

ORALI

CONCORSO GIOVANI RICERCATORI

O1

Impact of Thrombus Aspiration During Primary Percutaneous Coronary Intervention on Left Ventricular Two-Dimensional Strains: a Speckle Tracking Imaging Substudy of the EXPIRA trial

Alessandra Pecoraro (a), Gennaro Sardella (a), Simone Calcagno (a), Rocco Edoardo Stio (a), Luigi Lucisano (a), Filippo Placentino (a), Andrea Ceccacci (a), Mauro Pennacchi (a), Massimo Mancone (a), Francesco Fedele (a)

(a) *Departments of Cardiovascular Sciences, Umberto I Hospital, Sapienza University of Rome, Italy*

Background: In the EXPIRA trial, thrombectomy, preventing distal embolization, improves myocardial reperfusion, and reduces infarct size. In this substudy we evaluated the potential of Two-dimensional speckle tracking echocardiography (2D-STE) in assessing the efficacy of thrombectomy as compared to standard echocardiographic and cardiac magnetic resonance (CMR).

Methods: 2D-STE was performed in 60 patients divided into 2 groups (28 undergoing Export Manual thrombectomy (EM-PCI) and 32 standard PCI (S-PCI). Regional (wall motion score index) and global myocardial function were evaluated by using 2DSTE, global (GLS) and regional longitudinal myocardial strain in a 16-segment model were assessed. B-mode images from conventional chambers view were analyzed. CMR was performed at days 3 to 5 after primary PCI.

Results: Baseline clinical and angiographic characteristics before PCI were similar in the two groups. No significant differences in post-procedural 2D standard echocardiography and CMR data were found, except for microvascular obstruction (MVO), which was higher ($p=0.048$) in S-PCI subgroup. GLS was significantly higher in EM-PCI group than in S-PCI ($-18\pm 2\%$ vs. $-11\pm 1\%$, $p<0.001$). Segmental longitudinal myocardial strain (sLMS) in the infarct area was higher in EM-PCI than in S-PCI group ($-13\pm 7\%$ vs. $-9\pm 6\%$, respectively, $p=0.001$). GLS showed a linear correlation with infarct size ($R=0.5$; $p=0.03$) and with MVO ($R=0.6$; $p=0.001$). According with the MVO areas we observed a decrease of GLS in patients with MVO (-12 ± 0.2 vs. -14 ± 0.6 , $p=0.012$). Comparing the presence of delayed-enhancement (DE) with segmental sLMS values, sLMS was lower in the segments with DE respect to non-enhanced ones ($-10\pm 7\%$ vs. $-14\pm 7\%$ $p < 0.0001$).

Conclusion: EM-PCI patients had a more preserved microvascular integrity resulting in increased myocardial systolic deformation as assessed by 2D-STE. 2D strain analysis is more sensitive than traditional indices in detecting mechanical improvement induced from thrombectomy and is closely correlated with the extent of microvascular damage as assessed by CMR.

O2

La terapia guidata dai livelli dei peptidi natriuretici nello scompenso cardiaco cronico: una meta-analisi di 2686 pazienti e 12 trials randomizzati

Gianluigi Savarese (a), Maria Prastaro (a), Santo Dellegrottaglie (b), Francesco Gambardella (a), Bruno Trimarco (a), Pasquale Perrone Filardi (a)

(a) *Dipartimento di Scienze Biomediche Avanzate. Università degli Studi di Napoli "Federico II",*
(b) *Divisione di Cardiologia, Ospedale Medico-Chirurgico Accreditato Villa dei Fiori, Acerra, Napoli*

Background: Il ruolo dei peptidi natriuretici cardiaci nella gestione del paziente con scompenso cardiaco cronico è ancora incerto. Lo scopo di questo studio è valutare se la terapia guidata dai

SIC | *Indice Autori*

livelli dei peptidi natriuretici, paragonata alla terapia tradizionale, prolunga la sopravvivenza e riduce le ospedalizzazioni nei pazienti con scompenso cardiaco cronico.

Metodi: Sono stati ricercati tramite MEDLINE, Cochrane, ISI Web of Science e SCOPUS gli studi sull'utilizzo della terapia dello scompenso cardiaco cronico guidata dai livelli dei peptidi natriuretici. La meta-analisi è stata utilizzata per studiare l'effetto dei trattamenti sugli outcomes. La meta-regressione è stata utilizzata per studiare l'influenza di potenziali variabili confondenti sui nostri risultati. La presenza di publication bias è stata esaminata tramite il test di Macaskill modificato.

Risultati: Sono stati inclusi nell'analisi 12 studi che hanno arruolato 2686 soggetti. La terapia guidata dai livelli dei peptidi natriuretici [sia peptide natriuretico cerebrale (BNP) che segmento N-terminale del precursore del peptide natriuretico cerebrale (NT-proBNP)] ha ridotto significativamente il rischio di morte per tutte le cause (Odds Ratio [OR]:0.738; 95% Confidence Interval [CI]:0.596 a 0.913; $p=0.005$) ed il rischio di ospedalizzazione per scompenso cardiaco (OR:0.554; CI:0.399 a 0.769; $p=0.000$), ma non l'ospedalizzazione per tutte le cause (OR:0.803; CI:0.629 a 1.024; $p=0.077$). Quando valutate separatamente, la terapia guidata dai livelli di NT-proBNP ha ridotto significativamente il rischio di morte per tutte le cause (OR:0.717; CI:0.563 a 0.914; $p=0.007$) ed il rischio di ospedalizzazione per scompenso cardiaco (OR:0.531; CI:0.347 a 0.811; $p=0.003$), ma non il rischio di ospedalizzazione per tutte le cause (OR:0.779; CI:0.414 a 1.465; $p=0.438$), mentre la terapia guidata dai livelli di BNP non ha ridotto significativamente il rischio di morte per tutte le cause (OR:0.814; CI:0.518 a 1.279; $p=0.371$), il rischio di ospedalizzazione per scompenso cardiaco (OR:0.599; CI:0.303 a 1.187; $p=0.142$) o il rischio di ospedalizzazione per tutte le cause (OR:0.726; CI:0.609 a 0.964; $p=0.077$).

Conclusioni: Nei pazienti con scompenso cardiaco cronico, l'uso della terapia guidata dai livelli di peptidi natriuretici riduce significativamente la mortalità e l'ospedalizzazione per scompenso cardiaco. In particolare, la terapia guidata dai livelli di NT-proBNP ha ridotto la mortalità per tutte le cause e le ospedalizzazioni per scompenso cardiaco ma non quelle per tutte le cause, mentre la terapia guidata dai livelli di BNP non ha significativamente ridotto sia la mortalità che la morbidity.

O3

Glycosylated haemoglobin and the risk of contrast induced nephropathy in non-diabetic patients with impaired renal function undergoing coronary angiography or percutaneous intervention

Lucia Barbieri (a), Monica Verdoia (a), Alon Schaffer (a), Ettore Casseti (a), Gabriella Di Giovine (a), Paolo Marino (a), Giuseppe De Luca (a)

(a) *Division of Cardiology, Azienda Ospedaliera-Universitaria "Maggiore della Carità", Eastern Piedmont*

Background. Contrast Induced Nephropathy (CIN) is a common complication in patients undergoing coronary angiography or percutaneous interventions that seems to be mediated by endothelial dysfunction, cellular toxicity from the contrast agent and tubular apoptosis resulting from hypoxic damage or reactive oxygen species. It is known that diabetes is an independent risk factor for CIN, but we have no data regarding the association between CIN and glycemic levels in non-diabetic patients. Therefore, aim of our study was to evaluate whether high level of glycosylated haemoglobin in non diabetic patients is associated with an increased risk of CIN.

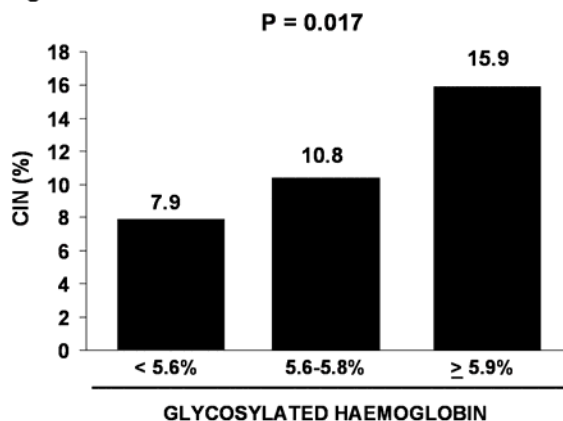
Methods. Our population is represented by 521 non diabetic patients, with impaired renal function (Creatinine clearance < 60) undergoing elective or urgent coronary angiography and/or angioplasty. Patients were divided according to tertiles of baseline glycosylated-haemoglobin (Group 1, <5.6%, $n=153$; Group 2, 5.6-5.8%, $n=154$; Group 3, $\geq 5.9\%$, $n=214$). CIN was defined as an absolute $\geq 0,5\text{mg/dl}$ or a relative $\geq 25\%$ increase in the serum creatinine level at 24 or 48h after the procedure.

Results. Patients with elevated glycosylated-haemoglobin levels had less often a previous stroke ($p=0.036$), had higher levels of white blood cells ($p=0.006$), higher tryglicerides ($p=0.022$), elevated fasting glycaemia ($p=0.009$) and glycaemia at admission ($p<0.001$), lower creatinine clearance

($p=0.04$) and higher levels of basal creatinine ($p<0.001$). In addition, they were more often on therapy with diuretics ($p=0.003$) and Calcium antagonist ($p=0.029$) at admission. CIN occurred in 62 patients (11,9%) with a significant linear association with glycosylated haemoglobin levels (7.9% in Group1 versus 10.8% in Group2 and 15.9% in Group3; $p=0.017$), but not with glycaemia at admission ($p=0.75$), or fasting glycaemia ($p=0.61$). The association between glycosylated haemoglobin and the occurrence of CIN was confirmed by multivariate analysis after correction for baseline confounding factors (Adjusted OR [95% CI]=1.52[1.05-2.19], $p=0.026$). By the use of ROC curve we identified 5.9% as the best cut-off value in the prediction of CIN.

Conclusions. This is the first study showing that among non-diabetic patients with impaired renal function undergoing coronary angiography or percutaneous interventions elevated glycosylated haemoglobin but not glucose levels is independently associated with the risk of CIN.

Figure 1



O4

Lost and Found: The Real Adult Cardiac Stem Cell

Iolanda Aquila (a), Carla Vicinanza (a), Mariangela Scalise (a), Christelle Correale (a), Fabiola Marino (a), Gianluigi Condorelli (c), Georgina M. Ellison (b, a), Bernardo Nadal-Ginard (b), Daniele Torella (a), Ciro Indolfi (a)

(a) *Molecular and Cellular Cardiology, Magna Graecia University, Catanzaro, Italy*, (b) *Stem Cell and Regenerative Biology Institute, King's College London, London*, (c) *Humanitas Clinical and Research Center and CNR, Rozzano-Milan, Italy*

Mammalian cardiac muscle ontogenic development depends on the progressive specification of cardiac progenitor cells dictated by their response to regulatory molecules known as cardiac morphogens. Among these, Wnt/ β -catenin and TGF- β /SMADs signalling pathways play critical roles in cardiac progenitor cell expansion and specification. The adult heart harbours resident and tissue specific endogenous cardiac stem progenitor cells (eCSCs), even though several phenotypically different cell populations with dissimilar regenerative potential have been described so far. Whether these cardiac progenitor cell populations are indeed developmentally distinct or are just different physiological intermediate states of a single true cardiac stem cell is yet to be established. Here we show that within the adult myocardium, c-kitpos eCSCs containing both primitive and more committed progenitors are identified and sorted as negative for the hematopoietic marker, CD45 and the mast cell marker, Tryptase. Freshly isolated c-kitpos eCSCs express at differential levels, CD90, PDGF α , CXCR4, Nestin, CD 105, CD146 and Flk-1, yet do not express Wilms Tumor-1 (Wt1). At clonal level from single cell derivation, c-kitpos eCSCs express the known pluripotency genes, Oct-4, Klf-4, Nanog and Sox-2. When grown in defined media these single cell derived Oct-4pos/c-kitpos eCSCs can differentiate into a variety of specific cell types corresponding to the derivatives of the three germ layers. More importantly, when a single-cell derived clone of YFP-tagged adult Oct-4pos/c-kitpos eCSCs was injected in the mouse blastocyst we were able to detect at post-natal day 2 and at 4 to 12 weeks CSC-derived YFPpos parenchymal cells in all tissues of the body. Also we show that the

canonical Wnt/ β -Catenin pathway is required for c-kitpos eCSC expansion, while through its antagonism c-kitpos eCSCs turn on the expression of multiple cardiomyogenic genes. Furthermore, TGF- β 1/Smad2 pathway activation drives c-kitpos eCSC cardiomyogenic differentiation. These growth factors are expressed by the adult myocardium in response to injury. A stage-specific TGF- β -Family/Wnt-Inhibitor cocktail fosters in vitro a progressive myogenic specification and maturation of c-kitpos eCSCs into functional spontaneously beating myocytes. microRNA analysis of these CSC-derived myocytes when compared to adult mouse cardiomyocytes revealed a clear transcriptome shift and cardiomyocyte lineage commitment from uncommitted c-kitpos eCSCs to mature cardiomyocytes. In particular, the c-kitpos eCSC-derived cardiomyocytes expressed the main cardiomyocyte transcription factors as well as sarcomeric contractile genes but still maintained the expression of cell cycle-related and high metabolic state genes typical of immature (neonatal) not yet terminally differentiated myocytes. Thus, adult c-kitpos eCSCs at single cell level express the known pluripotency genes and have a broad developmental plasticity potential in vitro and in vivo. These cells determine their fate using regulatory mechanisms similar to those of the embryonic heart. Thus, we believe that the Oct-4pos/c-kitpos eCSCs are the direct descendants of the mesoderm cardiac anlagen and represent the true cardiac stem cell.

O5

Persistent long-term apparent healing in a large cohort of patients with idiopathic dilated cardiomyopathy: prevalence and characterization

Marco Merlo (a), Davide Stolfo (a), Marco Anzini (a), Francesco Negri (a), Bruno Pinamonti (a), Giulia Barbati (a), Andrea Di Lenarda (b), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, "Ospedali Riuniti" and University of Trieste, Italy*, (b) *Cardiovascular Center, Azienda per i Servizi Sanitari n°1, Trieste, Italy*

Objective. To characterize the prevalence, clinical/laboratory features and prognostic significance of persistent long-term apparent healing in idiopathic dilated cardiomyopathy (IDCM). **Background.** The prevalence and characterization of persistent apparent healing during the long-term follow-up in large optimally treated IDCM populations are not known.

Methods. We analyzed 581 IDCM patients under optimal treatment. All patients have a potential follow-up of at least 8 years (mean follow-up: 180 ± 56 months). Apparent healing was defined as: left ventricular ejection fraction (LVEF) $\geq 50\%$ and indexed left ventricular end-diastolic diameter (LVEDDI) ≤ 33 mm/m² at mid-term follow-up (19 ± 4 months). Apparent healing was defined as persistent when the above-mentioned parameters were maintained at long-term (103 ± 9 months).

Results. At mid-term 86 (15%) IDCM patients were apparently healed and 38 (44%) among them showed a persistent apparent healing. At univariate analysis no baseline and mid-term parameters predicted persistent long-term apparent healing. In persistently apparently healed patients all main clinical/laboratory parameters reached the normalization at mid-term follow-up and thereafter maintained it; conversely, in non-persistently apparently healed patients the parameters progressive worsened after the 5th year of follow-up despite their normalization at mid-term. During the very-long-term follow-up persistently apparently healed patients showed a better heart transplant (HTx)-free survival ($p=0.014$) and fewer devices implantations with respect to non-persistently apparently healed patients.

Conclusions. In IDCM a persistent long-term apparent healing was evident in a remarkable proportion of patients and was associated with a stable normalization of main clinical/laboratory features and with an excellent very-long-term survival. No early features were able to predict persistent apparent healing.

O6

Ruolo della risonanza magnetica cardiaca nel sospetto di amiloidosi cardiaca: esperienza di un singolo centro

Stefano Nava (a), Patrizia Pedrotti (b), Giuseppina Quattrocchi (b), Angela Milazzo (b), Alberto Roghi (b)

(a) Università degli Studi di Milano Bicocca, (b) Unità di RM cardiaca - S.C. Cardiologia IV, Ospedale Niguarda Cà Granda - Milano

Background: La risonanza magnetica cardiaca (RMC) riveste un ruolo importante nel work-up diagnostico delle cardiomiopatie grazie alla capacità di caratterizzazione tissutale. L'amiloidosi cardiaca (AC) si associa ad una prognosi infausta e la diagnosi precoce può consentire un rapido inizio della terapia medica e l'eventuale accesso a programmi di trapianto cardiaco. Tuttavia la diagnosi di AC non è semplice sulla base dei comuni esami strumentali; la biopsia endomiocardica inoltre rimane una procedura invasiva e, in alcuni casi, poco sensibile. La RMC si è dimostrata una metodica sensibile e specifica nella diagnosi di AC grazie alla presenza di un pattern di late enhancement (LE) tipico (subendocardico circonferenziale a coinvolgimento biventricolare) e di un'alterata cinetica del mezzo di contrasto (mdc) caratterizzata da un rapido wash out. Sono tuttavia descritti casi di pattern di LE e di cinetica di wash out del mdc atipici.

Scopo: Valutare il pattern di late enhancement e la cinetica del mdc in pazienti riferiti ad un singolo centro per sospetta AC.

Metodi: Abbiamo valutato 44 pazienti consecutivi (età media 62.8 ± 1.4 anni, 31 uomini) afferenti al nostro centro dal 2007 per sospetta AC sulla base di dati clinici e strumentali. I pazienti sono stati sottoposti a RMC con mdc e.v. (gadobutrol, 1.5 mmoli/kg) con scanner da 1.5 Tesla (Siemens Avanto) e con protocollo dedicato che includeva valutazione morfo-funzionale e caratterizzazione tissutale con sequenze T1 e T2-pesate e late enhancement.

Risultati: In 2 pazienti l'esame è stato eseguito senza mdc per la presenza di insufficienza renale severa ($GFR < 30$ ml/min). 28 pazienti (66%) hanno mostrato un pattern tipico di LE (23 con cinetica tipica del mdc). In 13 casi la diagnosi di AC è stata confermata anche dall'esame istologico/genetico. 10 pazienti (24%) presentavano un pattern atipico di LE. Fra questi, 2 compatibili con malattia di Fabry e 2 con miocardite acuta diffusa. 1 paziente affetto da mieloma presentava un pattern di LE da sovraccarico VD in nota ipertensione polmonare primitiva. Sulla base dell'indagine istologica/genetica, 4 casi si sono rivelati AC ed 1 una cardiomiopatia restrittiva di ndd. 4 pazienti non presentavano LE, fra questi: 3 pazienti erano affetti da mieloma, ad 1 paziente è stata diagnosticata una pericardite costrittiva. Nel sottogruppo dei pazienti affetti da malattie ematologiche (7 casi di mieloma, 2 di plasmocitoma), 6 hanno mostrato LE positivo (5 tipico e 1 atipico); la diagnosi di AC è stata successivamente confermata dall'analisi istologica.

Conclusioni: Nella nostra esperienza, la RMC si è dimostrata un potente strumento diagnostico nel sospetto di AC grazie all'identificazione del pattern di LE tipico. Anche fra i pazienti che mostravano un pattern di LE atipico, il 40% si è dimostrato affetto da AC. La RMC si è rivelata inoltre un buon mezzo per l'identificazione dell'AC nei pazienti affetti da patologie ematologiche, suggerendo un più ampio impiego per la diagnosi precoce dell'AC in questo gruppo selezionato di pazienti. La RMC ha consentito inoltre l'identificazione di altre cause rilevanti di patologia cardiaca nei casi in cui è stata esclusa l'amiloidosi cardiaca.

O7

miR-23b Prevents TNF-induced Vascular Smooth Muscle Cell Proliferation And Migration By Targeting FOXO4

Alberto Polimeni (a), Claudio Iaconetti (a), Sabato Sorrentino (a), Jolanda Sabatino (a), Clarice Gareri (a), Annarita Carino (a), Francesco Passafaro (a), Caterina Covello (a), Maria Colangelo (a), Filomena Caria (a), Alessandra Carvelli (a), Andrea Tavernese (a), Antonio Curcio (a), Salvatore De Rosa (a), Daniele Torella (a), Ciro Indolfi (a)

(a) *Laboratorio di Cardiologia Molecolare e Cellulare, Università Magna Graecia di Catanzaro*

Background: Phenotypic switch of vascular smooth muscle cells (VSMCs) represent a key event in the pathogenesis of several cardiovascular diseases, including atherosclerosis and vascular response to injury. Several miRNAs have been recently implicated in VSMCs differentiation and phenotypic switch. MiR-23b is involved in cell cycle control, proliferation and differentiation of various cell types, but its role in vascular remodelling is currently unknown. Thus, the aim of the present study was to evaluate the role of miR-23b on VSMCs proliferation *in vitro* and after vascular injury *in vivo*.

Methods and Results: We found high expression levels of miR-23b in VSMCs *in vitro* and *in vivo*, as assessed by real-time RT-PCR. On a well-validated rat carotid balloon injury model, we demonstrated for the first time a consistent down-regulation of miR-23b at 3 and 7 days after vascular injury. Using both gain-of-function and loss-of-function approaches, we found that miR-23b regulate multiple aspects of vascular smooth muscle cell phenotype and alter TNF- α pathway signalling. In fact, TNF- α induced miR-23b down-regulation in a dose- and time-dependent fashion. Moreover, we found that over-expression of miR-23b prevented TNF- α -induced proliferation and migration of VSMCs, using EDU incorporation and cell migration assays. A bioinformatics approach revealed a highly conserved binding site for miR-23b in the 3' UTR of FOXO4. Interestingly, silencing of miR-23b in VSMCs increased FOXO4 expression, whereas its overexpression had the opposite effect. FOXO4 is known to inhibit the activation of Myocardin, a key regulator of VSMCs' differentiation. Accordingly, overexpression of miR-23b prevents the down-regulation of VSMCs differentiation markers in response to several stimuli.

Conclusions: The present study demonstrates for the first time that miR-23b inhibits TNF α -induced VSMCs proliferation and migration through downregulation of FOXO4. These findings suggest that overexpression of miR-23b may be exploited as a novel strategy to prevent restenosis after vascular injury.

O8

Myocardial scar characterization predicts device therapy in cardiac resynchronization therapy patients. A three years follow-up

Laura Cipolletta (a), Antonio Berruezo (b), Reinder Evertz (b), Diego Penela (b), Juan Fernández-Armenta (b), David Andreu (b), José María Tolosana (b), Elena Arbelo (b), Jose Tomás Ortiz (b), Marta Sitges (b), Lluís Mont (b), Josep Brugada (b)

(a) *Clinica di Cardiologia, Università Politenica delle Marche, Ancona*, (b) *Arrhythmia Section, Cardiology Department, Thorax Institute, Hospital Clinic, Universitat de Barcelo*

Introduction:

Survival benefit of cardiac resynchronization therapy with a backup defibrillator (CRT-D) over CRT alone is not clearly proven and both strategies have a class I indication in heart failure (HF) patients. No clear variables to select the appropriate therapy are available. We hypothesized that myocardial scar characterization can predict long term ventricular arrhythmias (VA) in these patients.

Methods:

97 HF patients (age 63 ± 12 y, NYHA class 2.7 ± 0.7 and EF $25 \pm 8\%$), undergoing CRT-D implantation, were prospectively enrolled. DE-MRI was performed before device implantation and analyzed with customized post processing software. Total scar area, core area and border zone of myocardial scar were measured. The relationship between scar characteristics and the incidence of appropriate ICD therapy was analyzed.

Results:

During a mean follow-up of 36 ± 24 months, appropriate ICD therapy occurred in 16 patients (17%). ROC analysis showed that a scar mass area $< 12,4$ g and a border zone mass < 7.1 g had a negative predictive value of 96 and 97% respectively (figure 1). A scar area with a greater percentage of border zone (heterogeneous scars) was associated with a higher risk of VA (figure 2).

Conclusion:

Scar mass percentage and border zone mass are independent predictors of long-term appropriate ICD therapy in CRT candidates. Scar heterogeneity is associated with a higher arrhythmia risk. This information could be used to discriminate those patients who will benefit from a backup defibrillator.

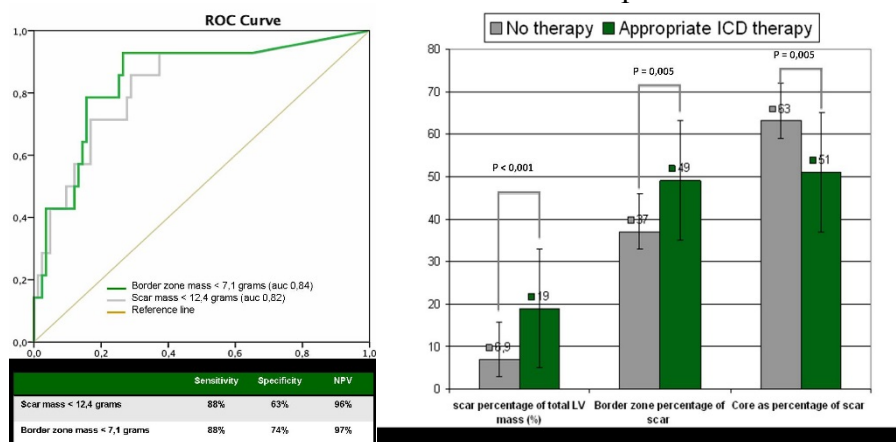


Figure 1: ROC curve of scar mass and border zone mass for appropriate ICD therapy. Figure 2: Patients with ICD therapy had a more heterogeneous scar (larger border zone).

O9

Three-dimensional (3D) and Speckle Tracking echocardiography assessment of right heart in young people: atrial and ventricular volumes and deformation properties study

Roberta Ancona (a), Salvatore Comenale Pinto (a), Pio Caso (a), Fortunato Arenga (a), Maria Gabriella Coppola (a), Raffaele Calabrò (a)

(a) *Non invasive Cardiology, Chair of Cardiology, Department of Cardiology, Second University of Naples*

Background: RV (right ventricle) plays an important role in determining cardiac symptoms in several diseases and RA (right atrium) is a quantitative marker of RV dysfunction severity. Real-time 3D echocardiography (3DE) enables accurate ventricle and atrial volume measurement. Speckle Tracking is a sensitive tool to quantitatively assess regional deformation properties. **Purpose:** to obtain normal reference ranges for RA volumes, RA EF, by 3D (both software Auto LVQ GE Healthcare and TomTec 4D), RV volumes, RV EF, by 3DE (TomTec) and RA and RV deformation properties by Speckle Tracking and intra and inter-observer reproducibility. **Methods:** 70 subjects, 38 males and 32 females, aged 25 ± 7 yrs, without any cardiovascular disease, were included. By E9GE we measured RA (maximum and minimum) both by biplane method and by 3D and 4D methods, and RV volumes (in apical 4-chamber, short-axis, and coronal views) by tracing endocardial borders at ventricular end-systole and end-diastole. Volumes were indexed for body surface. By Speckle tracking we measured 2D longitudinal systolic RA and RV Strain (S) and Strain rate (SR) in apical 4-chambers view, at level of RA and RV free wall (basal, medium and apical segments).

Results: We have reported, in young people, references range of RA and RV volumes: 2DRA maximum $32,35 \pm 8,2$ ml, indexed $18,27 \pm 4,14$ ml/mq, minimum $15,46 \pm 4,12$ ml, indexed $8,7 \pm 1,9$ ml/mq; 4DRA maximum $43,09 \pm 11,21$ ml; indexed $24,25 \pm 5,25$ ml/mq; minimum $22,32 \pm 6,14$ ml; indexed $12,54 \pm 2,86$ ml/mq; 3D TomTec $41,68 \pm 12,22$ ml, indexed $23,35 \pm 5,69$ ml/mq; minimum $23,3 \pm 7,9$ ml, indexed $13,08 \pm 3,7$ ml/mq; 3D RV end-diastolic: 33 ± 11 ml/mq; end-systolic volume: 16 ± 6 ml/mq; and RA and RV ejection fraction: 2D RAEF $52 \pm 7,5\%$; 4D RAEF $47,8 \pm 7,35\%$; 3D RAEF $44,36 \pm 7,63\%$; 3D RVEF $67 \pm 8\%$. We found a gradient between different segments for RA S (basal $>80\%$, medium $62,51 \pm 9,66\%$, apical $26,54 \pm 3,56\%$); RA SR (basal $5,1 \pm 0,71$ S-1; medium $3,33 \pm 0,61$ S-1; apical $2,1 \pm 0,26$ S-1); RV S (apical $-24,59 \pm 4,8\%$; medium $-29,69 \pm 4,78\%$; basal $-30,1 \pm 5,88\%$); RV SR (apical $-1,44 \pm 0,25$ S-1, medium: $-1,78 \pm 0,37$ S-1, basal: $-2 \pm 0,4$ S-1). For RA volumes we found significant differences only between 2DE and 3DE methods ($p < 0,0001$) and not between the two 3D methods ($p = 0,6$). Inter and intraobserver variability coefficients were 7% and 4% for 3D volumes and 8% and 4% for S-SR measurements, respectively. **Conclusions:** The present study provides normal reference values for RA and RV volumes and EF by 3DE and normal longitudinal RA and RV deformation values in young people. 3DE overcomes the limitations of 2DE to assess the complex anatomy of the RV and 2DE underestimation of RA volumes.

O10

Induction of tissue factor Expression in T lymphocytes: a contribution to thrombosis?

Giovanni Ciccarelli (a), Giovanni Cimmino (a), Giusi Barra (d), Stefano Conte (a), Grazia Pellegrino (c), Vittorio Tagliatela (c), Giuseppe Uccello (c), Plinio Cirillo (c), Raffaele De Palma (d), Francesco Pacifico (e), Paolo Golino (a, b)

(a) Dipartimento di Scienze Cardio-Toraciche e Respiratorie, Seconda Università di Napoli, (b) UOC di Cardiologia Clinica di Direzione Universitaria, AORN San Sebastiano e Sant'Anna, Caserta, (c) Dipartimento di Scienza Biomediche Avanzate, Università degli Studi di Napoli "Federico II", (d) Dipartimento Medico-Chirurgico di Internistica Clinica e Sperimentale "F. Magrassi - A. Lanzara", Se, (e) Istituto di Oncologia Sperimentale ed Endocrinologia, Università degli Studi di Napoli "Federico II"

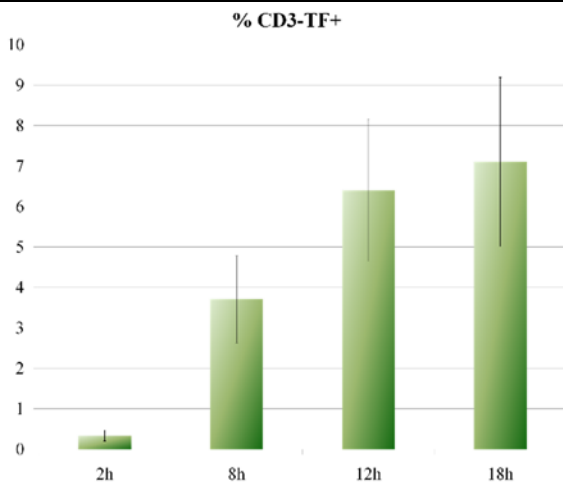
Background: Recent data suggest that inflammation and immune-mediated mechanisms contribute not only to the genesis of the atherosclerotic plaque, but also to its complication, which represents a key event in the pathophysiology of acute coronary syndromes (ACS). Plaque rupture involves exposure of Tissue Factor (TF) with consequent activation of the coagulation cascade that culminates in the formation of intravascular thrombus. Infiltration of immune-competent cells in the atherosclerotic lesion may induce release of inflammatory cytokines and other soluble factors that can stimulate the expression of TF in the various cellular components of the plaque itself, such as endothelial cells, macrophages, muscle cells. Activation of T cells has recently been proposed as an important mechanism in the pathophysiology of ACS. It has been demonstrated by our group that only unstable plaques taken from patients with ACS are characterized by a selective oligoclonal expansion of T lymphocytes, indicating that a specific recruitment, probably mediated antigen, is unleashed within the lesions unstable. At present, however, is not known whether the T lymphocytes may contribute directly to thrombosis by expressing TF.

Methods: CD3-positive cells were isolated from buffy coat of healthy volunteers and stimulated with PMA/ionomycin. The expression of TF was assessed at 2, 8, 12 and 18 hours after stimulation by FACS to assess the surface expression of TF and at 2, 8 and 12 hours for gene expression

Results: PMA/ionomycin induced increased expression of TF gene expression in T cells up to 50 times the baseline value, with a peak at 8 hours with a maximum increase on the cell surface of about 7% between 12 and 18 hours after stimulation

Conclusions: Our data suggest for the first time a pathophysiological role of T lymphocytes in the thrombotic process by the expression of TF, thus adding a new piece to the complex puzzle of thrombosis in ACS.

SIC | *Indice Autori*



CUORE E RENE 1

O11

Comparison between isolated ultrafiltration and intravenous diuretics for treating the acutely decompensated heart failure: a systematic review with metaanalysis.

Renato De Vecchis (a), Armando Pucciarelli (a), Carmelina Ariano (a), Adelaide Fusco (a), Claudia Esposito (b), Anna Giasi (a), Carmela Cioppa (a), Salvatore Cantatrione (a)

(a) Cardiology Unit, Presidio Sanitario Intermedio "Elena d'Aosta", Napoli, Italy, (b) Institute of Hygiene and Preventive Medicine, Second University of Napoli, Napoli, Italy

Purpose Intravenous diuretics (ivDiur) are usually employed for acutely decompensated heart failure (ADHF), but they have adverse effects, including electrolyte imbalance, hypotension, activation of neurohormones and iatrogenic increase in serum creatinine. Isolated ultrafiltration (IUF) is an alternative method to remove sodium and water. We made a systematic review with meta-analysis to compare IUF and ivDiur in the ADHF setting.

Methods Studies were searched for across the Pubmed and Ovid databases (January 1990- January 2013). Only randomized controlled trials (RCTs) comparing IUF vs. ivDiur in ADHF were considered. Efficacy and safety outcomes were extracted and a meta-analysis was subsequently made.

Results Six studies involving 477 participants were included in the qualitative analysis. However the meta-analysis was limited to three studies, due to marked dissimilarity between efficacy end-points in the between-study comparison. IUF was superior to ivDiur for 48-h fluid removal [weighted mean difference (WMD) = 1.20 liters, 95% CI: 0.73-1.67 liters $p < 0.001$] and 48-h weight loss (WMD = 1.77 kg, 95% CI: 1.18 - 2.36 kg $p < 0.001$). The proportion of patients with meaningful (> 0.3 mg/dl) rise in serum creatinine at 48 hours was similar in IUF and ivDiur groups (OR = 1.33, 95% CI: 0.81 - 2.16 $p = 0.26$).

Conclusions Greater fluid and weight losses were detected with IUF compared to ivDiur, whereas no significant differences emerged for the rise in serum creatinine. However, these conclusions arise from a small number of studies involving few patients. Further comparisons between RCTs with larger sample sizes are needed in the future.

O12

Studio dei valori di peptide natriuretico di tipo B nei pazienti affetti da interstiziopatia polmonare: correlazione con le pressioni polmonari e la funzione ventricolare destra

Gaetano Ruocco (a), Matteo Beltrami (a), Marco Pellegrini (a), Rosa Metella Refini (b), Paola Rottoli (b), Barbara Lucani (a), Beatrice Franci (a), Ranuccio Nuti (a), Alberto Palazzuoli (a)

(a) UOS Malattie Cardiovascolari Dipartimento Di Medicina Interna Ospedale le Scotte Università di Siena, (b) UO Malattie Respiratorie Ospedale le Scotte Università di Siena

Background: Il Peptide Natriuretico tipo B (BNP) è prodotto prevalentemente dal ventricolo sx in risposta al sovraccarico emodinamico, pressorio e allo stress parietale. Non è noto invece quale sia la relazione con la presenza di disfunzione e sovraccarico ventricolare destro nei pazienti affetti da malattie polmonari. A tale scopo abbiamo valutato i livelli del BNP in relazione all'aumento delle pressioni polmonari e alla disfunzione del ventricolo destro nei pazienti affetti da interstiziopatia polmonare con funzione ventricolare sinistra conservata (FE>50%).

Materiali e Metodi: Sono stati selezionati consecutivamente 113 pazienti con diagnosi clinico-strumentale di interstiziopatia polmonare; a tutti i pazienti arruolati, è stato misurato il BNP entro 24 ore dall'esecuzione dell'esame ecocardiografico. In tutti i soggetti sono stati misurati i seguenti parametri eco: la Pressione Arteriosa Polmonare (PAPs), la PAP media, il Diametro Tele-Diastolico del Ventricolo Destro (DTD dx), l'area dell'Atrio destro, il calibro della Vena Cava Inferiore (VCI), la funzione longitudinale del Ventricolo destro (TAPSE), e la Frazione di Eiezione (FE) del Ventricolo sinistro.

Risultati: Dai 113 pazienti selezionati, sono stati esclusi 24 pazienti in quanto presentavano disfunzione ventricolare sx (FE <50%); nei rimanenti 89 pazienti. Il valore medio del BNP nella popolazione era di 60 pg/mL (IC 95% 34-87; p<0,001). I parametri ecocardiografici dei pazienti considerati, venivano messi in correlazione con i livelli ematici di BNP attraverso metodica non parametrica (coefficiente rho di Spearman). Nei pazienti con pressione polmonare sistolica elevata (PAPs >40 mmhg) i valori di BNP sono risultati significativamente più elevati rispetto ai soggetti con valori di PAPs inferiore (157±196 vs 16±17 pg/ml p=0,004). Allo stesso modo i pazienti con PAP media >15 mmhg mostravano valori del peptide natriuretico significativamente aumentati (124±188 vs 23±28 pg/ml p<0,001). Il BNP risultava inoltre significativamente aumentato nei pazienti con TAPSE <20 mm (145±204 vs 26±41 pg/ml p<0,001) e con dilatazione del ventricolo dx (>38 mm) (175±219 vs 27±33 pg/ml p<0,001). In linea con tali dati è stata evidenziata una correlazione positiva significativa tra BNP ed i seguenti parametri: DTD (r=0,56; p<0,001), Area Atrio Destro (r= 0,45; p=0,005), PAPs (r=0,55; p<0,001), PAP media (r= 0,82; p<0,001) e calibro VCI (r=0,37; p<0,001). Una relazione inversa è stata invece dimostrata tra BNP e TAPSE (r=-0,57; p<0,001).

Conclusioni: In una popolazione di pazienti affetti da malattia interstiziale polmonare il dosaggio di BNP appare in grado di riconoscere i pazienti con pressioni polmonari elevate e con disfunzione ventricolare destra.

O13

L'uso combinato del dosaggio di BNP con gli indici ecocardiografici nello scompenso cardiaco acuto predice i soggetti con disfunzione sisto-diastolica più marcata

Alberto Palazzuoli (a), Riccardo Marzotti (a), Gaetano Ruocco (a), Maurizio Losito (b), Benedetta Natali (b), Marco Pellegrini (a), Ranuccio Nuti (a)

(a) UOS Malattie Cardiovascolari Dipartimento Di Medicina Interna, Ospedale le Scotte Università, (b) Scuola di Specializzazione di Cardiologia, Università di Siena

Background: Numerosi studi hanno dimostrato l'utilità del dosaggio di BNP nei pazienti con dispnea acuta al fine di identificare precocemente i pazienti con scompenso cardiaco. Tuttavia l'uso combinato dell'ecocardiografia associato alla misurazione del peptide natriuretico è stato scarsamente riportato a causa della scarsa fruibilità dell'imaging nei dipartimenti di emergenza: Lo scopo di questo studio è stato la valutazione della accuratezza del Peptide Natriuretico di tipo B (BNP), in aggiunta all'ecocardiografia doppler eseguiti entro le prime 24 ore dall'ingresso in ospedale ai fini di ottenere una informazione diagnostica più accurata nei pazienti con scompenso cardiaco acuto.

Materiali e Metodi: Dal gennaio 2011 al gennaio 2013 sono stati selezionati 303 pazienti con una diagnosi di scompenso cardiaco acuto. I pazienti arruolati entro 24 ore dal ricovero effettuavano il dosaggio del BNP e venivano sottoposti ad ecocardiografia doppler al fine di stimarne: la Frazione di Eiezione (FE), i diametri e i volumi del ventricolo sinistro (DTD, DTS, VTD, VTS), il pattern diastolico (E, A, rapporto E/A, rapporto E/e', DT, IVRT), SIV, PP e la valutazione della pressione arteriosa polmonare (PAPs). Successivamente i pazienti sono stati matchati in 4 sottogruppi a seconda della funzione sistolica del ventricolo sx (FE <50% e FE >50%;) e in base al pattern diastolico di riempimento ventricolare E/e' < 15; E/A < 1.

Risultati: Nel sottogruppo dei pazienti con disfunzione sistolica (n=165 FE < 50%) abbiamo riscontrato un significativo aumento del BNP rispetto ai pazienti con funzione sistolica conservata (n= 138 FE >50%) [1057 + 927 vs 751 + 800 pg/mL; p=0,01]; L'analisi della curva di ROC ha evidenziato che il cut-off di BNP > 809 pg/ml discriminava significativamente i pazienti con disfunzione sistolica (FE < 50%) con un AUC di 0,62 (IC 95% 0,54-0,70; p=0,002). Nei pazienti con rapporto E/e' > 15 abbiamo riscontrato un significativo aumento del BNP rispetto ai pazienti con rapporto E/e' < 15 (1219 + 754 vs 485 + 310 pg/mL; p<0,001); L'analisi della curva di ROC mostrava che un cut-off di BNP > 566 p/ml discriminava significativamente i pazienti con pattern restrittivo con un AUC di 0,84 (IC 95% 0,79-0,91; p<0,001). Nei pazienti con rapporto E/A > 1 abbiamo riscontrato un significativo aumento del BNP rispetto ai pazienti con rapporto E/A < 1 (1207 + 856 vs 625 + 451 pg/mL; p<0,001); L'analisi della curva di ROC mostrava che il BNP > 579 pg/ml discriminava significativamente i pazienti con rapporto E/A > 1 con un AUC di 0,72 (IC 95% 0,63-0,81; p<0,001). L'analisi delle correlazioni tra i vari parametri di rimodellamento e disfunzione ventricolare sx e il BNP in tutta la popolazione ha mostrato una correlazione significativa con : VTD r=0,20 p=0,01 VTS r=0,23 p=0,003 FE r=-0,25 p>0,001. Nessuna correlazione è stata riscontrata con i diametri e gli spessori del ventricolo sinistro. L'analisi delle correlazioni con il pattern di riempimento diastolico ha evidenziato: E r=0,24 p=0,002 DT r=-0,35 p>0,001 IVRT r=-0,53 P<0,001 E/e' r= 0,70 p<0,001. Infine una correlazione positiva è stata riscontrata tra BNP e pressione polmonare (r=0,26 p<0,001).

Conclusioni: L'aggiunta del BNP alle misurazioni ecocardiografiche routinarie identifica i pazienti con un grado più elevato di disfunzione e rimodellamento ventricolare sinistro. Tuttavia in una popolazione con scompenso cardiaco acuto a funzione sistolica preservata e ridotta, il fattore maggiormente correlato alla elevazione del BNP sembra essere l'aumento della pressione di riempimento come dimostrato dalla stretta correlazione tra il peptide ed un pattern di tipo restrittivo.

O14

Predicting response to cardiac resynchronization therapy by radial prediction index

Sandra D'Addario (a), Erberto Carluccio (a), Paolo Biagioli (a), Gianluca Zingarini (b), Fabiana De Martino (a), Giuseppe Ciliberti (a), Rosanna Lauciello (a), Gianfranco Alunni (a), Adriano Murrone (a), Giuseppe Ambrosio (a)

(a) *Università e Azienda Ospedaliera di Perugia - Cardiologia e Fisiopatologia Cardiovascolare,*
(b) *SC Cardiologia*

Background: Speckle tracking echocardiography (STE) has the potential to assess mechanical dyssynchrony, and to evaluate viability of the latest activated segment (LAS) by measuring its peak radial strain. The aim of this study was to assess the predictive value of a simple resynchronization response prediction index (RRPI), based on the combination of radial dyssynchrony, contractility of LAS, and concordance between LV lead position and LAS.

Methods and Results: Two-dimensional speckle tracking echocardiography was performed in 100 heart failure (HF) patients before undergoing CRT, to assess LV radial dyssynchrony (anteroseptal to posterior wall delay >130 msec), and residual myocardial viability (>16% peak radial strain) of the LAS. Concordance between LV lead position (by chest x-ray) and LAS was subsequently evaluated. The RRPI was obtained by multiplying radial dyssynchrony by peak radial strain of the LAS and then adding 1 in the presence of concordance. Two end-points were considered: 1) >15% reduction in LV end-systolic volume index at 6 months, and 2) combined all-cause mortality and hospitalizations for HF in long-term follow-up.

Fifty-three patients were classified as echo responders. RRPI was significantly greater in responders than in non-responders (57.9 ± 57 vs 16.8 ± 16 , $p < 0.0001$). After correction for other clinical and echocardiographic predictors, logistic regression analysis revealed that RRPI was independently associated with the likelihood of response to CRT ($P < 0.0001$). A cutoff value of RRPI >26.5 predicted responders with 68% sensitivity and 81% specificity. After a mean follow-up of 19 ± 15 months there were 35 combined events. Cox proportional regression analysis showed that RRPI was an independent predictor of worse outcome (log-rank test 10.6, $P < 0.01$).

Conclusions: The resynchronization response prediction index by radial strain exhibited a good ability to predict CRT response. The value of this novel echocardiographic index requires further assessment in larger studies.

O15

BNP and asymptomatic left ventricular dysfunction in obesity and chronic renal insufficiency: need of a diversified cut-off value.

Renato De Vecchis (a), Carmelina Ariano (a), Armando Pucciarelli (a), Anna Giasi (a), Carmela Cioppa (a), Salvatore Cantatrione (a)

(a) *Cardiology Unit, Presidio Sanitario Intermedio "Elena d'Aosta", Napoli (Italy)*

Background. The assessment of serum natriuretic peptides has been validated as a highly sensitive and accurate method for the detection of asymptomatic left ventricular dysfunction (ALVD), that is diastolic in the majority of cases.

Aims. In the present retrospective study we searched for possible differences concerning the optimal cut-off for the natriuretic peptide-based diagnosis of ALVD depending on different basal clinical and anthropometric features.

Methods. A retrospective cohort study was carried out by enrolling patients with history of one or more ambulatory visit, who had undergone one BNP determination and one echocardiographic assessment at least. The echocardiographic criteria for diagnosis of mild (i), moderate (ii) or severe (iii) ALVD included the diastolic filling patterns known as "impaired relaxation" (i), "pseudonormal" (ii), and "restrictive" (iii) as well as the ratio of E flow velocity divided by early (E') LV basal

longitudinal myocardial lengthening velocity (E/E' ratio) > 8. BNP values of the patients who had received the echocardiographic diagnosis of left ventricular dysfunction were compared with those of patients for whom this diagnosis had been ruled out. Furthermore, Receiver Operating Characteristic (ROC) curves were built to identify the serum BNP level provided with the best predictive accuracy for detection of ALVD.

Results. 88 patients on the whole were included in the retrospective study. Among them, 42 (47.7%) were found to be affected by ASVD, while 46 were classified as healthy subjects or patients with cardiovascular disease not entailing left ventricular dysfunction. The mean serum BNP level detected in ASVD patients was significantly higher than the one found in the ASVD – free subjects (273 ± 89 vs. 170 ± 76 pg / ml, $p < 0.0001$). At the ROC analysis, a BNP level of 220 pg/ml was identified as the best compromise between sensitivity and specificity (sensitivity = 78.6 %; specificity = 73.9%; positive likelihood ratio = 3.01; negative likelihood ratio = 0.29). Alternatively, for screening purpose among asymptomatic subjects deemed at high risk of heart failure, a cut off of 156 pg/ml could also be considered in order to maximize the sensitivity in the presence of fair specificity (sensitivity = 85.7 % ; specificity = 47.8 % ; positive likelihood ratio = 1.64; negative likelihood ratio = 0.30). Besides, in obese patients the ROC curve displayed a significantly lower cut-off of 80 pg / ml, with a sensitivity of 100% and a specificity of 33%. On the contrary, in patients with chronic renal insufficiency, the ROC analysis identified the level of 290 pg / ml as the best discriminating value for detecting ALVD

Conclusions. Body mass index and functional renal status are able to modify the BNP reference range for ALVD detection. Thus, on the basis of our study, in obese patients lower cut-off values for serum BNP should be used. In contrast, in order to maintain optimal diagnostic performance, the cut point for detecting ASVD may need to be raised when eGFR is less than 60 ml/min.

O16

Prognostic role of kidney arterio-venous oxygen difference in acute heart failure

Aurora Ilaria Danza (a), Federica D'Amato (a), Benedetta Nusca (a), Temistocle Taccheri (a), Gianmarco Schiaffini (a), Pasqualina Bruno (a), Veronica Moriconi (a), Maria Lembo (a), Roberta Carnesale (a), Alberto Foà (a), Massimo Mancone (a), Rocco Edoardo Stio (a), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari

Background: Cardiorenal syndrome is a clinical condition well known as a major cause of worsening in patients with acute heart failure (AHF). There are not hemodynamic parameters able to stratify renal impairment. In particular the kidney oxygen extraction (KOE) is really low in basal conditions. However, KOE may increase in AHF patients as compensation mechanism. The aim of our study is to assess the kidney arterio-venous oxygen difference (KAVD) as a new predictor of heart failure severity.

Materials and Methods: In our observational and prospective study, we enrolled 17 patients hospitalized with AHF (study group SG). A control group of 13 patients with an indication to cardiac catheterization (effort angina and positive stress test, mild pulmonary hypertension and others). We excluded patients with: chronic renal failure in dialysis treatment, significant renal artery stenosis, severe pulmonary hypertension and arterio-venous fistulas. All patients underwent to a complete right and left cardiac catheterization. To achieve KAVD, blood samples from renal artery and vein were analyzed in all pts. We collected clinical data and hemodynamic parameters as cardiac output (CO), cardiac index (CI), and KAVD. On the basis of CI, patients were divided into two groups: study group (SG: $CI < 2,2$ l/min/m²) and control group (CG: $CI > 2,2$ l/min/m²). For statistical analysis, we used t test to compare AVD means of two groups. AVD in the CG was used as normal reference value.

Results: We identified 17 patients in the SG (age $67 \pm 15,5$; male 70%) and 14 in the CG. In CG patients had an ejection fraction (EF) > 45% and AVD was $3 \pm 1,6$ ml/dl. This value was used as a

SIC | *Indice Autori*

cut-off in the SG identifying two different subgroups, group A (n=8) with KAVD $2,64 \pm 1,6$ ml/dl similar to the CG (p=0,25) and group B (n=6) with high KAVD ($6,98 \pm 3,49$ ml/dl) with statistically significant difference (p= 0,0042). Patients in both group B and A have not statistically significant difference in EF, NYHA class, creatinine clearance and similar with intraortic balloon pump positioning. Group B showed a longer hospitalization.

Conclusions: Our study analyzed for the first time the KAVD changes in AHF patients and identify a normal cut-off value KAVD. Our preliminary results suggest that pts with an higher KAVD are at higher risk, as showed by longer hospitalization. The major limitations of this study, is the small sample of the studied population. Therefore, Future studies will evaluate if this cut-off value is useful to identify AHF patients with a severe renal impairment and if this value correlate with clinical end-points.

FIBRILLAZIONE ATRIALE NELL'IPERTROFIA VENTRICOLARE SINISTRA E TRAPIANTO DI CUORE

O17

Physiopathology of atrial fibrillation in heart transplant patients: 25 years of experience in heart transplants

Loira Leoni (a), Immacolata Giuliani (a), Giuseppe Feltrin (b), Antonio Gambino (b), Giuseppe Toscano (b), Tomaso Bottio (b), Luca Brugnaro (a), Sabino Iliceto (a), Gino Gerosa (b)

(a) *Clinica Cardiologica di Padova-Università degli Studi di Padova*, (b) *Clinica Cardiochirurgica di Padova-Università degli Studi di Padova*

Background: Atrial fibrillation is the most common supraventricular arrhythmia in heart transplant patients. The physiopathology isn't yet fully understood, since in the normal heart the etiology of AF, particularly of paroxysmal fibrillation, lies in ectopic foci by the ostia of the Pulmonary Veins and/or the Superior Cava Vein.

In transplanted hearts there is a surgical isolation of these ectopic foci and we would expect a lower incidence of this arrhythmia.

Aim of the study: The aim of our study was to analyze the physiopathology of atrial fibrillation in transplanted hearts, identifying incidence, risk factors and survival of affected patients.

Materials and methods: We retrospectively analyzed 300 patients with a 25 year follow up. We considered two groups of 150 patients, subgrouped according to the surgical technique used for the transplantation. We performed a detailed serial analysis of electrocardiograms, echocardiograms, endomyocardial biopsies and of the clinical and therapeutic follow-up for each patient.

Results: 23% of the patients in our study (70 out of 300) developed at least one episode of paroxysmal atrial fibrillation, none of them permanently. Of these 70 patients, 55 developed AF within 1 year and the remaining 15 after 1 year.

We find that AF is more frequent in patients transplanted with biatrial technique but without statistically significant correlations.

Of the 70 patients with AF, 59% (41 of 70) had a documented episode of rejection and between these 41 patients, 21 had a rejection grade > 2 .

The survival of patients with AF was lower than that of patients with sinus rhythm (3662 days vs 4755 days, p = 0.017). Among the patients who developed FA, the survival was lower in patients who developed FA within 1 year instead of those who developed after 1 year (p=0,031).

We also noticed that the rejection score was higher in patients who developed AF instead of that in SR.

Conclusions: In our group, no patient developed permanent AF. The patients experiencing atrial fibrillation in the postoperative period of cardiac transplantation have a shorter life expectancy than that of patients who remain in sinus rhythm.

Also the patients who developed AF within 1 year have a shorter life expectancy than those who developed after that, probably because of a major relationship with acute cellular rejection. We think that Atrial Fibrillation could be associated with rejection and that the detection of this arrhythmia affects patient outcome.

O18

HDACs are responsible for epigenetic regulation of connexin 43 in human atrial fibrillation

Rita Bellomusto (a), Antonio Curcio (a), Giuseppe Santarpia (a), Maria Luposella (a), Giuseppe Musolino (b), Giuseppe Ambrosio (a), Clarice Gareri (a), Annarita Carino (a), Salvatore De Rosa (a), Pasquale Mastroberto (b), Daniele Torella (a), Ciro Indolfi (a)

(a) Division of Cardiology, Dept of Medical and Surgical Sciences, University Magna Graecia, Catanzaro, , (b) Division of Cardiac Surgery, Dept of Medical and Surgical Sciences, University Magna Graecia, Catanzaro

Background: Atrial fibrillation (AF) is the most common cardiac arrhythmia in the general population. Non-valvular AF currently represents a major challenge for clinicians, mainly because of the lack of actual predictors of recurrence. The prolongation of intraatrial and interatrial conduction times and the nonhomogeneous propagation of sinus impulses are thought to be increased in patients with paroxysmal AF. Changes in gap junction/connexin physiology have been recently acknowledged to play a role in such arrhythmia, leaving considerable uncertainties about the nature of connexin changes in AF. Histone acetyltransferases (HATs) and deacetylases (HDACs) regulate the nuclear protein acetylation–deacetylation cycle that modulates gene expression by altering chromatin condensation and transcription factor. To this regard, scarce evidences are currently available about the epigenetics of AF and histone acetylation. Accordingly, we investigated the regulation of connexin 43 (Cx43) in human arrhythmic atrial samples and correlated it with P-wave measurements.

Materials and methods: Holter electrocardiograms from eleven patients with AF and without cardiac structural abnormalities were recorded and evaluated. P-waves after spontaneous cardioversion at 0, 6, 12, 24 hrs were measured, and P-wave dispersion (PWD) was assessed on 12-lead tracings at precordial and limb leads digitally at 50mm/s or at a paper speed 25mm/s and 200% magnification, when digital exams were unavailable. Ten age-matched subjects were chosen as controls from our database of young patients with presumptive arrhythmias. Right atrial samples were additionally provided from AF patients undergoing surgical myocardial revascularization alone and epigenetic regulation of Cx43 gene was subsequently assessed in those subjects who developed post-operative AF. **RESULTS:** Maximum P-wave duration was 143.2 ± 9.4 ms, minimum P-wave duration was 72.3 ± 10.1 ms, PWD was 69.7 ± 13.6 ms ($p < 0.01$ vs. controls). Atrial electrograms revealed post-operative AF in 33.0% of patients while hospitalized. Moreover, Cx43 levels were found significantly increased in cardiac samples from AF patients and this phenomenon was linked to class II HDACs activation. Intriguingly, cell cultures from fibrillating atria samples displayed normalized Cx43 levels upon treatment with a HDAC inhibitor, Trichostatin A. **Conclusions:** Prolonged PWD reflects altered atrial substrate characterized by nonuniform intra- and interatrial conduction due to fibrosis and hypertrophy in AF human samples. Our data suggest that Cx43 dysregulation is implicated in AF development and that HDACs are involved in different pathways that control AF. Further studies are required to address the role of HDACs as predictors of AF and to understand additional determinants of arrhythmogenesis for developing novel, and more successful treatment possibilities.

O19

Impact of uncontrolled hypertension on Atrial Fibrillation Ablation Outcome

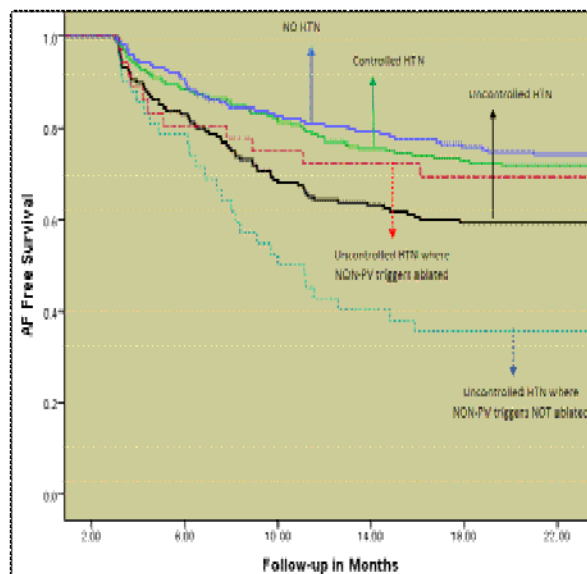
Francesco Santoro (c), Luigi Di Biase (a, b, c), Chintan Trivedi (a), Pasquale Santangeli (a, c), John David Burkhardt (a), Javier Sanchez (a), Prasant Mohanty (a), Sagamitra Mohanty (a), Rong Bai (a), Dhanujay Lakkireddy (f), Claude S. Elayi (e), Richard Hongo (h), Robert A. Schweikert (g), Corrado Carbucicchio (d), Antonio Dello Russo (d), Michela Casella (d), Claudio Tondo (d), Andrea Natale (a)

(a) Texas Cardiac Arrhythmia Institute, St. David's medical center, Austin, Texas, USA, (b) Albert Einstein, College of Medicine, Montefiore Hospital, New York, New York, USA, (c) Department of Cardiology, University of Foggia, Foggia, Italy, (d) Monzino Hosp, Milan, Italy, (e) Univ of Kentucky, Lexington, KE, USA, (f) Univ of Kansas, Kansas City, MS, USA, (g) Akron General Hosp, Akron, OH, USA, (h) California Pacific Medical Ctr, San Francisco, CA, USA

Introduction: Atrial fibrillation and hypertension are usually linked to each other. We sought to compare the impact of hypertension on the outcome of catheter ablation of AF.

Methods: 531 consecutive patients undergoing catheter ablation for atrial fibrillation were enrolled in this study. Patients were divided into 3 groups: patients with uncontrolled hypertension by medical treatment (group I, n=160), patients with controlled hypertension with medical therapy (group II, n=192), and patients without hypertension (group III, n=179). In all patients pulmonary vein antrum and posterior wall isolation was performed. Isoproterenol challenge up to 20 mcg/min to disclose non PV triggers was performed in all patients. All patients underwent extensive follow up.

Results: Non PV triggers were present in 78 (48.8%), 64 (33.3%) and 50 (27.9%) of groups I, II and III respectively (p<0.001). After 19 ± 7.7 months follow up, 65 (40.6%) group I, 54 (28.1%) group II and 46 (25.7%) group III had recurrences (p=0.003). After adjusting for confounders, group I pts had higher risk of recurrence [HR=1.66, (1.12, 2.44), p=0.01]. Risk for recurrence was similar between group II and III. Interestingly freedom from AT/AF in patients from group I was statistically different among patients with and without non-pv triggers ablation [25/36(69.4%) vs. 15/42 (36.8%,p=0.002].(Figure).



Conclusion: This prospective study shows that hypertension does not play a relevant role on the outcome of AF patients undergoing ablation for AF. However, in the uncontrolled hypertension pts a higher number of non-PV trigger requiring additional ablation was found.

O20

Impact of Concentric Left Ventricular Hypertrophy on Atrial Fibrillation Recurrence

Peeyush Grover (a), Neeraj Shah (a), Abhishek Deshmukh (a), Apurva Badheka (a), Ghanshyam Savani (a), James Coffey (a), Juan Viles-Gonzalez (a)

(a) *University of Miami Miller School of Medicine*

Background: Left ventricular diastolic dysfunction has been shown to influence left atrial mechanical function and increase risk of atrial fibrillation (AF). We sought to study if increased stiffness of the left ventricle characterized by high left ventricular mass (LVM) & relative wall thickness (RWT) predicts recurrence of AF in patients with paroxysmal AF undergoing rhythm control therapy.

Methods: We included 1,008 patients enrolled in AFFIRM trial in sinus rhythm at the time of randomization & with available echocardiographic data for calculation of RWT & LVM. The cohort was divided in four categories: normal, concentric remodeling (high RWT, normal LVM), concentric hypertrophy (high RWT & LVM) & eccentric hypertrophy (high LVM, normal RWT). RWT>0.42 was considered high. Primary endpoint was AF recurrence. Cox proportional hazards analysis was done, adjusting for left atrial size, mitral regurgitation & left ventricular systolic function.

Results: There were 1,479 (70.6%) AF recurrences over a 6 year period. Neither remodeling or hypertrophy was predictive of AF recurrence in the overall population (n=1088) or rate control arm (n=546). In the rhythm control arm (n=542), concentric left ventricular hypertrophy (LVH) was independently predictive of AF recurrence with adjusted HR 1.52, 95% confidence interval (CI) 1.13-2.04, p=0.006. In rhythm control arm, median time to recurrence in patients with concentric LVH was 13.3 months (95% CI 8.2-24.5) compared to 28.3 months (95% CI 20.2-48.6) in patients without LVH or remodeling.

Conclusion: Concentric LVH predicts a significantly higher incidence of AF recurrence in patients on rhythm control strategy, suggesting that concentric LVH may be a predictor of failure of anti-arrhythmic therapy.

VALVULOPATIA AORTICA ED EMODINAMICA NON INVASIVA 1

O21

Impact of transcatheter aortic valve implantation in renal function of elderly patients with severe aortic stenosis

Saverio Muscoli (a), Gianpaolo Ussia (a), Valeria Cammalleri (a), Francesca De Persis (a), Dorotea Rubino (a), Giuseppina Pascuzzo (a), Lucia Duro (a), Ersilia Mazzotta (a), Massimiliano Macrini (a), Massimo Marchei (a), Ruggiero Mango (a), Domenico Sergi (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia*

Background: Transcatheter aortic valve implantation (TAVI) is an emerging procedure for high-risk and inoperable patients with severe aortic stenosis. Renal impairment occurs in more patients undergoing cardiac surgery and it is associated with substantial morbidity and mortality, independent of all other factors. The correlation between TAVI and renal function has not been completely elucidated. The aim of this study was to determine the influence of baseline and post procedural renal function on prognosis after TAVI.

Methods: Fifty consecutive patients (60% male; mean age 80±8,3 y.o.) with severe, symptomatic aortic stenosis and high surgical risk (mean Logistic EuroSCORE 29,8 ± 15,6%, median STS score 8,21%) underwent TAVI in our institute with CoreValve Revalving System (CRS) (Medtronic, Minneapolis, Minnesota). Procedures were performed under fluoroscopy with local anesthesia in combination with a deep sedation. CRS was implanted via transfemoral (94%) or transaxillary access (6%). Serum creatinine levels were measured the day before and the days after TAVI during hospital SIC | *Indice Autori*

stay. Estimated glomerular filtration rate (eGFR) was calculated by Cockcroft and Gault Formula and acute kidney injury (AKI), defined as an increase in serum creatinine of 50% and a reduction in urine output of <0,5 ml/Kg/hr for more than 6 hours was evaluated. Institutional protocol was to hydrate the patient with eGFR <60 infusing 80 ml/hour of saline solution in the first 24 hours based on the central venous pressure (range 5-10 mmHg) and monitoring the urine output. Kidney complications and all causes of mortality were determined after 30 days and 6 months.

Results: At baseline serum creatinine level was $1.47 \pm 0,5$ mg/dl and eGFR 41,36 mg/min. 92% of patients had eGFR <60; one patient in 5 stage of chronic renal failure was in hemodialysis by arterovenous fistula. The procedural success rate was 100%. The mean device time $4,28 \pm 2,22$ minutes. The volume of contrast medium was $115 \pm 18,5$ ml. Our data shows a significant decrease in serum creatinine levels to $1.18 \pm 0,38$ mg/dl ($P=0,0019$) and increase in eGFR to 46,27 mg/min ($p=0,0049$). According to definition, no patients developed AKI after the procedure. At 30 days the mortality was 2% (1 patient died for unknown causes) and at 6 months t 4% (one patient died for pulmonary disease).

Conclusions: Guided hydration in elderly patients undergoing TAVI may reduce incidence of post procedural AKI. Further TAVI, eliminating the barrage of aortic valve stenosis, may improve renal perfusion and give a benefit in renal function.

O22

Transcatheter aortic valve implantation, five years single center experience

Alessandra Giarratana (a), Emanuele Benvenuto (a), Marco Barbanti (a), Sebastiano Immè (a), Martina Patanè (a), Patrizia Aruta (a), Anna Marchese (a), Vera Bottari (a), Simona Gulino (a), Stefano Cannata (a), Marilena Mizzi (a), Maria Letizia Santonoceto (a), Alessio Di Landro (a), Wanda Deste (a), Daniela Giannazzo (a), Carmelo Sgroi (a), Corrado Tamburino (a, b)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania, Italy*, (b) *Excellence through newest advance (ETNA fondation), Catania, Italy*

Background: Transcatheter aortic valve implantation (TAVI) represent a therapeutic alternative to surgical aortic valve replacement or palliative medical therapy for patients with symptomatic severe aortic stenosis (AS) and high surgical risk. Here we report our five year experience with the two type of devices (CoreValve- CVS and EdwardsSapien- EDW).

Methods: From June 2007 to May 2013, 380 consecutive patients underwent to TAVI (n 82, 21,57% implanted EDW; n 298, 78,42% CVS). Mean age was $80,76 \pm 5,27$; mean gradient $52,5 \pm 15,66$ mmHg, LogisticEuroScore $15,49 \pm 13,8$; mean STScore mortality 7,52% and morbidity and mortality 32,17%. Three patients had a dysfunctional aortic valve bioprosthesis.

Results: Procedural success was obtain in 330 patients, 86,84%. In Hospital mortality was 6,57% (n 25). Overall stroke rate was 2,89 % (5 patients Major, no patient with minor stroke, 6 patients TIA). Bleeding complications occurred in 18,68% n 71 (Life threatening bleeding 5,2% n 20, Major bleeding 5,52% n 21 and minor 7,89% n30). Vascular access complications occurred in 12,89 %, n 49 (Major 7,63% n 29, minor 5,26% n 20). Post procedural mean transaortic gradient was $10,13 \pm 4,59$ mmHg. Heart failure hospitalizations have been registered in 4,2%. At median Follow up of 24,72 months the mortality was 19,2% (n 73). All patients showed a significant improvement in NYHA functional class.

Conclusion: TAVI in the high risk patients, with the two available devices, show a good survival rate an improvement NYHA class at midterms outcomes.

O23

Clinical outcome and predictors of early mortality after transcatheter aortic valve implantation: a single center experience.

Amerigo Stabile (a), Vito Bonomo (b), Mariaconcetta Di Piazza (b), Giuseppe Cirrincione (a), Massimo Benedetto (a), Marco Caruso (a), Flavia Dispensa (a), Casimiro Caruso (a), Maria Giovanna Fiorino (a), Antonio Vivirito (a), Ignazio Smecca (a), Caterina Gandolfo (a)

(a) *Department of cardiology, ARNAS Civico Palermo, Italy*, (b) *Division of Cardiology, Department of Internal Medicine, Cardiovascular and Nephro-Urological Disease*

Aims: Transcatheter aortic valve implantation (TAVI) is a treatment option for high-risk patients with severe aortic stenosis. The purpose of this study is to investigate clinical outcomes of TAVI and predictors of early mortality using different devices.

Methods and Results: A consecutive cohort of 99 patients with symptomatic severe aortic valve stenosis and high surgical risk were submitted to TAVI with the CoreValve prosthesis (n=62) and the Edwards SAPIEN valve (n=37) implanted by either the transfemoral or subclavian access route.

All-cause mortality was 13.1% at 30 days with a higher percentage in the CoreValve group (19.35%, p=0.0112). Related cardiovascular mortality was 16.13% (p=0.0233). The need for a new definitive pacemaker implantation was significantly higher in the CoreValve treated patients (51.61% p<0.0001). The incidence of renal failure, clinical stroke or transient ischemic attack, infections and acute myocardial infarction within the first month after TAVI was comparable between both groups. In the multivariate analysis, the Logistic EuroScore (OR=2,079; p=0.0403) and pulmonary hypertension (OR=3,012; p=0,0033) remain the only predictive factors of mortality at 30 days

Conclusions: Our study demonstrated percutaneous treatment improves symptoms, functional capacity and quality of life at short-term follow-up.

O24

Acute valve-in-valve therapy in hemodynamically significant aortic regurgitation after transcatheter aortic valve implantation

Valeria Cammalleri (a), Gianpaolo Ussia (a), Saverio Muscoli (a), Dorotea Rubino (a), Giuseppina Pascuzzo (a), Francesca De Persis (a), Ersilia Mazzotta (a), Lucia Duro (a), Massimiliano Macrini (a), Ruggiero Mango (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia*

Background: Perivalvular-leak has been described after transcatheter aortic valve implantation (TAVI), in both CoreValve Revalving System (CRS) (Medtronic, Minneapolis, Minnesota) and Edwards SAPIEN XT valve (Edwards Lifesciences Corp, Irvine, CA) implantation. Recently the need for acute valve-in-valve therapy has been associated with higher risk of all-cause and cardiovascular mortality, rehospitalization and stroke.

Aim of our study is to assess clinical outcomes in patients underwent valve-in-valve therapy after CRS implantation.

Methods: From June 2011 to May 2013, 50 consecutive patients underwent TAVI with CRS implantation (14 patients 26 mm; 14 patients 29 mm; 22 patients 31 mm). 60% of patients were males; the mean age was 80±8,3 y.o; aortic valve area was 0,7±0.2 cm² and NYHA functional class 2,9±0,3. All patients were at high risk for cardiac surgery, assessed by Logistic EuroScore (29,84±15,68%); STS mortality score (median 8,1%) and frail index (2,34±1%). In 47 patients (94%) the procedure was performed by transfemoral approach, while 3 patients (6%) with unsuitable bilateral femoral vascular access were treated by distal transaxillary approach with surgical exposure of the artery.

Results: Among our study population, 4 patients, received acute valve-in-valve therapy for hemodynamically significant aortic regurgitation showed during the procedure with angiography and echocardiographic monitoring. All of these received the treatment for low implant of the device, CRS

26 mm in 1 pts and CRS 31 mm in 3 pts with a residual moderate-to-severe regurgitation with unstable hemodynamic. In these patients, the second device was successfully deployed, with immediately resolution of aortic regurgitation. In-hospital stay for these patients was $6,5 \pm 2,3$ days ($3 \pm 0,8$ days in intensive care unit) without significant differences with standard TAVI procedure. The other patients in hospital stay was $6 \pm 1,7$ days ($3 \pm 1,5$ days in intensive care unit) $p=0,43$. The mean trans-aortic valve gradient decreased from $51,5 \pm 9,9$ mmHg to 13 ± 4 mmHg ($p=0.0001$) after the procedure. Among valve-in-valve patients we observed III grade atrio-ventricular block in one patient, who was treated with permanent pace-maker implantation.

At 6 months follow-up all patients had significant improvement in symptoms. The NYHA class improved from $2,9 \pm 0,3$ to $1,8 \pm 0,5$ ($p=0,002$). Transprosthesis pressure gradient, effective orifice area and aortic regurgitation did not change at echocardiograms throughout the follow-up.

Conclusion: Valve-in-valve therapy is a safe and highly effective method to overcome severe regurgitation after CRS implantation, when it is observed hemodynamically significant. In our experience the implantation of two valves does not affect the performance of prosthesis at follow-up and does not influence the outcome.

O25

Ballon aortic valvuloplasty in neonates: procedural results and long term follow-up.

Gianpiero Gaio (a), Giuseppe Santoro (a), Luca Giugno (a), Cristina Capogrosso (a), Stefano Scafuri (a), Carola Iacono (a), Marianna Carrozza (a), Maria Teresa Palladino (a), Giuseppe Caianiello (b), Maria Giovanna Russo (a)

(a) *Cardiologia Pediatrica, A.O. "Monaldi", 2nd University of Naples, Naples, Italy*, (b) *Cardiochirurgia Pediatrica, A.O. "Monaldi", 2nd University of Naples, Naples, Italy*

Background: Balloon aortic valvuloplasty (BAV) is an option therapy for congenital aortic stenosis (AS) in neonates. Few reports describe also a long-term outcomes. In this study, a retrospective single-institution review was performed of patients who underwent BAV for congenital neonatal AS.

Methods: From 2000 to 2012, 28 neonates underwent BAV at ages 1 day to 30 days. The mean follow-up was 63 ± 31 months.

The following end points were evaluated: procedural immediate results, aortic insufficiency (AI), need of surgery, repeat BAV and death.

Results: The procedure was completed in all patients. In 26 patients (93%) the procedure was considered successful, with a significant reduction of the pressure gradient (from $85 + 24$ mmHg to $39 + 21$ mmHg $p<0.003$). In 2 patients the procedure was failure due to residual severe aortic stenosis.

At last follow up: 3/28 patients (10.7%) needed surgery due to the residual steno-insufficiency post BAV; death occurred in 2/28 patients (7%, 1 of them after BAV and 1 after surgery). No patients needed a second balloon valvuloplasty. Therefore, 18 patients are in natural history and among them at last follow-up control the residual stenosis was mild in 14/18 patients (77.7%), moderate in 4/18 (22.3%), while the residual insufficiency was mild in 16/18 patients (88.8%) and moderate in 2/18 (11.2%). None had a residual severe stenosis or insufficiency.

Conclusions: Balloon valvuloplasty of aortic valve stenosis is a feasible procedure that significantly reduces gradient in the most majority of the patients. In our series no patients, at long term follow up, had a severe residual stenosis/insufficiency. Only 10% needed a surgical treatment after the balloon valvuloplasty. Mortality rate was 7%.

O26

Gender-related outcomes at thirty day and one year follow-up after transfemoral transcatheter aortic valve implantation. Experience from a high volume Italian center.

Yohei Ohno (a), Carmelo Sgroi (a), Simona Gulino (a), Sebastiano Immè (a), Martina Patanè (a), Stefano Cannata (a), Alessandra Giarratana (a), Patrizia Aruta (a), Vera Bottari (a), Marco Barbanti (a), Deste Wanda (a), Daniella Giannazzo (a), Corrado Tamburino (a)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania*

Aims: Transcatheter aortic valve implantation (TAVI) has become an interesting therapeutic option in high-risk surgical patients with severe aortic stenosis. Nevertheless, the impact of gender differences has not been widely investigated. We aim to compare, therefore, gender-related outcomes at thirty day and one year follow-up after TAVI.

Methods: Data was obtained from the TAVI database of Ferrarotto Hospital, Catania, Italy, in which all procedures were performed. All the patients that underwent transfemoral TAVI from June 2007 to present, in whom both 30 day and 1 year follow-up were available, were included in the analysis. The endpoint and complication definitions were based on Valve Academic Research Consortium (VARC)-2 criteria.

Results: Female patients (n=163) exhibited higher ejection fraction (53.7% vs. 48.7%, $p<0.001$) and higher trans-aortic gradients (mean gradient 56.7mmHg vs. 48.6mmHg, respectively, $p<0.001$) compared with male patients (n=119). Baseline risk scores were comparable between groups. The combined early safety endpoint (27.4% vs. 15.8%, respectively, $p=0.021$) and major vascular adverse events at 30 days (11.5% vs. 2.5%, $p=0.021$) were more frequent in females compared with males, while device success rates and mortality (6.0% vs. 9.1%, $p=0.317$) were comparable between groups. At 1 year, mortality (15.5% vs. 15.7%, $p=0.99$), disabling stroke (3.0 vs. 1.7%, $p=0.477$), and pacemaker implantation rates (22.8% vs. 26.3%, $p=0.575$) were comparable between groups.

Conclusions: Female gender exhibited higher ejection fraction and mean trans-aortic gradients at baseline while risk scores were comparable with male gender. TAVI was less safe and associated with higher rates of major adverse vascular events at 30 days in females, whereas at 1 year adverse event rates were comparable between groups.

MIOCARDIOPATIE: SCIENZE DI BASE 1

O27

Glipizide reduces proliferation and migration of vascular smooth muscle cells

Jolanda Sabatino (a), Salvatore De Rosa (a), Claudio Iaconetti (a), Clarice Gareri (a), Sabato Sorrentino (a), Alberto Polimeni (a), Francesco Passafaro (a), Maria Colangelo (a), Caterina Covello (a), Filomena Caria (a), Alessandra Carvelli (a), Andrea Tavernese (a), Annarita Carino (a), Antonio Curcio (a), Daniele Torella (a), Ciro Indolfi (a)

(a) *Laboratorio di Cardiologia Molecolare e Cellulare Università Magna Grecia di Catanzaro*

Background: Intrinsic vasculoprotective effects have been suggested for both biguanides and thiazolidinediones, independently of their hypoglycaemic properties. Sulphonylureas act as ATP-dependent potassium channels (KATP) blockers. Expression of KATP has been recently shown to be expressed in vascular smooth muscle cells (VSMCs). In particular, glipizide-induced closure of KATP in VSMCs would be responsible for vasodilatation. Results from clinical studies report a lower incidence of restenosis in diabetic patients treated with glipizide, as compared to those on metformin treatment. However, no data are available on the involvement of glipizide in vascular response to injury or neointimal formation. Therefore, aim of the present study was to investigate the effect of glipizide on vascular smooth muscle cells (VSMCs) *in vitro*.

Methods and Results: The SUR2B subunit of KATP channels were highly expressed in vascular smooth muscle cells from rat carotid arteries. Treatment of cultured VSMCs with either metformin 100 μ M or glipizide 250 μ M resulted in similar reduction of cellular growth compared to control cells (1,4 fold reduction for metformin, 1,6 fold reduction for glipizide, 195000 \pm 14800 cells/well). Accordingly, both metformin (2,2 fold decrease compared to ctrl, $p < 0,05$) and glipizide (1,9 fold decrease compared to ctrl, $p < 0,05$) determined a similar reduction of cellular proliferation, evaluated with EDU-incorporation assay. Moreover, treatment with glipizide 250 μ M but not with metformin 100 μ M significantly reduced VSMCs migration in vitro as compared to control cells (2,8 fold decrease compared to ctrl, $p < 0,05$), as detected using a scratched-wound assay 24 h after stimulus administration.

Conclusions: The present preliminary results provide the first evidence that treatment of VSMCs with glipizide reduces both proliferation and cell migration in vitro. Further studies will be needed to confirm these results in vivo, in a rat model of balloon-induced carotid artery injury.

O28

Interleukin-1 beta induces left ventricular systolic dysfunction troponin I release in the mouse

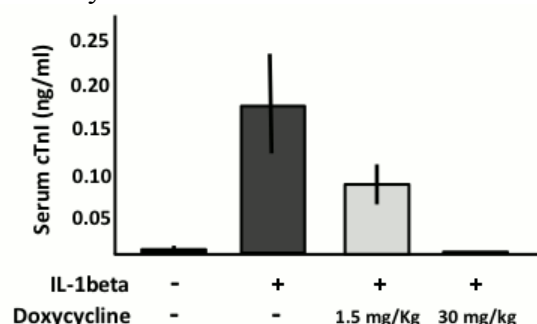
Carlo Marchetti (a), Eleonora Mezzaroma (a), Nicla Tranchida (a), Laura O'Brien (a), Benjamin Van Tassell (a), Antonio Abbate (a), Stefano Toldo (a)

(a) Virginia Commonwealth University

Objective. Elevation in circulating levels of cardiac troponin I (cTnI) in absence of ischemic events is frequently observed in patients with acute sepsis. The mechanism and significance of cTnI release are poorly understood. Interleukin-1 beta (IL-1beta) is a potent pro-inflammatory protein identified as a contractility depressant factor in the plasma of septic patients. The aim of this study was to investigate the effects of IL-1beta on cTnI release in a model of IL-1beta induced cardiomyopathy.

Methods and results. IL-1beta (3 mcg/kg) was injected intraperitoneally (i.p.; 0.2 ml) in 10-weeks-old CD-1 male mice. Control mice were injected i.p. with 0.9% NaCl (0.2 ml). Four hours after the treatment, the left ventricular (LV) fractional shortening (FS) was measured using ultrasounds and the cTnI levels were measured in the serum of the mice using an ELISA kit against mouse cTnI. The data were analyzed using the MWW test. IL-1 induced a significant decrease in the LVFS (33 \pm 1% NaCl-treated mice vs 22 \pm 1% IL-1beta treated, $U < 0.001$; Figure). This decrease in systolic function was accompanied by an increase in the serum levels of cTnI (0.018 \pm 0.01 ng/ml NaCl vs 0.31 \pm 0.15 ng/ml IL-1beta, $U = 0.002$; Figure). One potential mechanism for the troponin release is related to activation of matrix metalloproteinases (MMPs) by IL-1beta. We therefore administered an inhibitor of MMPs, doxycycline (1.5 mg/kg or 30 mg/kg), before IL-1beta. When doxycycline was administered, we found a dose-related reduction in troponin I levels (0.19 \pm 0.08 ng/ml and 0 ng/ml respectively; $U = 0.02$, 30 mg/kg vs IL-1beta alone) and preservation of LVFS (33 \pm 1%, $U < 0.001$ vs IL-1 beta alone, and 42 \pm 1%, $U < 0.001$ respectively).

Conclusions. The development of acute cardiomyopathy induced by IL-1beta is associated by acute release of troponin I. This may shed light on the frequently encountered troponin I elevation in patients with septic or inflammatory diseases.



O29

Circulating and endothelial progenitor cells in patients with chronic heart failure: relationship with left ventricular remodeling

Antonio Michelucci (a), Giuseppe Ricciardi (a), Francesca Cesari (b), Paola Attanà (a), Anna Maria Gori (b, c), Elena Sticchi (b), Cinzia Fatini (b), Paolo Pieragnoli (a), Ilaria Ricceri (a), Francesca Ristalli (a), Andrea Giomi (a), Luigi Padeletti (a), Gian Franco Gensini (a, c), Rosanna Abbate (b)

(a) *Department of Experimental and Clinical Medicine, University of Florence, Italy*, (b)

Department of Experimental and Clinical Medicine, Thrombosis Center, University of Florence, Italy, (c) *Don Gnocchi Foundation, Florence, Italy*

Objectives: To evaluate the association between circulating (CPCs) or endothelial (EPCs) progenitor cells and left ventricular (LV) remodelling in chronic heart failure (HF) patients.

Methods: 85 HF patients, age range 29-89 years, 83,5 % males, 45,9 % ischemic, in NYHA functional class II-IV, and with a LV ejection fraction ≤ 40 % were studied. LV ejection fraction, LV end-diastolic and end-systolic (LVESV) volumes, LVmass and tricuspid annular plane systolic excursion were evaluated and, when necessary, indexed for body surface area (BSA). CPCs and EPCs number were assessed using flow cytometry. CPCs were defined as CD34+, CD133+ and CD34+/CD133+. EPCs were identified through their expression of KDR and defined as CD34+/KDR+, CD133+/KDR+ and CD34+/CD133+/KDR+.

Results: No differences of EPCs levels in relation to cardiovascular risk factors, medications, etiology, age or gender were observed. Conversely CPCs number was higher in females and lower in ischemic patients. All EPCs were negatively related with LVESV/BSA ($r=-0.24$ $p=0.02$ for all EPCs populations) and with LVmass/BSA (CD34+KDR+ $r=-0.30$ $p=0.005$; CD133+KDR+ $r=-0.31$ $p=0.004$; CD34+CD133+KDR+ $r=-0.29$ $p=0.007$). CPCs proved to be higher and EPCs lower in patients with severely abnormal LVmass/BSA (gr/m^2 , ≥ 122 in women and ≥ 149 in men).

Conclusions: Our results denote the existence of a link between LV remodelling and progenitor cells. This is noteworthy considering that it was previously suggested that bone marrow derived endothelial progenitor cells participate in cardiac regeneration and function recovery in the setting of progressive HF.

O30

Clinical impact of desmosomal and titin gene mutations on the natural history of arrhythmogenic right ventricular cardiomyopathy

Francesca Brun (a, b), Carl Barnes (b), Bruno Pinamonti (a), Giulia Barbati (a), Dobromir Slavov (b), Sharon Graw (b), Xiao Zhu (b), Ernesto Salcedo (b), Taylor Matthew (b), Luisa Mestroni (b), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, "Ospedali Riuniti" and University of Trieste, Italy*, (b)

Cardiovascular Institute, University of Colorado, Colorado

Background: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is caused by abnormalities in desmosomal proteins of the intercalated disc and desmosomal gene mutations are the principal cause of ARVC. Recently novel variants were discovered in the sarcomeric gene titin (TTN) that are associated with ARVC. Whether known mutation carriers differ clinically from non-carriers is not well known. To address this question, we analyzed clinical outcomes in our ARVC population based on mutation status.

Methods: Thirty-eight ARVC families (66 patients) were analyzed, with a median follow-up of 77 months. Genotype-phenotype association analysis was performed, and multiple variables including symptoms, electrocardiogram/echocardiogram abnormalities, arrhythmias, pacemaker and/or ICD implantation and survival time free from death or heart transplant were compared between desmosomal mutation carriers, TTN carriers and non-carriers.

Results: Seven patients (11%) harbored genetic variants in desmosomal genes (DSP, PKP2, DSG2, and DSC2), 14 (21%) carried titin (TTN) variants and 45 (68%) were non-carriers. Desmosomal carriers (DC) were found to have more inverted T waves in V2-3 in the absence of RBBB (100% vs. 32%, $p=0.001$) and epsilon waves (57% vs. 14%, $p=0.007$) compared to non-carriers. The TTN group had significantly more supraventricular arrhythmias (atrial fibrillation, atrial tachycardia) (43% vs. 0%, $p=0.04$) and required more pacemakers (57% vs. 0%, $p=0.018$). Conversely, DC required more heart transplants relative to non-carriers (57% vs. 11%, $p=0.03$) and exhibited a worse survival free from death or heart transplant (63% vs. 88% at 30 years and 42% vs. 88% at 50 years, $p<0.001$).

Conclusions: This study provides valuable insights into the clinical consequences of gene mutations in individuals with ARVC. TTN mutations confer greater risk for supraventricular arrhythmias and the need for pacemaker implantation relative to DC, while DC portends a greater risk for electrocardiogram abnormalities and the combined end-point of heart transplant or death compared to non-carriers.

O31

Adult c-kit^{pos} cardiac stem cells are necessary and sufficient for functional cardiac regeneration and repair

Carla Vicinanza (a), Georgina M. Ellison (a, b), Iolanda Aquila (a), Angelo Leone (a), Mariangela Scalise (a), Christelle Correale (a), Fabiola Marino (a), Walter Sacco (a), Roberto Papait (c), Valter Agosti (d), Giuseppe Viglietto (d), Gianluigi Condorelli (c), Sergio Ottolenghi (e), Bernardo Nadal-Ginard (b), Daniele Torella (a), Ciro Indolfi (a)

(a) *Molecular and Cellular Cardiology, Magna Graecia University, Catanzaro, Italy*, (b) *Stem Cell and Regenerative Biology Institute, King's College London, London, UK.*, (c) *Humanitas Clinical and Research Center and CNR, Rozzano-Milan, Italy.*, (d) *Molecular Oncology, Magna Graecia University, Catanzaro, Italy.*, (e) *Department of Biotechnology and Bioscience, University of Milano-'Bicocca', Milan, Italy.*

The epidemic of heart failure has stimulated the development of multiple cardiac regeneration protocols, including claimed replication of post-mitotic cardiomyocytes and transplantation of multiple cell types. Yet, the adult myocardium harbors endogenous c-kit^{pos} cardiac stem-progenitor cells (eCSCs) with intrinsic regenerative capacity. However, their relevance in cardiac repair and regeneration remains controversial. To follow c-kit^{pos}eCSC physiological response to cardiac injury, we induced severe diffuse myocardial damage in adult rats with a single high dose of isoproterenol (ISO). This treatment -in the presence of a patent coronary circulation- produces a Takotsubo-like cardiomyopathy with both diffuse sub-endocardial and localized apical cardiomyocyte death. This acute insult kills 8-10% of the LV myocytes and results in overt acute heart failure. Interestingly, the myocardial damage and heart failure spontaneously reverses anatomically and functionally by 28 days. After ISO damage an ~8-fold increase in eCSC number is detected compared to control (CTRL). Many of the c-kit^{pos}eCSCs expressed GATA4 and Nkx2.5, two early transcription factors of the cardiac lineage, indicative of progressive myogenic commitment of these cells. Starting at day 3 post-ISO, very small mononucleated BrdU^{pos} myocytes were detected in vivo. From 3 to 28 days, there was a significant increase in the number of BrdU^{pos} myocytes, which were still mononucleated. To specifically address whether myocyte replication could be the source of new myocyte formation after ISO, we traced the cell lineage of the new myocytes. We generated double-transgenic MerCreMer-ZEG mice, which have adult myocytes labeled by GFP upon Tamoxifen injection. We demonstrated that new myocytes after ISO are not generated through the division of pre-existing terminally differentiated myocytes but rather from non-myocyte cells, with the characteristics of a stem-progenitor compartment. To directly identify whether c-kit^{pos}eCSCs replenish cardiomyocytes lost by myocardial damage, we genetically YFP-tagged in situ adult resident c-kit^{pos}eCSCs and their committed progeny. These in vivo genetic cell-fate mapping experiments show that new myocytes after ISO myocardial injury originate from resident c-kit^{pos}eCSCs. Using global gene expression by

microarray we further prove that endogenous resident c-kit^{pos}eCSCs generate *in vivo bona fide* new cardiomyocytes, which, however, are still immature at least at four weeks after birth. Finally, we show that ablation of the eCSCs after ISO by 5-FU administration abolishes regeneration and functional recovery. The regenerative process is completely restored by replacing the ablated eCSCs with the tagged progeny of one eCSC. After regeneration, selective suicide of these exogenous eCSCs and their progeny abolishes the regeneration, severely impairing ventricular performance. In conclusions, these data show that c-kit^{pos} eCSCs are necessary and sufficient for the regeneration and repair of myocardial damage.

O32

IL-18 blockade prevents the development of systolic dysfunction induced by human heart failure plasma but fails in preventing adverse remodeling following myocardial infarction in the mouse

Carlo Marchetti (a), Eleonora Mezzaroma (a), Nicola Tranchida (a), Benjamin Van Tassel (a), Charles Dinarello (b), Antonio Abbate (a), Stefano Toldo (a)

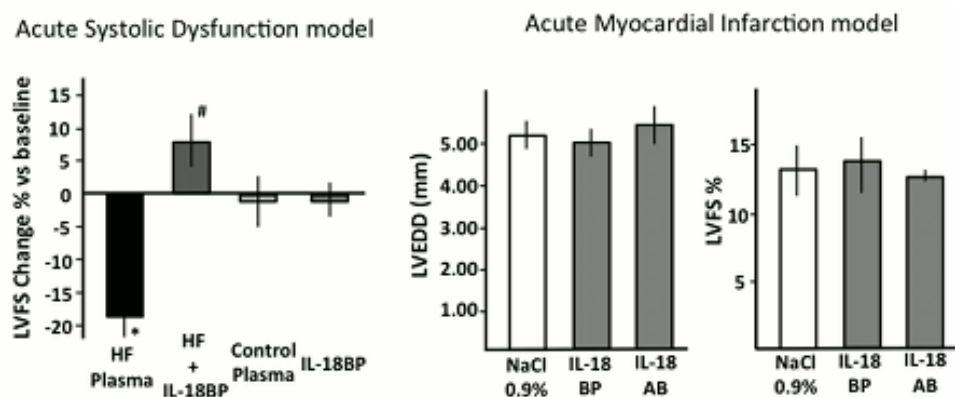
(a) Virginia Commonwealth University, (b) University of Colorado

Objective: An increase in cytokines plasma levels is commonly observed in patients with heart failure (HF) or acute myocardial infarction (AMI). Interleukin (IL)-18 is a pro-inflammatory cytokine associated with myocardial dysfunction, hypertrophy and fibrosis. The aim of this study is to evaluate the effects of IL-18 blockade in mouse models of acute systolic dysfunction and AMI.

Methods: Ten-week-old CD-1 male mice were used. Systolic dysfunction was induced by a single injection of plasma collected from HF patients. Clinical grade IL-18 binding protein (IL-18BP; 10 mg/kg) or 0.9% NaCl were given intraperitoneally (i.p.) to the mice 30 min before the plasma. Plasma from healthy subjects was used as control. Echocardiographic measurements, recorded at baseline and after 4 hours from plasma injections, were used to calculate differences in LV fractional shortening (LVFS) expressed as changes at 4 hours compared to baseline. IL-18BP or a IL-18 blocking antibody (IL-18AB; 5 mg/kg) were used to test the effects on post-myocardial LV remodeling following permanent left anterior coronary artery occlusion in the mouse. Echocardiography was used to measure LV end-diastolic and end-systolic diameters (LVEDD and LVESD), LVFS and LV mass.

Results: Plasma from HF patients induced a significant reduction in LVFS (-17%, *p<0.01). The pretreatment with IL-18BP effectively prevented the reduction in LVFS (+8%; #p<0.05; Figure). Following AMI, LVEDD (Figure), LVESD and LV mass and LVFS decreased in vehicle treated mice and in mice treated with IL-18BP and IL-18AB (N=6/group), without differences between the groups (all P<0.05 vs baseline, all P>0.05 between treatment groups).

Conclusions: IL-18 blockade prevents the development of systolic dysfunction induced by HF plasma, but it does not alter the healing of the infarct nor the enlargement, systolic function or hypertrophy of the LV after AMI.



ECO 3D

O33

Reference ranges for left ventricular geometry and function by 3D echocardiography using a vendor-independent software for quantitative analysis

Seena Padayattil Jose (a), Denisa Muraru (a), Diletta Peluso (a), Eleonora Piasentini (a), Simona Casablanca (a), Davide Ermacora (a), Sorina Mihaila (b), Paola Naso (a), Laura Puma (a), Luigi Paolo Badano (a), Sabino Iliceto (a), Renato Razzolini (a)

(a) Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, (b) University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

Background: Reference ranges for left ventricular (LV) geometry and function by 3D echocardiography (3DE) have been reported for vendor-specific softwares only, thus limiting their widespread applicability across other vendors.

Purpose: To identify LV normative values using a vendor-independent DICOM-based software commercially available (4D LV Analysis 3.1, TomTec, DE).

Methods: In 235 consecutive healthy volunteers (44±14 years, range 18–76 years, 104 men), 3D LV datasets (35±6 vps) acquired with GE Vivid E9 scanner have been analyzed by a single experienced researcher. Subjects had no history of cardiovascular or lung disease, no symptoms or cardiovascular risk factors, no cardioactive or vasoactive treatment, and normal results at ECG and physical examination. Exclusion criteria were athletic training, pregnancy, body mass index >30 kg/m², and poor apical acoustic window.

Results: All LV parameters were significantly correlated with body surface area (p<0.001). Gender differences in LV geometry and function were still significant after their indexing by body surface area (Table). LV volumes and stroke volume decreased with ageing (p<0.006), whereas LV mass and mass/volume ratio increased significantly with age (p<0.001).

Conclusion: Our study provides age- and gender-specific reference values for LV geometry and function obtained by a vendor-independent 3DE software from a large population of healthy volunteers uniformly distributed across age decades. Our data may foster the routine use of 3DE for assessing LV remodelling in multi-vendor echo labs.

LN, limits of normality;*, upper LN;φ, lower LN.

| | Men (n=104) | LN | Women (n=131) | LN | P (men vs women) |
|---|----------------|------|------------------|------|------------------|
| Age (years) | 44±15 | - | 44±14 | - | 0.87 |
| Heart rate (bpm) | 67±10 | - | 68±10 | - | 0.28 |
| Systolic blood pressure (mmHg) | 128±12 | - | 114±14 | - | <0.0001 |
| Diastolic blood pressure (mmHg) | 76±7 | - | 71±8 | - | <0.0001 |
| End-diastolic volume (ml/m ²) | 64±11 | 86* | 55±9 | 73* | <0.0001 |
| End-systolic volume (ml/m ²) | 24±5 | 34* | 20±4 | 28* | <0.0001 |
| Stroke volume (ml/m ²) | 39±6 | 27φ | 35±6 | 23φ | <0.0001 |
| Ejection fraction (%) | 62±4 | 54φ | 64±3 | 57φ | 0.001 |
| Mass (g/m ²) | 77±11 | 99* | 65±9 | 79* | <0.0001 |
| Mass/end-diastolic volume (g/ml) | 1.2±0.2 | 1.6* | 1.2±0.2 | 1.6* | 0.46 |

O34

The performance of 3-dimensional echocardiography for right ventricular volume and function in patients with and without congenital heart disease: a meta-analysis of studies in comparison to cardiac

Anna Gonella (a), Fabrizio D'Ascenzo (a), Flavia Casasso (b), Enrica Conte (b), Franca Margaria (b), Luigi Losardo (b), Walter Grosso Marra (a), Pierluigi Omedè (a), Simone Frea (a), Mara Morello (a), Claudio Moretti (a), Giuseppe Biondi Zoccai (c), Marco Bobbio (b), Fiorenzo Gaita (a)

(a) *Department of Internal Medicine, Division of Cardiology, Città Della Salute e Della Scienza, Turin*, (b) *Department of Cardiovascular Medicine, Division of Cardiology, S. Croce e Carle Hospital, Cuneo*, (c) *Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome, Latina*

Objective: the aim of this meta-analysis was to compare the accuracy of 3-Dimensional (3D) echocardiography to Cardiac Magnetic Resonance (CMR) to evaluate right ventricular (RV) volumes and function in patients with and without congenital heart disease.

Methods: Medline, Cochrane Library, Biomed Central and Google Scholar databases were searched for studies that compared RV volumes and ejection fraction (EF) measured by 3D echocardiography and CMR. RV function, end-diastolic (ED) and end systolic (ES) volumes were evaluated. The same analysis was performed in studies in which only patients with congenital heart disease (CHD) were included and according to software exploited echocardiography.

Results: 6 studies with 296 3D echocardiograms and CMR were included. Evaluation of EF was not different (0.1%; 95% confidence interval -2.2 to 2.32), while significant underestimation of RV end-systolic volume (-17.8 ml; -31.8 to -4) and end-diastolic volume (-9 ml; -18.6 to 0.1) was reported. In the subset of CHD 4 studies with 150 patients were included with similar results: EF did not differ (-0.2%; -2.5 to 2), while ES and ED volumes were underestimated by 3D echocardiography (-32.6 ml; -67.4 to 2.2 and -20.3; -35.8 to -4.9). Software by Philips seemed more similar to CMR both for end-systolic (-1.97 ml; -5.68, 1.73) and end-diastolic volumes (-5.09 -11.45, 1.27), while TomTec performed worse, especially for systolic volumes (-64.41: -82.53, -46.2 and -37.28 -82.96, 8.40)

Conclusions: compared to CMR. 3D echocardiography underestimates RV volumes, but is accurate to evaluate ejection fraction in patients with CHD and in the whole spectrum of heart disease. Implementation of specific software may help to fill these limitations.

O35

Right heart function by 3D-echocardiography and 2D-speckle tracking in scleroderma patients in absence of pulmonary hypertension

Diletta Peluso (a), Laura Ucci (a), Denisa Muraru (a), Sorina Mihaila (a), Umberto Cucchini (a), Simona Casablanca (a), Erica Pigatto (b), Franco Cozzi (b), Leonardo Punzi (b), Luigi P Badano (a), Sabino Iliceto (a)

(a) *Department of Cardiac, Thoracic and Vascular Sciences. University of Padua*, (b) *Medicine, Rheumatology Unit. University of Padua*.

Purpose: usually, Systemic Sclerosis (SSc) involves the right heart (RH) with the appearance of pulmonary hypertension (PH). Whether SSc can directly affect right ventricular (RV) and right atrial (RA) function in absence of PH remains to be clarified. Recently, 3D-echocardiography (3DE) and 2D-speckle tracking (2D-STE) have been validated to assess heart chamber function and mechanics. Therefore, we used 3DE and 2D-STE to assess RV and RA function in patients with SSc and normal pulmonary artery pressure.

Methods: 34 SSc patients (30 females, mean age 56±13 years, mean SSc duration 13.6±9.4 years), without known heart disease and PH, were compared with 34 age and gender-matched healthy subjects. All subjects underwent a complete echocardiogram, including: RV volumes and ejection SIC | *Indice Autori*

fraction measured by 3DE; global RV and RA longitudinal strain (Ls) by 2D STE from a dedicated apical view of the RH.

Results: As shown in Table, SSc patients demonstrated similar RV size with lower RV function. Pulmonary artery systolic pressure (PASP) and pulmonary vascular resistance (PVR) were higher in SSc patients than in controls (Table). Using 2D-STE we found no differences about RV global Ls between SSc patients and controls (Table). RA size was larger in SSc patients than in controls, and 2D-STE showed lower active contraction (measured as RA-LsNeg) in patients. At bivariate analysis, PVR was inversely correlated with RV ejection fraction ($r=-0.34$, $p=0.008$) and RA active contraction ($r=-0.27$, $p=0.04$) and directly correlated with RA maximum volume increase ($r=0.31$, $p=0.012$).

Conclusions: a slightly increased afterload in SSc patients appeared to be associated to an impairment of RV pump function, with normal RV myocardial mechanics, paralleled by an increase of RA volume with an impairment of RA active myocardial contraction

Table. RV and RA echo parameters

| | SSc patients | Controls | p |
|--|--------------|-----------|---------|
| RV End-diastolic area, cm ² | 18 ± 4 | 17 ± 2 | 0.053 |
| RV Fractional area change, % | 49 ± 7 | 51 ± 5 | 0.34 |
| 3D RV end-diastolic volume, ml | 91 ± 27 | 85 ± 15 | 0.26 |
| 3D RV ejection fraction, % | 51 ± 5 | 60 ± 6 | <0.0001 |
| TAPSE, mm | 24 ± 3 | 25 ± 2 | 0.009 |
| RV-GLs, % | -25.7 ± 3 | -25.3 ± 3 | 0.58 |
| PASP, mmHg | 27 ± 7 | 22 ± 5 | 0.003 |
| PVR, WU | 1.7 ± 0.2 | 1.4 ± 0.3 | 0.001 |
| 2D RA maximum volume, ml | 46 ± 15 | 36 ± 9 | 0.002 |
| RA-LsPos, % | 23 ± 9 | 25 ± 8 | 0.44 |
| RA-LsNeg, % | -15 ± 8 | -18 ± 4 | 0.047 |

3D=three-dimensional; GLs=global longitudinal strain; PASP=pulmonary artery systolic pressure; PVR=pulmonary vascular resistance; RA=right atrium; RV=right ventricular; SSc=systemic sclerosis.

O36

Reference values for 3D echo parameters describing left ventricular mechanics obtained by vendorin dependent software

Seena Padayattil Jose (a), Denisa Muraru (a), Diletta Peluso (a), Sorina Mihaila (b), Gentian Denas (a), Eleonora Piasentini (a), Simona Casablanca (a), Laura Puma (a), Paola Naso (a), Luigi Paolo Badano (a), Sabino Iliceto (a), Renato Razzolini (a)

(a) Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, (b) University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

Background: Differences in definitions and measurements of parameters describing left ventricular (LV) mechanics among vendors hamper the use of 3D deformation analysis for clinical and research purposes. Our aim was to identify the reference values for 3D LV function parameters using a vendor-independent DICOM-based software.

Methods: In 235 healthy volunteers uniformly distributed across decades (44±14 years, range 18–76 years), 3D LV full volume data sets (35±6 vps) were acquired using a GE Vivid E9 scanner. Exclusion criteria were athletic training, pregnancy, body mass index > 30 kg/m², and poor apical acoustic window. LV 3D parameters (including ejection fraction, strain parameters, systolic dyssynchrony index - SDI, twist and torsion) were analyzed offline using 4D LV Analysis software 3.1 (TomTec, D).

Results: Physiologic ageing was associated with a significant increase in LV ejection fraction and torsion, LV circumferential and 3D strain, and with a less synchronous regional LV function ($p<0.0001$ for all, except $p=0.01$ for torsion). Women had higher LV ejection fractions and absolute SIC | *Indice Autori*

values of longitudinal and 3D strain than men (Table), but also smaller LVs (EDV 55±9 vs 64±11 ml/m²) and lower blood pressure values (SBP 114±14 vs 128±13 mmHg, $p<0.0001$). LV torsional mechanics (twist 7.7 vs 6.4°, torsion 0.91 vs 0.83°/cm, $p=NS$) and synchronicity (SDI 5.2±1.3 vs 5.2±1.3%) were similar between genders. LV deformation also showed significant regional variations, strain values in LV basal region being significantly lower than in mid or apical regions ($p<0.001$ for all strains).

Conclusions: This study is the first to report age- and gender-specific normative values for global LV systolic function and deformation assessed by a vendor-independent software. Our data may foster the use of 3DE for assessing LV myocardial function in multi-vendor echo labs.

| | Men (n=104) | Women (n=133) | P |
|-----------------------------------|-------------|---------------|---------|
| Age (years) | 44±15 | 44±14 | 0.87 |
| Heart rate (bpm) | 67±10 | 68±10 | 0.28 |
| Ejection fraction (%) | 62±4 | 64±3 | <0.0001 |
| Global longitudinal strain (%) | -21.4±2.5 | -22.2±2.5 | 0.02 |
| Global circumferential strain (%) | -33.7±3.2 | -34.4±3.3 | 0.11 |
| Global 3D strain (%) | -36.7±2.9 | -37.5±3.9 | 0.03 |

TECNICHE E COMPLICANZE DELLE PROCEDURE DI ABLAZIONE

O37

Esophageal lesions following pulmonary vein isolation using the novel second-generation cryoballoon - Role of temperature monitoring

Alexander Fürnkranz (a), Stefano Bordignon (a), Daniela Dugo (a, b), Laura Perrotta (a), Boris Schmidt (a), Julian Chun (a)

(a) Cardioangiologisches Centrum Bethanien, Frankfurt am Main, (b) Electrophysiology Unit, Cardiology Department, Ferrarotto Hospital, University of Catania, Catania,

Background: The novel second-generation cryoballoon (CB2) facilitates pulmonary vein isolation (PVI) by improved surface cooling. The impact of this re-design on collateral damage is unknown. Objective: to investigate the incidence of esophageal lesions after PVI using the CB2 and the role of luminal esophageal temperature (LET) measurement as a predictor of lesion formation.

Methods: 32 consecutive patients underwent PVI using the 28 mm CB2. Target application time was 2x240 seconds. 92% PVs were isolated after one cryoenergy application. Complete PVI was achieved in all patients. Luminal esophageal temperature with 3 thermocouples was continuously measured during cryoenergy application. Freezing was only interrupted if weakening/loss of phrenic nerve (PN) function or very low LET ($< 5\text{ }^{\circ}\text{C}$) was observed.

Results: The lowest measured LET was $-12\text{ }^{\circ}\text{C}$ (despite cryoapplication interruption). Post-procedural gastro-esophagoscopy was performed after 1-3 days in all patients and showed lesions in 6/32 (19%) patients. A minimum LET of $\leq 12\text{ }^{\circ}\text{C}$ predicted esophageal lesions with 100% sensitivity and 92% specificity (area under the ROC curve 0,97; CI 0,93-1,02, $p = 0,001$). Persistent PN palsy occurred in 2 patients (6%) during ablation at the right inferior PV. Repeat gastro-esophagoscopy confirmed healing of lesions after 16±14 days.

Conclusion: Second-generation 28 mm cryoballoon PVI is associated with significant esophageal cooling resulting in lesion formation in 19% of patients. LET measurement accurately predicts lesion formation and may enhance the safety of the novel device.

O38

Iatrogenic atrial septal defects following atrial fibrillation transcatheter ablation: a relevant entity?

Matteo Anselmino (a), Marco Scaglione (b), Alberto Battaglia (a), Silvia Muccioli (a), Davide Sardi (b), Giuseppe Azzaro (b), Lucia Garberoglio (b), Salvatore Miceli (b), Fiorenzo Gaita (a)

(a) *Cardiology Division, Department of Internal Medicine, University of Turin, Italy*, (b) *Division of Cardiology, Cardinal Guglielmo Massaia Hospital, Asti, Italy*

Background: Previous literature has suggested that iatrogenic atrial septal defects (IASD) may follow left atrial (LA) access by trans-septal (TS) puncture, especially in case of a single TS for more than one catheter.

Purpose: Aim of the present study is to describe prevalence of patent foramen ovale (PFO) and IASDs in a cohort of atrial fibrillation (AF) patients undergoing redo catheter ablation (CA) procedures in a high volume center accessing LA by standardized, single TS puncture.

Methods: Patients (n=197) who underwent at least one redo AFCA, between 2004 and 2012, were retrospectively enrolled. Transesophageal echocardiography was performed before each procedure during which LA was indiscriminately accessed via a PFO, if present, or by single TS for both the mapping and ablation catheters.

Results: At baseline PFO was detected in 43 (21.8%) patients. Clinical and echocardiographic parameters recorded did not differ within patients presenting with or without PFO. LA was accessed via PFO in 39 (90.7% of those with PFO) patients during the first procedure. New onset IASD occurred in 11 (5.6%) patients following the first procedure and in one (2.2%) patient following the second procedure. Clinical and echocardiographic parameters did not differ within patients reporting or not IASD. No TS-related complications occurred.

Conclusion: In the present cohort LA access by PFO or single TS for both the mapping and ablation catheters lead to a small risk of asymptomatic IASD, not increased by redo procedures, confirming that it represents a safe approach. No clinical and/or echocardiographic parameters seemed to predict IASD occurrence.

O39

High rates of single shot pulmonary vein isolation and real time pulmonary vein potential visualization using the second generation 28mm cryoballoon.

Daniela Dugo (a, b), Stefano Bordignon (a), Alexander Fuernkranz (a), Laura Perrotta (a), Athanasios Konstantinou (a), Britta Schulte-Hahn (a), Bernd Nowak (a), Boris Schmidt (a), KR Julian Chun (a)

(a) *Cardioangiologisches Centrum Bethanien, Frankfurt a.M., Germany*, (b) *U.O. Elettrofisiologia e Cardioritmologia, Dipartimento di Cardiologia, P.O. Ferrarotto, Catania*

Background: The 28mm cryoballoon (CB) catheter has been designed to create a circumferential PV antrum lesion and carries the potential for single shot pulmonary vein isolation (PVI). Recently, a second generation CB (CB2 – CryoAdvance; Medtronic, Min, USA) with modified cooling capabilities has been released, potentially increasing the rate of "single shot" PVI confirmed by real time PV potential visualization.

Objectives: To analyze procedural data and to determine the rate of single shot PVI and real time PVI visualization using the new generation 28 mm CB.

Methods: Data from CB2 procedures were collected. All procedures were performed using the simplified single big cryoballoon technique (SBCB - 28 mm CB, single transeptal puncture, inner lumen spiral catheter Achieve - Medtronic, Min, USA). After acute PVI, one extra freeze was delivered at each PV. Single shot isolation was defined as PVI after the first application. Real time to PVI was considered only in the single shot PVI to exclude additive effect of multiple applications.

Results: Eighty-five patients (45 males, 64±14 years old, 69 paroxysmal atrial fibrillation, mean left atrium diameter 40±4mm) underwent SBCB with CB2 at our centre. A total of 330 PVs have been identified (10 LCPV). 328/330 (99,4%) PVs could be successfully isolated using the SBCB. Mean procedural and fluoroscopy time were 93±24 min and 12,5±4,8 min, respectively. Acute PVI (excluding bonus freeze) required 1,2±0,6 LSPV, 1,0±0,1 LIPV, 1,3±0,5 LCPV, 1,3±0,6 RSPV, 1,4±1,0 RIPV applications, with mean minimal temperatures of -51±5 LSPV, -47±6 LIPV, -54±5 LCPV, -51±6 RSPV, -47±6 RIPV. "Single shot" PVI was observed in 84% LSPV, 97% LIPV, 60% LCPV, 80% RSPV, 79% RIPV, and in total in 277/330 PVs (84%). In the PVs isolated at first attempt real time PVI was observed in 77% LSPV, 79% LIPV, 66% LCPV, 82% RSPV, 60% RIPV, and in total in 207/277 PVs (75%). Mean time to real time isolation was (seconds) 48±28 LSPV, 42±32 LIPV, 25±3 LCPV, 59±48 RSPV, 60±33 RIPV. The overall mean time to PVI was 51±36 seconds.

Conclusions: The novel CB2 generation enables high rates of single shot PVI along with high rates of real time PVI visualizations.

O40

Myocardial biomarker release using the novel 28mm cryoballoon - a link to increased efficacy.

Stefano Bordignon (a), Daniela Dugo (b, a), Laura Perrotta (a), Alexander Fuernkranz (a), Melanie Gunawardene (a), Bernd Nowak (a), Britta Schulte-Hahn (a), Boris Schmidt (a), KR Julian Chun (a)

(a) CCB - Cardioangiologisches Centrum Bethanien - Frankfurt am Main - Germany, (b) Electrophysiology Unit, Cardiology Department, Ferrarotto Hospital, University of Catania, Catania

Background: Recently, a novel second generation (G2) cryoballoon (CB) was introduced. First data suggested improved procedural efficacy as compared to the first generation (G1) CB. Comparative analysis of lesion formation in terms of myocardial biomarker release (G1 vs. G2) has not been studied.

Objective: To compare myocardial biomarker release using the 28mm G1 vs. G2 CB.

Methods: In patients (patients) treated with the simplified single big cryoballoon (SBCB) strategy for pulmonary vein isolation (PVI), myocardial biomarkers (TnT, CK, LDH) were measured at 12, 24 and 48 hours after PVI. Two groups were defined: group 1 (G1; freezing-time: 300s), group 2 (G2; freezing-time: 240s). Mean biomarker peak values were compared. To correct for between-group differences in cumulative freezing time, an index calculated as peak biomarker release divided by cumulative freezing time was calculated.

Results: 66 CB PVI procedures (G1: 33 patients, G2: 33 patients) were analyzed. PVI was achieved in all patients using SBCB only. Mean freezing time (51 ± 10 min vs. 33 ± 6 min, p<0,01) was significantly shorter in G2. All biomarker levels tended to be higher in G2 vs. G1. The indexed biomarkers values were significantly higher in G2: TnT: 18,8±8,5 vs. 32,3±13,6 pg/l/min (p<0,01); CPK: 6,7±2,7 U/l/min vs. 11,7±3,9 U/l/min (p<0,01); LDH: 5,2±1,0 U/l/min vs. 9,1±2,7 U/l/min (p<0,01). On a mid term follow up (180 days), G2 revealed a significant higher success rate (20/33 vs. 28/33; p=0,027).

Conclusion: PVI using the second generation cryoballoon increased the myocardial biomarker release index and is linked to a significantly improved mid term success rate.

O41

Phrenic nerve palsy following pulmonary vein isolation with the novel second-generation cryoballoon – Is there a higher incidence compared to the first generation balloon

Alexander Fürnkranz (a), Stephano Bordignon (a), Daniela Dugo (a, b), Laura Perrotta (a), Boris Schmidt (a), Julian Chun (a)

(a) *Cardioangiologisches Centrum Bethanien, Frankfurt am Main*, (b) *Electrophysiology Unit, Cardiology Department, Ferrarotto Hospital, University of Catania, Catania*,

Purpose: To describe incidence and characteristics of phrenic nerve palsy (PNP) following pulmonary vein isolation (PVI) using the novel second-generation cryoballoon with enhanced surface cooling (CB2) as compared to the first-generation balloon (CB1).

Methods: 191 consecutive patients with paroxysmal or persistent (< 6 months) atrial fibrillation underwent single-transseptal PVI with the CB2 (last 86 patients) or the CB1 (105 patients, control group) in conjunction with an endoluminal spiral mapping catheter. After successful PVI, one bonus CB application was applied for each PV. The right PN was continuously stimulated by a catheter from the superior caval vein during ablation of the septal PVs. In case of loss or weakening of diaphragm contraction, freezing was immediately stopped and no bonus application was applied. Transient PN palsy was defined as weakening/loss of diaphragm contraction with full recovery until discharge as demonstrated by chest fluoroscopy. Persistent PN palsy was defined as weakening/loss of diaphragm contraction present at discharge.

Results: In total, PNP occurred in 9/86 (10,5%) patients in the CB2 group and 6/105 (5,7%) patients in the CB1 group ($p = 0,23$; chi-square test). Persistent PNP occurred in 3 (3,5%) and 2 (1,9%) patients in the CB2 and CB1 group, respectively ($p = 0,66$; Fisher's exact test). Transient PNP occurred in 6 (7%) and 4 (3,8%) patients in the CB2 and CB1 group, respectively ($p = 0,25$; Fisher's exact test). PNP occurred exclusively during freezing at the right superior PV in the CB1 group, while in 5 patients (5,8%) of the CB2 group, PNP occurred during freezing at the right inferior PV (RIPV). PNP was generally right-sided with the exception of 1 patient in the CB2 group (1,1%), in whom delayed left-sided PNP was demonstrated 1 day after the procedure with unimpaired intraprocedural diaphragm movement. In the CB2 group, 2/3 patients with persistent PNP demonstrated partial recovery of PN function during 3±2 months of follow-up, 2 patients felt mild exertional dyspnea. In the CB1 group, 1/2 patients with persistent PNP demonstrated complete recovery of PN function after 1 month. The other patient was asymptomatic and declined further chest fluoroscopy.

Conclusions: We observed a numerical higher incidence of transient and persistent PNP following PVI with the novel CB2 vs. CB1, that did not, however, reach statistical significance. Particular awareness has to be given during ablation at the RIPV using CB2, since the majority of PNP cases occurred at this PV, which is in contrast to prior observations with the CB1.

O42

Results of Minimally Invasive Surgical Treatment of Lone Atrial Fibrillation: Standard Minimally Invasive versus Hybrid Approach Using Radiofrequency Sources

Fabiana Lucà (a, b), Calogero Puntrello (a), Gaspare Rubino (a), Carmelo Massimiliano Rao (c), Mark La Mair (b), Laurant Pison (b), Orlando Parise (d), Jos G Maessen (b), Harry Crijns (b), Francis Wellens (b), Gianfranco Gensini (d), Sandro Gelsomino (d)

(a) *Cardiologia/UTIC Ospedale Paolo Borsellino, Marsala (TP)*, (b) *Cardiology and Cardiosurgery Department, University Hospital of Maastricht, Maastricht, The Neherlan*, (c) *Cardiologia Riabilitiva, Ospedale Melacrino Morelli, Reggio Calabria*, (d) *Dipartimento Cuore e Vasi, AOU Careggi, Firenze*

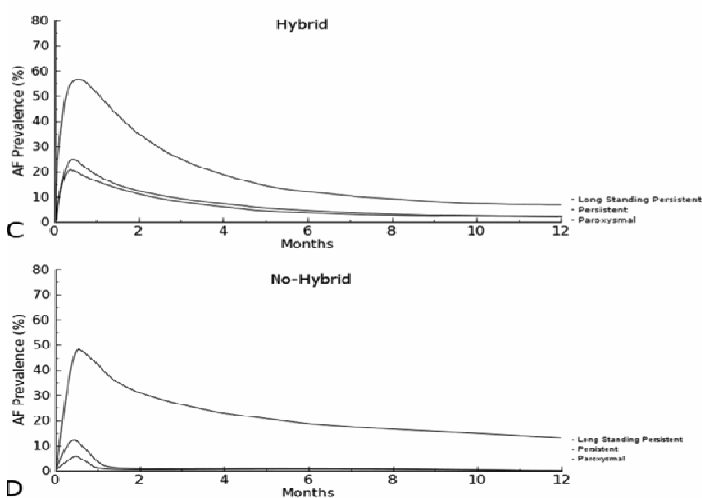
Background: We compared short-term results of a hybrid versus a standard surgical bilateral thoracoscopic approach employing radiofrequency (RF) sources in the surgical treatment of lone atrial fibrillation (LAF).

Methods: Between January 2008 and July 2010 sixty-three consecutive patients with LAF underwent minimally invasive surgery. Thirty-five (55.5%) underwent surgery with the hybrid approach whereas 28 (45.5%) underwent bilateral thoracoscopic standard procedure (no-hybrid group). All patients underwent continuous 7-day Holter Monitoring (HM) at 3 months, 6 months and 1 year.

Results: At 1 year, 91.4% and 82.1% (time-related prevalence 5.2% vs.6.0% [$p = 0.56$]) of the patients were free of AF and AAD. The hybrid group yielded better results in long standing persistent AF (8.2% [time related prevalence 81.8% vs. 44.4%, $p = 0.001$] vs.14.9%, $p = 0.04$). One-year success rates were 87.5% vs. 100% ($p = 0.04$) in persistent [time related prevalence 3.8% vs. 0%, $p < 0.001$] and 87.5% vs. 100% ($p = 0.04$) in paroxysmal AF [time related prevalence 3.2% vs. 0%, $p < 0.001$] in the two groups.

One-year prevalence of Warfarin use was significantly higher in the hybrid group (29.0% [26.2–33.1] and 13.4% [9.9–16.3]) with no difference by AF type. LA reverse remodelling occurred in 81.7% ($n = 30$) of hybrid patients and 67.8% ($n = 19$) of no-hybrid patients at latest control ($p = 0.02$). Left atrial emptying fraction increased in both groups ($50 \pm 14\%$, $p < 0.001$ and $52 \pm 12\%$, $p = 0.004$ in hybrid and no-hybrid, respectively) without differences between groups ($p = 0.6$).

Conclusions: The hybrid procedure yielded excellent results in long-standing persistent AF. Our findings need to be confirmed by further larger studies.



IMAGING CARDIOVASCOLARE

O43

Prognostic CMR parameters for heart failure and arrhythmias in a large cohort of well treated thalassemia major patients.

Alessia Pepe (a), Antonella Meloni (a), Letizia Gulino (a), Sabrina Armari (b), Antonella Carollo (c), Giuseppe Rossi (d), Cristina Salvatori (e), Claudio Ascioti (f), Monia Minati (g), Gennaro Restaino (h), Massimo Lombardi (a)

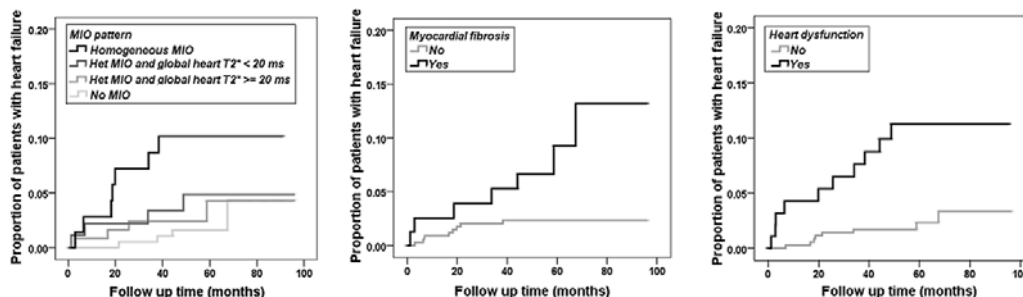
(a) CMR Unit, Fondazione G. Monasterio CNR-Regione Toscana and Inst. of Clinical Physiology, Pisa, Italy, (b) Reparto di Pediatria, Azienda Ospedaliera di Legnago, Legnago, Italy, (c) U.O. Pediatria Talassemia, Az. Osp. "Sant'Antonio abate", Trapani, Italy, (d) Epidemiology and Biostatistics Unit, Institute of Clinical Physiology, CNR, Pisa, Italy, (e) Unità Operativa Sistemi Informatici, Fondazione G. Monasterio CNR-Regione Toscana, Pisa, Italy, (f) Struttura Complessa di Cardiologia-UTIC, P.O. "Giovanni Paolo II", Lamezia Terme, Italy, (g) U.O.C. Diagnostica per Immagini e Interventistica, Policlinico "Casilino", Roma, Italy, (h) Radiology Department, "John Paul II" Catholic University, Campobasso, Italy

Background: Cardiac complications are the main cause of death in thalassemia major (TM) patients. Cardiovascular Magnetic Resonance (CMR) plays a key role in the management of TM, allowing to assess cardiac iron burden, biventricular dimension and function, atrial dimensions, and myocardial fibrosis. The aim of this study was to determine the predictive value of CMR parameters for heart failure and arrhythmias in TM.

Methods: We followed prospectively 537 white TM patients enrolled in the MIOT network. Fifty patients were excluded from the analysis because a cardiac complication was present at the time of the first CMR. All prognostic variables showing an association with the outcome at the univariate Cox proportional hazards model were placed in the multivariate model and were ruled out only if they did not significantly improve the adjustment of the model.

Results: At baseline the mean age of the patients was 29.5 ± 9.0 years and 222 were males. The mean follow-up time was 58 ± 18 months. After the first CMR scan only the 37.8% of the patients did not change the chelation regimen or the frequency/dosage of the chelators.

We recorded 19 episodes of heart failure, diagnosed by clinicians based on symptoms, signs and instrumental findings (electrocardiogram, echocardiography and CMR). Male sex, heart iron, ventricular dysfunction, ventricular dilation, atrial dilation, and myocardial fibrosis were significant univariate prognosticators. In the multivariate analysis the independent predictive factors were an homogeneous pattern of myocardial iron overload (MIO) compared to no MIO (HR=5.81, 95%CI=1.42-23.74, P=0.014), myocardial fibrosis (HR=4.93, 95%CI=1.71-14.71, P=0.003) and ventricular dysfunction (HR=3.45, 95%CI=1.19-9.98, P=0.022) (Kaplan–Meier survival curves in Figure).



Arrhythmias occurred in 19 patients and all were supraventricular hyperhyperkinetic. Male sex, atrial dilatation and ventricular dysfunction were significant univariate prognosticators. In the multivariate analysis the independent predictive factors were male sex (HR=3.17, 95%CI=1.02-9.87, P=0.047) and atrial dilatation (HR=3.07, 95%CI=1.14-8.23, P=0.026).

Serum ferritin and liver iron were not predictive factors for heart failure or arrhythmias.

SIC | *Indice Autori*

Conclusion: We detected few cardiac events thanks to a MR-guided, patient-specific adjustment of the chelation therapy. Severe and homogeneous myocardial iron overload, myocardial fibrosis and ventricular dysfunction identify patients at high risk of heart failure. Heart T2* doesn't have any power in predicting arrhythmias while male sex and atrial dilation are independent prognosticators.

O44

Left Ventricular Volumes, Mass and Function normalized to the body surface area, age and gender from CMR in a large cohort of well-treated Thalassemia Major patients without myocardial iron overload

Antonella Meloni (a), Giovanni Aquaro (a), Pierluigi Festa (a), Cristina Tassi (b), Michele Centra (c), Claudio Ascioti (d), Letizia Gulino (a), Elisabetta Chiodi (e), Monia Minati (f), Vincenzo Positano (a), Massimo Lombardi (a), Alessia Pepe (a)

(a) CMR Unit, Fondazione G. Monasterio CNR-Regione Toscana and Inst. of Clinical Physiology, Pisa, Italy, (b) Servizio di Immunoematologia e Centro Trasfusionale, Policlinico S. Orsola, Bologna, Italy, (c) Servizio Trasfusionale, OO.RR. Foggia, Foggia, Italy, (d) Struttura Complessa di Cardioradiologia-UTIC, P.O. "Giovanni Paolo II", Lamezia Terme, Italy, (e) Servizio Radiologia Ospedaliera-Universitaria, Arcispedale "S. Anna", Ferrara, Italy, (f) U.O.C. Diagnostica per Immagini e Interventistica, Policlinico "Casilino", Roma, Italy

Background: Cardiovascular Magnetic Resonance (CMR) allows an accurate and reproducible quantification of left ventricular (LV) parameters. In Thalassemia major (TM) patients different "normal" LV values have been reported due to chronic anemia and eventually pre-existing iron burdens. Moreover, in this population it is unknown the influence of sex and age on LV parameters and no ranges of normal have been reported using MASS® software. We established the ranges for normal LV volumes, mass and ejection fraction (EF), normalized to the influence of body surface area (BSA), age and sex in a large cohort of well-treated TM patients without myocardial iron overload.

Methods: We selected 142 TM patients with no known risk factors or history of cardiac disease, normal electrocardiogram, no myocardial fibrosis and no myocardial iron overload. Moreover, we studied 71 healthy subjects matched for age and sex. LV function parameters were quantitatively evaluated in a standard way by cine images using MASS® software. LV end-diastolic volume, end-systolic volume, stroke volume, and mass were normalized to BSA (EDVI, ESVI, SVI, mass I).

Results: TM patients showed significantly lower BSA than the controls ($P < 0.0001$). Significantly higher EDVI and SVI were found only for males < 14 years and > 30 years. Significantly higher LV EF were found only for males < 14 years.

In TM patients all LV volumes indexes were significantly larger in males than in females ($P < 0.0001$ in all cases). The EF was not different between the sexes. In males the ESVI and the EF were significant different among the age groups ($P = 0.006$ and $P = 0.001$, respectively). In females no significant differences were detected among the age groups. Table 1 shows the cut-off of normality for CMR parameters.

Table 1. Cut-offs (mean \pm 2 standard deviations) for LV volumes, mass index and EF with the differentiation for sex and age for TM patients.

| | < 14 | | 14-20 | | 20-30 | | 30-40 | | ≥40 | |
|----------------------------|------|----|-------|----|-------|-----|-------|----|-----|-----|
| | M | F | M | F | M | F | M | F | M | F |
| EDVI (ml/m ²) | 130 | 79 | 136 | 97 | 137 | 115 | 122 | 99 | 112 | 120 |
| ESVI (ml/m ²) | 43 | 25 | 54 | 42 | 54 | 46 | 44 | 38 | 41 | 44 |
| SVI (ml/m ²) | 91 | 54 | 81 | 55 | 85 | 71 | 79 | 63 | 80 | 76 |
| Mass I (g/m ²) | 71 | 40 | 83 | 63 | 90 | 71 | 86 | 70 | 100 | 75 |
| EF (%) | 58 | 57 | 56 | 55 | 57 | 55 | 59 | 56 | 56 | 58 |

Conclusion: In a large cohort of well-treated TM patients significant differences in LV parameters compared to controls were limited to males < 14 years and > 30 years. Appropriate “normal” reference ranges normalized to BSA, sex and age should be used to avoid misdiagnosis of cardiomyopathy in TM patients.

O45

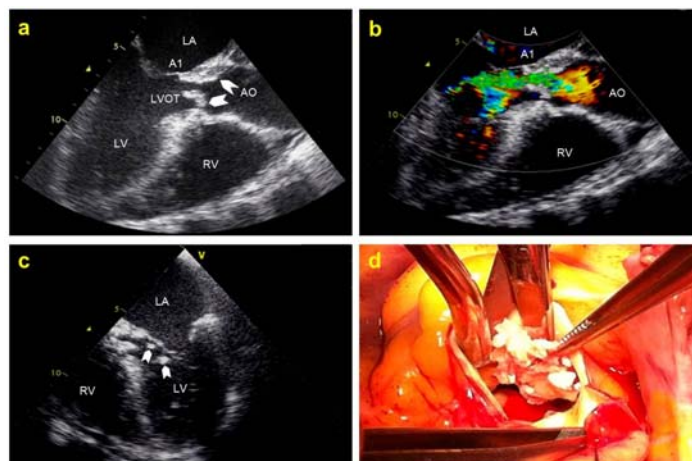
Giant infective endocarditis of native aortic valve with secondary mitral kissing vegetation

Andrea Cardona (a), Giuseppe De Socio (b), Ketty Savino (a), Stefano Pasquino (c), Giuseppe Ambrosio (a)

(a) *Cardiologia e Fisiopatologia Cardiovascolare. Università di Perugia*, (b) *Dipartimento Malattie Infettive. Ospedale S.M. Misericordia Perugia*, (c) *Dipartimento Cardiocirurgia. Ospedale S.M. Misericordia Perugia*

A previously healthy 50-year-old male was admitted to the hospital because of progressive worsening illness, with shortness of breath, asthenia, and fever over the past six months; medical history was otherwise unremarkable. Physical examination revealed tachycardia (120 bpm) a grade 3/6 diastolic aortic murmur, 2/6 systolic mitral murmur, signs of pulmonary congestion and peripheral hypoperfusion. Laboratory exams showed leukocytosis, anemia, microhematuria, high erythrocyte sedimentation rate and increased C-reactive protein. Three sets of blood culture yielded *streptococcus mutans*. At bed transthoracic echocardiography showed multiple areas of increased echogenicity both on the aortic and mitral valve. Left and right ventricular function was preserved. On transesophageal echocardiography mid esophageal long- and short-axis views showed giant vegetations involving all aortic leaflets, causing global disarrangement of their anatomy (white arrows, Figure 1a). All aortic cusps were completely infiltrated by vegetations. Rupture at the base of leaflets implant was present, causing important diastolic flail in the left ventricular outflow tract (LVOT), adjacent to the ventricular surface of the anterior scallop (A1) of the mitral valve (Figure 1a). Color-Doppler images confirmed severe aortic regurgitation (Figure 1b). The 5-chamber view (Figure 1c) showed multiple, highly mobile vegetations involving the anterior and posterior mitral leaflets (white arrows), spreading along subvalvular apparatus. Despite adequate antimicrobial therapy, emergent surgery was performed due to rapidly deteriorating hemodynamics. Intraoperatively, there was evidence of massive aortic valve incompetence due to rupture of left and non-coronary leaflets at the base. Aortic cusps were thickened, irregular and friable (figure 1d). Papillary muscles appeared pale and ischemic. Mitral and aortic valves were replaced by bioprosthesis with complete removal of cusps and subvalvular mitral apparatus. Postoperative course was uneventful.

Diagnostic delay of aortic infective endocarditis can lead to spreading of infection to mitral valve, causing secondary mitral kissing vegetation, and massive endocarditic involvement of cardiac structures.



O46**Role of 18F-FDG PET/TC in the diagnosis of infective endocarditis in patients with implanted electronic device**

Maddalena Graziosi (a), Rachele Bonfiglioli (b), Massimiliano Lorenzini (a), Michele Bartoletti (c), Mariagrazia Rotundo (a), Igor Diemberger (a), Cristina Nanni (b), Matteo Ziacchi (a), Fabio Tumietto (c), Giuseppe Boriani (a), Stefano Fanti (b), Pier Luigi Viale (c), Claudio Rapezzi (a)

(a) Policlinico S.Orsola-Malpighi Istituto di Cardiologia, (b) Policlinico S.Orsola-Malpighi Medicina Nucleare, (c) Policlinico S.Orsola-Malpighi Istituto di Malattie Infettive

Purpose: Infective endocarditis (IE) is still a serious and life threatening disease, underdiagnosed or diagnosed after a major delay. The diagnosis is currently based on the modified DUKE criteria, where the only validated imaging technique is echocardiography. The diagnosis remains challenging especially in patients with devices since echocardiography is often inconclusive. This study was aimed to assess the incremental diagnostic role of 18F-FDG PET/CT in patients with implanted electronic devices and suspected IE.

Methods: Between January 2011 and December 2012 we prospectively analysed 26 consecutive patients with implantable devices: ICD (6 pts), single or dual chamber PM (12 pts) and biventricular PM (8 pts). Five patients had signs of pocket infection. Clinical, microbiological and echocardiographic data were collected. The diagnostic probability of IE was defined during the first hospitalization with the modified DUKE score. All patients underwent 18F-FDG PET/CT before the beginning of antibiotic therapy or within 1 week. We used the culture of the extracted leads and the clinical/laboratory status at 6 month as gold standard. A final diagnosis of IE was established in case of: 1. positive extracted lead culture, or 2. autptic/surgical recognition of vegetations, or 3. development of definite IE during follow up.

Results: We divided patients into three groups according to the initial Duke score: definite, possible and rejected IE.

| | Definite IE (n=4) | Possible IE (n=10) | Rejected IE (n=12) |
|--|-------------------|--------------------|--------------------|
| TTE/TEE | | | |
| -positive | 4 (100%) | 3 (33%) | 0 |
| -ambiguous | | 2 (20%) | 1 (8%) |
| Positive 18-FDG PET/TC | 1 (25%) | 5 (50%) | 1 (8%) |
| Final dg of IE among +PET pts | 1/1 (100%) | 5/5 (100%) | 0 |
| Final dg of IE among - PET pts | / | 0 | 3/11 (27%) |
| ¹⁸ F-DG PET/TC technically suboptimal | 2 (50%) | 1 (10%) | 3 (25%) |
| Lead extraction | 3 (75%) | 5 (50%) | 7 |

Considering patients with a “possible” or “rejected” diagnosis of IE, the positivity of PET/CT suggested a diagnosis of IE in 6 cases, with sensitivity = 54% and specificity= 93%. The best diagnostic performance of PET/CT was in the “possible” IE group; in this group, PET/CT identified the infective focus in the extracardiac portion of the leads in 2 patients. PET/CT did not identify IE in three patients of each “definite” and “reject” IE group, these patients had a technically suboptimal scan of PET/TC or had already been treated with antibiotics for at least 7 days.

Conclusions: 18F-FDG PET/CT increases the diagnostic accuracy of the modified Duke criteria among patients with “possible” IE on electronic devices and may help the clinician to manage this challenging situation.

O47

Miocardite acuta: implicazioni prognostiche dei parametri di imaging

Lucia Occhi (a), Daniela Pini (a), Margherita Calcagnino (a), Veronica Lisignoli (a, b), Barbara Nardi (a, b), Maddalena Lettino (a), Luca Balzarini (b), Lorenzo Monti (b, a)

(a) *Cardiologia, Humanitas Clinical and Research Center, Rozzano, Italy*, (b) *Radiologia, Humanitas Clinical and Research Center, Rozzano, Italy*

Background: la risonanza magnetica cardiaca (CMR) permette la diagnosi non invasiva di miocardite in fase acuta. Esiste quindi una popolazione di pazienti emodinamicamente non compromessi, in cui viene posta la diagnosi di miocardite. Non è ad oggi noto ne' il significato prognostico delle alterazioni strutturali che si osservano in fase acuta (edema, necrosi miocardica) ne' dei parametri di imaging.

Scopo del lavoro: Valutare il significato clinico delle alterazioni di struttura e funzione cardiaca che si osservano in fase acuta sugli eventi clinici sia in acuto che al f.u.

Materiali e metodi: Sono stati raccolti retrospettivamente i dati clinici, biochimici e di CMR dei pz dimessi con diagnosi di miocardite acuta dal 2005 al 2013. Abbiamo inoltre cercato i dati clinici e strumentali di follow-up.

Risultati: Sono stati identificati 103 pazienti (78% maschi), con età media alla diagnosi 40 ± 18 anni. Il sintomo di esordio è stato dolore tracico nel 95% dei pz, con sindrome simil-influenzale nel 84%. Il 35% dei pazienti presentava una FE depressa all'esordio. Nessun dato clinico-anamnestico o biochimico è risultato associato a ridotta FE, mentre la presenza di una quota maggiore di segmenti miocardici con edema miocardico e soprattutto con late enhancement è risultata significativamente associata alla disfunzione VS all'esordio (p rispettivamente = 0.03 e 0.006). I pz con edema LGE esteso hanno presentato una significativamente maggiore quota di eventi aritmici e di complicanze emodinamiche durante il ricovero in fase acuta.

Al follow-up, disponibile con dati RM solo per 45 pz a f.u. medio di 6 mesi, i pz con FE depressa all'esordio hanno presentato un incremento medio di FE del 10%, senza più differenze di edema fra i gruppi, mentre persisteva una maggiore quota di LGE nei pazienti con danno esteso all'esordio. Abbiamo osservato un calo della funzione sistolica (generalmente nell'ambito della normalità) in 14 pz, di entità media di 3.9 punti percentuale. In tutti i casi di riduzione della funzione sistolica i pz appartenevano al gruppo con FE conservata in fase acuta. In soli 2 casi la funzione è passata da normale a depressa. Nessun parametro di imaging all'esordio è risultato correlato al calo di FE a medio termine.

Conclusioni: La disfunzione ventricolare sinistra nella fase acuta della miocardite risulta direttamente associata all'entità dell'edema e della fibrosi visualizzabili con CMR. L'evoluzione sfavorevole verso un calo di FE, contrariamente a quanto si osserva nella cardiopatia ischemica non è dipendente dall'estensione del danno flogistico iniziale (ma verosimilmente dall'interazione patogeno – ospite).

O48**Le cisti pericardiche: limiti diagnostici dell'ecocardiografia ed integrazione con le altre tecniche di imaging.**

Elisabetta Bordoni (a), Ketty Savino (a), Federico Crusco (b), Clara Riccini (a), Giovanni Tilocca (a), Giuseppe Ambrosio (a)

(a) *Cardiologia e Fisiopatologia Cardiovascolare - Università e Azienda Ospedaliera di Perugia*,

(b) *U.O. di Radiologia - ASL3 Umbria*

Introduzione: Le cisti pericardiche sono patologie molto rare, nella maggior parte dei casi benigne e che, se asintomatiche, non necessitano di escissione chirurgica. E' importante una corretta diagnosi differenziale con le cisti idatidee, le broncogene, le teratogene, i tumori mediastinici o cardiaci che, al contrario, devono essere trattate chirurgicamente anche se asintomatici. In questi casi l'integrazione delle tecniche di imaging consente una corretta diagnosi.

Caso clinico: Donna (AM) di 21 anni in ottime condizioni di salute svolge attività fisica regolare. Nel sospetto di scoliosi del rachide esegue un Rx colonna che mette in evidenza un massa ovale sovrapposta alla silhouette cardiaca (Figura 1A). Per una definizione diagnostica della massa viene richiesta una TC e RMN toracica. In attesa dell'esecuzione delle indagini radiologiche e data la stretta vicinanza della massa al cuore la giovane donna esegue una visita cardiologica completata da ecocardiogramma. L'EO ed il tracciato ECGgrafico non mettono in evidenza alcun reperto patologico. All'ecocardiografia, nelle sezioni standard non si apprezzano alterazioni dei diametri cavitari, degli spessori parietali e della cinesi miocardica globale e segmentaria. Normali tutti gli apparati valvolari per impianto, morfologia, dimensioni, cinesi e flussi transvalvolari. Dato il referto radiologico del torace vengono eseguite sezioni non convenzionali con studio della porzione posteriore del mediastino che mettono in evidenza una formazione con dimensioni > 2 cm, la superficie ed bordi appaiono omogeneamente regolari. L'interno della massa è anecogeno, non sepimentato e non si apprezza flusso al color-Doppler. La massa sembra prendere contatto con il pericardio posteriore. L'esame ecocardiografico non consente una diagnosi conclusiva pertanto si resta in attesa del referto della TC e RMN. La TC eseguita con piani assiale, coronale e sagittale mette in evidenza una massa mediastinica di dimensioni di 4 x 5,2 cm a parete liscia che si connette ad angolo ottuso con il pericardio medio-basale laterale del ventricolo sinistro (Figura 1B,C). La ricostruzione in volume rendering delle vie aeree evidenzia uno stop del bronco linguale secondario alla massa espansiva (Figura 1D). La RMN conferma le caratteristiche descritte alla TC e definisce la natura cistica della massa il cui contenuto fluido è deducibile dalla bassa intensità di segnale alle sequenze T1 e l'elevata intensità di segnale alle sequenze T2 pesate (Figura 1E).

Data l'assenza di sintomatologia clinica, l'assenza di pareti particolarmente sottili e la giovane età della paziente si decide per l'osservazione clinica con un attento follow-up.

Conclusioni: L'integrazione delle indagini di imaging consente un'accurata diagnosi differenziale della masse mediastiniche ed indirizza verso un corretta impostazione clinico-terapeutica.

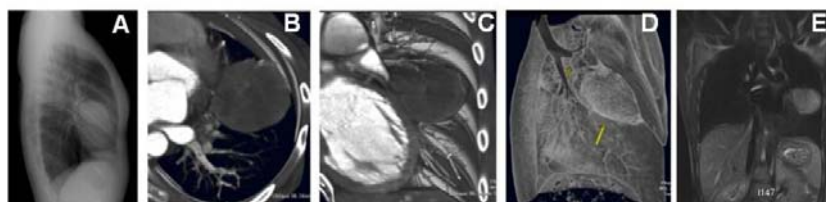


Figura 1

ASPETTI PSICOLOGICI E CARDIOPATIE

O49

Health-related quality of life of coronary artery disease patients improved after counseling program during cardiac rehabilitation.

Gennaro Ratti (a), Gianfranco Ricciardi (b), Cristina Capogrosso (a), Cosimo Fulgione (b), Gregorio Covino (a), Mario Volpicelli (a), Paolo Tammaro (a), Antonio Lizzadro (a), Salvatore Latte (b), Paolo Capogrosso (a), Mario Mallardo (b)

(a) *Cardiology/ICU, S. Giovanni Bosco Hospital, ASL NA 1 CENTRO, Naples*, (b) *Cardiology/Cardiac Rehabilitation, S. Gennaro Hospital, ASL NA 1 CENTRO, Naples*

Background: Inpatient rehabilitation should begin as soon as possible after admission to hospital. It is recognized that the length of hospital stay continues to decrease and, as a consequence, not all elements will be addressed for every patient. As part of the rehabilitation process, counselling offers patients the opportunity to talk about and make sense of their thoughts and feelings. Patients can contact the counselling service directly or can ask any member of the cardiac rehabilitation team to refer them. Counselling in this context does not necessarily mean specialized professional, but rather integrating individualized attention with information provision, reassurance and support for the patient and their family as part of routine daily care.

Aim: The aim of this study is to investigate the effects of patient education and counselling program, during cardiac rehabilitation, on health-related quality of life (HRQOL) in patients with coronary artery disease (CAD) patients.

Methods: 143 patients (112 male and 31 female) (mean age 49 ± 11 yrs) with CAD have undergone sessions of counselling of 50 minutes duration (4 session/month) from May 2012 to march 2013; have also participated 67 subjects as relatives. Subject of education and counselling intervention consists of healthy nutrition, physical activity, maintaining healthy body weight, smoking and alcohol quit issues. After educations and counselling intervention three months later, HRQOL profile was appraised using the Euro-QoL scale-5D (EQ-5D). The EQ-5D consists of two components: an EQ-5D descriptive system and an EQ-5D Visual Analogue Scale (EQ-5D VAS). In the descriptive system, the respondent is asked to rate his or her health by checking one of three levels of severity: “no problems” (coded as 1), “some or moderate problems” (coded as 2), “severe problems or unable to perform” (coded as 3). In each of the following 5 EQ-5D dimensions: mobility, self-care and pain/discomfort, usual activities, and anxiety/depression. For the EQ-VAS, participants draw a line from a box to the point on the thermometer-like scale corresponding to their health state (with a range from 0 “the worst imaginable health state” to 100 “the best imaginable health state”). Anxiety and depression was also evaluated by Hospital Anxiety and Depression Scale (HADS) a fourteen item scale (Seven of the items relate to anxiety and seven relate to depression).

Results: After education and counselling intervention, we have observed a meaningful improvement of lifestyle (body mass index, number of cigarettes and alcohol drinks per day) but also of HRQOL (EQ-5D values expressed respectively as a percentage of patients, mobility no problems 21% vs 80% moderate problems 49% vs 13% severe problems 30% vs 7% - self-care no problems 25% vs 75% moderate problems 47% vs 15% severe problems 30% vs 8% - pain/discomfort: no problems 19% vs 54%, moderate problems 31% vs 36% severe problems 55% vs 10% - usual activities no problems 20% vs 70%, moderate problems 70% vs 25% severe problems 10% vs 5% , - anxiety/depression no problems 5% vs 60% moderate problems 55% vs 27% severe problems 40% vs 13% - EQ-VAS 45 ± 17 vs 78 ± 22 - $p < 0.05$) and HADS score (17 ± 5 vs 12 ± 6 - $p < 0.05$). Conclusions: Education and counseling intervention in patients with CAD was accompanied by improvement in physical activity, increase in diet compliance level, positive effect on psychopathological profile and positive increasing trend in quality of life scale.

O50

La qualità di vita nel paziente cardiopatico ischemico cronico: protocolli di intervento psicologico.

Mariarosaria Cucinotta (a), Assunta Maiello (b), Federica Sacco (c), Martina Esposito (d), Gerolamo Sibilio (e)

(a) M. Cucinotta, U.O.C. Cardiologia ed UTIC Ospedale S.M. delle Grazie Pozzuoli, (b) A. Maiello, U.O.C. Cardiologia ed UTIC Ospedale S.M. delle Grazie Pozzuoli, (c) F. Sacco, U.O.C. Cardiologia ed UTIC Ospedale S.M. delle Grazie Pozzuoli, (d) M. Esposito, U.O.C. Cardiologia ed UTIC Ospedale S.M. delle Grazie Pozzuoli, (e) G. Sibilio, U.O.C. Cardiologia ed UTIC Ospedale S.M. delle Grazie Pozzuoli

Background: La conoscenza della qualità di vita del paziente affetto da cardiopatia ischemica cronica nello svolgimento della vita quotidiana e la diagnosi precoce dei segni prodromici di patologia a carattere disadattivo, sono fondamentali per un intervento riabilitativo di tipo psicologico, sia durante l'ospedalizzazione che in sede ambulatoriale.

Obiettivi: E' fondamentale valutare la presenza di percezioni a carattere disadattivo del paziente nei confronti della malattia, per istituire un protocollo che preveda attività di counselling individuale, durante il ricovero ospedaliero e supporto psicologico in ambito ambulatoriale. L'intervento riabilitativo precoce può migliorare la percezione di malattia e prevenire l'instaurarsi di manifestazioni comportamentali a carattere disadattivo.

Materiale e metodi: Sono stati arruolati n° 50 pazienti, di età compresa tra i 35 e 75 anni, affetti da cardiopatia ischemica cronica. E' stata somministrata la seguente testistica: l'*Illness Perception Questionnaire* ed il *Questionario sulla qualità della vita* del paziente con cardiopatia ischemica cronica. E' stato indagato il vissuto del paziente, rispetto alla gioia di vivere, al dover trascorrere l'intera vita con dolore toracico, senso di oppressione o angina. Un aspetto preminente è stato quello di individuare gli elementi a carattere psicopatologico, riferibili alla paura di morte improvvisa o infarto.

Risultati: Per quanto riguarda i risultati dell'*Illness Perception Questionnaire* rispetto alle “emozioni negative”, il 20 % dei pazienti dichiara di provare paura rispetto alla propria malattia, il 17% ansia, il 17% preoccupazione, il 16% si sente arrabbiato, il 15% si irrita quando pensa alla sua malattia ed il 15 % si deprime quando pensa alla propria malattia. In riferimento al *Questionario sulla qualità di vita* del paziente affetto da cardiopatia ischemica cronica, la “gioia di vivere” risulta per il 4% per niente influenzata dalla patologia coronarica, per il 4% molto poco, per il 14% poco, per il 53% moderatamente, per il 25% molto influenzata. Per quanto riguarda il “trascorrere tutta la vita con dolore toracico, senso di oppressione o angina”, il 22% dei pazienti risulta per niente soddisfatto, il 73% molto insoddisfatto, il 2% in parte soddisfatto, il 3% decisamente soddisfatto e lo 0% molto soddisfatto. Per quanto concerne il timore di un “attacco di cuore o morte improvvisa”, il 27% non può smettere di essere preoccupato, il 27% è occasionalmente preoccupato, il 46% ci pensa spesso ed è preoccupato, lo 0% dei pazienti non pensa e non è preoccupato della “possibilità di un attacco di cuore o morte improvvisa” e lo 0% raramente ci pensa ed è preoccupato.

Conclusioni: E' opportuno istituire dei protocolli di intervento psicologico, sia in ambito ospedaliero che ambulatoriale, per permettere al paziente il miglioramento della qualità di vita e l'elaborazione di ansia e depressione. Tali protocolli possono favorire una più adeguata percezione della malattia, al fine di prevenire eventuali e successivi comportamenti a carattere disadattivo.

O51

Effetto di un regime dietetico controllato sul tono dell'umore di pazienti affetti da infarto miocardico acuto e sottoposti a rivascularizzazione per via percutanea

Fabio Maresca (a), Ilaria Carandente (a), Vito Di Palma (a), Michele Bevilacqua (a), Giuseppe Uccello (a), Alessandro Giaquinto (a), Fabrizia Di Gioia (a), Plinio Cirillo (a), Bruno Trimarco (a)

(a) *Dipartimento di Scienze Biomediche Avanzate, Divisione di Cardiologia, Università Federico II Napoli*

Background: La malattia aterosclerotica è provocata da diversi fattori di rischio, alcuni dei quali imm modificabili come età, sesso e patrimonio genetico, ed altri, viceversa, modificabili mediante un corretto stile di vita, necessariamente vincolato anche a cambiamenti delle abitudini alimentari dei pazienti. Tuttavia, è stato dimostrato che la modifica delle abitudini alimentari, spesso accompagnata dall'eliminazione di determinati cibi, determina anche un impoverimento del tono dell'umore. Evidenze scientifiche recenti indicano che il tono dell'umore potrebbe giocare un potenziale ruolo come fattore di rischio cardiovascolare. La depressione clinicamente diagnosticata, così come il "semplice" riscontro di sintomi depressivi, possono predire l'incidenza di malattie cardiovascolari o peggiorarne la prognosi. Nel presente lavoro abbiamo studiato se la somministrazione di un regime dietetico "controllato" possa influire sul tono dell'umore, influenzando così la prognosi di pazienti con infarto miocardico (IMA).

Metodi: Cento pazienti affetti da IMA e trattati con PCI sono stati suddivisi in due gruppi: **a) gruppo di intervento:** indirizzato a seguire un regime alimentare suggerito da dietisti dedicati, in accordo alle indicazioni delle Linee Guida Europee sulla prevenzione cardiovascolare e personalizzato in base alle singole abitudini alimentari. **b) gruppo di controllo:** regime dietetico libero, senza supporto dietetico. I pazienti di entrambi i gruppi, in terapia medica ottimale, venivano seguiti per un periodo di follow-up di 6 mesi, all'inizio e fine dei quali compilavano un questionario finalizzato alla valutazione del tono dell'umore, il BDI II (Beck Depression Inventory II). Per valutare l'aderenza al regime dietetico, sono stati illustrati ai pazienti del gruppo d'intervento sette goals clinico-laboratoristici, scelti nell'ambito delle indicazioni sulla prevenzione cardiovascolare secondaria, da raggiungere nel corso del follow-up (PA < 140/90 mmHg, LDL < 70 mg/dl, HDL > 40 mg/dl per gli uomini e > 50 mg/dl per le donne, Trigliceridi < 150 mg/dl, Glicemia < 110 mg/dl, BMI < 25 kg/m², Circonferenza vita < 102 cm per gli uomini e < 88 cm per le donne). Una buona aderenza al regime dietetico è stata considerata come il raggiungimento di almeno 4 dei target previsti.

Risultati: Il gruppo di intervento, ha riportato una più equilibrata composizione bromatologica della dieta ed una riduzione dell'apporto calorico, mostrando anche un miglioramento significativo dei valori medi del BDI II tra inizio e fine follow-up ($22,2 \pm 3,7$ vs $7,6 \pm 3,2$; $p < 0,05$), non osservati nel gruppo di controllo ($21,9 \pm 4,1$ vs $14,7 \pm 7,2$; $p = ns$). All'interno del gruppo di intervento, solo i pazienti con miglior aderenza al regime dietetico hanno ottenuto un significativo miglioramento del profilo psicologico ($22,1 \pm 5,8$ vs $5,3 \pm 2,2$ $p < 0,05$), rispetto a chi non ha ottenuto gli stessi risultati clinici ($20,7 \pm 2,5$ vs $15,1 \pm 7,2$; n.s). Dati preliminari, indicano, inoltre, che un miglioramento del tono dell'umore possa influire positivamente anche sulle capacità funzionali dei pazienti, valutate tramite il valore di METS raggiunti al test ergometrico, in maniera indipendente dall'andamento clinico.

Conclusioni: Un approccio combinato di terapia farmacologica e correzione guidata delle abitudini alimentari permette una significativa riduzione dell'apporto calorico giornaliero, un miglioramento delle caratteristiche bromatologiche della dieta ed una più efficace prevenzione secondaria. Inoltre, l'adozione di tale regime ha effetti positivi sul tono dell'umore direttamente proporzionali al numero di target raggiunti.

O52

Depression symptoms and the progression of carotid intima-media thickness: a 5-year follow-up study.

Carmine Pizzi (a), Grazia Maria Costa (a), Luigi Santarella (a), Raffaele Bugiardini (a)

(a) *Dipartimento di Medicina Specialistica, Diagnostica e Sperimentale. Università Alma Mater Studiorum*

Background: Only a few studies have investigated the changes in carotid intima-media thickness (IMT) over time, and uncertainties remain on the underlying mechanisms linking depression and subclinical atherosclerosis. We carried out a prospective cohort study to evaluate whether depression is associated with changes in carotid IMT in subjects with cardiac risk factors but free from coronary heart disease (CHD), and to what extent the atherogenicity of depression can be explained by inflammatory markers and autonomic nervous system dysfunction.

Methods: During baseline and follow-up visits: all participants were asked to provide blood samples and compile a structured questionnaire; trained physicians assessed depression symptoms using Beck Depression Inventory (BDI); altered cardiac autonomic tone was measured using time-domain components of heart rate variability in 24h Holter recordings; measurements of carotid IMT were carried out using B-mode ultrasound image acquisition. Logistic and linear regression analyses were used to adjust for potential confounders and explore potential mediators.

Results: A total of 381 subjects completed the 5-year follow-up. The mean carotid IMT significantly increased in all subjects but the amount of increase was significantly larger among subjects with depression symptoms: mean IMT increased by 0.16 ± 0.14 mm; 0.31 ± 0.28 mm and 0.61 ± 0.54 mm among the subjects with no, mild and moderate/severe depression, respectively (all $p < 0.01$). The association between moderate/severe depression and IMT increase remained highly significant even after controlling for all the variables considered, however when both IL-6 and CRP were included in multivariate models the regression coefficient decreased by 42.3%. Some of the inflammation markers and autonomic nervous system dysfunction were also independently correlated with carotid IMT increase.

Conclusion: Depression symptoms are independently associated with an accelerated progression of carotid IMT in subjects with CHD risk factors, and inflammation may substantially modulate the association between depression and carotid IMT progression.

MIOCARDIOPATIE 1

O53

Atrial fibrillation in amyloidotic cardiomyopathy: prevalence, incidence, risk factors and prognostic role

Simone Longhi (a), Candida Cristina Quarta (a), Christian Gagliardi (a), Agnese Milandri (a), Ilaria Gallelli (a), Massimiliano Lorenzini (a), Nelson Gentile (a), Mario Michele Cinelli (a), Serena Foffi (a), Lisa Manuzzi (a), Angelo Branzi (a), Claudio Rapezzi (a)

(a) *Institute of Cardiology, University of Bologna and S.Orsola-Malpighi Hospital, Bologna*

Purpose: Although atrial fibrillation (AF) is a well known complication of amyloidotic cardiomyopathy (AC), a precise clinical, pathophysiological and prognostic characterization is not available. The aim of our study was to evaluate prevalence, incidence, risk factors for AF and prognostic significance of AF in the three main etiological subgroups of AC: light-chain (AL), hereditary transthyretin-related (mATTR) and non-mutant transthyretin-related (wtATTR).

Methods: We studied 263 patients with AC (124 AL, 94 mATTR, 45 wtTTR) and assessed clinical, ECG, echocardiographic and hemodynamic details at presentation.

Results: Prevalence of AF at first evaluation was 15% overall: 9% in AL, 11% in mATTR and 40% in wtTTR. During a median follow up of 1.2 (IQR 0.3–2.8) years, 11 other patients developed AF (2.1% person-years). At univariate analysis, age (OR 1.08, 95% CI 1.04–1.11), NYHA class III-IV (OR 4.12, 95% CI 1.99–8.55), wtATTR etiology (OR 6.8, 95% CI 2.84–16.30), left ventricular ejection fraction (LVEF) (OR 0.96, 95% CI 0.93–0.98), right atrial pressure (OR 1.14, 95% CI 1.04–1.23) and pulmonary capillary wedge pressure (OR 1.07, 95% CI 1.01–1.13) were significantly ($p<0.01$) associated with the risk of AF. At multivariate analysis however, only age (OR 1.06, 95% CI 1.01–1.12), LVEF (OR 0.96, 95% CI 0.94–0.99) and right atrial pressure (OR 1.13, 95% CI 1.03–1.24) remained associated as independent variables. Left ventricular wall thickness was not associated with AF in any of the three etiological subgroups. Warfarin was prescribed to all AF patients and none suffered thromboembolic events. AF was not associated with an increased mortality even though survival free from heart failure was significantly lower in patients with AF in the mATTR (event rate 14.6% vs 1.1% person-years, $p=0.0001$) and wtATTR groups (event rate 15.2% vs 5.4% person-years, $p=0.05$).

Conclusions: Prevalence of AF at presentation was 15% in the entire cohort, with a maximum rate of 40% in wtATTR patients. Left ventricular systolic and diastolic dysfunction, but not wall thickness, were associated with AF. AF was an incremental risk factor for mortality or heart failure in patients with TTR-related amyloidosis.

O54

Amiloidosi AL: il ruolo di età e sesso

Ambra Raimondi (a), Roberta Mussinelli (a), Francesco Salinaro (a), Michele Boldrini (a), Francesco Musca (a), Raffaele Dell'Acqua (a), Flavio Pietrangioli (a), Francesco Cappelli (b), Federico Perfetto (b), Caludio Rapezzi (c), Giovanni Palladini (d), Giampaolo Merlini (d), Stefano Perlini (a)

(a) IRCCS Policlinico San Matteo, Clinica Medica II, Università di Pavia, Pavia, (b) Ospedale Universitario Careggi, Centro Regionale Amiloidosi, Firenze, (c) Policlinico Malpighi, Cardiologia, Bologna, (d) Centro per lo Studio e la Cura delle Amiloidosi Sistemiche, Medicina Molecolare, Pavia

Purpose: Amyloidosis is a rare illness with a severe prognosis, since almost the totality of patients die in few years. The most important prognostic factor is cardiac involvement, but very few is known about others simpler determinants, as gender and age. The aim of this analysis is studying the differences of gender and age in cardiac AL amyloidosis, focusing in particular on stage of the illness at diagnosis and prognosis.

Methods: We enrolled 260 consecutive untreated subjects, in whom a first diagnosis of cardiac AL amyloidosis was concluded between 2008 and 2010. Patients in whom cardiac involvement was excluded served as controls ($n=120$). In the group with cardiac AL amyloidosis the prevalence of females was 38,8% ($n=101$), male 61,2% ($n=159$). Our cohort included patients with a minimum of 35 to a maximum of 88 years, divided in quartiles. Prognosis was assessed after a median follow-up of 326 days.

Results: As expected, when compared to males, females had a lower BSA ($p<0.001$) and left ventricular mass ($p<0.001$), but no differences were observed if left ventricular mass was corrected for BSA. At ECG we observed a prolonged PQ ($p=0.02$) and QRS ($p<0.001$) interval in men, but no elongation of QT interval. The echocardiographic data showed a worse lateral mitral annulus excursion (index of systolic function, $p=0.03$) in women, even if others parameters of systolic function didn't show significant differences. Moreover, the mean ventricular thickness was lower for women ($p=0.012$), while if this parameter was indexed for BSA, females showed higher values ($p=0.027$). No differences were found in biomarkers levels (such as NT-proBNP e TnI) and Free Light Chains amount. The analysis for age demonstrated no significant differences in ECG and biomarkers between quartiles at diagnosis, but younger patients seemed to present a worse diastolic

function (assessed with E/A $p=0.05$). In survival analysis, women and younger patients seemed to have better prognosis, but this difference was not statistically significant.

Conclusions: In cardiac AL amyloidosis the echocardiographic presentation at diagnosis is a little worse for woman and younger, but this difference don't affect the prognosis.

O55

Qual è la reale prevalenza della miocardiopatia Tako-Tsubo?

Antonio Facciorusso (a), Guido Valle (b), Giovanni de Luca (a), Sandra Mastroianno (a), Giuseppe Di Stolfo (a), Mario Fanelli (c), Serena Michellini (d), Cesare Amico (a), Mario Stanislao (a)

(a) *Unità di Cardiologia - IRCCS Casa Sollievo della Sofferenza, San Giovanni Rotondo (FG)*, (b) *Unità di Medicina Nucleare - IRCCS Casa Sollievo della Sofferenza, San Giovanni Rotondo (FG)*, (c) *Istituto di Cardiologia - Università degli Studi di Foggia*, (d) *Seconda Facoltà di Medicina e Chirurgia - Università "La Sapienza" - Roma*

Introduzione: La cardiomiopatia Tako-Tsubo (CTT) è caratterizzata da una sintomatologia clinica simile alla Sindrome Coronarica Acuta (SCA) da cui si differenzia per la transitoria disfunzione della regione apicale del ventricolo sinistro in assenza di coronaropatia di rilievo. Nei diversi studi disponibili in letteratura la prevalenza di CTT nei pazienti ricoverati in Unità Coronarica con sospetto di SCA varia notevolmente. Il nostro lavoro è stato finalizzato alla valutazione della reale prevalenza di CTT nei pazienti ricoverati nell'Unità Coronarica del nostro Ospedale ed a comprendere le ragioni della più alta prevalenza rilevata rispetto ai dati riportati da altri Autori.

Metodi e Risultati: Di 379 pazienti ricoverati con sospetta SCA, 20 soddisfacevano i criteri della Mayo Clinic per la diagnosi di CTT risultandone una prevalenza del 5.28%. Nella massima parte dei casi fu possibile identificare lo stress scatenante che risultò di tipo emozionale in 16 casi (80%) e fisico in 2 casi (10%). Durante il ricovero non si sono registrati decessi. Nei 47 ± 13 mesi di follow-up non si è osservata mortalità per cause cardiache ma una paziente decedette per una neoplasia ovarica e si verificarono 2 recidive di CTT, pari ad un tasso del 10%.

Conclusioni: La più alta prevalenza di CTT osservata nei pazienti ricoverati nella nostra Unità Coronarica per sospetta SCA è verosimilmente riconducibile alla accuratezza dell'anamnesi volta ad identificare, nei soggetti con coronarie angiograficamente integre, il verificarsi di stress psicologici, ancorché lievi, nei giorni precedenti il ricovero.

O56

Analisi della sopravvivenza in donne affette da LV Apical Ballooning Syndrome: dati preliminari

Francesca Cavalla (a), Roberta Miceli (a), Milena Aste (a), Camilla Zawaideh (a), Ombretta Cutuli (b), Alberto Valbusa (a), Francesco Abbadessa (a), Manrico Balbi (a), Gian Paolo Bezante (a)

(a) *IRCCS AOU San Martino - IST Clinica Malattie dell'Apparato Cardiovascolare*, (b) *IRCCS AOU San Martino - IST Dipartimento di Emergenza - Accettazione*

Background: L'Apical Ballooning Syndrome (LVABS) è una rara cardiomiopatia che colpisce prevalentemente il sesso femminile. La manifestazione clinica d'esordio mima una sindrome coronarica acuta con riscontro all'imaging cardiaco di una disfunzione ventricolare sinistra reversibile.

Scopo: Determinare l'incidenza di eventi fatali (morte da tutte le cause, morte cardiovascolare) delle pazienti affette da LVABS ricoverate presso la nostra struttura e confrontarle con la sopravvivenza della popolazione generale e di una popolazione STEMI (infarto miocardico acuto con sopraslivellamento del tratto ST).

Metodi: Da maggio 2001 a dicembre 2011 54 pazienti di sesso femminile dimesse con diagnosi di LVABS (età media 72.3 ± 10.8 anni) sono state confrontate con un gruppo STEMI appaiata per sesso, età e fattori di rischio, arruolate nello stesso periodo (età 72.3 ± 11.7 anni). Le caratteristiche di questa popolazione e della popolazione STEMI di confronto sono riassunte nella tabella seguente.

Il follow up è stato effettuato

| | LVABS | STEMI |
|--------------|-------|-------|
| Familiarità | 16.7% | 16.7% |
| Ipertensione | 66.7% | 46.3% |
| Diabete | 11.1% | 13.0% |
| Fumo | 11.1% | 11.1% |
| Dislipidemia | 40.7% | 40.7% |

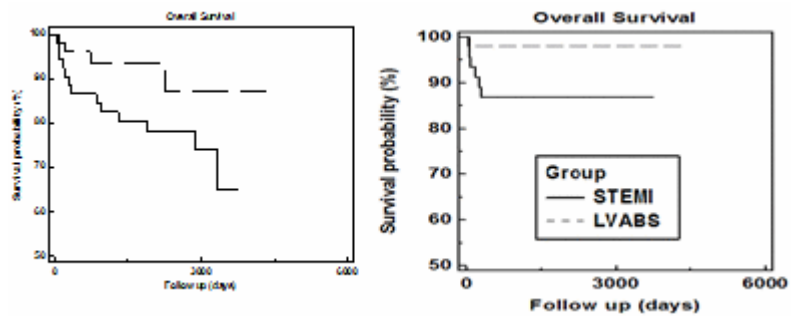
mediante regolari visite ambulatoriali o contatti telefonici,

con una durata media di 4.4 anni (range 1.5-12.9 anni) per LVABS e di 6.6 anni (range 6.7-10.5 anni) per STEMI. La sopravvivenza nei due gruppi è stata calcolata con il metodo di Kaplan Meier.

Risultati: L'evento trigger nel LVABS è stato uno stress emozionale nel 53.7% dei casi, nel 29.6% uno stress fisico. Dolore toracico era presente nel 79.6% dei casi all'esordio, accompagnato o meno da dispnea (35.2%). La sopravvivenza della popolazione affetta da LVABS è stata 87.3%. Vi sono stati 4 decessi, 1 dei quali per cause cardiovascolari (ictus). Nella popolazione STEMI la sopravvivenza è stata del 64.7%. 7 dei 13 decessi erano attribuibili a cause cardiovascolari. Non abbiamo quindi osservato una differenza statisticamente significativa in termini di sopravvivenza tra le due popolazioni ($p=0.065$), mentre vi era una significativa differenza nella mortalità per cause cardiovascolari nel gruppo STEMI ($p<0.05$).

Confrontando la sopravvivenza totale della popolazione con LVABS (87.3%) con il dato grezzo di sopravvivenza generale della popolazione italiana (estrapolata dalle tabelle del 2008 dell'Istituto Superiore di Sanità), di età compresa tra i 70 e 80 anni di sesso femminile (95.0%), si evince che i LVABS avevano una aspettativa di vita inferiore.

Conclusioni: Le pazienti con LVABS presentano una mortalità superiore alla popolazione generale di confronto, ma tale sindrome non sembra rappresentare un fattore di rischio per morte cardiovascolare.



O57

Amiloidosi cardiaca AL e ATTR: una presentazione ECG ed ecocardiografica sovrapponibile?

Michele Boldrini (a), Francesco Salinaro (a), Roberta Mussinelli (a), Ambra Raimondi (a), Francesco Musca (a), Francesco Cappelli (b), Federico Perfetto (b), Caludio Rapezzi (c), Raffaele Dell'Acqua (a), Erez Binot (a), Giovanni Palladini (d), Giampaolo Merlini (d), Stefano Perlini (a)

(a) IRCCS Policlinico San Matteo, Clinica Medica II, Università di Pavia, Pavia, (b) Ospedale Universitario Careggi, Centro Regionale Amiloidosi, Firenze, (c) Policlinico Malpighi, Cardiologia, Bologna, (d) Centro per lo Studio e la Cura delle Amiloidosi Sistemiche, Medicina Molecolare, Pavia

Scopo dello studio: La prognosi sia dell'amiloidosi a catene leggere (AL) che dell'amiloidosi ereditaria da transtiretina (m-ATTR) è fortemente influenzata dal coinvolgimento cardiaco, per quanto le due forme abbiano una storia naturale nettamente diversa. Abbiamo confrontato le caratteristiche elettrocardiografiche (ECG) di queste due forme di amiloidosi cardiaca al momento della diagnosi.

Metodi: Sono stati arruolati pazienti consecutivi con prima diagnosi di amiloidosi cardiaca AL ($n=160$) ed m-ATTR ($n=57$) e sottoposti ad ECG ed EcoColorDoppler cardiaco. Sono stati misurati gli intervalli PQ, QRS e QT corretto e la prevalenza di ritardi della conduzione intraventricolare, QRS frammentati (fQRS) e bassi voltaggi periferici. Il QRS score è stato calcolato come somma

dell'ampiezza dell'onda Q, R ed S in tutte le derivazioni. I disturbi della conduzione sono stati considerati esito del deposito intramiocardico di amiloide, mentre parametri quali presenza di fQRS e pseudonecrosi come espressione di aree fibrotiche reattive. Questi ultimi due assieme al pattern da sovraccarico sono stati attribuiti alla tossicità diretta delle fibrille. La massa del ventricolo sinistro indicizzata per superficie corporea (LVMI) è stata considerata una stima indiretta del deposito di amiloide. Sono stati inoltre dosati BNP, NT-proBNP e cTnI. Si è proceduto inoltre a confrontare due sottogruppi di pazienti accoppiati 1:1 per valori di LVMI.

Risultati: Nonostante una maggiore LVMI, rispetto alla forma AL l'amiloidosi m-ATTR è caratterizzata da una minore prevalenza di bassi voltaggi, di sovraccarico ventricolare sinistro nonché da un prolungamento del PQ e del QRS con intervallo QTc più corto (Tabella; valori medi±deviazione standard o mediani (range 25%-75%)). Tali dati risultano confermati anche analizzando i sottogruppi di pazienti "accoppiati" per valore di LVMI.

Conclusioni: Malgrado un maggiore deposito di sostanza amiloide, la forma m-ATTR presenta maggiori voltaggi e minore prevalenza di anomalie della ripolarizzazione e di fQRS. È evidente invece una maggiore prevalenza di ritardi della conduzione. Tale differente presentazione all'ECG suggerisce una diversa fisiopatologia del danno miocardico, che sembra maggiormente legato al deposito nella forma m-ATTR, mentre nella forma AL anche ad una maggiore tossicità delle catene leggere. Questo va di pari passo con livelli più elevati di marcatori di danno cardiaco e una peggiore prognosi delle amiloidosi cardiache AL.

| | m-aTTR | AL | p value |
|--------------------------------------|------------------|-------------------|----------------|
| LVMI (g/m²) | 213±59 | 173±46 | <0.001 |
| QRS score (mV) | 104±29 | 87±39 | 0.005 |
| PQ (msec) | 193±38 | 181±37 | 0.048 |
| QRS (msec) | 103±28 | 88±19 | <0.001 |
| QT corretto (msec/sec) | 438±29 | 457±39 | 0.001 |
| NT proBNP (ng/L) | 981 (483-1708) | 5527 (2917-13074) | <0.001 |
| cTnI (ng/mL) | 0.08 (0.02-0.14) | 0.3 (0.05-0.23) | 0.033 |
| Bassi voltaggi periferici (%) | 31.5 | 69 | <0.0001 |
| Ritardi di conduzione IV (%) | 43.8 | 23.75 | 0.025 |
| Anomalie da sovraccarico (%) | 10% | 51% | 0.002 |
| fQRS (%) | 10.5% | 30.6% | 0.003 |

O58

Effect of therapy with tafamidis on myocardial deformation in patients with cardiac familial amyloidosis

Gianluca Di Bella (a), Matteo Casale (a), Massimo Russo (b), Maria Sergi (a), Vittorio Virga (a), Concetta Zito (a), Anna Mazzeo (b), Giuseppe Vita (b), Scipione Carerj (a)

(a) Dipartimento di Medicina Clinica e Sperimentale, (b) Dipartimento di Scienze Neurologiche

Purpose: Familial amyloidotic polyneuropathy (FAP) is an inherited disease characterized by an abnormal systemic deposition of transthyretin with elective involvement of the peripheral nervous system and heart. Two dimensional strain echocardiography (SE) permits to quantify, non-invasively and accurately, longitudinal, radial and circumferential deformation of left ventricle (LV). Recently, tafamidis, showing a slowed progression of amyloid polyneuropathy, was indicated as therapy in adult patients with an early stage (stage 1) of familial amyloidotic polyneuropathy. No data are available about the role of tafamidis in cardiac amyloidosis.

The aim of our study was to investigate the effect of tafamidis in longitudinal, circumferential and radial deformation in FAP patients with cardiac amyloidosis.

Methods: twelve FAP (41±11 years) with a diagnosis of cardiac amyloidosis and indication to therapy with tafamidis were enrolled in the study. The patients were evaluated in 2 phase: 1) resting condition (before tafamidis) and 2) follow-up (after 1 year tafamidis therapy).

SE was performed using a commercial ultrasonography system (MyLab50CV, Esaote Florence). Echocardiographic recordings were done from 4 and 2 chambers apical view for the evaluation of ejection fraction and longitudinal strain, and for middle short axis view of LV for the evaluation of circumferential and radial strain. To quantify longitudinal and circumferential strain, the images were analysed offline by “track”LV endocardial borders in an operator driven automatic approach (“XStrain Imaging”).

Results: There were no adverse effect during therapy with tafamidis. Ejection fraction was similar before (62±4%) and after tafamidis therapy (61±4%). Longitudinal SE before (-14.3±8%) and during tafamidis (-15±8%) as well as radial strain before (26.6±11%) and during tafamidis (29±7%) were similar. Circumferential strain was higher (p=0.02) during tafamidis (25.5±8%) respect to before tafamidis (22.7±8%).

Conclusion: circumferential deformation but no radial and longitudinal deformation increases in FAP patients with cardiac amyloidosis after 1 year of therapy of tafamidis.

CARDIOPATIE NEL DIABETE 1

O59

Adverse epigenetic remodelling of p66Shc gene correlates with persistent endothelial dysfunction and oxidative stress in type 2 diabetics with optimal glycemc control

Francesco Paneni (a), Sarah Costantino (c), Lorenzo Castello (a), Giuliana Capretti (a), Sergio Chiandotto (a), Rodolfo Battista (b), Dario Pitocco (e), Giuseppe Scavone (d), Thomas Luscher (c), Gaetano Lanza (d), Massimo Volpe (a), Francesco Cosentino (a)

(a) *Cardiology, Department of Clinical and Molecular Medicine, University of Rome "Sapienza",*
(b) *Civil Hospital, Sora (FR), Italy,* (c) *Cardiology and Cardiovascular Research, University of Zurich, Switzerland,* (d) *Department of Cardiovascular Medicine, Catholic University, Rome, Italy,*
(e) *Diabetes Care Unit, Department of Internal Medicine, Catholic University, Rome, Italy*

Introduction: Hyperglycemic memory may explain why optimal glycemc control (OGC) has failed to improve cardiovascular outcomes in patients with diabetes. We recently reported that epigenetic regulation of the mitochondrial adaptor p66^{Shc}, critically involved in oxidative stress, accounts for persistent endothelial dysfunction in diabetic mice with OGC. In the present study we hypothesise that p66^{Shc} may be a determinant of vascular hyperglycemic memory in patients with type 2 diabetes.

Methods: 7 patients with newly-diagnosed type 2 diabetes (T2DM) and 7 age-matched healthy controls were studied (age 46±3 vs. 42±7 years, p=NS). After the enrolment, T2DM patients were assigned to OGC for 6 months with hypoglycaemic agents or insulin. Glycated haemoglobin (HbA1c) and continuous blood glucose monitoring (6 days) were used as markers of glycemc control. Both at baseline and follow-up T2DM patients underwent flow-mediated vasodilation (FMD) of the brachial artery to assess endothelial function. Urinary levels of 8-isoprostaglandinF2α (8-isoPGF2α) were measured as a marker of oxidative stress. p66^{Shc} mRNA expression and promoter-related epigenetic changes were assessed from peripheral blood monocytes. Chromatin immunoprecipitation (ChIP) was performed to investigate acetylation of histones binding p66^{Shc} promoter. Methylation of CpG dinucleotides was performed by real time PCR.

Results: Hb1Ac significantly differ in T2DM before and after OGC (9.4±2 vs. 6.9±1%, p<0.01). Continuous blood glucose monitoring confirmed the restoration of an euglycemc (235±25 vs. 131±28 mg/dl, p<0.05). As compared with controls, T2DM patients showed blunted FMD (6.8±1.9 vs. 8.6±1.4 %, p<0.05), increased urinary 8-isoPGF2α levels (295±100 vs. 33±9 pg/ml, p<0.05) and p66^{Shc} gene upregulation (0.18±0.06 vs.0.05±0.03 AU, p<0.05). However, OGC did not rescue

endothelial function (FMD 6.9 ± 1.7 vs. $6.8\pm 1.9\%$, $p=NS$), oxidative stress (295 ± 100 vs. 292 ± 85 pg/ml, $p=NS$) and p66^{Shc} upregulation (0.18 ± 0.06 vs. 0.22 ± 0.10 , $p=NS$). T2DM patients showed lysine 14 acetylation of histone 3 binding p66^{Shc} promoter as well as hypomethylation of CpG dinucleotides, two critical epigenetic markers favouring p66^{Shc} overexpression. Interestingly, these epigenetic changes remained despite OGC and significantly correlated with persistent endothelial dysfunction and oxidative stress.

Conclusions: Epigenetic regulation of p66^{Shc} gene may contribute to the residual burden of vascular disease in T2DM individuals with OGC.

O60

Early outcomes of coronary artery bypass grafting with bilateral internal thoracic artery in diabetic versus non-diabetic patients

Giuseppe Gatti (a), Luca Dell'Angela (b), Gabriella Forti (a), Umberto Tognolli (a), Marco Gabrielli (a), Elisabetta Rauber (a), Bernardo Benussi (a), Roberto Luzzati (c), Gianfranco Sinagra (b), Aniello Pappalardo (a)

(a) Division of Cardiac Surgery, University Hospital "Ospedali Riuniti", Trieste, Italy, (b) Division of Cardiology, University Hospital "Ospedali Riuniti", Trieste, Italy, (c) Division of Infectious Diseases, University Hospital "Ospedali Riuniti", Trieste, Italy

Objective: Early outcomes of coronary artery bypass grafting (CABG) in diabetic patients are generally worse than in non-diabetic patients. Despite an expected higher risk of sternal wound infections, use of bilateral internal thoracic artery (BITA) could reduce this gap. The present study analyzes a 14-year single center experience in the routine use of BITA.

Methods: Perioperative data of 4054 consecutive patients, who underwent isolated CABG from January 1999 throughout December 2012 at our unit, were collected prospectively in a computed database. BITA grafts were used in 2693 (66.4%) cases. Diabetic ($n=766$, 28.4%) and non-diabetic patients ($n=1927$, 71.6%) were compared about their early outcomes.

Results: Age (67.1 ± 8.3 vs. 65.9 ± 9.2 , $p=0.0031$), prevalence of peripheral vascular disease (21.0 vs. 9.9%, $p<0.0001$), dialysis-dependent renal failure (2.0 vs. 0.8%, $p=0.013$), NYHA class III–IV (12.3 vs. 7.4%, $p<0.0001$), unstable angina (39.0 vs. 34.3%, $p=0.022$), and left ventricular ejection fraction <0.3 (3.0 vs. 1.7%, $p=0.034$) were higher in diabetic patients. The two groups were comparable for prevalence of females (16.1 vs. 15.4%, $p=0.68$), chronic pulmonary disease (6.8 vs. 6.4%, $p=0.7$), left main coronary disease (23.1 vs. 26.4%, $p=0.08$), reoperation (1.3 vs. 1.1%, $p=0.64$), emergency surgical priority (1.3 vs. 2.1%, $p=0.18$), use of intraaortic balloon pumping (5.5 vs. 6.7%, $p=0.23$) and off-pump technique (6.9 vs. 5.8%, $p=0.26$). Hospital mortality (2.3 vs. 1.9%, $p=0.42$), 48-hour chest tube drainage (1116.2 ± 967.2 vs. 1048.5 ± 822.2 ml, $p=0.068$), rate of neurological complications (1.7 vs. 1.6%, $p=0.79$), mechanical ventilation >48 hours (6.5 vs. 5.3%, $p=0.23$), myocardial infarction (2.0 vs. 2.6%, $p=0.33$), and acute kidney injury (7.0 vs. 5.3%, $p=0.078$) were equivalent into the two groups. Sternal wound infections (13.6 vs. 6.4%, $p<0.0001$) and use of packed red blood cells (67.1 vs. 59.0%, $p=0.00048$) were more frequent in diabetic patients.

Conclusions: CABG with BITA grafts may be performed in diabetic patients with good early outcomes. Despite a higher risk profile, diabetic patients do not suffer from higher rates of postoperative complications than non-diabetic patients; only sternal wound infections increase.

O61

Grasso epicardico ed insulino-resistenza in pazienti con coronaropatia con e senza disfunzione ventricolare sinistra

Alessandra Pratesi (a, b, c), Andrea Giosafat Marella (a, b, c), Francesco Orso (a, b), Alice Foschini (a, b, c), Nadia Bartoli (a, b, c), Ilaria Bracali (a, b, c), Enrico Mossello (b, c), Mauro Di Bari (b, c), Francesca Tarantini (b, c), Samuele Baldasseroni (a, b)

(a) S.O.D. di Medicina e Cardiologia geriatrica, Azienda Ospedaliero-Universitaria Careggi, Firenze, (b) Dipartimento di Medicina Sperimentale e Clinica, Azienda Ospedaliero-Universitaria Careggi, Firenze, (c) Università degli Studi di Firenze.

Background e scopi: Il grasso epicardico (GE) è un grasso viscerale che compie due principali funzioni, di deposito di grasso e di secrezione di adipochine, ma ha anche proprietà pro-infiammatorie e pro-aterogene. È stato suggerito che il GE possa contribuire alla patogenesi dell'aterosclerosi e influenzare la storia clinica della coronaropatia. Nei pazienti con obesità, diabete mellito di tipo 2 e sindrome metabolica il GE è maggiormente rappresentato. Poco si sa sul ruolo del GE nella disfunzione del ventricolo sinistro. Scopo di questo studio è valutare la capacità dell'insulino-resistenza di predire lo spessore del GE nei pazienti con coronaropatia e disfunzione sistolica del ventricolo sinistro.

Metodi: Abbiamo arruolato 114 pazienti con diagnosi di coronaropatia effettuata mediante angiografia, la maggior parte dei quali sottoposti a rivascolarizzazione dopo una sindrome coronarica acuta. La disfunzione ventricolare sinistra è stata considerata significativa per frazione di eiezione $\leq 40\%$. Sono stati calcolati tre indici di insulino-resistenza: HOMA-IR index, QUICKI insulin sensitivity index, e il nuovo adiponectin/resistin index (ADIPO-IR_{AR}); questi successivamente sono stati correlati con lo spessore del GE. Il GE è stato misurato tramite ecocardiografia secondo i criteri di Iacobellis.

Risultati: I soggetti con diabete mellito di tipo 2 e storia di ipercolesterolemia avevano un GE più spesso rispetto ai controlli. I livelli di potassiemia e tutti e tre gli indici di insulino-resistenza sono risultati essere i migliori predittori indipendenti dello spessore del GE sia nella popolazione totale che nei pazienti con disfunzione ventricolare sinistra. In quest'ultimo gruppo il nuovo ADIPO-IR_{AR} index ha mostrato il maggior valore predittivo.

Conclusioni: L'insulino-resistenza è un predittore indipendente dello spessore del GE nei pazienti affetti da coronaropatia, anche in presenza di una significativa disfunzione del ventricolo sinistro.

Fig.1 Analisi multivariata (popolazione totale) Fig.2 Analisi multivariata (popolazione FE $\leq 40\%$)

| | Model 1 R ² =0.25, | Model 2 R ² =0.29 | Model 3 R ² =0.28 | | Model 1 R ² =0.32 | Model 2 R ² =0.38 | Model 3 R ² =0.35 |
|------------------------------|----------------------------------|---------------------------------|---------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | Beta; p value | Beta; p value | Beta; p value | | Beta; p value | Beta; p value | Beta; p value |
| Age | 0.06; p=0.682 | 0.16; p=0.164 | 0.03; p=0.843 | Age | -0.21; p=0.680 | -0.18; p=0.738 | 0.29; p=0.241 |
| Gender | -0.02; p=0.866 | 0.04; p=0.736 | 0.03; p=0.840 | Gender | -0.25; p=0.342 | -0.27; p=0.291 | -0.34; p=0.188 |
| Waist circumference | 0.06; p=0.652 | 0.01; p=0.952 | 0.05; p=0.787 | Waist circumference | -0.23; p=0.323 | -0.14; p=0.597 | -0.28; p=0.184 |
| Type 2 diabetes | 0.09; p=0.466 | 0.03; p=0.805 | 0.18; p=0.169 | Type 2 diabetes | 0.18; p=0.508 | 0.20; p=0.439 | 0.03; p=0.911 |
| Hypercholesterolemia | 0.08; p=0.514 | 0.04; p=0.751 | 0.09; p=0.436 | Hypercholesterolemia | -0.18; p=0.505 | -0.23; p=0.429 | 0.05; p=0.834 |
| Potassium | 0.42; p<0.001 | 0.40; p<0.001 | 0.35; p=0.005 | Potassium | 0.08; p=0.848 | 0.07; p=0.870 | 0.61; p=0.016 |
| 6-WT | -0.15; p=0.211 | -0.08; p=0.566 | -0.24; p=0.047 | 6-WT | -0.28; p=0.353 | -0.27; p=0.295 | -0.04; p=0.966 |
| Septal thickness | 0.12; p=0.311 | 0.10; p=0.374 | 0.12; p=0.313 | Septal thickness | -0.36; p=0.123 | -0.20; p=0.374 | -0.03; p=0.913 |
| Tdec | 0.16; p=0.177 | 0.13; p=0.226 | 0.14; p=0.244 | Tdec | 0.47; p=0.061 | 0.51; p=0.038 | 0.24; p=0.294 |
| HOMA index | 0.26; p=0.021 | | | HOMA index | 0.47; p=0.060 | | |
| QUICKI index | | -0.34; p=0.002 | | QUICKI index | | -0.54; p=0.028 | |
| ADIPO IR _{AR} index | | | 0.28; p=0.016 | ADIPO IR _{AR} index | | | 0.69; p=0.008 |

O62

Comparison of coronary artery flow impairment in diabetic and hypertensive patients with stable microvascular angina

Vincenzo Sucato (a), Enrico Bronte (a), Giuliana Pace (a), Giuseppe Riccardo Tona (a), Rosaria Linda Trovato (a), Angelo Quagliana (a), Salvatore Evola (a), Salvatore Novo (a)

(a) Division of Cardiology, Paolo Giaccone Hospital, Palermo

Introduction: The term “Stable Microvascular Angina” (SMVA) describe patients with angina, findings compatible with myocardial ischemia and normal coronary angiograms. The aim of this study was to compare the impairment of microcirculation in diabetics–non hypertensive and non-diabetics-hypertensive patients.

Materials and methods: This study included 310 patients with SMVA that we split into two populations: diabetics–non hypertensive (164 patients) and non-diabetics-hypertensive (146 patients). In this retrospective study the inclusion criteria are presence of chest pain, positive stress test, normal coronary angiograms. We excluded patients who had positive biomarkers for myocardial infarction and who had ischemic heart disease in history. We studied coronary microcirculation troughs angiography indexes like Gibson’s index (TIMI Frame Count - TFC and Myocardial Blush Grade - MBG), Yusuf’s index (Total Myocardial Blush Score- TMBS) and a new index that we imagined, on the basis of Yusuf’s experience: the Total TIMI Frame Count (TTFC). This indexes was calculated on the three main coronary arteries using the protocol described by Gibson.

Results: The study of microcirculation showed significant differences between diabetics-non i hypertensive and non diabetics –hypertensive patients. We found a worse coronary microcirculation in diabetic-non hypertensive patients with lower values of TFC, MBG and TMBS ($p=0.02$), compared with non- diabetics hypertensive. Examining TTFC this parameter has on higher in diabetics-non hypertensive than non-diabetics hypertensive, this show a trend towards a greater impairment of microcirculation in diabetic subjects (See Figure).

| | Diabetics-non hypertensive(164 Patients) | Non diabetics-hypertensive (146 Patients) | p-value |
|----------|--|---|---------|
| MBG LAD | 2,2 (+/- 0,4) | 2,4 (+/- 0,5) | 0,03 |
| MBG RCA | 2,2 (+/- 0,4) | 2,3 (+/- 0,47) | NS |
| MBG CX | 2,1 (+/- 0,36) | 2,3 (+/- 0,4) | 0,04 |
| TMBS | 6,6 (+/- 1,06) | 7 (+/- 1,16) | 0,02 |
| cTFC LAD | 45,7 (+/- 12,5) | 41 (+/- 11,6) | NS |
| TFC RCA | 25,6 (+/- 6,5) | 25,1 (+/- 6,3) | NS |
| TFC CX | 24 (+/- 5,4) | 21 (+/- 4,7) | 0,05 |

Furthermore we analyzed the correlation between TMBS with TTFC. We found, through a linear regression analysis, an inverse proportionality: the increase of the TTFC, highlighting a slow flow of the contrast, goes hand in hand with the reduction of TMBS, which underlines its slow removal from the microvascular territory perfused by

the same coronaries. Such this correspondence highlights the relationship between the two indices and their ability to detect the microvascular dysfunction.

Conclusion: Analysis of diabetics-non hypertensive and non diabetics hypertensive patients with SMVA, has led to asses that the diabetic population, compared to non-diabetic, has a greater involvement of microcirculation. The use of coronary angiography indexes like TFC and MBG may be a useful tool to evaluate coronary microvascular alterations in diabetic patients. Total Myocardial Blush Score introduced by Yusuf has proved a reliable marker of microvascular dysfunction well correlated with indexes like TFC. Also the new index introduced by us, the TTFC, proved to be a good marker, in agreement with results of other indices; therefore, this index can provide additional information on the overall rate of perfusion of microcirculation. Therefore, these studies can be used as a source to be predictive for future coronary artery disease.

O63

Hyperglycemia-induced myocardial oxidative stress and inflammation persist despite optimal glycemic control: role of the mitochondrial adaptor p66Shc

Francesco Paneni (a, b), Sarah Costantino (a), Thomas Luscher (a), Massimo Volpe (b), Francesco Cosentino (b)

(a) *Cardiology & Cardiovascular Research, University of Zurich*, (b) *Cardiology, Department of Clinical and Molecular Medicine, University of Rome "Sapienza"*

Introduction: Intensive glycemic control does not reduce the risk of heart failure in the diabetic population. Long-lasting effects of hyperglycemia are indeed emerging as a major determinant of cardiovascular morbidity and this phenomenon has been recently described hyperglycemic memory. The mitochondrial adaptor p66^{Shc}, critically involved in reactive oxygen species (ROS) production, mediates hyperglycemia-induced cardiomyopathy. The present study investigates the role of p66^{Shc} as a determinant of persistent oxidative stress in the diabetic heart despite glycemic control. **Methods:** Diabetes was induced in wild-type 129sv mice (4-6 months old) by a single i.p. dose of streptozocin. Mice were divided into 5 experimental groups: 1) healthy controls; 2) untreated diabetics; 3) diabetics treated with insulin, 4) diabetics receiving insulin together with p66^{Shc} siRNA or 5) scrambled siRNA (n=6-7/group). Insulin implants were placed subcutaneously 3 weeks after the induction of diabetes for the following 3 weeks. Silencing of p66^{Shc} was obtained by i.v. administration every 5 days. Isolated mitochondria from hearts were used for measurement of superoxide anion (O₂⁻) by ESR spectroscopy and mitochondrial swelling. Pull-down assay were performed to show the interaction between p66^{Shc} and cytochrome c. NF-κB activity was assessed by p65 nuclear translocation and binding activity. Chromatin immunoprecipitation (ChIP) was performed to investigate epigenetic modifications at the p66^{Shc} promoter.

Results: O₂⁻ production, and mitochondrial swelling were significantly increased in the heart of diabetic mice and glucose normalization by insulin did not revert this phenomenon. These findings were associated with persistent mitochondrial translocation of p66^{Shc} and its co-immunoprecipitation with cytochrome c. Moreover, expression of the pro-hypertrophic and pro-inflammatory genes IL-6, MCP-1 and VCAM-1 was elevated in the diabetic hearts and did not change despite intensive glucose control. Interestingly, in vivo siRNA of p66^{Shc} in the context of glucose normalization blunted ROS production, restored mitochondrial integrity and suppressed ongoing myocardial inflammation by inhibiting NF-κB activation. We also show that persistent p66^{Shc} expression was explained by reduced histone 3 deacetylation by SIRT1, leading to an open chromatin and continued gene transcription.

Conclusions: Our findings suggest that p66^{Shc} perpetuates ROS-mediated myocardial damage even after glucose normalization. Targeting molecular machineries underlying the “hyperglycaemic memory” may represent the best option to reduce diabetes cardiovascular health burden.

O64

Hyperosmolarity-enhanced COX-2 expression contributes to high glucose-induced angiogenesis

Rosalinda Madonna (a), Yong-Jian Geng (b), Elena Montebello (a), Maria Anna Teberino (a), Raffaele De Caterina (a, c)

(a) *Institute of Cardiology and Center of Excellence on Aging, “G. d’Annunzio” University – Chieti, Ital*, (b) *The University of Texas Health Science Center at Houston and the Texas Heart Institute, Houston, Tex*, (c) *Fondazione Toscana “G. Monasterio”, Pisa, Italy*

Aim/hypothesis: Diabetic hyperglycemia increases plasma osmolarity, leading to adaptive cellular responses. Cyclooxygenase-2 (COX-2) plays a role in angiogenesis and plaque stability. We tested the hypothesis that glucose-induced hyperosmolarity promotes angiogenesis through activation of COX-2 expression, thus orchestrating endothelial sprouting and migration.

Methods: Human aortic endothelial cells (HAEC) and dermal microvascular endothelial cells (HMVEC) were incubated with 5.5 mmol/L glucose (normoglycemia), high glucose (HG, at 12.5, 25 and 45 mmol/L), or equimolar concentrations of the hyperosmolar control mannitol (HM).

Results: Both HG and HM increased the expression of the water channel aquaporin-1 (AQP1) and of COX-2. HG and HM for 1 h increased the total expression and nuclear accumulation of Tonicity enhancer binding protein (TonEBP) and its binding to Tonicity enhancer element at electrophoretic mobility shift assay. HG and HM induced endothelial migration at a fluorimetric assay, and tubulization in Matrigel. Targeting the osmosignaling pathway with small interfering RNAs to AQP1 and to TonEBP reverted both the inducing effects of HG and HM on COX-2 expression and angiogenic activities. Finally, compared with age- and sex-matched C57/BL6 control mice, the aorta of D2.B6-*Ins2 Akita* type 1 diabetic mice, hypercholesterolemic *apoE*^{-/-} mice, and diabetic hypercholesterolemic D2.B6-*Ins2Akita/apoE*^{-/-} mice showed lipid accumulation, as visualized with Oil-red-O staining, and increased AQP1 and COX-2 expression, supporting the *in vivo* relevance of these findings.

Conclusion/interpretation: By activating the water channels AQP1 and TonEBP, hyperosmolarity caused by HG or HM induces COX-2 expression and angiogenesis in human macro- and microvascular endothelial cells. Such effects may be relevant for the vascular complications of diabetes.

IPERTENSIONE POLMONARE

O65

Usefulness of metabolomics in detecting increased pulmonary vascular resistance in systemic sclerosis patients

Stefania Palmas (a), Susanne Orofino (a), Roberta Piras (a), Martino Deidda (a), Christian Cadeddu (a), Mario Mura (a), Stefano Del Giacco (a), Mario Musu (b), Francesca Nonne (a), Anna Maria Settembrini (a), Paolo Emilio Manconi (a), Gabriele Finco (b), Giuseppe Mercurio (a)

(a) *Università degli Studi di Cagliari - Dipartimento di Scienze Mediche "M. Aresu"*, (b) *Università degli Studi di Cagliari - Dipartimento di Sanità pubblica, medicina clinica e molecolare*

Purpose: Pulmonary hypertension (PH) in systemic sclerosis (SS) identifies a poor prognosis subset of patients. Recent studies evidenced an inappropriate increase of pulmonary vascular resistance (PVR) only in a subgroup of patients with SS. Metabolomics (MBS), that enables the assessment of a broad range of metabolites providing a metabolic picture able to identify metabolic changes, could be effective in investigating perturbed pathways causing the observed different increase in PVR.

Methods: We studied 18 SS patients (age 58,7±15,6 years) free of pulmonary fibrosis that performed a clinical evaluation, a standard echocardiography with Tissue Doppler and Speckle tracking Imaging and a right heart catheterization (RHC). A blood sample was collected during the RHC in the distal peripheral circulation of the pulmonary arteries to perform the metabolomic analysis. Specimens were analyzed with a ¹H-NMR 500MHz spectrometer. An Orthogonal Signal Correction (OSC) and a Projection on Latent Structures Discriminant Analysis (PLS-DA) were applied.

Results: Based on PVR we divided the population in Group A (N=8; PVR<1.6 uW; mean±SD = 1,16±0,23 uW) and Group B (N=10; PVR>1.6 uW; mean±SD = 2,67±0,67 uW. p<0.001 vs Group A). No significant differences were identified in terms of anthropometric, clinical, echocardiographic and therapeutic characteristics. At RHC the 2 groups showed a difference in mean pulmonary pressures values (Group A: 20±4 mmHg; Group B: 25±5 mmHg), with mild PH in group B. We applied an OSC using NMR data as the X-matrix and PVR values as the Y-matrix. A clear clusterization was observed with the PLS-DA, achieving good values of R² (R²X=0.364; R²Y=0.889) and Q² (0.721), with significant ANOVA cross-validation (p=0.003). The discrimination were related to a metabolic fingerprint depending on a limited set of metabolites: Group B was characterized by

higher values of Lactate, Glycerol, fatty acids, Acetoacetate, Valine, Leucine, Isoleucine and VLDL/LDL, whereas Group A showed higher values of Choline, Betaine, Alanine, Glycine, Taurine, Arginine and 3-OH-butyrate; is worthy of note that all the compounds relatively higher in Group A are related to the NO metabolism and the endothelial function.

Conclusions: Increased PVR seems to be related to specific metabolites strictly connected to the endothelial dysfunction. Moreover MBS showed to be capable to finely identify the metabolic imbalance of vasoactive factors which determine and maintain the increased PVR. This approach proved to be useful in better understanding the pathophysiology of this severe complication of SS and could be allow to identify new therapeutic targets.

O66

Outcome of 30 cases of 22.q11.2 deletion syndrome and conotruncal malformation

Fiorella Fratta (a), Concetta Ricci (a), Rossella Melone (a), Marianna Carrozza (a), Giovanbattista Capozzi (a), Raffaella Esposito (a), Regina Sorrentino (a), Nunzia Borrelli (a), Giuseppe Caianiello (b), Maria Giovanna Russo (a)

(a) *Pediatric Cardiology - AORN dei Colli – AO Monaldi, SUN, Naples*, (b) *Pediatric Heart Surgery - AORN dei Colli – AO Monaldi, Naples*

Background: 22q11.2 deletion syndrome (DS) is a chromosomal anomaly which causes a congenital malformation disorder whose common features include cardiac defects, palatal anomalies, facial dysmorphism, developmental delay and immune deficiency. The worldwide incidence is estimated at 1/2,000-1/4,000 live births. The broad spectrum of clinical phenotypes that the syndrome encompasses was previously divided into distinct syndromes (e.g. DiGeorge syndrome, velocardiofacial syndrome, cardiofacial syndrome) but are now known to be etiologically identical and are referred to as 22q11.2 DS. The prognosis is variable and depends on the severity of the disease. The infant mortality rate is relatively low (~4%); in adults mortality is higher than that of the rest of the adult population.

Objective: To investigate clinicopathological features and outcome of 22q11.2 deletion syndrome patients admitted to our division for suspect of CHD.

Method: The clinical features, and cardiovascular anomaly findings were analyzed in cases of 22q11.2 deletion syndrome.

Results: Thirty cases of 22q11.2 deletion syndrome were analyzed, 19 patients were female, 11 male. Mean age 7+/-2 years. Prenatal diagnosis of 22q11.2 deletion syndrome by fluorescence in situ hybridization were made in 10 cases. 4 patients diagnosed with Tetralogy of Fallot and deletion 22 decided to terminate the pregnancy. The other patients were diagnosed with heart disease and syndrome after birth. Twenty-eight patients had a de novo deletion (93,3%) two female patients also had a parents affected by the syndrome, in one case the mother, in the other the father. Thirteen patients (43,3%) presented "complete" DiGeorge syndrome with thymic aplasia, cleft palate, hypocalcemia/Hypoparathyroidism, significant feeding problems and renal anomalies. In agreement with the literature data as heart disease, the conotruncal were the most common, including: 2 pulmonary atresia + VSD, 10 Tetralogy of Fallot, associated anomalies were: absent pulmonary valve (1), aortopulmonary collateral arteries, coronary anomaly (1), pulmonary artery hypoplasia. 6 interruption of the aortic arch type B, 1 type C. 6 VSD, 1 truncus, 1 valve prolapse mitral, 1 aberrant right subclavian artery, with tortuosity of left pulmonary artery. 2 ASD one with hypoplasia of the left pulmonary branch, one with aberrant right subclavian artery. All patients were subjected to surgical correction, subjected to pre-surgical antibiotic prophylaxis. The mean follow-up was 80 months, during follow-up we observed a case of endocarditis on pulmonary homograft, a case of recurrent pericarditis and recurrent respiratory infections (60%). Learning difficulties have also been reported. No significant psychiatric disorder was reported 2/30 patients died (7%): one with a diagnosis of truncus arteriosus I type with severe stenosis and regurgitation underwent valvuloplasty of the truncal valve, with no results; the second case was a TOF with hypoplastic pulmonary annulus,

confluent pulmonary branch and aberrant right subclavian artery, died for infectious complications after surgery surgical correction.

Conclusion: In our population we confirmed that the infant mortality rate is relatively low, but the prognosis depends on the severity of the cardiac malformation. Much attention should be paid to frequent infections, especially after cardiac surgery. Familial deletion should be considered in case of prenatal diagnosis.

O67

Experimental mild hypothermia increases pulmonary vasoconstriction during endotoxemia in pigs.

Alessio Alogna (a), Michael Schwarzl (a), Birgit Zirngast (b), Sebastian Seiler (a), Stefan Huber (b), Heinrich Mächler (b), Burkert Pieske (a), Heiner Post (a)

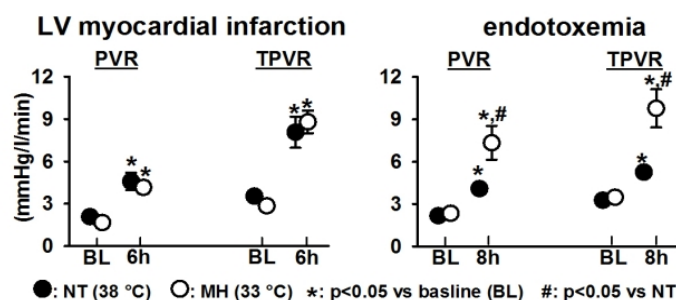
(a) Medical University of Graz, Department of Cardiology, Graz, Austria, (b) Medical University of Graz, Department of Cardiac Surgery, Graz, Austria, (c) Leiden University Medical Center, Leiden, Netherlands

Introduction: Mild hypothermia (MH) increases systemic vascular resistance and reduces the need for vasopressors in resuscitated patients. Less is known about the effect of MH on pulmonary vascular resistance.

Methods: We retrospectively analyzed data from experimental studies on hemodynamic effects of MH. Anaesthetized pigs (total n=29) were instrumented with a Swan-Ganz and a left ventricular (LV) pressure-volume catheter. Animals were cooled from 38 °C (normothermia, NT) to MH (33 °C) by an intravascular device for 6 h after LV myocardial infarction (MI) or for 8 h during endotoxemia. Endotoxemia was initiated by lipopolysaccharide (LPS) infusion, which induces pulmonary vasoconstriction by release of thromboxane A2 (TX-A2) from pulmonary endothelial cells. Total pulmonary vascular resistance (TPVR) was calculated as mean pulmonary pressure (mPAP) divided by cardiac output (CO), and pulmonary vascular resistance (PVR) was estimated as (mPAP minus LV end-diastolic pressure) divided by CO.

Results: In both protocols, mixed venous oxygen saturation was higher in MH vs NT, reflecting improved systemic oxygen supply-demand balance, and no measured systemic hemodynamic parameter indicated further destabilization by MH (data not shown). LV dysfunction after MI increased TPVR and PVR with no additional effect of MH (graph). LPS treatment increased TPVR and PVR, which was potentiated by MH (graph).

Conclusion: When hemodynamic load after LV MI increased pulmonary vascular resistance, MH did not further impact on pulmonary vascular tone. However, MH potentiated pulmonary vasoconstriction after pulmonary endothelial activation by LPS, possibly by higher production or lower clearance of TX-A2. Caution may thus be advised when MH is induced in patients with pre-existing severe pulmonary hypertension.



O68

Cardiopatie congenite, percorso diagnostico e follow-up in un centro di secondo livello, 25 anni di esperienza

Antonia Bassignana (a), Sarah Dogliani (a), Giuliana Bricco (a), Letizia Valeri (a), Diego Pancaldo (a), Livio Correndo (a), Aldo Coppolino (a), Antonio Dellavalle (a), Michele De Benedictis (a), Delio Tedeschi (a), Alberto Magliarditi (a), Baldassarre Doronzo (a)

(a) S.C. di Cardiologia, Ospedale SS. Annunziata, Savigliano (Cn)

L'incidenza delle cardiopatie congenite (CC) riportata in letteratura è dell' 8%. Nel nostro Ospedale dalla metà degli anni '80 la SC di Cardiologia (centro di secondo livello) ha realizzato un servizio dedicato di cardiologia pediatrica, esigenza dettata dall'elevato numero di nascite e dalla necessità di confermare o escludere una CC.

Scopo del lavoro è valutare in modo retrospettivo numero e incidenza delle CC in una popolazione nata presso un unico centro, valutando l'efficacia del percorso diagnostico-terapeutico.

Metodo: sono stati analizzati in modo retrospettivo tutti gli esami ecocardiografici eseguiti tra il 1988 e il 2012, consultando l'archivio informatico utilizzato nella SC di Cardiologia; verificando percorso e follow-up di tutte le CC diagnosticate. Sono state considerate le diagnosi effettuate alla nascita oppure negli anni successivi purché relative al periodo in esame, sempre solo per pazienti nati presso il nostro punto nascite (sono esclusi i numerosi bambini con diagnosi di CC e seguiti nel nostro ambulatorio ma nati in altri centri). Non sono stati considerati ed inseriti nella casistica i casi di ritardata chiusura del Dotto di Botallo ed i Forami ovali pervi. Sono stati analizzati diagnosi ed incidenza, invio ad un centro di terzo livello, indicazione a trattamento interventistico, mortalità rilevata al follow-up.

Risultati: dal 1988 al 2012 sono nati 31.883 bambini e sono state diagnosticate 383 CC con una incidenza complessiva delle CC del 12%. Per analizzare i dati suddividiamo le CC in tre gruppi: i DIV "semplici" che non hanno richiesto la correzione chirurgica, le cardiopatie congenite complesse (CCC) che hanno necessitato di un trattamento interventistico, quindi tutte le restanti CC. I DIV "semplici" (256 in totale) hanno una incidenza da soli dell'8% e rappresentano i 2/3 di tutte le CC, vengo seguiti in follow-up fino alla chiusura spontanea. Il 20% delle cardiopatie diagnosticate, in totale 77 CCC (con rapporto M/F di 2:1), sono state sottoposte ad intervento cardiocirurgico tradizionale o trattamento percutaneo; la mortalità per le CCC è dell'18%: i 14 decessi (11 M e 3 F) sono avvenuti tutti tra i soggetti sottoposti ad intervento cardiocirurgico. Tutti i bambini con diagnosi di CCC sono stati inviati presso un Centro Cardiologico Pediatrico di terzo livello dove hanno proseguito l'iter diagnostico-terapeutico per poi essere ripresi in carico da noi in un tempo successivo. Le restanti cardiopatie, che potremmo definire "intermedie", sono 50 in totale e rappresentano il 13% delle CC. Si tratta di pazienti con valvola aortica bicuspidale (18), stenosi della polmonare (15), DIA (7) e Dotto di Botallo (6), altro (4), seguiti in follow-up presso il nostro centro.

Conclusione e discussione: I) si è evidenziata una incidenza di CC superiore a quanto generalmente indicata in letteratura; le CCC hanno una incidenza ed una prognosi peggiore nei soggetti di sesso maschile. II) nell'arco di 25 anni il nostro ambulatorio di cardiologia dedicato alla valutazione del neonato e del bambino ha consentito di attuare un adeguato e tempestivo percorso diagnostico terapeutico per le CC: identificare tempestivamente i neonati con CCC che necessitano di un trasferimento presso il Centro di Cardiologia Pediatrica di terzo livello e seguire in follow-up le restanti CC. Punti di forza sono l'accesso riservato e preferenziale alla nostra struttura di neonati o bambini con sospetta CC, la collaborazione tra pediatri (neonatologi e pediatri del territorio) e cardiologo dedicato, l'utilizzo fin dall'inizio dell'attività di un archivio informatico.

RENE E INSUFFICIENZA CARDIACA

O69

Renal arterial resistance index is independently associate to high diuretic dose in chronic heart failure outpatients

Annalisa Doronzo (a), Agata Puzzovivo (a), Francesco Monitillo (a), Valeria Antoncecchi (a), Gaetano Citarelli (a), Valeria Paradies (a), Nicoletta Corrieri (a), Massimo Iacoviello (a), Stefano Favale (a), Marco Matteo Ciccone (a)

(a) *University of Bari, Department of Cardiology, Bari, Italy*

In chronic heart failure (CHF) patients, diuretic administration plays a key role in the control of congestion. However, high diuretic dose (HDD) has been also demonstrated to be associated with a worse prognosis. The aim of this study was to evaluate the factors independently associated to HDD and, in particular, the role of a marker of renal perfusion, the Renal arterial Resistance Index (RRI). We enrolled 250 outpatients (78% males, 64±13 years, NYHA class 2.2±0.6, left ventricular ejection fraction, LVEF, 34±10%) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions (> 1 month) and in conventional therapy. All patients underwent: a clinical evaluation to assess NYHA class; a routine chemistry to evaluate NT-proBNP and glomerular filtration rate (GFR) by creatinine (MDRD formula); an echocardiogram to evaluate LVEF and to estimate central venous pressure (CVP); a renal echo-Doppler in order to evaluate RRI. Peak systolic velocity and end diastolic velocity of segmental renal artery was obtained by pulsed Doppler flow and RRI was then calculated.

RRI was positively and significantly correlated with furosemide equivalent dose (r: 0.33; p<0.001) and with HDD (r: 0.36; p<0.001). As shown in the table, RRI remained significantly associated with HDD in a multivariate logistic regression analysis including the other factors significantly correlated at univariate analysis.

In conclusion, our findings help to better understand the wide variability of diuretic dosage, by demonstrating the independent influence of RRI, a parameter reflecting renal arterial resistance. These data could also represent the basis of future studies aimed to optimise therapeutic strategies by improving renal flow and, as a consequence, diuretic response.

Regression logistic analysis

| Dependent variable | Independent variable | p |
|--------------------|----------------------|-------|
| High diuretic dose | Age | 0.018 |
| | NYHA class | 0.002 |
| | LVEF | 0.11 |
| | CVP >5 mm Hg | 0.002 |
| | logNT-proBNP | 0.046 |
| | GFR-MDRD | 0.75 |
| | RRI | 0.003 |

High diuretic dose was defined as Furosemide eq. dose >100 mg/die.

O70

A high renal arterial resistance index is associated to 1 year worsening of renal function in heart failure outpatients

Gaetano Citarelli (a), Valeria Paradies (a), Annalisa Doronzo (a), Valeria Antoncetti (a), Francesco Monitillo (a), Agata Puzzovivo (a), Massimo Iacoviello (a), Stefano Favale (a), Marco Matteo Ciccone (a)

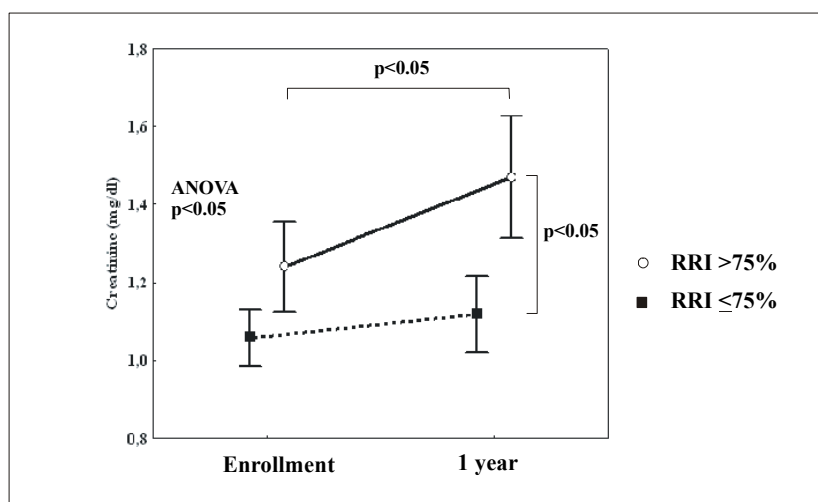
(a) University of Bari, Department of Cardiology, Bari, Italy

The aim of this study was to evaluate in a group of chronic heart failure (CHF) outpatients whether a parameter reflecting renal perfusion (Renal Resistance Index, RRI) is associated with the worsening of renal dysfunction.

We enrolled 96 outpatients (79% males, 64±14 years, NYHA class 2.2±0.6, left ventricular ejection fraction, LVEF, 34±9%) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions (> 1 month) and in conventional therapy. Peak systolic velocity and end diastolic velocity of segmental renal artery was obtained by pulsed Doppler flow and RRI was then calculated. Standard renal function assessment was obtained by measurement of creatinine serum levels and the calculation of glomerular filtration rate by MDRD formula. The evaluation of renal function was repeated after 1 year and the progression of renal failure worsening was defined as an increase of creatinine >0.3 mg/dl.

At the enrolment 27 patients (28%) showed a high value of RRI, that was defined as a value >75%. As shown in the figure, the presence of RRI >75% was associated with a significant increase in 1-year value of creatinine serum levels. At 1 year 18 patients (19%) showed an increase in creatinine serum levels >0.3 mg/dl. At a stepwise multivariate regression analysis a value RRI>75% was the only parameter significantly associated to the increase in creatinine levels (p: 0.025), after correction for age, baseline GFR-MDRD, diabetes, NYHA class, NT-proBNP levels and left ventricular ejection fraction.

In conclusion, our findings demonstrate the possible clinical usefulness of a parameter reflecting renal perfusion in order to better characterise cardiorenal syndrome and to better stratify patients' prognosis.



O71

Functional tricuspid regurgitation in patients with left ventricular dysfunction: its contribution to renal dysfunction and long-term prognosis.

Claudia Marini (a), Stefano Stella (a), Alberto Monello (a), Vincenzo Tufaro (a), Andrea Fisicaro (a), Michele Oppizzi (a), Alberto Margonato (a), Eustachio Agricola (a)

(a) *Division of Non Invasive Cardiology, San Raffaele Hospital, IRCCS, Milan, Italy.*

Background and aim: The prognostic role of renal impairment in heart failure (HF) is well known, while the pathophysiology of impaired renal function in patients with left ventricular dysfunction is debated. As the low cardiac output and the consequent impaired kidney perfusion was the most accepted underlying theory, recent evidences suggest an outstanding role of systemic venous congestion. Functional tricuspid regurgitation (FTR) plays an important role in increasing systemic venous pressure, leading to renal vascular congestion. The aim of the study was to assess the contribution of FTR to renal dysfunction and long-term prognosis in patients with systolic HF.

Methods: We enrolled 413 consecutive patients (mean age 74.2 ± 11 years, 76% men) with systolic HF, defined as an ejection fraction (EF) $< 50\%$, with or without FTR. TR severity was graded using the vena contracta and the jet area/right atrial area methods. Renal function was evaluated by serum creatinine values and the estimated glomerular filtration rate (eGFR) using sMDRD formula. Renal failure (RF) was defined with an eGFR < 60 mL/min/m². The end-points were HF episodes requiring hospitalizations and the overall mortality. Patients were followed up with outpatient visits or periodic telephone interviews. Univariate and multivariate Cox proportional hazard regression analysis was used to identify the predictors HF episodes and overall mortality. Univariate and multivariate predictors of renal function were assessed by logistic regression analysis.

Results: The median follow-up was 43.2 ± 36 months (range 1-144). 101 patients developed HF episodes; 161 patients died (62% cardiac deaths). Mean EF and NYHA class were $34.8 \pm 10.4\%$ and 2 ± 0.8 respectively. FTR was absent or mild in 68.5% of patients, moderate in 21.5% and severe in 10%. Patients with moderate/severe FTR had higher PAPs (43.2 ± 15.5 vs. 31.6 ± 12.3 mmHg, $p=0.0001$), right atrial area (22.6 ± 7 vs. 17.8 ± 6.0 cm², $p=0.0002$) and right ventricular diameter (35.3 ± 5.4 vs. 33.8 ± 4.1 mm, $p=0.009$), NT-proBNP values (9578.7 ± 13125.4 vs. 5203 ± 8178.1 pg/ml, $p=0.004$) and lower TAPSE (20.9 ± 4 vs. 21.9 ± 3.7 mm, $p=0.02$) compared with those with absent/mild FTR. At 1, 5 and 9 years the survival was 88%, 65%, 48% for absent/mild and 82%, 47%, 20% for moderate/severe FTR ($p=0.0001$) respectively. At 1, 5 and 9 years the survival was 84%, 50%, 20% and 89%, 68%, 62% in patients with (51.6%) and without RF ($p=0.0001$) respectively. At the univariate analysis moderate/severe FTR (OR 1.5, CI 1.0-2.3, $p=0.03$), increased PAPs (OR 1.1, CI 1.0-1.2, $p=0.002$), atrial fibrillation (AF) (OR 1.9, CI 1.2-3.0, $p=0.003$), NYHA class III/IV (OR 1.6, CI 1.1-2.4, $p=0.02$) and age (OR 1.1, CI 1.0-1.1, $p=0.0001$) were associated to RF. At multivariate analysis, the interaction between moderate/severe FTR and TAPSE < 16 mm (OR 1.2, CI 1.0-1.5, $p=0.04$), AF (OR 1.8, CI 1.2-3.0, $p=0.005$), NYHA class III/IV (OR 1.3, CI 1.1-2.1, $p=0.02$) and age (OR 1.03, CI 1.0-1.05, $p=0.0001$) were independent determinants of RF. The presence of RF (HR 2.3, CI 1.1-6.1, $p=0.04$), moderate/severe MR (HR 1.6, CI 1.2-4.7, $p=0.001$), NYHA class III/IV (HR 2.7, CI 1.2-7.3, $p=0.03$), AF (HR 1.4, CI 1.1-3.5, $p=0.01$), and ICD (HR 0.18, CI 0.05-0.6, $p=0.008$) were independent determinants of mortality.

Conclusions: Patients with systolic HF and moderate to severe FTR had a significantly higher mortality and morbidity than patients with absent or mild FTR. Systemic venous congestion due to FTR associated with right ventricular dysfunction is an independent predictor of RF and plays a pathophysiological role in impaired renal function.

O72

The presence of an altered renal arterial resistance index is independently associated to a significant increase in loop diuretic diuretic dose in heart failure outpatients

Valeria Paradies (a), Gaetano Citarelli (a), Annalisa Doronzo (a), Valeria Antoncecchi (a), Francesco Monitillo (a), Agata Puzzovivo (a), Massimo Iacoviello (a), Stefano Favale (a), Marco Matteo Ciccone (a)

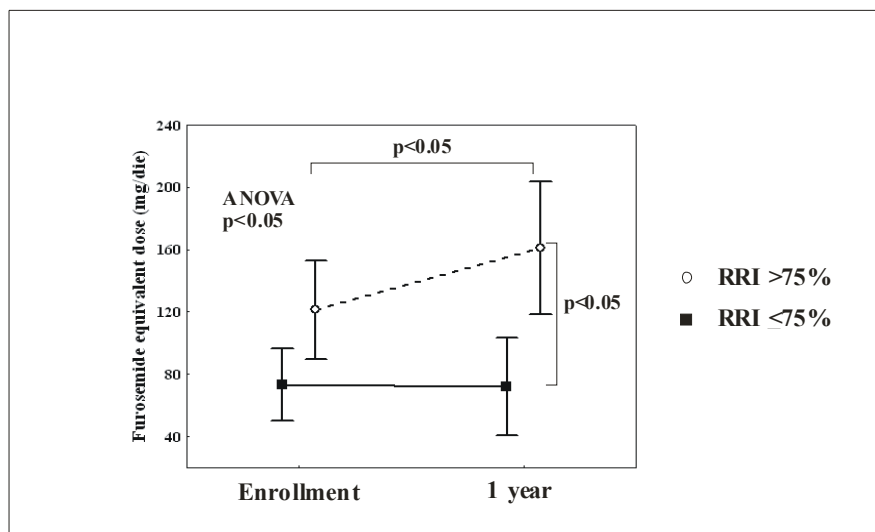
(a) University of Bari, Department of Cardiology, Bari, Italy

The aim of this study was to evaluate whether the presence of abnormalities in a parameter reflecting renal perfusion (Renal Resistance Index, RRI) is associated with changes in diuretic therapy in a group of chronic heart failure (CHF) outpatients.

We enrolled 96 outpatients (79% males, 64±14 years, NYHA class 2.2±0.6, left ventricular ejection fraction, LVEF, 34±9%) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions (> 1 month) and in conventional therapy. Peak systolic velocity and end diastolic velocity of segmental renal artery was obtained by pulsed Doppler flow and RRI was then calculated. Standard renal function assessment was obtained by measurement of creatinine serum levels and the calculation of glomerular filtration rate by MDRD formula. The evaluation of medical therapy was repeated after 1 year.

At the enrolment 27 patients (28%) showed a high value of RRI, that was defined as a value >75%. As shown in the figure, the presence of RRI >75% was associated to a significant increase in 1-year value of furosemide equivalent dose. At 1 year 11 patients (12%) showed an increase in daily furosemide equivalent dose >50%. At a stepwise multivariate regression analysis only the presence of RRI >75% (p: 0,005) and left ventricular ejection fraction <30% (p: 0.033) were independently associated with the increase in furosemide dose, whether no significant association was found for age, baseline GFR-MDRD, diabetes, NYHA class and NT-proBNP levels.

In conclusion, our findings demonstrate the possible clinical usefulness of a parameter reflecting renal perfusion in order to better detect patients prone to develop diuretic resistance.



O73

The Implication on outcome of CKD-EPI reclassification in patients with cardiovascular disease and renal dysfunction

Carmine Mazzone (a), Andrea Di Lenarda (a), Luigi Tarantini (b), Antonella Cherubini (a), Giorgio Faganello (a), Giulia Russo (a), Giulia Barbati (a), Endria Casanova Borca (a), Giacomo Faden (c), Pompilio Faggiano (c), Giovanni Cioffi (d)

(a) Cardiovascular Center, Maggiore Hospital, ASS 1 Triestina, Trieste, Italy, (b) S.Martino Hospital, Department of Cardiology, Belluno, Italy, (c) Civil Hospital of Brescia, Department of Cardiology, Brescia, Italy, (d) Villa Bianca Hospital, Department of Cardiology, Trento, Italy

Background: Renal dysfunction is a well known and powerful prognostic factor in patients with cardiovascular (CV) disease. The Chronic Kidney Disease – Epidemiology Collaboration Group have endorsed a new equation (CKD-EPI) for estimating GFR which is more accurate than the MDRD when compared against the radionuclide gold standard. However, the prevalence and prognostic implication of renal dysfunction in patients with “very high” CV risk according to European guidelines on CV Prevention, 2012 (VHCVR) if the CKD-EPI equation is used rather than the MDRD is uncertain.

Aim: We have evaluated in our VHCVR patients if the CKD-EPI equation, in comparison with MDRD, more accurately categorizes for higher risk of events (death, CV hospitalization) during follow up

Methods: Clinical data were derived from the E-data chart for our outpatient clinic and collected in a regional Data Warehouse. We used individual patient data at enrolment from 4355 pts (age 71 ± 11 years, males 58.3%) with VHCVR between November 2009 and December 2011 to estimate GFR with the CKD-EPI and the MDRD formula and to categorize patients into eGFR risk strata.

Results: Among 4355 pts with VHCVR, 56.4% had ischemic heart disease (HD), 25.5% vascular disease, 40.5% diabetes with target organ damage and /or CV risk factor and 0.9% with calculated SCORE $\geq 10\%$. Pts with eGFR above $90 \text{ ml/min} \cdot 1.73 \text{ m}^2$ (class 1), between 60 and 90 (class 2), 45 and 60 (class 3A), 30 and 45 (class 3B) and below 30 ml/min (class 4-5) were respectively 24.2%, 50.3%, 15.3%, 6.0%, 4.2% using MDRD formula and 21.4%, 48.3%, 17.5%, 7.7%, 5.1% using CKD-EPI formula. CKD-EPI reclassified 6% of patients with MDRD $\text{eGFR} \geq 60 \text{ ml/min} \cdot 1.73 \text{ m}^2$ to a $\text{eGFR} < 60 \text{ ml/min} \cdot 1.73 \text{ m}^2$. Such patients presented a worse clinical profile and had a higher 1-year mortality than those with concordant $\text{eGFR} \geq 60 \text{ ml/min} \cdot 1.73 \text{ m}^2$. (23 vs 16%, $p=0.005$). Overall 14% patients were re-classified into different risk categories. Among patients with MDRD eGFR class 1, CKD-EPI equation re-classified 18.1% patients in class 2; among those in MDRD class 2, 9.4% in class 3A and 3.2% in class 1; among those in MDRD class 3A, 16.1% in class 3B and 0.3% in class 2; among those in MDRD class 3B, 13.7% in class 4-5. The net reclassification improvement of CKD-EPI vs MDRD is statistically significant for death and CV hospitalization at 1 year ($p \leq 0.001$)

Conclusions: The prevalence of renal dysfunction in VHCVR is significantly higher than previously reported if the newly recommended CKD-EPI formula is used in place of MDRD ones. The CKD-EPI equation, in comparison with MDRD, more accurately categorizes VHCVR patients at higher risk of death or CV hospitalization

O74

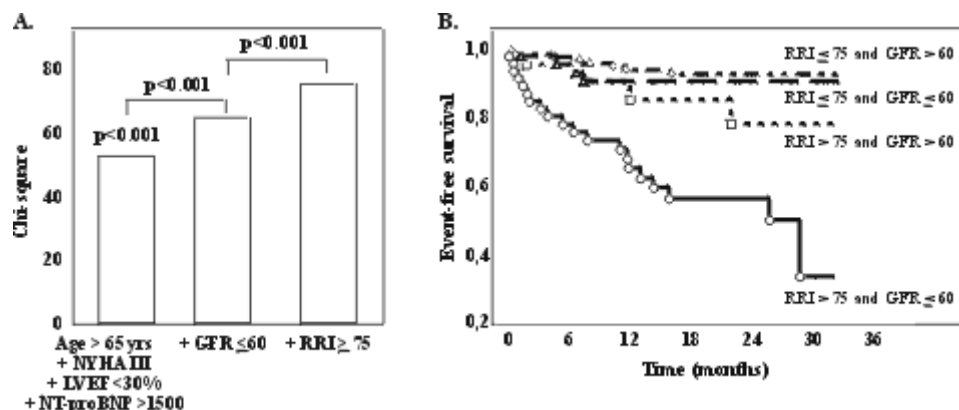
Renal arterial resistance index: a marker of renal dysfunction with an incremental role in predicting heart failure progression

Francesco Monitillo (a), Agata Puzzovivo (a), Annalisa Doronzo (a), Valeria Antoncecchi (a), Valeria Paradies (a), Gaetano Citarelli (a), Nicoletta Corrieri (a), Massimo Iacoviello (a), Stefano Favale (a), Marco Matteo Ciccone (a)

(a) University of Bari, Department of Cardiology, Bari, Italy

The aim of this study was to evaluate in a group of chronic heart failure (CHF) outpatients whether a parameter reflecting renal perfusion (Renal Resistance Index, RRI) could add an incremental prognostic information to the standard evaluation of renal dysfunction. We enrolled 250 outpatients (78% males, 64±13 years, NYHA class 2.2±0.6, left ventricular ejection fraction, LVEF, 34±10%) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions (> 1 month) and in conventional therapy. Peak systolic velocity and end diastolic velocity of segmental renal artery was obtained by pulsed Doppler flow and RRI was then calculated. Standard renal function assessment was obtained by measurement of creatinine serum levels and the calculation of glomerular filtration rate by MDRD formula. During follow-up (17.8±9.9 months), 37 patients experienced heart failure progression (hospitalization and/or heart transplantation and/or death due to heart failure worsening). As shown in part A of the figure, when the presence of RRI >75% was added to a Cox multivariate regression model including age >65 years, NYHA class III, LVEF<30%, NT-proBNP >1500 pg/ml and GFR<60 ml/min*1.73 m², a significant improvement of model was observed (Chi square from 63.1 to 76.8, part A of figure). In part B of the figure Kaplan-Meier curves of patients according to the presence of GFR below or above 60 ml/min*1.73 m² and of RRI above or below 75% are shown. A RRI >75 was associated with a worse prognosis both in patients with preserved and impaired renal function.

In conclusion, our findings demonstrate the possible clinical usefulness of a parameter reflecting renal perfusion in order to better characterise cardiorenal syndrome and to better stratify patients' prognosis.



Figure

TERAPIA DELL'IPERTENSIONE

O75

Terapia antiipertensiva di combinazione e la risposta pressoria all'esposizione ad alta quota in pazienti con ipertensione arteriosa. HIGHCARE-ANDES Lowlanders Study.

Grzegorz Bilo (a), Francisco Villafuerte (b), Cecilia Anza (b), Miriam Revera (a), Andrea Giuliano (a, c), Andrea Faini (a), Sergio Caravita (a, c), Francesca Gregorini (a), Carolina Lombardi (a), Elisabetta Salvioni (d), Jose Luis Macarlapu (b), Deborah Ossoli (a), Leah Landaveri (b), Morin Lang (e), Piergiuseppe Agostoni (d, f), Jose Manuel Sosa (b), Giuseppe Mancina (c), Gianfranco Parati (a, c)

(a) *Unità di Cardiologia, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano*, (b) *Universidad Peruana Cayetano Heredia, Lima, Peru*, (c) *Dipartimento di Scienze della Salute, Università degli Studi di Milano Bicocca, Milano, Italia*, (d) *Centro Cardiologico Monzino, Milano, Italia*, (e) *Dept. de Kinesiología, Universidad de Antofagasta, Antofagasta, Cile*, (f) *Università degli Studi di Milano, Milano, Italia*

Obiettivi: L'esposizione all'alta quota (AQ) può indurre l'aumento della pressione arteriosa (PA) in soggetti sani. Poco è noto sul suo effetto in soggetti ipertesi e questa questione non è mai stata studiata mediante il monitoraggio ambulatorio nelle 24h (ABPM). Lo scopo del HIGHCARE-ANDES Lowlanders Study è stato lo studio degli effetti dell'esposizione acuta ad AQ sulla PA 24h e dell'efficacia di terapia antiipertensiva di combinazione in questo contesto.

Metodi: In 100 soggetti con ipertensione lieve, non trattati o dopo 4 settimane di wash-out, randomizzati (1:1) a ricevere in doppio cieco placebo (PL) o telmisartan 80mg + nifedipina GITS 30 mg (T/N), è stato eseguito ABPM in: condizione basale (SLbas), al livello del mare dopo 6 settimane di terapia (SLtx), alla prima giornata intera di permanenza a 3260 m (Huancayo, Peru; HA); immediatamente dopo il ritorno al livello del mare (SLret).

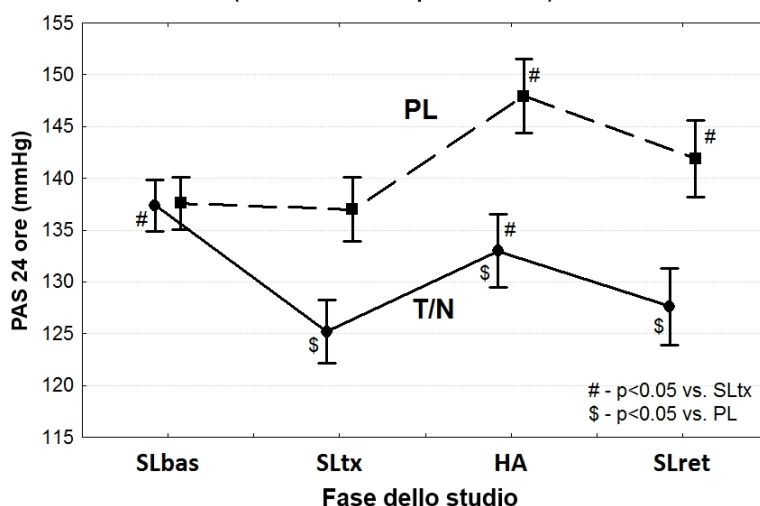
Risultati: 89 pazienti hanno completato tutte le visite (età 56.4 ± 17.6 , 52M/37F, BMI 28.2 ± 3.5 kg/m²). Non ci sono state differenze significative tra i gruppi in SLbas. In entrambi i gruppi PA sistolica 24h aumentava significativamente in HA (differenze rispetto a SLtx: 11.0 ± 9 mmHg in PL, 8.1 ± 10.4 mmHg in T/N, $p=0.17$ per PL vs. T/N). Trattamento attivo ha indotto un riduzione significativa della PAS 24h al livello del mare e questo effetto si è mantenuto in HA (Figura). Risultati simili sono stati ottenuti per la PA diastolica, nonché per i valori pressori diurni e notturni. Il trattamento è stato ben tollerato al livello del mare e all'AQ.

Conclusioni: Il nostro è il primo studio a dimostrare che:

1) PA 24h aumenta significativamente durante l'esposizione acuta all'AQ in soggetti ipertesi;

2) terapia antiipertensiva di combinazione mantiene la sua efficacia in questa condizione. Questi risultati possono avere rilevanza nella gestione di pazienti ipertesi che prevedono breve periodo di permanenza in AQ.

PAS 24 ore in soggetti trattati con placebo (PL) o trattamento attivo (T/N)
(medie di minimi quadrati \pm SE)



O76

Effetti dell'esposizione acuta all'alta quota sulla pressione arteriosa durante esercizio in ipertesi di grado lieve. Dati dello studio HIGHCARE-ANDES

Andrea Faini (a), Sergio Caravita (a, b), Morin Lang (c), José Luis Macarlapu (d), Cecilia Anza (d), Elisabetta Salvioni (e), Jessica Rossi (a, b), Miriam Revera (a), Andrea Giuliano (a, b), Francesca Gregorini (a), Mariaconsuelo Valentini (a), Carolina Lombardi (a), Grzegorz Bilo (a), Francisco Villafuerte (d), Giuseppe Mancina (b), Piergiuseppe Agostoni (e, f), Gianfranco Parati (a, b)

(a) Dipartimento di Cardiologia, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano, (b) Dipartimento di Scienze della Salute, Università degli Studi di Milano Bicocca, Milano, Italia, (c) Dept. de Kinesiología, Universidad de Antofagasta, Antofagasta, Chile, (d) Universidad Peruana Cayetano Heredia, Lima, Peru, (e) Centro Cardiologico Monzino, Milano, Italia, (f) Università degli Studi di Milano, Milano, Italia

Razionale: L'esposizione acuta all'ipossia ipobarica d'alta quota (HA) determina incremento della pressione arteriosa (PA) sistolica (S) e diastolica (D) a riposo e durante le 24 ore in soggetti sani. Non vi sono dati sull'effetto di HA sulla PA a riposo e durante l'esercizio in pazienti con ipertensione arteriosa.

Obiettivo: Descrivere l'effetto dell'esposizione acuta ad HA sulla PA a riposo e sull'incremento pressorio durante esercizio in soggetti ipertesi.

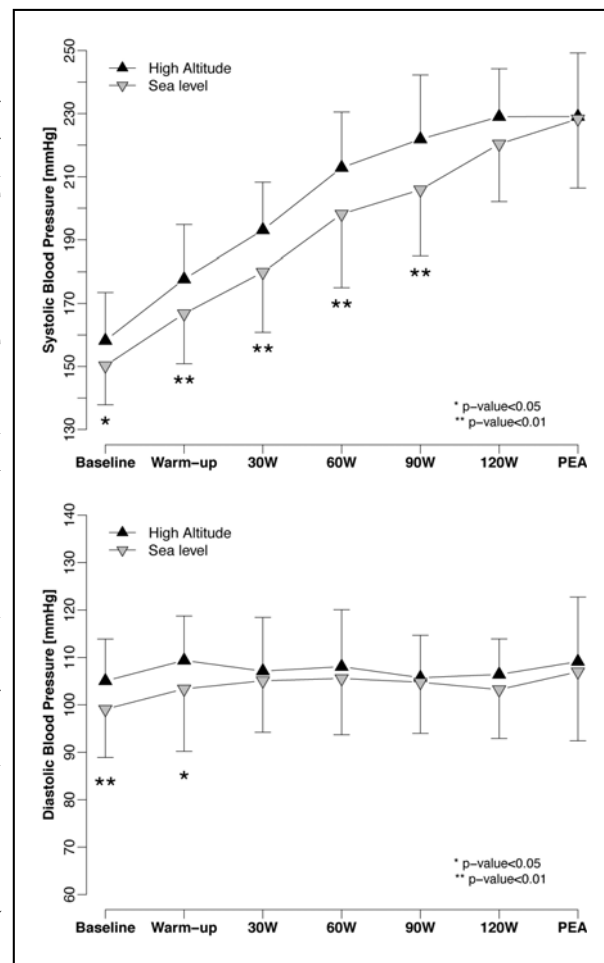
Metodi. Abbiamo analizzato i dati di 28 ipertesi di grado lieve (età 55.6±19.11; 16M/12F; BMI 28.61±3.59 Kg/m²), randomizzati a placebo nello studio HIGHCARE-ANDES, sottoposti a test da sforzo cardiopolmonare massimale (step incrementali:30watt/3minuti) a livello del mare (SL) e il primo giorno di permanenza a 3260 m s.l.m. (Huancayo-Perù). PA è stata misurata con tecnica auscultatoria sempre dallo stesso operatore.

Risultati: Rispetto a SL, in HA la capacità di lavoro era ridotta sia al picco (135.00±41.86 vs 119.21±31.51 W, p<0.001) sia alla soglia anaerobica (AT) (78.89±34.46 vs 60.00±20.38 W, p<0.01). Da SL a HA il consumo d'ossigeno (L/min) era ridotto al picco (1.988±0.469 vs 1.250±0.392) e all'AT (1.676±0.207 vs 1.038±0.080).

Da SL a HA, si è osservato aumento di PAS a riposo e durante esercizio ≤90 W (figura). Tale maggiore risposta di PAS in HA era presente anche all'AT (210.73±21.28 vs 202.58±22.80 mmHg, p=0.05), mentre non vi era differenza di PAS tra HA e SL al picco (corrispondente tuttavia ad un carico minore in HA vs SL). PAD era maggiore a riposo e durante warm-up in HA, non essendo presenti significative differenze con SL per carichi di lavoro maggiori.

Conclusioni: L'esposizione acuta di soggetti ipertesi alla quota di 3260 m determina, rispetto a SL, riduzione della capacità d'esercizio e rialzo di PA a riposo e durante esercizio fino all'AT. La maggiore risposta di PAS all'esercizio in HA scompare al picco, probabilmente per il minor carico di lavoro raggiunto ad HA. PAD si comporta diversamente, essendo maggiore in HA solo a riposo e durante warm-up. Questi risultati hanno rilevanza per la protezione e trattamento di soggetti ipertesi che pianifichino un'esposizione acuta all'HA.

SIC | *Indice Autori*



O77

Pressione arteriosa a riposo ed al picco dell'esercizio in ipertesi acutamente esposti all'alta quota. Effetti del trattamento di combinazione telmisartan-nifedipina GITS

Sergio Caravita (a, b), Andrea Faini (a), José Luis Macarlupu (c), Morin Lang (d), Cecilia Anza (c), Elisabetta Salvioni (e), Jessica Rossi (a, b), Miriam Revera (a), Andrea Giuliano (a, b), Francesca Gregorini (a), Mariaconsuelo Valentini (a), Carolina Lombardi (a), Grzegorz Bilo (a), Francisco Villafuerte (c), Giuseppe Mancia (b), Piergiuseppe Agostoni (e, f), Gianfranco Parati (a, b)

(a) Dipartimento di Cardiologia, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano, (b) Dipartimento di Scienze della Salute, Università degli Studi di Milano Bicocca, Milano, Italia, (c) Universidad Peruana Cayetano Heredia, Lima, Peru, (d) Dept. de Kinesiología, Universidad de Antofagasta, Antofagasta, Chile, (e) Centro Cardiologico Monzino, Milano, Italia, (f) Università degli Studi di Milano, Milano, Italia

Razionale: La pressione arteriosa sistolica (PAS) e diastolica (PAD) in soggetti sani, a riposo e nelle 24 ore, aumentano durante esposizione acuta all'ipossia ipobarica d'alta quota (HA). Non sono note le risposte pressorie e gli effetti del trattamento antiipertensivo a riposo e durante esercizio in soggetti ipertesi esposti ad HA.

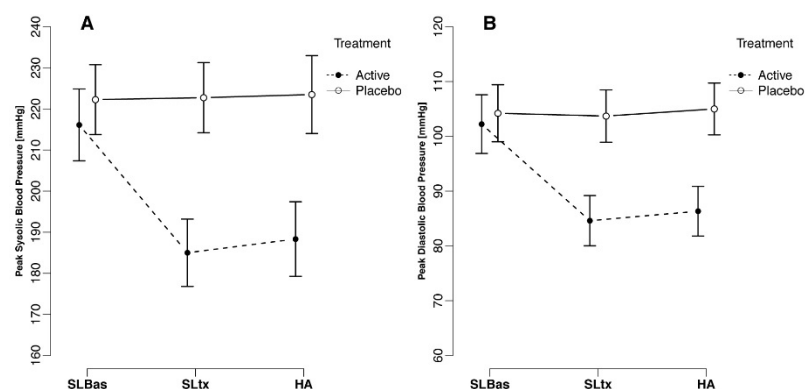
Obiettivi: Valutare in soggetti ipertesi esposti acutamente ad HA gli effetti 1) di HA sulla PA a riposo e sulla fisiologia dell'esercizio; 2) della terapia di combinazione telmisartan 80mg-nifedipina GITS 30mg (T/N-GITS) nel contrastare l'incremento pressorio indotto da HA a riposo e durante esercizio.

Metodi: 55 soggetti dello studio HIGHCARE-ANDES (età 56.96 ± 18.07 ; 28M/26F; BMI 27.99 ± 14.47 Kg/m²), affetti da ipertensione arteriosa di grado lieve, sono stati sottoposti a test da sforzo cardiopolmonare incrementale in 3 occasioni: a livello del mare (SL) in wash-out farmacologico (SLbas) e 6 settimane dopo randomizzazione (doppio-cieco) a placebo (PL) o T/N-GITS (SLtx); durante il primo giorno intero di permanenza a 3260 m s.l.m. (Huancayo-Perù).

Risultati: Non erano presenti differenze significative a SLbas tra PL (n=28) e T/N-GITS (n=27). A SLtx, T/N-GITS riduceva PAS/PAD a riposo ($126.19 \pm 16.02/82.63 \pm 11.54$ vs $150.25 \pm 12.39/99.07 \pm 10.18$ mmHg, $p < 0.001$ vs SL) ed al picco dell'esercizio (Figura), senza modificare il consumo di ossigeno (VO₂).

In HA, PAS/PAD aumentavano in entrambi i gruppi a riposo, con valori tuttavia inferiori in T/N-GITS rispetto a PL ($134.30 \pm 15.41/86.26 \pm 9.83$ vs $158.21 \pm 15.25/105.04 \pm 8.84$ mmHg, $p < 0.001$). In HA PAS/PAD al picco non erano differenti dai valori a SLtx (Figura), ma erano raggiunti nonostante riduzione (-13%) del VO₂ in entrambi i gruppi vs SLtx (1.664 ± 0.431 vs 1.901 ± 0.583 s L/min, $p < 0.001$).

Conclusioni: A 3260 m s.l.m., soggetti ipertesi mostrano una ridotta capacità funzionale (-13% VO₂ picco) ma raggiungono al picco la stessa PA ottenuta a SL, suggerendo un'iperreattività della PA durante esercizio in HA. T/N-GITS riduce PA a riposo e durante esercizio a SL e HA, senza modificare la capacità di esercizio. L'associazione T/N-GITS può essere considerata terapia sicura ed efficace negli ipertesi di grado lieve in occasione di un'esposizione acuta all'HA.



O78

Effetti della denervazione renale sul sistema nervoso simpatico: evidenze preliminari

Gino Seravalle (a), Gianmaria Brambilla (b), Marina Alimento (c), Antonio Bartorelli (c), Marco Volpe (b), Claudio Pini (d), Rocco Corso (e), Federico Pieruzzi (f), Andrea Stella (f), Giuseppe Mancina (b), Guido Grassi (b)

(a) Istituto Auxologico Italiano, Ospedale San Luca, Milano, (b) Clinica Medica, Università Milano-Bicocca, Ospedale San Gerardo dei Tintori, Monza, Milano, (c) Unità Operativa di Scompenso, Cardiologia Clinica e Riabilitativa. Centro Cardiologico Monzino, Mila, (d) Medicina Generale Centro per lo studio e terapia della Ipertensione arteriosa. Ospedale Sant'Anna, C, (e) Radiologia Interventistica, Università Milano-Bicocca, Ospedale San Gerardo dei Tintori, Monza, (f) Clinica Nefrologica, Università Milano-Bicocca, Ospedale San Gerardo dei Tintori, Monza, Milano

Introduzione: Nell'ipertensione resistente la denervazione renale induce effetti antipertensivi presumibilmente mediati dalla deattivazione simpatica. I dati sono tuttavia non univoci circa gli effetti diretti della procedura e la sua relazione con la riduzione pressoria.

Metodi: In 11 pazienti con ipertensione resistente sottoposti a denervazione renale sono stati valutati la pressione arteriosa (PA) clinica, battito-battito (Finapres) e ambulatoria (Spacelabs), la frequenza cardiaca (FC, ECG) ed il traffico nervoso simpatico efferente al distretto muscolare scheletrico (TNS, microneurografia, nervo peroneale) in basale e 30, 90 e 180 giorni dopo la procedura. L'analisi statistica è stata eseguita con test non-parametrico di Friedman; i dati sono espressi come medie \pm SE.

Risultati: I pazienti con una età media di 65.4 ± 3.4 anni e indice di massa corporea di 28.2 ± 1.1 kg/m² avevano valori di PA clinica di $170.6\pm 3.4/94.8\pm 4.4$ mmHg e PA ambulatoria di $154.9\pm 5.0/87.1\pm 3.0$ mmHg. Una riduzione dei valori di PA clinica sono stati osservati dopo 30 giorni dalla procedura ($155.7\pm 8.5/85.7\pm 3.9$) e si sono mantenuti nelle successive valutazioni con una riduzione di $-14.3.3\pm 8.1$ mmHg per la PA sistolica e -8.6 ± 4.8 mmHg per la PA diastolica (rispettivamente $P=0.06$ e $P<0.05$) a 180 giorni. Un trend simile è stato osservato per i valori di PA ambulatoria con una riduzione di -7.6 ± 2.4 mmHg di PA sistolica e -8.6 ± 3.1 mmHg di PA diastolica (rispettivamente $P=0.06$ e $P<0.05$). La FC non ha mostrato variazioni significative dopo la procedura. Il TNS ha evidenziato una progressiva riduzione durante il periodo di follow-up sia quando espresso come sc/min (da 42.9 ± 4.9 a 32.5 ± 2.5 a 180 giorni, $P<0.05$) che come sc/100bc (da 67.9 ± 2.9 a 53.7 ± 4.9 a 180 giorni, $P<0.01$). Non si sono osservate correlazioni significative tra TNS e FC, PA clinica, PA ambulatoria o PA battito-battito.

Conclusioni: Questi dati suggeriscono che la denervazione renale esercita progressivi effetti simpaticoinibitori che iniziano precocemente durante il follow-up sebbene tali effetti non sembrano necessariamente essere associati sia temporalmente che quantitativamente agli effetti antipertensivi della procedura

O79

Effects of zofenopril versus ramipril on cardiac function in patients with early hypertension

Matteo Cameli (a), Matteo Lisi (a), Marta Focardi (a), Margherita Padeletti (a), Flavio D'Ascenzi (a), Marco Solari (a), Stefano Lunghetti (a), Maurizio Galderisi (b), Sergio Mondillo (a)

(a) Department of Cardiovascular Diseases, University of Siena, Siena, Italy, (b) Cardioangiology Unit with CCU, Department of Clinical and Experimental Medicine, Federico II University

Background: There is still limited information about the functional effective cardiac improvement of myocardial deformation dynamics during ACE-inhibition therapy. Aim of the study was to determine if zofenopril is more effective than ramipril in the progressive improvement of left ventricular (LV) and atrial (LA) remodeling, analyzed by speckle tracking echocardiography, in patients with early hypertension.

Methods: In this prospective study, 30 patients with new-onset hypertension, naive to any anti-hypertensive therapy were randomized to zofenopril (30 mg titrated to 60 mg after 4 weeks; n=15) or ramipril (5 mg titrated to 10 mg after 4 weeks; n=15) for 6 months. Patients were treated to standard blood pressure targets. Before and 3 and 6 months after the start of therapy, LV and LA longitudinal strain parameters were measured in all patients.

Results: Systolic and diastolic blood pressures were reduced similarly in both treatment groups (8.2±13.9/4.0±10.1 mmHg in the zofenopril group and 8.0±15.5/3.9±9.7 mmHg in the ramipril arm; p<0.0001 within both groups, P=0.35 between groups). LV mass index was reduced significantly from baseline in both treatment groups only after 6 months (6.7- and 6.4- g/m² reductions in the zofenopril, and ramipril arms, respectively; p<0.0001 for both). No significant changes in LV longitudinal strain parameters were found either 3 months or 6 months after in both groups. Global atrial longitudinal strain increased significantly after 6 months of therapy in both groups (24.6±6.4 vs 36.8±7.0% and 24.3±6.2 vs 32.1±6.8%; in the zofenopril, and ramipril arms, respectively p=0.001 for both). Zofenopril was more effective than ramipril in increasing LA longitudinal strain (p=0.01). Safety and tolerability were similar across both treatment groups.

Conclusions: Zofenopril was more effective than ramipril in promoting LA function recovery, independently of blood pressure lowering in hypertensive patients with early hypertension. No changes were demonstrated for the LV myocardial deformation.

O80

Efficacia di differenti farmaci antipertensivi sul rimodellamento del microcircolo coronarico nel ratto spontaneamente iperteso

Angela Scavone (a), Massimiliano Mancini (b), Rocco Baccaro (a), Christina Kleinert (a), Giulia d'Amati (b), Paolo G. Camici (a)

(a) *Università Vita- Salute San Raffaele - Milano - Divisione di Scienze metaboliche e cardiovascolari*, (b) *Università "La Sapienza" - Roma - Dipartimento di scienze radiologiche, oncologiche e anatomo-patologiche*

Background: L'ipertensione arteriosa (HTN) è un problema sanitario mondiale e rappresenta il principale fattore di rischio, per importanza e prevalenza, nello sviluppo della malattia coronarica (CAD). Tra i pazienti ipertesi si riscontrano spesso sintomi e alterazioni ECG indicativi di CAD senza evidente aterosclerosi delle coronarie epicardiche. Tali manifestazioni sono attribuibili ad alterazioni morfo-funzionali del microcircolo ("coronary microvascular dysfunction", CMD), come il rimodellamento della tonaca media arteriolare, che compromettono la riserva coronarica (CFR). Recenti studi hanno fornito dati preliminari sulla capacità di alcuni farmaci anti-ipertensivi nel provocare un rimodellamento inverso delle arteriole coronariche e migliorare la CFR. Scopo del nostro lavoro è confrontare l'efficacia di diverse classi di farmaci antipertensivi nel ridurre i meccanismi di CMD in un modello animale di HTN, il ratto spontaneamente iperteso (SHR), che presenta segni di rimodellamento cardiaco e CMD accertata nell'età adulta, senza segni di aterosclerosi.

Metodi: SHR maschi di 24 settimane, sono stati assegnati random (n≥5) ai diversi gruppi di trattamento: Ramipril 10 mg/kg; Perindopril 1,2 mg/kg; Indapamide 1,1 mg/kg; Candesartan 3 mg/kg comparandoli a SHR placebo. Dopo 8 settimane di trattamento, i ratti sono stati anestetizzati, sottoposti a misurazione della pressione arteriosa invasiva per via transcarotidea e sacrificati. Il cuore è stato prontamente incannulato alla radice aortica e perfuso in maniera retrograda a pressione costante tramite la metodica di Langendorff, al fine di ottenere la misura del flusso coronarico basale e del flusso iperemico (flusso massimo) misurato dopo 2 minuti d'ischemia globale. L'analisi istologica è stata condotta tramite colorazione in ematossilina/eosina per evidenziare le strutture dei vasi e permettere la misurazione dell'area della tonaca media e del diametro totale dei vasi.

Risultati: Tutti i farmaci utilizzati hanno dimostrato un significativo effetto antipertensivo rispetto ai controlli SHR (p<0.05 per tutti i gruppi. Pressione arteriosa sistolica: SHR 210±23.1; Ramipril

130.18±26.15; Perindopril 142.76±30.3; Indapamide 167±8.5; Candesartan 85.12±17.95 mmHg). Inoltre abbiamo osservato che Candesartan e Perindopril inducono un significativo aumento del flusso coronarico iperemico (19.05±3.5 e 16.73±4.08 ml/min/g, rispettivamente) rispetto ai controlli placebo (SHR 11.93±2.02 ml/min/g, $p<0.05$) a differenza di Ramipril (13.98±3.41) e Indapamide (14.07±3.80) che non risultano significativi. Infine, l'analisi istologica ha evidenziato per tutti i farmaci una riduzione significativa ($p<0.05$) dell'area della tonaca media (SHR 6625.75±510.99; Ramipril 2842.11±233.11; Perindopril 1831.59±210.36; Indapamide 3713.81±457.46; Candesartan 4388.94±443.36 μm^2) e del diametro totale dei vasi (SHR 101.04±3.71; Ramipril 67.80±2.81; Perindopril 57.20±2.75; Indapamide 79.06±3.43; Candesartan 82.89±3.77 μm).

Conclusioni: Il nostro studio valuta per la prima volta l'efficacia delle diverse classi di farmaci antipertensivi nel ridurre la CMD. Oltre ad indurre una riduzione della pressione sanguigna, infatti, si nota un miglioramento nei segni strutturali e funzionali del rimodellamento del microcircolo coronarico. L'efficacia di ogni farmaco su tale regressione però, è fortemente variabile a seconda della classe, e potrebbe avere importanti implicazioni cliniche. Questi risultati suggeriscono che la CMD non è una semplice conseguenza dell'HTN, ma un fenotipo più complesso la cui patogenesi rimane non completamente chiarita.

LA CARDIOLOGIA INTERVENTISTICA NEL NUOVO MILLENNIO: VECCHI E NUOVI OBIETTIVI TERAPEUTICI

O81

Risk prediction of contrast-induced nephropathy by modified age, creatinine clearance and ejection fraction [acef] score in patients undergoing coronary angiography with or without percutaneous corona

Margherita Ministeri (a), Davide Capodanno (a), Veronica D'Alessandro (a), Fabio Di Pasqua (a), Silvia Cumbo (a), Corrado Tamburino (a, b)

(a) Cardiovascular Department, Ferrarotto Hospital, Catania, Italy, (b) ETNA Foundation, Catania, Italy

Objectives: To explore the ability of the ACEF score to predict the incidence of contrast-induced nephropathy (CIN) in patients undergoing coronary angiography with or without percutaneous coronary intervention.

Background: The ACEF score is a parsimonious risk model encompassing age, creatinine clearance and left ventricular ejection fraction.

Methods: A total of 706 patients undergoing coronary angiography±percutaneous coronary intervention (PCI) between March 2011 and October 2011 were analyzed. CIN using different definitions was termed as CIN_{narrow} (rise in serum creatinine ≥ 0.5 mg/dL) and CIN_{broad} (rise in serum creatinine ≥ 0.5 mg/dL and/or $\geq 25\%$ increase in baseline serum creatinine).

Results: The mean ACEF score was 1.5±0.6. Overall incidences of CIN_{narrow} and CIN_{broad} were 5.5% and 13.6%, respectively. There was a significant gradient in the incidence of CIN_{narrow} (2.9%, 3.9%, 10.6% in the I, II and III tertiles, respectively, $P<0.001$) and CIN_{broad} (9.1%, 14.2%, 17.9% in the I, II and III tertiles, respectively, $P=0.021$) across increasing ACEF tertiles. The ACEF score was independently associated with the risk of CIN_{narrow} (adjusted odds ratio [OR] 1.6, 95% confidence interval [CI] 1.0-2.7; $P=0.047$). Discrimination was more satisfactory when using the ACEF as a predictor of CIN_{narrow} (c-statistic 0.71, 95% 0.63-0.79). A cut-off of ACEF=1.3 was identified as the one with the best combination of sensibility (82%) and specificity (54%). ACEF>1.3 was significantly and independently associated with CIN_{narrow} (adjusted OR 2.9, 95% 1.2-7.5, $P=0.012$).

Conclusions: The ACEF score is an independent

O82

Pharmacodynamic effect of switching therapy in patients with high on-treatment platelet reactivity and genotype variation with high clopidogrel dose versus prasugrel

Gennaro Sardella (a), Simone Calcagno (a), Massimo Mancone (a), Filippo Placentino (a), Mauro Pennacchi (a), Luigi Lucisano (a), Alessandra Pecoraro (a), Andrea Ceccacci (a), Rocco Edoardo Stio (a), Francesco Fedele (a)

(a) *Departments of Cardiovascular Sciences, Umberto I Hospital, Sapienza University of Rome, Italy*

Background: Dual antiplatelet therapy with aspirin and clopidogrel has become the cornerstone preventive means of ischemic events in patients undergoing percutaneous coronary intervention (PCI).^{1–3} However, substantial between-subject variability in platelet response (PR) to clopidogrel has been reported,⁴ with several mechanisms being implicated for high on-treatment platelet reactivity (HTPR). High on-treatment platelet reactivity (HTPR) is associated with adverse outcomes.

Aim: The primary aim of the present study was to investigate the antiplatelet effects of prasugrel (10 mg/day) versus high-dose clopidogrel (150 mg/day) in stable patients with HTPR, also taking into account genotype variation.

Methods: Consecutive stable patients undergoing percutaneous coronary intervention were screened with the Multiplate Analyzer P2Y12 assay, defining HTPR as area under the curve >450. Those with HTPR were randomized to prasugrel (10 mg/day) or high-dose clopidogrel (150 mg/day) for 2 weeks and then crossed-over to, respectively, clopidogrel and prasugrel, repeating the P2Y12 assay at the end of each cycle. Clinical follow-up (until 3 months) and CYP2C19 genotyping was performed in all patients. The primary end point was platelet reactivity after 14 days of prasugrel versus high-dose clopidogrel.

Results: Thirty-two patients were randomized to prasugrel and then high-dose clopidogrel or to high-dose clopidogrel followed by prasugrel. Prasugrel was associated with a significantly lower platelet reactivity than high-dose clopidogrel was (325.8 versus 478.5 area under the curve, $P=0.028$). No patient treated with prasugrel exhibited HTPR, whereas 9 (28.1%) receiving high-dose clopidogrel still had prevalence of HTPR ($P=0.001$). Similar findings were obtained changing cutoffs or considering platelet reactivity as a continuous variable. Genotyping showed the same efficacy between high-dose clopidogrel and prasugrel in the 18 (56.3%) CYP2C19*2 noncarriers (HTPR in 12.5% versus 0, $P=0.274$), whereas it was significantly worse in the 14 (43.7%) carriers (HTPR in 43.7% versus 0, $P=0.003$). Analysis of the receiver-operating characteristic curve identified a 600 AUC cutoff for the identification of carriers of the CYP2C19*2 allele, with 75% sensibility and 72% specificity (95% CI; $P=0.032$).

Conclusions: We demonstrated that, in HTPR patients, double dose (150 mg) of clopidogrel, although reducing the platelet function, is less effective than prasugrel standard dose. Moreover, despite fact that the study was not powered for an additive genetic model, it showed that prasugrel is more effective in CYP2C19*2 carriers. Finally, receiver-operating characteristic curve analysis could identify the CYP2C19*2 carriers.

O83

Catheter-based radiofrequency renal denervation for the treatment of resistant hypertension: our experience with significant ambulatory blood pressure drop

Alessandro Sticchi (a), Azeem Latib (a), Daniela Piraino (a), Charis Costopoulos (a), Filippo Figini (a), Toru Naganuma (a), Charbel Naim (a), Giuseppe Pizzetti (a), Alberto Cappelletti (a), Alberto Margonato (a), Paolo Camici (a), Antonio Colombo (a)

(a) *Department of Cardio-Thoracic-Vascular Medicine, San Raffaele Scientific Institute, Milan, Italy, (b) Unità Operativa di Cardiologia Clinica, Ospedale San Raffaele, Milano - Italia, (c) Terapia Intensiva Coronarica, Ospedale San Raffaele, Milano - Italy*

Background: Several recent studies have shown that renal denervation is a safe and effective treatment for drug-resistant hypertension and the interest in this field is testified by the emergence of new ablation devices using different configurations and ablation methods (e.g. local delivery of neurotoxic drugs, ultrasound, cryoablation).

Aims and Methods: To report our experience with catheter-based selective renal sympathetic denervation from November 2012 to March 2013. Included patients were between 18-80 years of age with office systolic BP ≥ 160 mmHg (≥ 150 mmHg for patients with Type 2 diabetes) on ≥ 3 antihypertensive agents (including a diuretic). Using these criteria, 20 patients were identified and treated. The first ten patients were treated with the Ardian Symplicity Catheter whereas the last ten patients with the Covidien One-Shot, both radiofrequency devices. Patients were followed up at 1-3-6-12-18-24 months after treatment. Follow-up included patient review by a hypertension specialist, blood pressure measurement at point of review as well as blood and urinary sampling for glucose, urea electrolytes, microalbuminuria, brain natriuretic peptide among others. 24-hour Ambulatory Blood Pressure Monitoring (ABPM) was also undertaken at the same time intervals.

Results: All 20 patients have reached 1-month follow-up with an ABPM. This demonstrated an average systolic drop of 24 ± 7 mmHg and an average diastolic drop of 9 ± 3 mmHg. Fourteen patients completed 6-month follow-up. ABPM in these patients showed an average systolic drop of 32 ± 11 mmHg and an average diastolic drop of 13 ± 5 mmHg. No renal artery or other major vascular complications were noted. There were no changes in renal function post-procedure as assessed by creatinine clearance (Cockcroft-Gault GFR 70 ± 28 mL/min).

Conclusion: This small study demonstrates that renal denervation using radiofrequency devices is a safe and efficacious procedure for the treatment of resistant hypertension. Larger studies and longer follow-up are required to assess this further. Studies are also required to assess the effect of renal denervation on other conditions such as obstructive sleep apnea, insulin resistance, chronic kidney disease, atrial fibrillation and heart failure.

O84

Rivascolarizzazione miocardica completa o incompleta nella malattia coronarica multivasale: una meta-analisi di studi randomizzati ed osservazionali

Cosimo Mattia Romanello (a), Fabrizio Ricci (a), Marco Zimarino (a), Raffaele De Caterina (a)

(a) *Istituto di Cardiologia Università "G. d'Annunzio", Chieti*

Background: Nei pazienti con malattia coronarica multivasale (MVCAD) l'estensione ottimale della rivascolarizzazione miocardica, eseguita tramite intervento coronarico percutaneo (PCI) o bypass aorto-coronarico, è controversa. Ad oggi, mancano specifici trial disegnati per confrontare direttamente una rivascolarizzazione completa (CR) o incompleta (IR), e gli studi che hanno tentato d'identificare la strategia di rivascolarizzazione ottimale non hanno dimensione campionaria adeguata a valutare una significativa riduzione di end-point "duri".

Scopo: Confrontare l'efficacia della CR e della IR in una popolazione di pazienti con MVCAD, attraverso una meta-analisi di trial clinici randomizzati (RCT) e studi osservazionali non randomizzati (nROS).

Metodi: Abbiamo condotto una ricerca nel database Pubmed per individuare RCT e nROS pertinenti al nostro scopo, pubblicati tra il gennaio 1990 e l'aprile 2013. Ci siamo serviti della seguente strategia di ricerca: 'multivessel disease' OR 'complete revascularization' OR 'incomplete revascularization'. Abbiamo escluso i pazienti con STEMI, nei quali è attualmente raccomandato il trattamento della sola lesione colpevole. Utilizzando un modello di analisi ad effetti fissi ed il metodo statistico di Mantel-Haenszel, abbiamo calcolato gli Odds Ratio (OR) con relativi intervalli di confidenza del 95% (95% CI) in riferimento a tre esiti: mortalità da tutte le cause, infarto miocardico e re-intervento di rivascolarizzazione.

Risultati: Sono stati individuati 19 studi, per un totale di 33,404 pazienti con MVCAD (follow-up mediano 2.7 anni). Rispetto alla IR, la CR riduceva significativamente il rischio di morte da tutte le cause (OR: 0.77, 95% CI 0.72 - 0.83), infarto miocardico (OR: 0.78, 95% CI 0.66 - 0.92) e re-intervento (OR: 0.77, 95% CI 0.68 - 0.86). Analizzando i dati in base alla tecnica di rivascolarizzazione, gli OR a favore della CR per la morte e l'infarto miocardico erano, rispettivamente, 0.66 (95% CI 0.59 - 0.75) e 0.82 (95% CI 0.66 - 1.02) per la chirurgia, 0.84 (95% CI 0.76 - 0.92) e 0.73 (95% CI 0.56-0.95) per la PCI.

Conclusioni: La CR, sia tramite bypass aorto-coronarico che tramite PCI, conferisce benefici in termini di mortalità, infarto miocardico e necessità di re-intervento, rispetto alla IR. Pertanto la CR dovrebbe essere la strategia di scelta a cui puntare nel momento in cui si pianifica una procedura di rivascolarizzazione in un paziente con MVCAD.

O85

La performance diagnostica della iFR nella valutazione funzionale della stenosi del Tronco Comune

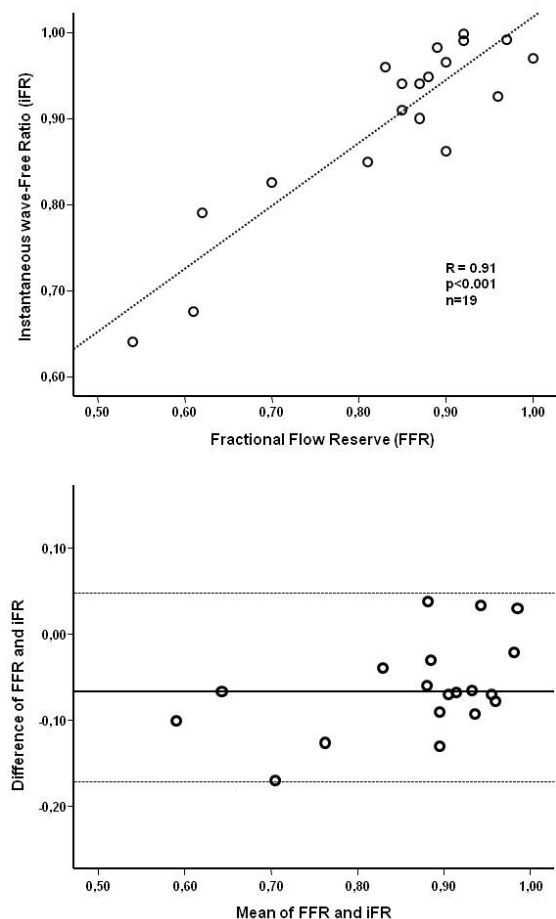
Salvatore De Rosa (a), Annalisa Mongiardo (a), Carmen Spaccarotella (a), Daniele Torella (a), Gianluca Caiazzo (a), Salvatore Giampa (a), Mariella Miceli (a), Alberto Polimeni (a), Sabato Sorrentino (a), Ciro Indolfi (a)

(a) *Cattedra di Cardiologia, Università degli Studi "Magna Graecia" di Catanzaro*

Background. L'angiografia coronarica presenta numerose limitazioni per la valutazione della severità della stenosi, specialmente nel caso in cui questa sia localizzata al tronco comune della coronaria sinistra (TC). La lunghezza limitata, la frequente sovrapposizione di collaterali, la mancanza di un segmento di riferimento, il diametro gradualmente decrescente contribuiscono infatti a complicare la valutazione della stenosi del TC. La fractional flow reserve (FFR) è un utile - ma spesso sottoutilizzato - strumento per la valutazione funzionale della stenosi di TC. Recentemente è stato introdotto un indice analogo, la instantaneous wave-free ratio (iFR), che potrebbe contribuire a semplificare ulteriormente la misurazione, non necessitando della somministrazione di adenosina. Tuttavia, l'efficacia diagnostica di quest'ultimo per la valutazione della stenosi di TC non è stata ancora valutata.

Metodi e Risultati. Il presente studio monocentrico ha incluso una serie di 19 stenosi del TC angiograficamente borderline. La FFR è stata misurata in corso di iperemia, ottenuta mediante infusion di adenosine (140 mcg/Kg/min) attraverso una vena centrale. La iFR è stata misurata quale rapporto tra la pressione intracoronarica distale prossimale, misurate durante il "wave-free period", quella fase della diastole in cui le resistenze coronariche sono minime e stabili. Il confronto tra la iFR e la FFR ha dimostrato una stretta correlazione tra le due metodiche ($r=0.91$; $p<0.001$). In accordo con tale riscontro, l'analisi di Bland-Altman mostrava una buona concordanza tra le due misurazioni (figura). La selezione del cut off diagnostico ottimale (iFR<0.85) sulla base dei risultati dell'analisi ROC conduceva ad una concordanza diagnostica del 100% tra le due metodiche. Applicando invece il cut off di uso corrente currently per la iFR (iFR<0.90) si otteneva una concordanza diagnostica del 94% con la FFR.

Conclusioni. La valutazione della stenosi di TC mediante la instantaneous wave-Free Ratio rappresenta un'alternativa sicura e promettente alla classica fractional flow reserve, il cui utilizzo potrebbe contribuire ad un maggiore utilizzo degli indici pressori per la valutazione funzionale della stenosi di TC, data la maggiore semplicità di utilizzo.



O86

Volume-to-creatinine clearance ratio in patients undergoing coronary angiography with or without percutaneous coronary intervention: implications of varying definitions of contrast-induced nephropathy

Margherita ministeri (a), Davide Capodanno (a), Silvia Cumbo (a), Veronica D'Alessandro (a), Corrado Tamburino (a)

(a) *Cardiovascular Department, Ferrarotto Hospital, Catania, Italy*

Background: A ratio of the volume of contrast media administered to the estimated creatinine clearance ($V/CrCl$) ≥ 4 has been proven to predict the risk of ≥ 0.5 mg/dL postprocedural absolute rise in serum creatinine. Whether this index is also applicable to a broader and widely adopted definition of contrast-induced nephropathy (CIN) (≥ 0.5 mg/dL absolute and a 25% relative increase from baseline serum creatinine) is unknown.

Methods: A total of 722 patients undergoing coronary angiography \pm percutaneous coronary intervention (PCI) between March 2011 and October 2011 with paired serum creatinine determinations at pre- and within 72 hours post-procedure were analyzed. The $V/CrCl$ ratio was calculated by dividing the volume of contrast received by the patient's creatinine clearance. CIN using different definitions was termed as CIN_{narrow} (rise in serum creatinine ≥ 0.5 mg/dL) and CIN_{broad} (rise in serum creatinine ≥ 0.5 mg/dL or a $\geq 25\%$ increase in baseline serum creatinine).

Results: The mean age was 66 ± 11 years and the mean estimated creatinine clearance was 1.1 ± 0.8 ml/min. Patients with $V/CrCl \geq 4$ were significantly older, with lower body mass index, more likely presented with hypertension or peripheral artery disease, and more frequently underwent ad-hoc PCI compared with those with $V/CrCl < 4$. CIN_{narrow} and CIN_{broad} were observed in 13% vs 3% ($P < 0.001$) and 23% vs 11% ($P < 0.001$) of patients with or without $V/CrCl \geq 4$, respectively. After statistical adjustment, a $V/CrCl$ ratio ≥ 4 remained significantly associated with the risk of both CIN_{narrow} (adjusted OR 3.8, 95% CI 1.9-7.8; $P < 0.001$) and CIN_{broad} (adjusted OR 2.5, 95% CI 1.6-3.9; $P < 0.001$).

Conclusions: A volume-to-creatinine clearance ratio ≥ 4 significantly predict the risk of CIN regardless of the definition adopted.

ESPOSIZIONE SINTESI LAVORI VINCITORI BORSE DI STUDIO 2011

O87

Valutazione delle complicanze aritmiche indotte da terapia cellulare in un modello animale di infarto miocardico acuto: confronto tra cellule midollari mesenchimali e cardiosfere

Sonia Pennella (a, b), Enrico Giuliani (c), Roberto Lonardi (d), Alberto Farinetti (e), Giacomo Frati (f), Anna Vittoria Mattioli (a, b)

(a) *Istituto Nazionale Ricerche Cardiovascolari U.O. Modena*, (b) *Dipartimento di Scienze della Vita, Università degli Studi di Modena e Reggio Emilia*, (c) *Dipartimento integrato di Medicina, Endocrinologia, Metabolismo e Geriatria*, (d) *Dipartimento di Scienze Biomediche, Metaboliche e Neuroscienze*, (e) *Dipartimento di Scienze Mediche e Chirurgiche Materno-Infantili e dell'Adulto*, (f) *U.P. "Tecnologie cellulari-molecolari applicate alle malattie cardiovascolari", Università di Roma*

Background: La terapia cellulare è una strategia terapeutica innovativa nei processi di riparazione e rigenerazione miocardica dopo infarto miocardico acuto (IMA). Scopo dello studio è stato confrontare le cellule mesenchimali di origine midollare (MSCs) con le cardiosfere in un modello pre-clinico.

Metodi: In 34 conigli New Zealand è stato indotto un IMA mediante legatura della discendente anteriore (LAD) dell'arteria coronaria sinistra. Le MSCs sono state isolate, coltivate e risospese per SIC | *Indice Autori*

l'iniezione. Le cardiosfere sono state isolate da tessuto cardiaco mediante il metodo dell'espianto. Durante la procedura chirurgica gli animali sono stati casualmente assegnati a uno dei 5 gruppi: 1. IM + MSC + cellule i.m.; 2. IM + MSC + cellule e.v.; 3. IM + Sol. Fisio i.m.; 4. IM + cardiosfere + cellule i.m. e 5. IM + cardiosfere + cellule e.v. La valutazione istologica dell'engraftment cellulare è stata eseguita post-mortem. Gli animali sono stati successivamente monitorati nel seguente modo: ecg ai giorni 1,3,7,14,30,45,60 ed ecocardiogramma ai giorni 0, 14,30,45,60.

Risultati: Valutazione ecgrafica: durante la fase acuta dell'induzione dell'IMA, è stato registrato un maggior numero di contrazioni ventricolari premature (VPCs) nel gruppo di animali che aveva ricevuto le MSC per via i.m. o la soluzione fisiologica rispetto agli animali che avevano ricevuto le MSC per via e.v. Durante l'ischemia abbiamo registrato 3 episodi di tachicardia ventricolare (VT) reversibile. Al 7 giorno è stato registrato il più alto numero di VPCs negli animali trattati con iniezione i.m. di MSC rispetto al gruppo di animali trattati per via e.v. e al gruppo che aveva ricevuto per via i.m. la soluzione fisiologica. Dall'esame istopatologico è emerso l'assenza di infiammazione cronica da cellule infiltrate o evidenza di rigetto. Una minima fibrosi endomiocardica è stata riscontrata in tutti i gruppi ed era maggiore nel gruppo di animali che aveva ricevuto l'iniezione i.m. rispetto a quelli che avevano ricevuto l'iniezione i.v. Per quanto riguarda, invece, i gruppi trattati con le cardiosfere, i dati sono ancora in fase di elaborazione.

Conclusioni: Dall'analisi dei dati emerge che, l'iniezione intramiocardica è, di per sé, fonte di aritmie ventricolari. La somministrazione di MSCs per via i.m. determina un numero di eventi aritmici maggiore rispetto alla somministrazione delle cellule per via i.v. e rispetto al placebo per via i.m. L'effetto aritmico sarebbe imputabile al danno miocardico indotto dalla puntura. A questo si somma l'effetto pro-aritmico delle cellule somministrate in loco determinato dalla scarsa integrazione delle cellule con il miocardio sottostante e dalla fibrosi.

O88

Utilità della Tomografia Assiale Computerizzata nel trattamento percutaneo delle Occlusioni Coronariche Croniche Totali e impatto sulla qualità di vita del paziente: protocollo e esperienza iniziale

Daniela Boscarelli (a), Beatriz Vaquerizo (a), Antonio Barros (a), Sandra Pujades (a), Faustino Miranda (b), Ester Bajo (a), Marcelo Jimenez (a), Antonio Serra Peñaranda (a), Juan Cinca (a)

(a) Hospital de la Santa Creu y Sant Pau, (b) Hospital del Mar.

Background: Le occlusioni croniche totali (CTO) sono considerate tra le lesioni coronariche più complesse, per questo vengono rivascolarizzate in meno del 9% dei casi e con percentuali di successo procedurale inferiori rispetto agli altri tipi di lesioni. Accanto all'angiografia coronarica tradizionale, oggi, la tomografia computerizzata multidetettore (TCMD) sta emergendo come tecnica di supporto nella valutazione e nello studio delle CTO.

Scopo: Indagare l'utilizzo della TCMD quale strumento utile per migliorare i risultati immediati del trattamento percutaneo delle CTO e valutare il beneficio clinico sulla qualità di vita e sulla capacità di esercizio della rivascolarizzazione efficace di CTO.

Metodo: studio osservazionale, prospettico e multicentrico, che prevede l'inclusione di 180 pazienti con almeno una CTO su vaso nativo e con indicazione clinica di rivascolarizzazione percutanea, sottoposti a TCMD e randomizzati 1:1 ad un gruppo di analisi angiografica standard (analisi delle sole variabili angiografiche e cieco al TCMD) e ad un gruppo di analisi congiunta (analisi delle variabili angiografiche e delle variabili TCMD). Tutti i pazienti inoltre eseguiranno il questionario SF-36 ed il test della marcia dei 6 minuti pre-rivascolarizzazione e al 6° mese, insieme ad una RMN cardiaca.

Risultati: Dal Gennaio 2012 al Marzo 2013, 74 pazienti provenienti dai due centri pilota sono stati inclusi nello studio. Ad oggi 54 sono i pazienti sottoposti a rivascolarizzazione percutanea, 25 dei quali appartenenti al gruppo "analisi congiunta" e 29 al gruppo "analisi standard". La popolazione oggetto dello studio è risultata avere un'età media di 62,6±10,4 anni, prevalentemente di sesso

maschile (87%, 47/54), fumatori (o ex-fumatori), ipertesi, dislipidemicici e diabetici rispettivamente nel 65%, 70%, 74% e 43% dei casi. La percentuale totale di successo della rivascolarizzazione percutanea fin'ora raggiunta è pari all' 87% (47/54) ma se considerata per i due subgruppi di analisi otteniamo un successo del 83% (24/29) e del 92% (24/25) rispettivamente per i pazienti appartenenti all'analisi angiografica classica ed a quelli per l'analisi congiunta. Il beneficio clinico della rivascolarizzazione e la percezione soggettiva della capacità fisica sono stati valutati attraverso dati preliminari provenienti dal test della marcia dei 6 minuti pre- e post-rivascolarizzazione (6° mese): distanza media percorsa pre e post-PTCA ($397,3 \pm 136,5$ m vs $455,4 \pm 119,1$ m) e distanza media percorsa tra pazienti rivascolarizzati con successo rispetto al gruppo controllo (PTCA fallita) ($455,4 \pm 119,1$ m vs 370 ± 60 m). La percezione finale allo sforzo valutata secondo la scala di Borg modificata si è ridotta dal valore basale di $2,28 \pm 2,3$ (lieve) a $1,8 \pm 2,3$ (molto lieve) dopo rivascolarizzazione efficace e fortemente ridotta rispetto al gruppo controllo ($4,0 \pm 0,0$) (piuttosto intensa). La mortalità intraospedaliera, al mese ed a 6 mesi è stata nulla. Tra le complicanze osservate un caso di CIN e 2 sanguinamenti minori.

Conclusioni: Dai dati preliminare del nostro studio emerge che la TCMD sia uno strumento utile ai fini della rivascolarizzazione percutanea delle CTO, determinando un maggior successo procedurale. La qualità di vita dei pazienti con CTO rivascolarizzati con successo sembra migliorata, tuttavia ulteriori dati a lungo termine sono necessari per confermare questa ipotesi.

O89

Smooth muscle cells proliferation in juvenile coronary atherosclerosis: evidence of a contractile phenotype

Stefania Rizzo (a)

(a) *Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari, Università di Padova*

Background: Coronary atherosclerosis (CA) is the main cause of sudden cardiac death (SCD) not only in the adult but also in young people (<40 years old), accounting for nearly 20% of all the fatal events. However, in the latter it exhibits distinctive features in terms of extent, site, and morphology of the plaques, which are mostly fibrocellular, due to smooth muscle cells (SMCs) proliferation with a variable amount of connective tissue. We aimed to characterize the phenotypic features of SMCs in the media and intima of coronary arteries during the early development of atherosclerotic lesions.

Methods: Among young SCD victims due to CA in the Registry on Juvenile Sudden Death of the Veneto Region of Northeast Italy, 10 were selected for the study (8 Male and 2 Female, from 17 to 40 years old, mean age 33 ± 6.5), with mostly single vessel disease (50%), all involving the left anterior descending coronary artery. Young patients with non-coronary SCD (n=8, mean age 23 ± 10 , 6M, 2F), adult patients > 40 year old with classical atherosclerotic plaques (n=6, mean age 52 ± 12 , 7M) and adult patients > 40 year old with burst of intimal proliferation of SMCs, superimposed on classical atherosclerosis (n=4, mean age 47 ± 4) were used for comparison. For histomorphological evaluation of the plaques, 3 μ m thick sections of the coronary artery segments were stained with hematoxylin-eosin (HE), Miller, Masson trichrome and Sirius red. To investigate the phenotype of SMCs, we tested the expression of early (α -smooth muscle actin (α -SMA and S100A4) and late (smooth muscle myosin heavy chain (SMMHC) types 1/2 and smoothelin) SMC differentiation markers on serial sections by immunohistochemistry.

Results: The coronary artery segments with fibrocellular plaques exhibited a preserved tunica media, with strong positivity for the late SMC differentiation markers α -SMA, SMMHCs and smoothelin. In the intima, SMCs showed the synthetic phenotype (α -SMA and S100A4 positivity) with an increased amount of type III collagen by Sirius red stain. About 30% of α -SMA positive cells coexpressed the contractile phenotype marker SMMHC. This feature was observed also in the burst of intimal SMCs proliferation, superimposed on classical atherosclerosis, but never in fibroatheromatic plaques.

Conclusions: In the coronary artery segments with fibrocellular plaques α -SMA and SMMHCs positivity, typical of the “contractile” phenotype or mature SMCs, is found in the intima. This evidence suggests that intima SMCs might acquire a repertoire of molecular expression similar to that of media SMCs. Taking into account the expression of a late SMC contractility marker, intimal hypervasoreactivity together with vasospasm due to a preserved tunica media might contribute to transient coronary occlusion with myocardial ischemia precipitating SCD.

O90

Strategie terapeutiche con cellule staminali nell'infarto miocardico acuto: meccanismi di differenziazione e reclutamento e ruolo delle interazioni farmacologiche

Serena Vitale (c), Isabella Tritto (c), Giuseppe Ambrosio (c), Anna Vittoria Mattioli (b)

(a) *Farmacologia, Tossicologia e Chemioterapia, Università di Perugia*, (b) *Cardiologia e Angiologia, Università di Modena e Reggio Emilia*, (c) *Cardiologia e Fisiopatologia Cardiovascolare, Università di Perugia*

Scopo del progetto è analizzare e approfondire alcuni punti della terapia cellulare cardiaca, con particolare riguardo ai meccanismi fisiopatologici di reclutamento delle cellule staminali nei tessuti postischemici e ai fattori che possono favorire o inibire questo fenomeno. Recenti studi hanno suggerito che l'ossido nitrico (NO) gioca un ruolo importante sia nel reclutamento delle CS che nel preconditionamento (preC) e postcondizionamento (postC) ischemico. Farmaci donatori di NO possono influenzare in vitro la crescita e la differenziazione delle cellule staminali umane, e la somministrazione in vivo di nitroderivati può migliorare la funzione delle cellule progenitrici endoteliali. D'altra parte, preC e postC potrebbero favorire il reclutamento delle CS sia tramite protezione del microcircolo postischemico che attraverso l'attivazione di vie specifiche, come la RISK, che potrebbe contribuire ad aumentare la sopravvivenza delle CS nei tessuti postischemici. A questo riguardo, la terapia cronica con nitrati al momento del ricovero ospedaliero si associava ad un minor rilascio dei marcatori di necrosi cardiaca rispetto ai pazienti non trattati con nitrati. Le ricerche sono state volte a valutare la migrazione delle cellule staminali nei tessuti, e il ruolo del preC e del postC nell'attivazione di specifiche vie di traduzione del segnale e rilascio di NO.

Il reclutamento delle CS nei tessuti postischemici era valutato *in vivo* nel cremastere di ratto, in cui il microcircolo era visualizzato mediante video-microscopia intravitale, che permette la visualizzazione diretta e il monitoraggio in vivo delle varie fasi dell'homing delle cellule staminali. Gli animali erano stati divisi nei seguenti gruppi sperimentali:

- I/R + HSC: il cremastere era sottoposto a 180 minuti di ischemia, seguiti da 90 minuti di riperfusione. 20 milioni di HSC CD34+ marcate con rosso di acridina erano infuse alla fine della riperfusione e il loro comportamento è stato monitorato mediante videomicroscopia per 45 minuti
- Sham + HSC: il microcircolo del cremastere era monitorato per 270 min, in assenza di ischemia. Seguiva l'infusione di 20 milioni di SC, il cui comportamento era monitorato per 45 minuti.
- I/R + preC o postC ischemico.

Al termine dell'esperimento, i campioni per immunostochimica erano fissati e inclusi in paraffina; i campioni destinati alla biologia molecolare erano congelati in azoto liquido e conservati a -80°. Erano valutati: l'infiltrazione delle CS mediante immunostochimica e real-time PCR per CD34, e l'attivazione di MAPK ERK-1/2, Akt, PKC ϵ , eNOS tramite Western blot. Cellule CD34+ sono state individuate nelle sezioni di muscolo cremastere, e tale presenza è stata confermata dall'analisi mediante RT-PCR. L'I/R induceva anche reclutamento dei leucociti nel tessuto, e riduzione della capacità vasodilatante. Sia il preC che il postC riducevano l'interazione leucociti-parete vasale; solo il preC era in grado di preservare la riserva vasodilatante. La valutazione dei potenziali meccanismi protettivi suggerisce che sia il preC che il postC attivino la via RISK e eNOS. Nell'insieme, i dati ottenuti mostrano che le cellule staminali sono attratte nei tessuti in maniera specifica dal danno indotto da ischemia riperfusione, e che il preconditionamento e postcondizionamento possono attivare le vie di protezione che possono condurre alla protezione tissutale e vascolare dal danno

ischemico. Studi ulteriori sono necessari per meglio definire la correlazione delle diverse vie di protezione con l'effetto protettivo sulla funzione micro vascolare e il ruolo dell'apoptosi in questo fenomeno.

O91

Remote ischemic conditioning to protect from ischemia-reperfusion injury in the setting of ST-elevation myocardial infarction (the RESCUE study, initial experience)

De Caterina A.R. (a, b), Vaghetti M. (a), Masci P.G. (a), Ravani M. (a), Rizza A. (a), Trianni G. (a), Della Latta D. (a), Clemente A. (a), Clerico A. (a), Chiappino D. (a), Palmieri C. (a), Emdin M. (a), Berti S. (a)

(a) *Fondazione Toscana "G. Monasterio"*, (b) *Scuola Superiore di Studi Universitari e Perfezionamento Sant'Anna*

Background: Remote ischemic preconditioning (RiPreC) has been shown to be protective in the setting of myocardial infarction in patients with ST-elevation myocardial infarction (STEMI). Similarly, animal models and one single study in man has been shown to reduce infarct size in the setting of STEMI. The present study aims at assessing whether the combination of RiPreC and RiPostC might represent a potent stimulus to counteract ischemia-reperfusion (IR) injury in the setting of STEMI.

Methods and Results: The RESCUE study is a bicenter prospective randomized study planning to enroll 120 STEMI patients across a 2 year period. Briefly, patients with STEMI undergoing primary percutaneous coronary intervention (PCI) are randomized to RiPreC (4 cycles of 5 minute inflation and deflation of an arm blood pressure cuff) during ambulance transportation towards the "Ospedale del Cuore", Massa. Patients initially randomized to RiPreC undergo RiPostC at the end and 6 hours after primary PCI and then daily until discharge. Control group is represented by STEMI patients undergoing conventional treatment. Infarct size is assessed by troponin measurement and cardiac Magnetic Resonance Imaging within 10 days after the index event, to assess area at risk using T2-weighted sequences, and at 4 month follow-up, to assess final infarct size. The study has enrolled 6 patients per group so far. No significant difference in terms of age, sex, cardiovascular risk factors, ischemic time and culprit vessel were found. No significant differences in terms of peak troponin I are observed among the 2 groups (62 ± 12 vs 68 ± 15 , $p=0.27$). As no patient reached follow-up time, MRI data are incomplete to provide an interim analysis.

Conclusion: The idea of combining RiPreC and RiPostC might provide an additional protective stimulus to counteract IR injury and reduce infarct size in the setting of STEMI. By the end of the year the study is planning to enroll 20 patients per group, which will allow an initial complete data analysis. Definitive data are expected by June 2015.

O92

Presenilin mediated Ca²⁺ changes and protein quality control in heart failure

Cristina Balla (a, b), khaushik subramanian (b), Massimo Volpe (a, c), Federica del Monte (b)

(a) *Dipartimento di medicina cardiovascolare, Sapienza, Università di Roma, Italia*, (b) *Cardiovascular Institute, BIDMC, Harvard Medical School, Boston (MA) USA*, (c) *IRCCS Neuromed, Polo Molisano Università di Roma Sapienza, Pozzilli (Is), Italia*

Idiopathic dilated cardiomyopathy (iDCM) is characterized by marked dysregulation of Ca²⁺ cycling with increased intracellular Ca²⁺ and decreased sarcoplasmic reticulum (SR) Ca²⁺. However, SR is also the site of protein synthesis and folding. Alterations of the quality of proteins have been identified in iDCM and genetic variants of presenilin 2 (PSEN2), a component of -secretase complex, were described in familial and sporadic cases of iDCM. We analyzed if the cellular response to ER stress, the unfolded protein response (UPR), is activated in iDCM where Ca²⁺ homeostasis is known to

occur; we then evaluated if and how changes in PSEN2 affect ER Ca²⁺ homeostasis and UPR and if this alterations are correlated with an impairment in the cardiac function and increased arrhythmogenicity.

In tissue extracts from 9 explanted iDCM and 7 non-failing donor hearts we evaluated the protein expression and RNA level of the UPR. iDCM hearts showed an overall impairment of the ER stress response compared to donor hearts. We characterized a mouse model of complete KO for presenilin 2 (PSEN2^{-/-}) that showed a failing phenotype *in vivo*.

In vitro, cell contractility and Ca²⁺ transients were depressed compared to control cells and a pulse of caffeine superfusion showed a significant reduction in the SR Ca²⁺ load. Further, PSEN2^{-/-} myocytes showed spontaneous Ca²⁺ waves suggesting diastolic SR Ca²⁺ leakage leading to delayed afterdepolarizations and arrhythmias. The expression profile of the EC coupling proteins showed a reduction of SERCA2a expression with a correspondent increase of the monomeric inhibitory subunit of phospholamban and a reduced expression of ryanodine receptors (RyRs) pointing towards an overall defect in both Ca²⁺ reuptake and Ca²⁺ release. Moreover, we found a reduction in the expression of UPR proteins independently from the protein aggregate accumulation.

In conclusion, we described for the first time a chronic activation of the UPR in human iDCM induced and/or further sustained by the SR Ca²⁺ disequilibrium. Mice models of PSEN2^{-/-} showed that PSEN2 plays a role in the cardiac function and ER Ca²⁺ cycling. Changes in protein quality control in the heart may be secondary to the changes in Ca²⁺ homeostasis.

O93

Valutazione dell'efficienza ventilatoria in un modello umano di scompenso cardiaco cronico e broncopneumopatia cronica ostruttiva.

Paola Gargiulo (a, c), Anna Apostolo (c), Pasquale Perrone Filardi (a), Susanna Sciomer (d), Paolo Palange (e), Piergiuseppe Agostoni (b)

(a) Dipartimento di Scienze Biomediche Avanzate, Università degli Studi di Napoli "Federico II",

(b) Dipartimento di Scienze Cliniche e Medicina di Comunità, Università degli Studi di Milano,

Milano, (c) IRCCS Centro Cardiologico Monzino, Milano, (d) Dipartimento di Scienze

Cardiovascolari e Respiratorie, Università "La Sapienza", Roma, (e) Dipartimento di Sanità

Pubblica e Malattie Infettive, Università "La Sapienza", Roma

Premesse: Durante esercizio i pazienti affetti da scompenso cardiaco cronico (SCC) mostrano un incremento sproporzionato della ventilazione (VE), mentre nei soggetti affetti da broncopneumopatia cronica ostruttiva (BPCO) la risposta ventilatoria è tipicamente troncata. Quando SCC e BPCO coesistono, la VE durante esercizio è difficilmente valutabile.

Per questo motivo, abbiamo creato con l'aggiunta di volumi crescenti di spazio morto (DS: 0 mL, +250 mL; + 500 mL) un modello umano di BPCO in 10 soggetti sani e in 10 pazienti affetti da SCC. L'ipotesi è che l'incremento in serie dello DS sposti verso l'alto la relazione VE vs VCO₂ e che l'intercetta sull'asse della ventilazione della suddetta relazione (VE_{Yint}) possa essere indice di un' aumentata ventilazione relativa al DS.

Metodi: Tutti i soggetti sono stati sottoposti a test da sforzo cardiopolmonare con protocollo a rampa incrementale al cicloergometro coi 3 differenti volumi di DS aggiunto e ad emogasanalisi a riposo e poi ogni 2 minuti durante esercizio.

Risultati: Nei pazienti affetti da SCC, l'aggiunta dello spazio morto aumenta la VE_{Yint} (+0mL=4.98±1.63L; +250mL=9.69±2.91L; +500mL=13.26±3.18L; p<0.001) e sposta verso l'alto la relazione VE vs VCO₂ con solo un minimo incremento della pendenza della stessa (+0mL=27±4; +250mL=28±5; +500mL= 29±4; p<0.05; figura). Nei soggetti sani, l'aggiunta del DS aumenta la VE_{Yint} (+0mL=4.9±1.4L; +250mL=9.3±2.4L; +500mL=13.1±3.04L; p<0.001) senza modificare la pendenza della relazione. Per confermare questi dati abbiamo confrontato il volume dello DS, stimato dividendo il valore di VE_{Yint} per la frequenza respiratoria (RR), calcolata come intercetta Y della relazione RR vs VCO₂, con la misura del volume del DS ottenuta col metodo standard. I valori del

volume dello DS misurato e stimato sono risultati simili sia nei sani che nei pazienti con SCC. I risultati sono mostrati in tabella.

Conclusioni: $VE_{Y_{int}}$ è un indice della ventilazione dello DS e può essere utilizzato per stimare il volume del DS in maniera non invasiva.

| SCC | SPAZIO MORTO AGGIUNTO | | | p value |
|-------------------------------------|-------------------------|------------------------|------------|---------|
| | +0 mL | +250 mL | +500 mL | |
| VE/VC ₂ slope | 27±4 | 28±5 | 29±4 | 0.037 |
| $VE_{Y_{int}}$ (L/min) | 4.98±1.63 ^{†§} | 9.69±2.91* | 13.26±3.18 | 0.000 |
| RR _{Y_{int}} (bpm) | 13±4 ^{‡§} | 15±3 | 16±3 | 0.032 |
| VD _{Y_{int}} (L) | 0.39±0.07 ^{‡§} | 0.61±0.12 [§] | 0.83±0.11 | 0.000 |
| VD _{meas} (L) | 0.38±0.08 ^{‡§} | 0.61±0.12 [§] | 0.80±0.09 | 0.000 |
| SANI | | | | |
| VE/VC ₂ slope | 23±3 | 24±4 | 24±4 | NS |
| $VE_{Y_{int}}$ (L/min) | 4.9±1.4 ^{†§} | 9.3±2.4 [§] | 13.1±3.04 | 0.000 |
| RR _{Y_{int}} (bpm) | 14±4 | 14±4 | 14±3 | NS |
| VD _{Y_{int}} (L) | 0.37±0.11 ^{‡§} | 0.68±0.15 [§] | 0.95±0.14 | 0.000 |
| VD _{meas} (L) | 0.37±0.06 ^{‡§} | 0.68±0.11* | 0.94±0.1 | 0.000 |

[†] p<0.001 versus +250 mL; [‡] p<0.001 versus +500 mL; * p<0.01 versus +500 mL; [‡] p<0.05 versus +250 mL; [§] p<0.05 versus +500 mL; [¶] p<0.01 versus +250 mL.

CARDIOPATIA ISCHEMICA 1

O94

Diagnostic accuracy of st/hr hysteresis for the detection of coronary artery disease in patients with left ventricular hypertrophy

Elena Montebello (a), Francesco Radico (a), Fabrizio Ricci (a), Alessandro Corazzini (a), Francesco Iachini (a), Marco Zimarino (a), Raffaele De Caterina (a)

(a) Institute of Cardiology and Center of Excellence on Aging - "G. d'Annunzio" University - Chieti

Purpose: Exercise electrocardiography (ECG) test (ExET) is the most widely non-invasive diagnostic method used to detect coronary artery disease (CAD). However the only ST depression has a poor specificity in patients with left ventricular hypertrophy (LVH), and stress imaging techniques are often required in order to avoid unnecessary coronary angiograms. The ST-segment depression/heart rate hysteresis (ST/HR Hys) has been reported to increase the diagnostic accuracy of ExET for CAD detection. We compared the diagnostic performance of ST/HR Hys, ST depression during ExET, and the Duke Treadmill Score (DTS) for the diagnosis of CAD in patients with LVH.

Methods: We studied 60 consecutive patients (mean age 64 ± 8 ; 93% males) referred for coronary angiography with a positive or equivocal ExET (performed ≤ 30 days before coronary angiography) and LVH at echocardiography (LV mass $> 115 \text{ g/m}^2$). Significant CAD was documented in 26 patients (43%).

Results: Specificity (SPEC), accuracy (ACC) and area under the curve (AUC) for the three parameters are reported in the Table:

| | SENS % (95% CI) | SPEC % (95% CI) | ACC % (95% CI) | AUC (95% CI) |
|---------------|-----------------|-----------------|-------------------------------|------------------------------|
| ST/HR Hys | 77 (56-91) | 88 (73-97) | 83 (71-92) * | 0.83 (0.71-0.92) * |
| DTS | 77 (56-91) | 56 (38-73) | 65 (50-80) § | 0.70 (0.56-0.80) § |
| ST depression | 85 (65-96) | 26 (13-44) | 52 (35-68) † | 0.51 (0.38-0.64) † |
| | | | * P = 0.0006 vs ST depression | * P = 0.001 vs ST depression |

| | |
|-------------------------|-----------------------|
| § P = 0.04 vs ST/HR Hys | § P = NS vs ST/HR Hys |
| † P = NS vs DTS | † P = NS vs DTS |

Conclusions:

Among currently available ECG-based diagnostic techniques, the ST/HR Hys has the best diagnostic performance in detecting or ruling out CAD in patients with LVH.

O95**La ricomparsa dell'onda R durante stress test in pazienti con pregresso infarto miocardico transmurale anteriore è segno di vitalità miocellulare.**

Riccardo Di Placido (a), Giuseppe Napoleoni (a), Marta Palumo (a), Nino Cocco (a), Flavio Tafani (a), Alessandra Tanzilli (a), Massimiliano Scappaticci (a), Gaetano Tanzilli (a), Carlo Gaudio (a)

(a) Dipartimento Cuore e Grossi Vasi, "Sapienza" Università di Roma

Le onde Q registrate sull'ecg di superficie sono dovute all'incapacità, temporanea o permanente, del muscolo cardiaco di depolarizzarsi spontaneamente o in risposta alla propagazione di un fronte di eccitazione. Nell'ambito di aree di miocardio dove il potenziale d'azione è alterato o abolito, possono essere presenti isole ad estensione variabile di tessuto vitale ma elettricamente silente. Abbiamo, pertanto, voluto verificare in aree miocardiche sede di pregresso infarto Q l'esistenza o meno di una relazione attività elettrica/vitalità sulla base dei dati perfusionali ottenuti durante scintigrafia miocardica con Sestamibi.

Materiali e Metodi: Sono stati selezionati 55 pazienti consecutivi (età 40-72 anni, media 64) con pregresso IMA anteriore transmurale (> 6 mesi) e angina da sforzo fisso. Criteri di inclusione sono stati: la presenza di complessi QS nelle derivazioni precordiali V1-V6; la presenza di asinergie nel territorio di distribuzione della arteria coronaria discendente anteriore (DA); la presenza di stenosi significativa/occlusione della DA diagnosticata alla coronarografia selettiva.

Tutti i pazienti hanno eseguito ecocardiogramma M/Bidimensionale in condizioni basali e scintigrafia miocardica perfusionale basale e dopo stress ergometrico con Sestamibi per la ricerca di "miocardio a rischio. Allo scopo dello studio sono stati analizzati solo i segmenti relativi al territorio di distribuzione della DA. Ad ogni segmento è stato attribuito un punteggio semiquantitativo con scala a tre punti. Dai tracciati ecg registrati è stata misurata, su 10 complessi QRS, la massima ampiezza dell'onda R ricomparsa nelle derivazioni precordiali durante lavoro muscolare e la frequenza cardiaca (FC) relativa. Un punteggio medio è stato ottenuto dalla somma dell'ampiezza dell'onda R rapportata al numero delle derivazioni in cui era presente. Sedici pazienti avevano malattia monovasale della DA, 15 avevano un coinvolgimento coronario bivasale e 24 erano trivasali. Tutti i pazienti sono stati sottoposti ad intervento di rivascularizzazione miocardica: 17 mediante PTCA ed i restanti 38 mediante by-pass aorto-coronarico.

Risultati: I pazienti sono stati suddivisi in due gruppi: Gruppo A, assenza di ricomparsa dell'onda R (n=26); Gruppo B, ricomparsa dell'onda R (n=29)

Il punteggio medio di massima ampiezza dell'onda R "ricomparsa" è stato di 1.52 ± 0.09 mV ed è stato raggiunto alla FC di 111 ± 8 b/min. Il punteggio medio dell'onda R all'acme dell'esercizio è stato di 0.87 ± 0.45 mV ed è stato misurato alla FC di 132 ± 3.6 b/min. In 4 pazienti si è avuta la completa scomparsa dei vettori elettrici al massimo sforzo.

I valori medi di captazione miocardica basale erano 6.6 ± 0.7 nel gruppo A e 6.8 ± 0.9 nel Gruppo B (p=NS). Dopo sforzo essa si riduceva a 6.1 ± 0.8 nel Gruppo A mentre aumentava a 11.2 ± 2.7 nel gruppo B (p<0.01). Dopo rivascularizzazione miocardica si aveva un incremento in entrambi i gruppi: 8.4 ± 1.9 nel gruppo A (p<0.01 vs base) e 10.7 ± 3.0 nel gruppo B (p<0.01 vs base).

Conclusioni: La ricomparsa dell'onda R durante test ergometrico è associata ad un aumento di captazione miocardica del tracciante radioisotopico al massimo sforzo ("reverse redistribution") nei territori sede di pregressa necrosi transmurale.

SIC | *Indice Autori*

L'aumento della captazione miocellulare nelle stesse aree dopo intervento di rivascularizzazione miocardica indica come tale fenomeno elettrico potrebbe essere un segnale di residua vitalità miocellulare.

O96

Correlazioni tra allungamento del QT e vitalità miocardica in soggetti con sindrome coronarica acuta.

Riccardo Ieva (a), Antonio Totaro (a), Francesco Gallo (a), Rafel Sai (a), Maria Scarcia (a), Emanuele Serio (a), Michele Correale (a), Francesco Santoro (a), Natale Daniele Brunetti (a), Matteo Di Biase (a)

(a) *Università di Foggia*

Background: Valori aumentati del QTc e della QTc dispersion sono riscontrabili nei soggetti con ischemia cardiaca acuta e sembrano essere correlati con la presenza di aritmie ventricolari. Meno chiaro è il rapporto tra QT e vitalità miocardica.

Metodi: 33 pazienti consecutivi affetti da sindrome coronarica acuta e ricoverati presso la nostra unità coronarica sono stati arruolati e sottoposti all'ingresso a valutazione ECG a 12 derivazioni e del QT (anche con correzione secondo formula di Bazett), del QTc max, della QTc dispersion, e ad esame ecocardiografico con rilevazione della frazione di eiezione (FE), della cinetica segmentaria del ventricolo sinistro e del wall motion score index (WMSI); tali valutazioni sono state ripetute a distanza di 48h, alla dimissione, e a distanza di sei mesi.

Sono stati esclusi dallo studio pazienti: con QT lungo congenito, con FA persistente o permanente, con ritmo elettro-indotto da pacemaker, con blocco di branca, iperkaliemia ($K^+ > 5.5 \text{ mEq/l}$), o ipercalcemia ($Ca^{++} < 8.4 \text{ mg/dl}$ o > 10), in terapia antiaritmica o antipsicotica, che, durante la degenza, non siano stati sottoposti ad alcuna strategia ripercussiva farmacologica o interventistica.

Risultati: QTc max, numero di derivazioni con QTc allungato e QTc dispersion mostrano un picco a 48 ore dal ricovero per poi diminuire alla dimissione ed al follow up (ANOVA $p < 0.01$).

A 48h dal ricovero, è riscontrabile una correlazione tra sede dell'ischemia e localizzazione dell'allungamento del QTc (con ischemia in sede anteriore 56% di soggetti con evidenza di QTc allungato in sede anteriore vs 10% in caso di ischemia non anteriore, 90% di ischemia anteriore in caso di allungamento del QTc nelle derivazioni anteriori vs 44% in caso di allungamento non in sede anteriore; $p < 0.05$).

All'ingresso, il QTc max correlava inversamente con il numero di segmenti con anomalie della cinetica ($r -0.37$, $p < 0.05$) e con il WMSI ($r -0.38$, $p < 0.05$).

A 48h il QTc max correlava con il miglioramento della FE in dimissione ($r 0.43$, $p < 0.05$) ma anche con il numero di segmenti che miglioravano la loro cinetica al follow up a 6 mesi ($r 0.52$, $p < 0.05$)

In dimissione, il QTc max ed il numero di segmenti con QTc allungato correlavano con il numero di segmenti che miglioravano la cinetica a 6 mesi ($r 0.77$, $p < 0.001$; $r 0.58$, $p < 0.05$) e con il miglioramento del WMSI ($r 0.81$, $p < 0.001$; $r 0.57$, $p < 0.05$).

Conclusioni: La presenza di QTc allungato in soggetti con sindrome coronarica acuta e l'entità dell'allungamento sembrano correlare con la presenza di miocardio ischemico stordito/vitale, suscettibile di recupero funzionale dopo rivascularizzazione e con l'entità del recupero a breve e a medio termine.

O97

Loss of physiological compensatory mechanism at the acme of stress test assessed in ischemic patients by RR, RT, QRS area time series continuous ECG recording.

Silvia Da Ros (a), Andrea Quaresima (b), Marisa Varrenti (a), Simonetta Di Bona (a), Silvia Amato (a), Valeria Castellano (a), Camillo Cammarota (b), Sergio Matteoli (a), Mario Curione (a)

(a) Department of Internal Medicine and Medical Specialities, University "Sapienza" Rome, (b) Mathematics Department, University "Sapienza" Rome

Background: RR, RT intervals and QRS area (which gives information on ventricular filling) has been monitored during stress test in a previous study in a group of normal subjects. In this study minimum RT and minimum QRS area values occurred contemporaneously and were delayed respect to RR minimum value (see fig 1 top). This delay could represent separate effect of catecholamines on pacemaker cells in sinus node (able to modify R-R interval) and on ventricular myocytes (able to modify R-T interval and ventricular filling). This phenomenon appears as a compensatory physiological mechanism in normal subjects preventing reduction in ejection fraction as consequence of sudden decrease in heart rate.

Aim: Verify during stress test differences in profiles and in minimum values occurrence in RR, RT and QRS area time series in ischemic patients respect to normal subjects. **Method:** 30 ischemic subjects (28 males, 2 females, mean age 61 years) underwent to ECG stress

test performed, according to Bruce protocol. RT interval has been adopted instead QT interval as the latter is not reliable at rapid heart rates as T wave fuses with the ensuing P wave. We estimate the minimum location from the trend of RR, RT and QRS area time series. 20 normal subjects have been used as control group. Standard paired t-test of comparison of the means and generalized linear model to check the relationship between delay and the other variables : age, gender, hr, bp, mets, RR and RT slope have been used in two groups of patients.

Results: See Tab.1 and Fig.1.

Conclusion: Profiles and minimum values occurrence in RR, RT and QRS area time series in ischemic patients appear quite different respect normal subjects at the acme of stress test (Fig.1 bottom). We can assume that ischemic patients loss compensatory mechanism which allows in normal subjects to prevent reduction in ejection fraction as consequence of rapid decreasing in heart rate.

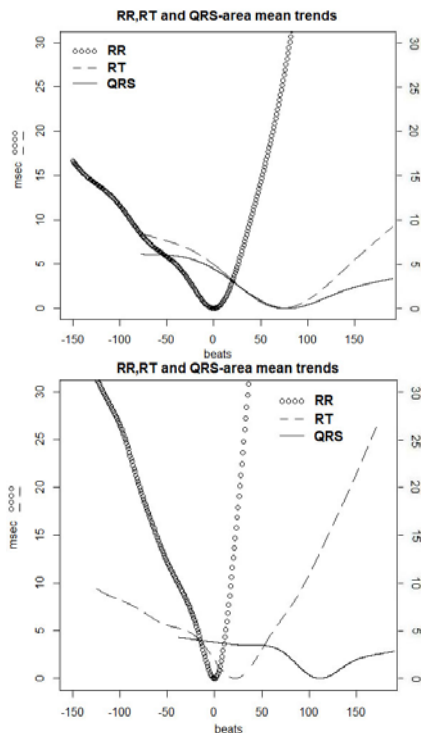


Fig.1 RR, RT and QRS area mean trends in 20 normal subjects (top) and in 30 ischemic patients (bottom). In ischemic patients RT minimum and QRS area minimum are split respect to normal subjects.

| RR-RT mean delay (beats number) | p-value | RT-QRS mean delay (beats number) | p-value | RR-QRS mean delay (beats number) | p-value |
|---------------------------------------|-----------|--|-----------|--|-----------|
| 70 | 1.567e-06 | 6 | 0.6228 | 73 | 9.872e-07 |
| RR-RT mean delay (beats number) | p-value | RT-QRS mean delay (beats number) | p-value | RR-QRS mean delay (beats number) | p-value |
| 28 | 0.003204 | 84 | 5.739e-05 | 112 | 1.275e-06 |

Tab.1 Diversely to normal subjects (top), ischemic patients (bottom) show a statistical difference in RT-QRS area minimum values occurrences.

O98

QT analysis in tako-tsubo cardiomyopathy

Maria Chiara Gatto (a), Luca Cacciotti (b), Ilaria Passaseo (b), Alessandra Cinque (a), Maqria Lembo (a), Simone Calcagno (a), Pasqualina Bruno (a), Alberto Foà (a), Francesca Sconci (a), Bruno Brasolin (a), Massimo Mancone (a), Gennaro Sardella (a), Gerardo Ansalone (b), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari, (b) Ospedale "Vannini"; Figlie di San Camillo; Cardiologia

Background: Tako-tsubo cardiomyopathy (TC) is associated with different types of electrophysiological changes as sinus tachycardia, atrial fibrillation, atrium ventricular block, ST segment change and often with QTc prolongation. QTc prolongation and QT dispersion (QTd) could be a pathognomonic findings in acute phase of (TC).

Material and Methods: We retrospectively analyzed 82 patients with TC between 1st January 2006 and 1st January 2013. The mean QTc interval and QTd were measured by 12 lead EKG in each patient at in-hospital admission and at discharge. A 6-months follow-up was performed in 46 patients. QTc interval above 440 ms and a QTd above 80 ms were considered abnormal. T-student test was used to compare ordinal variables.

Results: During hospitalization (mean 9 days) nobody died and nobody had life-treating arrhythmias. Mean age of patients was 71 and 96% were women. Among patients, relevant echocardiographic and EKGraphic mean values at in-hospital admission were: EF 36,29±8,72%; QTc 505±48 ms; QTd 65±37 ms; the same values at discharge were: EF 49,15±8,16% (p<0,001); QTc 462±45 ms (p<0,001); QTd 50±38 ms (P=0,003). In 46 patients, at 6-months follow-up, mean QTc was 433±13 ms (p=0,017 if compared with QTc at discharge) and QTd was 18±13 ms (p<0,001 if compared with QTd at discharge).

Conclusion: As demonstrated with QT analysis during hospitalization and at 6-month follow-up, prolongation of QTc interval and QTd was strongly correlated with acute phase of TC.

O99

Valore predittivo della dispersione del QT corretto nella selezione dei pazienti ischemici con disfunzione ventricolare sinistra con indicazione ad impianto di ICD

Paolo Vadala' (a), Domenico G. Della Rocca (a), Armando Del Prete (a), Carlo A. Stazi (a), Vanessa Porretta (a), Germana Panattoni (a), Saverio Muscoli (a), Domenico Sergi (a), Luca Santini (a), Giovanni B. Forleo (a), Francesco Romeo (a)

(a) Dipartimento Cardiologia Università degli Studi Tor Vergata di Roma

Introduzione: la dispersione dell'intervallo QT corretto (QTcd) riflette le variazioni regionali della ripolarizzazione ventricolare ed è stata correlata all'instabilità elettrica ed al rischio di aritmie ventricolari nei pazienti con cardiopatia ischemica. Lo scopo dello studio è stato quello di correlare la variazione del QTcd con il burden aterosclerotico coronarico all'ingresso e con la variazione della funzione sistolica del ventricolo sinistro a 40 giorni da un infarto miocardico acuto (STEMI, NSTEMI) trattato mediante intervento coronarico percutaneo.

Materiali e metodi: abbiamo arruolato 46 pazienti consecutivi (76% maschi, età media 64±12 aa, 72% STEMI). Sono stati esclusi dallo studio i pazienti affetti da fibrillazione o flutter atriale, blocco di branca destra o sinistra completo, cardiomiopatie, patologie valvolari severe e precedenti episodi di ischemia miocardica. La popolazione è stata suddivisa in due gruppi in base alla presenza di QTcd basale >80ms (gruppoA, n=17) o <80ms (gruppoB, n=29). Abbiamo effettuato visita cardiologica, ECG di superficie ed ecocardiogramma c/D a 40 giorni dall'evento ischemico acuto.

Risultati: Non si sono osservate differenze significative tra i gruppi riguardo a prevalenza dei fattori di rischio cardiovascolare, diagnosi d'ingresso (STEMI o NSTEMI), burden aterosclerotico

SIC | *Indice Autori*

coronarico. La funzione sistolica ventricolare sinistra è risultata essere significativamente minore nei pazienti del gruppo A rispetto ai pazienti del gruppo B all'ingresso e a 40 giorni di follow-up ($p < 0.01$ e $p = 0.02$, rispettivamente). Il gruppo A ha mostrato una riduzione significativa della QTcd a 40 giorni dall'intervento di rivascularizzazione coronarica percutanea ($101,76 \pm 17,04$ ms vs. $77,73 \pm 22,26$ ms; $p = 0.016$) ed un miglioramento della funzione sistolica del ventricolo sinistro (FE: 0.41 ± 0.08 vs 0.43 ± 0.09 , $p = \text{NS}$). Nel gruppo B non si sono osservate differenze significative nei valori di QTcd ($61,50 \pm 13,66$ a $61,50 \pm 13,66$; $p = \text{NS}$) ed FE (0.49 ± 0.07 a 0.50 ± 0.08 , $p = \text{NS}$) durante il follow-up. Quattro pazienti nel gruppo A e nessuno nel gruppo B ($p = 0.01$) hanno ricevuto l'indicazione all'impianto di ICD in prevenzione primaria della morte cardiaca improvvisa al termine del follow-up. Due pazienti nel gruppo A non hanno effettuato il follow-up a 40 giorni dall'evento ischemico acuto per sopraggiunta morte di origine cardiaca ($p = 0.07$).

Conclusioni: I pazienti con infarto miocardico acuto sottoposti ad intervento di rivascularizzazione coronarica percutanea e con QTcd > 80ms alla baseline hanno presentato una funzione sistolica ventricolare sinistra significativamente minore rispetto a quelli con QTcd < 80ms. Tale condizione ha correlato con un ricorso all'impianto di ICD in prevenzione primaria della morte cardiaca improvvisa significativamente maggiore e con una maggiore mortalità di origine cardiaca in acuto nel gruppo di pazienti con QTcd < 80ms.

PROGNOSI NELL'INSUFFICIENZA CARDIACA 1

O100

Impaired pulmonary hemodynamic right ventricular coupling during exercise in patients with heart failure and exercise oscillatory ventilation

Francesco Bandera (a), Marta Pellegrino (a), Greta Generati (a), Valeria Donghi (a), Eleonora Alfonzetti (a), Serenella Castelvechio (b), Lorenzo Menicanti (b), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese, (b) Cardiosurgery Unit, IRCCS Policlinico San Donato Milanese

Purpose: Right ventricular (RV) dysfunction and RV-pulmonary circulation uncoupling determine clinical course and prognosis in heart failure (HF). Pulmonary artery systolic pressure (PASP) and tricuspid annular systolic excursion (TAPSE) are RV systolic markers in HF. We investigated the pulmonary pressure (PP)-RV function coupling during exercise by looking at the relationship between PAPS and TAPSE (rest and peak) in HF patients with exercise oscillatory ventilation (EOV) vs no-EOV.

Methods and Results: 45 HF patients (age 66.5 ± 10.3 ; male 72%; NYHA II 53%, III 37%, IV 10%; EF $35 \pm 8\%$) with no-EOV ($n = 27$) and EOV ($n = 18$) underwent a maximal CPET test combined with Echo. The table shows the main test results. Both rest and peak PASP/TAPSE in EOV patients resulted worse than the peak ratio in no-EOV group, meaning an unfavorable PP-RV function coupling and dynamic pulmonary hypertension.

| | NO EOV | | EOV | | T-test |
|-------------------------------|-----------|---------------|-----------|---------------|--------|
| | Rest | Peak exercise | Rest | Peak exercise | P |
| NTproBNP, ng/L | 1818±1223 | | 3508±2348 | | 0,05 |
| LVEDVi, ml | 101±31 | | 85±15 | | 0,03 |
| Mitral Regurg, 4 degree scale | 1,5±0,9 | 2±1,2 | 2,4±0,9 | 2,9±0,9 | NS |
| Left Atrium Vol, ml | 105±51 | 102±41 | 83±35 | 89±30 | NS |
| RV End Diastolic Area, cmq | 19±5,2 | 19,4±5,3 | 14,6±3,2 | 14,8±3,4 | 0,002 |
| RV Area Fraction, % | 36±14 | 36±11 | 40±13 | 41±13 | NS |
| TAPSE, mm | 18,4±5 | 21,4±5 | 17,6±5 | 19,6±5 | NS |

| | | | | | |
|---|-------|------------|---------|------------|------|
| PASP, mmHg | 34±18 | 53±27 | 38±16 | 59±21 | NS |
| PASP/TAPSE ratio | 2±1.2 | 2,7±1,4 | 2,6±1,6 | 3,6±1,6 | 0,07 |
| Watt | | 73±26 | | 61±26 | NS |
| Peak VO ₂ , mlO ₂ /kg/min | | 14,4±3 | | 12,2±3,7 | NS |
| VE/VCO ₂ slope | | 31,2±7 | | 36±11 | NS |
| O ₂ pulse, ml/beats | | 10±2 | | 8,2±2,5 | 0,05 |
| Flattening VO ₂ /Work | | 6/27 (22%) | | 9/18 (50%) | NS |

Conclusions: The abnormal pattern of EOV is associated with a higher degree of pulmonary circulation/RV function uncoupling (PASP/TAPSE) both at rest and peak exercise with a corresponding impaired ventilation efficiency (VE/VCO₂) and overall exercise performance (peak VO₂). These findings provide a rationale for proposing a systematic combined evaluation of Echo-derived RV functional data and CPET.

O101

Insulin resistance is associated with impaired cardiac sympathetic innervation in patients with heart failure

Stefania Paolillo (a), Gianluigi Savarese (a), Giuseppe Rengo (b), Teresa Pellegrino (a), Roberto Formisano (b), Laura Petraglia (b), Gennaro Pagano (b), Dario Leosco (b), Bruno Trimarco (a), Alberto Cuocolo (a), Pasquale Perrone Filardi (a)

(a) Department of Advanced Biomedical Sciences, Federico II University, Naples, Italy, (b) Department of Medical Translational Sciences, Federico II University, Naples, Italy

Background: Insulin resistance (IR) affects prognosis in patients with heart failure (HF), but pathophysiological mechanisms remain unclear. Since hyperinsulinemia enhances sympathetic drive, it can be hypothesized that IR is associated with impaired cardiac sympathetic innervation in HF patients. Yet, this hypothesis has never been investigated.

Methods: One-hundred seventeen patients (85% males; age 66.5±9.6 yrs) with severe-to-moderate HF (ejection fraction 30.7±7.3%), underwent in the same day iodine-123 metaiodobenzylguanidine (123I-MIBG) myocardial scintigraphy to assess cardiac sympathetic innervation and blood sampling for insulin and fasting glucose measurement. To assess insulin sensitivity Homeostasis Model of Assessment-Insulin Resistance (HOMA-IR) index was calculated using the formula [fasting Glucose (mmol/L) x fasting Insulin (mU/L) / 22.5] (normal values <2.5). From MIBG scintigraphy the early and late heart-to-mediastinum (H/M) ratios were calculated.

Results: Seventy-eight (66.7%) patients showed IR and 39 (33.3%) were non-IR. Early (1.63±0.19 vs 1.80±0.22; p<0.001) and late H/M ratio (1.47±0.19 vs 1.61±0.28; p=0.007) were significantly reduced in IR compared to non-IR patients. Patients were further divided into 3 groups: with type 2 diabetes mellitus (DM; n=54), without DM with IR (non-DM/IR; n=35) and without DM and IR (non-DM/non-IR; n=28). Early and late H/M were lowest in DM (early H/M 1.63±0.22; late H/M 1.46±0.20), intermediate in non-DM/IR (early H/M 1.68±0.17; late H/M 1.53±0.20) and highest non-DM/non-IR patients (early H/M 1.82±0.20; late H/M 1.61±0.28) (p=0.01 by ANOVA test). Early and late H/M, however, did not differ between DM and non-DM/IR patients. In the whole population early H/M ratio showed a significant inverse correlation with fasting insulinemia (r=-0.424; p<0.001) and HOMA-IR (r=-0.415; p<0.001). Similarly, late H/M ratio showed a significant inverse correlation with fasting insulinemia (r=-0.277; p<0.003) and HOMA-IR (r=-0.288; p<0.002).

Conclusions: Cardiac sympathetic innervation is impaired in patients with IR and HF and correlates with HOMA-IR and insulinemia. These findings contribute to explain the unfavorable prognostic impact of IR in patients with HF and provide new insights into mechanisms of adverse prognosis in patients with DM and HF.

O102

SIC | *Indice Autori*

Indicatori prognostici nei pazienti con scompenso cardiaco avanzato: rapporto rischio/beneficio del trapianto cardiaco

Annalisa Amabile (a), Valentina Manfredini (a), Giulia Norscini (a), Carlo Lonetti (a), Marco Masetti (a), Marco Luciani (a), Luciano Potena (a), Francesco Grigioni (a), Giuseppe Marinelli (a), Angelo Branzi (a)

(a) *Medicina Specialistica, Diagnostica e Sperimentale- DIMES (Bologna)*

Introduzione: Lo scompenso cardiaco avanzato è una condizione ad elevata mortalità che, in casi selezionati, si giova di un trattamento con trapianto di cuore. Tuttavia, il ridotto numero di donazioni disponibili rende necessaria un'accurata valutazione del rischio/beneficio dell'intervento di trapianto, che tenga conto della prognosi legata allo scompenso e del rischio del trapianto stesso.

Metodi: Lo scopo di questo lavoro è di stimare il potenziale beneficio del trapianto cardiaco confrontando il rischio di mortalità per scompenso con la probabilità di sopravvivenza post-trapianto. A tal fine abbiamo costruito uno score di rischio di mortalità in pazienti con scompenso avanzato valutati per trapianto di cuore, basato su caratteristiche cliniche e strumentali al momento dell'indicazione al trapianto. Abbiamo quindi analizzato la sopravvivenza post-trapianto stratificata per queste categorie di rischio e per i fattori che influenzano il rischio operatorio. Sono stati considerati eleggibili tutti i pazienti valutati dal gennaio 2003 al dicembre 2012, considerando come outcome: 1) l'incidenza di morte a 5 anni o trapianto in urgenza (con ECMO o IABP); 2) l'incidenza di morte globale a 5 anni dal trapianto nel sottogruppo di pazienti trapiantati.

Risultati: Sono stati inclusi 500 pazienti con scompenso cardiaco avanzato (età di 52 ± 11 anni, 82% maschi; 45% con cardiopatia ischemica, 77% in classe NYHA III-IV; FE $27 \pm 10\%$). Tra le caratteristiche valutate, la classe NYHA III-IV, l'anemia, l'insufficienza renale, l'iperbilirubinemia, l'iposodiemia, l'ipertensione polmonare e l'ipotensione sistemica hanno consentito la costruzione di uno score di rischio elevato, intermedio e basso di mortalità (Figura 1). La mortalità post-trapianto non era influenzata dallo score di rischio di mortalità dello scompenso. Confrontando la probabilità di sopravvivenza a 1 e 5 anni dei tre gruppi di rischio (Figura 2), è possibile speculare che mentre i pazienti con scompenso cardiaco a rischio alto traggono un beneficio di sopravvivenza sia a breve che a lungo termine dopo trapianto, quelli a rischio basso o intermedio traggono un significativo vantaggio di sopravvivenza post-trapianto solo a lungo termine. La presenza di insufficienza renale e l'età >55 anni aumenta il rischio del trapianto e rende complessivamente svantaggioso il trapianto sia nei pazienti con scompenso a rischio basso che intermedio.

Conclusioni: Pur con i limiti del disegno retrospettivo, questi risultati forniscono una prospettiva importante per guidare la priorità di lista e l'indicazione al trapianto dei pazienti con scompenso cardiaco avanzato e comorbidità.

Figura 1

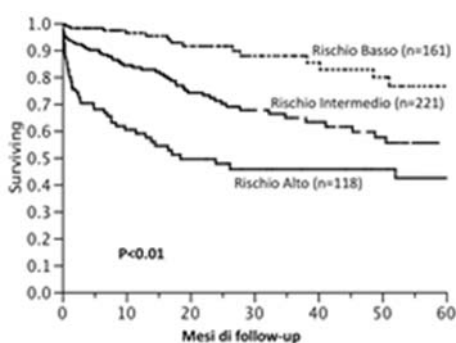
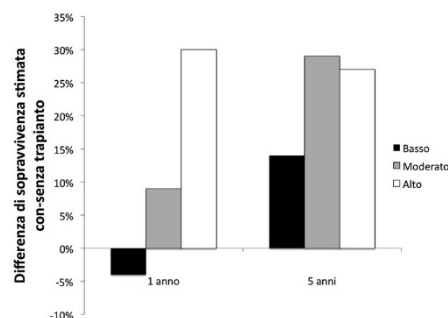


Figura 2



O103

SIC | *Indice Autori*

IGF-1 predicts all-cause mortality in Chronic Heart Failure

Alberto Maria Marra (a), Michele Arcopinto (a), Andrea Salzano (a), Olga Vritz (c), Jorgen Isgaard (d), Domenico Sirico (a), Emanuele Bobbio (a), Giuseppe Limongelli (e), Eduardo Bossone (b), Luigi Saccà (a), Antonio Cittadini (a)

(a) *Traslational Medical Sciences Department, "Federico II" University, Naples, Italy, (b) Department of Cardiology and Cardiosurgery, University Hospital "Scuola Medica Salernitana", Salerno, (c) Division of Cardiology, San Daniele del Friuli Hospital, Udine, Italy, (d) Department of Internal Medicine, The Sahlgrenska Academy at the University of Gothenburg, Gröna Strå, (e) Department of Cardiology, Monaldi Hospital, Second University of Naples, Naples, Italy*

Introduction: Several studies have reported abnormalities of the GH/IGF-1 axis in Chronic Heart Failure (CHF). Specifically, some investigators found normal IGF-1 values, some decreased, and some even increased. Few studies have so far systematically investigated circulating levels of IGF-1, IGF Binding Proteins (IGFBP-3) as well as stimulated GH pituitary secretion in a large population of CHF patients, and addressed their impact on long-term mortality.

Populations and methods: We studied 158 consecutive patients with CHF, NYHA class I to III, who underwent a basal hormonal evaluation with IGF-1 and IGFBP-3 measurement. All patients underwent baseline, extensive cardiovascular study with complete echocardiography, cardiopulmonary exercise testing, NT-proBNP. Most patients also underwent a provocative test with GHRH + arginine. CHF patients were followed for a mean follow-up of 36 months (range 1-84 months). We also studied basal hormonal pattern in 135 age- sex- and BMI-matched controls. The IGF-1 peripheral activity was estimated as the molar ratio of serum IGF-1 to IGFBP-3 and was calculate by the formula $IGF-1 / IGFBP-3 * 3.7$.

Results: Total serum IGF-1 values in controls and CHF were similar (137.7 ± 5.2 vs. 135.4 ± 4.6 , $p=.78$). IGF-1 peripheral activity estimated by IGF-1/IGFBP-3 molar ratio was significantly higher in CHF then in controls (138.1 ± 3.8 vs. 154.8 ± 3.9 , $p=.003$). IGF-1 correlated with peak VO₂ consumption ($p=.029$) and workload ($p=.049$). About one third of CHF subjects showed GHD, and increasing classes of GHD severity correlated with worse exercise capacity and LV remodeling. Low IGF-1 and IGFBP-3 levels proved to be predictors of all-cause mortality (log rank, $p=.13$ and $p=.016$, respectively).

Conclusion: In our population of mild-to-moderate CHF, GH/IGF-1 parameters were associated with worse cardiovascular outcomes. Moreover, IGF-1 and IGFBP-3 levels under the median value independently predicted all-cause mortality.

O104

Ruolo prognostico di uno score clinico di facile determinazione nel paziente con insufficienza cardiaca cronica

Ferdinando Loiacono (a), Luca Paolo Alberti (a), Giliola Calori (a), Carmela Silipigni (a), Alberto Cappelletti (a), Gabriele Fragasso (a), Alberto Margonato (a)

(a) *Unità Insufficienza Cardiaca - Istituto Scientifico Ospedale San Raffaele – Milano*

Background: Al fine di stimare il rischio di mortalità nei pazienti con insufficienza cardiaca cronica (ICC) sono stati proposti numerosi modelli prognostici e punteggi di rischio. Si tratta tuttavia di modelli spesso complessi, che comprendono a volte variabili di uso clinico non routinario. Scopo di questo lavoro è di creare e validare per pazienti affetti da ICC un punteggio prognostico semplice da calcolare, che comprenda esclusivamente parametri facilmente ottenibili dalla sola raccolta anamnestica.

Metodi: 376 pazienti consecutivi con insufficienza cardiaca sistolica (FE<45%) sono stati arruolati dal registro dell'ambulatorio di insufficienza cardiaca del nostro ospedale. Dodici variabili raccolte al momento dell'arruolamento sono state correlate singolarmente con il rischio di mortalità a 5 anni

mediante la regressione di Cox univariata. Esse erano: genere; età; presenza di coronaropatia documentata con coronarografia, pregresso infarto del miocardio (IMA), pregresso scompenso acuto (SC), frazione d'eiezione del ventricolo sinistro (FE) <30%, classe NYHA IV, diabete mellito, fibrillazione atriale (FA), insufficienza renale cronica stabilita come creatininemia >1.4 mg/dl; non assunzione di betabloccante (BB); non assunzione di ACE-inibitore (ACE-I) (in entrambi i casi a causa di intolleranza e/o controindicazione). Le variabili associate in modo statisticamente significativo ad un aumento della mortalità sono state poi utilizzate per costruire il modello di rischio attraverso la regressione di Cox multivariata. Il punteggio di ogni singola variabile è stato ottenuto moltiplicando il coefficiente β per la costante di regressione del modello. Lo score ottenuto è stato successivamente validato su un diverso campione di 325 pazienti arruolati precedentemente in altri studi clinici.

Risultati: La durata media del follow-up è stata 40.39 ± 16.25 mesi. Le variabili risultate significativamente associate alla mortalità per cause cardiovascolari, e quindi utilizzate per calcolare lo score, sono state: pregresso SC, FA, FE <30%, non assunzione di BB, età >70 anni, non assunzione di ACE-I. Lo score prevede un punteggio massimo di 35 punti, così suddivisi: pregresso SC = 8, FE <30% = 7, non assunzione di BB = 6, non assunzione di ACE-I = 5, FA = 5, età >70 = 4. All'analisi per quintili il punteggio di rischio > 20 mostra un rischio di mortalità per cause cardiovascolari di 5 volte superiore rispetto al punteggio di rischio < 20 (HR: 5.02; 95% CI: 2.17-11.58; $p=0.0002$). Le curve di sopravvivenza di Kaplan-Meier, calcolate a 5 anni, mostrano in caso di punteggio di rischio > 20 una mortalità per cause cardiovascolari del 58.9% superiore rispetto a punteggio di rischio < 20 (89.2% vs 30.3%, $p<0.0005$).

Conclusioni: Il presente modello prognostico per l'ICC, validato su un campione esterno, è di semplice utilizzo e ha una buona correlazione con la sopravvivenza a 5 anni. Esso è rapidamente calcolabile in ogni contesto, basato esclusivamente su dati anamnestici e non richiede indagini mirate, risultando quindi applicabile a tutti i pazienti durante una semplice valutazione ambulatoriale.

O105

La Frequenza cardiaca a riposo e' un predittore indipendente di disfunzione ventricolare sinistra diastolica nei pazienti obesi con o senza ipertensione arteriosa.

Doralisa Morrone (a), Frank Lloyd Dini (a), Mario Miccoli (c), Angelo Baggiani (c), Vitantonio Di Bello (a), Mario Marzilli (a)

(a) Università di Pisa-Dipartimento Cardiotoracico, (b) Unità di Malattie Cardiovascolari 2-Ospedale S. Chiara, (c) Dipartimento di Patologia Sperimentale-Unità di epidemiologia-Pisa

Background: La Frequenza cardiaca a riposo è una misurazione semplice da effettuare e nello stesso tempo è un importante indicatore di benessere cardiovascolare. In questo studio ci proponiamo di evidenziare i determinanti della disfunzione ventricolare sinistra diastolica nei pazienti obesi con o senza ipertensione.

Methods and results: 117 pazienti asintomatici (con grado di obesità 2-3) consecutivi e senza storia di scompenso cardiaco o CAD, afferenti al nostro centro per controllo sono stati reclutati. Tutti i pazienti sono stati sottoposti ad esame ecocardiografico. La funzione diastolica compromessa (LVDD) e' stata identificata da un rapporto E/A > 1.5 e E/A <0.8. L'esame ecocardiografico e' stato inoltre eseguito su 38 pazienti non obesi per controllo. La prevalenza di ipertensione arteriosa fra i soggetti obesi era del 41% mentre risultò essere del 59% nel gruppo di controllo. 36 pazienti obesi avevano una disfunzione diastolica; inoltre i pazienti con grado di obesità 3 presentavano: volumi ventricolari aumentati, aumentata massa ventricolare ($p<0.0001$), aumentate dimensioni atriali sinistre, ($p=0.0008$) cardiac output ($p<0.0001$), stroke volume ($p=0.015$) e frequenza cardiaca a riposo ($p=0.028$), peggioramento della funzione ventricolare sinistra longitudinale. Nei pazienti con grado di obesità 2-3 la frequenza cardiaca correlava con volume di fine diastole ($r=-0.43$; $p<0.0001$), volume di fine sistole ($r=-0.42$; $p<0.0001$) e massa ventricolare ($r=-0.37$; $p<0.0001$). Inoltre la frequenza cardiaca a riposo (hazard ratio [HR]:1.06,

$p=0.004$), l'ipertensione (HR:4.34, $p=0.005$), e l'indice di massa corporea (HR:0.93, $p=0.044$) erano indipendentemente associati alla disfunzione ventricolare sinistra diastolica in pazienti con grado 2-3 di obesità.

Conclusioni: Nei pazienti obesi con o senza ipertensione la frequenza cardiaca a riposo era il maggiore predittore di disfunzione ventricolare sinistra diastolica e correlava negativamente con la massa ventricolare sinistra e con il volume.

O106

Powerful prognostic and clinical insights combining tricuspid annular systolic excursion and pulmonary arterial systolic pressure in heart failure: correlation and additive value with CPET

Francesco Bandera (a), Ross Arena (b), Ugo Corrà (c), Stefano Ghio (d), Paul Forfia (e), Andrea Rossi (f), Frank Dini (g), Lawrence P Cahalin (h), Pierluigi Temporelli (c), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese, Italy, (b) Univ of New Mexico, Albuquerque, NM, (c) IRCCS Fondazione "S. Maugeri", Veruno, Novara, Italy, (d) IRCCS Policlinico San Matteo, Pavia, Italy, (e) Univ of Pennsylvania, Philadelphia., (f) Univ of Verona, Verona, Italy, (g) Azienda Ospedaliera Pisana, Pisa, Italy, (h) Univ of Miami, Coral Gables, Florida

Purpose: Development of right heart dysfunction affect the clinical course in heart failure (HF) syndrome. Evaluation of exercise ventilator response by cardiopulmonary exercise (CPET) test provides relevant prognostic correlates. We tested whether combining echo-derived RV function variables and CPET indicators of ventilator impairment may provide additional insights on the evolving nature of HF.

Methods and Results: 459 stable HF patients (NYHA I-IV; average LVEF: $33\pm 10\%$) underwent right heart echo-Doppler with assessment of tricuspid annular systolic excursion (TAPSE) and pulmonary systolic pressure (PASP) as well as CPET with assessment of peak VO_2 , VE/ VCO_2 slope, oscillatory ventilation (EOV) and then prospectively tracked for adverse events. Cox regression and Kaplan-Meier analyses were performed with TAPSE and PASP as individual measures and combining them in ratio form. Overall, TAPSE/PASP was the strongest predictor while NYHA class and EOV added significant predictive value. We defined a 4 group based on a simple echocardiographic TAPSE vs PASP rule that identifies risk prediction according to the combined CPET variables' distribution: Group A (TAPSE > 16 mm and /PASP < 40 mmHg) included pts at lower risk (HR:0.17) and best ventilatory performance; Group B identified subjects still at low risk (HR:0.88) with normal PASP (< 40 mmHg) and some TAPSE reduction (< 16 mm) showing a quite preserved exercise performance but impaired ventilation efficiency. Group C identified pts that maintained a compensatory TAPSE response (> 16 mm) to increased PASP (> 40 mmHg) with a compromised exercise phenotype, especially exhibiting EOV in a significant rate (HR: 1.3). Group D identified pts at higher risk with the worse RV-pulmonary pressure uncoupling (TAPSE < 16 and PASP > 40 mmHg), lower overall exercise performance and highest EOV rate (HR: 5.6).

Conclusions: Noninvasive echo-derived assessment of RV systolic function proposed under easy-to-perform approach by normalizing TAPSE/PASP provides relevant clinical and prognostic insights tightly combining with abnormal oscillatory ventilation during exercise. Presence of a low TAPSE/PASP and EOV could serve as an indicator of very high risk and a target condition to strictly monitor in HF cohorts.

O107

SIC | *Indice Autori*

Identificazione precoce di danno miocardico indotto da trattamento antineoplastico

Marco Triggiani (a), Graziella Bonetti (b), Annalisa Pizzuto (a), Ilaria Papa (a), Vito Amoroso (c), Edda Simoncini (c), Alessandra Manerba (a), Nicola Berlinghieri (a), Savina Nodari (a)

(a) *Dipartimento Specialità Medico-Chirurgiche, Scienze Radiologiche, e Sanità Pubblica. U.O. Cardiolog,* (b) *Dipartimento Specialità Medico Chirurgiche, Scienze Radiologiche e Sanità Pubbliche, U.O.Laboratorio,* (c) *Dipartimento Specialità Medico Chirurgiche, Scienze Radiologiche e Sanità Pubbliche, U.O.Oncologia*

Background: L'utilizzo di Antracicline (ANT) nel trattamento del tumore della mammella ha consentito il raggiungimento di ottimi risultati in termini di sopravvivenza e guarigione completa. Il successo raggiunto tuttavia viene spesso pagato da un aumentato rischio di sviluppo di insufficienza cardiaca (IC). Lo scopo di questo studio è valutare l'utilità dell'impiego seriato e combinato dell'ecocardiografia e del dosaggio di biomarcatori specifici per l'identificazione precoce del danno miocardico durante trattamento con ANT.

Metodi: Analisi preliminare dei dati clinici, strumentali e laboratoristici di pts affette da tumore della mammella e arruolate in un protocollo di studio che prevede una serie di valutazioni cardiologiche a cadenza predefinita per identificare precocemente l'eventuale danno miocardico indotto dai diversi trattamenti antineoplastici. La presenza di una cardiopatia nota e/o una precedente esposizione a irradiazione mediastinica, ovvero un pregresso trattamento con ANT, sono stati criteri di esclusione dal protocollo di studio. In questa analisi abbiamo considerato solo le pts che hanno terminato il trattamento con basse dosi di ANT (3 o 4 cicli di Epirubicina 90 mg/m² ogni 3 settimane). Al momento dell'arruolamento (T0) e a una settimana di distanza da ciascun ciclo di ANT tutte le pts arruolate sono state sottoposte a valutazione clinica, ECG, Ecocardiogramma (Eco) e alla determinazione dei livelli plasmatici della porzione n-terminale pro peptide natriuretico (nT-proBNP) e della Troponina cardiaca I (TnI). In tutte le pts è stata inoltre effettuata ricerca di marcatori genetici di suscettibilità individuale allo sviluppo di cardiotoxicità. Considerando una variabilità biologica interindividuale del 10% e un'imprecisione analitica del nostro laboratorio del 4%, solo un incremento dei livelli plasmatici di nT-proBNP pari o superiore al 30% rispetto al valore basale è stato considerato significativo.

Risultati: L'analisi include 40 pts (età media 50,23 ± 10,71) con basso profilo di rischio cardiovascolare (CV) (10% diabetiche, 12,5% dislipidemiche e 22,5% ipertese) e con livelli basali medi di nT-proBNP pari a 67,05 ± 35,48 ng/mL. Al termine (T4) del trattamento con ANT (dose cumulativa media 307,06 ± 44,96 mg/m²) 16 pts (40%; gruppo 1) hanno mostrato un incremento significativo dei livelli plasmatici di nT-proBNP rispetto ai loro livelli basali. Di queste 12 lo avevano già mostrato dopo il primo ciclo (T1). I livelli plasmatici di TnI sono invece sempre risultati <0.015 ng/mL ai diversi controlli. Dal confronto delle caratteristiche cliniche, demografiche, laboratoristiche, ECG ed Eco rilevate al T0 non sono emerse differenze significative tra il gruppo 1 e le pts con livelli stabili di nT-proBNP ai diversi controlli seriatati (gruppo di controllo). Dal confronto delle caratteristiche ECG ed Eco registrate al T0 e al T4, nel gruppo 1 si è registrata una riduzione significativa dell'onda E' mediale al tissue doppler (9,69±2,5 vs 7,79±2,33; p < 0,05), un aumento del rapporto E/E' mediale (7,36±1,96 vs 10,45 ±2,01; p < 0,001) e un allungamento del QTc (429,33±19,66 vs 454,17±28,85; p < 0,05). Nessuna variazione significativa è invece emersa nel gruppo di controllo.

Conclusioni: In un gruppo omogeneo di pts a basso profilo di rischio CV, il trattamento con basse dosi di ANT può indurre variazioni significative dei livelli plasmatici di nT-proBNP che sono correlate ad alterazioni precoci della funzione diastolica. Il significato di queste alterazioni e il loro rapporto con lo sviluppo di IC restano tuttavia ancora da chiarire. I risultati della ricerca dei biomarcatori genetici di suscettibilità individuale potranno forse far luce sulle questioni ad oggi ancora aperte.

MALATTIE CARDIOVASCOLARI DI GENERE

O108

Idiopathic dilated cardiomyopathy in women

Laura Vitali Serdoz (a), Massimo Zecchin (a), Cristina Lutman (a), Giulia Barbati (a), Elena Cadamuro (a), Silvia Magnani (a), Marco Merlo (a), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, Ospedali Riuniti and University of Trieste, Trieste, Italy*

Background: Gender differences may affect disease presentation, clinical pathways, diagnostic yield and prognosis of patients with cardiovascular disease; few information about gender differences in idiopathic dilated cardiomyopathy are available (DCM).

We evaluated possible clinical, laboratory and prognostic divergences in women and men with DCM.

Methods and Results: From 1988 to 2012, 803 consecutive patients with DCM recorded in the Heart Muscle Disease Registry of Trieste (Italy) were evaluated; 576 (72%) were male and 227 (28%) were female.

At the first evaluation women were older (48 vs 45 years old, $p < 0,008$); 62 (28%) of women and 134 (23%) of men presented in NYHA functional class III-IV ($p < 0,226$).

Women presented more frequently with left bundle branch block (38% vs 28%, $p < 0,01$), with significantly greater left ventricular end-diastolic indexed diameter (36 vs 34 mm/m², $p < 0,001$) and more frequently with significant mitral regurgitation (43% vs 33%, $p < 0,015$). No difference resulted in medical treatment and device implantation.

Although during a 120 months follow-up men presented a better clinical and echocardiographic improvement than women, the ten years total mortality/heart transplantation rate and cardiovascular death in men and women were respectively 32% vs 20% ($p < 0,001$), and 15% vs 9% ($p < 0,024$).

Conclusions: In our experience women with DCM present a more advanced phase of the disease and a lower clinical-instrumental improvement on optimal medical therapy than men, but they have a better prognosis.

O109

Evaluation of estrogen receptors polymorphisms in Takotsubo cardiomyopathy

Antonio Madaffari (a), Pasquale Crea (a), Scipione Carerj (a), Giuseppe Oreto (a), Maurizio Cusmà-Piccione (a), Edvige Aciri (a), Alessandra Oteri (a), Olga Vrizz (c), Rosalba Minisini (d), Myriam D'Angelo (a), Marta Zucco (a), Luigi Rivetti (a), Concetta Zito (a)

(a) *Cardiology - Department of Clinical and Experimental Medicine, University of Messina.*, (b) *Pharmacology-Department of Clinical and Experimental Medicine, University of Messina*, (c) *San Antonio Hospital, Ass4, Department of Cardiology, San Daniele del Friuli, Italy*, (d) *University of Eastern Piedmont, Novara, Italy*

Background: Takotsubo cardiomyopathy (TKCM) has a higher prevalence in females and primarily affects menopausal age when estrogen levels are particularly low. Cohort studies suggest an association between polymorphisms of ESR1 and ESR2 genes and myocardial infarction (MI), but data are lacking about the role of the estrogen receptor genes in TKCM.

Methods: Two polymorphisms of ESR1 gene (-397 T> C rs2234693, -351 A> G rs9340799), and ESR2 gene (-1839 G> T rs1271572 and 1082 G> A rs1256049), with their associated haplotypes, were evaluated in 18 women affected by TKCM (70 ± 6.9 yrs), 50 women with myocardial infarction (76 ± 9 yrs) and 30 healthy controls (66 ± 3.4 yrs).

Results: Homozygous for T in ESR1 -397 was found prevailing in patients with TKCM (Table 1). As to haplotypes of ESR genes, we observed a higher prevalence of haplotypes T in patients with TKCM both in ESR1 -397 and ESR2 -1839 (Table 2). On logistic regression analysis the haplotype T of ESR1 -397 was significantly associated with TKCM, whereas the haplotypes G for ESR1 -351 and for ESR2 -1839, respectively, were associated with MI (Table 3).

Conclusions: Polymorphism ESR1-397 T>C, particularly haplotype T is associated with TKCM.

O110

| Table 1. Pearson's chi square - ESR1 - 397 T>C | TT | CT | CC | | | | | |
|---|------------------|--------|-----------|--------|------------------------|--------|------------|--------|
| Controls | 32.4% | 47.1% | 20.6% | | | | | |
| Takotsubo | 61.1% | 38.9% | 0% | | | | | |
| Myocardial Infarction | 26.2% | 61.9% | 11.9% | p=0.04 | | | | |
| Table 2. Pearson's chi square - Polymorphisms | ESR1-397 | | ESR1 -351 | | ESR2 -1082 | | ESR2 -1839 | |
| Haplotype | T | C | A | G | G | A | T | G |
| Controls | 55.9 % | 44.1 % | 59.7 % | 40.3 % | 52.9 % | 47.1 % | 50.1 % | 49.9 % |
| Takotsubo | 80.6 % | 19.4 % | 55.9 % | 44.1 % | 55.6 % | 44.4 % | 61.1 % | 39.9 % |
| Myocardial Infarction | 57.1 % | 42.9 % | 42.1 % | 57.9 % | 58.3 % | 41.7 % | 28.6 % | 71.4 % |
| p | 0.029 | | NS | | NS | | 0.001 | |
| Table 3. Simple Logistic Regression Analysis Polymorphisms | TAKOTSUBO | | | | MYOCARDIAL INF. | | | |
| | OR (CI 95 %) | | p | | OR (CI 95 %) | | p | |
| ESR1 -397 T | 3.27 (1.26-8.49) | | 0.015 | | 0.95 (0.49-1.81) | | 0.87 | |
| ESR1 -351 G | 0.85 (0.37-1.99) | | 0.71 | | 2.03 (1.02-4.02) | | 0.04 | |
| ESR2 -1082 G | 1.11 (0.49-2.50) | | 0.79 | | 1.24 (0.65-2.37) | | 0.5 | |
| ESR2 -1839 G | 1.57 (0.68-3.60) | | 0.28 | | 2.5 (1.26-4.94) | | 0.008 | |

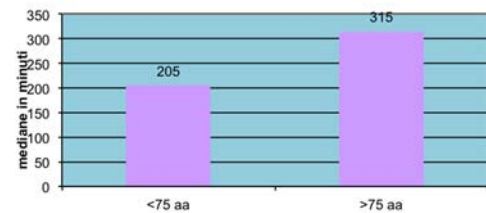
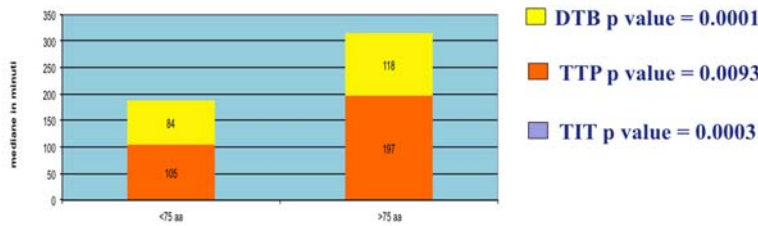
Differenze correlate all'età e al sesso nella gestione dello STEMI

Cristina Cacace (a), Antonio Bracco (a), Roberto Floris (a), Michela Congia (a), Daniele Scano (a), Federica Scano (a), Raimondo Pirisi (a), Massimo Ruscazio (a), Roberta Montisci (a), Luigi Meloni (a)

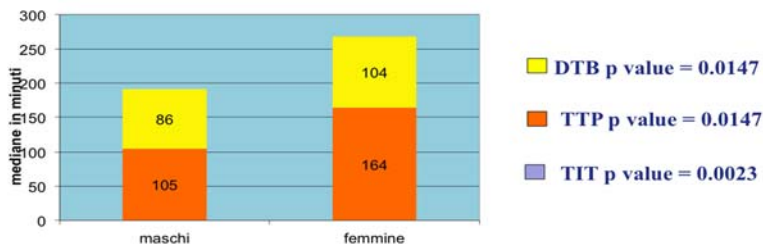
(a) Clinica Cardiologica, PO San Giovanni di Dio, AOU Cagliari, Università degli Studi di Cagliari

Le malattie cardiovascolari sono la principale causa di mortalità nelle donne e nella popolazione anziana. Sebbene negli ultimi anni la mortalità per cardiopatia ischemica si sia ridotta, tale decremento nella donna è meno consistente come anche nei soggetti anziani. I pazienti con età ≥ 75 anni e le donne con STEMI hanno un significativo ritardo nell'essere trattati e una maggiore mortalità. Scopo dello studio: valutare l'impatto dell'età e del genere sul ritardo decisionale e sul ritardo intercorrente tra l'ingresso in Ospedale e l'esecuzione dell'angioplastica primaria nei pazienti con STEMI afferenti autonomamente al PS. Materiale e Metodo: Abbiamo studiato 121 pazienti con STEMI che si sono presentati autonomamente al PS del P.O. San Giovanni di Dio, AOU Cagliari dal 1/1/2007 al 30/4/2012: 89 pazienti erano uomini e 32 donne; 91 pazienti avevano un'età ≤ 75 anni e 30 > 75 anni. Abbiamo analizzato in tutti i pazienti: 1) Time To Presentation (TTP), dall'esordio sintomatologico alla presentazione in PS; 2) Door To Balloon (DTB), dall'arrivo in PS alla riapertura del vaso di necrosi; 3) Total Ischemic Time (TIT), dall'inizio dei sintomi alla riperfusione. Come misure di performance abbiamo considerato: una percentuale di pazienti riperfusi entro e oltre i primi 90.

Risultati: I pazienti più anziani hanno mostrato un TTP, un DTB (grafico 1) ed un TIT (grafico 2) decisamente superiori rispetto ai pazienti di età ≤ 75 anni.



Il 77% dei pazienti con età >75 aa ha mostrato un DTB > 90 minuti rispetto al 37% dei pazienti più giovani ($p < 0.0001$). I pazienti STEMI di sesso femminile hanno presentato TTP, un DTB (grafico 3) e un TIT (grafico 4) significativamente maggiori rispetto ai pazienti di sesso maschile.



Il 63% delle donne ha un DTB > 90 minuti rispetto al 42% degli uomini ($p < 0.04$).

Conclusioni: Dal nostro studio si evidenzia un significativo ritardo preospedaliero, intraospedaliero, e nel TIT nei soggetti più anziani e nelle donne con STEMI presentatisi autonomamente al PS. Nonostante le ragioni di ciò non siano ben chiare, pensiamo che nell'anziano e nella donna la più frequente presenza di comorbidità ed un più alto profilo di rischio di base possano contribuire a complicare il percorso intraospedaliero di questi pazienti. Oltre a ciò, bisogna considerare le difficoltà che in queste categorie di pazienti si possono avere nel riconoscere i sintomi dell'IMA.

O111

Predictors of outcomes after TAVI: a gender based analysis.

Federico Conrotto (a), Fabrizio D'Ascenzo (a), Stefano Salizzoni (b), Patrizia Presbitero (e), Corrado Tamburino (c), Piergiuseppe Agostoni (f), Giuseppe Tarantini (d), Marco Barbanti (c), Valeria Gasparetto (d), Marco Mennuni (e), Massimo Napodano (d), Marco Luciano Rossi (e), Freek Nijhoff (f), Michele La Torre (b), Paolo Scacciatella (a), Pierluigi Omedè (a), Gaetana Ferraro (a), Walter Grosso Marra (a), Francesca Giordana (a), Giuseppe Biondi Zoccai (g), Claudio Moretti (a), Maurizio D'Amico (a), Mauro Rinaldi (b), Fiorenzo Gaita (a), Sebastiano Marra (a)

(a) Città della Salute e della Scienza Hospital, Division of Cardiology, University of Turin, (b) Città Della Salute e della Scienza Hospital, Division of Cardiac Surgery, University of Turin, (c) Ferrarotto Hospital, University of Catania, (d) Division of Cardiology, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, (e) Istituto Humanitas, Division of Cardiology, Milan, (f) University Medical Center Utrecht, (g) Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome

Aim: Impact of different patho-physiological features of severe aortic stenosis between male and female patients undergoing TAVI remains to be defined, as consistency of predictors of adverse events.

Methods: All consecutive patients undergoing TAVI at our Institutions were enrolled, and divided into two groups according to gender. All-cause mortality at 30-day or in-hospital and at follow-up were the primary end points, while peri-procedural complications, rates of myocardial infarction, stroke, re-intervention at follow-up the secondary ones. All these events were adjudicated according to VARC definitions.

Results: 836 patients were enrolled: 463 (55.5%) were female and 372 (44.5%) male. At midterm follow-up (median 365 days, IQR 100-516) women had comparable rates of all cause mortality

compared to men (18.1% Vs 22.6% p=0.11) and similar incidence of myocardial infarction and cerebrovascular accident. Male gender did not increase risk of adverse events also at multivariate analysis. About clinical features, Glomerular Filtration Rate less than 30 mL/min/1.73 m² (HR 2.55 95% CI 1.36 to 4.79 p=0.003) and Systolic Pulmonary Arterial Pressure more than 50 mmHg (HR 2.26 95% CI 1.26 to 4.02 p=0.006) independently predicted mortality in females, while insulin treated diabetes (HR 3.45 95%CI 1.47 to 8.09 p=0.004), previous stroke (HR 3.42 95% CI 1.43 to 8.18 p=0.006), and ejection fraction<30% (HR 3.82 95% CI 1.41 to 10.37 p=0.009) were related to mortality in males.

Conclusion: Different clinical and echocardiography presentation of aortic stenosis in female and male patients do not affect mid-term survival; on the contrary different predictors of adverse events stratified by gender were demonstrated, helping clinical risk assessment.

| Male | HR | 95% LCI | 95% UCI | P |
|--------------------------|------|---------|---------|-------|
| Insulin treated diabetes | 3.45 | 1.47 | 8.09 | 0.004 |
| Previous stroke | 3.42 | 1.43 | 8.18 | 0.006 |
| EF<30 | 3.82 | 1.41 | 10.37 | 0.009 |
| Female | HR | 95% LCI | 95% UCI | P |
| GFR<30 | 2.55 | 1.36 | 4.79 | 0.003 |
| PAPS>50 mmHg | 2.26 | 1.26 | 4.02 | 0.006 |

O112

Left Ventricular Mass, Geometry, Function and Aortic Stiffness assessed by Global Pulse Wave Velocity in postmenopausal women

Maria Maiello (a), Annapaola Zito (b), Marco Matteo Ciccone (b), Pasquale Palmiero (a)

(a) ASL Brindisi, Equipe Cardiologia Distrettuale, Brindisi, (b) Università di Bari, Cattedra di Cardiologia, Bari

Objective: global aortic pulse wave velocity (gPWV), is a marker of arterial stiffness, might cause changes on myocardial mass, geometry and function, but the relation between these changes and gPWV and myocardial function in postmenopausal women has not been studied.

Patients and method: a total of 321 consecutive women, mean age 59,9yrs, underwent gPWV determination and echocardiograph examination. Relative wall thickness was used for LV geometry assessment, LV diastolic dysfunction(LVDD) and LV hypertrophy(LVH) were diagnosed according to ASE(American Society Echocardiography) Guidelines.

Results: all population mean gPWV was 8,2m/sec.. 257 were postmenopausal women(80%), mean age 64,1yrs, their mean gPWV was 8,5m/sec; 64(20%) were menstruate, mean age 43,2yrs, their mean gPWV was 6,4m/sec.. Women were divided in 4 groups according to postmenopausal status and gPWV, a cut off value of gPWV was 7,1±1,1. There was no significant statistical difference for age between postmenopausal women with increased gPWV, 64,6yrs aged and without 61,7yrs aged, the same for menstruate women with increased gPWV, 44,4yrs aged and without 43,2yrs aged . Among postmenopausal women 168(66,7%) were affected by LVDD: 150(70,5%) with increased gPWV and 18(45%) without, p<0,001; 32(12,6%) presented a LV concentric geometry: 28(13,2%) with increased gPWV and 4(10%) without, p<n.s.; particularly concentric LVH 9(4,2%) with

SIC | *Indice Autori*

increased gPWV and 2(5%) without, $p < n.s.$; 60(23,8%) presented eccentric LVH: 53(25%) with increased gPWV and 7(17,5%) without, $p < 0,02$; considering all LVH, patients affected were 71(28,1%): 62(29,2%) with increased gPWV and 9(22,5%) without, $p < 0,05$.

Conclusion: according to our data the relation between aortic gPWV and LVH and LVDD is not age dependent, we observe a strong relation between LVDD and gPWV, the same for LVH, while we found a lack of relation between gPWV and concentric geometry. Our study supports the usefulness of the assessment of aortic stiffness as a marker of cardiovascular disease to identify at an early stage women at major risk to develop LVDD and LVH.

Key words: aortic stiffness, pulse wave velocity, postmenopausal women, left ventricular diastolic dysfunction, left ventricular hypertrophy.

O113

Efficacy of Bannedipine on Left Ventricular Mass, Function and Arterial Stiffness in Hypertensive Postmenopausal Women

Pasquale Palmiero (a), Maria Maiello (a), Annapaola Zito (b), Marco Matteo Ciccone (b)

(a) ASL Brindisi, Equipe Cardiologia Distrettuale, Brindisi, (b) Università di Bari, Cattedra di Cardiologia, Bari

Background: Increased aortic stiffness measured by global pulse wave velocity (PWVg), left ventricular hypertrophy (LVH) and LV diastolic dysfunction are independently related to cardiovascular events in hypertensive patients. Our epidemiological study examines the effects of the calcium antagonist (Bannedipine) on PWVg and LV changes in mass and function in a population of hypertensive postmenopausal women, versus others drug treatments as betablockers, ace-inhibitors and angiotensin II antagonists.

Methods: A total of 120 consecutive hypertensive postmenopausal women, with first diagnosis of hypertension from no more than one month and on treatment started by general practitioner, with no more than two drugs, will be enrolled. The included women will have no evidence of associated cardiovascular complications. Blood pressure, heart rate, aortic PWV, left ventricular mass index(LVMI) and LV diastolic function(LVDD) will be measured by 2-D echocardiography at baseline and after six month of treatment. Exclusion criteria will be: blood pressure out of target, calcium-antagonist therapy. All women will be divided in 4 groups according to pharmacological therapy: first group bannedipine alone, second group betablockers alone, third group bannedipine associated to drugs active on SRA system and fourth group betablockers associated to drugs active on SRA system.

Conclusion: The data resulting by four groups will be compared and the therapy more active on PWV, to prevent LV changes in mass and function in our population of hypertensive postmenopausal women, will be identified.

PROBLEMATICHE ARTMOLOGICHE IN CARDIOLOGIA FETALE E PEDIATRICA

O114

Isolated III degree Atrioventricular Block in fetuses and neonates: a retrospective study of 12 Patients

Concetta Ricci (a), Raffaella Esposito (a), Carmela Morelli (a), Fortuna Del Gaizo (a), Fiorella Fratta (a), diego Colonna (a), michele D'alto (a), Laura Di Pietto (a), Berardo Sarubbi (a), Maria Giovanna Russo (a)

(a) *Pediatric Cardiology - AORN dei Colli – AO Monaldi, SUN, Naples*

Introduction: Isolated complete atrioventricular block (icAVB) is a rare but potentially lethal condition in which the effects of maternal steroid treatment on outcome is unclear. .

Aim: The objective of this work was to study risk factors associated with death and the influence of steroid treatment on outcome in a population of fetuses referred for fetal echocardiography for icAVB in our third level center (AORN dei colli - AO Monaldi, Second university of Naples).

Population: Since January 1995 to April 2013 we practiced 8143 fetal heart scans. Among these, we diagnosed 1219 (16%) consecutive fetuses with CHD. We retrospectively collected the data concerning 10/1219 (0.08%) fetuses diagnosed with third-degree atrioventricular block. 7/10 (70%) patients were referred for a suspicion of icAVB on obstetric scanning. 3/10 (30%) were referred because of maternal antibodies status. Mean gestational age at diagnosis was 19.3 +/- 1.4 weeks. In 100% of pregnancies we documented antibody status: the icAVB was associated with maternal anti-Ro/SSA and anti-Ro/SSB antibodies.

Moreover, we observed 2 neonates with postnatal diagnosis of icAVB.

Results: 12 cases of icAVB: 2/12 (17%) with postnatal diagnosis and 10/2 (83%) diagnosed in utero. *Outcome of the fetal group:* 7/10 (70%) were treated with high dose corticosteroids (Prednisone: 1.5 mg/Kg/die) for a median of 10 weeks. 3/10 (27%) were not treated because of the absence of maternal symptoms and the good fetal heart rate (100 bpm). These cases were the three referred only for maternal antibodies status.

We observed 2/10 (20%) fetal deaths [mean gestational age: 32 weeks] due to severe heart failure. These fetuses had presented fetal hydrops and a mean heart rate 50 bpm, in spite of Prednisone. 8/10 (80%) were alive at birth: 3/8 (38%) had not been treated and 5/8 (62%) had received maternal Prednisone.

Deliveries occurred at a mean gestational age of 35.3 weeks. Survival in the neonatal period was 88% (7/8): 1/8 (12%) died at 3 days of life for severe heart failure. Variables associated with death were gestational age at diagnosis <20 weeks, ventricular rate <50 bpm and fetal hydrops.

1/8 (12%) had an epicardial pacemaker by 1 year of age (at 8 months), she is now alive and well. 2/8 (24%) underwent pace-maker implantation after the year of age: 1 when he was aged 2 (epicardial device) and 1 when he was aged 8 (endocardial device), they are alive and well. In 1/8 (12%) the icAVB spontaneously converted in II degree AVB. 3/8 (38%) are alive and well in natural history. The mean follow up is 7±3 years.

Outcome of the neonatal group: 2/2 (100%) are alive and well in natural history.

Conclusions: Isolated complete atrioventricular block in the fetus is a rare but potentially lethal condition in which the effect of steroid treatment on outcome is unclear.

Fetal risk factors associated with a poor outcome were gestation <20 weeks, ventricular rate <50 bpm, hydrops, and impaired left ventricular function.

On the other hand, icAVB when diagnosed in postnatal life tend to have a better outcome.

O115

Analisi della dispersione del tempo di recupero ventricolare mediante monitoraggio dinamico di lunga durata in soggetti sottoposti ad intervento di correzione per cardiopatie congenite

Maurizio Santomauro (a), Luigi Matarazzo (a), Giuseppina Langella (a), Veronica Russolillo (a), Marco Mucerino (a), Gaetano Palma (a), Vincenzo De Amicis (a), Loredana Maria Grande (a), Alessandro Saccenti (a), Fabio Marino (b), Carlo Vosa (a)

(a) *Dipartimento di cardiologia, cardiocirurgia e emergenze cardiovascolari, AOU Federico II, Napoli*, (b) *Centro di Ingegneria Biomedica NUUBO, Madrid, Spagna*

La dispersione del tempo di recupero ventricolare (DTRV), ovvero l'inomogeneità della ripolarizzazione ventricolare esistente tra le varie regioni miocardiche riflette una instabilità elettrica che potenzialmente può condurre allo sviluppo di aritmie ventricolari maligne. È stato dimostrato che tre parametri elettrocardiografici, la dispersione del Qtc (QTcD, differenza tra il massimo ed il minimo Qtc sull'ECG di superficie), la dispersione del Jtc (JTcD, differenza tra il massimo ed il minimo Jtc) e l'intervallo Tp-Te (distanza tra il picco e la fine dell'onda T) rispecchiano fedelmente la misura della dispersione del tempo di recupero ventricolare. Scopo dello studio è stato quello di valutare il comportamento della dispersione del tempo di recupero ventricolare in un gruppo di giovani pazienti sottoposti a correzione chirurgica di difetti congeniti e perciò a particolare rischio aritmico.

Materiali e Metodi: 23 giovani pazienti (15M, 8F; età 11.1 ± 3.4 anni) di cui 7 sottoposti a correzione chirurgica di tetralogia di Fallot, 5 sottoposti a correzione chirurgica di difetto interventricolare, 4 sottoposti a correzione chirurgica di il difetto interatriale, 2 sottoposti a correzione chirurgica di dotto di Botallo pervio e 3 sottoposti a correzione chirurgica di coartazione aortica, 2 sottoposti a correzione chirurgica di trasposizione completa delle grandi arterie, sono stati sottoposti ad esame clinico-anamnestico, ad esame elettrocardiografico standard, test da sforzo al cicloergometro, ECG dinamico long time (7 giorni) secondo Holter comprensivo di analisi dell'Heart Rate Variability ed ecocardiogramma mono e 2D con Doppler. L'analisi dei parametri elettrocardiografici è avvenuta mediante sistema computerizzato. Nuubo nECG SUITE. Questo software di analisi consente la gestione di tutte le informazioni registrate o trasmesse dal dispositivo medico wireless nECG MINDER collegato ad una T-shirt dotata di sensori Blendfix.

Risultati: I soggetti sottoposti ad intervento di correzione per via transventricolare, e quindi a maggiore rischio aritmico, hanno dimostrato, rispetto a quelli corretti per via transatriale valori più elevati di QTcD (72.8 ± 26.4 vs 64.2 ± 22.7) e di Tp-Te (127.8 ± 11.4 vs 126.4 ± 16.2). Anche la presenza di insufficienza polmonare residua, ulteriore fattore prognostico negativo, ha condizionato più elevati valori di QTcD (70.2 ± 27.2 vs 65.4 ± 19.8), di Tp-Te (130.8 ± 14.6 vs 123.4 ± 15.4) e di JTcD (75.2 ± 29.7 vs 64.6 ± 17.9). Dall'analisi di correlazione lineare è stato dimostrato che nei soggetti sottoposti a correzione radicale per TOF la DTRV, è significativamente correlata con la durata del QRS e del QT, misurato sull'ECG di superficie o calcolato dalla media registrata all'esame dinamico secondo Holter: QTcD vs QT: $r=0.444$ $p=0.011$; QTcD vs Qtc Holter: $r=0.407$ $p=0.032$; JTcD vs QT: $r=0.405$ $p=0.022$; Tp-Te vs ORS: $r=0.532$ $p=0.002$; Tp-Te vs Qtc: $r=0.783$ $p=0.0001$; Tp-Te vs Qtc Holter: $r=0.321$ $p=0.032$. Inoltre è stata anche dimostrata che la dispersione del Qtc (QTcD) e quella del Jtc (JTcD) sono anche correlati nel gruppo di studio con alcuni indici dell'Heart Rate Variability, espressione del tono simpato-vagale, QTcD vs Ind, SDNN: $r=0.401$ $p=0.035$; QTcD vs rMSSD: $r=0.433$ $p=0.021$; JTcD vs Ind.SDNN: $r=0.454$ $p=0.015$; JTcD vs rMSSD: $r=0.438$ $p=0.020$.

Conclusioni: La DTRV rappresenta un parametro molto interessante nella valutazione dei pazienti a rischio di morte improvvisa. La sua valutazione potrà costituire un utile marker di rischio aritmico in una valutazione poliparametrica di giovani soggetti a rischio dopo correzione cardiocirurgica per cardiopatie congenite.

O116

Utilizzo di un catetere irrigato con sistema di controllo della forza di contatto nelle ablazione transcatetere di vie anomale postero-settali in età pediatrica: una possibile opzione?

Giuliano D'Alterio (a), Berardo Sarubbi (a), Giangiacomo Di Nardo (a), Diego Colonna (a), Nicola Grimaldi (a), Michele D'Alto (a), Emanuele Romeo (a), Salvatore Virno (b), Maria Giovanna Russo (b)

(a) *UOSD Cardiopatie Congenite dell'Adulto- Ospedale Monaldi- AORN dei Colli- Napoli*, (b) *UOSD Cardiologia Pediatrica- Seconda Università degli Studi di Napoli- Ospedale Monaldi- AORN dei Colli- Napoli*

Introduzione: Le vie accessorie postero-settali sono a maggior rischio di recidiva dopo una procedura di ablazione transcatetere con radiofrequenza (RFCA) a causa della loro frequente localizzazione profonda.

L'utilizzo di cateteri irrigati permette di ottenere lesioni più profonde che risultano essere maggiormente efficaci. Tuttavia tali lesioni non sono esenti da complicanze, soprattutto in pazienti in età pediatrica.

Scopo dello studio: Valutare l'efficacia e la sicurezza di RFCA di vie anomale postero-settali utilizzando un catetere irrigato con sistema di monitoraggio per il controllo della forza di contatto in una popolazione di pazienti in età pediatrica.

Materiali e Metodi: Dieci pazienti (6 maschi/4 femmine; età media 11 ± 2 anni) con vie anomale postero-settali (7 manifeste, 3 occulte) responsabili di TRAV ortodromiche di cui una tipo "Coumel", sono stati sottoposti nel periodo compreso tra gennaio 2012 ed aprile 2013 a RFCA utilizzando un catetere irrigato con sistema di monitoraggio per il controllo della forza di contatto (4 dopo recidiva di precedente RFCA con catetere ablatore senza punta irrigata e 6 come prima procedura).

E' stato effettuato un follow up di 3-15 mesi con visita cardiologica, ECG, Ecocardiogramma 2D Color Doppler.

Risultati: In tutti pazienti si è ottenuta l'ablazione della via anomala dopo 1-3 applicazioni di radiofrequenza (120 ± 60 sec) con una forza di contatto media di 18 g (18 ± 10 g) e temperatura media di 33°C ($30 \pm 3^\circ\text{C}$).

La localizzazione delle vie anomale era per 4 pazienti all'imbocco del seno coronarico, in due pazienti all'interno del seno coronarico in posizione prossimale all'imbocco ed in 4 pazienti in recessi prossimi all'imbocco del seno coronarico.

Non si sono verificate recidive né complicanze sia nell'immediato post ablazione che durante tutto il follow up.

Conclusioni: In pazienti pediatriche l'ablazione transcatetere con radiofrequenza di vie anomale postero-settali mediante utilizzo di catetere irrigato con sistema di monitoraggio per il controllo della forza di contatto rappresenta una tecnica efficace e sicura permettendo una rapida e duratura scomparsa della via anomala minimizzando le possibili complicanze legate al catetere irrigato.

O117

Chirurgia ablativa combinata in una popolazione di cardiopatici congeniti adulti affetti da tachiaritmie atriali

Nicola Grimaldi (a), Berardo Sarubbi (a), Michele D'Alto (a), Emanuele Romeo (a), Diego Colonna (a), Giangiacomo Di Nardo (a), Giovanni Maria Di Marco (a), Anna Correra (a), Assunta Merola (a), Nunzia Borrelli (a), Maria Pignatiello (a), Giuseppe Caianiello (b), Maria Giovanna Russo (a)
(a) *UOSD Cardiopatie Congenite dell'Adulto – AORN dei Colli - Ospedale Monaldi - Napoli*, (b) *UOC Cardiochirurgia Pediatrica – AORN dei Colli - Ospedale Monaldi - Napoli*

Razionale: Lo studio raccoglie dati preliminari su sicurezza ed efficacia della RFCA intraoperatoria di tachiaritmie atriali combinata ad intervento cardiocirurgico riparativo in una popolazione di pazienti GUCH. Il razionale risiede nella scarsa efficacia della terapia antiaritmica e nei modesti risultati a lungo termine della terapia ablativa tradizionale in questa popolazione di pazienti.

Materiali e Metodi: Dal febbraio 2009 al febbraio 2013 sono stati arruolati 20 pazienti (età media 46.6 ± 12.05 aa, 12 maschi) con cardiopatie congenite semplici e complesse, in storia naturale o già sottoposti ad intervento riparativo e con sequele emodinamiche, tutti affetti da tachiaritmie atriali refrattarie alla terapia medica (in 7 casi anche a tentativo di RFCA del substrato aritmico), distribuite in FA permanente (9 pazienti-45%); TRIA (5 pazienti-25%); FA persistente (4 pazienti-20%); FA parossistica (2 paziente-10%). Tutti i pazienti sono stati sottoposti ad intervento chirurgico correttivo o reintervento riparativo della patologia congenita di base ed a contestuale ablazione intraoperatoria della FA mediante radiofrequenza, con device monopolari e bipolari, secondo schemi classici di ablazione per l'atrio destro e bi-atriale con approccio individualizzato.

Risultati: Nessun evento indesiderato correlato alla procedura ablativa (dissezioni, perforazione di vene polmonari, lesioni accidentali delle coronarie, danno esofageo) è stato osservato. Il tempo medio di CEC è stato di 114.4 minuti (range 72-187 min, DS 33.5 min); il prolungamento medio di CEC è stato di 31 minuti per lo schema bi-atriale e di 10 minuti per la procedura di mini-Maze atriale destra. Il tempo medio di clampaggio aortico è stato di 69.2 min (range 2-138 min, DS 38.5 min). La durata media di intubazione è stata 6.5 ore (range 3-18 ore, DS 6.5 ore). Un solo paziente è deceduto nell'immediato post-operatorio (1/20, 5%) per un'emorragia intrattabile da severa piastrinopenia preesistente. Tutti i pazienti hanno lasciato la camera operatoria in ritmo sinusale. Due pazienti (2/20, 10%) sono stati sottoposti a contestuale impianto di pacemaker epicardico bicamerale per storia di manifestazioni bradiaritmiche.

Due pazienti (2/19, 10.5%) con FA permanente, già sottoposti a precedente tentativo infruttuoso di RFCA, hanno sviluppato FA lenta durante la degenza e sono stati dimessi in rate-control therapy. Sedici pazienti (16/19, 84%) sono stati dimessi in ritmo sinusale ed in terapia antiaritmica profilattica titolata nel corso del follow-up alla dose massima tollerata (flecainide: 2/16, 12.5%; amiodarone: 6/16, 37.5%; sotalolo 8/16, 50%). Un solo paziente (1/19, 5%) è stato dimesso in ritmo sinusale senza terapia antiaritmica profilattica. Il follow-up medio è stato di 19.0 mesi (range 3-36 mesi, DS 9.49 mesi). I pazienti sono stati rivalutati a 30 giorni dall'intervento cardiocirurgico, riscontrando un miglioramento globale della classe funzionale valutata con l'Ability Index Score, e successivamente ogni 3 mesi, mediante ECG secondo Holter, senza evidenza di ripresa dell'attività tachiaritmica atriale, anche asintomatica, nei pazienti dimessi in ritmo sinusale.

Conclusioni: L'utilizzo d'energia sotto forma di radiofrequenza non ha comportato eventi avversi maggiori né modifiche significative nei tempi di circolazione extracorporea e di clampaggio aortico. I risultati della chirurgia combinata hanno mostrato un'efficacia in acuto, indipendentemente dalla cardiopatia e dalla tachiaritmia di base e da precedenti procedure transcatetere, e nel follow-up, in considerazione del miglioramento della capacità funzionale e della stabilità del risultato intraoperatorio sul ritmo cardiaco, seppure in terapia antiaritmica profilattica.

O118

Efficacy of cryoablation in pediatric and adult patients

Paolo Pieragnoli (a), Gianmarco Carrassa (a), Giuseppe Ricciardi (a), Luca Checchi (a), Antonio Michelucci (a), Luigi Padeletti (a)

(a) *Department of Cardiology, University of Florence, Italy*

Purpose: In the last years cryoablation (CA) emerged as an alternative treatment modality to radiofrequency (RF) in ablation of supraventricular tachycardias. The purpose of our study is to compare the efficacy of cryoablation in the treatment of atrioventricular nodal reentrant tachycardia (AVNRT) in terms of electrophysiological parameters between pediatric and adult patients.

Methods: We enrolled 55 consecutive patients [age 45 ± 21 years; 18 male(M)], undergoing cryoablation for AVNRT and divided them into three groups according to age [A(≤ 18 yrs): N 11, 14 ± 2 yrs, 4 M; B(19-50 yrs): N 21, 38 ± 8 yrs, 3 M; C(> 50 yrs): N 23, 66 ± 10 yrs, 11 M)]. Inclusion criteria were normal heart structure, no prior ablation procedures, documented narrow complex tachycardia, inducible AVNRT during electrophysiological study (EPS), normal AH and HV interval. Isoproterenol was utilized pre-ablation and post-ablation in all patient. We considered the following electrophysiological parameters: Atrial-His jump > 50 msec; induction of tachycardia; AV node effective refractory period (AVNERP) pre- and post-ablation; Wenckebach cycle length (WBCL) pre- and post-ablation and lastly number of lesions and timing of cryomapping (CM) and cryoablation (CA).

Results: Fifty-five patients underwent CA for AVNRT. Procedural endpoints were loss of sustained slow-pathway conduction, change in WBCL and in AVNERP. The induction of tachycardia was obtained in 8 (72.7%), 14 (66.6%) and 15 patients (65.2%) and AH jump without induction of tachycardia in 3 (27.3%), 7 (33.3%) and 8 patients (34.8%) respectively. Acute procedural success was achieved in all patients. No acute and long term complications occurred. When comparing electrophysiology testing parameters pre- and post-ablation no statistical differences were found in WBCL and AVNERP among all groups and there were no differences between number and timing of CM and CA treatments. During a mean follow-up of 15.8 ± 18.3 months, AVNRT recurrences occurred in 5 patients (9.1%) [1 in B group (1.8 %) and 4 in C group (7.3%) p for trend=0.174]. Comparing patients with recurrences to those without recurrences there were not statistically significant differences in any electrophysiology parameters pre- and post- ablation and any procedural cryotherapy parameters.

Conclusions: In conclusion, in our experience, cryoablation can be considered a safe procedure in differently aged patients with AVNRT. The acute and long-term results demonstrate that cryoablation of AVNRT is very effective and completely safe in pediatric and adult patients. No statistically significant differences could be found in electrophysiological and procedural cryoablation parameters when patients were grouped either according to age, or according to the occurrences of recurrences at follow-up.

O119

Ablazione transcateretere con RF di vie accessorie sinistre con sistema di mappaggio 3D CARTO 3™ in età pediatrica: risultati e parametri di successo di un Centro ad alto flusso

Mario Salvatore Russo (a), Corrado Di Mambro (a), Maria Teresa Naso Onofrio (a), Monica Prosperi (a), Daniela Righi (a), Massimo Stefano Silvetti (a), Fabrizio Drago (a)

(a) U.O.C. di Aritmologia Pediatrica e Sincope Unit, I.R.C.C.S. Ospedale Pediatrico Bambino Gesù, Roma

Introduzione: L'ablazione transcateretere (ATC) con radiofrequenza (RF) è una metodica consolidata nel trattamento delle tachicardie sopraventricolari (TSV) da via accessoria (VA) sinistra nella popolazione adulta. Tuttavia nella popolazione pediatrica esistono delle variabili, quali l'approccio al ventricolo sinistro e la modalità di erogazione dell'energia, non ancora codificate, per condurre un'ablazione con successo e con un rischio minimo di complicanze.

Obiettivi: È stata condotta un'analisi retrospettiva delle ablazioni RF eseguite nel nostro Centro allo scopo di valutare i risultati in acuto e a distanza e di identificare i parametri elettrofisiologici o individuali correlati ad un'ablazione efficace.

Metodo: Da luglio 2010 a marzo 2013 sono stati sottoposti ad ablazione con RF 100 pazienti pediatrici (età media 12.1 ± 3.2 anni) con TSV da rientro atrio-ventricolare da VA sinistra. La localizzazione anatomica della VA è stata eseguita inizialmente con mappaggio convenzionale a tre cateteri: un catetere decapolare posto in seno coronarico con approccio transvenoso giugulare destro e due cateteri quadripolari posti in atrio destro e in regione Hissiana con approccio transvenoso femorale. Il mappaggio è stato condotto in ritmo sinusale per le VA manifeste, durante TSV da rientro o pacing ventricolare per le vie occulte. Tutte le procedure sono state effettuate con approccio retrogrado transaortico. Il mappaggio elettroanatomico dell'anello mitralico e la successiva ablazione sono stati realizzati con sistema tridimensionale CARTO 3™ tramite elettrocateretere Navistar R™ (Biosense Webster Inc, CA, USA). L'ablazione è stata condotta in controllo di temperatura. Durante ogni ablazione sono stati valutati la temperatura raggiunta, il wattaggio erogato, l'impedenza iniziale e finale ed il valore assoluto della sua riduzione. Inoltre, per ogni sito di ablazione acutamente efficace sono stati registrati l'intervallo A-V locale e l'anticipo della V-locale rispetto all'onda delta di superficie per le vie manifeste e l'intervallo V-A locale e l'anticipo dell'atriogramma locale rispetto al più precoce atriogramma registrato dai dipoli dell'elettrocateretere posto in seno coronarico per le vie occulte. **RISULTATI:** Nessuna complicanza è stata riportata in seguito all'approccio retrogrado transaortico. 70 pazienti avevano una via accessoria manifesta, 30 una via accessoria occulta. L'ATC è stata condotta con successo nel 98% dei casi. Dei 2 insuccessi 1 era una via manifesta laterale verosimilmente epicardica e l'altra una via occulta posteroseptale. Il tempo medio di fluoroscopia è stato di 18.2 ± 10.2 minuti (range 1.9-52.6). Durante RF è stato registrato un sottoslivellamento a sede inferiore rientrato dopo pochi secondi in un paziente con VA laterale occulta. Aritmie ventricolari complesse sono state osservate durante ablazione di una via anterolaterale manifesta in un caso. Durante un follow-up medio di 14 mesi (range 1-24 mesi) una recidiva clinica è stata registrata in 5 pazienti (5.1%), 2 dopo ablazione di via manifesta, 3 dopo ablazione di via occulta. In 2 casi su 5 la recidiva è stata documentata anche con ECG. Due pazienti con recidiva clinica dopo ablazione RF di via occulta sono stati nuovamente sottoposti ad ATC, efficace. L'unico parametro periprocedurale comune a tutti i pazienti con recidiva è stata la temperatura non superiore ai 45°C durante erogazione di RF. **CONCLUSIONI:** L'ATC con RF con sistema di mappaggio 3D CARTO 3™ è una metodica efficace nel trattamento delle TSV da VA sinistra anche nella popolazione pediatrica. Nella nostra esperienza l'approccio retrogrado transaortico non ha determinato alcuna complicanza. Una temperatura inferiore ai 45°C durante erogazione sembra essere associata a una più elevata probabilità di recidiva.

O120**Left ventricular pacing in neonates and infants with isolated complete atrioventricular block: a prospective study.**

Massimo Stefano Silveti (a), Duccio Di Carlo (b), Silvia Placidi (c), Antonio Ammirati (d), Rosalinda Palmieri (e), Corrado Di Mambro (g), Daniela Righi (h), Mario Salvatore Russo (i), Fabrizio Gimigliano (i), Fabrizio Drago (l)

(a) UOC Aritmologia, Osp. Bambino Gesù Roma, (b) UOC Cardiocirurgia, Osp. Bambino Gesù Roma, (c) UOC Aritmologia, Osp. Bambino Gesù Roma, (d) UOC Aritmologia, Osp. Bambino Gesù Roma, (e) UOC Aritmologia, Osp. Bambino Gesù Roma, (f) UOC Aritmologia, Osp. Bambino Gesù Roma, (g) UOC Aritmologia, Osp. Bambino Gesù Roma, (h) UOC Aritmologia, Osp. Bambino Gesù Roma, (i) UOC Aritmologia, Osp. Bambino Gesù Roma, (l) UOC Aritmologia, Osp. Bambino Gesù Roma

Aims: Pacing-induced dilated cardiomyopathy (DCM) occurs early in the first year of life and frequently (30%) in neonates and infants with isolated congenital complete or advanced atrioventricular block (CCAVB). Therefore, alternative sites of pacing have been proposed. We describe the short- and medium-term effects of LV pacing on clinical status, ventricular function and synchrony in these patients.

Methods: This is a single-centre, prospective study, enrolling neonates and infants. ECG data are spontaneous/paced QRS and QTc duration. Echo data are: standard M-mode, Doppler, 2D and 3D measurements, interventricular dyssynchrony (interventricular mechanical delay, IVMD), LV dyssynchrony (septal to posterior wall motion delay, SPWMD), the systolic dyssynchrony index (SDI). Data are reported as median (range).

Data were collected pre-implantation and after 1 and 12 months post-implantation.

Results: 10 consecutive patients underwent pacemaker implantation with a LV epicardial lead for CCAVB at an age of 4 months (1 day-18 months) and weight 4.3 kg (2.4-10). LV pacing site was the apex in 7 patients and the LV free-wall in 3. Five patients received VVIR pacing and 5 DDD pacing. Follow-up duration is 1 year for all patients. ECG/echo data are reported in the table 1. Most data were within normal limit after 1 month with mild LV dyssynchrony at SDI, and better at 1 year. All children were asymptomatic and in good hemodynamic status, with normal growth. No DCM occurred.

Conclusions: LV apical or free-wall pacing preserves electromechanical ventricular function in neonates and infants with CCAVB at short- and medium-term follow-up.

Table 1.

| | Pre-implant Median (range) | 1 month post- implant. Median (range) | 12 months post- implant. Median (range) |
|--------------------------|----------------------------------|---|---|
| QRS, ms | 60 (50-80) | 90 (80-100) | 90 (80-110) |
| QTc, ms | 430 (370-520) | 450 (410-500) | 440 (440-450) |
| QTcd, ms | 40 (20-80) | 40 (20-50) | 40 (30-60) |
| LV diameter (Z score) | 0.9 (-2 to 2.4) | 0.3 (-1.9 to 1.1) | -0.1 (-1.9 to 1.1) |
| FS, % | 43 (17-61) | 46 (29-66) | 46 (34-51) |
| LVEDVolume,ml | 13 (5-21) | 17 (5-21) | 14 (11-22) |
| LVESVolume,ml | 5 (2.5-8) | 7 (2-9) | 6 (4-9) |
| EF | 50 (40-62) | 58 (53-60) | 59 (53-66) |
| IVMD, ms | n.a. | 16 (5-17) | 13 (3-35) |
| SPWMD, ms | n.a. | 120 (81-160) | 102 (40-141) |
| SDI, % | n.a. | 6.6 (4-13.5) | 5 (1.5-8.6) |

O121

Implantable cardioverter defibrillators in pediatric and congenital heart disease patients: a single center experience

Rosalinda palmieri (a), Corrado Di Mambro (a), Silvia Placidi (a), Daniela Righi (a), Lorenzo Maria Santucci (a), Massimo Stefano Silvetti (a), Fabrizio Drago (a)

(a) *U.O.C. di Aritmologia, Dipartimento Medico Chirurgico di Cardiologia Pediatrica, Ospedale Pediatrico*

Introduction: Implantable cardioverter defibrillators (ICDs) became the main therapy for treatment of life-threatening ventricular arrhythmias. Advances in technology have permitted ICD therapy to be used more frequently in children. Due to the small number of patients in each study, it is difficult to estimate the true incidence of ICD related complications in children. The aim of the study was to evaluate ICD acute and long-term results obtained in our pediatric center.

Methods: We retrospectively reviewed data of patients who underwent ICD implantation at our centre. Data are reported as median (range).

Results: between 1999 and 2013, 34 pediatric and congenital heart disease (CHD) patients (26 male and 8 female) underwent ICD implantation, at the age of 16 (1-36) years, for primary (22 patients, including 10 with nonsustained, NS, VT) or secondary prevention (12 patients). Systems were implanted transvenously in 23 patients, epicardially in 11 patients (intrapericardial coil in 6, subcutaneous coil in 5). No intraoperative complications occurred. VF zone was set at 200-220 bpm, VT zone at 180-220 bpm. Follow-up: 1 (0.3-11) years; 9 patients (26%) received appropriate shocks for VT or VF, and none inappropriate shocks. Three patients had NS VT not treated appropriately by the ICD. Early (first 90 days post-implantation) complications requiring reoperation occurred in 18% of patients: drained pocket hematoma 2 patients (6 %), pocket erosion 1 (3 %), transvenous defibrillation lead dislocation 3 patients (9 %). Late complications requiring reoperation occurred in 18 % of patients: pocket erosion in 1 patient (3%), subcutaneous coil dislocation due to the somatic growth in 3 patients (9 %) and lead fracture in 2 patient (6%, 1 with a transvenous defibrillation lead and 1 with pacing epicardial lead).

Conclusions: The ICD implantation in young patients has a high number of early and late complications but a proper programming of the device can avoid inappropriate shocks.

CASI CLINICI 1

O122

Left Sided Arrhythmogenic Cardiomyopathy (ALVD). Case Report.

Vito Maurizio Parato (a), Piergiorgio Masci (b)

(a) *Cardiology Unit of Emergency Department, Madonna del Soccorso Hospital, San Benedetto del Tronto*, (b) *Cardiac MRI & Cardiovascular Medicine Dpts, Fondazione CNR/Regione Toscana 'G. Monasterio', Pisa.*

Introduction: Several authors illustrated that arrhythmogenic cardiomyopathy is not limited to the right ventricle, but it can involve the entire myocardium.

The case: The patient was male, 40 y-o and played as competitive soccer player up to two years ago. His clinical history was free from heart diseases but he had an hyperlipidemia and a panic disorder treated with pimozide. His father had an episode of exertional syncope in his history. He had two episodes of exertional syncope occurring during soccer competition. At first episode he presented to our Emergency Department where the first physical examination resulted normal. Bloods and brain CT scan resulted also normal. ECG showed a normal SR and normal PR, QRS, QT, ST/T. No arrhythmias were found at 12-leads ECG telemetry during 12 hours observation period. The transthoracic echocardiogram (TTE) showed a slightly reduced LVEF (43%) and a lateral wall

SIC | *Indice Autori*

hypokinesia. Before discharge a Dobutamine Stress Echocardiogram (DSE) was interrupted at second step because of a non sustained ventricular tachycardia and, after that, patient refused coronary angiography. Three months after, because of the second episode of exertional syncope, he was referred to our Emergency Department again. At first examination patient complained epigastric pain, physical findings were normal, BP was 130/80 but ECG showed an atrial fibrillation with average HR 160/m. A successful pharmacologic cardioversion (with propafenone plus LMWH) was performed. Bloods and brain CT scan resulted again normal. TTE after SR restoration showed the same slightly reduced LVEF (42%) and a more clear hypokinesia of posterior and lateral LV wall. The patient underwent Cardiac Magnetic Resonance (CMR) 2 weeks after. CMR showed the following findings. 1) The cine steady state free precession showed hypokinesia of the mid-lateral wall without wall motion abnormalities of the right ventricle. 2) The black-blood proton-density weighted fast spin-echo image showed an irregularity of the boundary between the epicardium and fat of the mid and apical segments of the LV lateral wall. This finding is consistent with epicardial fat infiltration. 3) The late gadolinium enhancement images showed myocardial fibrosis of the mid and epicardial layers of LV lateral wall. Overall these findings showed fibro-fatty infiltration of the LV lateral wall along with wall motion abnormalities. A diagnosis of 'Left Sided Arrhythmogenic Cardiomyopathy' was made. The patient underwent ICD implantation and started medical therapy with bisoprolol 2,5 mg bid and enalapril 5 mg daily. He's event-free since now.

Discussion: We never found published cases in which only the LV was involved. The question is about a possible ALVD: does it exist?

O123

Valutazione del balance autonomico e della dinamica funzionale cardiaca in pazienti affetti da malattia di Parkinson con o senza mutazioni del gene LRRK2

Nicola Mura (a), Christian Cadeddu (a), Paolo Solla (b), Martino Deidda (a), Salvatore Farci (a), Stefania Palmas (a), Francesco Marrosu (b), Giuseppe Mercurio (a)

(a) *Università degli Studi di Cagliari - Dipartimento di Scienze Mediche "M. Aresu"*, (b) *Università degli Studi di Cagliari - Dipartimento di Sanità pubblica, medicina clinica e molecolare*

Introduzione: Negli ultimi anni, la concezione di malattia di Parkinson (MP) come disturbo quasi unicamente motorio si è andata via via disgregando. I sintomi di tipo non motorio e, tra questi, i sintomi di disautonomia cardiovascolare, infatti, costituiscono un evento comune in pazienti affetti da MP in grado di condizionare negativamente la disabilità e la qualità di vita del paziente parkinsoniano. In tale contesto, la scoperta di mutazioni del gene LRRK2, propone nuovi ed interessanti scenari su una migliore definizione diagnostica sia dei sintomi motori che non motori della MP.

Obiettivo: Valutare il balance autonomico e la dinamica funzionale cardiaca in pazienti affetti da parkinsonismo associato a mutazioni LRRK2 ed in pazienti parkinsoniani senza evidenza di tali mutazioni mediante approccio di tipo combinato effettuato con l'utilizzo di uno studio della HRV e con successiva valutazione ecocardiografica da stress. A tal fine, i due gruppi pazienti sono stati adeguatamente confrontati con un gruppo di controllo sano.

Materiali e Metodi: Sono stati inclusi nello studio pazienti affetti da MP con mutazioni genetiche del gene LRRK2 che un campione di pazienti affetti da MP senza mutazioni del gene LRRK2, adeguatamente bilanciati per età, sesso e terapia farmacologica antiparkinsoniana.

La valutazione motoria è stata condotta con la scala di Hoehn and Yahr e con la UPDRS.

La valutazione del balance autonomico è stata condotta mediante metodica HRV e valutazione della funzione cardiaca con Ecocardiogramma standard, Speckle Tracking e Tissue doppler imaging, in condizioni basali e con esame Ecocardiografico da sforzo su lettoergometro.

Risultati: Sono stati inclusi nello studio 8 pazienti affetti da MP con mutazioni del gene LRRK2, 16 pazienti affetti da MP senza mutazioni del gene LRRK2, nonché 8 soggetti di controllo. L'età media all'osservazione era bilanciata nei tre gruppi (64,6±11,4 anni). La durata media di malattia era pari a

8,2±5,4 anni nel gruppo LRRK2+ e di 8,1±5,4 anni nel gruppo LRRK2-. L'analisi dell'HRV ha evidenziato un'alterazione del balance simpato-vagale, espresso dalla riduzione del rapporto LF/HF sia nel gruppo dei pazienti LRRK2- che LRRK2+ rispetto ai controlli sani (2,24±0,78 e 2,23 ± 0,51 vs 2,83±0,80; p<0,01). All'ecocardiografia da sforzo, le valutazioni effettuate al basale, ai 25 watt ed al picco hanno mostrato in tutti e tre i gruppi un progressivo incremento, statisticamente significativo, dei valori di Strain rate (SR). il Delta misurato al picco (rispetto ai valori basali) è stato significativamente minore sia nel gruppo dei pazienti LRRK2- che LRRK2+ rispetto a quello dei controlli (Δ SR 0,29 ± 0,16 e 0,30 ± 0,18 Vs 0,49 ± 0,16; p<0,05). Tale variazione ha mostrato una correlazione diretta con il rapporto LF/HF nel solo gruppo dei pazienti con parkinsonismo genetico LRRK2 (r=0,75; p<0,05)

Conclusioni: Il nostro studio evidenzia una chiara distinzione tra differenti popolazioni di soggetti parkinsoniani con o senza mutazioni del gene LRRK2, con una netta differenziazione tra questi due gruppi di pazienti parkinsoniani, anche in relazione ad una popolazione di controllo.

O124

PRKAG2 Syndrome: behind Hypertrophic Cardiomyopathy

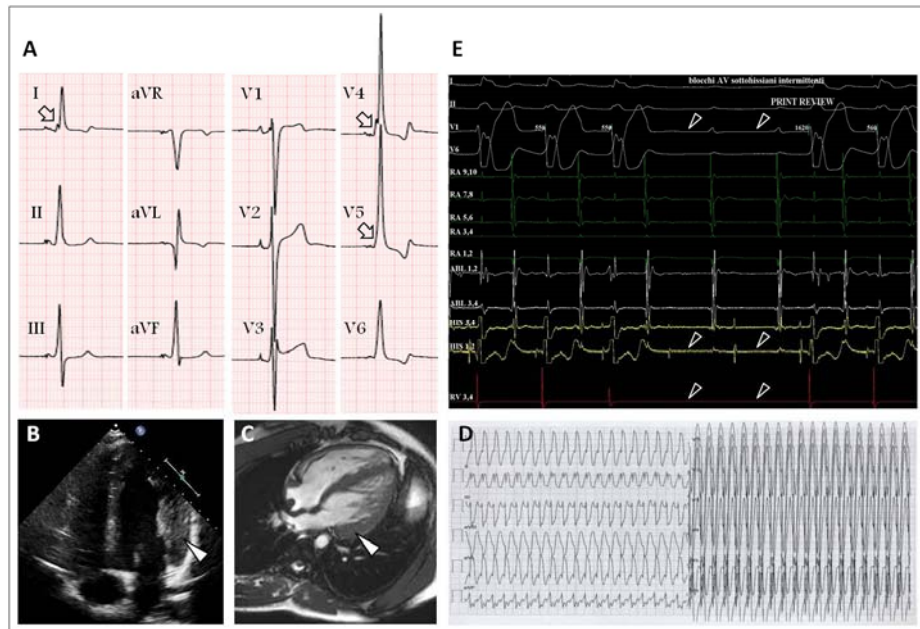
Francesca Brun (a), Andrea Giuseppe Porto (a), Enrico Fabris (a), Pasquale Losurdo (a), Laura Vitali Serdoz (a), Massimo Zecchin (a), Giovanni Maria Severini (b), Luisa Mestroni (c), Antonio Di Chiara (d), Gianfranco Sinagra (a)

(a) Dip. Cardiovascolare Azienda Ospedaliero Universitaria, Trieste – Italy, (b) IRCCS materno infantile Burlo Garofolo, Trieste – Italy, (c) University of Colorado, Cardiovascular Institute, Aurora - United States, (d) UO Cardiologia Ospedale S. Antonio Abate di Tolmezzo, Udine - Italy

A 17-year-old man was referred for family screening because of his father's unexplained left ventricular hypertrophy (LVH) and pacemaker (PM) implantation at the age of 35 for sick sinus syndrome.

On presentation he was asymptomatic but with a history of recurrent palpitations.

His electrocardiogram (ECG) showed sinus rhythm (SR), LVH and ventricular pre-excitation (VPE), (A). Echocardiography demonstrated mild asymmetrical LVH with postero-lateral distribution (B). All other findings were unremarkable. Cardiac magnetic resonance (C) confirmed asymmetric LVH



(maximal wall thickness 13 mm). Few weeks later the patient presented to the emergency department with sudden onset of palpitations. ECG showed a supraventricular tachycardia with aberrant conduction (D). Considering his symptoms associated with high suspicion of pre-excitation, the patient underwent electrophysiology study with successful ablation of a postero-septal accessory pathway. Before the procedure an intermittent third degree atrio-ventricular block was observed (E), and PM was consequently implanted. Genetic analysis revealed no sarcomeric gene mutations and identified a missense mutation in the protein kinase, AMP-activated, gamma-2 (PRKAG2) gene leading to an Arg302Glu substitution.

PRKAG2 disease is an autosomal dominant and fully penetrant syndrome characterized by a wide early-onset clinical spectrum encompassing LVH, VPE, supra-ventricular and ventricular arrhythmias, advanced heart blocks, heart failure and sudden cardiac death (SCD).

Given its numerous severe consequences, a prompt management is indispensable: PM implantation in patients with cardiac syncope even in the absence of clear chronotropic incompetence or early ICD implantation in those patients showing high risk indicators for SCD could be significantly beneficial. PRKAG2 expression can considerably vary in relation to the mutation site. A genotype-phenotype linking could help to better visualize the clinical scenario of each mutation and to make a management tailored for every patient, including those without current clinical abnormalities.

Finally, genetic testing represents an essential tool for diagnosis and it can often have implication in genetic counseling as well.

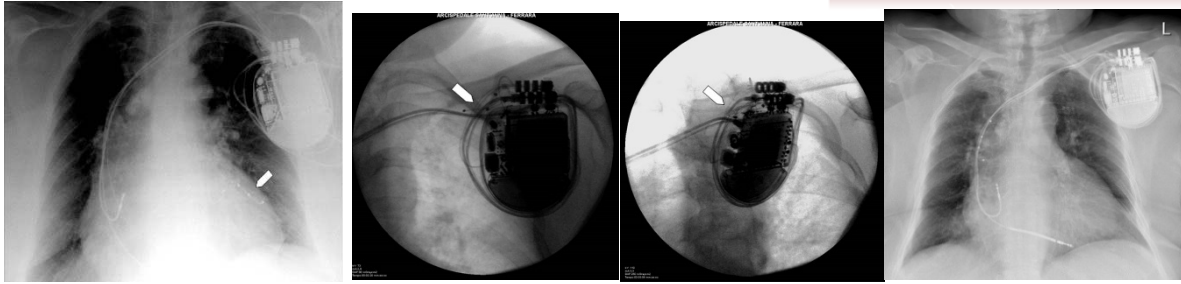
O125

Catetere ventricolare sinistro migrante: un caso di sindrome di Reel

Michele Malagù (a), Lina Marcantoni (a), Stefano Zicchino (a), Giuseppe Sammarco (a), Tiziano Toselli (a), Claudio Pratola (a), Matteo Bertini (a)

(a) Università degli Studi di Ferrara, UO di Cardiologia

Una donna di 70 anni affetta da cardiomiopatia dilatativa non ischemica in classe funzionale NYHA III con severa disfunzione sistolica (frazione di eiezione < 30%) e blocco di branca sinistra viene sottoposta a terapia di resincronizzazione cardiaca (CRT-D). La radiografia del torace del giorno successivo all'impianto mostra i tre elettrocateri, atriale destro, ventricolare destro e ventricolare sinistro (quadripolare), in posizione corretta (fig. 1). Subito dopo la dimissione, la paziente migliora clinicamente e la classe funzionale passa da NYHA III a NYHA I. Quattro mesi dopo l'impianto di CRT-D la paziente inizia a lamentare di nuovo astenia e discomfort, viene riscontrato malfunzionamento del catetere ventricolare sinistro con stimolazione diaframmatica per cui il catetere viene disattivato. Un anno dopo l'impianto, al controllo routinario del defibrillatore, vengono riscontrati: assenza di cattura ventricolare sinistra ma non stimolazione diaframmatica, trend della soglia ventricolare destra in aumento, elevata impedenza di shock (> 150 Ohm); clinicamente la classe NYHA è tornata III. Al controllo fluoroscopico viene riscontrata retrazione del catetere ventricolare sinistro, che appare completamente avvolto nella tasca pettorale; i cateteri atriale e ventricolare destro risultano in posizione corretta ma sottoposti a evidente trazione (fig. 2 e fig. 3). Un Rx-torace risalente a cinque mesi prima (sette mesi dopo l'impianto), eseguito in occasione di trauma toracico con infrazione costale, mostra il catetere ventricolare sinistro dislocato ma non completamente arrotolato, con l'estremità distale in vena cava superiore (fig. 4). Si procede pertanto a impianto di tre nuovi elettrocateri, estrazione dei precedenti e fissaggio del dispositivo alla fascia muscolare. Dopo il re-impianto la paziente non lamenta più sintomi e la classe funzionale torna NYHA I. Al follow-up di 5 mesi persiste benessere clinico e buon funzionamento del dispositivo con ottimi parametri di pacing, sensing, impedenza e impedenza di shock. Abbiamo ipotizzato che la paziente fosse affetta da sindrome di Twiddler, la quale avesse determinato dislocazione e retrazione del catetere ventricolare sinistro e iniziale malfunzionamento dei cateteri atriale e ventricolare destro a causa di un'eccessiva trazione. La sindrome di Twiddler è un'entità clinica dovuta alla retrazione di uno o più elettrocateri per rotazione di un pacemaker/defibrillatore sul suo asse lungo, spontanea o dovuta a manipolazione ripetuta da parte del paziente, all'interno della tasca, con conseguente malfunzionamento del device e relativa sintomatologia. In questo caso particolare la rotazione del dispositivo è avvenuta lungo l'asse trasverso, per cui la diagnosi corretta è sindrome di Reel. La sindrome Reel è una forma di Twiddler in cui la rotazione del device avviene lungo l'asse trasverso. Questo è il primo caso di nostra conoscenza in cui è documentato uno stato di retrazione intermedia di un catetere, a dimostrazione del fatto che il completo arrotolamento si sviluppa nell'arco di un lungo periodo di tempo.



O126

Effetti della stimolazione bicamerale closed loop in pazienti affetti da sincope vasovagale cardioinibitoria: studio cross-over, prospettico, randomizzato, in singolo cieco

Vincenzo Russo (a), Anna Rago (a), Andrea Antonio Papa (a), Federica Di Meo (a), Valerio Giordano (a), Anna Cristiano (a), Paolo Golino (b), Raffaele Calabrò (a), Gerardo Nigro (a), Maria Giovanna Russo (a)

(a) Dipartimento di scienze cardio-toraciche e respiratorie, Seconda Università di Napoli - AORN Monaldi, (b) Dipartimento di scienze cardio-toraciche e respiratorie. Seconda Università di Napoli - AORN Caserta.

Introduzione: La stimolazione Closed Loop (CLS) estrapola le informazioni che consentono di regolare la frequenza cardiaca dalla misurazione delle variazioni dell'impedenza intracardiaca, che avvengono durante la fase sistolica ventricolare destra. Il ruolo che l'algoritmo CLS svolge nella prevenzione della sincope ricorrente è ancora oggi poco chiaro. Obiettivo del nostro studio prospettico, randomizzato, in doppio cieco, cross-over è stato valutare l'effetto della stimolazione bicamerale closed-loop nella prevenzione degli episodi sincopali in pazienti affetti da sincope vasovagale cardioinibitoria durante un follow-up di 36 mesi.

Materiali e Metodi: Abbiamo arruolato 50 pazienti (età $49,3 \pm 6,4$ anni, 35 maschi) affetti da sincope vasovagale tilt indotta di tipo cardioinibitoria, refrattaria a terapia convenzionale, e sottoposti ad impianto di pacemaker bicamerale. Ad un mese dall'impianto i pazienti sono stati randomizzati, secondo un disegno di cross over, all'attivazione dell'algoritmo CLS ON oppure OFF, ognuno per un periodo di 18 mesi. Di ciascun paziente sono stati raccolti nel corso del follow-up il numero di episodi sincopali e presincopali.

Risultati: Durante la fase CLS ON solo un paziente (2%) presentava recidiva sincopale; 4 pazienti (8%) riferivano sintomatologia presincopale di media intensità. Durante la fase CLS OFF 8 pazienti (16%) presentavano recidiva sincopale; 18 pazienti (27,8%) riferivano solo sintomatologia presincopale. Il numero di episodi sincopali durante la fase CLS ON era inferiore rispetto a quello durante la fase CLS OFF ($n: 2$ vs 15 ; $P = 0,007$), così come quello degli episodi presincopali ($3 \pm 2,1$ vs $10 \pm 1,8$ min; $P = 0,02$). La durata media degli episodi presincopali durante la fase CLS On era più breve rispetto a quella degli episodi registrati durante la fase CLS OFF ($3 \pm 2,1$ vs $10 \pm 1,8$ min; $P: 0,02$). I parametri degli elettrocatereteri restavano stabili nel tempo.

Conclusioni: I risultati del nostro studio prospettico, randomizzato, in doppio cieco, cross-over con follow-up di 36 mesi hanno dimostrato che la stimolazione bicamerale con algoritmo CLS è efficace nel prevenire gli episodi sincopali e nel ridurre la durata della sintomatologia presincopale in pazienti con sincopi ricorrenti e risposta cardioinibitoria al tilt test.

O127

SWALLOW SYNCOPE: a case-report

Domenico Grieco (a), Danilo Ricciardi (a), Vito Calabrese (a), Annunziata Nusca (a), Flavio Marullo (a), Giacomo Di Giovanni (a), Germano Di Sciascio (a)

(a) Dipartimento di Scienze Cardiovascolari, Policlinico Universitario Campus Bio-Medico

Case Report: Un uomo di 60 anni veniva riferito al reparto di cardiologia per multipli episodi sincopali, che si verificavano immediatamente dopo aver bevuto bevande gassate. Questi episodi erano preceduti da sensazione di “testa vuota” e vertigini, Il paziente non assumeva farmaci che potessero ridurre la frequenza cardiaca o ritardare la conduzione cardiaca. Il monitoraggio elettrocardiografico durante massaggio del seno carotideo mostrava una bradicardia sinusale, senza pause significative, e fasi di ritmo atriale ectopico. Dopo aver effettuato un test provocativo chiamato “Pepsi challenge” (bere bibite gassate) la striscia elettrocardiografica mostrava un blocco seno-atriale con ritmo di scappamento giunzionale ad una frequenza di 50 battiti per minuto. Veniva registrata, inoltre, attraverso monitoraggio Holter, una prolungata pausa sinusale (3.09 sec) durante l’orario della colazione (Fig. 1). A questo punto, venivano intraprese ulteriori indagini, per identificare qualunque malattia sottostante potesse spiegare questi episodi. L’ecocardiogramma transtoracico escludeva possibili anomalie strutturali cardiache. Anche l’esofago era stato studiato, attraverso un esofagogramma con bario ed una esofago-gastro-duodenoscopia. Il paziente non aveva stenosi esofagee, diverticoli o ernie iatali e il flusso medio di bario attraverso lo stomaco era normale. Pertanto si concludeva, in assenza di qualunque altra patologia sottostante, per sincope da deglutizione, e il paziente veniva sottoposto ad impianto di pacemaker bicamerale, in assenza di sintomi spontanei o ripetendo i test provocativi al follow-up a 6 mesi.

Conclusioni: La sincope da deglutizione rappresenta solo una minoranza delle sincopi neuro-mediate. Anche se la fisiopatologia di questa sindrome è complessa e tuttora non molto chiara, la diagnosi, di solito, non è difficile ma impegnativa allo stesso tempo. Vari tipi di aritmia possono essere responsabili degli episodi sincopali, e malattie esofagee, cardiache, autonomiche o neurologiche si possono talvolta associare. Il problema può essere risolto cambiando abitudini alimentari o, se persistente, con l’impianto di un pacemaker permanente.



ASSESSMENT VALVULOPATIA AORTICA

O128

Clinical outcomes of a large cohort of patients with low-gradient aortic stenosis despite preserved left ventricular ejection fraction

Marco Morosin (a), Enrico Fabris (a), Michele Moretti (a), Marco Merlo (a), Bruno Pinamonti (a), Giulia Barbati (a), Aniello Pappalardo (a), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, "Ospedali Riuniti" and University of Trieste, Italy*

Purpose: Paradoxical low flow low gradient (PLFLG) aortic stenosis (AS) with preserved left ventricular ejection fraction (LVEF) is a new entity of severe AS defined by aortic valve area (AVA) $< 1.0 \text{ cm}^2$ or an indexed AVAi $\leq 0.6 \text{ cm}^2/\text{m}^2$ in the presence of a mean pressure gradient (ΔPm) $< 40 \text{ mmHg}$ despite a normal LVEF ($> 50\%$). Therapeutic management of patients with PLFLG AS is a matter of controversy. The discordance between a severe AVA and low gradient raises uncertainty with regard to indication for surgical intervention often leading to undertreatment despite a severe AVA. We retrospectively analyzed clinical and echocardiographic data of a large cohort of PLFLG AS patients in order to better understand clinical outcome and prognostic factors.

Methods: We retrospectively analyzed our clinical and echocardiographic database from 2005 to 2010. Inclusion criteria were: AVA $< 1.0 \text{ cm}^2$ or indexed AVAi $\leq 0.6 \text{ cm}^2/\text{m}^2$, $\Delta\text{Pm} \leq 30 \text{ mmHg}$ and LVEF $\geq 55\%$. We excluded patients in whom LVEF could not be measured quantitatively because of inadequate quality images, patients previously operated of aortic valve replacement (AVR) and patients with severe mitral regurgitation.

Results: Study population counted 170 patients. Mean patients age was 78 (1°-3° interquartile range 69 - 83) years, 65.1% females, the AVA was 0.88 (0.8 – 0.93) cm^2 , AVAi was 0.54 cm^2/m^2 , ΔPm 22 (19–26) mmHg, mean LVEF of 66 (62 – 71) % and AVR was performed in 27.1% of patients. During follow up 32% of patients died. Patients that died were older (76[69-83] vs 81[74-85] years, $p=0.05$), more frequently female (60 vs 75.9%, $p=0.04$), with a higher prevalence of atrial fibrillation (AF) (17.1 vs 32.7%, $p=0.01$) a wider left atrial area (25[19.5-30]-27.5[23-36] cm^2 $p=0.014$) and a lower AVR rate (35.7 vs 9.1%, $p<0.001$). On multivariable analysis, the predictive factors independently associated with all-cause mortality were: AVR (HR = 0.22, 95% CI 0.08 – 0.63, $p = 0.005$), NYHA Functional Class III – IV (HR = 2.20, 95 % CI 1.07 – 4.55, $p = 0.033$) and AF (HR = 1.99, 95 % CI 1.09 – 3.68, $p = 0.026$). The estimated long-term prognosis of patients in NYHA III – IV and AF treated with AVR was similar to those patients in NYHA I-II and sinus rhythm without AVR.

Conclusions: In our population of patients with PLFLG AS despite preserved LVEF, AVR was strongly correlated to a better prognosis, in particular in patients with AF and heart failure NYHA III-IV.

O129

Prevalence and characteristics of the inconsistent grading issue in aortic stenosis

Corinna Bergamini (a), Giorgio Golia (a), Matteo Pernigo (a), Giulia Vinco (a), Tatiana Zanuso (a), Corrado Vassanelli (a)

(a) *D.U. Cardiologia, Dipartimento di Medicina, A.O.U.I., Università degli Studi di Verona*

Background: Criteria for grading aortic stenosis (AS) in patients with normal systolic left ventricular function are frequently inconsistent and a cluster of patients with severe low gradient AS (LGAS) despite preserved ejection fraction (EF) has recently been identified. Aim of this study was to evaluate the prevalence of the inconsistent grading issue between the parameters used to define AS severity and define echocardiographic characteristics of patients presenting with such discrepancy.

Methods: We retrospectively analysed 534 echocardiographic examinations performed between January 2006 and June 2012 and relative to 418 patients by reviewing the database of our Division. Clinical and full echocardiographic data were collected. The relationship between aortic valve area index (AVAi) and mean gradient (MG) was plotted.

Results: 143 (27 %) exams showed inconsistent grading AS defined as LGAS and presented significantly lower stroke volume (SV; 65 ± 16 ml/m² vs 70 ± 17 ml/m²; $p=0.006$) and lower ejection fraction (EF; 55.1 ± 16.9 % vs 59.4 ± 12.4 %; $p=0.0075$) compared to exams with high gradient AS (HGAS). 396 (74%) examinations showed normal EF and among these 23% were LGAS. When matched according to AVAi values, LGAS showed significantly lower SV (68 ± 16 ml vs 75 ± 17 ml; $p=0.046$) despite a higher EF (67.8 ± 7.2 % vs 64.4 ± 7.7 % $p=0.015$) compared to HGAS. 46 cases with normal EF (12 %) presented low flow (LF: SVI ≤ 35 ml/m²): 22 of these had LF-LGAS and showed higher AVAi compared to LF-HGAS (0.44 ± 0.08 cm²/mq² vs 0.32 ± 0.05 cm²/mq²; $p<0.0001$). Cases in LF-LGAS subgroup represented 25% of all examinations with LGAS and compared to the subgroup of cases with LGAS and normal flow (NF: SVI > 35 ml/m²) showed significantly lower MG (28 ± 6 mmHg vs 32 ± 4 mmHg, $p=0.0009$) and AVAi (0.44 ± 0.08 cm²/mq² vs 0.55 ± 0.06 cm²/mq², $p<0.00001$), higher valvulo-aortic impedance with slightly higher left ventricular mass and relative wall thickness.

Conclusion: Inconsistent grading of AS severity (LGAS) in patients with preserved EF is frequent and on the basis of SV values different subgroups can be identified. Such discrepancy in criteria for grading AS is, in fact, only at times explained by the presence of low flow. Further studies evaluating outcome of different subgroups of patients with LGAS are needed, also to better identify echocardiographic prognostic predictors.

O130

“Obesity paradox” e stenosi aortica severa sintomatica. Associazione inversa tra indice di massa corporea e mortalità indipendentemente dalla severità della malattia cardiaca e comorbidità.

Andrea Rossi (a), Stefano Nistri (b), Gianni Cioffi (d), Giacomo Faden (c), Federica Guidetti (c), Pompilio Faggiano (c)

(a) Sezione di Cardiologia, Dipartimento di Medicina, Università di Verona, (b) Servizio di Cardiologia, CMSR Veneto Medica, Altavilla Vicentina, (c) Unità di Cardiologia, Spedali Civili, Brescia, (d) Dipartimento di Cardiologia, Casa di Cura Villa Bianca, Trento

In diverse patologie cardiovascolari ad un aumento dell' indice di massa corporea (BMI) si associa una paradossale riduzione della mortalità (obesity paradox). Non è noto se questo fenomeno sia presente anche nei pazienti con valvulopatia. Obiettivo dello studio è di valutare l' interazione di BMI con mortalità in pazienti con stenosi aortica severa sintomatica.

Metodi: pazienti consecutivi con stenosi aortica severa sintomatica sono stati inclusi. BMI è stato definito come il rapporto tra il peso e il quadrato dell' altezza. Le variabili cliniche considerate sono: età, sesso, classe NYHA. Le variabili ecocardiografiche: area valvolare aortica (AVA), gradiente medio (GM), massa (LVM) e frazione di eiezione (FE) ventricolare e pressione sistolica polmonare (PAPs). Le comorbidità considerate: insufficienza renale (creatinina e clearance creatinina Cockroff [CLCR]), anemia (livelli di emoglobina), broncopneumopatia ostruttiva (BPCO) (anamnestica e/o uso di broncodilatatori), pregresse rivascolarizzazioni miocardiche percutanee o chirurgiche, vasculopatia arti inferiori, aneurisma aorta addominale (AAA), precedente TIA/ictus, neoplasia precedenti o in atto. End point clinico dello studio è stata considerata la mortalità per tutte le cause.

Risultati: 345 pazienti (età media 78 ± 10 ; 60% maschi) hanno formato la popolazione di studio. AVA media era $0,7 \pm 0,2$ cmq e GM 53 ± 16 mmHg. 250 pazienti sono stati sottoposti a intervento chirurgico/percutaneo, 95 pazienti sono stato trattati con terapia medica e/o valvuloplastica. All' analisi univariata di Cox, BMI è risultato fortemente e inversamente associato alla mortalità (HR 0,90 95% IC 0,87 0,95; $p<0.0001$). Altre variabili significativamente associate alla mortalità erano:

SIC | *Indice Autori*

età (HR 1,09 95% IC 1,06 1,1; $p < 0,0001$), NYHA (HR 2,2 95% IC 1,5 3,0; $p < 0,0001$), CLCR (HR 0,97 95% IC 0,95 0,98; $p < 0,0001$), neoplasie in atto (HR 1,7 95% IC 1,5 2,3; $p = 0,002$), BPCO (HR 1,8 95% IC 1,2 2,8; $p = 0,008$), AAA (HR 1,2 95% IC 1,1 4,1, $p = 0,04$), euroscore (HR 1,02 95% IC 1,01 1,03; $p < 0,0001$), AVA (HR 0,1 95% IC 0,03 0,39; $p = 0,0007$), PAPs (HR 1,02 95% IC 1,01 1,04; $p = 0,0008$), EF (HR 0,97 95% IC 0,95 0,98; $p < 0,0001$). Infine l' intervento chirurgico/percutaneo si associava ad un marcato miglioramento della sopravvivenza (HR 0,16 95% IC 0,1 0,25; $p < 0,0001$). Nel modello di analisi multivariata costituito inserendo tutte le variabili significative all' analisi univariata, il BMI rimaneva significativamente associato alla mortalità (HR 0,94 95% IC 0,89 0,98, $p = 0,02$). L' associazione tra BMI e mortalità non si modificava (HR 0,94 95% IC 0,89 0,99; $p = 0,04$) nemmeno quando nel modello era inserito anche il tipo di trattamento terapeutico. Infine, l' associazione inversa tra BMI e mortalità si evidenziava sia nei pazienti sottoposti ad intervento chirurgico (HR 0,88 95 IC 0,80 0,97; $p = 0,0009$) sia nei pazienti trattati in modo conservativo (HR 0,92 95% IC 0,86 0,92; $p = 0,02$).

Conclusioni: Anche nei pazienti con stenosi aortica severa sintomatica si osserva una associazione inversa tra BMI e mortalità indipendentemente dalla severità clinica ed emodinamica della malattia ed indipendentemente dalle numerosi comorbidità associate alla valvulopatia.

O131

Eco-doppler and invasive evaluation of valvulo-arterial impedance in patients with severe aortic stenosis

Corinna Bergamini (a), Giorgio Golia (a), Matteo Pernigo (a), Aldo Milano (b), Giuseppe Faggian (b), Corrado Vassanelli (a)

(a) D.U. Cardiologia, Dipartimento di Medicina, A.O.U.I., Università degli Studi di Verona, (b) D.U. Cardiochirurgia, A.O.U.I., Università degli Studi di Verona

Background: eco-Doppler mean (MG) and peak (PG) gradient and valve area are used as index to the quantitative evaluation of aortic valve stenosis (AS). However, these parameters are sometimes inadequate to a correct identification of severe AS and new parameters have been proposed such as valvulo-arterial impedance (Zva), an index of global left ventricular afterload, comprising aortic gradient and arterial impedance and relating to prognosis in patients with AS. Aim of the study was to determine the correlation between Doppler and invasive estimation of global left ventricular afterload in patients with severe AS.

Methods: Valvulo-arterial impedance (Zva) was estimated using Doppler MG and PG both as absolute values taking into account pressure recovery (MGnet and PGnet) in 48 patients with severe AS. This parameter was then related to the invasive parameter of global left ventricular load (intraventricular peak systolic pressure, Zva-I).

Results: Doppler MG showed 12 mmHg mean overestimation in respect of MGnet. Pressure recovery was inversely related to aortic diameter. Zva-MG and Zva-MGnet didn't differ both within patients with small aorta and within patients with large aorta. A strict relationship was found between Zva-MG and Zva-MGnet and this was very close to the line of identity presenting a very small overestimation of Zva-MG (0.07 mmHg/ml). Both Zva-MG and Zva-MGnet were closely related to Zva-I. However, the strongest correlation to Zva-I was found using in its calculation noninvasive Zva-PGnet values.

Conclusions: Our results strengthens that Zva reflects the global systolic load of the left ventricle in patients with severe AS, although pressure recovery is neglected in its calculation. The better estimation of left ventricular pressure is obtained using Zva-PGnet in its calculation.

O132**Assessing exercise performance by combining cardiopulmonary test to stress echo in aortic stenosis**

Francesco Bandera (a), Greta Generati (a), Marta Pellegrino (a), Eleonora Alfonzetti (a), Valeria Donghi (a), Serenella Castelvechio (b), Lorenzo Menicanti (b), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese, (b) Cardiosurgery Unit, IRCCS Policlinico San Donato Milanese

Purpose: Aortic stenosis (AS) is primarily characterized by increased afterload and functional disability. Exercise intolerance may incur even without overt symptoms. Cardiopulmonary exercise test (CPET) provides pathophysiological insights on mechanisms affecting exercise intolerance. Nevertheless, it has never been used in the past for assessing this specific disorder. We hypothesized that a flattening in the incremental oxygen consumption (ΔVO_2) over work rate (ΔWR) may well reflect the degree of hemodynamic and cardiac output impairment.

Methods and Results: 16 pts with mod-to-severe AS (age 75 ± 7 ; male 44%; asymptomatic 56%; EF $62\pm 11\%$) underwent a maximal CPET combined with Echo. We considered 2 subgroups according to the occurrence of $\Delta\text{VO}_2/\Delta\text{WR}$ flattening, defined as a change $>20\%$ of the slope during exercise. The table shows the main results. Pts who presented $\Delta\text{VO}_2/\Delta\text{WR}$ flattening had higher transaortic gradients (83% mean grad >40 mmHg), more severe mitral regurgitation, worse ventilation efficiency, a trend toward elevated PAPS, reduced peak VO_2 and dilated left atrium.

| | NO Flattening (n 10) | | Flattening (n 6) | | T-test |
|------------------------------------|----------------------|---------------|------------------|---------------|--------|
| | Rest | Peak exercise | Rest | Peak exercise | |
| LVEDVi, ml | 47.3±12 | 53.2±9 | 48.3±10.3 | 49.8±11 | NS |
| Left Atrium Vol, ml | 60.9±30 | 71.7±33 | 80.3±31 | 84.2±27 | NS |
| Mitral Regurg, 4 degree scale | 0.2±0.4 | 0.2±0.4 | 1.5±0.8 | 1.7±1 | 0.005 |
| AoGrad max, mmHg | 60±17.3 | 81±27.6 | 76±16.6 | 97±28.1 | 0.05 |
| AoGrad med, mmHg | 39±13.3 | 51±17.5 | 48±11.9 | 58±16.8 | 0.05 |
| TAPSE, mm | 23.8±3.8 | 24.3±5.9 | 23.5±2 | 24±4.6 | NS |
| PASP, mmHg | 40.1±10.9 | 64.1±13.3 | 42.8±6.6 | 72.5±16.2 | NS |
| E/e' | 16.5±4.8 | 11.6±2.9 | 18.4±5 | 24.1±11.3 | 0.018 |
| Watt | | 72±34 | | 54±12 | NS |
| Peak VO_2 , ml/kg/min | | 17.5±6 | | 14.1±1.4 | NS |
| VE/ VCO_2 slope | | 26.5±2.6 | | 32.1±7.9 | NS |
| VE/ VCO_2 slope >32 , % | | 0 | | 50 | 0.016 |
| O ₂ pulse, ml/beats | | 10.1±3.8 | | 7.8±3.6 | NS |

Conclusion: In AS, for similar symptomatic state, a flattened $\Delta\text{VO}_2/\Delta\text{WR}$ identifies highest aortic gradients and true cardiac limitation to exercise, associated with an increased prevalence of ventilatory inefficiency. Finding suggests the additive ability of CPET to better unmask AS phenotypes.

O133

Left ventricular function improvement and mass reduction after transcatheter aortic valve implantation

Anna Marchese (a), Patrizia Aruta (a), Vera Bottari (a), Emanuele Benvenuto (a), Giarratana Alessandra (a), Gulino Simona (a), Santonoceto Letizia (a), Di Landro Alessio (a), Mizzi Marilena (a), Marco Barbanti (a), Sebastiano Immè (a), Stefano Cannata (a), Martina Patanè (a), Wanda Deste (a), Carmelo Sgroi (a), Daniela Giannazzo (a), Corrado Tamburino (a)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania, Italy*, (b) *Excellence Through Newest Advances (ETNA) Foundation, Catania, Italy*

Purpose: Left ventricular (LV) hypertrophy is an adaptive process that leads to left ventricular mass (LVM) increase in aortic stenosis. Increased LVM has been identified as an independent risk factor for cardiovascular mortality and morbidity. Several studies have examined the regression of LVM after surgical aortic valve replacement (AVR), but few data are still available after transcatheter aortic valve implantation (TAVI). Our aim is to evaluate changes in left ventricular function and regression of LVM early after TAVI, comparing them to surgical results. We report our echocardiographic experience of the patients who underwent successful transcatheter aortic valve implantation at one month of follow-up.

Methods: 82 patients (mean age 81 ± 5 years) with contraindications to surgery (mean logistic Euroscore 22 ± 14) who underwent TAVI, were evaluated by 2D-echocardiography follow-up at 1 month after the procedure. Left ventricular function, left ventricular mass, transaortic pressure gradient, aortic valve area and aortic regurgitation were assessed. To allow comparisons to surgical experience we performed a bibliographic searches including 20 articles published between 2000 and 2012 about the outcome of surgical valve replacement in aortic stenosis patients.

Results: Pre-operative LVM was 318 ± 92.3 g. Pre-procedural aortic valve area was 0.59 ± 0.2 cm², transaortic peak pressure gradient and mean pressure gradient averaged 89 ± 26 mmHg and 56 ± 26 mmHg respectively. Ejection fraction was $52\% \pm 10\%$. After TAVI, aortic valve area significantly increased and both peak and mean transaortic pressure gradients decreased ($P < .0001$ and $P < .0001$, respectively). 2D-echocardiography showed a significant regression of LV mass (220 ± 87.6 g) with mild improvement of LV ejection fraction ($54 \pm 7.4\%$) only after one month. Preliminary comparison of these data with surgical experience shows that after surgery a significant ventricular mass regression occurs primarily within 6 months, while in our experience this regression was obtained within one months with a higher increase in ejection fraction.

Conclusions: Echocardiography at one month after TAVI shows a significant regression of LV mass with improvement of LV ejection fraction, while in surgical experience this regression was obtained within six months with a lower improvement of ejection fraction. These findings however are limited, therefore further investigation are needed to demonstrate their real prognostic impact.

O134

Percutaneous treatment of aortic coarctation: the value of physical echo stress in the follow up.

Gianpiero Gaio (a), Giuseppe Santoro (a), Giovanni Di Salvo (a), Emanuele Romeo (a), Fiorella Fratta (a), Ettore Campagnano (a), Marianna Carrozza (a), Alessandra Rea (a), Giovanbattista Capozzi (a), Maria Giovanna Russo (a)

(a) *Cardiologia Pediatrica, A.O. "Monaldi", 2nd University of Naples, Naples, Italy*

Background: An important functional parameter in the assessment of the effects of percutaneous repair of CoA is the maximal pressure gradient in the descending aorta with the presence of diastolic run off. Increasing of these parameters after exercise stress test is a clinical parameter that need to be

evaluate. Aim of the study was to evaluate the echocardiographic maximum gradient after physical stress as indicator of recoartaction in patients underwent to stent implantation.

Methods: In the last 2 years 30 patients underwent to stent implantation for primary aortic coartaction. All of them were evaluated at 6 months from the percutaneous procedure with echocardiography at rest and after physical stress. Of these, 10/30 (33%. (8 males, 2 females; mean age 21.8+ 5.4 years) showed a significant increase of the maximum gradient. Therefore in this subgroup a second percutaneous procedure was indicated. The stent implanted at the first procedure were: 3, 3, 4.

Echocardiographic maximum gradient in the descending aorta at rest and after physical stress were evaluated and then compared with cathlab data.

Results: At the rest echo the mean value of maximal pressure gradient was 45mmHg +/- 4 mm Hg without diastolic run off while at the end of the physical stress was 83mmHg +/- 13mmHg (P <0.02 versus rest) with diastolic run off. In the cath lab we found a mean peak to peak gradient of 25 mmHg +/- 5mmHg . In 5/10 patients (50%) we performed a stent redilatation.

Conclusions: Physical stress echocardiography could be a predictive exam for recoartation even if in about 50% of the cases it over-estimate the gradient.

O135

Early variation of diastolic and systolic function after tavi, the importance of myocardial performance index

Patrizia Aruta (a), Anna Marchese (a), Vera Bottari (a), Emanuele Benvenuto (a), Gulino Simona (a), Di Landro Alessio (a), Marilena Mizzi (a), Letizia Santonoceto (a), Alessandra Giarratana (a), Sebastiano Immè (a), Marco Barbanti (a), Martina Patanè (a), Stefano Cannata (a), Wanda Deste (a), Carmelo Sgroi (a), Daniela Giannazzo (a), Corrado Tamburino (a, b)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania, Italy*, (b) *Excellence Through Newest Advances (ETNA) Foundation, Catania, Italy*

Aim: Transcatheter aortic valve implantation (TAVI) has emerged as an alternative to surgical aortic valve replacement for patients with severe symptomatic aortic valve stenosis and high surgical risk. This study aimed to evaluate the short-term effects of TAVI on left ventricular (LV) systolic and diastolic function.

Methods and results: Thirty-one patients with Severe Aortic stenosis (AS) were prospectively enrolled, it was examined them Left Ventricular (LV) diastolic and systolic function before, one and six months after TAVI.

About systolic function, LV Ejection Fraction (EF) improved only minimally (baseline/one month/six months 53 ± 12 vs $54,1 \pm 13,3$ vs $56,5 \pm 10$ %, p NS), instead there was an improvement of pulsed-wave tissue Doppler-derived S comparing baseline to six month ($5,23 \pm 2,32$ vs $6,6 \pm 2$ cm/sec, $p < 0,05$) and an earlier reduction of LV mass (baseline/one month $301,2 \pm 84$ vs 230 ± 97 gr, $p = 0,003$; Baseline/six months 301 ± 84 vs 183 ± 54 gr, $p < 0,0001$).

The standard indices of LV diastolic function remained unchanged, despite a slight decrease of Left atrial Volume index (Baseline/six months $49,2 \pm 14,6$ vs $42,8 \pm 16,8$ ml/mq, p NS). LV myocardial performance index (MPI) decreased early and significantly (baseline/ one month $0,63 \pm 0,12$ vs $0,5 \pm 0,14$, $p < 0,0001$).

Conclusion: Early after TAVI there is an improvement in LV systolic and diastolic function despite standard indices of LV function doesn't change.

ASPETTI PARTICOLARI DELL'ICD NELL'AUDIO

O136

Systematic Fluoroscopic and Electrical Assessment of ICD Patients Implanted with Silicone-polyurethane (Optim™) Coated Leads.

Alessandro Politano (a), Giovanni B Forleo (a), Germana Panattoni (a), Giulia Magliano (a), Maria Stella Riccardi (a), Fabiana Romeo (a), Fabio Ticconi (a), Domenico Sergi (a), Luca Santini (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia, Università degli Studi di Roma, Policlinico Tor Vergata*

Aims: Serious concerns have been recently raised about the reliability of the silicone–polyurethane copolymer (Optim™) lead insulation system. We sought to identify insulation defects and Optim-lead failures by systematic fluoroscopic and electrical assessment in a prospectively defined cohort of internal cardioverter-defibrillator (ICD) patients.

Methods: Between July 2007 and December 2011, 234 patients were implanted with 413 optim-coated leads as part of a ICD system at a single center. Fluoroscopic screening with high-resolution cine-fluoroscopy at 30 frames per second was offered to all patients. In addition, the electrical integrity of all implanted leads was assessed.

Results: Durata, Riata ST Optim and low-voltage Optim-leads were implanted in 199, 26 and 188 cases, respectively. During a total follow-up of 10,036 lead-months, there were 7 Optim-lead failures (defined as electrical malfunction resulting in lead replacement) and 31 deaths; no cases of electrical noises were encountered. The overall incidence of lead failure was 1.2 vs. 0.3 per 100 lead-years, for high- and low-voltage leads, respectively ($P=0.1$). Fluoroscopy screening took place from November 2012 to January 2013 and 151 patients agreed to participate. None of the 264 Optim leads analyzed were found to have fluoroscopically visible structural defects after an average of 31 months post-implant.

Conclusions: This study represents the first systematic screening of Optim-coated leads in a large unselected cohort of ICD patients. Over a 5-year period few lead failures were observed and normal fluoroscopic appearance was present in all patients.

O137

Aritmie sopraventricolari VS ventricolari in portatori di icd gestite con monitoraggio remoto

Stefano Zicchino (a), Giuseppe Sammarco (a), Lina Marcantoni (a), Matteo Bertini (a), Tiziano Toselli (a)

(A) *Azienda Ospedaliero-Universitaria S. Anna Ferrara*

Introduzione: oggi il monitoraggio remoto fa parte della quotidiana gestione dei pazienti portatori di dispositivi impiantabili. La possibilità di una gestione precoce degli episodi aritmici si è rivelata costo-efficace e fornisce grandi vantaggi sia ai medici che ai pazienti.

Scopo: scopo dello studio è valutare il diverso impatto che ha il monitoraggio remoto ha in pazienti portatori di defibrillatore impiantabile nella gestione delle aritmie ventricolari rispetto alle sopraventricolari.

Metodi: abbiamo confrontato una popolazione di 158 pazienti portatori di ICD (mono-bi-biv). 64 di questi erano seguiti con monitoraggio remoto in aggiunta a follow up ambulatoriali annuali, 94 pazienti erano seguiti solo ambulatorialmente ogni 6 mesi. Le 2 popolazioni sono risultate sovrapponibili senza differenze statisticamente significative per caratteristiche cliniche, indicazione all'impianto e tipo di dispositivo impiantato.

Risultati: dopo un follow up mediano di 33 mesi (RI 12-53 mesi) 67 pazienti (42.4% della popolazione in studio) hanno avuto episodi aritmici che hanno richiesto ospedalizzazione o erogazione di DC shock dall'ICD, senza differenza tra aritmie sopraventricolari e ventricolari, SIC | *Indice Autori*

rispettivamente 20.9%(33 pz) e 21.5%(34 pz). Nessuna differenza è emersa nell'incidenza delle aritmie anche analizzando separatamente le 2 popolazioni (monitoraggio remoto vs follow up esclusivamente ambulatoriale: P 0.843 per aritmie SV e P 0.557 per aritmie V). E' stato interessante notare che l'end point composito dello studio (necessità di ospedalizzazione e/o erogazione di shock) era significativamente minore nel gruppo di pazienti seguiti con sistemi di monitoraggio remoto solo se le aritmie sopraventricolari venivano analizzate separatamente (10.9% vs 28.7%; p=0.01). Nessuna differenza emergeva nell'end-point riguardo le aritmie ventricolari (18.1% vs 17.2%; p=1). All'analisi multivariata di Cox, infatti il monitoraggio remoto è risultato essere fattore protettivo indipendente per l'end point composito dello studio solo quando si analizzavano le aritmie sopraventricolari (HR 0.41; CI 95% 0.23-0.72).

Conclusioni: oltre la metà dei messaggi di allarme inviati dai sistemi di monitoraggio remoto sono relativi a fibrillazione atriale. La possibilità di un precoce intervento terapeutico, non solo farmacologico, su tale aritmia previene conseguenze cliniche che porterebbero il paziente al ricovero o all'errata diagnosi dall'ICD con erogazione di shock inappropriati. Lo stesso non si può ancora dire per le aritmie ventricolari. Erogazioni di shock ripetuti in pochi minuti, spesso su storm aritmici, destabilizzano clinicamente il paziente e necessariamente lo portano all'ospedalizzazione in tempi rapidi prima che il monitoraggio remoto possa permettere una valutazione gestionale dell'aritmia.



Fig.1 Storm aritmico con erogazione di multipli shock in pochi minuti

O138

First clinical experience with the new four-pole standard connector for high-voltage ICD leads. Early results of a multicenter comparison with conventional implant outcomes.

Germana Panattoni (a), Giovanni B Forleo (a), Valentina Schirripa (a), Karim Mahfouz (a), Valentina Minni (a), Chiara Ricagni (a), Domenico G Della Rocca (a), Lida P Papavasileiou (b), Giulia Magliano (a), Domenico Sergi (a), Luca Santini (a), Francesco Romeo (a)

(a) Cardiology Division, Tor Vergata University Hospital, Rome, Italy , (b) Electrophysiology, Pacemaker &ICD Unit, Hygeia Hospital, Athens, Greece

Purpose: A new four-pole connector system (DF-4) for transvenous high-voltage implantable cardioverter defibrillators (ICD) is currently available in clinical practice. However, no clinical data demonstrating the safety and effectiveness of this complex electromechanical design is available. This study aims to test the safety and effectiveness of this newly designed system compared to the conventional DF-1 leads.

Methods: During a 3-years period, 351 consecutive patients were implanted with DF-4 leads as part of an ICD or ICD-cardiac resynchronization therapy system. Patients were matched for age, sex and follow-up with 154 patients implanted with a standard DF-1 lead. The primary outcome of the study was defibrillation lead failure, defined as the need for lead removal or capping. Operative, electrical and safety data were obtained at implant and during postoperative follow-up.

Results: Implantation success rate in both groups was 100%. A trend towards shorter procedure time was observed in the DF-4 group but the difference did not reach statistical significance. Handling characteristics of the DF-4 leads were graded better than those of DF-1 models. During a total follow-up of 8130,5 lead-months, there were 8 ICD-lead failures (4 system erosion/infections and 4 electrical lead dysfunctions). The overall incidence of electrical lead failure was 0.43 vs. 0.97 per 100 lead-years, for DF-4 and DF-1 leads, respectively (P=0.2).

Conclusions. This multi-center experience provides strong evidence that the feasibility and safety of this novel technology compare favorably with those of the conventional DF-1 leads.

O139

Impatto dell'insufficienza renale sui benefici del defibrillatore impiantabile nello scompenso cardiaco: stimatori del filtrato glomerulare a confronto

Pietro Francia (a), Carmen Adduci (a), Massimo Caprinuzzi (a), Agnese Ricotta (a), Daria Santini (a), Lorenzo Semprini (a), Isabella Sensini (a), Alessandra Frattari (a), Cristina Balla (a), Massimo Volpe (a, b)

(a) *Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza Università di Roma, Italy*, (b) *I.R.C.C.S. Neuromed, Pozzilli (IS), Italy*

Background: L'insufficienza renale predice in modo efficace la mortalità nello scompenso cardiaco, ed è stato riportato che potrebbe associarsi a uno scarso beneficio clinico del defibrillatore impiantabile (ICD). Tuttavia, non è noto quali stimatori di filtrato glomerulare siano più efficaci nel predire il beneficio clinico dell'ICD.

Metodi: 186 pazienti consecutivi affetti da scompenso cardiaco con indicazione all'impianto di un ICD sono stati sottoposti a valutazione clinica, ECG, esami di laboratorio completi ed ecocardiogramma sia pre-impianto che al follow-up. La durata del follow-up è stata definita come il tempo intercorso tra l'impianto e il decesso, o la valutazione clinica più recente. I predittori di eventi sono stati determinati mediante analisi di regressione secondo Cox. Il filtrato glomerulare (GFR) è stato stimato secondo le formule di Cocroft-Gault (CG), MDRD, e CKD-EPI. I diversi stimatori del GFR sono stati confrontati in termini di potere prognostico.

Risultati: L'83% della popolazione era di sesso maschile (età media: 64±10 anni), con una prevalente eziologia ischemica dell'insufficienza cardiaca (n=105;56%). La classe NYHA riscontrata è stata II-III nell'80% dei pazienti. Al momento dell'impianto, la frazione di eiezione media era del 27±7%. Tutti i pazienti erano in terapia medica ottimizzata con beta-bloccanti (83%), ACE-i o antagonisti recettoriali dell'angiotensina (97%), diuretici (89%), spironolattone (54%) e amiodarone (20%). 71 pazienti (38%) erano affetti da insufficienza renale cronica da lieve a severa considerando un eGFR <60 ml/min secondo Cocroft-Gault.

Al termine di un follow-up medio di 36±22 mesi, 36 pazienti (19%) sono deceduti, di cui 26 per cause cardiovascolari. 55 pazienti (30%) hanno ricevuto almeno un intervento appropriato dell'ICD. In analisi univariata, il eGFR secondo CG (HR: 0.98; CI95%, 0.96-0.99; p=0.005) e CKD-EPI (HR: 0.98; CI95%, 0.96-0.99; p=0.01) predicevano la mortalità, mentre il eGFR secondo MDRD (HR: 0.99; CI95%, 0.98-1.02; p=0.11) non risultava predittore. L'insufficienza renale definita come eGFR <60 ml/min secondo CG si associava ad un aumento di 2.4 volte della mortalità, anche dopo correzione per sesso, età, classe NYHA e cardiopatia ischemica (HR 2.4; 95%CI, 1.1-5.2; p= 0.02). In analisi ROC, il filtrato secondo CG presentava tra i tre stimatori la maggior area sotto la curva (AUC 0.70; p= 0.02). Dei 36 pazienti deceduti, 23 (64%) non hanno mai ricevuto una terapia appropriata dell'ICD. Il eGFR secondo CG si è rivelato il miglior predittore di morte in assenza di un intervento appropriato dell'ICD (HR: 0.96; CI95%, 0.95-0.98; p=0.002).

Nel gruppo di pazienti deceduti, avendo ricevuto almeno un intervento appropriato dell'ICD, la sopravvivenza media è stata di 20±7 mesi nel gruppo con eGFR CG≥60 ml/min, e di soli 7±2 mesi nel gruppo con eGFR <60 ml/min (p<0.0001).

Conclusioni: I pazienti affetti da scompenso cardiaco e insufficienza renale di grado anche solo moderato, traggono un beneficio limitato in termini di aspettativa di vita dall'impianto dell'ICD. La formula di Cocroft-Gault rappresenta il miglior stimatore del filtrato glomerulare in grado di anticipare i benefici della protezione dalla morte improvvisa. Tali osservazioni, se confermate su scala più ampia, potrebbero contribuire ad una più appropriata selezione dei pazienti candidati all'impianto di ICD.

TERAPIA DELL'INSUFFICIENZA CARDIACA CRONICA

O140

Terapia infusiva continua rispetto alla terapia intermittente con furosemide nello scompenso cardiaco acuto: effetti a breve e lungo termine

Alberto Palazzuoli (a), Gaetano Ruocco (a), Marco Pellegrini (a), Matteo Beltrami (a), Beatrice Franci (a), Maria S Campagna (a), Ranuccio Nuti (a)

(a) Dipartimento di Medicina Interna, UOS Malattie Cardiovascolari Ospedale S Maria alle Scotte, Università di Siena

Background: La terapia infusiva con diuretici dell'ansa nell'ambito dello scompenso cardiaco è ancora oggi fondamentale ai fini di ridurre la congestione polmonare e la ritenzione idrica durante la fase acuta. Tuttavia non è ancora chiaro quale sia la modalità di infusione più idonea e il dosaggio ottimale. In teoria, la terapia continua dovrebbe comportare una diuresi più attiva evitando squilibri emodinamici a livello renale e il riassorbimento del sodio a livello del tubulo distale

Metodi: A tale scopo abbiamo comparato in una popolazione di pazienti affetti da scompenso cardiaco acuto la modalità di somministrazione intermittente rispetto ad una somministrazione continua misurando la funzione renale i livelli di BNP, l'escrezione media di urine, e la perdita di peso. Infine abbiamo analizzato la necessità di terapie addizionali nei 2 gruppi e l'end point di mortalità e re-ospedalizzazione in un follow-up di 6 mesi.

Risultati: I pazienti sono stati randomizzati in 2 gruppi: 43 hanno ricevuto una infusione continua (CIV) e 39 una infusione intermittente (IIV) di furosemide a dosaggio equivalente. Il gruppo CIV ha evidenziato una riduzione più significativa dei livelli di BNP (723 ± 497 vs. 822 ± 548 pg/ml $p=0.05$) e un incremento dell'output urinario (2295 ± 755 vs 2090 ± 421 ml $p<0.002$) rispetto al gruppo IIV. Abbiamo riscontrato un incremento dei valori di funzione renale dall'inizio rispetto al termine del trattamento nel gruppo con CIV rispetto al gruppo IIV sia per i valori di creatinina ($1,78 \pm 0,6$ vs. $1,34 \pm 0,3$ mg/dl $p<0,0001$), per il eGFR ($40,6 \pm 10,5$ vs. $50,4 \pm 11,4$ ml/min $p<0,01$) che per l'azotemia (100 ± 60 vs 69 ± 31 mg/dl $p<0,02$). I pazienti con CIV inoltre dimostravano un incremento di necessità di terapia addizionale (40% vs. 26%) e un allungamento del tempo medio di degenza ($14,3 \pm 5$ vs. $11,5 \pm 4,3$ $p<0,03$). Infine un incremento significativo di venti avversi in termini di mortalità e reospedalizzazione durante il periodo di followup è stato riscontrato nel gruppo con CIV ($p<0.001$)

Conclusioni: La terapia infusione continua appare più idonea nella riduzione dei livelli di BNP e nella attività diuretica rispetto alla terapia diuretica intermittente. A fronte di questi end points positivi, la terapia CIV si associa ad un aumento del peggioramento della funzione renale ed un aumento degli eventi avversi a distanza.

O141**Impatto prognostico della dose di diuretico in pazienti ambulatoriali clinicamente stabili affetti da insufficienza cardiaca**

Marco Triggiani (a), Laura Lupi (a), Silvia Suardi (a), Alessandra Manerba (a), Giuseppe Milesi (a), Nicola Berlinghieri (a), Elena Rocco (a), Arnaud Romeo Mbadjeu Hondjeu (a), Cristian Maiandi (a), Savina Nodari (a)

(a) Dipartimento Specialità Medico-Chirurgiche, Scienze Radiologiche, e Sanità Pubblica. U.O. Cardiologi

Background: I diuretici rappresentano un caposaldo nel trattamento dei pazienti (pts) con insufficienza cardiaca (IC) in quanto farmaci sintomatici per eccellenza, necessari per ridurre la stasi polmonare e periferica. Tuttavia poco si conosce sul significato prognostico dell'utilizzo di alte dosi giornaliere di diuretici (DDD) nei pts clinicamente stabili affetti da IC cronica.

Metodi: Abbiamo eseguito un'analisi retrospettiva dei dati clinici, laboratoristici ed ecocardiografici di pts affetti da IC cronica con disfunzione sistolica ventricolare sinistra ($FE% < 45%$) seguiti in follow-up presso il nostro Centro Ambulatoriale per lo Scompenso Cardiaco. Tutti i pts erano in terapia medica ottimizzata e in condizioni cliniche stabili (nessun evento né modifiche terapeutiche nei tre mesi precedenti). È stato considerato come end-point composito primario la mortalità o il ricovero per IC o cause cardiovascolari (CV) a un anno di follow-up. La correlazione con gli eventi è stata eseguita considerando la DDD sia come variabile continua che come variabile categorica (analisi per quartili). È stato inoltre calcolato il grado di congestione utilizzando il 'sodium retention score' (NaRS).

Risultati: In totale sono stati inclusi nell'analisi 528 pts (età media $66,9 \pm 13$ anni; 82% maschi) e l'endpoint composito si è verificato in 151 pts (28.6%). All'analisi multivariata il NaRS (OR 2.58; CI 1.52-4.39; $p < 0.001$), la FE% (OR 0.97; CI 0.94-0.99; $p = 0.029$) e la DDD (OR 1.002; CI 1.0005-1.004; $p = 0.011$) hanno mantenuto un valore prognostico indipendente. Le caratteristiche basali dei pazienti stratificati in base ai quartili di DDD sono riassunte nella Tab. 1. L'incidenza di eventi è risultata significativamente superiore nei pazienti che assumevano $DDD \geq 100$ mg/die. Solo nel sottogruppo di pts euvolemici ($NaRS < 3$), l'utilizzo di $DDD \geq 100$ mg/die ha mantenuto un significato prognostico indipendente (OR 1.94; CI 1.07-3.53; $p = 0.030$) e proporzionale alla DDD utilizzata (OR 2.64, CI 1.3-5.25, $p = 0.005$ per valori ≥ 150 mg/die e OR 3.36, CI 1.5-7.2; $p = 0.002$ per valori ≥ 200 mg/die).

Conclusioni: L'utilizzo di alte DDD in pazienti affetti da IC cronica e senza segni clinici di congestione sembra avere un valore prognostico negativo indipendente.

| | 1° Quartile 0-25 | 2° Quartile 2 26-50 | 3° Quartile 3 51-100 | 4° Quartile 4 ≥ 100 | P value |
|--|---------------------|------------------------|-------------------------|-----------------------------|------------------|
| Variabili cliniche e laboratoristiche | | | | | |
| Pressione arteriosa sistolica, mmHg | 123,69 \pm 15,42 | 122,11 \pm 16,32 | 118,87 \pm 14,62 | 113,91 \pm 15,33 | <0,001 |
| Frequenza cardiaca, bpm | 64,23 \pm 12,09 | 68,91 \pm 10,37 | 69,02 \pm 11,05 | 69,70 \pm 10,44 | 0.003 |
| Classe NYHA | 1,54 \pm 0,63 | 1,81 \pm 0,69 | 2,02 \pm 0,80 | 2,25 \pm 0,72 | <0,001 |
| NaRS ≥ 3 , n(%) | 9 (7,56%) | 22 (22,68%) | 10 (20,41%) | 40 (30,77%) | <0,001 |
| Emoglobina, g/dL | 13,98 \pm 1,26 | 13,15 \pm 1,55 | 12,65 \pm 1,32 | 12,28 \pm 1,44 | <0,001 |
| Glicemia, mg/dL | 113,02 \pm 29,91 | 131,04 \pm 53,82 | 121,35 \pm 32,37 | 132,53 \pm 42,10 | <0,001 |
| Azotemia, mg/dL | 45,51 \pm 15,39 | 64,88 \pm 29,62 | 61,64 \pm 28,86 | 93,13 \pm 51,16 | <0,001 |
| Creatinina, mg/dL | 1,12 \pm 1,05 | 1,36 \pm 0,52 | 1,36 \pm 0,55 | 1,97 \pm 1,59 | <0,001 |
| Variabili ecocardiografiche | | | | | |
| FE (%) | 42,62 \pm 8,08 | 36,97 \pm 8,40 | 35,53 \pm 8,45 | 31,41 \pm 8,36 | <0,001 |
| Diametro telediastolico Vsx (mm) | 57,46 \pm 50,90 | 75,39 \pm 62,29 | 88,92 \pm 77,00 | 83,48 \pm 75,81 | <0,001 |
| Pattern di riempimento restrittivo n(%) | 1 (0,84%) | 4 (4,12%) | 4 (8,16%) | 24 (18,46%) | <0,001 |
| Congestione epatocavale, n(%) | 7 (5,88%) | 12 (12,37%) | 7 (14,29%) | 40 (30,77%) | <0,001 |
| Eventi n(%) | 17 (14,29%) | 23 (26,53%) | 13 (26,53%) | 59 (45,38%) | <0,001 |

Tab. 1. Caratteristiche basali ed eventi in base ai quartili di DDD

O142

Superottimizzazione della terapia anti-neuroormonale nello scompenso cardiaco: un nuovo “target” terapeutico?

Daniele Masarone (a), Andrea Buono (a), Rossella Vastarella (a), Filomena Riccardi (a), Marta Rubino (a), Antimo Leva (a), Francesco Renga (a), Ernesto Ammendola (a), Giuseppe Del Giorno (a), Lucio Santangelo (a), Alessandra Rea (a), Rita Gravino (a), Raffaele Calabrò (a), Giuseppe Limongelli (a), Giuseppe Pacileo (a)

(a) *Cardiologia Riabilitativa, Intensiva e Scompenso Cardiaco. AORN dei Colli Presidio Monaldi.*

Background: La terapia antagonizzante l'attivazione neuro-ormonale basata sull'utilizzo di Betabloccanti (BB) e bloccanti il sistema renina-angiotensina-aldosterone (RAAS), rappresenta il cardine del trattamento farmacologico del paziente affetto da scompenso cardiaco cronico. I risultati dei grandi trial hanno dimostrato che l'ottimizzazione è fondamentale per migliorare la morbilità e la mortalità dei pazienti affetti da scompenso cardiaco cronico. Tuttavia, pochi dati sono presenti in letteratura circa l'utilizzo di dosi maggiori rispetto a quelle considerate “target” dalle linee-guida (superottimizzazione).

Metodi: Presso la divisione sono stati arruolati da Maggio 2005 a Settembre 2011, a 292 pazienti consecutivi affetti da scompenso cardiaco cronico secondo i criteri di Framingham. Ciascun paziente è stato sottoposto ad una valutazione clinico-strumentale completa comprensiva di test cardiopolmonare. Il follow-up medio è stato di 50 mesi. Durante tale periodo sono stati registrati gli eventi clinici maggiori (MCE). Per ogni paziente, è quindi stata registrata la terapia al momento del MCE.

Risultati: Dei 292 pazienti (80% maschi, 20% femmine, età media (età media 56.28 ± 11.39 anni) 287 erano in terapia con BB. Di questi 69 avevano un dosaggio < al 50% della dose target, 135 una dose $\geq 50\%$ ma <100% del dosaggio target, 64 un dosaggio target, e 19 un dosaggio superiore al >100% del dosaggio massimale. Tutti erano in terapia con un farmaco antagonizzante il sistema renina-angiotensina. 113 assumevano un dosaggio < al 50% del valore target, 77 una dose $\geq 50\%$ ma <100% di quella target, 96 una dose target, 6 a dose > del 100% del target. Dei 19 pazienti in terapia BB superottimizzata 4 assumevano un antagonista del RAAS a dose <50% del dosaggio target, 6 a dosaggio $\geq 50\%$ ma <100% del dosaggio target, 8 a dosaggio target e 1 superottimizzato. Dei 64 pazienti con BB ottimizzato 24 assumevano un antagonista del RAAS a dose <50%, 20 a dosaggio $\geq 50\%$ ma <100% del dosaggio target, 20 a dosaggio target e nessuno superottimizzato.

I MCE maggiori erano uguali nel gruppo super-ottimizzazione rispetto al gruppo in terapia ottimizzata ma gli eventi in tale gruppo erano inferiori a quelli con dosi inferiori al 100% del dosaggio target.

Conclusioni: La superottimizzazione rispetto al raggiungimento della dose target non sembra migliorare l'outcome. La dose BB parzialmente ottimizzata è comunque più efficace di dosaggi inferiori al 50% del target. I farmaci antagonizzanti il sistema renina-angiotensina-aldosterone (RAAS) a parità di alte dosi di BB migliorano l'outcome clinico. Infine non emergono differenze statisticamente significative quando si associava una terapia BB parzialmente ottimizzata con una anti-RAAS ottimizzata rispetto all'associazione terapia anti-RAAS parzialmente ottimizzata con BB ottimizzati, come a voler sottolineare l'importanza di raggiungere l'ottimizzazione di almeno una delle due classi farmacologiche, qualora vi sia impossibilità di andare oltre la parziale ottimizzazione dell'altra.

O143

Effects of oral administration of L-Carnosine and exercise training in patients with chronic heart failure and severe left ventricular dysfunction

Carlo Lombardi (a), Valentina Carubelli (a), Valentina Lazzarini (a), Federica Guidetti (a), Gaetano Aloisi (a), Rita Straquadaino (a), Andrea Zanoletti (a), Marco Metra (a)

(a) Cattedra di cardiologia università e ospedali civili di Brescia

Background: CHF is characterized by physical deconditioning and several micronutrient deficits. These conditions play a negative role in the progression of symptoms and outcomes. Regular exercise training in pts with systolic heart failure showed positive effects on exercise capacity and quality of life. Amino acid supplementation may have a positive impact on nutritional and metabolic status in CHF. The purpose was to analyze in pts with CHF and severe left ventricular dysfunction the effects of exercise training and oral administration of orodispersible L-Carnosine, a dipeptide (beta-alanyl-L-histidine) expressed at high concentration in myocardium with anti-oxidant and free radicals scavenger properties. **Methods:** thirty (30) pts with CHF and severe left ventricular systolic dysfunction on optimal medical therapy were randomized in 3 groups. 10 pts received L-Carnosine (500 mg OD) and played a regular aerobic exercise training protocol. 10 pts received only L-Carnosine. These groups were compared with a control group (10 pts). Cardiopulmonary stress test, six minutes walking test (6MWT) and quality-of-life (QoL) tests have been performed at baseline and after 6 months. **Result:** The mean age of pts was 57 ± 9.6 years, 22 (73%) were male. 90% of pts was NYHA class II and the mean EF was $33.4 \pm 6.9\%$. Between baseline and follow-up pts receiving orodispersible L-Carnosine and exercise training had an improvement in 6MWT distance ($p=0.032$) and in QoL measured with EQ-5D test ($p=0.003$) and VAS ($p=0.023$). Pts received only L-Carnosine had a significant improvement in 6MWT distance ($p=0.01$) at 6 months. Aerobic exercise training associated with administration of L-Carnosine was associated with an improvement in the variation of peak VO_2 (2.2 ± 2 vs 0.2 ± 1.1 ml/Kg/min; $p < 0.001$) compared with the only administration of L-Carnosine. Compared with control group L-Carnosine added to exercise training program has been associated with a significant improvement in the variation of peak VO_2 ($p < 0.001$), VO_2 at anaerobic threshold ($p=0.011$), maximal work load ($p=0.02$), 6MWT distance ($p=0.029$) EQ-5D test ($p=0.02$) and VAS ($p < 0.001$). Pts received only L-Carnosine had an improvement in the variation of peak VO_2 ($p < 0.03$), VO_2 at anaerobic threshold ($p=0.048$), 6MWT distance ($p=0.004$) EQ-5D ($p=0.014$) and VAS ($p < 0.009$) compared with controls. **Conclusion:** oral administrations of L-Carnosine, added to conventional therapy, has beneficial effects on exercise performance and QoL in CHF. The association between oral L-Carnosine and exercise training program has improved the functional capacity more than only administration L-Carnosine.

O144

Zofenopril è costo-efficace nel trattamento di pazienti affetti da disfunzione sistolica del ventricolo sinistro a seguito di infarto miocardico acuto: analisi retrospettiva dello studio smile-4.

Claudio Borghi (a), Ettore Ambrosioni (a), Stefano Omboni (b), Arrigo FG Cicero (a), Stefano Bacchelli (a), Daniela Degli Esposti (a), Salvatore Novo (c), Dragos Vinereanu (d), Giuseppe Ambrosio (e), Giorgio Reggiardo (f), Dario Zava (f)

(a) Unità di Medicina Interna, Policlinico S. Orsola, Università di Bologna, Bologna, Italia, (b) Istituto Italiano di Telemedicina, Varese, Italia, (c) Divisione di Cardiologia, Università di Palermo, Palermo, Italia, (d) Università e Ospedale d'Emergenza, Bucarest, Romania, (e) Divisione di Cardiologia, Università di Perugia, Perugia, Italia, (f) Istituto Lusofarmaco d'Italia S.p.A., Peschiera Borromeo, Italia

Introduzione e obiettivo: nello studio SMILE-4 è stato dimostrato come il trattamento con zofenopril e acido acetilsalicilico (ASA) sia più efficace rispetto a quello con ramipril associato ad ASA nel ridurre il rischio di eventi cardiovascolari (CV) in pazienti affetti da disfunzione ventricolare sinistra (DVS) successiva ad infarto miocardico acuto (IMA). La seguente analisi è stata effettuata con lo scopo di valutare l'impatto economico del trattamento con zofenopril rispetto a ramipril.

Metodi: 771 pazienti con DVS e IMA sono stati randomizzati in doppio cieco al trattamento per un anno con zofenopril 60 mg/die (n=389) o ramipril 10 mg/die (n=382) entrambi associati ad ASA 100 mg/die. L'obiettivo primario dello studio era valutare il rischio di mortalità o di ospedalizzazione dovuti ad eventi CV nel corso dell'anno di osservazione. L'analisi economica si è basata sulla valutazione dei costi dei farmaci e dei ricoveri ed è stata eseguita sulla popolazione intention-to-treat (n=716). I dati sui costi sono stati ricavati dai database del Servizio Sanitario Nazionale dei Paesi europei partecipanti allo studio. Per quantificare il costo per ogni evento prevenuto con zofenopril rispetto a ramipril è stato utilizzato il rapporto incrementale di costo-efficacia (ICER).

Risultati: zofenopril ha portato ad una riduzione significativa (30%, p=0.028) rispetto a ramipril (IC al 95%: 49%, 4%) della mortalità o dell'ospedalizzazione per eventi CV. Il numero di pazienti che deve essere trattato con zofenopril per prevenire un evento CV è risultato essere inferiore di 13 unità rispetto a ramipril. La terapia con zofenopril è risultata essere più costosa (328.78 Euro all'anno per paziente, n=365) rispetto a quella con ramipril (165.12 Euro all'anno per paziente, n=351). Il costo relativo all'ospedalizzazione per eventi CV era in media di 4983.64 Euro per i pazienti trattati con zofenopril e di 4850.01 Euro per quelli trattati con ramipril. È stato calcolato che l'ICER di zofenopril rispetto a ramipril era di circa 2125.45 Euro per evento prevenuto (peggiore e migliore stima nell'analisi di sensibilità 3590.09 e 3243.96 Euro).

Conclusioni: zofenopril è un trattamento valido e costo-efficace nella gestione di pazienti con DVS a seguito di IMA.

O145

Rivascolarizzazione coronarica percutanea e terapia medica a confronto nella cardiopatia ischemica cronica e nell'infarto miocardico post acuto

Doralisa Morrone (a), Lionel Malebranche (b), Aaron Horne (c), Ruth Aguiar (b), Paul Kolm (b), Wei Zhang (b), John Resar (b), Lee Ann Riesenberg (d), Ellen Justice (b), Claudine Jurkovitz (b), William Weintraub (b)

(a) Università di Pisa-Dipartimento Cardiotoracico, (b) Christiana Care Health System-Newark-Delaware; USA, (c) The Johns Hopkins Hospital, Division of Cardiology, Baltimore, Maryland, USA, (d) Medical Education Outcomes and Research, Department of Anesthesiology, the University of Alabama

Introduzione: Mentre molti studi hanno evidenziato il beneficio della rivascolarizzazione coronarica percutanea (PCI) nelle sindromi coronariche acute (ACS) in termini di mortalità, il beneficio della PCI nella cardiopatia ischemica cronica (SIHD) è meno chiaro. Il nostro obiettivo è quello di evidenziare il rischio combinato di morte ed infarto miocardico ed il rischio di mortalità per tutte le cause o la necessità di rivascolarizzazione fra i trials che confrontano PCI e terapia medica ottimale.

Metodi: Una ricerca in letteratura eseguita su OVID/Medline (dal 1946 fino ad ora) è stata eseguita utilizzando i termini: "coronary artery disease", "invasive strategy", "conservative strategy" per identificare tutti gli studi pubblicati che hanno messo a confronto Terapia medica ottimale e PCI. Due medici-ricercatori hanno indipendentemente revisionato i trials ed estratto i dati di nostro interesse in un database comune. I dati raccolti sono stati revisionati da un terzo ricercatore che aveva il compito di accertare la veridicità dei dati estratti confrontandoli con il testo di ciascun trial. I dati estratti sono stati analizzati eseguendo una meta-analisi utilizzando il modello DerSimonian e Laird con effetto random degli studi inseriti. Inoltre è stata eseguita una analisi Baesiana.

Risultati: 16 trials sono stati identificati ed analizzati. La meta-analisi mostrava che non c'era differenza tra PCI e terapia medica negli outcome combinati (infarto miocardico/morte) fra i trials; (RR:0.975;95% CI:0.754-1.261, W:100%,I²=89.9%). Risultati simili sono stati evidenziati quando sono stati analizzati i trials separatamente (Angina stabile/ post infarto miocardico) (RR:1.024 95%CI:0.905-1.160,W:100%, I²:23.5%). Il rischio relativo di tutte le cause di mortalità non si riduceva quando terapia medica e PCI erano messe a confronto nella cardiopatia ischemica stabile (pooled RR:0.986; CI:0.841-1.156;W:100%;I²:0%). Il rischio relativo di tutte le cause di mortalità sembrava in favore della PCI nei trials post MI analizzati separatamente (RR:0.708; CI:0.499-1.006; W:100%; I²:77.1%; p = 0.054).

Conclusioni: Il nostro studio conferma che la PCI non apporta nessun beneficio addizionale alla terapia medica nei pazienti con cardiopatia ischemica stabile in termini di end-point combinati (MI/morte) o per tutte le cause di mortalità. La PCI sembra essere la favorita nel periodo post infarto se si prende in considerazione come end-point la sola mortalità.

EMODINAMICA NON INVASIVA E VALVULOPATIA AORTICA

O146

Prosthetic valves dimensions provided by 2d & 3d tee measurements in vitro. Potential impact on percutaneous valve in valve therapy

Fortunata Condemi (a, c), Vinayak Bapat (b), Silvia Gianstefani (a), Norman Catibog (a), Francesco Romeo (c), Mark J Monaghan (a)

(a) Department of Non invasive Cardiology Kings College Hospital, London UK, (b) Department of Cardiothoracic Surgery Guys and St Thomas' Hospital, London UK, (c) Department of Cardiology University of Study Tor Vergata, Rome Italy

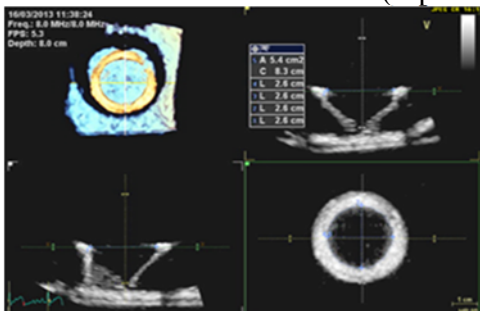
Background: Percutaneous valve in valve (ViV) therapy has become an important treatment option for failing bio-prosthetic heart valves. Accurate assessment of valve internal diameter (ID) is essential for effective and safe treatment. These data may not be available in an individual patient or the manufacturer supplied dimensions may be incorrect because they do not allow for the space occupied by valve leaflet material.

Methods: We performed 2,332 2D and 3D TEE in-vitro measurements using both Philips iE33 and GE Vivid E9 systems with a range of system settings on 53 bioprosthetic valves in all available sizes. 2D Echo ID measurements were made in 2 orthogonal planes at the level of the sewing ring and similar 3D measurements were generated from multi-plane reconstructions. They were compared to both the manufacturer supplied valve ID (M.ID) and the True ID (T.ID) measured with Hegar dilators. Valve ID v Echo measurements

| | Mean Difference (mm) | S.D. |
|------------------|----------------------|-------|
| T.ID v M.ID | 1,53 | ±0,98 |
| All echo v T. ID | 0,31 | ±1,11 |
| All Echo v M.ID | 1,42 | ±1,32 |
| 2D v T. ID | 0,19 | ±1,01 |
| 2D v M.ID | 1,45 | ±1,20 |
| 3D v T.ID | 0,36 | ±1,15 |
| 3D v M.ID | 1,41 | ±1,37 |
| Philips v T.ID | 0,38 | ±1,23 |
| GE v T.ID | 0,24 | ±0,99 |

Comparison of manufacturers internal dimension (M.ID), true (measured) internal dimension (T.ID) and 3D and 2D TEE measurements

Conclusions: Both vendors provide valve ID measurements which are comparable. T.ID is significantly smaller than M.ID and this may lead to a wrong choice of implanted valve. However all Echo measurements are much closer to T.ID than M.ID. and 2D is the closest because of higher spatial resolution. These findings have important implications for ViV procedures and imply that TEE valve ID measurements (especially 2D) compare well with the T.ID.



O147

Diagnostic Accuracy of Multidetector Computed Tomography Coronary Angiography in 325 Consecutive Patients Referred for Transcatheter Aortic Valve Implantation

Daniele Andreini (a, b), Gianluca Pontone (a), Saima Mushtaq (a), Edoardo Conte (a), Erika Bertella (a), Andrea Annoni (a), Alberto Formenti (a), Andrea Baggiano (a), Cesare Fiorentini (a, b), Mauro Pepi (a)

(a) *Centro Cardiologico Monzino IRCCS*, (b) *Department of Clinical Sciences and Community Health, Cardiovascular Section, University of Milan*

Objectives: To assess diagnostic performance of multidetector computed tomography (MDCT) for coronary artery evaluation before transcatheter aortic valve implantation (TAVI).

Background. MDCT provides detailed assessment of valve annulus and iliofemoral vessels in TAVI patients. However, data on diagnostic performance of MDCT coronary angiography (MDCT-CA) are scarce.

Methods: 325 consecutive patients [237 without previous myocardial revascularization, 47 with previous coronary stenting and 41 with previous coronary artery bypass graft (CABG)] underwent invasive coronary angiography (ICA) and MDCT before TAVI. MDCT-CA was performed using the same data set dedicated to standard MDCT aortic annulus evaluation. MDCT-CA evaluability and diagnostic accuracy in comparison with ICA as gold standard were assessed.

Results: The MDCT-CA evaluability of native coronaries was 95.6%. The leading cause of unevaluability was beam-hardening artifact due to coronary calcifications. In a segment-based analysis, MDCT-CA showed sensibility, specificity, positive predictive value, negative predictive value and accuracy for detecting $\geq 50\%$ stenosis of 91%, 99.2%, 83.4%, 99.6% and 98.8%, respectively. The MDCT-CA evaluability of coronary stents was 82.1%. In a segment-based analysis, MDCT-CA showed sensibility, specificity, positive predictive value, negative predictive value and accuracy for detecting $\geq 50\%$ in-stent restenosis (ISR) of 94.1%, 86.7%, 66.7%, 98.1% and 88.3%, respectively. All CABGs were correctly assessed by MDCT-CA. In a patient-based analysis, MDCT-CA showed sensibility, specificity, positive predictive value, negative predictive value and accuracy of 89.7%, 90.8%, 80.6%, 95.4% and 90.5%, respectively.

Conclusions: MDCT-CA allows to correctly ruling out the presence of significant native coronary artery stenosis, significant ISR and CABG

O148

Accuracy of aortic root annulus assessment with cardiac magnetic resonance in patients referred for transcatheter aortic valve implantation: a comparison with multi-detector computed tomography

Erika Bertella (a), Gianluca Pontone (a), Daniele Andreini (a), Paola Gripari (a), Saima Mushtaq (a), Monica Loguercio (a), Sarah Cortinovis (a), Andrea Baggiano (a), Edoardo Conte (a), Mauro Pepi (a)

(a) *Centro Cardiologico Monzino, IRCCS, Milano*

Purpose: To compare the accuracy of cardiac magnetic resonance (CMR) evaluation of the aortic root as compared to multi-detector computed tomography (MDCT) in patients referred for transcatheter aortic valve implantation (TAVI).

Materials and Methods: In 50 patients, the following parameters were assessed with CMR and compared with those obtained with MDCT: aortic annulus (AoA) maximum diameter (AoA-Dmax), minimum diameter (AoA-Dmin), and area (AoA-A), length of the left coronary, right coronary, and non-coronary aortic leaflets, degree (grades 1 to 4) of aortic leaflet calcification and distance between AoA and coronary artery ostia.

Results: AoA-Dmax, AoA-Dmin and AoA-A were 26.45 ± 2.83 mm, 20.17 ± 2.20 mm, 444.88 ± 84.61

mm² and 26.45±2.76 mm, 20.59±2.35 mm and 449.78±86.22 mm² by MDCT and CMR, respectively. The length of left coronary, right coronary, and non-coronary leaflets were 14.02±2.27 mm, 13.33±2.33 mm, 13.39±1.97 mm, and 13.95±2.18 mm, 13.30±2.14 mm, 13.46±1.80 mm by MDCT and CMR, respectively, while the scores of aortic leaflet calcifications were 3.4±0.7 vs. 2.97±0.77. Finally, the distance between AoA and left main and right coronary artery ostia was 16.21±3.07 mm, 16.02±4.29 mm and 16.14±2.83 mm, 16.14±4.36 mm by CCT and CMR, respectively. There was close agreement between CMR and MDCT measurements, whereas aortic leaflet calcifications were underestimated by CMR.

Conclusions: Aortic root assessment with CMR including AoA size, aortic leaflet length and coronary artery ostia height is accurate in comparison to MDCT. CMR may be a valid imaging alternative in patients unsuitable for MDCT.

O149

Impianto percutaneo della valvola aortica: follow-up ecocardiografico a lungo termine. Nostra esperienza

Anna Marchese (a), Wanda Deste (b), Patrizia Aruta (b), Vera Bottari (b), Emanuele Benvenuto (b), Marialetizia Santonoceto (b), Marilena Mizzi (b), Alessio Dilandro (b), Alessandra Giarratana (b), Simona Giulino (b), Daniela Giannazzo (b), Carmelo Sgroi (b), Corrado Tamburino (b)

(a) *Unità Operativa di Cardiologia ospedale Umberto I Siracusa*, (b) *Istituto di Cardiologia ospedale Ferrarotto università di Catania*

Introduzione: La sostituzione aortica percutanea (TAVI) rappresenta una tecnica emergente nel trattamento di pazienti sintomatici con stenosi aortica severa ad alto rischio o con controindicazioni alla chirurgia. Fondamentale risulta il ruolo dell'ecocardiografia nella selezione del paziente da sottoporre a TAVI ed al follow-up per determinare la performance della protesi e le variazioni emodinamiche nel tempo. Noi riportiamo la nostra esperienza ecocardiografica di 256 pazienti che sono stati sottoposti ad impianto percutaneo della valvola aorta in un follow-up a 5 anni.

Materiale e metodi: Da luglio 2007 a febbraio 2013, 356 pazienti, età media 81 ± 5 anni, con logistic euroscore di 21±14, il 64.1% maschi, sono stati sottoposti a TAVI e successivamente valutati con follow up clinico ecocardiografico rispettivamente a 24 ore, un mese, sei mesi, e ogni anno dalla procedura. L'area valvolare aortica media preprocedurale era 0.59±0.2 cm², la media del gradiente massimo e medio era rispettivamente 89±26 mmHg e 56± 26 mmHg. La frazione di eiezione era 52%±10%.

Risultati: Dopo la procedura, il 91% dei pazienti ha avuto un miglioramento della classe funzionale NYHA. L'area valvolare aortica è passata da 0.59 a 1.7±0.3 cm², con un decremento di -0.06 cm² per anno, il gradiente medio (P<.0001), si è ridotto da 56 a 10 mmHg dopo la procedura, mantenendosi stabile al follow-up. Nell'insieme dei pazienti la funzione contrattile entro un anno è migliorata con FE di 56%±5%. I leaks periprotesici sono stati evidenziati nel 88% dei casi, ma solo 4 di questi hanno determinato un'insufficienza residua di 3° grado. Al controllo post-procedurale l'insufficienza periprotesica risultava di 1° grado nel 61%, di 2° grado nel 25% e di 3° grado nel 2% dei casi. Nessuna insufficienza residua è peggiorata nel follow up a 5 anni, al contrario nel 9.7% dei casi si è ottenuto una riduzione di un grado nel follow up, verificatasi prevalentemente dopo sei mesi-1 anno dalla TAVI. A dimostrazione che l'endotelizzazione della protesi determina la riduzione del rigurgito. La sopravvivenza a tre anni è stata del 71% ed a 5 anni del 61%.

Conclusioni: L'impianto percutaneo della valvola aorta ha evidenziato una buona persistenza di risultati a medio e lungo termine. Il follow up a 5 anni ha mostrato il corretto posizionamento e funzionamento della protesi aortica percutanea. La procedura sembra offrire un'adeguata soluzione in pazienti ad alto rischio chirurgico affetti da stenosi aortica severa sintomatica.

FORAME OVALE PERVIO

O150

Percutaneous closure of residual shunts after initial percutaneous patent foramen ovale closure: should be a solution?

Gianpiero Gaio (a), Giuseppe Santoro (a), Cristina Capogrosso (a), Luca Giugno (a), Maria Teresa Palladino (a), Carola Iacono (a), Marianna Carrozza (a), Ettore Campagnano (a), Giovanbattista Capozzi (a), Maria Giovanna Russo (a)

(a) *Cardiologia Pediatrica, A.O. "Monaldi", 2nd University of Naples, Naples, Italy*

Background: Percutaneous transcatheter closure of patent foramen ovale (PFO) is deemed as an alternative to long-term anticoagulation in patients with paradoxical embolism. Significant residual shunt after percutaneous PFO closure, reported in literature, is about 3%. The management in these cases has not been clearly established in clinical practice.

Aim of the study: We reported preliminary data about our experience in the percutaneous closure of significant residual shunt after PFO closure with different approaches tailored to local anatomy and residual shunt feature.

Methods: From December 2001 to March 2013 184 pts underwent PFO closure at our institution. Transcranial Doppler was performed after 12 months, resulting in significant (shower appearance) right to left shunt in 5 of them. According to features of PFO, different kinds of device were implanted at the primary procedure (n= 1 ASO PFO 30 mm, n=1 ASO PFO 35 mm, n=1 Occlutech 27/30 mm; n=1 ASO cribriform 30 mm, in one patients were implanted two devices ASO MF 30 mm and ASO MF 18 mm).

Results: The patients were evaluated during procedure by transesophageal echocardiography. The residual shunt was intra-prothestic in 3 patients and peri-prothestic in 2 patients. Percutaneous closure was attempted, and successfully completed in all patients with different devices. Four pts needed a single device (Amplatzer Vasclular Plug II; Premiere device); one patient needed two devices: (Amplatzer Vascular Plug 4). The procedural and fluoroscopy times were significantly longer than the primary procedure (83,6 + 45 min and 10 + 8 min, $p < 0,05$ vs PFO closure). Wasn't observed acute complications. Immediate residual shunt occlusion was recorded in all patients.

Conclusions: Residual PFO shunts can be closed by transcatheter approach with different strategies and device according to the characteristics of the residual shunt. In our small series the procedure has proved feasible, even if more cases are required to demonstrate efficacy and safety.

O151

Relationships between echocardiographic features and transcranial Doppler in patients with patent foramen ovale and previous cerebral ischemic events

Francesco De Stefano (a), Alessandro Santoro (a), Roberta Esposito (a), Ciro Santoro (a), Vincenzo Schiano Lomoriello (a), Daniela De Palma (a), Antonella Tufano (b), Maurizio Galderisi (a)

(a) *Department of Medical Translational Sciences, Federico II University Hospital, Naples, (b) Department of Clinical and Surgical Medicine, Federico II University Hospital, Naples, Italy*

Purpose: Patients with patent foramen ovale (PFO) present possible volume overload of cardiac chambers, this finding being possibly relevant in those developing cerebral ischemic events. However, the cardiac features have been never assessed in this clinical setting. Aim of the present study was to investigate echocardiographic characteristics and their relations with transcranial Doppler in PFO patients with previous cryptogenic juvenile cerebral ischemic events.

Methods: After the exclusion of patients with previous myocardial infarction, overt heart failure, valve heart disease and atrial fibrillation, the final study population included 68 consecutive outpatients with a recent cryptogenic, juvenile cerebral ischemic event referring for PFO search from SIC | *Indice Autori*

January 2011 to May 2013 at our Department. All the patients underwent a complete echo Doppler examination including the quantitative analysis of cardiac chambers and the assessment of systolic and diastolic function of both the ventricles. In addition, bubble test of saline solution injected into a vein of an arm (in order to visualize movement of bubbles from right to left atrium) and transcranial Doppler of middle cerebral artery (first segment M1, trans-temporal view) with additional bubble injection (in order to detect right to left shunting) were performed. Both transthoracic and transcranial bubble tests were performed at rest and during / after Valsalva manoeuvre. Presence and number of high intensity transient signals (HITS) per cardiac cycle were determined. Patients were divided in 2 groups: 33 without PFO and 35 with PFO.

Results: The 2 groups were comparable for sex, age, body mass index, systolic and diastolic blood pressure and heart rate. Patients with positive "bubble" transthoracic echo had greater left ventricular ejection fraction (LVEF), aortic root diameter and left atrial volume index (all $p < 0.01$) as well as larger right atrial diameter (3.8 ± 0.6 cm versus 3.3 ± 0.5 cm, $p < 0.01$), right atrial diameter index ($p < 0.02$) and pulmonary arterial pressure ($p < 0.01$) than patients without PFO. In patients diagnosed for PFO the number of HITS per cardiac cycle at transcranial Doppler of middle cerebral artery was positively related with right atrial diameter ($r = 0.34$, $p < 0.01$), right atrial diameter index ($r = 0.55$, $p < 0.0001$) and LVEF ($r = 0.35$, $p < 0.01$)

Conclusions: The present study demonstrates that in a group of patients with previous cryptogenic juvenile cerebral ischemic events PFO detection is combined with echocardiographic changes of both left and right cardiac chambers. These changes include increase of left atrial volume, aortic root and right atrial size as well as an increase of LVEF and higher pulmonary arterial pressure. In addition, the number of high intensity transient signals per cardiac cycle in middle cerebral artery at transcranial Doppler appears to be positively related with possible right atrial overload and also with the degree of left ventricular systolic performance. These findings can contribute to explain possible discrepancies of bubble test between transthoracic and transcranial echo Doppler examinations in this clinical setting.

O152

Transcatheter treatment of fenestrated aneurismal atrial septum: safety, feasibility and mid-term follow-up.

Luca Giugno (a), Giuseppe Santoro (a), Gianpiero Gaio (a), Carola Iacono (a), Maria Teresa Palladino (a), Cristina Capogrosso (a), Raffaella Esposito (a), Giovanbattista Capozzi (a), Maria Giovanna Russo (a)

(a) *Cardiologia Pediatrica, A.O. "Monaldi", 2nd University of Naples, Naples, Italy*

Introduction: Transcatheter closure of atrial septal defects (ASDs) is currently a reliable alternative to surgery. However, percutaneous approach to fenestrated aneurismal atrial septum is still challenging and not universally indicated. Aim of this study was to evaluate feasibility, safety and mid-term follow-up of transcatheter treatment of fenestrated aneurismal atrial septum in a third-level, high-volume paediatric and G.U.C.H. centre.

Methods: Between April 2000 and March 2013, 123 (13.8%) of the 893 patients submitted to transcatheter atrial septal closure (ASD)/patent foramen ovale (PFO) showed fenestrated aneurismal septum with ASD ($n = 88$) or PFO ($n = 32$). Their mean age and weight were 30 ± 20 years (range 5-72) and 59.5 ± 22.6 kg (range 18-105), respectively. Atrial shunt resulted in a QP/QS of 1.5 ± 0.5 (range 1-2.6) due to multiple fenestrations in 43 patients (38%).

Results: Transcatheter approach was successful in 97.6% of patients (120/123, using a single device in 105 patients, two devices in 14 patients and three devices in one patient. Overall, 109 Amplatzer Atrial Septal Occluder (ASO) devices, 12 Cribriform ASO devices, 2 Gore Septal Occluder devices, 9 Figulla Occlutech device, and 2 NMT Starflex devices were used. Procedural and fluoroscopy times were 98 ± 48 min and 19 ± 11 min, respectively ($p = \text{NS}$ vs closure of simple atrial septal defect for both comparisons). Procedure-related complication rate was 0.9%, ($p = \text{NS}$ vs

SIC | *Indice Autori*

closure of simple atrial septal defect). Immediate ASD occlusion was recorded in 59.7% of patients, reaching 95.9% at the last follow-up control (p=NS vs. simple ASD closure for both comparisons). **Conclusions:** Percutaneous treatment of fenestrated aneurismal septum can be considered technically feasible, safe and effective in a high percentage of cases, although the procedure is still significantly more demanding than transcatheter closure of simple ASDs

O153

Percutaneous implantation of a second device in patients with residual shunt after patent foramen ovale closure

Chiara Rovera (a), Luigi Biasco (a), Fulvio Orzan (a), Riccardo Belli (b), Pierluigi Omedé (a), Fiorenzo Gaita (a)

(a) *Cardiology Division, Department of Internal Medicine, University of Turin, Italy*, (b) *Cardiology Division, Maria Vittoria Hospital, Turin, Italy*

Introduction: Although complete closure rate of patent foramen ovale (PFO) with percutaneous closure devices is estimated to be >90%, in few patients a residual right-to left shunt (rRLS) may remain. The management of these patients has not been clearly established in clinical practice. The aim of this study was to determine the incidence of moderate-to-large rRLS after initial PFO closure and to report the feasibility, safety, procedural and long term clinical outcome of transcatheter closure of residual shunt after percutaneous PFO closure.

Methods: Since June 2000, 344 subjects underwent percutaneous PFO closure; a second cardiac catheterization was performed in 38 (11%) patients presenting with moderate-to-large rRLS on transesophageal echocardiogram (TEE: > 20 microbubbles after Valsalva maneuver, any rRLS at rest) and/or transcranial doppler (TCD: “shower” or “curtain” pattern), in order to invasively evaluate the entity of the rRLS and the feasibility of implanting a second device.

Results: A second closure device was implanted in 20 patients (53%). In 18 (47%) patients, the delivery of a second device was not performed for the following reasons: in 12 (67%) patients no residual passage could be entered, in 5 (28%) patients the residual shunt was deemed to be negligible, and in 1 (5%) patient minor pulmonary arteriovenous anastomoses were the mechanism of residual shunt. No significant complications occurred. After the second procedure, complete closure was proved by TCD in 17 (85%) subjects. One of these patients, showing a still large residual shunt, received a third device. During follow-up (40±18 months), no cerebrovascular ischemic events occurred.

Conclusions: A second percutaneous PFO occlusion is feasible and safe in patients with significant residual shunt following initial closure. However, a moderate-to-large residual shunt on TEE and/or TCD may not necessarily represent a significant risk of further paradoxical embolization.

O154

Cryptogenic stroke and effectiveness of transcatheter closure of patent foramen ovale

Ketty Savino (a), Elisabetta Bordoni (a), Clara Riccini (a), Giovanni Tilocca (a), Giuseppe Ambrosio (a)

(a) *Cardiology and Cardiovascular Pathophysiology – University of Perugia*

Background: Actually percutaneous closure of the patent foramen ovale (PFO) is the most widely and less invasive used approach. The treatment is suitable for removing the interatrial shunt and prevent the recurrence of cardioembolic stroke. However, at times, the treatment is not solver both in terms of persistence of residual shunts and recurrent stroke.

Purpose: To verify the persistence of interatrial shunt in patients undergoing percutaneous closure device.

Materials and methods: We enrolled in the study all patients undergoing percutaneous closure of PFO after at least one year from the implant. The history made particular reference to the recurrence of TIA / stroke occurred after percutaneous treatment. All subjects also performed a cerebral MRI to check a new ischemic lesions. The evaluation of the absence / persistence of shunt was performed by contrast echocardiography with transesophageal approach performed both at baseline and during Valsalva maneuver, the shunt was positive in presence of at least 3 microbubbles in the left atrium by 3 cycles of the complete opacification of the right atrium. The shunt was defined as mild if they were counted <10 microbubbles, as large with >10 microbubbles.

Results: Were enrolled in the study 56 patients (18 M and 38 F), mean age 48 + 11.4 years who underwent percutaneous PFO closure with Amplatzer (size 24.96 + 3.97). The mean follow-up was 25.30 + 18.08 months. Of the 56 patients in the study 50 (89.2%) had not recurrent cerebrovascular events, while 3 patients (5.3%) had a TIA, 1 patient (1.8%) a stroke and 2 patients (3.6%) on cerebral MRI showed new ischemic lesions. At echocardiography 49 patients (87.5%) had no residual shunt, while 7 (12.5%) had mild persistent shunt.

| <i>Variables</i> | <i>n</i> [•] |
|--|-----------------------|
| Gender | 18 M / 38 F |
| Age (mean ± SD) | 48 ± 11.4 |
| Mean follow-up (mesi) | 25.30 ± 10.8 |
| Pts on antiplatelet therapy at follow-up | 34 (60.7%) |
| No ischemic events at follow-up | 50 (89.2%) |
| TIA recurrence at follow-up | 3 (5.3%) |
| Stroke recurrence at follow-up | 1 (1.8%) |
| New ischemic lesions at RMI | 2 (3.6%) |
| TEE : No shunt | 49 (87.5%) |
| Mild shunt | 7 (12.5%) |

Conclusions: The percutaneous closure of the PFO is the most widely used technique for the treatment of cryptogenic stroke. In our study the procedure is effective in the majority of cases, however, is not negligible the percentage of failure understood as persistence of shunt and recurrence of cerebrovascular events. In our opinion these data suggest a careful selection of patients for transcatheter closure.

O155

Atrial deformational properties after successful percutaneous closure of atrial septal defects. A speckle tracking echocardiographic (STE) study.

Sergio Buccheri (a), Sarah Mangiafico (b), Ines Monte (a), Andrea Arcidiacono (a), Vera Bottari (a), Stefano Leggio (a), Corrado Tamburino (a)

(a) *Dipartimento di Scienze Mediche e Pediatriche, Università di Catania*, (b) *UO Cardiologia Osp.Ferrarotto Catania*

Background: Atrial septal defect (ASD) is frequent cardiac malformation seen in adults. Transcatheter closure of the defect using new devices, like the Amplatzer septal occluder, has been recently developed and when feasible is the preferred therapeutic strategy given the non-invasive nature of the procedure. However, few studies have been performed to assess the effect of the imposition of the occluding devices on atrial function.

Purpose: We aimed therefore to evaluate left and right atrial (LA and RA, respectively) function of patients after transcatheter ASD closure by means of speckle tracking imaging.

Methods: A total of 36 ASD patients (pts) were enrolled in the study and divided in two groups according to the anatomical characteristics of the ASD: Group 1 (19 pts, mean age: 47.3±17.1y) included pts after closure of ostium primum ASD, Group 2 (17 pts, mean age: 43.9±10.6y) consisted SIC | *Indice Autori*

of patients with closed defects for the presence of Patent Foramen Ovale (PFO). Data were compared with a control group of 16 sex- and age-matched healthy subjects (Group C). All pts underwent ASD correction at least one year before the study. All underwent standard echocardiographic examination by using a GE Vivid 9 equipped with a MS 5 probe. Strain and strain rate imaging (SR) of LA and RA were off-analyzed by using an Echopac workstation (GE Healthcare, ver. 112.0) to obtain indexes of reservoir, conduit and contractile function of the atria. Data were compared among groups by using ANOVA with post-hoc Bonferroni test.

Results: Patients in Group 1 showed a significant reduction of LA reservoir, conduit and contractile function as compared with Group 2 and Group C. LA negative strain, expression of atrial deformation during LA contraction, was the only functional parameter preserved in patients in Group 1. Group 2 patients had a preserved LA function in respect to subjects in Group C.

Group 1 showed a significant reduction of RA reservoir function and of RA deformation (positive strain) during conduit phase when compared with Group C. Group 2 showed a significant reduction of the deformational velocity during RA reservoir function (positive strain rate) in respect to subjects in Group C.

Conclusions: Patients after closure of an ostium primum ASD have a significant impairment of both LA and RA function. Subclinical impairment of RA is also present in patients after closure of a PFO. STE imaging is a useful noninvasive imaging modality for the assessment of atrial deformational properties in patients with corrected ASDs.

HIGHLIGHTS GIOVANI RICERCATORI – LAVORI INEDITI – SESSIONE 1

O156

Human cardiac stem cells derived from human induced pluripotent stem cells: a novel and un-invasive approach to generate autologous regenerative cells without the need of cardiac tissue

Mariangela Scalise (a), Carla Vicinanza (a), Iolanda Aquila (a), Fabiola Marino (a), Giovanni Cuda (b), Georgina M. Ellison (c), Bernardo Nadal-Ginard (c), Daniele Torella (a), Ciro Indolfi (a)

(a) *Molecular and Cellular Cardiology, University Magna Graecia, Catanzaro, Italy*, (b) *Laboratory of Proteomics, University Magna Graecia, Catanzaro, Italy*, (c) *Stem Cell and Regenerative Biology Institute, King's College London, London, UK*

Background: Human induced pluripotent stem cells (hiPSCs) have emerged as an alternative source of pluripotent stem cells that can be used for tissue regeneration, evading all ethical issues regarding the use of human embryos as a source of embryonic stem cells (ESCs). hiPSCs have also recently emerged as a potential source of parenchymal cells of all body tissues, including cardiomyocytes. Concurrently, the adult heart harbours endogenous c-kit⁺ cardiac stem cells (CSCs) that are necessary and sufficient for myocardial repair and regeneration after injury in rodents. Human CSCs have been accordingly isolated from human cardiac biopsies and used in the first-in-man clinical trial to treat heart failure patients. However, the access to human heart tissue is logically limited, and the procedure to obtain and expand hCSCs to sufficient numbers is invasive while its success depends on the pathological state of the diseased heart. Thus, in the present study, we aimed at obtaining c-kit⁺ CSCs from human iPS to establish a proof of concept for a novel and un-invasive approach to generate and expand autologous hCSCs without the need of adult cardiac tissue.

Methods: Human fibroblasts (HDF) were isolated from skin biopsy by explant culture. For reprogramming, fibroblasts were used within the first three passages from biopsy retrieval. Fibroblasts were reprogrammed using the non-integrating CytoTune™-Sendai viral vector kit and allowed to proliferate on MEF feeder layers in iPSC medium. To correctly pick only reprogrammed colonies, a live staining with Tra1-60 and Tra1-81 antibodies was employed to recognize and pick undifferentiated hiPSCs. Characterization of bona fide hiPSCs was performed by RT-PCR, immunostaining and FACS analysis. A dedicated conditioned culture medium was used to induce iPS commitment to mesodermal lineage progenitors. c-kit⁺ cells were sorted by FACS and expanded in SIC | *Indice Autori*

hCSC media. These hiPSC-derived c-kit⁺ cells were analysed for markers of stemness and cardiac lineages by RT-PCR, FACS and immunocytochemistry.

Results: We have generated iPS colonies fromHDF and shown their ES-like phenotype. hiPSCs stably expressed endogenous transcripts of stemness and pluripotency genes by RT-PCR and scored positive for OCT4, SOX2, NANOG, KLF4, hTERT, and MYC by FACS and immunocytochemistry. After induction to mesodermal lineage, hiPSCs reduced the expression of pluripotency genes and turned on the expression of the primordial embryonic cardiac precursor genes. Indeed, these cells expressed both Brachury and Mesp1, key regulators of the earliest step of cardiac development. c-kit expression was investigated at different time points after mesodermal induction and gradually increased during the first week in culture. Sorted c-kit⁺ cells show a stable cardiac stemness phenotype and expressed also known cardiac specific transcription factors, like GATA4, MEF-2C and NKX 2.5. These hiPSC-derived cells were clonogenic, self-renewing and multipotent in vitro being able to differentiate in cardiomyocytes, smooth muscle and endothelial cells similarly to control adult hCSCs. When analysed by RNA-seq hiPSC-derived c-kit⁺ cells were practically undistinguishable from adult c-kit⁺hCSCs. Importantly, hiPSC-derived c-kit⁺ cells were equivalent to adult c-kit⁺ hCSCs in regenerating a myocardial infarction after LAD occlusion in immunodepressed rats *in vivo*.

Conclusions: We have for the first time generated large amounts of *bona fide* c-kit⁺hCSCs from hiPSCs. These findings establish the potential to non-invasively obtain 'unlimited' autologous cardio-reparative cells to be used for clinical protocols of myocardial regeneration.

O157

Biodegradable-polymer drug-eluting stents: a pairwise meta-analysis of randomized controlled trials.

Fabrizio D'Ascenzo (a), Claudio Moretti (a), Pierluigi Omedè (a), Davide Giacomo Presutti (a), Enrico Cerrato (a), Francesco Colombo (a), Giorgio Quadri (a), Umberto Barbero (a), Giuseppe Biondi-Zoccai (b), Fiorenzo Gaita (a)

(a) *Division of Cardiology University of Turin, Città Della Salute e Delle Scienze San Giovanni Battista*, (b) *Department of Medico-Surgical Sciences and Biotechnologies Sapienza University of Rome*

Introduction: Biodegradable-polymer drug-eluting stents may offer a feasible alternative to both Bare Metal Stents (BMS) or Drug Eluting Stents (DES) even if recent data have cast doubt about their safety and efficacy. Moreover, potential differences in biolimus or sirolimus antiproliferative drugs have not been appraised.

Methods: Pubmed, Medline and Cochrane were searched for randomized controlled trials comparing patients treated with biodegradable stents. MACE (Major Adverse Cardiac Events) was the primary end point, while Myocardial Infarction (MI), Target Vessel Revascularization (TVR) and definite or probable Stent Thrombosis (ST) were secondary endpoints. Random effects was used both for pairwise meta-analysis and for meta-regression.

Results: 10 studies with 13173 patients were included. After 2 years (1-2.75) MACE rates did not differ for both biolimus or sirolimus (0.86 0.67-1.10 and 0.86 0.64-1.12), for MI (1.04 0.79-1.35 and 1.03 0.77-1.37), TVR (0.84 0.58-1.22 and 0.75 0.52-1.08) and ST (0.99 0.65-1.49 and 0.67 0.43-1.06). Overall results did not differ (0.86 [0.73, 1.01]; 1.03 [0.87, 1.22]; 0.80 [0.63, 1.02]; 0.83 [0.64, 1.08], respectively), also after exclusion of the two trials comparing biodegradable-polymer drug-eluting stents to bare metal stents (0.90 [0.78, 1.05]; 1.07 [0.90, 1.28]; 0.88 [0.72, 1.09]; 0.86 [0.65, 1.14]; all CI 95%). Meta-regression showed that the presence of diabetes mellitus and length of coronary lesions did not influence outcomes, while biodegradable-polymer drug-eluting stents reduced TVR, mainly driven from a reduction of infarctions for patients presenting with ST or Non ST Segment Elevation Myocardial infarction (B -0.03 p 0.025 and B -0.007 p 0.045).

Conclusions: At mid term follow up, biodegradable-polymer drug-eluting stents provided similar outcomes in terms of efficacy and safety to BMS or DES and appear to reduction subsequent thrombotic events in patients with myocardial infarction.

O158

Terapia antiaggregante e terapia eparinica durante chirurgia non cardiaca in 720 pazienti con pregresso infarto miocardico: analisi retrospettiva di infarti, mortalità e sanguinamenti

Giuseppe Contarino (a), Guido Rocchi (a), Luca Favero (b), Martina Taglioni (b), Jacopo Cristallini (a), Paola Battistini (a), Beatrice Gardini (a), Paolo Cimaglia (a), Angelo Branzi (a), Giuseppe Boriani (a)

(a) Istituto di Cardiologia, Ospedale S. Orsola-Malpighi, Univesità di Bologna, Bologna-Italy, (b) Ospedale S. Orsola-Malpighi, Univesità di Bologna, Bologna-Italy

Scopo: Nella chirurgia non cardiaca prima dell'intervento è prassi comune sospendere l'antiaggregante che a volte viene sostituito con eparina sottocute. Abbiamo verificato l'impatto di tale consuetudine nella prevenzione di infarti e mortalità in pazienti con pregresso infarto miocardico.

Metodi: È stata eseguita una analisi retrospettiva dei DRG di tutti gli interventi di chirurgia non cardiaca dell'adulto eseguiti dal 1/1/2008 al 1/1/2012 su pazienti con pregresso infarto miocardico.

Risultati: In un totale di 46.650 interventi sono stati riscontrati 720 pazienti con pregresso infarto sottoposti a chirurgia non cardiaca. Di questi il 7.9% (57/720) ha avuto un reinfarto perioperatorio con una mortalità perinfartuale del 16% (9/57) e una mortalità globale del 3.2% (23/720).

Prima dell'intervento il 69.6% (501/720) dei pazienti era in terapia antiaggregante singola, il 17.6% (127/720) era in duplice terapia antiaggregante, il 6,1% (44/720) era in terapia anticoagulante, il 5.9% (43/720) era in aspirina + warfarin e lo 0.7% (5/720) era in triplice terapia.

Per quanto riguarda l'antiaggregante, solo il 37.6% dei pazienti (271/720) l'ha proseguito nel perioperatorio infondendo acido acetilsalicilico e.v.. Nonostante tali pazienti avessero un rischio anestesilogico più alto (Classe ASA: 3.21 ± 0.43 vs 3.09 ± 0.57 ; $p=0.015$), la prosecuzione dell'antiaggregante ha determinato una minor incidenza di mortalità perinfartuale (4.7%, 1/21 vs 22% 8/36; $p=0.193$), di mortalità globale (1.11% 3/271 vs 4.45% 20/449; $p=0.025$) e la stessa incidenza di necessità di trasfusioni eterologhe (29.6% 80/271 vs 29.0% 131/449; $p=0.915$) ad eccezione di un eccesso di trasfusioni negli interventi urologici (OR 1.9) e ginecologici (OR 2.3).

Per quanto riguarda la terapia eparinica sottocute, il 20% dei pazienti (141/720) nel postoperatorio era in terapia con eparina a dosaggio terapeutico (alto dosaggio), mentre il restante 80% (579/720) era in terapia eparinica a basso dosaggio in profilassi di trombosi venosa profonda (TVP). I pazienti in terapia eparinica a dosaggio terapeutico (elevato) avevano un rischio anestesilogico leggermente più elevato rispetto agli altri pazienti (Classe ASA: 3.24 ± 0.46 vs 3.11 ± 0.53 ; $p=0.025$). Nel perioperatorio i pazienti in terapia eparinica a dosaggio terapeutico hanno avuto una maggior incidenza di reinfarti perioperatori (13.5% 19/141 vs 6.6% 38/579; $p=0.011$) una maggior incidenza di trasfusioni (38.3% 54/141 vs 28.1% 163/579; $p=0.023$) e una maggior mortalità globale (5.7% 8/141 vs 2.6% 15/579; $p=0.108$) rispetto ai pazienti in terapia eparinica a basso dosaggio.

Conclusioni: Nell'analisi retrospettiva di un gruppo di pazienti con pregresso infarto, sottoposti a chirurgia non cardiaca, la prosecuzione dell'antiaggregante nel perioperatorio si associa, in maniera statisticamente significativa, ad una minore mortalità perinfartuale e ad una minore mortalità globale perioperatoria senza che si sia verificato un incremento dei sanguinamenti con necessità di trasfusioni ad eccezione degli interventi urologici e ginecologici. La terapia eparinica sottocute a dosaggio terapeutico, ossia elevato, rispetto al dosaggio profilattico TVP, si associa invece ad un incremento in maniera statisticamente significativa non solo dei sanguinamenti con necessità di trasfusioni, ma anche ad un incremento degli infarti perioperatori e della mortalità globale. È comunque possibile che tale differenza sia in parte attribuibile ad una maggiore severità dei pazienti in terapia eparinica ad alto dosaggio, mentre l'effetto positivo della prosecuzione dell'antiaggregante nel perioperatorio è risultato indipendente dalla severità dei pazienti.

O159**Role of 123-iodine metaiodobenzylguanidine imaging in identifying heart failure patients at high risk for sudden cardiac death: a real world single centre experience**

Maria Lembo (a), Noemi Bruno (a), Nicolò Salvi (a), Francesco Adamo (a), Maria Laura Foschi (a), Massimo Mancone (a), Bruno Brasolin (a), Giuseppe De Vincentis (b), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari, (b) "Sapienza" Università di Roma; Medicina Nucleare

Background: According to guidelines, implantable cardioverter defibrillator (ICD) is recommended in prevention of sudden cardiac death (SCD) in heart failure (HF) patients (pts). Guidelines have several limitations because ICD indication is based mainly on left ventricular ejection fraction (EF). Recently, 123-iodine metaiodobenzylguanidine imaging (123-I MIBG) seems to identify, in pts candidate to ICD and independently from EF, pts at high risk of SCD (heart/ mediastinum (H/M) ratio <1.6).

Aim: Our aim is to assess, in a real world registry, the role of 123-I MIBG for the prediction of ventricular tachyarrhythmia causing appropriate ICD therapy in HF pts.

Methods: we enrolled 29 patients (pts), consecutively admitted to our hospital with diagnosis of HF and EF $\leq 35\%$, who underwent a 123-I MIBG imaging. A H/M ratio < 1.6 and a summed score (SS) > 26 were used as cut-off to identify high risk (group 1) versus (vs) low risk (group 2) pts. All pts of both groups were submitted to ICD implantation. We assessed ventricular arrhythmic (VA) events and appropriate ICD therapy at 6 months follow-up.

Results: 15 pts were included in group 1 and 14 in group 2. All baseline characteristics were similar in 2 groups (table 1), apart from the ischemic aetiology of HF (76% in group 1 vs 37% in group 2, $p=0.02$). In group 1, HM ratio was 1.38 ± 0.2 vs 1.77 ± 0.2 in group 2 ($p = 0.0002$); SS was 36.4 ± 9.7 vs 15 ± 6 in group 2 ($p < 0.0001$). At 6 months follow-up VA events causing appropriate ICD therapy in group 1 were 29% vs 4.5% ($p=0.04$) in group 2.

Conclusion: Our results seem to confirm that reduced 123-I MIBG uptake is associated with the occurrence of life-threatening ventricular arrhythmias in HF patients. MIBG imaging, in next future, may assume a pivotal role in indication to ICD identifying pts at high risk of SCD.

Table 1 Patients characteristics

| | Group 1 (N=15) | Group 2 (N=14) | p |
|--|----------------|----------------|---------|
| Age (years) | 64±15.5 | 67.5±9.6 | 0.5 |
| Male Sex (%) | 94 | 92 | ns |
| EF (%) | 27.7±6.6 | 29.3±6 | 0.5 |
| Ischemic aetiology (%) | 76 | 37 | 0.02 |
| H/M ratio | 1.38±0.2 | 1.7±0.2 | 0.0002 |
| Summed score | 36.4±9.7 | 15±6 | <0.0001 |
| Life-threatening arrhythmic events (%) | 29 | 4.5 | 0.04 |

CORONOPATIE

O160

C21, uno specifico agonista AT2 recettoriale, inibisce l'espressione antigenica e l'attività procoagulante del Fattore Tissutale in cellule mononucleate umane attivate da LPS.

Cristina Balia (a), Silvia Petrini (a), Valentina Scalise (a), Silvana Cianchetti (a), Tommaso Neri (a), Alessandro Celi (a), Roberto Pedrinelli (a)

(a) Dipartimento di Patologia Chirurgica, Medica, Molecolare e dell'Area Critica - Università di Pisa

Background: Un intenso cross-talk collega il Fattore Tissutale (TF), l'iniziatore della cascata coagulativa, con l'infiammazione. Il sistema renina-angiotensina (RAS) tissutale contribuisce a questa relazione tramite l'Angiotensina (Ang) II, il suo effettore finale che attraverso la stimolazione del recettore dell'AngII di tipo 1 (AT1R) amplifica svariati meccanismi proinfiammatori e stimola direttamente l'espressione del TF. Tuttavia, è plausibile ipotizzare che anche la stimolazione del AT2R possa contribuire alla regolazione del TF ma non esiste alcun dato sperimentale in favore o contro tale ipotesi.

Scopo: Per questo motivo, abbiamo studiato l'effetto di C21, un AT2R agonista altamente specifico, sull'espressione Antigenica (Ag) e l'attività procoagulante (PCA) del TF in cellule mononucleate umane (MNCs) attivate dal lipopolisaccaride (LPS), un tipico stimolo pro-infiammatorio.

Materiali e metodi: Le MNCs, sono state ottenute dal sangue di donatori sani usando il gradiente di densità discontinuo Ficoll/Hystopaque. C21, un agonista AT2R, PD123319 e Olmesartan (OLM), rispettivamente un AT2R ed un AT1R antagonista, sono stati aggiunti alle MNCs attivate con LPS (100 ng/mL x 18 ore a 37°C). La PCA è stata determinata tramite il "one-stage clotting assay". I risultati sono stati espressi in unità arbitrarie (AU) tramite il confronto con una curva di calibrazione ottenuta con concentrazioni note di TF. I livelli di TF Ag sono stati misurati tramite ELISA (Imubind TF kit, American Diagnostica Inc).

Risultati: LPS stimolava, come atteso, sia TF Ag (da 26±18 pg/mL a 832±588 pg/mL, n=14, p<0.001) e PCA (da 0,009±0,008 a 1,1233±0.45 AU, n=14, p<0.001), un effetto inibito da C21 in modo concentrazione-dipendente (TF Ag: 10⁻⁸ M: -34±27%, 10⁻⁷ M: -37±15%, 10⁻⁶ M: -44±17%, 10⁻⁵ M: -44±20%, n=14, p<0.001; PCA: 10⁻⁸ M: -26±25%, 10⁻⁷ M: -40±22%, 10⁻⁶ M: -42±19%, 10⁻⁵ M: -40±27%, n=14, p<0.001). PD123319 (10⁻⁶ M), un AT2R antagonista, attenuava (p<0.001) l'effetto inibitorio di C21 sia sull'espressione di TF Ag (10⁻⁸ M: -10±18%, 10⁻⁷ M: 0±25%, 10⁻⁶ M: -0±24%, 10⁻⁵ M: -3±21%, n=7) che PCA (10⁻⁸ M: -2±46%, 10⁻⁷ M: -22±15%, 10⁻⁶ M: -11±42%, 10⁻⁵ M: -16±13%, n=10). Inoltre, l'effetto modulante del C21 sull'espressione di TF Ag e PCA LPS-stimolata non veniva modificato in campioni in cui gli AT1R erano bloccati dal pretrattamento con OLM (10⁻⁶ M) (TF Ag: 10⁻⁸ M: -39±19%, 10⁻⁷ M: -41±16%, 10⁻⁶ M: -43±25%, 10⁻⁵ M: -54±18%, n=7, p<0.001; PCA: 10⁻⁸ M: -36±22%, 10⁻⁷ M: -46±29%, 10⁻⁶ M: -47±24%, 10⁻⁵ M: -54±23%, n=14, p<0.001).

Conclusioni: C21, un AT2R agonista, down-regola la risposta procoagulante stimolata da LPS, indicando un ruolo finora ignorato della stimolazione AT2 recettoriale sulla espressione antigenica e funzionale di TF, un meccanismo potenzialmente rilevante dal punto di vista clinico e fisiopatologico per la comprensione delle complesse relazioni esistenti fra collegano AngII ad infiammazione e coagulazione.

O161

Prognostic Impact of High Platelet Reactivity in Coronary Artery Disease: Systematic Review and Meta-Analysis

Marta Bisi (a), Umberto Barbero (a), Fabrizio D'Ascenzo (a), Giorgio Quadri (a), Claudio Moretti (a), Fiorenzo Gaita (a)

(a) *Cardiologia 1, Città della Salute e della Scienza, Torino*

Introduction: Negative results of recent randomized clinical trials testing the hypothesis of target therapy for patients with High On-treatment Platelet reactivity (HOPR) have questioned its independent impact on clinical outcomes.

Methods: Pubmed, Medline and Cochrane collaboration were searched for observational studies reporting independent predictive impact of aspirin and ADP receptor antagonists for patients undergoing Percutaneous Coronary Intervention (PCI). Cardiac adverse events (all-cause mortality and cardiovascular mortality, non fatal myocardial infarction and stroke, revascularization and stent thrombosis) were the primary end point. Sensitivity analyses were performed appraising separately aspirin and ADP receptor antagonists, indications for PCI (stable and not stable disease) and assays for HOPR. Publications bias was assessed graphically and with appropriate tests.

Results: 24 studies with 18,178 patients were included, with a median age of 66.8 (64- 68), and 22.7% (22.4-27.8) of female gender. Stable angina was admission diagnosis for 45% (37-100) of patients, Acute Coronary Syndrome (ACS) for 45% (33-100) and acute myocardial infarction (AMI) for 12% (0-34). HOPR on aspirin was reported in 25% (22-26) of population, on ADP receptor antagonists for 29% (25-37) and of both for 26% (22-39). After a follow-up of 1 year in median (0.1-1), 8.3% (3-11; all results are reported as median and interquartile range) cardiac adverse events occurred. Pooling all studies together, on treatment platelet reactivity increased risk of adverse events (OR 1.34 [1.11, 1.63], I² 0%). Sensitivity analysis showed that HOPR did not increase the risk of adverse events for patients with ACS, AMI or stable angina and for those resistant to aspirin, ADP antagonists or both. For all studies, publication bias was graphically and formally evident: after adjusting for it, HOPR was not significant (OR 1.2: 95% confidence interval [CI] 0.90-1.3)

Conclusion: Available evidence on HOPR is limited by relevant publication bias. After adjusting for clinical and literature confounders, HOPR did not demonstrate an independent impact on prognosis for unselected patients with both stable and unstable coronary disease. Its clinical impact for high-risk populations remains to be assessed.

O162

Visualizzazione in vivo della doppia irrorazione coronarica del muscolo papillare posteriore: dall'imaging alla fisiopatologia.

Sonia Ferretto (a), Manuel De Lazzari (a), Filippo Zilio (a), Benedetta Giorgi (b), Giuseppe Tarantini (a), Diego Miotto (b), Francesco Tona (a), Martina Perazzolo Marra (a), Sabino Iliceto (a)

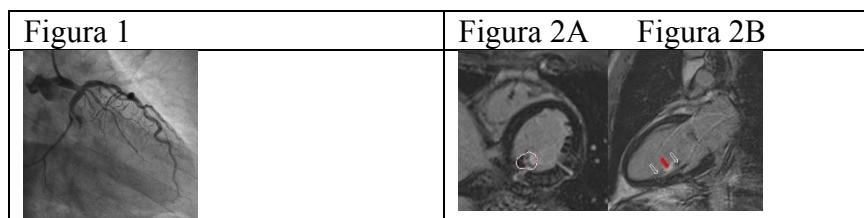
(a) *Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari, Policlinico Universitario, Padova*, (b) *Dipartimento di Scienze Mediche Diagnostiche, Policlinico Universitario, Padova*

Background: L'infarto miocardico acuto inferiore può complicarsi con insufficienza mitralica massiva da rottura del muscolo papillare postero-mediale (PPM), più spesso di quanto non avvenga nel caso di infarto che colpisca il muscolo papillare antero-laterale (PAL), dal momento che questo ha generalmente una duplice irrorazione, sia dalla coronaria circonflessa sia dalla discendente anteriore. Al contrario, la vascolarizzazione del muscolo PPM dipende pressoché esclusivamente dal ramo discendente posteriore della coronaria destra e solo in rari casi, quando vi sia un circolo coronarico a dominanza sinistra, è a carico del ramo circonflesso. Di seguito descriviamo un caso in cui si documenta *in vivo* la doppia vascolarizzazione del muscolo PPM con diverse conseguenze ischemiche coronaria-correlate, visualizzate dalla risonanza magnetica cardiaca.

Caso clinico: Maschio 52 anni, fumatore, affetto da ipertensione arteriosa in terapia, senza precedenti cardiologici. In data 03/04 u.s. il paziente accusava dolore costringente retrosternale per cui si recava in Pronto Soccorso, dove un ECG documentava sopraslivellamento del tratto ST in sede infero-laterale. Intrapresa la terapia antiaggregante, il paziente veniva sottoposto a studio ventricolocoronarografico urgente, con riscontro di coronaropatia critica monovasale in circolo coronarico a dominanza destra, con occlusione totale trombotica di sviluppato ramo marginale ottuso (Figura 1). La lesione veniva trattata con stenting diretto medicato con buon risultato angiografico finale. Un ecocardiogramma nei giorni successivi mostrava lieve riduzione della funzione sistolica con segni compatibili con infarcimento emorragico della parete posteriore e lieve rigurgito mitralico. Il paziente veniva sottoposto ad una prima risonanza magnetica cardiaca (entro le 36 ore) al fine di valutare la presenza di infarcimento emorragico. L'esame documentava una necrosi transmurale con massiva emorragia intramurale coinvolgente le pareti antero-laterale basale e media e infero-laterale media.

Il muscolo PPM della valvola mitralica appariva, nelle sequenze dopo contrasto, coinvolto dalla necrosi miocardica con una peculiare distribuzione del late gadolinium enhancement (LGE) con coinvolgimento parziale (Figura 2A) con risparmio inoltre della base e dell'apice (freccie bianche in Figura 2B) e con coinvolgimento invece della porzione media (freccia rossa in Figura 2B) indicativa della presenza di una duplice vascolarizzazione coronarica.

Conclusioni: La distribuzione a strie dell'LGE ha dimostrato in vivo come, in questo caso, sia presente una duplice vascolarizzazione coronarica del muscolo PPM, che risulta a carico del ramo marginale ottuso della circonflessa per la sua porzione media e verosimilmente a carico della coronaria destra per le porzioni basali e apicali. Il coinvolgimento solo parziale del muscolo PPM vicariato in questo caso da una duplice vascolarizzazione rende conto del limitato coinvolgimento della funzionalità della valvola mitralica, pur in presenza di un massivo infarto emorragico della parete laterale del ventricolo sinistro.



O163

Ectasia delle arterie coronariche: incidenza e patogenesi

Claudia Paleologo (b), Gregory Dendramis (b), Davide Piraino (a), Sabrina Spoto (b), Egle Incalcaterra (b), Giuseppe Andolina (a), Pasquale Assennato (c), Salvatore Novo (b)

(a) Policlinico Palermo UO di cardiologia interventistica ed emodinamica, (b) Policlinico Palermo UO complessa di cardiologia, (c) Policlinico Palermo Cardiologia II

Background: Poco è noto sull'eziopatogenesi dell'ectasia coronarica. Nel corso del tempo sono state formulate diverse ipotesi. La più accreditata tra queste riconosce come principale responsabile un'incontrollata attività di una particolare famiglia di enzimi che degradano la matrice extracellulare, le metalloproteasi (MMPs). Questa esasperata attività può essere imputabile ad un incremento in senso assoluto di tali enzimi e/o ad una riduzione dei livelli dei loro inibitori tissutali (TIMPs), che determina un rimodellamento espansivo della parete arteriosa.

Scopo: Valutare l'associazione tra coronaropatia ectasica ed i livelli sierici di alcune metalloproteasi di matrice, in particolare la MMP-2 (gelatinasi A o 72-kD gelatinasi), la MMP-9 (gelatinasi B o 92-kD gelatinasi) ed i loro rispettivi inibitori, TIMP-1 e TIMP-2, in pazienti con coronarie dilatate per dimostrare il ruolo patogenetico di queste molecole nella genesi dell'ectasia coronarica.

Materiali e metodi: In 40 pazienti con coronarie ectasiche (età media 60 anni, 32 maschi e 8 femmine), sottoposti ad esame coronarografico prevalentemente per sospetta sindrome coronarica acuta, è stato eseguito un prelievo di sangue venoso per il dosaggio delle MMP-2, MMP-9 e dei loro inibitori TIMP-1 e TIMP-2. I campioni sono stati centrifugati a 4°C per 10 minuti, il plasma separato in aliquote e congelato a -80°C. Successivamente è stato effettuato il dosaggio degli enzimi e dei rispettivi inibitori. 40 soggetti con coronarie indenni (età media 65 anni, 20 femmine e 20 maschi) sono stati inclusi come controlli. Per ciascun gruppo di pazienti sono stati valutati i più comuni fattori di rischio per malattia cardiovascolare (ipertensione arteriosa, dislipidemia, diabete mellito, familiarità), gli indici di funzionalità renale e l'indicazione clinica all'esecuzione della coronarografia.

Per la valutazione dei dati raccolti sono stati eseguiti dei calcoli statistici tramite lo Student's test, l'ANOVA test (ANalysis of VAriance test) e le curve ROC (Receiver-Operating Characteristics).

Risultati: Nei pazienti con ectasia coronarica erano presenti i più comuni fattori di rischio cardiovascolare, ma soltanto il 15% dei pazienti era diabetico. In entrambi i gruppi l'indicazione più frequente alla CVG è stata l'angina, seguita dalla diagnosi di infarto acuto del miocardio.

L'esame coronarografico ha mostrato un prevalente coinvolgimento della coronaria destra (nel 60,9% dei casi) ed una frequente coesistenza tra coronaropatia ectasica, CAE, ed aterosclerosi ostruttiva, CAD (nel 75% dei casi). Il test T student e il test ANOVA hanno dimostrato un aumento statisticamente significativo dei livelli di MMP 2 (P level <0,0001) e di MMP 9 (P level <0,0001) nei pazienti con coronarie ectasiche rispetto a quelli con coronarie indenni. Non è stata invece osservata una differenza statisticamente significativa per quanto riguarda i valori dei TIMPs.

E' stato inoltre dimostrato che la possibilità di ritrovare in associazione CAE e CAD dipende dai livelli di enzimi e dei loro inibitori nel sangue dei pazienti con ectasia coronarica.

Conclusioni: Il nostro studio ha riportato un'associazione significativa, indipendente e inversa tra CAE e diabete mellito. Inoltre è stato dimostrato un incremento statisticamente significativo di MMPs nei pazienti con coronarie dilatate, confermando il probabile ruolo di questi ultimi nella genesi della patologia ectasica. Infine è stata documentata la frequente coesistenza di CAE e CAD la cui associazione risulta meritevole di ulteriori studi e approfondimenti.

O164

Rilascio locale di agenti trombolitici prima della trombectomia in pazienti con STEMI sottoposti a PCI

Cesare Greco (a), Marina Polacco (a), Elodia Sussolano (a), Aldo Maria Rosignuolo (a), Tiziana Spezzano (a), Ester Taurino (a), Michele Schiariti (a), Francesco Pelliccia (a), Carlo Gaudio (a)

(a) Università di Roma "La Sapienza", Facoltà di Medicina, Dipartimento Cuore e Grossi Vasi.

Background: Nello STEMI un'immediata riperfusione mediante PCI migliora i risultati clinici consentendo il salvataggio del tessuto miocardico. Sebbene l'uso della tromboaspirazione tramite PCI possa migliorare il flusso epicardico e la perfusione miocardica, diversi punti restano da chiarire.

Scopo: Valutare l'ipotesi che il rilascio locale di una bassa dose di trombolitici possa migliorare l'efficacia della tromboaspirazione in pazienti con STEMI sottoposti a pPCI.

Metodi: Un totale di 102 pazienti con STEMI ed evidenza angiografica di trombosi occlusiva nel vaso culprit sono stati randomizzati a ricevere localmente un bolo di 200,000 unità di Urokinasi (N=51) o soluzione salina (N=51) seguita da tromboaspirazione (Pronto™, Vascular Solution, Inc., Minneapolis, Minnesota) e PCI. Entrambi i gruppi hanno ricevuto abiciximab (bolo e.v. + infusione per 12h). Gli end points includevano TIMI flow grade, TIMI frame count, e TIMI thrombus grade >2, Myocardial Blush Grade (MBG), risoluzione dell'ST in 60 minuti (STR)>70%, e risultati clinici a 6 mesi. Tutti i pazienti hanno effettuato controllo ecocardiografico con valutazione della frazione di eiezione ventricolare sinistra (LVEF) e del Wall Motion Score (WMS).

Risultati: I due gruppi hanno mostrato caratteristiche cliniche e angiografiche sovrapponibili. L'urokinasi locale è stata associata ad un più alto TIMI flow grade 3 ed evidenza post-PCI (96% vs

68%; $p=0.027$), un più basso TIMI frame count (18 ± 11 vs 25 ± 13 ; $p=0.045$) ed un minor TIMI thrombus grade >2 (20% vs 52%; $p=0.039$). La valutazione istopatologica effettuata in 11 pazienti del gruppo A e 11 pazienti del gruppo B ha dimostrato che i trombi aspirati post-urokinasi erano più piccoli, più soffici e meno organizzati rispetto a quelli post-infusione di soluzione salina. La perfusione miocardica post-PCI ha mostrato un lieve aumento nei pazienti trattati con urokinasi (MBG 2/3: 88% vs 64%; $p=0.09$), con un significativo numero di pazienti che ha mostrato STR $>70\%$ (80% vs 56%, $p=0.001$). Non si è riscontrata alcuna differenza fra i due gruppi sia nei risultati clinici che nella frazione di eiezione, mentre il Wall Motion Score a 6 mesi è stato significativamente più basso nei pazienti a cui è stata somministrata urokinasi locale rispetto a quelli a cui è stata infusa soluzione salina. (1.21 ± 0.29 vs 1.45 ± 0.32 , $p=0.008$).

Conclusioni: Questo studio ha dimostrato come la somministrazione di basse dosi di trombolitici, prima della trombectomia, in pazienti con STEMI sottoposti a pPCI sia associata ad un flusso coronarico maggiore, aumentata perfusione miocardica e migliore cinesi regionale miocardica a 6 mesi. Pertanto la somministrazione di basse dosi di agenti trombolitici direttamente nel sito del trombo potrebbe rappresentare una valida strategia per migliorare l'efficacia della tromboaspirazione nella PCI primaria.

O165

Antithrombotic agent combinations in standard management of acute coronary syndrome: results from the italian cohort of epicor study

Claudio Cavallini (a), Sergio Berti (b), Gavino Casu (c), Ciro Mauro (d), Francesco Gentile (e), Giovanni Maria Santoro (f), Piovaccari Giancarlo (g), Giancarlo Marenzi (h), Leonardo Paloscia (i), Leonardo De Luca (l)

(a) Ospedale Santa Maria Misericordia, Perugia, (b) Ospedale Pediatrico Apuano G. Pasquinucci, Massa Carrara, (c) Ospedale San Francesco di Nuoro, Nuoro, (d) Ospedale Cardarelli, Napoli, (e) Ospedale Bassini, Cinisello Balsamo, (f) Ospedale S. Giovanni di Dio; Firenze, (g) Ospedale degli Infermi, Rimini, (h) Centro Cardiologico Monzino, Milano, (i) Ospedale Civile Santo Spirito, Pescara, (l) Roma European Hospital, Roma.

Objectives: EPICOR was a multinational, prospective, observational, longitudinal cohort study designed to describe the short- and long-term antithrombotic management patterns (AMPs) in a real-life setting for patients hospitalized with an acute coronary syndrome (i.e. STEMI, NSTEMI-ACS). The international cohort included overall 10,568 pts in 555 centres in 20 countries. In-hospital data relative to the Italian cohort (901 pts) are presented here. This analysis wants to describe the management of ACS in Italy. This may be of help for doctors/payers to better understand current management of patients and identify improvement measures.

Methods: Eligible patients were those discharged after hospitalization for ACS within 24 h of symptom onset and who had a final diagnosis of ST-segment elevation myocardial infarction (STEMI) or unstable angina or non-ST segment elevation myocardial infarction (NSTEMI-ACS). UA, STEMI or NSTEMI precipitated by or as a complication of surgery, trauma, or GI bleeding or post-PCI, or occurring in patients already hospitalized for other reasons were not enrolled. The patients were followed up for 24 months after discharge.

Results: The Italian cohort consisted of 901 patients enrolled by 34 centres, among primary, secondary or tertiary hospitals. Patients were 701 men and 200 women, with a higher proportion of UA/NSTEMI among women (60%) and more women in NSTEMI-ACS than men comparatively; median age was 64 years, with older patients in UA/STEMI group (67 years vs. 62 in STEMI, respectively). Ethnicity was Caucasian in almost 99% of patients, the two groups were well balanced for weight, height and BMI. From this point on, values for STEMI vs. UA/NSTEMI are given for the different parameters as follows: presence of cardiovascular risk factors at baseline was 79.4% vs. 87%, respectively. They included hypertension (51.5 vs. 68.8%), hypercholesterolemia (45.4 vs. 56%), diabetes mellitus (overall 18.6 vs. 27.2%), current smoker (44.5 vs. 24.3%) and previous

cardiovascular disease (19.5 vs. 46.5%). Main pre-hospital medications were anti-platelets (mostly ASA, 17.5 vs. 6.1%; clopidogrel 8.3 vs. 3.4%) and anticoagulants (mostly unfractionated heparin, 12.3 vs. 1.8%; LMW heparin 1.8 vs. 1.1%). Median time from symptom onset to ECG was 1.58 (0-25.9) vs. 2.82 (0.2-673.5) h ECG was abnormal for ischemia in 97.6 vs. 58.7% of patients. In-hospital medications included thrombolytic agents in 10.3 vs. 0.0%, at least one antiplatelet drug in 100 vs. 99.8%, anticoagulant therapy in 64.9 vs. 69.2%. Overall, on the basis of pre- and in-hospital treatment, the antiplatelet regimen was ASA+clopidogrel in 56.4 vs. 70.6%, ASA+clopidogrel+GP IIb/IIIa in 30.5 vs. 13.7%, ASA only in 8.8 vs. 11.5%. Patients undergone any PCI were 93.4 vs. 80.0%; thrombolysis 12.1 vs. 0.0%. Patients who underwent CABG were 1.3 vs. 1.6%. Median time from symptom onset to first PCI was 3.1 (0-360) vs. 33.0 (0-744) h. Patients in need of a second or more procedures were 12.1 vs. 6.3%. Resuscitation was required in 5.7 vs. 1.6%, mechanical ventilation was necessary in 1.5 vs. 0.0%. In-hospital outcome was myocardial infarction in 0.2 vs. 2.0%, recurrent ischemia 0.9 vs. 1.1%, heart failure in 3.7 vs. 2.0%, cardiogenic shock in 2.2 vs. 0.2%. Cardiac arrest occurred in 5.9 vs. 0.4%, atrial fibrillation/flutter in 4.4 vs. 4.7%. Rate of haemorrhagic complications was low: 2.4 vs. 1.6%.

Conclusion: A+C is still the most frequently prescribed acute AT for ACS, followed by the triple antithrombotic drug regimen. Management pattern rank is the same for STEMI and UA/NSTEMI.

CASI CLINICI 2

O166

Sustained monomorphic ventricular tachycardia in a rare case of non-ischemic left ventricular aneurysm

Daniele Menci (a), Francesca Maria Righini (a), Valerio Zacà (a), Marta Focardi (a), Matteo Cameli (a), Roberto Favilli (a), Sergio Mondillo (a)

(a) Department of Cardiovascular Disease, Hospital Santa Maria alle Scotte, University of Siena, Siena

Case Report: We describe the case of a 67 years old obese, hypertensive caucasian man admitted to our intensive care unit for sustained monomorphic ventricular tachycardia (VT). The patient had no major medical conditions and only was treated with an ACE-inhibitor. In the hours before admission he reported some limitation in his functional capacity and to have experienced multiple episodes of dizziness and lightheadedness. The first available 12-leads ECG (**Figure 1**) recorded at the emergency department showed a fast VT likely originating from the infero-lateral wall of the left ventricle (LV). The arrhythmia was sustained but spontaneously terminating and the underlying ECG showed atrial fibrillation (AF) with no other abnormal findings. During the arrhythmia the patient experienced lightheadedness without loss of consciousness secondary to hemodynamic marginalization. Intravenous amiodarone and heparin were started, followed by intravenous lidocaine for recurrent episodes of sustained VT of short duration, and after few hours sinus rhythm was restored with no recurrence of VTs. Cardiac biomarkers and basic labs were all unremarkable. Transthoracic echocardiography (TTE) revealed the presence of LV aneurysm of the basal segments of the infero-lateral wall (**Figure 2**), with mild reduction of ejection fraction (EF 50%). Coronary angiography documented mild atherosclerosis without significant stenosis. Magnetic Resonance Imaging (MRI) clearly depicted the presence of LV aneurysm at the basal infero-lateral wall with intramyocardial adipose infiltration and a non-ischemic pattern at delayed-enhancement imaging and the absence of intramyocardial edema (**Figure 3**). The patient underwent implantation of a bicameral implantable cardioverter defibrillator (ICD) with an uneventful subsequent clinical course and was eventually discharged home on prophylactic amiodarone for the prevention of short-term AF recurrences. VT ablation was considered as a second-line option in case of VTs recurrence.

Discussion: Idiopathic LV aneurysms without identifiable underlying cause are rare. However, they may be associated with life-threatening ventricular tachyarrhythmias and cardiac arrest even as a first manifestation of the disease. So far, little is known about the pathogenesis of idiopathic LV aneurysms. Transthoracic echocardiography, MRI, and cardiac catheterization can reliably detect the location, extent, and morphology of the aneurysm. Modern contrast-enhanced MR imaging provides additional information on myocardial tissue characteristics, perfusion, and viability. Based on the potential clinical correlates, empiric therapeutic options therefore may range from antiarrhythmic drugs, to VT ablation, implantation of an ICD, or less frequently aneurysmectomy.

Conclusions: We reported the case of a LV aneurysm without evidence of myocardial infarction or significant coronary disease, unraveling with life-threatening ventricular tachyarrhythmia as the first clinical manifestation, and treated with ICD implantation.



Figure 1

Figure 2

Figure 3

O167

Raro caso di origine anomala della coronaria sinistra dall'arteria polmonare in uomo adulto asintomatico fino all'età di 58 anni

Mario Crisci (a), Ciro De Simone (b), Paolo Calabrò (a), Santo Delle Grottaglie (b), Arcangelo D'Errico (b), Renatomaria Bianchi (a), Donato Tartaglione (a), Maurizio Cappelli Bigazzi (a), Roberto Giordano (a), Alessandra Cacace (b), Maria Giovanna Russo (a), Pasquale Guarini (b), Raffaele Calabrò (a)

(a) *Cardiologia Seconda Università degli Studi di Napoli AO dei Colli - Monaldi, Napoli*, (b) *Cardiologia Casa di Cura Villa dei Fiori, Acerra Napoli*

L'origine anomala della coronaria sinistra dall'arteria polmonare è una rara anomalia cardiaca, in una piccola percentuale dei casi associata ad altri difetti cardiaci. Nella vita fetale l'equipararsi delle pressioni sistemiche e polmonari permette flusso anterogrado attraverso la coronaria sinistra e buona ossigenazione dei miociti. Dopo la nascita la perfusione coronarica diventa inadeguata e la progressiva ipoperfusione induce segni di angina al minimo sforzo (durante i pasti), sino ad arrivare ai segni di infarto conclamato ed alla massiva dilatazione del ventricolo sinistro con insufficienza mitralica. I pazienti che sopravvivono a queste crisi ischemiche possono sviluppare un circolo collaterale intercoronarico od uno shunt sinistro destro tra coronaria anomala ed arteria polmonare. È causa spesso di morte improvvisa, ischemia miocardica e cardiomiopatia dilatativa nei primi anni di vita. In rari casi si giunge all'età adulta e si possono avere quadri di dilatativa, insufficienza valvolare mitralica, ischemia, fino a morte improvvisa per l'instaurarsi di aritmie maligne. Riportiamo un caso rarissimo di ALPACA. Paziente di 58 anni che giunge alla nostra osservazione per dispnea e riferito gonfiore arti inferiori. All'ECG evidenza di aspecifiche anomalie del recupero ventricolare. All'ecocardiogramma evidenza di lieve dilatazione del VSx con acinesia dei segmenti medio basali della parete anteriore con FE 55% ed insufficienza mitralica moderata. Enzimi cardiaci positivi. Viene pertanto eseguita coronarografia con non visualizzazione dell'ostio del tronco comune dall'aortografia. Coronaria destra di buon calibro e decorso esente da stenosi emodinamicamente significative. Ampio circolo collaterale che dalla coronaria destra riabita interamente ramo interventricolare anteriore e circonflessa.

Il paziente viene inviato ad eseguire una RMN cardiaca con evidenza di ventricolo sinistro moderatamente dilatato con area di disfunzione focale in sede anteriore e con normale funzione sistolica globale. Prolasso valvola mitrale associato ad insufficienza valvolare di grado moderato. Origine anomala dell'arteria coronaria sinistra dal tronco dell'arteria polmonare.

Il paziente si è recato presso centro di cardiocirurgia e viene trattato con legatura della comunicazione dell'ostio coronarico su tronco della polmonare e by pass in AMIS su IVA. Torna a controllo dopo 6 mesi e ripete RMN con evidenza di: esiti di intervento di correzione di origine anomala dell'arteria coronaria sinistra dall'arteria polmonare. Buona visualizzazione del graft in arteria mammaria sinistra su discendente anteriore, con quest'ultima che appare diffusamente dilatata (9 mm); assenza di jet di comunicazione tra circolo coronarico ed arteria polmonare. Dal punto di vista clinico il paziente continua a lamentare dispnea per sforzi moderati. Classe NYHA II.

Discussione

Fondamentale nel neonato o nel bambino è la diagnosi precoce dell'ALPACA per indirizzare il più velocemente possibile il soggetto alla correzione chirurgica con re inserzione della coronaria sinistra sull'aorta. La diagnosi è affidata attualmente alla TC o RMN cardiaca. Per quanto riguarda l'adulto non sono presenti in letteratura dati certi riguardo al trattamento. Secondo alcuni autori la re inserzione deve essere sempre il primo intervento considerato tuttavia che nell'adulto spesso non è perseguibile. Altri interventi possibili sono la creazione di un baffle attraverso l'arteria polmonare oppure la combinazione della legatura dell'origine anomala e CABG. Eseguiremo un attento follow up del nostro paziente per valutare la prognosi e la riuscita del trattamento chirurgico.

O168

Un caso complesso di Cardiomiopatia Ipertrofica con Ostruzione MedioVentricolare, aneurisma dell'apice ed 'enlargement' basale del ventricolo sinistro.

Vito Maurizio Parato (a), Iacopo Olivotto (b), Benedetto Labanti (a)

(a) U.O. Cardiologia - Ospedale Madonna del Soccorso, San Benedetto del Tronto - UNIVPM, Ancona, (b) CRR per le cardiomiopatie ipertrofiche e dilatative - AOUC, Careggi, Firenze

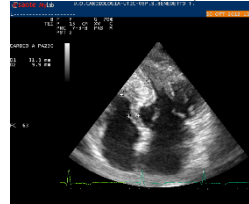
Il Caso: Trattasi di una paziente di sesso femminile di anni 60, con diagnosi di CardioMiopatia Ipertrofica (CMI) dall'età di 30 anni. La malattia è rimasta asintomatica per 27 anni circa e la paziente ha portato a termine due gravidanze. Nel 2010 la paziente viene rivalutata a causa di un episodio di fibrillazione atriale ad alta frequenza, con instabilità emodinamica e che viene cardiovertita elettricamente. Altro episodio di f.a. rapida, con instabilità emodinamica e sempre trattata elettricamente, si verifica nel 2012. Dopo tale episodio la CF/NYHA è II-III, con ipotensione e percezione di cardiopalmo. Il quadro ecocardiografico attuale depone per una massiva ipertrofia parietale a livello della porzione media del ventricolo sinistro, con spessore massimo (23 mm) a livello settale. Vi è obliterazione sistolica della camera ventricolare sinistra a livello medio, dilatazione aneurismatica dell'apice, assottigliamento parietale e significativo 'enlargement' della porzione basale del ventricolo sinistro con evidente bulging del setto interventricolare inferobasale. Aggiungasi un impianto periapicale dei due muscoli papillari, ipertrofici. Al doppler era riscontrabile un quadro di ostruzione medioventricolare con gradiente diastolico fino 13 mmHg e un gradiente sistolico diretto verso l'apice (variabile da 20 a 60 mmHg a seconda dell' R-R). Erano inoltre evidenti dimensioni atriali sinistre marcatamente aumentate (volume indicizzato= 45 ml/mq) e una severa disfunzione diastolica con pattern restrittivo pur in presenza di normale funzione sistolica globale (FEVS 65%). Il quadro ECG basale era di un RS, QRSD 112 ms, PR 156 ms, QT(c) 428 ms, deviazione assiale sinistra, ST tendenzialmente sopraelevato in V1-4, T negativa in D1, avL. Durante F.A. rapida si assisteva a sopraelevazione simil-infartuale di ST fino 4 mm da V1 a V5, reversibile dopo cardioversione elettrica. Aggiungasi un pattern aritmico ventricolare con run di TVNS sia mono che polimorfa all'holter. Considerazioni fisiopatologiche. La ostruzione medioventricolare nella CMI è una evenienza rara (1% di tutte le CMI). Il quadro fisiopatologico è caratterizzato da una severa disfunzione diastolica con annullamento della cavità medioapicale e, in qualche caso, 'enlargement'

SIC | *Indice Autori*

compensatorio della cavità basale come nel nostro caso. L'ostruzione si complica (nel 28% dei casi circa) con la formazione di aneurisma apicale (1). I pazienti con tale tipologia di CMI sono generalmente più sintomatici e l'ostruzione medioventricolare + l'aneurisma apicale sono una fattore di rischio indipendente di morte improvvisa e di eventi aritmici potenzialmente letali (1).

Management: La paziente è stata posta in terapia con amiodarone (200 mg/die), bisoprololo (2,5 mg/die), warfarin per INR 2-3. E' stata pianificata CRM, TCMS coronarica e successivamente impianto di ICD. Dopo cardio-RM sarà pianificata strategia chirurgica, per la quale le maggiori evidenze in letteratura sono a favore dell'approccio transapicale.

Referenze - 1. Minami Y. Clinical implications of midventricular obstruction in patients with hypertrophic cardiomyopathy. [J Am Coll Cardiol.](#) 2011 Jun 7;57(23):2346-55.



O169

Diagnosi fetale di aneurisma sacciforme del seno di Valsalva destro fistolizzato nel corpo del ventricolo destro: caso clinico

Concetta Ricci (a), Fiorella Fratta (a), Carmela Morelli (a), Laura Di Pietto (a), Nicola Di Virgilio (a), Giuseppe Santoro (a), Gianpiero Gaio (a), Maria Teresa Palladino (a), Giuseppe Caianiello (b), Maria Giovanna Russo (a)

(a) Pediatric Cardiology - AORN dei Colli – AO Monaldi, SUN, Naples, (b) Pediatric Heart Surgery - AORN dei Colli – AO Monaldi, Naples

Caso clinico: La fistola coronarica è una rara anomalia consistente nella comunicazione diretta tra un'arteria coronarica epicardica ed una camera o un vaso cardiaco. Tale anomalia presenta un'incidenza dello 0.8% delle cardiopatie congenite (1/100.000 nati vivi). Le sedi di drenaggio più frequenti sono rappresentate dalle camere cardiache destre: vena cava superiore, atrio e ventricolo destro, seno coronarico, arteria polmonare.

Nelle fistole di tipo congenito si distinguono due varietà: quelle associate ad altre malformazioni (come per es. atresia polmonare a setto intatto) e quelle presenti in forma isolata. La diagnosi fetale delle forme isolate è molto rara perché particolarmente difficile. In letteratura sono riportati alcuni casi di oblitterazione percutanea di tali difetti, nonostante la procedura possa essere particolarmente indagine.

Presentiamo il caso clinico di una neonata affetta da aneurisma sacciforme del seno di Valsalva destro fistolizzato nel corpo del ventricolo destro giunta alla nostra osservazione alla 30 settimana di gestazione. L'ecocardiografia fetale faceva sospettare una sospetta fistola coronarica tra il seno coronarico destro e l'infundibulo del ventricolo destro. La piccola nacque mediante parto spontaneo alla 36° settimana. Il peso alla nascita era 2.550 g. Apgar 8-9. L'esame obiettivo alla nascita era nella norma. Trasferita presso la nostra UOD di Cardiologia pediatrica in prima giornata di vita, è stata sottoposta a monitoraggio continuo dei parametri vitali con controlli ECG seriati, che hanno evidenziato nel corso dei giorni anomalie della ripolarizzazione nelle derivazioni precordiali come da sovraccarico ventricolare. Inoltre, si è avuto riscontro di valori di Troponina I lievemente aumentati (max 0.12 ng/dl). In 15° giornata di vita è stata sottoposta ad esame emodinamico diagnostico che concludeva per: aneurisma sacciforme del seno di Valsalva destro fistolizzato nel corpo del ventricolo destro. Pertanto, in 32° giornata di vita è stata sottoposta ad intervento di legatura della zona aneurismatica al suo imbocco. Ad un follow up di 4 mesi, l'ecocardiogramma mostra buone dimensioni e funzioni ventricolari destre e l'elettrocardiogramma mostra assenza di anomalie.

O170

Sotos syndrome, isolated left ventricular non compaction cardiomyopathy and ventricular pre excitation: a case report.

Francesca Cortese (a), Pietro Scicchitano (a), Annapaola Zito (a), Michele Gesualdo (a), Marco Sassara (b), Pasquale Caldarola (b), Giulia Frasso (a), Mariangela Carbone (a), Marco Matteo Ciccone (a)

(a) Cardiovascular Diseases Section, Department of Emergency and Organ Transplantation (DETO), University, (b) Department of Cardiology, San Paolo Hospital- ASL Bari, Bari, Italy

We report the case of a 22 year-old-male patient affected by Sotos syndrome was preoperatively and urgently evaluated for tracheal stent implantation due to respiratory insufficiency caused by idiopathic tracheal stenosis. Rest electrocardiogram detected a ventricular pre excitation; a transthoracic echocardiography showed a classic pattern fulfilling criteria for isolated left ventricular non compaction. At the best of our knowledge this is the first report of a patient suffering from Sotos syndrome and simultaneously affected by isolated left ventricular non compaction and ventricular pre excitation. Sotos syndrome is a rare (1:14,000 newborns) genetic disorder diagnosed according to the following criteria: overgrowth with advanced bone age, macrocephaly, facial characteristics (i.e., prominent forehead, receding hairline, hypertelorism with down slanting palpebral fissures, prominent jaw and pointed chin), and learning difficulties.

It is due to a mutation or deletions in NSD1 gene located at chromosome 5q35 (discovered in 2002) and coding for a histone methyltransferase implicated in transcriptional regulation. This genetic alteration accounts for more than 75% of cases. According to heart related diseases, Sotos syndrome shows atrial and or ventricular septal defects, patent ductus arteriosus, truncocoanal anomalies in 25% of cases. Nevertheless, at the best of our knowledge only one case is associated with ventricular pre excitation, and 2 cases with ILVNC.

ILVNC and SOTOS relationship: ILVNC is a myocardial disorder maybe due to failure in compactation process during myocardial embryogenesis; in 2006 the American Heart Association classified ILVNC as a genetic cardiomyopathy (7). Despite genetic heterogeneity, its inheritance is autosomal dominant/ recessive in adult, X-linked in children. Some cases are caused by the loss of cardiac specific gene, named CSX, mapped on 5q chromosome, thus the same involved in Sotos syndrome (8). Furthermore, subtelomeric defects account for facial anomalies. Alterations in subtelomeric sequences of chromosome 5q can be outlined both in Sotos syndrome and ILVNC.

ILVNC and ventricular pre excitation relationship: ILVNC and accessory pathways (the same involved in ventricular pre excitation) maybe caused by an arrest of normal embryogenesis of endocardium and myocardium in the absence of structural heart disease. For this reason the ventricular pre excitation features have been described in up to 15% of pediatric patient with ILVNC.

ILVNC, SOTOS and ventricular pre excitation: the final combined syndrome: Association of Sotos with ventricular pre excitation is more difficult to explain than Sotos – ILVNC one. Although 15% of ILVNC present a ventricular pre excitation EKG pattern, at the best of our knowledge only one Sotos syndrome case is associated with ventricular pre excitation. The triple association may be a purely random event; nevertheless genetic studies are still in progress in order to better define the role of NSX and CSX genes and other encoded from long arm of chromosome 5 in this novel and intriguing association. If the results of such research are confirmed, it will be necessary to carry out targeted diagnostic investigation in all Sotos patients in order to exclude or demonstrate the presence of cardiac abnormalities.

O171

Infarto acuto STEMI in giovane con cardiomiopatia non compatta biventricolare

Mario Crisci (a), Ciro De Simone (b), Paolo Calabrò (a), Santo Delle Grottaglie (b), Alessandra Cacace (b), Renatomaria Bianchi (a), Arcangelo D'Errico (b), Maurizio Cappelli Bigazzi (a), Donato Tartaglione (a), Giuseppe Limongelli (a), Giuseppe Pacileo (a), Roberto Giordano (a), Serena Prizio (a), Ludovica D'Acerno (a), Maria Giovanna Russo (a), Pasquale Guarini (b), Raffaele Calabrò (a)

(a) *Cardiologia Seconda Università degli Studi di Napoli AO dei Colli - Monaldi, Napoli*, (b) *Cardiologia Casa di Cura Villa dei Fiori, Acerra Napoli*

La cardiomiopatia non compatta è una rara forma genetica caratterizzata da trabecole aggettanti il lume ventricolare, con profondi recessi intertrabecolari. La sua causa è probabilmente secondaria ad arresto intrauterino della compattazione delle fibre miocardiche. La malattia può presentarsi con diversi quadri clinici che vanno dalla completa mancanza di sintomatologia allo scompenso cardiaco, aritmie ventricolari, embolie sistemiche e morte improvvisa. Attualmente molti autori ritengono che la non compatta appartiene ad una gamma di cardiomiopatie con aspetti clinici e fenotipici sovrapponibili e, con cause genetiche in comune. Colpisce più frequentemente gli uomini ed è più presente nella razza nera.

Caso clinico: Presentiamo un caso di un uomo di 30 anni senza conosciuti fattori di rischio cardiovascolare. Durante un test ergometrico, praticato per precordi algie aspecifiche, ha presentato intenso dolore toracico e sopraslivellamento del tratto ST in sede anteriore estesa. Trasportato al pronto soccorso è stato eseguito ecocardiogramma con evidenza di acinesia dell'apice in toto e della parete anteriore. Gli enzimi sono risultati positivi. È stata effettuata immediatamente coronarografia con evidenza di occlusione del tronco comune trattata mediante PTCA ed impianto di stent metallico. Con buon risultato angiografico finale. Dopo la procedura il paziente ha continuato a manifestare sintomi da scompenso e bassa gittata. È stata eseguita una RMN cardiaca con evidenza di: non compattazione miocardica con interessamento bi ventricolare. Ventricolo sinistro moderatamente dilatato, con area di disfunzione molto estesa e coinvolgente le pareti antero-settale, anteriore e laterale, nonché l'apice in toto. Funzione sistolica globale severamente ridotta (FE 32%). Versamento pleurico di grado severo a destra. Per il presentarsi di aritmie maligne dopo 40 gg dalla procedura coronarografica il paziente è stato sottoposto ad impianto di Defibrillatore. Eseguito screening per trombofilia, in attesa di refertazione. Attualmente in discreto compenso emodinamico (a 3 mesi dalla dimissione) con FE 40%.

Discussione: Appare chiaro in letteratura l'associazione tra la cardiomiopatia non compatta e fenomeni embolici periferici. Sono presenti alcuni casi di associazione di sindrome coronarica acuta e cardiomiopatia non compatta. Nel nostro caso clinico, la giovane età, l'assenza di fattori di rischio, e la buona qualità dell'albero coronarico a valle del trombo su tronco comune, rendono lecito il sospetto di una associazione tra le due patologie. Sono in corso gli esami genetici per eventuale trombofilia ma il paziente non ha mai avuto episodi trombo embolici fino all'evento in discussione. Nei primi studi appariva molto forte l'associazione con gli eventi trombo embolici (fino al 20% dei casi), attualmente appare molto meno significativa. Tuttavia la rarità della patologia e la mancanza di grossi registri non permette una definizione diagnostica, ma il nostro caso clinico rappresenta motivo di riflessione e spunto per eventuali successivi studi.

SPECKLE TRACKING

O172

Feasibility and agreement between different speckle tracking echocardiographic (STE) techniques for the assessment of left ventricular longitudinal deformation.

Sergio Buccheri (a), Stefano Leggio (a), Sarah Mangiafico (b), Ines Monte (a), Corrado Tamburino (a)

(a) *Dipartimento di Scienze Mediche e Pediatriche, Università di Catania*, (b) *UO Cardiologia Osp. Ferrarotto Catania*

Background: Left ventricular (LV) longitudinal deformation, conventionally determined by two-dimensional echocardiography (2DE), can nowadays be assessed with the use of new techniques like triplane echocardiography (3PEcho) and real time four-dimensional echocardiography (4DE). We aimed to assess the feasibility, reproducibility and agreement between these different speckle-tracking techniques in the assessment of longitudinal deformation.

Methods: All consecutive subjects underwent echocardiographic examination by using a GE Vivid 9 with a MS5 probe and a matrix array 4V probe. 2D cine loops from the apical views, a triplane view and a LV 4D full volume were acquired in all subjects. Speckle tracking analysis was performed using commercially available software and LV longitudinal strain for each imaging modality was obtained by using the 17-segments anatomic model of the LV.

Results. 101 subjects were included in the study. 2DE analysis of LV strain was feasible in 90/101 subjects, 3P strain in 89/101 while 4DE strain was obtained in 90/101. A total of 1717 segments were analyzed for each strain technique. The mean value of 2DE and 3P derived longitudinal strain was significantly higher in respect to 4DE strain. Relationship between 2DE and 3P ($r=0.782$) was significantly higher ($z=3.72$, $p<0.001$) than that between 2DE and 4DE ($r=0.429$) and that between 3P Echo and 4DE ($r=0.510$; $z= 3.09$ $p=0.001$).

Conclusions: Real time multi dimensional echocardiographic techniques for the assessment of longitudinal deformation are feasible but show a fewer number of segments considered as appropriate for analysis. 3P derived strain has a good relationship with 2D strain while 4DE significantly underestimates LV longitudinal deformation. Echocardiographic techniques for the assessment of longitudinal deformation are therefore not interchangeable and further studies are needed to assess specific reference values.

O173

Analisi della funzione torsionale età correlate negli atleti e sue relazioni con la funzione sistolica e diastolica, uno studio Speckle Tracking echocardiography

Amato Santoro (a), Federico Alvino (a), Giovanni Antonelli (a), Raffaella de Vito (a), Roberta Molle (a), Carlo Sassi (a), Stefano Lunghetti (a), Sergio Mondillo (a)

(a) *Università degli Studi di Siena, Divisione di Cardiologia Universitaria*

Background: La componente sistolica torsionale del ventricolo sinistro (LVT) costituisce un meccanismo di riserva contrattile negli atleti necessaria ad incrementare il cardiac output durante le prestazioni sportive. LVT risulta influenzato a riposo dalla frequenza cardiaca, dal riempimento diastolico e dallo shape del ventricolo sinistro. Con l'invecchiamento la funzione diastolica peggiora parallelamente all'aumento dei valori di LVT. Scopo del nostro studio è analizzare l'influenza dell'età sulla funzione diastolica e sul LVT negli atleti.

Metodi: Abbiamo arruolato 96 nuotatori che praticano attività sportiva circa 3 volte a settimana per due ore ad allenamento, li abbiamo suddivisi in 3 gruppi in base all'età e sottoposti ad esame ecocardiografico standard ed analisi Speckle Tracking Echocardiography (STE). Gruppo A: 40 atleti

SIC | *Indice Autori*

di età compresa tra 16 e 26 anni; gruppo B: 33 atleti di età compresa tra 27 e 37 anni; gruppo C: 23 atleti di età compresa tra i 38 e 48 anni.

Risultati: La funzione diastolica misurata con E/A era simile tra i 3 gruppi di atleti (A: 1.8 ± 0.5 ; B: 1.7 ± 0.5 ; C: 1.8 ± 0.6 ; $p = \text{Ns}$ tra i gruppi). LVT aveva valori simili in tutti e tre i gruppi (A: $10.5 \pm 5.1^\circ$; B: $10.6 \pm 5.2^\circ$; C: $8.3 \pm 3.3^\circ$; $p = \text{Ns}$ tra i gruppi). Vi è una correlazione inversa tra LVT ed E/A ratio ($r = -0.2$; $p < 0.05$). LVT ed E/A ratio non correlavano con l'età.

Conclusioni: Contrariamente a quanto si osserva in pazienti sedentari, la funzione diastolica ed LVT non appaiono influenzati dall'età. Il miglior riempimento diastolico degli atleti sviluppato con il costante allenamento aerobico, riduce e probabilmente ritarda gli effetti peggiorativi dell'età sulla funzione contrattile delle fibre subepicardiche responsabili del LVT e sulla funzione diastolica. Come già osservato in precedenti studi LVT risulta prevalentemente influenzato dall'E/A ratio e potrebbe essere utilizzato per ottimizzare lo studio della funzione sistolica e diastolica.

O174

Valutazione del rilasciamento ventricolare sinistro mediante strain rate Automated Function Imaging-derivato

Oana Mirea (c), Gabriele Savioli (b), Claudia Cefalù (a), Marco Guglielmo (d), Paolo Barbier (a)

(a) Centro Cardiologico Monzino IRCCS Milano Italy, (b) Fondazione IRCCS Policlinico San Matteo Clinica Medica II Università di Pavia, (c) Craic Center Craiova Romania, (d) Policlinico P. Giaccone di Palermo, Malattie Cardiovascolari, Palermo, Italy.

Scopo: Il picco di strain rate globale precoce diastolico (SRe) rappresenta la precoce performance diastolica di tutti i segmenti del ventricolo sinistro (VS) ed è stato dimostrato sperimentalmente dipendere dal rilasciamento del VS. Speckle-tracking Automated Function Imaging (AFI) è un metodo relativamente semplice per misurare lo strain longitudinale durante l'esame ecocardiografico. Abbiamo sperimentato il suo potenziale per misurare SRe in una vasta popolazione.

Metodi: Sono stati arruolati e sottoposti a ecocardiografia 427 soggetti consecutivi (339 con e 88 senza cardiopatia) (range, età: 14-93 aa; FC: 40-130 bpm; PAS: 90-180 mmHg; FE: 15-78%), utilizzando GE Vivid 7 e 9 systems (analisi offline con Echopac v12). Il picco massimo precoce diastolico AFI-derivato SRe e il tempo al picco SRe (SRetp, ms) sono stati ottenuti calcolando la prima derivata della curva dello strain precoce diastolico ottenuta nelle 3 proiezioni apicali.

Risultati: Il picco SRe e il SRetp seguivano una distribuzione normale e rispettivamente $1.86 \pm .83 \text{ s}^{-1}$ (95% CI 1.68, 2.03) e $153 \pm 42 \text{ ms}$ (95% CI 144, 162) nei normali, e $.98 \pm .6$ e 187 ± 76 nei pazienti (entrambi, $p < .001$). Entrambi erano ridotti nella cardiopatia dilatativa ($n = 35$; $.55 \pm .28$, 245 ± 86 ; $p < .001$), CAD con normale precarico ($n = 30$; $.71 \pm .51$, 201 ± 72 ; $p = .001$), e stenosi aortica ($n = 23$; $.9 \pm .38$ $p < .001$, 163 ± 38 ; $p = \text{ns}$); si dimostrava una tendenza a incremento di SRe negli atleti ($n = 12$; $2.34 \pm .86$). Alla regressione multipla corretta per precarico ventricolare sinistro, pressioni di riempimento, gittata pulsatoria, indice di massa ventricolare sinistra e volume atrio sinistro, SRe risulta influenzata positivamente da picco sistolico Doppler tissutale annulare, e negativamente da età, wall motion score index ventricolare sinistro, indice di massa ventricolare sinistra, frequenza cardiaca e col tempo di decelerazione dell'onda E mitralica ($r = .74$, $p < .001$), laddove SRetp è influenzato positivamente da wall motion score index VS, tempo di decelerazione dell'onda E mitralica e pressione sistolica polmonare, e negativamente da frequenza cardiaca ($r = .6$, $p < .001$). Mentre il tempo di rilasciamento isovolumico del VS era indicato come una variabile dipendente, lo abbiamo trovato influenzato negativamente da velocità massima di picco precoce tissutale mitralico, frequenza cardiaca, pressioni di riempimento ventricolari sinistre, e positivamente da SRetp ($r = .69$, $p < .001$). In particolare, SRe era grandemente ridotto in tutte le classi di disfunzione diastolica ventricolare sinistra (DD): assente DD, $1.67 \pm .8$ (95%CI 1.56-1.78); classe I DD, $.79 \pm .44$ (95%CI .72-.86); classe II DD, $.7 \pm .58$ (95%CI .33-1.07); classe III DD, $.67 \pm .23$ (95%CI .55-78); all $p < .001$.

Conclusioni: SRe e SRetp AFI-derivati sono entrambi influenzati dal rilasciamento ventricolare

sinistro e dalle sue determinanti. Differentemente dalla velocità Doppler tissutale dell'annulus mitralico riflettono il rilasciamento globale del ventricolo sinistro; fatto promettente dal punto di vista clinico, anche se attualmente non ancora misurabili "online".

O175

Ruolo dei beta bloccanti sulla funzione sistolica analizzata con metodica standard e Speckle Tracking ecocardiografica.

Amato Santoro (b), Federico Alvino (b), Giovanni Antonelli (b), Susanna Benincasa (b), Carlo Sassi (b), Sergio Mondillo (b)

(b) *Università degli Studi di Siena, Divisione di Cardiologia Universitaria*

Background: La struttura miocardica del ventricolo sinistro è costituita da fibre muscolari orientate obliquamente, a partire da un'elica destrorsa a livello subendocardico, fino ad arrivare ad un'elica sinistrorsa a livello subepicardico. La contrazione di queste fibre con orientamento elicoidale, determina un movimento di torsione intorno all'asse lungo del ventricolo sinistro, con la rotazione dell'apice del cuore rispetto alla base nota come movimento di twist (LVT). I betabloccanti sono farmaci che bloccano i recettori beta-adrenergici, proteggendo il cuore dagli effetti tossici delle catecolamine attraverso una [downregulation](#) dei recettori beta. Scopo dello studio è analizzare gli effetti dei beta-bloccanti su una popolazione di pazienti ipertesi in terapia betabloccante.

Metodi: Abbiamo arruolato 18 pazienti ipertesi in terapia antipertensiva con betabloccante (GB) (bisoprololo da 2,5 mg a 7,5 mg; massima dose tollerata dai pazienti, associata ad altri farmaci secondo le linee guida europee della terapia per l'ipertensione arteriosa) e 18 pazienti in terapia antipertensiva senza betabloccanti (GNB). I pazienti erano matchati per età, massa cardiaca, diametri endocavitari, frazione di eiezione. Tutti i pazienti sono stati sottoposti ad esame ecocardiografico standard ed analisi off-line Speckle Tracking echocardiography (STE).

Risultati: Non vi erano differenze tra i due gruppi nei parametri misurati con il Doppler pulsato e Tissutale (E/A, E/E'). I valori di Strain longitudinale e circumferenziale apicale e basale del ventricolo sinistro erano simili nei due gruppi di pazienti. GB mostrava valori più bassi di LVT rispetto a GNB (GB: $9.4 \pm 4.7^\circ$ vs $12.1 \pm 4.1^\circ$; $p < 0.05$), e valori più bassi di rotazione apicale ($3.8 \pm 5.4^\circ$ vs 7.1 ± 4.1 ; $p < 0.05$). Vi era una correlazione inversa tra LVT ed E/A ($r = -0.4$; $p < 0.05$), ed una correlazione diretta tra LVT ed E/E' ($r = 0.5$; $p < 0.05$). Vi era inoltre una correlazione tra i valori di LVT e strain longitudinale del ventricolo sinistro ($r = 0.39$; $p < 0.05$).

Conclusioni: Il twist ventricolare sinistro risulta ridotto in GB e come dimostrato in letteratura risente dello stato adrenergico dell'organismo. La correlazione inversa con lo strain longitudinale potrebbe identificare un potenziale effetto protettivo del beta-bloccante; questi farmaci riducendo il post carico ventricolare ed ottimizzando il riempimento proto diastolico permettono a LVT di svolgere una funzione di "riserva" contrattile. Le terapie antipertensive non beta bloccanti non riducono i valori di LVT lasciando ad esso la funzione di compenso sistolico necessario a mantenere una adeguata funzione sistolica nonostante una riduzione della funzione longitudinale caratteristica degli stati di aumentato post carico.

O176

Ivabradina: effetti sulla funzione ventricolare sx valutata con metodica speckle tracking nei pazienti con angina microvascolare

Romina Navarri (a), Claudia Nucci (a), Ester Maria Nucci (a), Stefano Lunghetti (a), Lucia Baldi (a), Paolo Aitiani (a), Roberto Favilli (a), Sergio Mondillo (a)

(a) *Dipartimento Cardio-toraco-vascolare, Azienda Ospedaliera Universitaria Senese.*

L'Ivabradina è un inibitore specifico della corrente If a livello del nodo senoatriale che determina una riduzione della frequenza cardiaca nei pazienti in ritmo sinusale. Tale farmaco costituisce un

trattamento sintomatico nei pazienti con angina pectoris stabile, tuttavia non ci sono ancora evidenze cliniche circa il suo ruolo nei pazienti affetti da angina microvascolare.

Scopo dello studio: Abbiamo arruolato un gruppo di pazienti con angina microvascolare diagnosticata dopo studio coronarografico o ecocardiogramma da stress. Abbiamo valutato vari parametri di funzione sistolica e longitudinale del ventricolo sinistro quali FE biplana, movimento dell'anello mitralico con M-mode (MAPSE), onda Sm con il Tissue Doppler e parametri ottenuti con metodica 2 D speckle tracking, quali strain longitudinale del ventricolo sinistro e movimento torsionale al basale e dopo 3 mesi di trattamento con ivabradina alla dose massima tollerata dal paziente.

Materiali e Metodi: 18 pazienti (età media 62 anni) sono stati sottoposti ad ecocardiogrammi al basale e a tre mesi dal trattamento con ivabradina. Sono stati misurati vari parametri quali MAPSE, Onda Sm con il Doppler tissutale (TDI) e, tramite software dedicato, il picco di strain longitudinale del ventricolo sinistro in proiezione 4 Camere e 2 camere Apicale (PVLS), l'angolo di twist ovvero il movimento torsionale che compie il ventricolo sx durante la sistole. Abbiamo inoltre valutato la frequenza di attacchi anginosi prima e dopo il trattamento.

Risultati: I valori di MAPSE miglioravano significativamente ($15 \text{ mm} \pm 1$ e $17.2 \text{ mm} \pm 2.8$ $p=0.03$) e si verificava anche un aumento significativo dell'onda Sm al TDI ($0.08 \text{ m/sec} \pm 0.01$ Vs $0.09 \text{ m/sec} \pm 0.02$, $P=0.03$) e dell'angolo di twist del ventricolo sx ($10.65^\circ \pm 2.6$ Vs $13.11^\circ \pm 2.5$, $p=0.01$). Vi era inoltre un incremento dello strain longitudinale del ventricolo sx che raggiungeva la significatività statistica (PVLS 4C: $-17\% \pm 4$ Vs $-20.7\% \pm 3.4$, $p=0.01$; PVLS 2 C: $-17.83\% \pm 1.9$ Vs $-19.91\% \pm 2.3$, $P=0.01$) e una netta riduzione fino alla scomparsa, in alcuni pazienti, degli episodi di angina.

Conclusioni: Nell'angina microvascolare l'ivabradina migliora la sintomatologia anginosa e determina un incremento della funzione longitudinale del ventricolo sinistro, valutata anche con tecniche innovative quali 2D speckle tracking. Questa metodica ci ha permesso di evidenziare un miglioramento dello strain longitudinale del ventricolo sinistro ovvero del movimento delle fibre dello strato endocardico che sono anche le più sensibili all'ischemia. L'ivabradina, riducendo la frequenza cardiaca, favorisce un maggior riempimento diastolico delle coronarie e pertanto migliora la perfusione delle fibre endocardiche che sono le più lontane dal flusso sanguigno epicardico. Essa incrementa inoltre l'angolo di twist ovvero il movimento rotazionale che compie il ventricolo sinistro durante l'eiezione ventricolare, reso possibile dalla sua architettura ad alfa elica e generato dalla rotazione oraria della base ed antioraria dell'apice.

O177

Ivabradine improves left ventricular systolic longitudinal function in heart transplant recipients with sinus tachycardia and normal ejection fraction

Matteo Lisi (a), Matteo Cameli (a), Cristina Di Tommaso (a), Marco Solari (a), Francesca Maria Righini (a), Marta Focardi (a), Sonia Bernazzali (c), Massimo Maccherini (c), Michael Y Henein (b), Sergio Mondillo (a)

(a) *Department of Cardiovascular Disease, University of Siena, Italy*, (b) *Department of Public Health and Internal Medicine and Heart Centre, Umeå University, Sweden.*, (c) *Department of Cardiac Surgery, University of Siena, Italy*

Background: Sinus tachycardia is frequently seen in heart transplant (HT) recipients, and results in increased myocardial oxygen demand and shortening of diastole which compromises resting stroke volume and myocardial perfusion. Ivabradine is a new drug that is able to reduce heart rate (HR) because of its selective inhibition of If current in the sinus node's cells. The aim of this prospective longitudinal study is to evaluate left ventricular (LV) longitudinal function by Speckle Tracking Echocardiography (STE), after 3 months of therapy with low dose Ivabradine (5mg bd) in addition to standard therapy, in such patients.

Methods: In this preliminary evaluation we enrolled 14 HT patients (49 + 14 months, after HT) with sinus tachycardia, in NYHA Class I. All patients had a normal LV ejection fraction ($EF > 55\%$),

SIC | *Indice Autori*

normal LV diastolic pattern and had no history of rejection. Echocardiographic examinations were performed before and after 3 months of Ivabradine therapy.

Results: After therapy HR fell (from 83.7 ± 8.8 to 92.5 ± 11.5 , $p < 0.001$) but LV EF and E/e' ratio remained unchanged. Among all analyzed parameters LV global longitudinal strain (-17.7 ± 2.1 vs -16.9 ± 2.9 , $p = 0.01$) and E/A ratio (2.1 ± 1.2 vs 1.8 ± 0.5 , $p = 0.05$) both increased.

Conclusions: This preliminary study shows that Ivabradine is able to reduce HR in HT patients and to improve systolic function, shown by longitudinal systolic performance, and diastolic function, in patients with normal LVEF.

FIBRILLAZIONE ATRIALE

O178

Rischio tromboembolico e terapia anticoagulante nei pazienti con fibrillazione atriale: analisi italiana dei dati basali del registro europeo prefer in af

Pasquale Mollo (a), Duino Boncompagni (a), Carmine Mazzone (b), Andrea Di Lenarda (c), Livio Di Lecce (d), Fabio Romeo (d), Giulia Renda (e), Raffaele De Caterina (e)

(a) *Unità Operativa di Cardiologia, Ospedale F. Spaziani, Frosinone*, (b) *Centro Cardiovascolare, ASSI, Trieste*, (c) *Centro Cardiovascolare, ASSI-Università di Trieste, Trieste*, (d) *Direzione Medica, Daiichi-Sankyo Italia*, (e) *Istituto di Cardiologia, Università "G. D'Annunzio" c/o Ospedale SS. Annunziata, Chieti*

Razionale: Le recenti linee guida della Società Europea di Cardiologia (ESC) per il trattamento e la gestione della Fibrillazione Atriale (FA) raccomandano l'utilizzo di una terapia antitrombotica per la prevenzione di eventi tromboembolici in tutti i pazienti con FA ad eccezione di quelli veramente a basso rischio. Per la valutazione del rischio tromboembolico è raccomandato l'utilizzo della scala CHA₂DS₂VASC. Tuttavia non sono disponibili molte informazioni riguardanti la valutazione del rischio con questa nuova scala in Italia e l'impatto delle raccomandazioni delle linee guida ESC nel nostro paese.

Metodi: Nel registro PREFER in AF (The PREvention of thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da Gennaio 2012 a Gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia, Spagna, Svizzera e Regno Unito. I dati di seguito riportati, raccolti in occasione della visita basale dello studio, si riferiscono alla valutazione del rischio tromboembolico, calcolato utilizzando la nuova scala CHA₂DS₂VASC, e all'utilizzo della terapia anticoagulante orale in Italia.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri. In Italia il 71.6% dei pazienti è risultato in trattamento, nei 12 mesi precedenti l'arruolamento nel registro, con antagonisti della Vitamina K (62% con warfarin e 9.6% con acenocumarolo). Ridottissimo era al momento dell'analisi l'uso di inibitori del fattore X attivato (0.1%) e di inibitori della trombina (0.2%), verosimilmente a causa dell'accesso ancora limitato a questi farmaci in Italia al momento della rilevazione dei dati. Nel 29.6% dei pazienti è stato riportato un trattamento con farmaci antiplastrinici (ASA 24.4%; clopidogrel 4.6%; prasugrel 0.5%; ticagrelor 0.1%). Nei pazienti arruolati è stata effettuata la valutazione del rischio tromboembolico mediante le scale CHADS₂ e CHA₂DS₂VASC. L'11.4% dei pazienti aveva un punteggio CHADS₂ = 0; il 30% = 1 e il 58.5% un punteggio ≥ 2 . Un punteggio CHA₂DS₂VASC = 0 è stato rilevato nel 4.7% dei pazienti. L'11.3% dei pazienti aveva un punteggio CHA₂DS₂VASC = 1 mentre l'84% dei pazienti aveva un valore ≥ 2 . Il 2.3% dei pazienti era in trattamento con antagonisti della Vitamina K nonostante un valore CHA₂DS₂VASC=0, mentre il 26.1% dei pazienti che avevano un punteggio di CHA₂DS₂VASC ≥ 1 non erano in trattamento con anticoagulanti orali.

Il rischio di sanguinamento dei pazienti è stato valutato con la scala HAS-BLED. Il 37.2% dei pazienti aveva un punteggio ≥ 3 .

Conclusioni: Esiste ancora in Italia una percentuale importante di pazienti con FA che, nonostante un profilo di rischio tromboembolico elevato, valutato con la scala CHA₂DS₂VASC, non riceve un trattamento con terapia anticoagulante orale, come raccomandato dalle Linee Guida europee. Per converso, esiste anche un uso inappropriato di anticoagulanti in categorie a rischio veramente basso, in cui la preferenza migliore dovrebbe andare al non trattamento.

O179

Caratteristiche dei pazienti affetti da fibrillazione atriale: analisi descrittiva delle differenze e analogie tra l'Italia e l'Europa nel registro prefer in af

Emilio Attenu (a), Raffaele Sangiuolo (a), Maurizio Lunati (b), Emanuela Teresa Locati (b), Livio Di Lecce (c), Fabio Romeo (c), Giulia Renda (d), Raffaele De Caterina (d)

(a) U.O. Complessa, Cardiologia – UTIC, Ospedale Buon Consiglio Fatebenefratelli, Napoli, (b) Dipartimento Cardiotoracovascolare, Ospedale Niguarda ca' Granda, Milano, (c) Direzione Medica, Daiichi-Sankyo Italia, (d) Istituto di Cardiologia, Università "G. D'Annunzio" c/o Ospedale SS. Annunziata, Chieti

Razionale: Il profilo dei pazienti affetti da Fibrillazione Atriale (FA) in Europa (EU) e nei singoli Paesi europei è ben delineato, poche sono invece le informazioni disponibili riguardanti le caratteristiche comuni e le differenze tra pazienti italiani ed europei, che mettano particolarmente in evidenza le modalità di trattamento e la gestione dei pazienti stessi.

Metodi: Nel registro PREFER in AF (The PREvention oF thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da Gennaio 2012 a Gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia (ITA), Spagna, Svizzera e Regno Unito. I dati di seguito riportati si riferiscono ad un confronto delle caratteristiche dei pazienti italiani ed europei al momento della visita basale dello studio.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri.

L'età media dei pazienti italiani era di 70.9 (± 11.08) anni, lievemente inferiore rispetto a quella europea (71.5 ± 10.7 anni).

L'incidenza di FA permanente era del 35.5%, persistente del 31.7% (in questo caso superiore del 7.7% rispetto alla media EU), parossistica del 26.9%.

Tra le comorbidità, l'ipertensione era presente nel 73.5% dei pazienti italiani, in linea con il dato europeo, mentre la percentuale di pazienti obesi (BMI $>30\text{kg/m}^2$) è risultata inferiore rispetto alla media EU (21.9% vs. 27.5%, rispettivamente).

Un precedente ictus ischemico è stato riportato nel 6.5% dei pazienti italiani, dato inferiore rispetto alla media EU (8.4%)

Il punteggio medio della scala di rischio tromboembolico CHADS₂ era di 1.9 \pm 1.2 (EU 1.8 \pm 1.3); mentre i valori medi della scala CHA₂DS₂VASC erano di 3.3 \pm 1.7 (EU 3.4 \pm 1.8).

Il 31% dei pazienti italiani aveva avuto degli eventi clinici/ospedalizzazioni nei 12 mesi precedenti l'arruolamento, dato questo superiore rispetto alla media EU (23.4%). I più frequenti eventi clinici sono stati la FA sintomatica (ITA: 17.4%; media EU 12.3%), lo scompenso cardiaco (ITA 6.5%, media EU 5.8%) e la sindrome coronarica acuta (ITA 4.1%; media EU 2.7%).

L'Italia è risultata essere il paese europeo con la percentuale più bassa di pazienti trattati con antagonisti della Vitamina K (71.6% vs una media EU del 78.3%).

Conclusioni: Sebbene il profilo dei pazienti italiani con FA sia risultato essere per molti aspetti omogeneo a quello dei paesi EU, differenze sono emerse per quanto riguarda una maggiore incidenza di eventi clinici/ospedalizzazioni nel nostro Paese e un minor utilizzo degli antagonisti della vitamina K rispetto alla media EU.

O180

Very long-term results of surgical and transcatheter ablation of longstanding persistent atrial fibrillation

SIC | *Indice Autori*

Elisa Ebrille (a), Marco Scaglione (b), Domenico Caponi (b), Lucia Garberoglio (b), Laura Vivalda (b), Alessandro Barbone (c), Roberto Gallotti (c), Fiorenzo Gaita (a)

(a) *Divisione di Cardiologia, Ospedale Molinette, Università degli Studi di Torino, Torino, Italy,*

(b) *Divisione di Cardiologia, Ospedale Cardinal G. Massaia, Asti, Italy,* (c) *Divisione di Cardiochirurgia, Istituto Clinico Humanitas IRCCS, Rozzano, Italy*

Background: New hybrid approaches for atrial fibrillation (AF) ablation, combining surgical and percutaneous procedures, are emerging to enhance the long term success rate of these two procedures severally considered. Recent guidelines underline the need for long-term follow-up to really assess the efficacy of AF ablation.

Methods: From 2000 to 2002, 33 patients with long-standing persistent AF and valvular heart disease underwent valve surgery and cryoablation (pulmonary veins isolation and mitral isthmus and roof line lesions). The surgically created ablation scheme was validated with electroanatomic mapping and percutaneous radiofrequency ablation was performed in case of lesion incompleteness.

Results: In 19/33 patients (58%) the electroanatomic mapping showed a complete lesion scheme, which increased to 79% (26/33) with the addition of radiofrequency ablation. At the mean follow-up of 10.7±3.1 years, 73% (24/33) of patients were in sinus rhythm (SR), whereas 27% had permanent AF. At the end of follow-up 81% of patients with a complete lesion scheme were in SR, while 43% with an incomplete one maintained SR (p=0.048).

Conclusions: In patients with long-standing persistent AF and valvular heart disease, the hybrid approach with surgical cryoablation consisting of pulmonary veins isolation and left atrial linear lesions combined with transcatheter radiofrequency ablation showed to be highly effective in maintaining SR in a very long-term follow-up. An electrophysiological evaluation, to validate the transmuralità of the surgical lesions and to complete the lesion scheme applying radiofrequency energy, allowed to improve the long-term efficacy.

O181

Variazioni della forza di contatto per la valutazione delle cause di riconnessione in acuto durante procedura di isolamento elettrico delle vene polmonari

Lorenzo Adriano Doni (a, b, c), Roberto De Ponti (a, b), Raffaella Marazzi (a, b), Jacopo Marazzato (a, b), Jorge Antonio Salerno Uriarte (a, b)

(a) *Dipartimento Cardiovascolare, Ospedale di Circolo e Fondazione Macchi, Varese,* (b) *Università degli Studi dell'Insubria,* (c) *Casa di Cura "Le Terrazze", Cunardo*

Premesse e scopo dello studio: Durante procedura di isolamento delle vene polmonari (IVP) per ablazione transcateretere (ATC) della fibrillazione atriale (FA) viene osservata in alcuni pazienti ripresa di conduzione a livello della giunzione atriovenosa durante la fase di verifica del blocco di conduzione a termine della procedura. Scopo dello studio è di valutare il ruolo della forza di contatto (FC) in tali soggetti.

Metodi: Sono stati considerati 20 pazienti consecutivi sottoposti a prima procedura di IVP per FA parossistica o persistente. La procedura è stata eseguita da 2 operatori esperti consapevoli dei valori di FC con ausilio del sistema CARTO3 (Biosense Webster, USA), utilizzando un sistema di integrazione di immagine (CARTOMerge) un catetere irrigato dotato di sensore meccanico di forza (Thermocool SmartTouch, Biosense Webster, USA). Sono stati considerati i valori medi di forza esercitati per ogni applicazione di radiofrequenza (RF) di 60" a 30W di potenza. Gli osti delle vene polmonari sono stati suddivisi in 15 quadranti. Al termine della procedura di IVP si sono attesi 30' e si è proceduto a verificare il blocco in entrata e in uscita da ciascuna VP. Nei siti di riconnessione sono state ripetute applicazioni di RF fino ad ottenere blocco completo stabile bidirezionale della conduzione atriovenosa.

Risultati: Si è osservata riconnessione acuta delle VP in 5/20 (25%) pazienti trattati; 3/11 procedure (27%) per l'operatore 1 e 2/9 procedure (22%) per l'operatore 2. In 5/5 pazienti la riconnessione è avvenuta a livello delle VP sinistre, di cui 3/5 a livello del quadrante anteriore, 1/5 a livello del quadrante superiore e 1/5 a livello della carena tra le 2 VP sinistre. I valori medi di FC non erano significativamente più bassi degli altri quadranti omolaterali, ma vi era una maggiore percentuale di applicazioni con FC media < 5 g rispetto agli altri quadranti omolaterali di ciascun paziente (30% vs 4%, 7% vs 5%, 33% vs 11%, 9% vs 0%, 57% vs 12%). Non si sono verificate complicanze.

Conclusioni: La FC è un parametro importante nell'efficacia in acuto dell'IVP, e valori medi di FC < 5g sono predittori di riconnessione in acuto della conduzione atriovenosa.

O182

Confronto tra cateteri con nuovi sistemi di irrigazione rispetto a quelli con tecnologia tradizionale nell'ablazione transcateretere di fibrillazione atriale.

Cristina Raimondo (a, b), Elisa Ebrille (a, b), Francesca Di Clemente (a), Domenico Caponi (a), Paolo Di Donna (a), Manuela Appendino (a), Pier Alessandro Giorgetti (a), Alberto Battaglia (a, b), Fiorenzo Gaita (b), Marco Scaglione (a)

(a) *Divisione di Cardiologia, Ospedale Cardinal Massaia, Asti, Italia*, (b) *Divisione di Cardiologia, Ospedale San Giovanni Battista; Università di Torino, Torino, Italia*

Scopo: Negli ultimi anni sono state sviluppate nuove tecnologie per ottimizzare il raffreddamento dell'interfaccia elettrodo-tessuto, al fine di migliorare la sicurezza e l'efficacia delle procedure di ablazione transcateretere con radiofrequenze (RF) di fibrillazione atriale (FA). In particolare, due aziende hanno prodotto due cateteri con differenti innovativi sistemi di irrigazione: il primo, caratterizzato da una punta flessibile completamente irrigata con un design sviluppato per adattarsi al meglio al tessuto circostante; il secondo, dotato di una punta che presenta un maggior numero di pori di irrigazione in grado di ottimizzare il processo di raffreddamento. Lo scopo del nostro studio era quello di valutare i parametri procedurali ed i risultati in acuto nell'isolamento delle vene polmonari (IVP) confrontando quattro differenti tipi di cateteri: due con sistemi di irrigazione "tradizionali" (Coolpath St. Jude e Thermocool Biosense) e due dotati di nuovi sistemi di irrigazione (Cool-flex St. Jude e Thermocool SF Biosense).

Metodi e Risultati: 131 pazienti con FA parossistica afferenti al Nostro Centro per esser sottoposti a IVP sono stati consecutivamente arruolati e suddivisi in 4 gruppi: 32 pazienti trattati con l'utilizzo del catetere Thermocool (Th), 34 con Thermocool SF (SF), 32 con Coolpath (CP) e 33 con Coolflex (CF). Tutti i gruppi risultavano confrontabili per quel che riguarda le caratteristiche della popolazione. L'IVP è stato ottenuto nel 100% dei pazienti in tutti i gruppi. Per quel che riguarda i parametri procedurali, la durata della procedura risultava significativamente inferiore utilizzando i cateteri SF ed CF rispetto ai cateteri Th e CP (SF, 114 min vs Th, 161 min; $p=0.001$; CF, 112 min vs CP, 139 min; $p=0.008$). Il tempo di erogazione delle RF era significativamente ridotto impiegando le nuove tecnologie di entrambe le aziende (SF 1977 s vs Th 2683 s; $p<0.001$; CF, 1694 s vs CP, 1980 s; $p=0.039$; Th vs CP $p<0.001$); tuttavia, non vi erano differenze significative tra SF e CF ($p=0.095$). Inoltre, i cateteri dotati di nuovi sistemi di irrigazione permettevano un ridotto ma significativo incremento della potenza delle RF, in particolare con l'impiego del catetere SF (SF, 35 W vs Th, 32 W; $p=0.035$; CF, 32 W vs CP, 30 W; $p=0.046$; Th vs CP $p=0.017$; SF vs CF $p<0.001$). Infine, il volume di infusione di soluzione salina risultava significativamente ridotto utilizzando i cateteri con i nuovi sistemi di irrigazione (SF, 871 ml vs Th, 1610 ml; $p<0.001$; CF, 963 ml vs CP, 1231 ml; $p=0.045$) senza differenza significativa tra SF e CF ($p=0.328$). Non si sono verificate complicanze intra- o periprocedurali.

Conclusioni: L'IVP è stato ottenuto in tutti i gruppi senza complicanze. I cateteri dotati di nuovi sistemi di irrigazione sono stati in grado di ridurre sia la durata complessiva della procedura che il tempo di erogazione delle RF. Inoltre, un miglior sistema di raffreddamento ha permesso di incrementare la potenza di erogazione delle RF e di ridurre il volume di infusione di soluzione salina.

O183

Energy drink e fibrillazione atriale: dati preliminari di uno studio osservazionale

Sonia Pennella (a), Cristina Rosi (c), Alberto Farinetti (b), Patrizia Pedrazzi (a), Anna Vittoria Mattioli (a)

(a) Università degli studi di Modena e Reggio Emilia Dip Scienze della Vita, (b) Università degli studi di Modena e Reggio Emilia Dip di Scienze Mediche e Chirurgiche Materno-Infant, (c) Azienda AUSL di Modena, Servizio di dietistica

La caffeina è la sostanza neuroattiva più diffusa nei Paesi Occidentali, Ben noti sono i suoi effetti cardiovascolari così come nota è la differente risposta cardiovascolare che si osserva nei soggetti che assumono abitualmente caffeina da bevande ed alimenti rispetto ai soggetti che la assumono occasionalmente. Negli ultimi anni si sono ampiamente diffuse, soprattutto tra i giovani le bevande definite “energy drinks” che vengono assunte per aumentare la vigilanza durante le ore serali. I dati relativi agli effetti collaterali di tali bevande sono ancora parzialmente sconosciuti. L’osservazione di 3 casi clinici ha portato alla nostra attenzione la comparsa di fibrillazione atriale (FA) in giovani che avevano assunto energy drinks.

Metodi: Abbiamo registrato 3 casi di giovani (tutti maschi di età 23, 22, 26 anni) che si sono presentati alla nostra osservazione per un episodio sintomatico di fibrillazione atriale sviluppatosi nelle prime ore del mattino (orario di comparsa tra le 6.00 e le 10.00). Tutti i soggetti presentavano cardiopalmo aritmico in un caso associato ad un importante stato ansioso. L’ecg registrava tachiaritmia da FA (frequenza media variava da 135-170 bpm), l’ecocardiogramma era normale. L’esame tossicologico era negativo. I pazienti sono stati sottoposti con successo a cardioversione farmacologica. Dall’anamnesi raccolta veniva segnalato in tutti e 3 i casi l’assunzione di energy drinks (ED) ad alto dosaggio. Un paziente riferiva l’intake nelle 8 ore precedenti la comparsa di FA di 2 lattine di un popolare ED (125 mg caffeina + guarana), non associato ad assunzione di alcool. Il secondo paziente riferiva la comparsa di FA dopo assunzione di un popolare energy drink (dichiarato 80 mg caffeina + erbe a dosaggio non definito) associato a moderate quantità di alcool (l’ED era stato mischiato con un superalcolico in quantità non ben valutabile). Il terzo paziente riferiva l’assunzione di un popolare energy drink (125 mg caffeina + guarana) circa 4 ore prima della comparsa di FA e segnalava di essere “in un periodo di notevole stress psicologico”. La valutazione alimentare identificava l’abitudine ad assumere 2-3 caffè al giorno, in genere in relazione ai pasti principali. L’utilizzo di ED soprattutto in associazione all’alcool può agire come trigger per la comparsa di aritmie.

Da queste esperienze e dalla segnalazione in letteratura di un aumento del consumo di ED nella popolazione giovanile abbiamo sviluppato un questionario per valutare le abitudini della popolazione universitaria della nostra città in relazione al consumo di ED.

I dati sono in corso di raccolta ed elaborazione ed in particolare vengono rilevate eventuali associazioni tra consumo di ED e aritmie.

CARDIOPATIE NEL DIABETE 2

O184

Myocardial fibrosis by CMR LGE in a large cohort of pediatric thalassemia major patients

Alessia Pepe (a), Antonella Meloni (a), Aldo Filosa (b), Cristina Salvatori (c), Elena Facchini (d), Claudio Ascoti (e), Monia Minati (f), Vincenzo Positano (a), Letizia Gulino (a), Gianluca Valeri (g), Massimo Lombardi (a)

(a) CMR Unit, Fondazione G. Monasterio CNR-Regione Toscana and Inst. of Clinical Physiology, Pisa, Italy, (b) UOC Pediatria - DH Talassemia, AORNA. Cardarelli, Napoli, Italy, (c) Unità Operativa Sistemi Informatici, Fondazione G. Monasterio CNR-Regione Toscana, Pisa, Italy, (d) U.O. Pediatria, Policlinico Universitario S. Orsola-Malpighi, Bologna, Italy, (e) Struttura Complessa di Cardiologia-UTIC, P.O. "Giovanni Paolo II", Lamezia Terme, Italy, (f) U.O.C. Diagnostica per Immagini e Interventistica, Policlinico "Casilino, Roma, Italy, (g) Dipartimento di Radiologia, Ospedali Riuniti "Umberto I-Lancisi-Salesi", Ancona, Italy

Background: Cardiovascular Magnetic Resonance (CMR) by late gadolinium enhancement (LGE) allows to detect myocardial fibrosis. Myocardial fibrosis was shown to be a relative common finding in large cohort of Italian thalassemia major (TM) patients mainly related to HCV infection, but specific studies involving only pediatric patients are not available. Our aim was to investigate the prevalence and clinical-instrumental correlates of myocardial fibrosis in pediatric TM patients.

Methods: We studied retrospectively 76 pediatric TM patients enrolled in the MIOT Network. LGE images were acquired to detect myocardial fibrosis. Myocardial iron overload (MIO) was measured by T2* multislice technique. Biventricular function parameters were evaluated by cine images.

Results: Myocardial fibrosis was detected in 12 (15.8%) patients. In all patients the location of the fibrosis was epi-mesocardial, with no ischemic pattern. The youngest patient showing myocardial fibrosis had 13 years of age. The Table shows the comparison between patients with and without myocardial fibrosis. A significant higher MIO was detected in patients with myocardial fibrosis. The left atrial area, all the left ventricular (LV) indexed volumes, the LV mass index and the bi-ventricular stroke volume indexes were significantly higher in the fibrosis group.

Conclusion: In pediatric TM patients myocardial fibrosis is not a rare finding to keep in mind in the cardiological management. When appropriate treatment has been administered since early childhood, CMR LGE can be postponed until 13 years of age. By the natural history of this large cohort of pediatric patients where HCV infection has been appropriately prevented, myocardial fibrosis seem to be associated with MIO and high cardiac output.

| | Fibrosis | No-fibrosis | P |
|---|--------------|-------------|-------|
| Sex (M/F) | 10/2 | 34/30 | 0.062 |
| Age (years) | 15.4 ± 1.8 | 13.3 ± 3.5 | 0.073 |
| HCV antibodies | 0 | 3 (4.8%) | 0.437 |
| Global Heart T2* (ms) | 20.9 ± 13.9 | 30.6 ± 9.7 | 0.022 |
| Left atrial area (cm ²) | 18.3 ± 3.1 | 15.9 ± 3.9 | 0.050 |
| Right atrial area (cm ²) | 16.9 ± 4.3 | 14.9 ± 3.5 | 0.169 |
| Left ventricular end-diastolic volume index (ml/m ²) | 102.9 ± 23.5 | 87.0 ± 16.3 | 0.005 |
| Left ventricular stroke volume index (ml/m ²) | 60.7 ± 12.4 | 51.8 ± 10.7 | 0.012 |
| Left ventricular mass index (g/m ²) | 65.3 ± 11.4 | 53.8 ± 11.4 | 0.003 |
| Left ventricular ejection fraction (%) | 59.2 ± 4.4 | 59.7 ± 5.9 | 0.368 |
| Right ventricular end-diastolic volume index (ml/m ²) | 96.9 ± 25.6 | 81.6 ± 17.1 | 0.089 |
| Right ventricular stroke volume index (ml/m ²) | 61.5 ± 11.6 | 48.9 ± 14.1 | 0.005 |
| Right ventricular ejection fraction (%) | 62.6 ± 4.4 | 60.2 ± 7.1 | 0.175 |

O185

Relazione tra BMI, quadro coronarico e comorbidità in una popolazione di pazienti diabetici affetti da sindrome coronarica acuta

Luciano De Biase (a), Francesca Jacoangeli (a), Sofia Abbolito (a), Giovanna Viola (a), Giovanna Gallo (a), Allegra Battistoni (a), Priscilla Milewski (a), Massimo Volpe (a)

(a) *Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Università Sapienza*

La sindrome metabolica è una condizione patologica caratterizzata da elevato rischio cardiovascolare ed associata ad elevata mortalità. In letteratura sono presenti dati discordanti sulla relazione che sussiste tra elevati valori di body mass index (BMI) e severità del quadro coronarico.

Obiettivo: il nostro scopo è stato quello di valutare se ci fosse una relazione tra la presenza di sindrome metabolica e una maggiore compromissione dell'albero coronarico; se fosse presente una relazione tra sindrome metabolica ed altre comorbidità (quali scompenso cardiaco ed insufficienza renale).

Materiali e metodi: sono stati arruolati 102 pazienti, consecutivi, afferenti all'unità di terapia intensiva coronarica (UTIC) del nostro ospedale, con diagnosi di sindrome coronarica acuta (SCA) ostruttiva e diabete mellito.

Di ogni paziente è stata raccolta un'accurata anamnesi, è stato registrato un elettrocardiogramma, un ecocardiogramma, e sono stati eseguiti prelievi ematici di routine; qualora necessario i pazienti sono stati sottoposti a rivascolarizzazione coronarica percutanea o tramite bypass aorto-coronarico.

I pazienti sono stati poi suddivisi in due gruppi, in base ai valori di BMI, utilizzando come cut-off per uomini e donne il valori di BMI >30 Kg/m².

Risultati: il gruppo 1 (pazienti diabetici con BMI < 29.9 Kg/m²) è composto da 68 pazienti, di età media pari a 69,22 anni; e il gruppo 2 (pazienti diabetici con BMI >30 Kg/m²) è composto da 34 pazienti di età media pari a 64,53 anni.

Dall'analisi dei dati non sono state evidenziate differenze statisticamente significative per quanto riguarda la severità del quadro coronarografico nei due gruppi, studiato valutando il numero di arterie coronarie epicardiche con almeno una stenosi > 75% del lume vasale (p=0,58). Sono stati analizzati inoltre alcuni parametri di funzionalità del ventricolo sinistro, in particolare: frazione d'eiezione, risultata paragonabile nei due gruppi (valore medio nel gruppo 1: 46,32 %; valore medio nel gruppo 2: 45,09 %; p=0,59); valori plasmatici di NT-proBNP: risultato paragonabile nei due gruppi (valori medi nel gruppo 1: 1849 pg/ml; valori medi nel gruppo 2: 6191 pg/ml; p=0,13).

È stata inoltre analizzata la funzione renale dei pazienti nei due gruppi; i dati non mostrano differenze statisticamente significative per quanto riguarda il valore di velocità di filtrazione glomerulare stimata (eGFR), calcolata con il metodo CKD-EPI: valori medi nel gruppo 1: 67,87 ml/min/1,73m²; valori medi nel gruppo 2: 79,26 ml/min/1,73m²; p= 0,09).

Conclusioni: i nostri risultati non mostrano relazioni tra i valori di BMI e la gravità del quadro coronarico né tra BMI e presenza di comorbidità.

Tali dati contrastano con alcuni lavori presenti in letteratura in cui è stato evidenziato che elevati livelli di BMI fossero correlati ad una maggior prevalenza di comorbidità e ad un quadro coronarico più grave in pazienti con sindrome coronarica acuta.

O186**Stato glicometabolico dopo infarto miocardico acuto in pazienti ad alto rischio: impatto sulla capacità funzionale e sulla prognosi**

Nicola Russo (a, b), Leonida Compostella (a), Tiziana Setzu (a), Elia Vettore (b), Gian Paolo Fadini (c), Sonia Ferretto (b), Filippo Zilio (b), Claudio Bilato (b), Giuseppe Tarantini (b), Luisa Cacciavillani (b), Armando Marzari (b), Sabino Iliceto (b), Angelo Avogaro (c), Fabio Bellotto (a)

(a) *Cardiologia Preventiva e Riabilitativa, Istituto Codivilla-Putti, Cortina d'Ampezzo (BL)*, (b) *Dip.to Scienze Cardiologiche, Toraciche e Vascolari, Clinica Cardiologica, Università di Padova*, (c) *Malattie del Metabolismo, Università di Padova*

Background: Nei pazienti dopo infarto miocardico acuto (IMA) le alterazioni del metabolismo glucidico sono molto frequenti. Pochi sono gli studi che hanno specificamente considerato l'impatto di tali alterazioni sulla capacità funzionale nell'immediato periodo post-infartuale e sulla prognosi a distanza. Questo è quindi lo scopo del presente studio.

Metodi: 326 pazienti (età media 64,3±12,3 anni, maschi 78,2%) che giungevano nel nostro centro per un ciclo di riabilitazione cardiologica degenziale dopo sindrome coronarica acuta (in media dopo 16,3±11,5 giorni, ST sopra 65,5%). Nell'85% dei casi si trattava di infarti complicati (arresto, shock, edema polmonare, aritmie maligne) ed il 47% dei pazienti aveva ricevuto una rivascolarizzazione incompleta. A tutti i soggetti senza diabete noto è stata somministrata una curva da carico di glucosio standard (OGTT), nonché determinazione dell'HbA1c. Il campione è stato suddiviso in 3 gruppi: normoglicemici, pre-diabetici (coloro che presentavano alterata glicemia a digiuno e/o alterata tolleranza glucidica), diabetici. Tutti i soggetti sono stati sottoposti ad un *6-min walking test* (6MWT) all'ingresso ed alla dimissione e ad un test cardiopolmonare (CPET) pre-dimissione.

Risultati (tabella1): Tutti i pazienti al termine del ciclo riabilitativo hanno migliorato la propria capacità funzionale: incremento medio al 6MWT (Δ 6MWT) pari a 70.7 ± 55.7 mt (p<0,01), senza differenze significative tra i gruppi. La mortalità a 5 anni nella popolazione generale è risultata pari al 7.9%. I pazienti diabetici presentavano condizioni cliniche più compromesse rispetto agli altri due gruppi ed erano in media più anziani. Nei pazienti senza diabete noto è stata riscontrata una condizione di pre-diabete nel 54% dei casi. Questi soggetti presentavano caratteristiche intermedie, in termini di capacità funzionale e percentuale di eventi infausti a distanza. All'analisi multivariata la presenza di un'alterazione del metabolismo glucidico (sia considerando come variabile continua l'HbA1c, sia come variabili qualitative la presenza di prediabete o diabete) risultava un predittore indipendente del 6MWT alla dimissione e del picco di VO₂ raggiunto al CPET (assieme ad all'età, alla frazione d'ieiezione, emoglobina all'ingresso, beta -0,220, p<0,01). Inoltre le medesime variabili risultavano predittori prognostici indipendenti di eventi cardiaci maggiori (morte+reinformato+nuove rivascolarizzazioni+scompenso) alla regressione di Cox (B -0,534, p<0,05).

Conclusioni: La presenza di un'alterazione del metabolismo glucidico predice la capacità funzionale dopo IMA e risulta un predittore prognostico indipendente di eventi infausti. Di qui l'importanza di un'adeguata caratterizzazione del metabolismo glucidico dopo un IMA, soprattutto nei pazienti ad alto rischio, con un mezzo semplice e poco costoso come l'OGTT.

| Tabella 1 | Normoglicemici | Prediabetici | Diabetici | p |
|--|----------------|--------------|-------------|-------|
| Età (anni) | 59.8±12.8 | 64.4±12.0 | 67.0±15.5 | <0.01 |
| Frazione d'ieiezione | 48.4±8.9 | 48.5±10.5 | 44.4±10.4 | <0.01 |
| Emoglobina (g/dL) | 12.3±1.6 | 12.3±1.6 | 11.9±1.4 | 0.2 |
| 6MWT ingresso | 464.2±118.4 | 421.6±111.1 | 344.2±121.8 | <0.01 |
| 6MWT dimissione | 532.9±117.6 | 488.5±110.4 | 404.4±125.2 | <0.01 |
| Δ 6MWT | 74.2±59.6 | 63.8±45.9 | 74.1±62.1 | 0.3 |
| picco VO ₂ (ml/kg/min) CPET | 19.4±5.5 | 17.9±4.8 | 15.3±4.1 | <0.01 |
| Carico max (watt) CPET | 88.8±35.5 | 80.0±27.2 | 66.3±24.0 | <0.01 |
| Mortalità* n (%) | 6 (5.8) | 9 (7.1) | 10 (11.5) | 0.3 |
| MACE n (%) | 13 (12.5) | 22 (17.5) | 28 (32.2) | <0.01 |

O187

Liraglutide suppresses postprandial triglyceride (TG) and apolipoprotein B48 (ApoB48) responses to a fat-rich meal in subjects with type 2 diabetes

Piermarco Piatti (a), K Hermansen (b), A Pietraszek (c), LS Mortensen (d), KEB Knudsen (e), M Mancuso (f), A Flint (g)

(a) *Cardio-Diabetes and Core Lab Unit, Metabolic and Cardiovascular Science Division, San Raffaele Scien*, (b) *Aarhus University Hospital, Aarhus C, Denmark*, (c) *Aarhus University Hospital, Aarhus C, Denmark*, (d) *Aarhus University Hospital, Aarhus C, Denmark*, (e) *Aarhus University, Tjele, Denmark*, (f) *Novo Nordisk SpA, Italy*, (g) *Novo Nordisk A/S, Søborg, Denmark*

Aim: This trial investigated the effect of steady-state 1.8 mg liraglutide compared to placebo on postprandial plasma lipid levels.

Materials and methods: In a crossover design, subjects with type 2 diabetes (T2DM) (n=20, 53-73 years, BMI 24-39 kg/m²) were randomly treated for 3 weeks with once-daily liraglutide (weekly dose escalation from 0.6 to 1.8 mg) and placebo. After 3 weeks' treatment, a standardized fat-rich (63%E) meal was served and the effect of liraglutide on TG, free fatty acids (FFA), ApoB48, glycemic responses, and gastric emptying was assessed.

Results: After 3 weeks' liraglutide treatment, postprandial TG (Figure) and ApoB48 (incremental AUC_{0-8h} -0.034, 95%CI [-0.051;-0.018], p=0.0003) decreased significantly compared to placebo. There was no significant difference in overall FFA response (incremental AUC_{0-8h} (0.31, 95%CI [-0.38;0.99], p=0.3368). Neither method assessing postprandial rate of gastric emptying (paracetamol absorption technique and ¹³C-octanoate breath test) displayed differences between treatments. Mean postprandial glucose and glucagon responses were significantly reduced and mean body weight was reduced (-1.77 kg [-2.54;-1.00], p<0.0001) after liraglutide treatment. Also, mean low-density lipoprotein and total cholesterol decreased significantly after treatment with liraglutide compared to placebo. Liraglutide was well tolerated.

Conclusion: In conclusion, liraglutide treatment in subjects with T2DM significantly reduced postprandial excursions of TG and ApoB48 after a fat-rich meal. The effect was apparently independent of gastric emptying.

O188

HIV patients with acute coronary syndromes: does diabetes confer a worse prognosis?

Giorgio Quadri (a), Fabrizio D'Ascenzo (a), Enrico Cerrato (a), Andrea Calcagno (b), Stefano Bonora (b), Pierluigi Omedè (a), Filippo Sciuto (a), Davide Giacomo Presutti (a), Giacomo Frati (c), Darryn Appleton (d), George Vetrovec (d), Antonio Abbate (d), Giuseppe Biondi Zoccai (c), Claudio Moretti (a), Fiorenzo Gaita (a)

(a) *Division of Cardiology, University of Turin, Turin, Italy.*, (b) *Unit of Infectious Diseases, Department of Medical Sciences, University of Turin, Turin, Italy*, (c) *Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome, Latina, Ita*, (d) *VCU Pauley Heart Center, Richmond, VA, USA*

Aims: A close association between HIV status and the risk of developing an acute coronary syndrome (ACS) has been reported. However, the prognostic role of the concomitant presence of diabetes in these patients is not entirely known.

Methods and results: Patients with HIV infection receiving standard highly active antiretroviral therapy (HAART) presenting with ACS between January 2001 and September 2012 were included and divided in two groups according to their diabetic status. Cardiac death and myocardial infarction were the main end-points.

A total of 192 patients were included: of these, 34 (17.8%) with diabetes. Patients with diabetes were older (60.7±9.4 years vs 53.4±10.1; p<0.001) and had a significantly worse cardiovascular risk profile

as shown by the higher incidence of hypertension (75% vs 42.8%; $p < 0.001$) and hyperlipidemia (80.6% vs 47%; $p < 0.001$). There were no differences between the two groups regarding the time since HIV diagnosis (168 ± 83 months vs 159 ± 79 months; $p = 0.634$) and the duration of antiretroviral therapy (127 ± 76 vs 113 ± 60 months; $p = 0.395$). About half of patients had a nadir cell count less than 190 per mm^3 (41.9% vs 54.2%; $p = 0.235$). At a median follow up of 31.8 ± 29.9 months from the ACS the two groups showed no significant differences in the occurrence of cardiac death (17.1% vs 15%; $p = 0.796$) and of myocardial infarction (15.2% vs 9.9%; $p = 0.365$). At multivariate adjustment the only independent HIV-related predictor of cardiac death was the absence of treatment with nucleoside reverse transcriptase inhibitors (NRTI) (hazard ratio=5.32 [95% confidence interval 1.92-14.72] $p = 0.001$)

Conclusions: The presence of diabetes in HIV patients with ACS does not appear predictive of increase cardiovascular adverse outcome. Therapy with NRTI could be cardioprotective.

O189

Echocardiographic predictors of adverse cardiac events in beta thalassemia major.

Stefano Leggio (a), Sergio Buccheri (a), Ines Monte (a), Corrado Tamburino (a)

(a) *Dipartimento di scienze Mediche e Pediatriche, Università di Catania*

Background: Cardiac dysfunction secondary to chronic iron overload and high output state represents the leading cause of mortality and morbidity in thalassemic patients. Echocardiography is a fundamental tool for the close follows up that this group of patients require. However, few studies have been performed to assess echocardiographic predictors of long-term cardiac adverse events.

Purpose: We aimed therefore to identify echocardiographic parameters related to the development of future cardiac dysfunction in a group of asymptomatic thalassemic patients.

Methods: 58 thalassemic patients (TM group) were included in the study. A control group of 23 healthy subjects (HS group), matched for age and sex, was also included. All subjects underwent standard echocardiography by using a GE Vivid 7 (GE, Vingmed Ultrasound AS, Horten, Norway) equipped with a S3 multi-frequency probe. Standard M-Mode and 2D parameters of left ventricular (LV) function were obtained. Tissue Doppler Imaging was applied in the pulsed wave Doppler mode (PW-TDI) at the septal and lateral sides of the mitral annulus to obtain the averaged values of systolic (S' wave), early and late diastolic myocardial velocities (E' and A' wave, respectively). All subjects were then prospectively followed up on an outpatient basis. Adverse events (AEs) were considered in a composite endpoint including: cardio-vascular death, heart failure onset (HF), conduction disturbances requiring permanent pace maker (PM) implantation, new detection of supra-ventricular arrhythmias. The overall population was followed up for 575 ± 152 days.

Results: Subjects in TM group showed a significant increase in the mean value of LV diastolic diameter and diastolic volumes in respect to HS ($p = 0.006$ and $p = 0.003$, respectively). LV Mass indexed for BSA was significantly increased in TM patients ($p = 0.003$).

All the TDI derived parameters were significantly reduced in TM group. The mean value E/E' ratio was significantly increased in TM group ($p = 0.003$).

10 AEs were observed in the TM subjects including: one death from cardiac cause, 6 patients developing HF, 3 new detected supra-ventricular arrhythmias one of which required PM implantation. ROC curve analysis identified LV diastolic volumes > 122 ml (AUC 0.84, $p < 0.0001$, Sensitivity 100%, Specificity 66,7%), LV Mass Index > 89.7 g/m^2 (AUC 0.88, $p < 0.0001$, Sensitivity 100%, Specificity 76,6%), S' wave ≤ 7.0 cm/sec (AUC 0.81, $p < 0.0001$, Sensitivity 80%, Specificity 62,5%), E' wave ≤ 10 cm/sec (AUC 0.75, $p = 0.02$, Sensitivity 50%, Specificity 91,7%), E/E' ratio > 7.45 (AUC 0.83, $p = 0.0003$, Sensitivity 90%, Specificity 70,8%) and A' wave ≤ 5 cm/sec (AUC 0.79, $p = 0.002$, Sensitivity 70%, Specificity 81,3%) as cut off-values differentiating TM patients with AEs. LV ejection fraction was indeed not useful for this purpose (AUC 0.64, $p = 0.21$).

Conclusions: TDI derived parameters are able to identify subclinical myocardial dysfunction in asymptomatic TM patients. These functional parameters are also useful for the prediction of adverse cardiac events before the impairment of conventional parameters like ejection fraction.

FIBRILLAZIONE ATRIALE E NUOVI COAGULANTI

O190

Efficacia e sicurezza di rivaroxaban come strategia antitrombotica in pazienti sottoposti a isolamento delle vene polmonari

Aniello Viggiano (a), Tom De Potter (a), Peter Peytchev (a), Peter Geelen (a)

(a) *Arrhythmia Unit Aalst Cardiovascular Center, Aalst*

Introduzione: La sicurezza e l'efficacia della terapia antitrombotica con i nuovi farmaci anticoagulanti orali (NOAC) non è stata ancora ben definita nel contesto della procedura di isolamento delle vene polmonari (PVI) mediante radiofrequenza. Lo scopo di questo studio è analizzare tali parametri in pazienti che hanno utilizzato un inibitore diretto del fattore Xa, rivaroxaban, come strategia anticoagulante peri-procedurale.

Metodi e risultati: Un totale di 127 pazienti (61 ± 12 anni, 74,9% maschi) sono stati sottoposti a PVI tra dicembre 2012 e maggio 2013 per fibrillazione atriale parossistica (79%) o persistente. Tutti erano in terapia con rivaroxaban 15 o 20 mg al giorno se il punteggio CHA2DS2-VASc era > 1 e l'ultima dose veniva somministrata fra le 18 e le 24 ore prima di PVI. In aggiunta, 5 pazienti assumevano aspirina e 3 pazienti erano in doppia terapia antiaggregante con aspirina e clopidogrel. In ogni procedura è stata somministrata eparina per mantenere un ACT tra 250 e 350 secondi. Il successo procedurale in acuto, definito come isolamento delle vene con blocco bidirezionale, è stato ottenuto in tutti i pazienti. Dopo PVI, è stata somministrata la dose originale di rivaroxaban fra le 6 e le 12 ore dopo che l'emostasi era stata ottenuta e la terapia veniva continuata per almeno 4 settimane in tutti i casi o proseguita ulteriormente, a seconda delle indicazioni. Ogni paziente è stato sottoposto a controllo clinico ed ecocardiografico prima della dimissione. Sono stati considerati come complicanze emorragiche maggiori e fino a 30 giorni post-procedura ogni tipo di sanguinamento che ha necessitato trasfusione di sangue/derivati, ematomi che hanno richiesto un intervento chirurgico nonché i versamenti pericardici di ogni entità che hanno richiesto un drenaggio (tamponamento). Altri eventi come ictus/TIA sono stati considerati fino a 30 giorni dopo la procedura come complicanze maggiori. Sono state considerate come complicanze emorragiche minori i piccoli ematomi, i versamenti pericardici che non hanno richiesto un intervento (non-tamponamento) e qualsiasi altro evento emorragico clinicamente rilevante. Nessuna complicanza emorragica maggiore si è verificata in questa serie mentre 1 paziente è andato in contro ad un evento cerebrovascolare (CVA) dopo la procedura manifestatosi con una monoparesi ad gamba. Una TC dell'encefalo ha escluso la genesi emorragica e dopo poche settimane si è osservato un recupero motorio pressoché completo. Complicanze emorragiche minori si sono verificate in 13 (10.2%) pazienti. I versamenti pericardici lievi e transitori (> 2 millimetri, ma senza alcun effetto emodinamico) hanno rappresentato la maggior parte delle complicanze (n = 11). Ad un paziente è stato diagnosticato un pseudoaneurisma in sede di accesso inguinale e in un altro è stata documentata una macroematuria transitoria nelle prime 72h dopo la procedura. Infine in un paziente è stata diagnosticata una pericardite essudativa sette giorni dopo la procedura, efficacemente trattata con farmaci anti-infiammatori per via orale. Non si sono verificate re-ospedalizzazioni durante il periodo di follow-up e come sequele della procedura. Pertanto, secondo la nostra esperienza e la letteratura medica, tutti questi dati sono confrontabili con la strategia anticoagulante peri-procedurale convenzionale con dicumarolici.

Conclusioni: I pazienti sottoposti efficacemente a PVI in terapia anticoagulante con rivaroxaban mostrano un buon profilo di sicurezza. I tassi di complicanze peri-procedurali sono paragonabili a quelli riportati con la strategia anticoagulante convenzionale.

O191

Dabigatran has a higher risk of left atrial appendage thrombus formation in patients with AF when compared to warfarin and Rivaroxaban

Luigi Di biase (a, b, c), Francesco Santoro (c), Pasquale Santangeli (a, c), John D. Burkardt (a), Javier Sanchez (a), Prasant Mohanty (a), Dhanunjay Lakkireddy (f), Claude Elayi (g), Richard Hongo (d), Robert A. Schweikert (e), Andrea Natale (a)

(a) *Texas Cardiac Arrhythmia Institute, St. David's medical center, Austin, Texas, USA*, (b) *Albert Einstein, College of Medicine, Montefiore Hospital, New York, New York, USA*, (c) *Department of Cardiology, University of Foggia, Foggia, Italy*, (d) *California Pacific Medical Ctr, San Francisco, CA, USA*, (e) *Akron General Hosp, Akron, OH, USA*, (f) *Univ of Kansas, Kansas City, MS, USA*, (g) *Univ of Kentucky, Lexington, KE, USA*

Introduction: Transesophageal echocardiography (TEE) has been demonstrated to be a sensitive tool to detect left atrial thrombi in patients with AF before electrical cardioversion or before AF ablation. We sought to determine the prevalence of LAA thrombi before electrical cardioversion in patients treated with different oral anticoagulants.

Methods: 487 consecutive patients with AF undergoing TEE before electrical cardioversion or before AF ablation have been enrolled in this study. Based on the oral anticoagulant used before TEE, patients were divided into three groups: patients undergoing TEE while on warfarin (group I, n=209), patients undergoing TEE while on dabigatran 150 mg (group II, n=149) and patients undergoing TEE while on Rivaroxaban (group III, n=129). All patients had to be on their OAT for at least 30 days before TEE. The prevalence of left atrial thrombi were collected and analyzed.

Results: No baseline differences were observed between groups. Prevalence of positive TEE for left atrial thrombi was 0.96% (2/209 pts) in group I, 6.7% (10/149) in group II and 0.78% (1/129) in group III (p=0.002). After adjusting for potential risk factors in multivariate logistic model, non-paroxysmal AF was a predictor of positive TEE (odds ratio 3.01, 95% CI 1.4 to 6.5, p=0.005). When stratified by type of anticoagulation, dabigatran use had 4.6 times higher likelihood for LAA thrombi compared to warfarin (OR 4.6 (1.6 to 21), p=0.003) and 6.2 times compared to Rivaroxaban (OR 6.2 (1.9 to 31), p=0.002). The area under the receiver operating characteristic curve (AUC) demonstrated fair discriminatory ability of the model (AUC 0.72, 95% CI 0.59 to 0.85).

Conclusion: The results of our study show that anticoagulation with dabigatran 150mg is associated with a higher prevalence of left atrial thrombus as assessed by TEE when compared to Warfarin and Rivaroxaban.

O192

La gestione del monitoraggio della terapia anticoagulante orale nei pazienti con fibrillazione atriale in Italia: confronto tra i paesi partecipanti al registro europeo prefer in af

Maurizio Lunati (a), Emanuela Teresa Locati (a), Assunta Iuliano (b), Francesco Cariello (c), Livio Di Lecce (d), Fabio Romeo (d), Giulia Renda (e), Raffaele De Caterina (e)

(a) Dipartimento Cardioracovascolare, Ospedale Niguarda ca' Granda, Milano, (b) Laboratorio di Elettrofisiologia, Clinica Mediterranea, Napoli, (c) Casa di cura Tricarico Rosano, Belvedere Marittimo, Cosenza, (d) Direzione Medica, Daiichi-Sankyo Italia, (e) Istituto di Cardiologia, Università "G. D'Annunzio" c/o Ospedale SS. Annunziata, Chieti

Razionale: La maggior parte dei pazienti affetti da Fibrillazione Atriale (FA) in Italia è in trattamento cronico con farmaci antagonisti della vitamina K per la prevenzione di eventi tromboembolici. Tale terapia necessita di un monitoraggio continuo dei parametri della coagulazione mediante test di laboratorio specifici. La gestione del monitoraggio di questi pazienti è diversa nei vari paesi europei e pochi studi hanno valutato l'impatto di queste differenze sul mantenimento dei valori ottimali di INR (International Normalized Ratio).

Metodi: Nel registro PREFER in AF (The PREvention of thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da Gennaio 2012 a Gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia, Spagna, Svizzera e Regno Unito. I dati di seguito riportati sono stati raccolti in occasione della visita basale dello studio e si riferiscono ad una sottoanalisi dei pazienti italiani ed al relativo confronto rispetto agli altri paesi europei focalizzato sulla valutazione e gestione del monitoraggio dell'INR.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri.

Il 64.7% dei pazienti italiani aveva effettuato almeno una misurazione INR nel mese precedente l'arruolamento nel registro (media europea: 67.6%). Il numero medio di monitoraggi dei valori INR nell'ultimo mese è risultato essere più alto in Italia (2.8 ± 1.9) rispetto a tutti gli altri paesi europei (Francia: 1.8 ± 1.3 ; Germania: 1.7 ± 1.4 ; Spagna: 1.6 ± 1.3 ; Regno Unito: 2.3 ± 2.2). Anche il numero medio di misurazioni INR nell'ultimo anno è risultato essere maggiore in Italia (16.1 ± 9.7) rispetto a Francia (12.8 ± 6.7); Germania (15.7 ± 10.4); Spagna (11.4 ± 5.3) e Regno Unito (15.2 ± 9.0).

In Italia il monitoraggio INR era effettuato presso i centri di anticoagulazione nel 44.4% dei casi, rispetto ad una media europea del 19.3%.

Il Time in Therapeutic Range (TTR), calcolato sulle ultime 3 misurazioni INR, è risultato essere inferiore in Italia (72.2%) rispetto a Germania (82.5%), Francia (77.2%) e Regno Unito (73.4%), superiore invece rispetto alla Spagna (68.6%).

Conclusioni: In Italia i centri di anticoagulazione rappresentano, anche rispetto agli altri paesi europei, il punto di riferimento principale per il monitoraggio INR e la gestione dell'anticoagulazione nei pazienti affetti da FA in trattamento con antagonisti della vitamina K per la prevenzione di eventi tromboembolici.

L'Italia è inoltre il paese con il numero medio di monitoraggi più alto tra i paesi europei oggetto del registro. Tuttavia questa maggiore frequenza di monitoraggio non si traduce in un migliore controllo dei valori ottimali di INR (valutati con il TTR) rispetto agli altri paesi europei.

Tali dati appaiono di notevole interesse in prospettiva dell'introduzione in commercio, anche nel nostro paese, dei nuovi anticoagulanti orali diretti.

O193

Controindicazioni alla terapia anticoagulante orale nei pazienti con fibrillazione atriale: analisi descrittiva dei dati italiani del registro europeo prefer in af

Carmine Mazzone (a), Andrea Di Lenarda (b), Francesco Cariello (c), Livio Di Lecce (d), Fabio Romeo (d), Giulia Renda (e), Raffaele De Caterina (e)

(a) Centro Cardiovascolare, ASSI, Trieste, (b) Centro Cardiovascolare, ASSI-Università di Trieste, Trieste, (c) Casa di cura Tricarico Rosano, Belvedere Marittimo, Cosenza, (d) Direzione Medica, Daiichi-Sankyo Italia, (e) Istituto di Cardiologia, Università “G. D’Annunzio” c/o Ospedale SS. Annunziata, Chieti

Razionale: Le controindicazioni relative ed assolute alla terapia con anticoagulanti orali per la prevenzione di eventi tromboembolici in pazienti affetti da Fibrillazione Atriale (FA) sono ben note. Tuttavia si hanno poche informazioni riguardanti l’incidenza reale di queste controindicazioni nei pazienti italiani.

Metodi: Nel registro PREFER in AF (The PREvention of thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da gennaio 2012 a gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia, Spagna, Svizzera e Regno Unito. I dati di seguito riportati, raccolti in occasione della visita basale dello studio, riguardano un’analisi descrittiva dell’incidenza di controindicazioni al trattamento con terapia anticoagulante orale nei pazienti italiani, indipendentemente dalla terapia effettivamente prescritta.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri. In Italia il 71.6% dei pazienti è risultato in trattamento, nei 12 mesi precedenti l’arruolamento nel registro, con antagonisti della Vitamina K (62% con warfarin e il 9.6% con acenocumarolo). Il 2.2% dei pazienti aveva un cancro in fase attiva e la stessa percentuale aveva avuto emorragie nell’anno precedente all’arruolamento. Sanguinamenti maggiori gastrointestinali erano riportati nel 2% dei pazienti, sanguinamenti cerebrovascolari nello 0.5%, altre emorragie maggiori nell’ 1.5% dei pazienti. Una scarsa aderenza al trattamento negli ultimi 12 mesi era riportata nel 6.2% dei pazienti, dato superiore rispetto alla media dei pazienti europei (2.6%). Tra le altre controindicazioni alla terapia: il rifiuto della terapia anticoagulante è stato riportato nell’1.3% dei pazienti italiani (media dei pazienti europei: 0.4%). Un’insufficienza epatica cronica è stata riportata nel 2.8% e un’insufficienza renale cronica nel 14.5 dei pazienti italiani. Durante la visita basale sono stati riscontrati valori di clearance della creatinina stimata compresi tra 90 e 60 nel 2.3% dei pazienti, valori <60 nel 9.3% dei pazienti.

Conclusioni: I dati relativi alla visita basale del registro PREFER in AF hanno confermato la presenza di numerose possibili controindicazioni all’utilizzo della terapia anticoagulante orale nei pazienti italiani affetti da FA. Le più frequenti controindicazioni sono risultate l’insufficienza renale cronica, l’insufficienza epatica, una storia di precedenti sanguinamenti, e la scarsa aderenza al trattamento. La conoscenza di tali controindicazioni assume una notevole importanza alla luce dell’immissione in commercio dei nuovi anticoagulanti orali diretti, poiché aiuterebbe ad individuare la terapia più appropriata per ciascun paziente.

O194

Associazione tra farmaci antagonisti della vitamina k e antiplastrinici in pazienti con fibrillazione atriale: analisi italiana dei dati al basale del registro europeo prefer in af

Giulia Renda (a), Giancarlo Piccinni (b), Raffaele Sangiuolo (c), Emilio Attena (c), Livio Di Lecce (d), Fabio Romeo (d), Raffaele De Caterina (a)

(a) Istituto di Cardiologia, Università "G. D'Annunzio" c/o Ospedale SS. Annunziata, Chieti, (b) Unità Operativa Complessa, Ospedale "Francesco Ferrari", Casarano, Lecce, (c) U.O. Complessa, Cardiologia – UTIC, Ospedale Buon Consiglio Fatebenefratelli, Napoli, (d) Direzione Medica, Daiichi-Sankyo Italia

Razionale: L'associazione a lungo termine tra farmaci antagonisti della vitamina K (VKA) e antiplastrinici (AP) in pazienti con Fibrillazione Atriale (FA) è generalmente non raccomandata dalle Linee Guida della Società Europea di Cardiologia (ESC), poiché si accompagna ad un aumento del rischio di sanguinamento e non ha dimostrato benefici evidenti in termini di efficacia. Abbiamo valutato la frequenza di quest'associazione e le caratteristiche dei pazienti cui essa è stata prescritta.

Metodi: Nel registro PREFER in AF (The PREvention of thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da Gennaio 2012 a Gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia, Spagna, Svizzera e Regno Unito. I dati di seguito riportati, raccolti in occasione della visita basale dello studio, si riferiscono alle caratteristiche dei pazienti italiani in trattamento combinato con VKA e AP.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri.

In Italia il 62.4% dei pazienti è risultato in trattamento, nei 12 mesi precedenti l'arruolamento nel registro, con VKA (warfarin e acenocumarolo); il 18.1% dei pazienti era in trattamento con soli AP (prevalentemente ASA e clopidogrel); l'8.8% dei pazienti era in trattamento combinato con VKA e AP; il 10.4% dei pazienti non risultava invece in trattamento con farmaci di nessuna delle due classi. I pazienti in terapia di combinazione VKA+AP avevano, in confronto ai pazienti in trattamento solamente con VKA, età media simile (71.8 ± 9.9 vs. 71.6 ± 9.9 , rispettivamente) e BMI simile (media 27.8 ± 4.3 vs. 27.2 ± 4.5 , rispettivamente), ma incidenza più alta di diabete (29.3% vs. 20.1%), dislipidemia (59.9% vs. 37.8%), insufficienza renale cronica (18.6% vs. 12.1%) e comorbidità con cardiopatia ischemica (58.7% vs. 16.5%). Avevano inoltre un punteggio medio più alto alla scala di rischio tromboembolico CHA₂DS₂VASc (3.9 vs. 3.4) e alla scala di rischio emorragico HAS-BLED (2.9 vs. 2.0). Le differenze riscontrate nei pazienti italiani tra questi due gruppi sono simili a quelle riportate negli altri paesi europei.

In quanto non prescritti per solito a seguito ad una recente sindrome coronarica acuta, nella maggior parte dei casi tali trattamenti di combinazione tra VKA e AP sarebbero inappropriati secondo le recenti linee guida ESC.

Conclusioni: La terapia di combinazione tra VKA e AP sembra essere relativamente comune nei pazienti italiani con Fibrillazione Atriale, in larga parte spiegata con la coesistenza di cardiopatia ischemica, ma non influenzata da valutazioni sul rischio tromboembolico o di sanguinamento dei pazienti. Sarebbe utile avviare progetti educazionali riguardanti l'implementazione delle Linee Guida per favorire l'utilizzo delle terapie di combinazione VKA + AP solo nei pazienti appropriati.

O195

Una rilettura dei trial sui nuovi anticoagulanti orali nella fibrillazione atriale. Il significato dei numeri assoluti.

Sergio Coccheri (a), Donatella Orlando (b)

(a) Dipartimento di Malattie Cardiovascolari, Università di Bologna, (b) Centro di Medicina Cardiovascolare, Bologna

Introduzione: L'efficacia di un nuovo farmaco viene generalmente valutata attraverso la significatività del valore di p. Tale valore indica la probabilità che la differenza osservata sia diversa da zero, cioè reale, ma non dà sufficienti informazioni sulla grandezza delle differenze osservate, che invece ha un notevole significato clinico.

Scopo: Obiettivo del presente studio è stato quello di riesaminare i risultati dei tre maggiori trials sui Nuovi Anticoagulanti Orali (NAO) (Connolly SJ et al. NEJM 2009, Dabigatran; Patel MR et al. NEJM 2011, Rivaroxaban; Granger CB et al. NEJM 2011, Apixaban) nella prevenzione dell'ictus durante fibrillazione atriale.

Metodo: Sono stati desunti i numeri assoluti di eventi risparmiati con i diversi NAO rispetto ai corrispondenti gruppi trattati con Warfarin. Tali valori e i relativi NNT (number needed to treat), sono stati confrontati con i risultati dell'analisi statistica tradizionale presentata nei lavori originali. Il procedimento è stato applicato, oltre che ai risultati di base, anche al confronto tra prevenzione primaria e secondaria. Dall'analisi è stato escluso il sottogruppo trattato con la dose più bassa di Dabigatran (110 mg).

Risultati: Riguardo all'end point "ictus cerebrale totale" il vantaggio maggiore verso il corrispondente gruppo Warfarin è attribuibile a Dabigatran 150 mg (5.8 eventi x 1000 pz/anno, NNT 172). Sull'end point "ictus ischemico" il vantaggio di Dabigatran su Warfarin permane, ma molto meno marcato, mentre quello di Rivaroxaban e Apixaban appare piuttosto modesto. Sulla "mortalità totale" la grandezza dell'effetto verso Warfarin è comparabile con i tre NAO, sebbene solo con l'Apixaban sia raggiunta una p significativa. Sulle "emorragie maggiori" il vantaggio su Warfarin è nettamente più elevato per Apixaban. Sulle "emorragie intracraniche" il vantaggio è in sostanziale parità per Dabigatran e Apixaban, di minore entità per Rivaroxaban. Valutando l'attività dei NAO vs Warfarin in prevenzione secondaria vs primaria, la migliore efficienza (+ bassi NNT) si ottiene per Apixaban sia sull'ictus totale che ischemico, e per Dabigatran sul solo ictus totale. Il maggiore risparmio di emorragie intracraniche si riscontra ancora per Apixaban e Dabigatran.

Conclusioni: Dalla presente rilettura dei dati si evince anzitutto che la superiorità o non inferiorità dei NAO sul Warfarin negli ictus totali è in gran parte il risultato di una riduzione degli ictus emorragici piuttosto che di quelli ischemici. Il risparmio di emorragie intracraniche è uniforme e quello di emorragie maggiori è massimo per Apixaban. In prevenzione secondaria la migliore efficienza verso Warfarin si è riscontrata per Apixaban e Dabigatran. D'altra parte nello studio del Rivaroxaban il confronto tra pazienti in prevenzione secondaria o primaria è reso improprio dal fatto che tutti i pazienti inclusi, primari o secondari, erano comunque ad alto rischio cardioembolico. In conclusione, risulta chiaro che il vantaggio dei NAO sul Warfarin nei trial suddetti, è ascrivibile in gran parte ad una maggiore sicurezza piuttosto che ad una maggiore efficacia sull'ictus cardioembolico.

IL CUORE D'ATLETA

O196

Longitudinal assessment of left atrial stiffness in top-level athletes

Flavio D'Ascenzi (a), Benedetta Maria Natali (a), Matteo Cameli (a), Matteo Lisi (a), Marta Focardi (a), Marco Bonifazi (b), Sergio Mondillo (a)

(a) *Department of Cardiovascular Diseases, University of Siena, Siena, Italy*, (b) *Department of Medicine, Surgery, and NeuroScience, University of Siena, Siena, Italy*

Background: Left atrial (LA) stiffness has emerged as a new parameter able to provide further insights into the physiology and pathophysiology of LA function. This parameter is a non-invasive estimation of myocardial stiffness of the LA and is calculated by using the E/e' ratio in conjunction with LA strains, derived from speckle-tracking echocardiographic analysis. It has been applied to patients with paroxysmal atrial fibrillation and with mild hypertension, demonstrating a higher LA stiffness in these patients as compared with controls. Conversely, we previously demonstrated in a cross-sectional study that athletes had a LA stiffness comparable with that of sedentary control subjects. However, while the increase of LA maximum volume is a relatively known phenomenon observed during the training program in top-level athletes, no data are available regarding the possible changes of LA stiffness during the regular season in elite athletes. The aim of this study was to investigate whether LA stiffness vary in athletes during the season.

Methods: Twenty-six professional soccer players were enrolled in the study. Measurements were performed at the beginning of the training program and after 1, 4, and 8 months. LA volume, E/e' ratio, and LA stiffness were obtained at each timepoint.

Results: A significant increase of LA volume was observed between pre-season and end-season measurements (50.8 ± 5.7 vs. 63.4 ± 7.2 mL, $p < 0.001$). Conversely, E/e' ratio did not significantly vary during the season and was within the normal range at each timepoint. LA stiffness did not vary during the study, with pre-season and end-season LA stiffness values being 0.14 ± 0.03 and 0.15 ± 0.04 , respectively. Furthermore, all athletes showed a low value of LA stiffness, being always within the normal range.

Conclusions: A significant increase of LA volume was observed in top-level athletes during the season. However, intra-cardiac filling pressures did not significantly vary and LA stiffness did not increase during the season, suggesting that the increased LA size in athletes should be interpreted as a physiological phenomenon of adaptation to intensive training. Contrary to patients with paroxysmal atrial fibrillation or with mild hypertension, in athletes the increase in LA size is not accompanied by an increase in LA stiffness.

O197

EKG abnormalities distribution between athletes and no athletes in a population of 12.000 young Italian students

Alessandra Cinque (a), Maria Chiara Gatto (a), Azzurra Marceca (a), Maria Giovanna Vassallo (a), Paola Scarparo (a), Antonio Fusto (a), Ilaria Mancini (a), Francesco Adamo (a), Alessandra D'Ambrosi (a), Massimo Mancone (a), Giuseppe Giunta (a), Francesco Fedele (a)

(a) *Università Sapienza di Roma. Policlinico Umberto I Dipartimento di scienze cardiovascolari*

Introduction: The athletes cardiovascular screening is recommended by the European Society of Cardiology (ESC). In young population the execution of 12-lead EKG screening is still controversial. The aim of our study is to evaluate the distribution of EKG abnormalities between athletes and no athletes.

Methods: From October 2010 to March 2013, we evaluated prospectively 12108 high school students (Age $17,9 \pm 1,57$ and 55,98% female): 8233 (68%) no athletes (G-A) and 3875 (32%) athletes (G-B). They were screened using 12-lead EKG. For statistical analysis we used the t test and Fisher's test, when appropriate. The statistical difference was considered significant only for p-value ≤ 0.05 .

Results: There are significant statistical difference between distributions of EKG abnormalities in two groups; particularly the first degree AV block, left atrial enlargement, supraventricular and ventricular arrhythmia, sinus tachycardia are more common in G-A.

Conclusions: Our study evidenced that the distribution of EKG abnormalities between two groups is similar or higher in G-A. These results suggest that an EKG screening is recommended also in no athletes.

| EKG finding | Percentage of abnormal in athletes EKGs | Percentage of abnormal in no athletes EKGs | p value |
|------------------------------------|---|--|---------|
| Right bundle branch block | 2.10% | 1.94% | >0.05 |
| Left bundle branch block | 0.5% | 0.3% | >0.05 |
| Prolonged QT | 0.20% | 0.44% | >0.05 |
| Short QT | 1.91% | 1.32% | 0.03 |
| ST-T wave abnormality | 3.44% | 3.67% | >0.05 |
| Left ventricular hypertrophy | 45.42% | 4.28% | 0.0001 |
| Left atrial enlargement | 1.34% | 3.32% | <0.0001 |
| Right ventricular conduction delay | 19.85% | 23.14% | 0.0003 |
| Short PQ interval | 4.77% | 4.63% | 0.72 |
| Premature ventricular contraction | 0.0002% | 0.52% | <0.0001 |
| Premature atrial contraction | 0.95% | 1.31% | 0.03 |
| Sinus Tachycardia | 4.58% | 5.76% | 0.016 |
| Sinus Bradycardia | 9.35% | 4.10% | <0.0001 |
| First degree AV block | 0.38% | 1.14% | 0.0001 |
| Early repolarization | 9.16% | 8.12% | 0.08 |

O198

Variation of thoracic impedance in top-level basketball players induced by a 6-month training program

Flavio D'Ascenzi (a), Marco Solari (a), Federico Alvino (a), Benedetta Maria Natali (a), Alberto Massoni (a), Matteo Cameli (a), Gian Maria Vassallo (b), Marco Bonifazi (c), Sergio Mondillo (a)

(a) *Department of Cardiovascular Diseases, University of Siena, Siena, Italy*, (b) *Medical Staff Mens Sana Basketball Club, Siena, Italy*, (c) *Department of Medicine, Surgery, and NeuroScience, University of Siena, Siena, Italy*

Background: The non-invasive assessment of hemodynamic performance has been largely studied in the field of heart failure. However, the bio-reactance-based evaluation of hemodynamic parameters has not been yet applied to top-level athletes. NICOM[®] is a bio-reactance cardiac output monitor that exploits the cyclic changes in amplitude and phase of the thoracic impedance for a non-invasive assessment of hemodynamic parameters. The aim of this prospective, longitudinal study was to non-invasively evaluate the changes of thoracic fluids induced by training in top-level athletes.

Methods: Twelve elite basketball athletes (Mens Sana Basket Siena, Italian Basket League A Series) were prospectively enrolled. A continuous hemodynamic evaluation was performed before the

beginning of the regular season and after 6 months of training. Measurements were performed in the same time of the day. Care was taken positioning the electrodes in pre-set anatomical landmarks. Athletes were engaged in an intensive and closely supervised training program for at least 20 hours/week. They were excluded from the study if they withdrew from training program >15 days because of musculo-skeletal injuries.

Results: After applying the exclusion criteria, a final population of 10 athletes was analysed. All athletes had a continuous registration of 5.42 ± 1.68 min. Body surface area did not significantly increased after training. No significant differences were observed after 6 months for cardiac output, stroke volume, systolic, and mean blood pressure. Conversely, diastolic blood pressure significantly decreased (76.9 ± 6.67 vs. 73.6 ± 6.45 mmHg, $p < 0.05$). A slight non-significant decrease of total peripheral arterial resistance was observed (863.21 ± 123.56 vs. 846.14 ± 258.70 dyn.sec/cm⁵). Moreover, a significant increase of thoracic fluid content was observed after 6 months of training (72.84 ± 8.47 vs. 83.99 ± 15.72 kΩ⁻¹, $p < 0.05$).

Conclusions: A 6-month training program was able to induce a decrease of diastolic blood pressure and an increase in thoracic fluid content in top-level basketball players. Conversely, bio-reactance cardiac output monitor was not able to detect changes in hemodynamic parameters. Thoracic fluid content is considered in heart failure patients as a sign of fluid overload, however muscular tissue conducts well, similarly to fluids. Thus, in order to avoid misleading interpretations, the increase of thoracic fluid content in top-level athletes should be interpreted as a surrogate of the increased fat-free mass induced by training.

O199

Myocardial deformational adaptations to different forms of training. A real time three dimensional speckle tracking echocardiographic study.

Sergio Buccheri (a), Sarah Mangiafico (b), Ines Monte (a), Vincenzo Lavanco (a), Vera Bottari (a), Stefano Leggio (a), Andrea Arcidiacono (a), Corrado Tamburino (a)

(a) *Dipartimento di Scienze Mediche e Pediatriche, Università di Catania*, (b) *UO Cardiologia Osp. Ferrarotto Catania*

Background: The hemodynamic load due to physical activity leads to structural and functional cardiac adaptations known as “Athlete’s heart”. Two major phenotypes have been described, the endurance trained heart, characterized by a preeminent eccentric ventricular hypertrophy and the heart adapted to strength sports that indeed shows a concentric type of hypertrophy. In addition, mixed sports can lead to a mixed phenotype of cardiac remodelling.

Purpose: We aimed to compare myocardial performance in different groups of trained athletes by means of 3D echocardiography (3D echo) and 3D speckle tracking echocardiography (3D-STE).

Methods: This was a single centre, prospective observational study. The final study population consisted of 51 subjects. 33 trained athletes were included and subdivided in two groups including 17 body builders (BB group) and 16 elite swimmers (SW group). A control group of 18 sedentary subjects matched for age and sex was also included (Sed.). All subjects underwent standard echocardiographic examination by using a GE Vivid 9 (GE Healthcare, Horten, Norway) equipped with a MS5 probe and a matrix array 4V probe. Standard M-mode and 2-D parameters of left ventricular (LV) function were obtained. Real time 3D-STE was performed using a commercially available software (Echopac, GE Healthcare, ver. 112.0.0.). Strain along the Longitudinal, Radial and Circumferential direction was obtained. In addition, Area Strain was also measured.

Results: LV mass indexed for BSA, LV IVSd and LV PWd thickness mean values were significantly increased in athletes when compared to sedentary subjects. LV diastolic diameter indexed for BSA had a significantly higher mean value in SW group in respect to subjects in BB group. There were no differences in conventional parameters of diastolic function among the three groups. Despite a preserved mean value of LV ejection fraction (LV EF) in all the groups, subjects in BB group showed a significant impairment of strain in both the longitudinal, radial and circumferential direction ($p < 0.05$

for all). Area strain mean value was also significantly impaired in BB group ($p < 0.01$). On multiple linear regression analysis BMI was the only independent predictor of radial (β coefficient -0.592 , $p < 0.001$, cumulative $R^2 = 0.351$), circumferential (β coefficient 0.470 , $p < 0.001$, cumulative $R^2 = 0.221$) and area strain (β coefficient 0.577 , $p < 0.001$, cumulative $R^2 = 0.310$). The E/A ratio (β coefficient -0.370 , $p < 0.001$), LV EF (β coefficient -0.237 , $p = 0.033$) and BMI (β coefficient 0.520 , $p < 0.001$; cumulative $R^2 = 0.640$) were independent predictors of longitudinal strain.

Conclusions: Sport specific patterns of ventricular morphological and functional remodelling are present in athletes performing different kinds of training. Myocardial deformation appears to be impaired in strength trained athletes mainly as a consequence of cardiac and vascular remodelling secondary to physiological adaptations during training. 3D-STE is a useful and feasible echocardiographic technique for the assessment of sport specific pattern of deformational adaptations.

O200

Il cuore d'atleta nell'adolescenza: ruolo del sesso

Antonio Crocama (a), Mauro Li Calzi (a), Matteo Goldoni (a), Marina Gianfreda (a), Margherita Ilaria Gioia (a), Luisa Musiari (a), Sebastian Cinconze (a), Almerina Biggi (a), Alberto Anedda (b), Antonio Bonetti (a), Alberto Montanari (a), Giovanna Pelà (a)

(a) Dipartimento di Medicina Clinica e Sperimentale, Azienda Ospedaliero-Universitaria, Parma,

(b) Unità Complessa di Medicina dello Sport, Azienda USL, Parma

Background: Gli adattamenti del ventricolo sinistro (VS) all'esercizio fisico sono ritenuti meno pronunciati nel genere femminile rispetto a quello maschile, come osservato sulla base di alcuni studi, peraltro eseguiti unicamente in atleti adulti di élite, che hanno messo in evidenza un minor grado di ipertrofia e di dilatazione del ventricolo sinistro (VS) nelle femmine rispetto ai maschi. Su questa base sono stati anche definiti i parametri sesso-specifici di normalità del VS, necessari per la prevenzione delle complicanze cardiovascolari nell'atleta nell'ambito dello screening di idoneità alla pratica agonistica. Non esistono però studi di confronto fra i due generi né in età adolescenziale, quando minori appaiono le differenze antropometriche, né in atleti di livello amatoriale e non professionale.

Disegno dello studio: Abbiamo esaminato 180 atleti adolescenti (età media $14 \pm 1,5$, 12-17), di cui 140 maschi (M) e 40 femmine (F), impegnati in attività agonistiche di tipo aerobico in campionati provinciali di livello dilettantistico, con simili protocolli di allenamento. Tutti i partecipanti sono stati sottoposti a valutazione clinica, ECG e ad ecocardiogramma, con misura dello spessore del setto interventricolare (SIV), della parete posteriore (PP), dei diametri, dei volumi e della massa indicizzata del VS (LVM/BSA), utilizzando il "relative wall thickness" (RWT) quale indice di geometria.

Risultati: I due gruppi non differivano per età, peso, altezza, indice di massa corporea (BMI). Le F presentavano più bassi valori di pressione arteriosa sistolica (PAS) (114 ± 8 mmHg vs 118 ± 10 nei M; $p = 0,068$) e diastolica (67 ± 6 mmHg vs 70 ± 7 ; $p < 0,05$) e più elevata frequenza cardiaca (FC) (76 ± 11 bpm vs 71 ± 11 ; $p < 0,05$). Nei M erano più elevati: SIV ($8,5 \pm 1,1$ vs $7,8 \pm 0,9$; $p < 0,001$), PP ($8,1 \pm 1,2$ vs $7,3 \pm 1,0$ mm; $p < 0,001$), LVM/BSA (100 ± 18 vs 80 ± 13 gr/m²; $p < 0,001$), diametri (diastolico: 47 ± 4 vs 44 ± 3 mm; $p < 0,001$; sistolico: 29 ± 4 vs 27 ± 4 mm; $p < 0,001$), volumi cavitari (diastolico: 110 ± 25 vs 90 ± 17 ml; $p < 0,001$; sistolico: 37 ± 12 vs 29 ± 8 ml; $p < 0,001$) e gittata sistolica (73 ± 16 vs 62 ± 11 ml; $p < 0,001$). Non si osservavano invece differenze significative nella geometria del VS (RWT: M = $0,35 \pm 0,04$ vs F = $0,34 \pm 0,04$). La frazione di eiezione (FE) e la frazione di accorciamento (FA) erano più elevate nelle F (FE = $68,9 \pm 5,4$ vs $66,6 \pm 5,8$; $p < 0,05$; FA $40,3 \pm 5,3$ vs $38,3 \pm 5,6$; $p < 0,05$) con simili parametri di funzione diastolica. All'ECG si osservavano nei M più elevati voltaggi R5/S1 (30 mm vs 21 ; $p < 0,001$) con una maggior prevalenza di ipertrofia VS (35% vs $2,8\%$; $p < 0,001$) e "ripolarizzazione precoce" (42% vs 10% ; $p < 0,001$). All'analisi della covarianza (ANCOVA), in cui le covariate erano età, PAS, BMI e FC, il sesso risultava un forte predittore della LVM/BSA, del SIV, della PP e del diametro telediastolico del VS, con un potere predittivo simile a quello di età e

BMI (per tutti $p < 0,0001$). Il sesso prediceva anche FE, FA ($p < 0,05$) ed il parametro ECG R5/S1 ($p < 0,001$). All'analisi logistica binaria, eseguita considerando come categoriche le variabili ECG, il sesso influenzava ugualmente ($p < 0,01$) la presenza di IVS ECGrafica e di ripolarizzazione precoce. **Conclusioni:** Come già osservato in studi su atleti adulti di livello professionale, le atlete adolescenti di livello amatoriale presentano, rispetto ai coetanei atleti maschi, con simili parametri antropometrici, minori diametri e spessori del VS, con relativo incremento nella funzione sistolica ed identica geometria del VS, definita dal RWT. Il sesso rappresenta quindi un importante determinante degli adattamenti cardiaci, sia strutturali che funzionali, all'esercizio fisico negli atleti adolescenti, indipendentemente dall'età e dalla BMI.

O201

Precompetitive Stress in Top-level Athletes during Play-offs: a Heart Rate Variability Study.

Flavio D'Ascenzi (a), Federico Alvino (a), Benedetta Maria Natali (a), Matteo Cameli (a), Giampaolo Boschetti (b), Marco Bonifazi (c), Sergio Mondillo (a)

(a) Department of Cardiovascular Diseases, University of Siena, Siena, Italy, (b) Staff Santa Croce Volleyball Club, Santa Croce sull'Arno, Pisa, Italy, (c) Department of Medicine, Surgery, and NeuroScience, University of Siena, Siena, Italy

Background: Variations of sympathetic and/or parasympathetic activity have been observed with heart rate variability (HRV) in response to mental stress. The moment prior to sports competition is supposed to be a stressful condition and its influence on performance is of great interest of the athletic world. However, HRV has been rarely used in top-level athletes prior to decisive matches. The aim of this study was to examine the changes in HRV in elite female volleyball players before a stressful competition during play-offs.

Methods: A short-term resting HRV analysis was applied right after the night sleep in 10 top-level athletes 1 and 2 days prior to a decisive play-off match and the day of the match.

Results: Under the effect of pre-competitive stress, RR interval, resting heart, pNN50, rMSDD, and SD1 did not significantly vary. SD2 significantly increased in comparison with first-day measurement (140.93 ± 91.83 vs. 117.39 ± 72.75 ms, $p < 0.05$). HF% levels significantly decreased the morning of the match day as compared with first-day data (24.04 ± 12.47 vs. 36.45 ± 17.41 %, $p < 0.05$, respectively), however no significant changes in LF/HF% ratio were observed. A gradual increase in VLF% and in LnVLF was observed, with a significant difference between match-day and first-day measurements (56.78 ± 15.80 vs. 34.21 ± 16.83 %, $p < 0.01$ and 7.53 ± 1.34 vs. 6.64 ± 1.00 , $p < 0.05$, respectively). The number of positive receptions was inversely correlated with LF/HF% ratio ($R = -0.98$, $p < 0.05$), while the number of reception errors was significantly correlated with the minimum resting HR ($R = 0.98$, $p < 0.05$).

Conclusions: In conclusion, female athletes practising team sports did not exhibit a pronounced modulation of autonomic nervous system activity prior to competition. Interestingly, an inverse relationship was observed between performance indicator of technical skills and LF/HF% ratio, suggesting that an increase of sympathetic activity could impair sports-specific performance. A day-to-day HRV measurement could be a useful tool to monitor the levels of pre-competitive stress in athletes, also considering its impact on athletic performance.

FUNZIONE VENTRICOLARE DESTRA E INSUFFICIENZA CARDIACA

O202

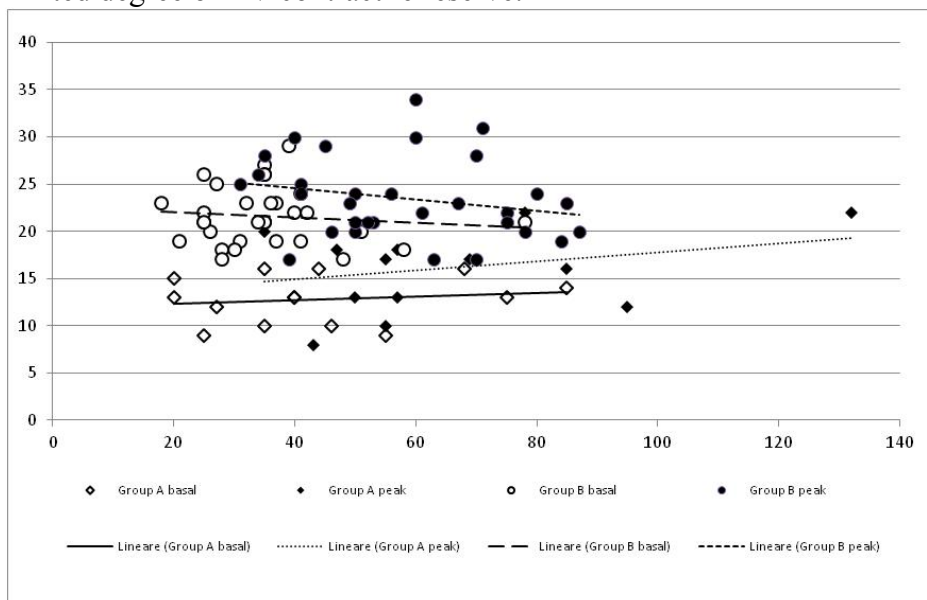
Assessing right ventricular functional response during incremental exercise in heart failure: insights on mitral regurgitation and ventilatory efficiency

Greta Generati (a), Francesco Bandera (a), Marta Pellegrino (a), Eleonora Alfonzetti (a), Valeria Donghi (a), Serenella Castelvechio (b), Andrea Garatti (b), Lorenzo Menicanti (b), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese, (b) Cardiosurgery Unit, IRCCS Policlinico San Donato Milanese

Purpose: Right ventricular (RV) dysfunction and pulmonary hypertension (PH) are predictors of adverse prognosis in patients with heart failure reduced ejection fraction (HFrEF). Mitral regurgitation (MR) plays a central role in determining pulmonary flow overload and PH. We explored the functional response of the RV during maximal exercise according to MR severity and ventilatory response by combining stress Echo with cardiopulmonary exercise test (CPET). **Methods:** 45 HFrEF patients (age 67 ± 11 ; male 64%; ischemic 79%; NYHA class II/III/IV 46%/42%/12% and EF $36 \pm 8\%$) were evaluated at rest and during exercise (tilt table cycloergometer) assessing the changes in the RV TAPSE (length) vs pulmonary arterial systolic pressure PAPS (developed pressure, force) relationship along with exercise-induced MR changes and ventilatory efficiency (VE/VCO₂) response.

Results: Patients with an impaired RV function (n 14, Group A, TAPSE < 16 mm; average 12.8 ± 2.5 mm and PAPS 44 ± 20 mmHg) compared to Group B (n 31, TAPSE > 16, average 21.6 ± 3 and PAPS 35.2 ± 11.6) presented with a high prevalence of rest moderate-to-severe MR (43% vs 13%; $p < 0.05$), a remarkable steeper VE/VCO₂ slope (41.2 ± 9 vs 30.5 ± 6 ; $p < 0.001$) and an unfavorable TAPSE vs PAPS relationship (Figure). At peak exercise, the relationship TAPSE vs PAPS of the group A shifted upward to a functional RV response lower than the one observed at rest in group B (Figure), suggesting a limited degree of RV contractile reserve.



Conclusions: In HFrEF the functional response of the RV during maximal exercise differs according to the degree of MR that, when moderate to severe, typically combines with ventilator inefficiency. The functional evaluation of RV function during maximal exercise provides adjunctive insights in the clinical workup of HFrEF.

O203

Right ventricular longitudinal deformation correlates closely with right ventricular myocardial fibrosis in patients with end-stage heart failure

Matteo Lisi (a), Matteo Cameli (a), Francesca Maria Righini (a), Angela Malandrino (a), Damiana Tacchini (b), Marta Focardi (a), Charilaos Tsioulpas (c), Sonia Bernazzali (c), Massimo Maccherini (c), Michael Y Henein (d), Sergio Mondillo (a)

(a) Department of Cardiovascular Disease, University of Siena, Italy, (b) Department of Pathology, University of Siena, Italy, (c) Department of cardiac surgery, University of Siena, Italy, (d) Department of Public Health and Clinical Medicine and Heart Centre, Umeå University, Sweden.

Background: Right ventricular (RV) longitudinal strain (LS) plays an key role in the evaluation of its systolic performance and clinical outcome in patients with refractory heart failure (HF). This study sought to determine the value of RVLS for prediction of RV myocardial fibrosis in patients with severe HF undergoing heart transplantation (HTx).

Methods: The cohort we studied consists of 24 patients with severe systolic HF (left ventricular ejection fraction $\leq 25\%$; NYHA class IV) referred to Le Scotte Hospital of Siena between 2009 and 2013 for a simultaneous right heart catheterization and echocardiographic evaluation before HTx. RVLS by Speckle Tracking Echocardiography (STE) was used to assess free-wall RVLS, global cavity RVLS (including all segments in the apical 4 chamber view and right atrial LS (RALS), RV fractional area change (RVFAC), RV sphericity index (RVSI) and tricuspid annular plane systolic excursion (TAPSE) were also measured. All patients underwent HTx 12 ± 34 days afterwards. From the explanted hearts a $1 \times 0,5$ cm myocardial sample of the RV lateral free wall was obtained and stained with hematoxylin-eosin and Masson's trichrome. The ratio of the fibrotic area to the total surface area of each section was used to estimate the extent of RV myocardial fibrosis (percentage) as (fibrotic area-total area) $\times 100$.

Results: A good correlation was found between the extent of RV myocardial fibrosis and free-wall RVLS ($r = 0.72$; $p < 0.0001$), global RVLS ($r = 0.49$; $p < 0.0001$), RVSI ($r = 0.47$; $p < 0.0001$), and RALS ($r = -0.46$; $p = 0.005$), with a poorer correlation with TAPSE ($r = -0.32$; $p = 0.01$) and RVFAC ($r = -0.25$; $p = \text{ns}$). Of these indices, free-wall RVLS had the strongest diagnostic accuracy for detecting severe RV myocardial fibrosis (AUC = 0.87).

Conclusions: In late stage HF patients, right ventricular free wall myocardial deformation is the best functional measure that correlates with the extent of myocardial fibrosis. These findings should have clinical implications when interpreting other RV measurements.

O204

Prognostic role of right ventricular contraction pressure index in advanced decompensated heart failure

Stefano Pidello (a), Federico Giovanni Canavosio (a), Virginia Bovolo (a), Simone Frea (a), Serena Bergerone (a), Fiorenzo Gaita (a)

(a) Cardiologia Universitaria, Azienda Ospedaliera Città della Salute e della Scienza di Torino

Background: Few data are available to predict short-term outcomes in patients hospitalized for advanced heart failure (HF). Aim of the study was to determine the prognostic relevance of the *simplified Right Ventricular Contraction-Pressure Index* (sRVCPI), a new simple echo-Doppler parameter derived as *Tricuspid Annular Plane Systolic Excursion* (TAPSE) multiplied by *Right Ventricular-Right Atrial Gradient*.

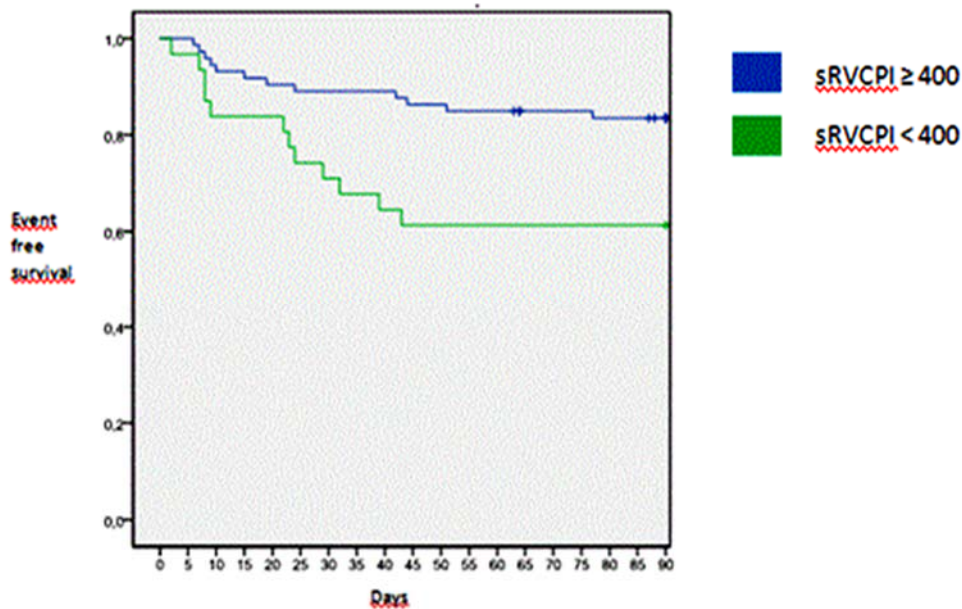
Methods: 105 patients admitted for advanced decompensated HF (EF $24.1 \pm 12.1\%$) were prospectively enrolled. Simplified RVCPI at admission was compared to predefined parameters of

increased in-hospital mortality. Endpoint was a composite of cardiovascular death, urgent heart transplantation and mechanical circulation support (MCS) at 3 months.

Results: During follow up 28 (26.6%) patients met the primary outcome (among them 15 died). Simplified RVCPI showed good diagnostic accuracy in predicting events (area under the ROC curve 0.734 ± 0.102). Patients with sRVCPI < 400 mm·mmHg had the worst outcome (event-free survival at 90 days: 58% vs. 75%, $p < 0.005$).

At logistic regression analysis INTERMACS profile ≤ 3 , total bilirubin ≥ 2 mg/dl and sRVCPI < 400 mm·mmHg independently predicted events. A 3-point (ComBiRight) risk score was calculated from those 3 variables (area under the curve 0.86 ± 0.07): odds of events for patients ($n = 22$) with ComBiRight ≥ 2 were greater than subjects ($n = 83$) with a score ≤ 1 (Likelihood Ratio 5.89, 95% CI: 2.69-13, $p < 0.001$).

Conclusions: Echocardiographic evaluation of RV function with sRVCPI improves risk stratification in the setting of advanced decompensated HF. Simplified RVCPI, combined with INTERMACS profile and bilirubine, could provide proper and timely decisions regarding treatment strategies in this challenging population.



O205

Ipertensione polmonare reattiva e rischio operatorio in pazienti candidati a trapianto di cuore: ruolo prognostico del test con enoximone e del match donatore-ricevente

Valentina Manfredini (a), Carlo Lonetti (a), Luciano Potena (a), Sofia Martin Suarez (a), Emanuele Pilato (a), Antonio Loforte (a), Fabio Coccolo (a), Francesco Grigioni (a), Giuseppe Marinelli (a), Claudio Rapezzi (a), Angelo Branzi (a)

(a) Dipartimento di Medicina Specialistica Diagnostica e Sperimentale - Università di Bologna

Background: L'ipertensione polmonare (IP) è una severa complicanza dello scompenso cardiaco cronico avanzato che aumenta il rischio di graft failure acuta nei pazienti candidati al trapianto di cuore. Nonostante la pratica clinica corrente preveda test di vasoreattività (VT) per testare la reversibilità dell'IP nei pazienti in lista per trapianto, il significato prognostico dei risultati ottenuti non sono ancora stati del tutto chiariti. In questo studio abbiamo analizzato in che modo la presenza di IP reattiva condizioni il rischio post-operatorio in pazienti sottoposti a trapianto di cuore e se il VT consenta una ulteriore di stratificazione del rischio rispetto alla valutazione con cateterismo cardiaco destro (RHC) basale. Successivamente, abbiamo valutato in che modo le caratteristiche della donazione possono incidere sul rischio legato alla IP reattiva.

Metodi: In questo studio, sono stati inclusi tutti i pazienti sottoposti a trapianto di cuore tra il 1999 e SIC | *Indice Autori*

il 2012 nel nostro Centro. I pazienti venivano studiati con RHC ogni 6 mesi durante la lista d'attesa. Coloro che mostravano elevati valori di resistenze polmonari (RVP) erano sottoposti al test acuto con bolo di enoximone ad alta dose (90mcg/kg/min), per valutare il grado di reversibilità della IP. L'Endpoint dello studio è stato definito come Perdita Precoce del Graft (mortalità ospedaliera o necessità di ritrapianto entro 30 giorni).

Risultati: Sono stati inclusi 385 pazienti consecutivi, di cui 30 (8%) hanno presentato perdita precoce del graft. Le RVP pre-trapianto sono risultate un fattore di rischio indipendente per la perdita precoce del graft (OR=2.25; P=0.03), ma non per l'outcome a lungo termine nei pazienti sopravvissuti al primo mese post-trapianto. In 95 pazienti è stato effettuato VT con l'enoximone. Mentre la prevalenza di endpoint primario era 5,26% nei pazienti con RVP basali <2.5 UW, in coloro con resistenze post test <2.5 UW era 9.7%, con resistenze post-test 2.5-3 UW era 16.6% e con resistenze post-test >3UW era 41.7% (P=0.03). Le RVP post-test sono risultate essere un indicatore prognostico indipendente dalle RVP basali (OR per resistenze post test >2.5 =3.5; P=0.04). L'analisi in sottogruppi valutando diverse caratteristiche del donatore ha mostrato che l'impatto negativo dell' IP viene significativamente ridotto in coloro che ricevono l'organo da donatori non deceduti per emorragia cerebrale: nei casi con donatore deceduto per emorragia cerebrale, la prevalenza dell'endpoint era 14,8% nei pazienti con IP e 3,6% in quelli senza IP (P=0,02); nei casi di donatore deceduto per altre cause i riceventi con IP avevano una mortalità del 10,7% mentre quelli senza IP del 6,1% (P=0,2)

Conclusioni: Nei pazienti candidati al trapianto di cuore, la IP reattiva rappresenta un fattore di rischio importante di perdita precoce del graft. Il test di vasoreattività acuta con enoximone è in grado di stratificare ulteriormente il rischio operatorio nei pazienti con IP prima del trapianto. La causa di morte del donatore interagisce con la presenza di IP nel determinare il rischio post-operatorio. Questi risultati confermano l'utilità del test di VT nei pazienti candidati a trapianto di cuore e suggeriscono l'importanza di elaborare nuove strategie di allocazione degli organi per migliorare l'outcome nei pazienti con elevate RVP.

O206

Assessing right ventricular to pulmonary circulation reserve during exercise in heart failure patients with depressed right ventricular function at rest provides relevant clinical insights

Francesco Bandera (a), Marta Pellegrino (a), Greta Generati (a), Valeria Donghi (a), Eleonora Alfonzetti (a), Magdalena Nowacka (a), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese

Purpose: Right ventricular (RV)-pulmonary circulation (PC) uncoupling plays a key role in HF syndrome carrying a remarkable risk of death. Assessing the adaptations of tricuspid annular systolic excursion (TAPSE), as RV systolic function indicator, and pulmonary artery systolic pressure (PASP) may provide important insights on the functional reserve of the right heart (RH). **Objectives:** In a group of HF patients with significant RH disease we aimed at assessing the functional RV-PC reserve during a symptom-limited cardiopulmonary exercise testing (CPET).

Methods and Results: 24 HF patients (mean age 66; male 65%; NYHA II 30%, III 63%, IV 7%) with an average TAPSE and PASP of 13 mm and 43 mmHg, respectively underwent a maximal CPET (bike, personalized incremental ramp) combined with Echo-Doppler assessment. The table reports the main clinical characteristics and results looking at patients with a preserved vs impaired RV-PC response. Interestingly, for similar degree of LV function, remodeling and RV function impairment at rest, 2 different exercise phenotypes were observed and patients with impaired exercise RV-PC reserve (higher PASP/TAPSE) exhibited a severely reduced exercise performance (peak VO₂ and workload).

| | | |
|--|----------------------------------|---------------------------------|
| | Preserved Exercise RV-PC Reserve | Impaired Exercise RV-PC Reserve |
|--|----------------------------------|---------------------------------|

| | Rest | Peak exercise | Rest | Peak exercise |
|--|----------|---------------|----------|---------------|
| LVEF, % | 39±12 | 45±16 | 43±17 | 40±15 |
| RVFA, % | 33±16 | 38±13 | 32±9 | 38±10 |
| TAPSE, mm | 13.1±2.4 | 18.6±2.8 * § | 13.9±2.5 | 13.3±2.8 |
| PASP, mmHg | 41.0±20 | 70.2±27 * | 45.8±16 | 62.4±16 * |
| PASP/TAPSE ratio | 3.2±1.4 | 3.8±1.4 § | 3.4±1.5 | 4.9±1.5 * |
| Workload, Watt | | 70.6±22 § | | 41.8±14 |
| Peak VO ₂ , mlO ₂ /kg/min | | 14.1±4 § | | 9.95±2.5 |

*: p<0.01 vs corresponding rest; §: p<0,01 vs RV-PC impaired reserve corresponding value

Conclusions: An impaired RH function at rest may not invariably lead to an impaired RV-PC adaptation during exercise. Testing the degree of RV functional reserve adaptations during maximal exercise seems worth to be unmasked even in the advance stages of the disease. Whether a preserved RV-PC reserve may translate in a more favorable response to therapeutic interventions needs to be tested in larger and specifically designed trials.

O207

La ventilazione durante esercizio in pazienti affetti da insufficienza cardiaca cronica e broncopneumopatia cronica ostruttiva

Paola Gargiulo (b, c), Anna Apostolo (c), Maurizio Bussotti (e), Erica Gondoni (c), Mattia Internullo (a), Matteo Bonini (a), Paolo Palange (a), Piergiuseppe Agostoni (d)

(a) Dipartimento di Sanità Pubblica e Malattie Infettive, Università "La Sapienza", Roma, (b) Dipartimento di Scienze Biomediche Avanzate, Università degli Studi di Napoli "Federico II", (c) IRCCS Centro Cardiologico Monzino, Milano, (d) Dipartimento di Scienze Cliniche e Medicina di Comunità, Università degli Studi di Milano, Milano, (e) Fondazione Salvatore Maugeri, Milano

Premesse: In pazienti affetti da scompenso cardiaco cronico (SCC) e broncopneumopatia cronica ostruttiva (BPCO) la risposta ventilatoria all'esercizio è difficilmente prevedibile. Infatti, nello SCC si osserva tipicamente un incremento sproporzionato della ventilazione rispetto alla richiesta metabolica, mentre generalmente nella BPCO la risposta ventilazione è troncata. La ventilazione (VE) durante esercizio è definita dal suo comportamento in relazione alla produzione di anidride carbonica (VCO₂), secondo l'equazione lineare $VE = aVCO_2 + b$, dove "a" è la pendenza della relazione, comunemente adoperata per definire l'efficienza ventilatoria, e "b" è l'intercetta sull'asse della VE (VEY_{int}), corrispondente alla ventilazione dello spazio morto.

Scopo dello studio è valutare la risposta ventilatoria all'esercizio in pazienti affetti SCC e BPCO, da SCC, da BPCO, da ipertensione arteriosa polmonare (PAH) e in soggetti sani attraverso la valutazione della pendenza (slope) e dell'intercetta (VEY_{int}) della relazione VE vs VCO₂.

Metodi: I criteri di inclusione sono stati: FE₁≤40% e FEV₁/FVC <0.70% per pazienti affetti da SCC e BPCO, FE₁≤40% e FEV₁/FVC >0.70% per i pazienti affetti da SCC, FE conservata e FEV₁/FVC <0.70% per i pazienti affetti da BPCO. Tutti i pazienti sono stati sottoposti in singola giornata a spirometria, ecocardiogramma transtoracico e test da sforzo cardiopolmonare con protocollo incrementale a rampa al cicloergometro.

Risultati: Lo studio, prospettico e multicentrico, ha arruolato 355 pazienti (79 SCC+BPCO, 78 SCC, 74 BPCO, 57 PAH, 67 volontari sani). I risultati sono mostrati in tabella 1.

Conclusioni: $VE_{Y_{int}}$ è aumentata in pazienti affetti da SCC e BPCO e nei pazienti affetti solo da BPCO, e non negli altri gruppi, indipendentemente dalla pendenza della relazione VE vs VCO_2 , proponendosi come un utile parametro di valutazione dell'efficienza ventilatoria nei pazienti scompensati con comorbidità respiratoria.

| | SCC+BPCO | BPCO | SCC | PAH | SOGGETTI SANI |
|------------------|----------------|----------------|----------------|---------------|---------------|
| VE/VCO_2 slope | 29.29*† ± 7.44 | 32.11*† ± 6.10 | 31.83*† ± 5.64 | 37.04 ± 10.53 | 23.85 ± 2.80 |
| $VE_{Y_{int}}$ | 5.10§* ± 1.69 | 3.64& ± 2.02 | 6.06*† ± 2.96 | 3.08 ± 3.31 | 3.98 ± 2.50 |

* $p \leq 0.05$ vs PAH; † $p \leq 0.05$ vs sani; § $p \leq 0.05$ vs BPCO; & $p \leq 0.05$ vs SCC.

CARDIOPATIE CONGENITE E CARDIOCHIRURGIA

O208

Mid-term results of different surgical techniques to replace the ascending aorta associated with bicuspid aortic valve disease

Paolo Nardi (a), Guglielmo Saitto (a), Marco Russo (a), Fabio Bertoldo (a), Antonio Scafuri (a), Antonio Pellegrino (a), Luigi Chiariello (a)

(a) Department of Cardiac Surgery, Policlinico Tor Vergata University of Rome, Italy

Aim of the study: To evaluate the effectiveness of three different surgical strategies to treat ascending aorta aneurysm with or without involvement of the root associated with bicuspid aortic valve (BAV).

Methods: One-hundred and fifty consecutive patients in a 5-year period underwent Bentall operation in presence of ascending aorta and aortic root dilation ≥ 45 mm of diameter and malfunctioning BAV (n=46, Group 1), separate aortic valve and ascending aorta replacement in presence of ascending aorta dilation ≥ 45 mm, aortic root < 45 mm and malfunctioning BAV (n=77, Group 2), ascending aorta replacement +/-BAV repair in presence of ascending aorta dilation ≥ 45 mm, aortic root < 45 mm and normal functioning or mildly insufficient BAV (n=27, Group 3).

Results: Patients of Group 1 were younger and affected by more BAV insufficiency and impaired left ventricular function as compared with Group 2 and 3 ($p < 0.05$); aortic X-clamp time was longer for Group 1 and 2 vs Group 3 ($p < 0.0001$). Operative mortality was 2.1% in Group 1, 1.3% in Group 2, absent in Group 3 ($p = NS$). Five-year survival was $94\% \pm 4\%$ (Group 1), $92\% \pm 3.4\%$ (Group 2), 100% (Group 3) ($p = NS$). At 5-year follow-up no patient in any Group required reoperation on the ascending aorta or experienced aortic complications; in all groups there was a significant improvement of clinical dyspnea ($p < 0.0001$) and, in Group 2 and 3, root dimensions not only did not increase, but were found significantly smaller as compared with preoperative measurements ($p < 0.05$, for all comparisons). In Group 3 aortic regurgitation grade ($0.5 \pm 0.8/4+$) did not increase as compared with the preoperative value ($0.8 \pm 0.9/4+$).

Conclusions: Bentall operation still remains associated with optimal results for the treatment of BAV pathology, despite a worse clinical presentation. Less invasive surgical procedures, BAV sparing or repair procedures, appear to offer satisfactory results in presence of mildly diseased or normal aortic root and normal BAV function at the time of operation.

O209

Long term outcome of arterial switch for transposition of great arteries in tunisian children. An emergent country experience.

Marouane Boukhris (a)

(a) *Tunisian cardiologists of Tomorrow (TnCOT)*

Introduction: After its introduction by Jatene and colleagues in 1975, the arterial switch operation (ASO) has become the surgical technique of choice for correction of transposition of the great arteries (TGA) with or without ventricular septal defect (VSD). Short- and mid-term results are promising, data on long-term outcome are limited and major complications may occur.

Objectives: Our work is intended to assess the long term results of ASO in Tunisian children with TGA and to identify potential factors affecting these results.

Methods:

We studied 44 patients with ASO (mean age: 11.5 years, 73%-male, 50 % TGA with VSD) followed at our department. The inclusion criterion was at least 5 years of follow-up. Complete clinical examination, standard and 24-hour Holter electrocardiogram, M-mode, 2D-and color Doppler echocardiography and coronary investigations were performed.

Results:

Mean follow-up was 106 months (8.83 years). One patient died (2.27%). Impaired left ventricular function was observed in 5 cases (11.36%). Right ventricular outflow tract obstruction was observed in 6 patients (13.63%) requiring reintervention in 2 cases. Pulmonary regurgitation was frequent (40.90%). Aortic regurgitation was observed in 20 patients (45.45%) but appeared not to be progressive. Coronary lesions were found in 4 patients (9.09%) requiring a coronary artery bypass graft (CABG) in 1 case. Intramural coronary artery course was the risk factor of late coronary arteries lesions ($p=0.013$) Freedom from late reintervention was 84% at 15 years after ASO. Eight late reinterventions were performed in 4 patients (9.09%) with a mean age of 10.43 years.

Conclusions:

The TGA, including complex types, can be corrected with good long-term outcomes by ASO. The association to a VSD was not considered to be a predictor of long-term complications except of aortic regurgitation. Right ventricular outflow tract dysfunction was the main reason for late reinterventions. Potential risk of myocardial ischemia requires regular appropriate follow up.

O210

Exercise capacity and stress echocardiography long term after arterial switch operation for TGA

Fortuna Del Gaizo (a), Concetta Ricci (a), Alessandra Rea (a), Marianna Conte (a), Raffaella Esposito (a), Giovanni Di Salvo (a), Nicola Di Virgilio (a), Regina Sorrentino (a), Giuseppe Caianiello (b), Maria Giovanna Russo (a)

(a) *Pediatric Cardiology - AORN dei Colli – AO Monaldi, SUN, Naples*, (b) *Pediatric Heart Surgery - AORN dei Colli – AO Monaldi, Naples*

Background: The arterial switch operation (ASO) is currently the treatment of choice in neonates with transposition of the great arteries (TGA). The outcome in childhood is encouraging but only limited data for long-term outcome into adulthood exist. Patients who undergo the ASO are at risk of reduced exercise capacity, with most reports focusing on chronotropic incompetence as the cause. We wanted to assess the feasibility and the physiologic responses of stress echocardiography and Cardiopulmonary test in 15 patients that underwent ASO in neonatal age. The results were compared with that of 15 patients that underwent heart surgery for ventricular septal defect (VSD) under 1 year of age.

Methods: 30 patients were reviewed for functional capacity and morphologic assessment of the left ventricle. 15 patients that underwent ASO for TGA (all had simple TGA with intact ventricular septum), and of 15 patients that underwent heart surgery for ventricular septal defect (VSD) under 1 year of age. The two groups were comparable for: age, gender, BSA and physical activity. The two groups were evaluated with:

- rest EKG 12-leads;
- 12-leads Holter EKG 24 hours;
- Transthoracic Echocardiography at rest performed with Toshiba Artida Aplio 500 (5 MHz): parasternal views: parasternal views short and long axis; apical views: 2-3-4-chambers;
- Systolic and Diastolic function evaluated with DTI Physical stress Echocardiography performed with GE Vivid 7 (5 MHz): parasternal views: long axis; apical views: 2-3-4-chambers;
- Cardiopulmonary test.

Results: Both groups had not significant alteration of ST-T at EKG; few patients with TGA and more patients with VSD had right bundle branch block (3/15; 20% vs 7/15; 47%). 3/15 (20%) VSD had BAV I. There were no major arrhythmias at holter ECG evaluation. Echocardiographic parameters at rest as FE, FS, and VSX dimensions were normal in both groups. The systo-diastolic function was normal in ASO group, while the VSD group had a reduced myocardial velocity in at basal interventricular septum, compatibly with the type of operation. At physical stress echocardiography: in the ASO group, 10 (67%) had normal motion at basal and during stress, 5 (33%) with interventricular septum dyskinesia showed normal motion during stress. In the VSD group: 10 (67%) had interventricular septum dyskinesia at rest that did not recovered normal motion during stress, and 5 (33%) had normal kinesis. 7 (47%) patients operated for TGA showed an increased gradient (>30 mmHg) at right ventricle outflow tract during stress. At cardiopulmonary test: the VO₂ peak, during, was normal (> 84%) in operated VSD. In 10 (67%) pz after ASO the peak of VO₂ was decreased. This is compatible with a residual right ventricle outflow tract obstruction (> 30 mmHg CW gradient).

Conclusions: Aim of our study was to compare two groups of patients that underwent to CEC for different congenital heart disease: patients operated for VSD and for TGA. Patients operated for VSD often showed a reduced wall motion at basal and during stress. TGA operated showed an increased RVOT obstruction during stress, that is a determinant for exercise capacity.

O211

The systemic right ventricle: differences between congenitally corrected transposition of the great arteries and dextro-transposition after atrial switch.

Assunta Merola (a), Giancarlo Scognamiglio (a), Gemma Salerno (b), Enrica Pezzullo (b), Giovanni Maria Di Marco (a), Giangiacomo Di Nardo (a), Michela Palma (a), Michele D'Alto (a), Giuseppe Caianiello (c), Maria Giovanna Russo (d), Berardo Sarubbi (a)

(a) UOD Cardiopatie Congenite dell'Adulto – Ospedale Monaldi – AORN Dei Colli, (b) UOD Cardiologia Riabilitativa Intensiva e Scompenso - Ospedale Monaldi – AORN dei Colli, (c) UOC Cardiochirurgia Pediatrica – Ospedale Monaldi – AORN dei Colli, (d) UOD Cardiologia Pediatrica – Seconda Università degli Studi di Napoli – Osp Monaldi – AORN dei Colli

Background: Systemic right ventricle (RV) is a typical feature of congenitally corrected transposition of the great arteries (ccTGA) and complete transposition of the great arteries (TGA) after atrial switch operation.

In the present study we aimed to define differences between adult patients with ccTGA and those with TGA after atrial switch by comparing echocardiographic, biochemical and cardiopulmonary exercise test (CPET) parameters.

Methods and Results: A total of 10 patients (eight male) with ccTGA and 29 patients (12 male) with TGA after atrial switch were studied. All patients underwent echocardiographic assessment of RV dimension and function, CPET and NT-pro-BNP levels determination. Although patients with

ccTGA were older (41.6 ± 8.8 years vs 23.3 ± 5.2 years, $p < 0.0001$), they showed higher indexes of RV longitudinal systolic function such as TAPSE (15.7 ± 2.8 cm vs 10.9 ± 2.9 cm, $p < 0.0001$) and S' wave at pulsed DTI analysis (8.9 ± 1.9 cm/sec vs 7.3 ± 2.4 cm/sec, $p = 0.04$) compared with patients with TGA. In patients with TGA higher RV filling pressures, estimated by E/E' ratio (15.5 ± 6.5 vs 8.2 ± 3.5 , $p = 0.002$), were found and the systemic RV appeared more dilated, especially at the tricuspid annular level (3.5 ± 0.5 cm vs 3.1 ± 0.2 cm, $p = 0.006$). On the contrary, there was no significant difference in the NT-pro-BNP levels and in the CPET parameters, except for higher values of VD/VT ratio in ccTGA patients (0.21 ± 0.04 vs 0.17 ± 0.04 , $p = 0.02$).

Conclusion: Although patients with ccTGA had a longer pressure load of the systemic right ventricle, ventricular function was better compared with that in patients with TGA after atrial switch. The results suggest that the systemic ventricles might have partly different physiologies. One difference could be the post-operative situation after atrial switch, which results in impaired atrial contribution to ventricular filling.

O212

Confronto della capacità funzionale nell'età adulta in pazienti sottoposti a differenti approcci chirurgici sec Fontan.

Anna Correr (a), Michela Palma (a), Berardo Sarubbi (a), Giancarlo Scognamiglio (a), Michele D'Alto (a), Diego Colonna (a), Assunta Merola (a), Nicola Grimaldi (a), Giovanni Di Marco (a), Giangiacomo Di Nardo (a), Emanuele Romeo (a), Maria Giovanna Russo (b)

(a) UOSD Cardiopatie Congenite dell'Adulto. Ospedale Monaldi – A.O. dei Colli – Napoli, (b) UOSD Cardiologia Pediatrica

In pazienti operati di correzione secondo Fontan esiste una netta discrepanza tra la capacità funzionale riferita dai pazienti ed i dati obiettivi valutati mediante metodiche standardizzate. **Scopo del lavoro:** confrontare i risultati emersi dal test cardiopolmonare (CPET), test dei sei minuti (6MWT) e dosaggio del Pro-BNP in pazienti adulti già sottoposti a diversi approcci chirurgici di correzione sec Fontan.

Materiali e metodi: Lo studio include 22 pazienti (10M/12F età media $27,1 \pm 9,4$). 15 (7M/8F età media 24.46) di questi erano stati sottoposti ad intervento sec. Fontan mediante connessione atrio-polmonare diretta o mediante tubo intracardiaco (APC) e 7 (3M/4F età media 37.85) mediante connessione cavo-polmonare totale diretta (TCPC). Di ogni paziente è stato considerato il proBNP, la frazione di eiezione del ventricolo sistemico (FE%) all'esame ecocardiografico, il 6MWT, la classe funzionale (NYHA) ed i risultati del CPET.

Risultati:

| | 6MWT Distanza | Borg | FE% | VO2 max | VO2 Work | VE/VC O2 | Polso di O2 | proBNPnt |
|------|---------------------|---------------------|----------------------|---------------------|---------------------|--------------------|-------------------|-------------------------|
| APC | 383 ± 32.6 1 | 2.37 ± 0.9 4 | 55 ± 4.71 | $11.63 \pm 2.$ 8 | $8.92 \pm$ 0.3 | $28.4 \pm 5.$ 2 | $70 \pm 4.$ 2% | 441.81 ± 212.3 1 |
| TCPC | 453 ± 48.8 9 | 1.33 ± 0.9 4 | $52.77 \pm 8.$ 53 | 21. 3 ± 5.48 | 10.91 ± 2.07 | $29.6 \pm 5.$ 1 | $80 \pm 5.$ 7% | 128.64 ± 83.26 |
| p | 0.03 | 0.016 | ns | < 0.05 | < 0.05 | 0.05 | < 0.05 | 0.03 |

La maggioranza dei pazienti riportavano soggettivamente una buona tolleranza all'esercizio (10 I classe NYHA, 7 II classe NYHA, 5 III classe NYHA). La funzione contrattile globale (FE%) del ventricolo sistemico non mostrava differenze significative tra i due gruppi. La capacità di esercizio al 6MWT risultava superiore nei pz con TCPC rispetto a quelli con APC, rispecchiata anche da un indice di Borg superiore in questi ultimi. Il test cardiopolmonare mostrava una ridotta capacità funzionale e un ridotto consumo di O2 (VO2max, VO2work, Polso di O2) nei pazienti con APC

rispetto al quelli con TCPC, con una normale risposta ventilatoria (VE/VCO₂) nei due gruppi. I livelli di pro-bnp erano significativamente più alti nei pazienti sottoposti a connessione atrio polmonare rispetto ai paziente sottoposti a connessione cavo-polmonare.

Conclusioni: I livelli di pro-bnp correlano col tipo di correzione sec Fontan. La APC mostra livelli di pro-bnp più alti rispetto ai pazienti s/p TCPC indipendentemente da loro stato cardiaco. E' possibile dimostrare una correlazione tra livelli di proBNP e capacità funzionale al 6MWT ed al CpET solo nei pz con APC. Non esiste una correlazione significativa tra livelli di pro BNP e parametri valutati al 6MWT and CpET nei pz con TCPC.

O213

I nuovi criteri di ghent del 2010 nell'indicazione all'intervento cardiocirurgico nei pazienti affetti da sindrome di marfan. L'esperienza di un singolo centro di cardiocirurgia

Susanna Grego (a), Paolo Nardi (a), Valentina Gislao (a), Marco Russo (a), Emanuele Bovio (a), Luigi Chiariello (a)

(a) U.O.C. di Cardiocirurgia, Università degli Studi, Policlinico Tor Vergata, Roma

Razionale: La diagnosi e il trattamento chirurgico della sindrome di Marfan sono ancora argomento di dibattito. E' necessario identificare i soggetti a rischio di eventi aortici acuti, stabilire il timing e il trattamento chirurgico più idonei e per prevenire le complicanze acute.

Materiali e metodi: Da maggio 2008 a dicembre 2012, 500 pazienti si sono sottoposti a screening presso il Presidio Marfan del Policlinico Tor Vergata. I pazienti sono stati sottoposti a visita cardiocirurgica con esame ecocardiografico, visita ortopedica, oculistica, odontoiatrica. In tutti i pazienti è stata effettuata anche una consulenza genetica con prelievo, se ritenuto opportuno.

Risultati: La diagnosi di sindrome di Marfan è stata confermata in 146 pazienti (29.2%). Tra gli 86 pazienti con conferma posta dal nostro presidio in 48 casi (56%) la diagnosi è stata posta con l'ausilio dei nuovi criteri di Ghent del 2010. 54 pazienti hanno effettuato intervento chirurgico, 28 dei quali sono stati sottoposti ad intervento chirurgico presso la nostra divisione: 14 ad intervento di David, 1 ad intervento di Yacoub, 14 ad intervento di Bentall. Di questi, 8 pazienti sono stati sottoposti ad intervento su indicazione precoce posta dal nostro Presidio (diametro della radice aortica >40 mm e <47 mm), nessuno in emergenza. Gli interventi di risparmio della valvola aortica nativa al confronto con quelli di sostituzione completa della radice aortica sono stati più frequentemente eseguiti da quando è stato introdotto il Presidio Marfan rispetto al periodo precedente (12/19 casi, 63% vs. 2/9 casi, 22%, $p < 0.0001$).

Conclusioni: L'applicazione dei nuovi criteri di Ghent del 2010 ha consentito di identificare con precisione i pazienti affetti dalla sindrome, di organizzare in modo mirato il follow-up ecocardiografico e di porre, in casi selezionati, indicazione chirurgica precoce (con diametro della radice aortica <50 mm), evitando l'insorgenza di complicanze acute e consentendo di potere effettuare più frequentemente il risparmio della valvola aortica nativa. Questioni logistiche, abitative e psicologiche possono influenzare comunque il timing chirurgico.

RISERVA INOTROPA – RIMODELLAMENTO VENTRICOLARE SINISTRO

O214

Additional value of real-time 3D speckle tracking echocardiography in detecting subclinical left ventricular dysfunction in aortic valve disease

Renato Ippolito (b), Ciro Santoro (a), Alessandro Santoro (a), Roberta Esposito (a), Vincenzo Schiano Lomoriello (a), Daniela De Palma (b), Francesco De Stefano (b), Riccardo Muscariello (b), Maurizio Galderisi (a)

(a) *Department of Translational Clinical Sciences, Federico II University Hospital, Naples, Italy,*

(b) *Department of Clinical and Surgical Medicine, Federico II University Hospital, Naples, Italy*

Purpose: While aortic valve stenosis (AS) induces a pure pressure overload of the left ventricle, aortic regurgitation (AR) is associated to a variable degree of volume overload. It is conceivable therefore that AS and AR could induce different changes of deformation properties of the left ventricle when the chamber function is still normal. Aim of the present study was to investigate the value of three-dimensional Speckle Tracking Echocardiography (STE) for the detection of subclinical left ventricular (LV) dysfunction in patients with AS and AR.

Methods: After excluding patients with overt heart failure, coronary artery disease, primary cardiomyopathies, atrial fibrillation and mitral valve disease, the final study population included 15 normal controls, 22 patients with moderate to severe AR (vena contracta > 3 mm) and 19 with moderate to severe AS (mean transvalvular gradient > 20 mm Hg and aortic valve area < 1.5 cm²), comparable for sex and age. AR and AS patients were all in NYHA class I. Participants underwent a real-time 3D echo examination with both volumetric and STE post-processing (Vivid E9, GE Healthcare). 3D derived end-diastolic and end-systolic volumes, ejection fraction (EF) and left ventricular mass index (LVMI) as well as global longitudinal strain (GLS), global circumferential strain (GCS), global area strain (GAS) and global radial strain (GRS) were determined. The comparison among the 3 groups was performed by one-way ANOVA (Bonferroni post-hoc test).

Results: 3D-derived LV EF was comparable among the 3 groups while LVMI was higher in both AR (37.1 ± 6.5 g/m^{2.7}) and AS group (37.4 ± 5.8 g/m^{2.7}) in comparison with normal controls (30.5 ± 1.7 g/m^{2.7}) (both p<0.002). 3D STE analysis showed lower values of GLS (p<0.001), GCS (p<0.05), GAS (p<0.001) and GRS (p<0.002) in AS versus normal while no significant difference of the different strain components was found between AR and normal. GLS (AS = -12.2 ± 3.6%, AR = -15.4 ± 2.8%, p<0.001) and GAS (-22.6 ± 6.1 % versus -27.3 ± 4.9 %, p<0.02), but not GCS and GRS, were lower in AS than in AR. In the pooled population LVMI was negatively related with both GCS (r = -0.32, p<0.02) and GAS (r = 0.27, p<0.05). These relations remained significant even after adjusting for age (r = -0.33, p<0.01 and r = -0.27, p<0.05 respectively).

Conclusions: Subclinical differences of myocardial deformation are detectable in patients with AS but not in those with AR. All the strain components are reduced in AS but not in AR versus normal. In addition, global longitudinal strain and global area strain are impaired in AS in comparison with AR. Among the strain components only changes of global circumferential strain and global area strain are significantly affected by the increase of left ventricular mass. These findings confirm the greater left ventricular contractile reserve own of aortic regurgitation and highlight early, subclinical changes of myocardial function in patients with aortic stenosis.

O215

Myocardial contractile reserve: a global approach by combining cardiopulmonary exercise test with exercise-echocardiography

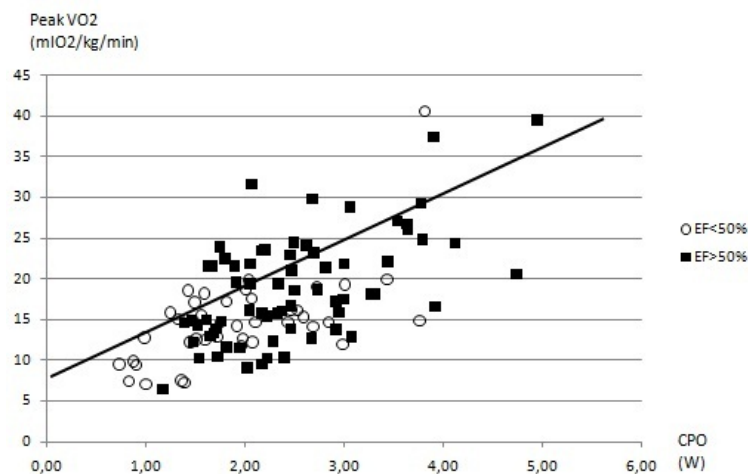
Greta Generati (a), Francesco Bandera (a), Marta Pellegrino (a), Valeria Donghi (a), Eleonora Alfonzetti (a), Marco Guazzi (a)

(a) Heart Failure Unit, IRCCS Policlinico San Donato Milanese

Purpose: Several approaches are available to evaluate myocardial contractile reserve during exercise. Cardiopulmonary exercise test (CPET) allows a response characterization by well established variables with powerful prognostic power. Echocardiography allows for peak cardiac power output (CPO= mean BP x (SV/60) x HR) calculation, by incorporating flow measurement with blood pressure, which has been proposed as an index of energy imparted by the left ventricle (LV) to the volume of blood ejected per second. We aimed to explore if CPO reflects functional capacity as evaluated by CPET.

Methods: 108 patients with different cardiovascular disease (HF_rEF 37%, HF_pEF 63%, aortic and mitral valvular disease 2.8%, aortic valvular disease 11.1%, mitral valvular disease 21.3%, mean age 63±13; male 60%; NYHA class II 50%, III 42% and IV 8%, mean EF 52±15%) were evaluated at rest and during incremental exercise (tiltable cycle ergometer) assessing CPO, peak VO₂, % of predicted peak VO₂ and peak O₂ pulse.

Results: A good linear correlation was found between CPO and peak VO₂, % of predicted peak VO₂ and peak O₂ pulse (Sperman's rho respectively of 0.570, 0.692 and 0.620, p <0,0001). The correlation was maintained along all the spectrum of LV systolic function at rest (see the figure), being patients with reduced EF (n 40) distributed on the left-side of the regression due to the reduced contractile reserve.



Conclusions: CPET indices of functional capacity showed a good correlation with echo-derived CPO, both in normal and reduced LV systolic function. These results confirm the potential prognostic role of such echocardiographic index and suggest the importance of systematically assess CPO during stress echocardiography.

O216**Blunted inotropic response to dobutamine in patients with markedly remodeled post-infarcted left ventricle**

Massimiliano Scappaticci (a), Nino Cocco (a), Alessandra Tanzilli (a), Flavio Tafani (a), Giuseppe Napoleoni (a), Suleiman Al Kindy (a), Marta Palumo (a), Gaetano Tanzilli (a), Carlo Gaudio (a)

(a) Dept of Heart and Great Vessels, "Sapienza" University of Rome.

In patients with ischemic heart disease, regional reductions in norepinephrine-tracer uptake occur in areas of infarction, as well as in clinically viable myocardium distal to severe coronary stenoses. These abnormalities have been interpreted as evidence for sympathetic denervation showing a blunted contractile reserve during catecholamine stimulation. Aim of the study was to assess the value of dobutamine stress echocardiography (DSE) in predicting the improvement of global left ventricular (LV) function in patients with ischemic cardiomyopathy according to cardiac sympathetic nerve activity.

Methods: We enrolled 33 out of 37 consecutive stable patients (age 52 ± 10 years, NYHA class II/III) with previous anterior AMI referred for coronary angiography and possible revascularization. All patients underwent, off-drug and in the fasting state, DSE and iodine-123 metaiodobenzylguanidine (123I-MIBG) scintigraphy. The extent severity score (ESS) of sympathetic denervation in the infarct related zone was determined by calculating the number of segments falling below 30% of maximal uptake and by expressing this number as a percentage of the total number of LAD perfused area. All patients had a successful revascularization.

Results: Comparison of patients with (Group A) and without extensive severe adrenergic denervation (Group B)

| | Group A N=18 | Group B N=15 | P< |
|-------------------|-----------------|-----------------|--------|
| ESS (%) | 38.3 ± 6.8 | 6.6 ± 5.4 | 0.0001 |
| LVEDV (ml) | | | |
| • Baseline | 185 ± 32 | 144.2 ± 16.7 | 0.001 |
| • DSE | 176.4 ± 28 | 139.9 ± 13.9 | 0.001 |
| • After R | 167.8 ± 23 | 139.2 ± 10 | 0.001 |
| LVESV (ml) | | | |
| • Baseline | 126.2 ± 21.3 | 80.7 ± 9.9 | 0.001 |
| • DSE | 116.4 ± 18.5 | 67.5 ± 11.2* | 0.001 |
| • After R | 93 ± 13.4 | 64.2 ± 19 | 0.001 |
| LVEF (%) | | | |
| • Baseline | 31.4 ± 5 | 44 ± 4.2 | 0.0001 |
| • DSE | 33.2 ± 4.1 | 53.2 ± 5.2* | 0.0001 |
| • After R | 44.1 ± 6.2# | 54.9 ± 2.9# | 0.05 |

*p< 0.01; #p<0.005 versus baseline

ESS = extent severity score of sympathetic denervation; LVEDV = left ventricular end-diastolic volume; LVESV = left ventricular end-systolic volume; LVEF = left ventricular ejection fraction; DSE = dobutamine stress echocardiography; R = myocardial revascularization

Conclusions: The patients with extensive sympathetic denervation have more remodeled LV and show a blunted inotropic response to D. In this subset of patients D is of less value in predicting post-revascularization recovery of function.

O217

Ruolo del gadolinio nei pazienti con dolore toracico, rialzo troponinico e coronarie indenni: solo valore diagnostico o anche prognostico?

Manuel De Lazzari (a), Alberto Cipriani (a), Alice Niero (a), Kim Anh Nguyen (a), Filippo Zilio (a), Riccardo Turri (a), Giulia Brunello (a), Alessandro Zorzi (a), Anna Baritussio (a), Giuseppe Tarantini (a), Francesco Corbetti (b), Luisa Cacciavillani (a), Martina Perazzolo Marra (a), Sabino Iliceto (a)

(a) Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy, (b) Department of Radiology, Padua University Hospital, Padua, Italy

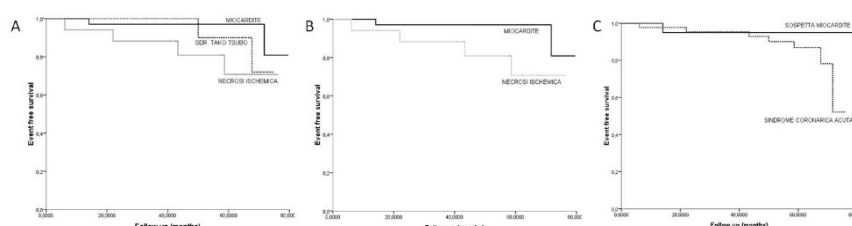
Introduzione: In pazienti con dolore toracico, elevazione della troponina (TnI) e coronarie prive di lesioni angiograficamente significative, la diagnosi finale e le conseguenti strategie terapeutiche rimangono spesso dubbie. L'utilità della Risonanza Magnetica Cardiaca (RMC) è ormai nota: permette di differenziare un danno ischemico da una miocardite o da un insulto transitorio come la sindrome di Tako Tsubo (STT). Non ancora confermata risulta essere l'utilità prognostica di tale metodica in questa tipologia di pazienti.

Scopo: Confermare il valore diagnostico della RMC in questa tipologia di pazienti rispetto alle altre metodiche diagnostiche e valutarne l'utilità prognostica in un follow up a lungo termine.

Metodi: Sono stati reclutati consecutivamente i pazienti ricoverati nella nostra clinica, con le caratteristiche sopracitate, da ottobre 2006 a marzo 2010. Tutti i pazienti sono stati sottoposti a coronarografia e a RMC in fase acuta. Per ogni paziente sono stati raccolti i dati clinici e strumentali. È stato eseguito follow up mediante visita medica o contatto telefonico mirato alla valutazione di eventi cardiovascolari maggiori (MACE), quali: mortalità cardiaca, ricoveri per scompenso cardiaco, re-infarto, recidiva di miocardite, recidiva di STT.

Risultati: Di 86 pazienti arruolati, la diagnosi clinica iniziale è stata in 16 pazienti SCA-STE, in 34 pazienti SCA-NSTE, in 36 pazienti miopericardite acuta. La RMC ha corretto la diagnosi d'ingresso in 31 pazienti (36%), permettendo di diagnosticare 53 miocarditi, 19 infarti a coronarie angiograficamente indenni e 14 STT. Di 63 pazienti (73%) abbiamo raccolto il follow up (mediana 64 mesi). L'end point MACE è stato raggiunto in 8 pazienti (2 recidive di miocardite, 4 recidive di infarto miocardico, 1 ricovero per scompenso cardiaco, 1 morte cardiaca). L'analisi di Kaplan Meier (Figura 1A) sebbene evidenzi un tasso di eventi per anno maggiore nell'infarto a coronarie sane rispetto agli altri due gruppi non raggiunge la significatività statistica. Focalizzando l'analisi solo sui gruppi con necrosi miocardica, quali il gruppo miocardite e infarto a coronarie sane, la presenza di necrosi ischemica è correlata a una sopravvivenza libera da eventi peggiore, (Figura 1B, Log Rank 0.029, Breslow 0.024), confermata (ai limiti della significatività) anche dall'analisi univariata (RR 5.6, CI 1.00-31.59, p=0.05). Non predittivi all'univariata risultano essere la frazione di eiezione, il picco di TnI e l'estensione del LGE. Nella figura 1C si evidenzia come la diagnosi d'ingresso non sia invece sufficiente a predire la sopravvivenza libera da eventi.

Conclusioni: La RMC conferma la sua utilità nella diagnostica e nella successiva gestione terapeutica di questi pazienti rispetto le metodiche tradizionali. Inoltre da questo preliminare studio si evince come tale metodica acquisisca anche un valore prognostico aggiunto che si dimostra più correlato alla distribuzione della necrosi che all'estensione della stessa, probabilmente poiché in entrambi i gruppi, di limitata e comparabile estensione.



O218

Cardiac magnetic resonance improves diagnostic accuracy of no reflow compared to coronary angiography

Alessandro Durante (a, b), Ornella Rimoldi (c), Antonio Esposito (a, b), Umberto Gianni (b), Giuseppe Pizzetti (a), Anna Damascelli (a, b), Isabella Scotti (b), Giulia Benedetti (b), Giacomo M Viani (b), Mariangela Cava (a, b), Alessandra Laricchia (b), Ylenia Salerno (b), Azeem Latib (a), Antonio Colombo (a), Alberto Margonato (a, b), Francesco De Cobelli (a, b), Paolo G Camici (a, b)
(a) IRCCS Ospedale San Raffaele, Milano, (b) Università Vita-Salute San Raffaele, Milano, (c) IBFM CNR, Milano

Introduction: No reflow (NR) incidence ranges between 10 and 50% depending on how it is assessed. In the current clinical practice NR is assessed by visual angiographic criteria. In patients with STEMI we compared cardiovascular magnetic resonance (CMR) derived parameters and angiographic NR to evaluate the accuracy of each method.

Methods: We enrolled 38 consecutive STEMI patients within 12 hours of symptoms onset who underwent primary percutaneous coronary intervention (PCI). Angiographic criteria of NR were TIMI flow grade <3 and/or blush grade <2. The CMR (Philips Achieva 1.5 T) criterion of NR was the presence of microvascular obstruction (MVO) early and/or late after gadolinium contrast administration. The area at risk (AAR) was defined as ratio of signal intensity myocardium/skeletal muscle >2, edema on STIR sequences. Both AAR and late gadolinium enhancement (LGE) were calculated as percentage of left ventricular (LV) mass. Data are expressed as mean \pm SD.

Results: NR incidence was higher with CMR in comparison with angiographic criteria (25 [65.8%] vs 12 [31.6%] patients, $p < 0.0001$). Patients with MVO had higher, CK MB peak (306 ± 151 mcg/l vs 81 ± 72 mcg/l, $p < 0.0001$), troponin T peak (7.83 ± 4.84 vs 2.80 ± 2.53 , $p < 0.0001$), larger AAR ($38.17 \pm 8.95\%$ vs $27.85 \pm 8.96\%$, $p < 0.0001$), infarct size (LGE) area ($32.1 \pm 8.3\%$ vs $20.8 \pm 8.8\%$, $p < 0.0001$) and hemorrhagic area ($1.00 \pm 2.16\%$ vs $0 \pm 0\%$ of LV mass, $p = 0.04$). On the other hand, there were no significant differences in the humoral markers or infarct size in patients with or without angiographic NR. Despite similar LGE area ($28.16 \pm 10.63\%$ vs $28.16 \pm 9.29\%$, $p = ns$), patients with angiographic NR had larger early MVO area ($2.00 \pm 2.75\%$ vs $4.92 \pm 4.85\%$, $p = 0.02$) and higher MVO/AAR ratio (14.20 ± 11.95 vs 4.96 ± 6.65 , $p < 0.001$).

The extension of both early and late MVO is directly correlated to CK MB peak ($r = 0.709$ and $r = 0.630$ respectively, $p < 0.0001$), troponin T peak ($r = 0.599$ and $r = 0.620$ respectively, $p < 0.0001$) and LGE extension ($r = 0.523$ and $r = 0.523$ respectively, $p < 0.001$).

LV ejection fraction was significantly lower in patients with MVO ($46.3 \pm 9.8\%$ vs $55.2 \pm 7.0\%$, $p = 0.006$). In a subset of patients there was a trend towards a better event free survival after an average follow-up of 216 days in patients without MVO (93% vs 59%, $p = 0.19$).

Conclusion: Our data suggest that CMR is a more accurate method for NR assessment compared to angiography. The presence and the extension of MVO are predictive of the infarct size. Moreover, the presence of MVO seems to be correlated with a worse prognosis, although a longer follow-up is needed in order to confirm these data.

O219

Rimodellamento ventricolare sinistro dopo infarto miocardico acuto: ruolo di differenti indici ecocardiografici di deformazione miocardica.

Laura Ucci (a), Umberto Cucchini (a), Denisa Muraru (a), Diletta Peluso (a), Seena Padayattil-Jose (a), Gentian Denas (a), Gabriella Romeo (a), Manuel De Lazzari (a), Luigi P. Badano (a), Sabino Iliceto (a)

(a) Clinica Cardiologica di Padova, Università di Padova

Background: Lo sviluppo di un rimodellamento avverso del ventricolo sinistro (VS) a distanza dall'infarto del miocardio (IMA) è strettamente correlato ad una prognosi peggiore per aumentato rischio di scompenso cardiaco acuto e aritmie maggiori. Scopo del nostro studio è determinare i predittori del rimodellamento avverso tra i diversi parametri ecocardiografici di deformazione miocardica (*strain*) in un follow-up di medio termine.

Metodi: Abbiamo arruolato consecutivamente 64 pazienti trattati per IMA con angioplastica primaria percutanea (PCI) nel nostro centro. Tutti i pazienti sono stati sottoposti ad ecocardiogramma bi- (2D) e tridimensionale (3D) pre-dimissione e ad una distanza media di 14 mesi per la determinazione dei volumi del VS, funzione di pompa e misurazione degli indici di *strain* con metodica speckle tracking.

Risultati: L'analisi dello *strain* e le misurazioni dei volumi sono state possibili in tutti i pazienti eccetto uno. Il volume telediastolico del VS (3D-EDV) è stato in media di 134±28 ml pre-dimissione e 143±36 ml al follow-up ($p<0.0001$); il volume telesistolico del VS (3D-ESV) è stato in media di 68±22 ml pre-dimissione e 70±32 ml al follow up (p :NS) con una frazione di eiezione (3D-FE) in media di 50±8% basale e 53±10% al follow-up ($p=0.001$). Diciassette (27%) pazienti hanno mostrato un rimodellamento negativo del VS (definito come aumento del 3D-ESV di almeno il 15%) alla visita di follow-up. All'analisi univariata i predittori di rimodellamento negativo del VS sono risultati il picco di troponina I, il 3D-ESV, la 3D-FE, lo strain globale longitudinale (GLS) 3D, lo strain globale circonferenziale (GCS) 3D, l'area strain globale (GAS) 3D, lo strain globale radiale (GRS) 3D, il 2D ESV e il 2D GLS ($p<0.05$ per tutti). Alla regressione logistica multivariata, solo lo strain longitudinale globale 2D ha mantenuto un valore predittivo indipendente (χ^2 6.67 p : 0.02) con un odds ratio di 1.71 (1.07-2.72 95%CI).

Conclusioni: Nonostante la terapia medica ottimale, il rimodellamento negativo del VS resta un processo relativamente comune dopo infarto miocardico acuto ad un follow-up di medio termine. Lo *strain* globale longitudinale 2D si è dimostrato il migliore predittore di tale fenomeno in confronto alle variabili cliniche ed ecocardiografiche testate, compresi i nuovi indici di deformazione miocardica 3D.

MIOCARDIOPATIE 2

O220

Arrhythmogenic right ventricular cardiomyopathy and heart transplantation due to severe heart failure

Maddalena Graziosi (a), Ornella Leone (a), Alessandra Berardini (a), Massimiliano Lorenzini (a), Mariagrazia Rotundo (a), Matteo Ziacchi (a), Ferdinando Pasquale (a), Elena Biagini (a), Francesco Grigioni (a), Caludio Rapezzi (a)

(a) Policlinico S.Orsola-Malpighi Istituto di Cardiologia, (b) Policlinico S.Orsola-Malpighi Istituto di Anatomia Patologica

Purpose: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is predominantly known as a cause of sudden death and ventricular arrhythmias in the young, whereas the relationship between ARVC and heart failure (HF) has been scarcely investigated. We aimed this study to evaluate prevalence, incidence, pathophysiology and morphologic basis of ARVC leading to severe HF.

Methods: We retrospectively analyzed 60 patients with ARVC evaluated at a single referral centre. We compared the clinical, electrocardiographic, hemodynamic and echocardiographic findings of ARVC patients with/without severe HF (NYHA III-IV) at first evaluation or during follow up. We also analyzed the histopathological findings of the explanted hearts of patients who underwent heart transplantation.

Results: Severe HF was present in 10 patients at presentation (prevalence=16%) and occurred in other 9 during a median follow up of 68 months (IQR 24-127; incidence=2.3% person-years). Fourteen patients (23%) required heart transplantation and 40 patients (66%) underwent ICD implantation. Patients with advanced HF were younger at symptom onset (47 ± 16 versus 37 ± 12 years, $p=0.01$) and more often had epsilon waves in the right precordial leads (53% versus 8%, $p=0.001$) and low voltages in the peripheral leads (46% versus 16%, $p=0.05$); right ventricle (RV) was larger and more hypokinetic at echocardiography (RVOT 41 ± 6 versus 37 ± 6 mm, $p=0.02$; RV end diastolic internal diameter 35 ± 12 versus 28 ± 8 mm, $p=0.01$; fractional shortening area $24\%\pm 8$ versus $31\%\pm 11$, $p=0.016$). Interestingly, left ventricle (LV) was slightly more dilated (75 ± 30 ml/m² versus 60 ± 20 , $p=0.02$) and globally hypokinetic (LV Ejection Fraction = $41\%\pm 16$ versus $57\%\pm 12$, $p=0.001$). The hemodynamic profile of patients who underwent cardiac transplantation was characterized by low cardiac index (1.8 ± 0.2 l/min/m²) with normal or nearly normal capillary wedge and pulmonary pressure (12 ± 8 mmHg and 26 ± 10 mmHg). A detailed histological analysis of the explanted hearts showed extensive (>60% of the surface) fibro-fatty infiltration of the right ventricle and isolated or confluent areas of LV fibrosis. In 4 patients (28%) flogistic infiltrations were also evident.

Conclusions: In ARVC, HF can be the only symptom at presentation and leads to heart transplantation in a relevant subset of patients. Patients who develop advanced HF are younger, have more severe right ventricular involvement associated with slight dilation and global hypokinesia of the LV, due to fibrotic infiltration.

O221

Three-dimensional (3D) volumes and deformation properties by 3D and 2D Speckle Tracking in patients with arrhythmogenic right ventricular cardiomyopathy (ARVC) and in their relatives allow to assess

Roberta Ancona (a), Salvatore Comenale Pinto (a), Pio Caso (a), Maria Gabriella Coppola (a), Fortunato Arenga (a), Ciro Cavallaro (a), Filippo Vecchione (a), Antonio D'Onofrio (a), Raffaele Calabrò (a)

(a) *Non invasive Cardiology, Chair of Cardiology, Department of Cardiology, Second University of Naples*

Purpose: We evaluated 3DE, 3D strain(S),2DS-Strain rate(SR) to quantitatively assess RV(right ventricle), LV(left ventricle) and RA(right atrium) function in ARVC patients(pts), with apparently normal LV and in their relatives with apparently normal RV. Methods:we studied 115 subjects:35 with ARVC(GroupA),40 relatives(GroupB)and 40controls(GroupC). By E9GE we measured LV ejection fraction (EF%), diameters and volumes,RV dimension,fractional area change (FAC%), RVOT fractional shortening (RVOTfs%), RA volume. We measured: by DTI annulus velocities; by 3DE RA, RV volumes and RVEF; by 3DS peak of global longitudinal, circumferential, radial and area S in apical 4-chambers; 2D longitudinal systolic S-SR in apical 4 and 2-chambers views, at level of LV segments (4 basal,4 mid,4 apical), RV segments (1 basal,1 mid,1apical) and atrial walls and circumferential and radial peak systolic LV 2D S-SR in short axis views.Results:no significant differences were found between relatives and controls for RVdimensions, RVFAC (50±12vs51±11%), RVOTfs (64,8±13vs65,3±14%), 2DRAMaxVolumes (20,3±4,5vs8,7±6ml/mq), 3DRVend-diastolic (31±10,5vs33±11ml/mq) and end-systolic volume(15±4vs16±6ml/mq), and for RA S-SR. Differences were present between Group A and C for RV dimensions, 3DRV end-diastolic(52,8±9ml/mq) and end-systolic volume(27±6,8ml/mq), FAC(27,8±12,1%), RVOTfs (27,2±16%), 3D RVEF(49±7,4%), 2DRA volume (25,6±10,4ml/mq). Tricuspidal E'/A' ratio was inverted in pts and in 32/40 ARVC relatives. No significant differences were found for 3DRA volume(GroupA:27,9±5; GroupB:27,4±5,6; GroupC:28±10ml/mq). RV 2DSR-S were lower in pts(SR=-1,37±0,37S-1;S=-12,45±4,4%,p<0.001) and in 28/40(70%) subjects of GroupB(S=-18,5±4,8%; SR=-1,54±0,4S-1,p<0.002) compared with controls(S=-26,6±8,1%,SR=-2,37±0,51 S-1). LV SR-S were significantly lower in GroupA compared to controls (longitudinal: 2DSR=-1,01±0,21 vs -1,53±0,49S-1; 2DS=-15,2±4,3% vs -20,59±4,47%, 3DS-12,3±2,3% vs-9±3,1%; circumferential: 2DSR=-1,18±0,33 vs 1,62±0,4S-1; 2DS=-15,12±3,9 vs -21±5,1%; 3DS -13,8±3,1% vs -15,3±2,6%; radial: 2DSR=1,19±0,26 vs 1,58±0,3 S-1, 2DS=16,25±8,9 vs 46,3±9,2%; 3DS 34,5±6,1% vs 48±9%; 3DareaS -23,3±2,9% vs -30,1±3,6%; p<0.007) without differences for GroupB (longitudinal: 2DSR=1,49±0,45S-1, 2DS=19,59±4,1%, 3DS -17,7 ±3,2%; circumferential: 2DSR=-1,59±0,4S-1; 2DS=-20,8±5%; 3DS -18,8±1,9%; radial:2DSR=1,56±0,29S-1; 2DS=45,9±9%; 3DS 49 ±8,1%;3DareaS -31±3,1%).

Conclusions: 2DS-SR shows early RV dysfunction in asymptomatic ARVC relatives and LV dysfunction in ARVC, when standard echo appears normal. 3DS enable to show early LV dysfunction in ARVC, adding new information about global LV mechanics.

O222

Left ventricular function by speckle tracking analysis correlates with the presence and the percentage of delayed enhancement in patients with myocarditis and preserved ejection fraction

Marta Focardi (a), Matteo Cameli (a), Elena Bennati (a), Alberto Massoni (a), Marco Solari (a), Paolo Cameli (a), Francesco Salvatore Carbone (b), Benedetta Banchi (b), Roberto Favilli (a), Sergio Mondillo (a)

(a) Department of Cardiovascular Diseases, University of Siena, Siena, Italy, (b) Radiology Unit, University of Siena, Siena, Italy

Background: Myocarditis is defined as inflammation of myocardial tissue and it has different etiologies. The incidence of non fatal myocarditis is likely greater than actually diagnosed, mostly as a result of the challenges of establishing the diagnosis in clinical settings.

Nowadays endomyocardial biopsy (EMB) is the gold standard for the diagnosis of myocarditis but it is performed only in selected cases because of its invasivity. In clinical practice the diagnosis is based on clinical criteria, ECG findings, biomarkers and echocardiography.

Cardiac magnetic resonance (CMR) has become in the last years an important tool for the diagnosis of myocarditis. It allows to visualize tissue changes, showing interstitial edema, hyperemia and, in more severe cases, cellular necrosis and subsequent fibrosis. In asymptomatic patients with preserved ejection fraction (EF), the diagnosis of myocarditis is difficult and for this reason therapy is not always performed with negative impact on prognosis.

Objectives: The aim of this study is to evaluate the diagnostic accuracy of left ventricular (LV) function analysis by speckle tracking echocardiography (STE) in patients with suspected myocarditis and preserved left ventricular ejection fraction (LVEF) and to correlate these parameters with the delayed enhancement (DE) area.

Methods: Nineteen patients with suspected myocarditis and preserved LVEF were examined; they underwent CMR and echocardiography the same day. In patient with DE we calculated the percentage using the 2 standard deviation (SD) method. A complete echocardiographic examination was performed in all patients. LV function was studied by EF calculated by Simpson's method and by an off-line complete speckle tracking analysis, including LV longitudinal, radial, circumferential strain and LV torsion.

Results: Twelve patients showed DE with non-ischemic pattern. These patients presented a significantly lower apical-radial strain (26.8% vs 32.5%, $p < 0.0001$) and a lower LV apical rotation (6.4 deg vs 7.4 deg, $p = 0.01$) compared to subjects without DE. Among patients with DE we found significant correlations between DE percentage and global LV apical (R -0.77; $p = 0.0002$) and basal (R -0.35; $p = 0.01$) radial strain, LV torsion (R -0.28; $p = 0.01$) and LV apical (R 0.36; $p = 0.01$) and basal (R -0.20; $p = 0.05$) rotation.

No significant correlation was found with longitudinal strain and the percentage of DE.

Conclusions: In patients with myocarditis and preserved LVEF, LV apical-radial strain and LV apical rotation correlate with the presence and the percentage of DE.

O223

Subclinical myocardial dysfunction by three-dimensional speckle tracking echocardiography in asymptomatic patients with myotonic dystrophy

Ciro Santoro (a), Francesco De Stefano (a), Agostino Buonauro (a), Riccardo Muscariello (a), Renato Ippolito (a), Daniela De Palma (a), Vincenzo Schiano Lomoriello (a), Maurizio Galderisi (a)
(a) *Department of Medical Translational Sciences, Federico II University Hospital, Naples*

Purpose: Myotonic dystrophy (MD), also recognized as myotonia atrophica, is an inherited disorder of muscle weakness and wasting characterized by sustained involuntary muscle contraction. Despite some controversial results, it is known that patients with MD may develop a specific late cardiomyopathy, while only subclinical left ventricular (LV) diastolic dysfunction is detectable in the early stages of disease by using standard imaging techniques. Our study aimed to identify early LV involvement in asymptomatic patients with MD by real-time 3D Speckle Tracking Echocardiography (STE).

Methods: After excluding patients with arterial hypertension, overt heart failure, coronary artery disease and atrial fibrillation, the final study population comprised 21 MD asymptomatic patients (mean age: 34 years) and 21 normal controls (N), matched for sex and age. All the participants underwent a standard echo Doppler assessment (including cardiac chamber quantification and assessment of both systolic and diastolic function) and a real-time 3D echo examination with both volumetric and STE post-processing. Real-time 3D echo was performed according to standardized procedures (frame rate of recording $\geq 40\%$ of the individual heart rate). 3D derived LV end-diastolic volume and end-systolic volumes, ejection fraction and LV mass index as well as global longitudinal strain (GLS), global circumferential strain (GCS), global area strain (GAS) and global radial strain (GRS) were compared between the 2 groups.

Results: The 2 groups were comparable for body mass index, blood pressure and heart rate. Standard echo Doppler did not show significant difference of LV mass index, relative wall thickness, ejection fraction, transmitral E/A ratio, E velocity deceleration time and E/e' ratio but LV end-diastolic volume was marginally smaller in MD than in N ($p < 0.05$). 3D volumetric assessment confirmed smaller end-diastolic volume (95.7 ± 23.2 ml vs 123 ± 34.9 ml, $p < 0.01$) and lower sphericity index (0.31 ± 0.11 versus 0.39 ± 0.11 , $p < 0.02$), without significant difference of ejection fraction and LV mass index. 3D STE showed lower values of GCS ($-14.0 \pm 1.77\%$ vs. $-16.4 \pm 2.4\%$, $p < 0.005$), GAS ($-25.5 \pm 4.2\%$ vs. $28.6 \pm 3.5\%$, $p < 0.02$) and GRS ($37.2 \pm 8.4\%$ vs $42.3 \pm 8.7\%$, $p < 0.01$) in MD than in N, without significant difference of GLS. In the pooled population GAS was positively related with sphericity index ($r = 0.38$, $p < 0.01$), even after adjusting for heart rate (partial $r = 0.45$, $p < 0.005$).

Conclusions: The present study demonstrates that subclinical differences of myocardial deformation are detectable in patients with MD by 3D STE when standard echo Doppler indices are still normal. These early abnormalities involve global circumferential strain of midwall fibers, global radial strain of subepicardial fibers and the comprehensive deformation parameter represented by global area strain but not global longitudinal strain of subendocardial fibers. This involvement appears to be also associated with LV remodeling (smaller LV size and lower sphericity index). These findings could be explained on the grounds of myocardial fibrosis and fatty infiltration possibly involving not uniformly the different layers of myocardial tissue in this disease.

O224

Correlation between late gadolinium enhancement on cardiac magnetic resonance and electrocardiographic features in HCM

Andrea Cocciolo (a), Marco Merlo (a), Bruno Pinamonti (a), Francesca Brun (a), Gherardo Finocchiaro (a), Alessio Della Mattia (a), Gaetano Morea (a), Fabrizio Pirozzi (a), Sara Doimo (a), Francesco Negri (a), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, "Ospedali Riuniti" and University of Trieste, Italy*

Background and aims: Cardiac magnetic resonance (CMR) with late gadolinium enhancement (LGE) represents a powerful instrument for the non-invasive evaluation of cardiac hypertrophy and identification of myocardial fibrosis in patients affected by hypertrophic cardiomyopathy (HCM). The purpose of the present study was to examine the possible associations between electrocardiographic (ECG) and CMR findings in a cohort of HCM patients.

Methods: We considered 46 consecutive HCM patients (70% males, age 38 ± 19 years) observed from 2005 to 2013 in our Department. The whole population underwent a complete clinical and instrumental assessment, including ECG, echocardiography and CMR.

Results: Patients with at least one electrocardiographic criteria for left ventricular (LV) hypertrophy were 35 (76%). The Sokolow-Lyon index was positive in 25 patients (54%), the Cornell voltage index in 21 (46%) while a Romhilt-Estes score >4 was present in 31 patients (67%). Eleven (24%) patients did not manifest ventricular hypertrophy at the ECG. Pathological Q waves were found in 9 patients (20%). Patients with negative T waves were found to be 20 (44%), while giant negative T waves were present in 4 patients (9%). Left atrial (LA) enlargement was present in 12 patients (26%). On CMR LGE was present in 27/46 patients (59%). No significant associations were evident between maximum interventricular septum (IVS) thickness on CMR and LV hypertrophy on ECG (Sokolow-Lyon $p=0.42$; Cornell $p=0.094$; Romhilt-Estes >4 $p=0.15$). At the statistical analysis neither ECG criteria for LV hypertrophy (Sokolow-Lyon $p=0.54$; Cornell $p=0.14$; Romhilt-Estes >4 $p=0.36$), nor the presence of pathological Q waves ($p=0.20$) or giant negative T waves ($p=0.52$), nor the presence of LA enlargement ($p=0.21$) were associated with the presence of LGE.

Conclusions: We did not demonstrate any statistically significant association between some frequent pathological ECG findings and the presence of LGE on CMR in patients with HCM. Our preliminary results underline the necessity of a complete characterization (from electrocardiogram to CMR) of HCM patients for an accurate assessment and management of the disease. Future analyses, on larger populations, are required.

O225

The diagnostic and prognostic value of myocardial fibrosis in non ischemic dilated cardiomyopathy: a study by endomyocardial biopsy and cardiac magnetic resonance.

Manuel De Lazzari (a), Martina Perazzolo Marra (a), Stefania Rizzo (b), Filippo Zilio (a), Ana Susac (b), Giulia Vettor (a), Veronica Spadotto (a), Chiara Calore (a), Benedetta Giorgi (b), Luisa Cacciavillani (a), Giuseppe Tarantini (a), Francesco Tona (a), Diego Miotto (b), Gaetano Thiene (b), Domenico Corrado (a), Sabino Iliceto (a), Cristina Basso (b)

(a) *Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy*, (b) *Department of Diagnostic and Medical Sciences, University of Padua, Padua, Italy*

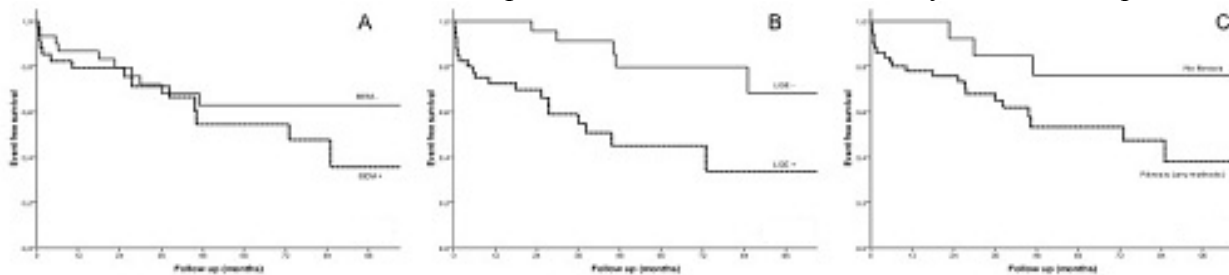
Introduction: Non-ischemic dilated cardiomyopathy (DCM) is characterized by fibrotic changes beyond myocyte vacuolization and nuclear abnormalities. While the diagnostic value of endomyocardial biopsy (EMB) for DCM is well established, its prognostic role remain to be elucidated. Cardiac magnetic resonance (CMR) detects fibrosis as late gadolinium enhancement (LGE).

Aims: Evaluate the prognostic value of EMB in patients with DCM and compare it with fibrosis detected by CMR.

Methods: We prospectively evaluated consecutive patients referred for unexplained left ventricular dilatation/dysfunction with subacute-chronic heart failure onset (≥ 1 month) who underwent to a CMR and EMB (coronary artery disease was excluded by angiography). Composite end point included cardiac death/transplantation, ventricular arrhythmias, hospitalization for heart failure.

Results: The patients eventually enrolled were 62. At histology 33/62 patients (53%) showed replacement-type fibrosis and 39/63 (63%) LGE on CMR. Of the 33 with positive EMB, 23 patients (69.7%) showed LGE. Out of 29/62 patients (47%) without fibrosis on EMB, LGE was present in 16/29 (55%). On follow-up (52 ± 37 months), 25/62 patients (40%) reached the composite end-point. Kaplan-Meier survival estimates for composite end-point did not show differences between patients with or without fibrosis on EMB ($p=0.3$) (Figure 1A), whereas LGE reached statistical significance ($p=0.002$) (Figure 1B). Adding the CMR information in negative EMB subjects, LGE stratified the population at risk for major cardiac events (Figure 1C).

Conclusions: Compared to EMB, CMR is superior in detecting replacement type fibrosis mostly due to the epicardial location of scar in DCM, which is not caught by EMB due to its endocardial approach. Fibrosis alone on EMB seems to be unable to stratify patients for major clinical events. A better survival is demonstrated in DCM patients with fibrosis identified by either techniques.



MODIFICAZIONI MORFO – FUNZIONALI CARDIACHE NELL'IPERTENSIONE ARTERIOSA

O226

Early effects of arterial hypertension: left atrial deformation analysis by two-dimensional speckle tracking echocardiography

Matteo Lisi (a), Matteo Cameli (a), Michael Y Henein (b), Francesca Maria Righini (a), Susanna Benincasa (a), Marco Solari (a), Flavio D'Ascenzi (a), Marta Focardi (a), Stefano Lunghetti (a), Sergio Mondillo (a)

(a) Department of Cardiovascular Disease, University of Siena, Italy., (b) Department of Public Health and Internal Medicine and Heart Centre, Umeå University, Sweden.

Background: Arterial hypertension (HTN) causes left ventricular (LV) cavity dysfunction even if ejection function (EF) remains preserved. Recent studies have shown that diastolic dysfunction and left atrial (LA) dilatation are also associated with myocardial dysfunction. The aim of the present study was to explore the nature of LA longitudinal function disturbances in hypertensive patients with normal LV and LA structure and conventional function parameters.

Methods: Peak atrial longitudinal strain (PALS) was evaluated in 78 patients with systemic HTN and preserved EF ($\geq 55\%$) divided in 41 patients with diastolic dysfunction but no hypertrophy (group HTNdd), and 37 patients with no diastolic dysfunction or hypertrophy (group eHTN). Results were compared with those from 38 age- and gender-matched healthy controls.

Results: Indexed LA area and indexed LA volume were within the normal range and not different between the two patient groups and controls. eHTN group had reduced global PALS ($p < 0.001$) and

four-and two-chamber average PALS ($p < 0.001$ for both). Similar abnormalities were seen in HTNdd group but to a worse degree ($P < 0.01$ for both). LV EF was not different between the eHTN and HTNdd groups compared to controls. LV E/e' ratio was the strongest predictor of reduced global PALS in both eHTN and HTNdd groups.

Conclusion: Asymptomatic untreated HTN patients with preserved LVEF and normal diastolic function have compromised LA strain despite normal cavity size, consistent with preclinical LA myocardial dysfunction.

O227

Limited prediction of incomplete left ventricular relaxation from diastolic time intervals and the isovolumic relaxation constant tau

Alessio Alogna (a), Michael Schwarzl (a), Birgit Zirngast (b), Jochen Verderber (a), David Zweiker (a), Paul Steendijk (c), Heinrich Mächler (b), Burkert Pieske (a), Heiner Post (a)

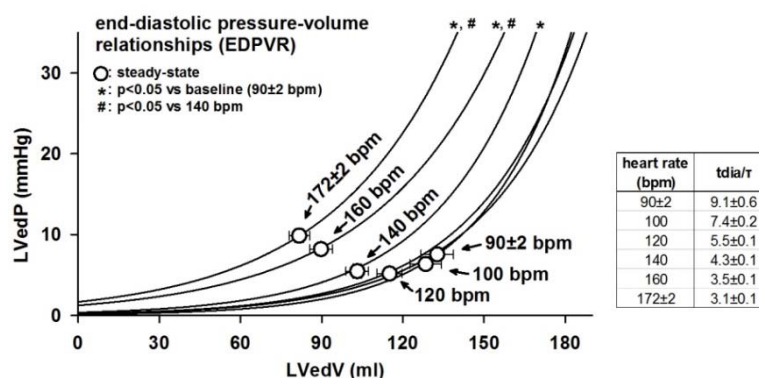
(a) Medical University of Graz, Department of Cardiology, Graz, Austria, (b) Medical University of Graz, Department of Cardiac Surgery, Graz, Austria, (c) Leiden University Medical Center, Leiden, Netherlands

Background: Incomplete left ventricular (LV) relaxation can lead to increased LV end-diastolic pressure and contribute to exertional dyspnea. Mathematical calculations predict that LV relaxation is incomplete when the diastolic duration (tdia) is less than 3.5 x the LV isovolumic relaxation constant tau (τ). We tested this widely used assumption in normal pigs in vivo at normal and hypothermia induced slowed LV relaxation.

Methods: 17 anaesthetized pigs were acutely instrumented with a LV pressure-volume catheter, a Swan-Ganz catheter and a right atrial pacing probe. After baseline measurements, heart rate (HR) was increased to 100, 120, 140, 160 and 180 bpm, if possible. At each HR, steady state haemodynamics and the end-diastolic pressure-volume relationship (EDPVR, aortic occlusion) were assessed. A subgroup of 6 animals was subsequently cooled to 33 °C and measurements were repeated.

Results: Before cooling, the ratio $tdia/\tau$ decreased from 9.1 ± 0.6 at baseline HR (90 ± 2 bpm) to 3.1 ± 0.1 ($p < 0.05$) at maximum HR (172 ± 2 bpm). LV end-diastolic volume (LVedV) fell progressively, while LV end-diastolic pressure (LVedP) started to increase at 160 bpm, when $tdia/\tau$ was 3.5 ± 0.1 . However, a significant leftward shift of the EDPVR occurred already at 140 bpm (see graph), when $tdia/\tau$ was 4.3 ± 0.1 . At 33 °C, HR was 66 ± 2 bpm and τ was prolonged to 119 ± 16 ms, resulting in a significant leftward shift of the EDPVR, i. e. incomplete relaxation, already at 120 bpm.

Conclusion: A fall of LVedV delays an increase of LVedP at increasing heart rates. Analysis of the EDPVR reveals that incomplete LV relaxation occurs at lower heart rates than predicted from diastolic time intervals and τ . Measurement of LV volumes next to LV pressures and time intervals is thus required to accurately assess incomplete LV relaxation.



O228

Impact of pulse pressure on non invasively estimated left ventricular filling pressure in newly diagnosed uncomplicated hypertensive patients

Daniela De Palma (b), Maurizio Galderisi (a), Riccardo Muscariello (b), Renato Ippolito (b), Roberta Esposito (a), Rosa Raia (a), Francesco Gargiulo (b), Pasquale Strazzullo (b), Giovanni de Simone (a)

(a) *Department of Translational Clinical Sciences, Federico II University Hospital, Naples, Italy,*

(b) *Department of Clinical and Surgical Medicine, Federico II University Hospital, Naples, Italy*

Purpose: The pulsatile component (pulse pressure, PP) is the consequence of intermittent left ventricular ejection. Although elevated PP, an indirect marker of arterial stiffness, has been shown to be associated to cardiac organ damage and increased risk of cardiovascular events, its relations with LV diastolic function have been poorly investigated. The present study aimed to assess the impact of PP on non invasively estimated LV filling pressure (LVFP) in newly diagnosed, uncomplicated arterial hypertension.

Methods: After excluding patients with type 2 diabetes mellitus, coronary artery disease, overt heart failure, valve heart disease, primary cardiomyopathies, atrial fibrillation and those undergoing anti-hypertensive therapy, the study population included 70 newly diagnosed, never treated hypertensive patients and 56 normotensive, healthy controls. All the participants underwent a complete echo Doppler examination including determination of LV mass index (LVMI), relative diastolic wall thickness (RDWT), left atrial volume index (LAVi), Doppler diastolic transmitral inflow, pulsed tissue Doppler of mitral annulus and E/e' ratio (e' average = septal e' + lateral e' / 2) as a non invasive estimate of LVFP. The study population was divided into 2 groups independent on blood pressure values according to brachial PP (systolic blood pressure – diastolic blood pressure): 91 with PP ≤ 50 mmHg (Group 1) and 35 with PP > 50 mmHg (Group 2).

Results: The 2 groups were comparable for sex, age, body mass index (BMI), heart rate and diastolic blood pressure (BP) while systolic BP was higher in Group 2 (p<0.0001). PP was 42.3 ± 7.2 mmHg in Group 1 and 65.2 ± 8.1 mmHg in Group 2 (p<0.0001). Echo Doppler analysis showed higher values of LVMI, LAVi and of E/e' ratio (7.2 ± 2.1 versus 6.5 ± 1.6) (all p<0.01) as well as lower transmitral E/A ratio and E velocity longer deceleration time (both p<0.02) in Group 2 than in Group 1, without significant difference of RDWT. After adjusting for several confounders including age, heart rate, BMI and LVMI by multiple linear regression analysis, PP and E/e' ratio were independently associated in the pooled population (standardized β coefficient = 0.39, p<0.0001) (cumulative R² = 0.22, p<0.0001).

Conclusions: Pulse pressure is positively associated with the degree of non invasively estimated LVFP in patients with newly diagnosed, uncomplicated arterial hypertension. These findings confirm the association between arterial stiffness and LV diastolic function explored by other techniques and open a track on the assessment of a possible impact of pharmacological treatment on the arterial-ventricular coupling.

O229

Carico pressorio delle 24 ore e risposta morfofunzionale cardiaca nel paziente iperteso

Antonio Atanasio (a), Sergio Buccheri (a), Ines Monte (a), Corrado Tamburino (a)

(a) *Dipartimento di scienze Mediche e Pediatriche, Università di Catania*

Introduzione: E' noto come il carico pressorio giornaliero influenzi il rimodellamento ventricolare e l'importanza della valutazione dei valori pressori nell'arco delle 24 ore nel management del paziente iperteso. Tuttavia, pochi dati sono presenti in letteratura sull'impatto che il carico pressorio delle 24 ore esercita sulla funzione del ventricolo sinistro.

Scopo dello studio: Valutare l'influenza esercitata dal carico pressorio delle 24 ore sul rimodellamento morfo-funzionale cardiaco nel paziente iperteso.

Metodi: 58 pazienti (34 M e 24 F aventi età media di $53,3 \pm 11,6$ anni) affetti da ipertensione arteriosa sono stati arruolati prospetticamente da Settembre 2012 a Febbraio 2013. Tutti i pazienti sono stati valutati mediante un monitoraggio della pressione arteriosa delle 24 ore ed un successivo esame ecocardiografico. Spessori e diametri ventricolari, la massa ventricolare sinistra indicizzata per la superficie corporea (LV Mass Ind.) sono stati misurati mediante ecocardiografia in M-mode. I parametri di funzione sistolica esaminati sono stati la frazione d'eiezione del ventricolo sinistro (EF), la velocità di contrazione sistolica miocardica (Sm) e lo Strain longitudinale globale del ventricolo (GLS) sinistro mediante ecocardiografia in speckle tracking. La funzione diastolica è stata valutata mediante i seguenti parametri: rapporto E/A, rapporto E/Em, Volume atriale sinistro indicizzato (LAVi) per la superficie corporea. La Compliance Arteriosa Sistemica (CAS) è stata infine valutata mediante il rapporto tra Stroke Volume e Pressione Differenziale.

Risultati: Correlazioni statisticamente significative tra carico pressorio e parametri morfo-funzionali cardiaci sono mostrate in Tabella I. Lo Strain Longitudinale Ventricolare era l'unico parametro funzionale correlato ai valori pressori medi sistolici e diastolici delle 24 ore. Le velocità di contrazione e rilasciamento precoce cardiaco erano invece correlate con i valori pressori notturni. Inoltre, la CAS era linearmente correlata alla LV Mass Ind. ($r=0.290$, $p=0.028$) ed al LAVi ($r=0.335$, $p=0.011$). Correlazione altamente significativa si riscontrava infine tra LV Mass Ind. e LV GS ($r=0.424$, $p=0.001$)

Conclusioni: Lo strain ventricolare longitudinale rappresenta il parametro funzionale meglio correlato ai valori pressori medi delle 24 ore. La CAS influenza prevalentemente il rimodellamento morfologico cardiaco. Tali parametri sembrano, pertanto, utili per una valutazione globale della performance miocardica nel paziente iperteso.

| Tabella 1 Parametri | Correlazione lineare di Pearson (r) | | | | | |
|------------------------|-------------------------------------|-----------------------|-------------------------|--------------------------|---------------------------|----------------------------|
| | Valori sistolici 24h | Valori diastolici 24h | Valori sistolici diurni | Valori diastolici diurni | Valori sistolici notturni | Valori diastolici notturni |
| LV Mass Ind. | 0,32* | 0,27* | 0,32* | 0,28* | 0,29* | 0,18 |
| Sm (cm/sec) | -0,14 | -0,15 | -0,05 | -0,15 | -0,27* | -0,16 |
| Em (cm/sec) | -0,25 | -0,24 | -0,19 | -0,23 | -0,34* | -0,30* |
| LAVi | 0,28* | 0,09 | 0,16 | 0,05 | 0,22 | 0,13 |
| LV long. Strain (%) | 0,30* | 0,31* | 0,32* | 0,32* | 0,19 | 0,26 |

IVSd: Setto interventricolare diastole; LVIDd: Diametro ventricolare sinistro diastolico; LVMassInd: massa ventricolare sinistra indicizzata; LAVi: Volume atriale sinistro; MPI: Myocardial performance index; LV long. Strain: strain longitudinale globale sinistro; LA G. strain: Strain longitudinale atriale sinistro; *: $p < 0,05$; **: $p = 0,01$.

O230

Prevalenza di massa ventricolare sinistra inappropriata in una popolazione di giovani ipertesi naive

Allegra Battistoni (a), Giuseppino Massimo Ciavarella (a), Marta Salvati (a), Giuliano Tocci (a, b), Andrea Ferrucci (a), Carmine Savoia (a), Luciano De Biase (a), Massimo Volpe (a, b)

(a) Department of Clinical and Molecular Medicine, Faculty of Medicine, University Sapienza, Roma, (b) IRCCS Neuromed, Pozzilli (IS)

Background: La presenza di Massa Ventricolare Sinistra Inappropriata (MVSII) è un parametro da considerare nella stratificazione del rischio cardiovascolare globale nel paziente iperteso. La MVSII è definita come una risposta cardiaca non proporzionale all'aumento della pressione e si ritiene sia in parte correlata a meccanismi extracardiaci. E' peraltro dimostrato che l'aumento della MVSII si associa ad un aumento di mortalità e morbilità cardiovascolare.

Scopo: Determinare la prevalenza di MVSII con ecocardiocolorDopplerTDI (ECD) in una popolazione di giovani affetti da ipertensione arteriosa.

Metodi: 21 pazienti (12M, età media 43 aa) con recente diagnosi di ipertensione arteriosa (clinica ed al monitoraggio pressorio delle 24 ore), peraltro sani, non in terapia anti-ipertensiva, con elettrocardiogramma ed esame ECD completo di Doppler tissutale normale, sono stati sottoposti ad una valutazione ecocardiografica di secondo livello che ha preso in considerazione l'eventuale presenza di MVSI. Ogni paziente è stato poi posto a confronto con un soggetto non iperteso, sovrapponibile per sesso ed età.

Risultati: tabella 1*

| | MVSI | Massa h ^{2.7} | H/R | FE | Fs | MFS |
|-----------|------------|------------------------|-----------|-----------|----------|----------|
| Casi | 116.3±20.2 | 38.7±7.8 | 0.35±0.05 | 68,19±7,2 | 39.6±5.9 | 18±0.3 |
| Controlli | 96.7±21.7 | 28.6±6.4 | 0.31±0.04 | 70,6±5,4 | 40.5±4.4 | 18.3±0.2 |
| P | 0.01 | 0.0003 | 0.02 | 0,2 | 0.5 | 0.003 |

Conclusioni: La nostra popolazione di ipertesi giovani naive presenta una prevalenza di MVSI significativamente maggiore rispetto ai controlli. Tale riscontro si accompagna ad un più elevato valore assoluto di massa quando considerata con indicizzazione allometrica, con iniziale tendenza al rimodellamento concentrico della camera ventricolare sinistra. Al contrario, i soggetti ipertesi non sono distinguibili dai controlli riguardo gli indici di funzione sistolica classicamente considerati (FE e fractional shortening endocardica), ma lo diventano se consideriamo il midwall fractional shortening, come a testimoniare una riduzione della performance ventricolare in relazione all'aumentato postcarico.

*Dati espressi come media ± ds, t-test per p<0.5; MVSI : massa ventricolo sinistro inappropriata espressa in gr; Mvs/h^{2.7} : massa Vsn indicizzata allometricamente in gr; H/R: raggio/spessore Vsn; FE: frazione di eiezione in %; Fs: fractional shortening endocardica in %; MFS: midwall fractional shortening.

O231

Impatto prognostico di una nuova classificazione della geometria ventricolare sinistra

Raffaele Izzo (a), Giovanni de Simone (a), Marina De Marco (a), Costantino Mancusi (a), Valentina Trimarco (b), Francesco Rozza (d), Nicola De Luca (a), Bruno Trimarco (c)

(a) DPT di Scienze Mediche Traslazionali - Università federico II - Napoli, (b) DPT di Neuroscienze - Università federico II - Napoli, (c) DPT di Scienze Biomediche Avanzate - Università federico II - Napoli, (d) Scuola di Medicina - Università di Salerno

Background: Nel 2010, il Dallas Heart Study (DHS) ha proposto un aggiornamento della classificazione della geometria del ventricolo sinistro (LV) del 1991, usando la massa del LV (LVM) ed il volume tele-diastolico (EDV) in sostituzione delle misure lineari del diametro del LV e dello spessore della parete posteriore. Abbiamo adottato questo nuovo metodo di classificazione per testare l'impatto prognostico dei nuovi pattern geometrici del LV ricavati attraverso questa nuova classificazione.

Metodi: Abbiamo valutato i parametri ecocardiografici, antropometrici e di laboratorio di 8941 ipertesi dal Campania Salute Network (52±12 anni, 56% maschi), senza malattie cardiovascolari (CV) o valvulopatie prevalenti e con una frazione d'eiezione ≥50%. La LVM ed I volume sono stati calcolati usando il modello proposto da Khouri (Circ Cardiovasc Imaging. 2010;3:129), generando i cut-points sesso-specifici (97.5th percentile) grazie ai valori di LVM, EDV e del rapporto LVM/EDV^{0.67} ottenuti da un campione di 711 soggetti normali (260 donne), partecipanti al progetto EchoNormal Collaboration Group. Per eventi cardiovascolari maggiori (MACE) sono stati considerati: morte cardiaca, IMA, rivascolarizzazione coronarica, stroke o TIA ed insufficienza renale richiedente il trattamento dialitico.

Risultati: Abbiamo identificato 6 tipi di geometria alterata del LV (22% dei pazienti). In una regressione di Cox aggiustata per età e sesso e con un periodo medio di follow-up di 35 mesi (range: 1-180 mesi) sono risultati essere significativamente associati a MACE: i pazienti con iniziale ipertrofia concentrica (4.4%) ($p < 0.0001$; HR = 3.99; 95% CI 0 2.38-6.69), quelli con ipertrofia concentrica e dilatata (0.6%) ($p = 0.037$; HR = 3.5; 95% CI 0 1.08-11.21) e quelli con dilatazione del LV senza ipertrofia (0.6%) ($p = 0.039$; HR = 3.41; 95% CI = 1.06-10.92), mentre i pattern con ipertrofia eccentrica (indeterminata), ipertrofia con dilatazione ed il rimodellamento concentrico non sono risultati essere associati a MACE.

Conclusioni: La classificazione della geometria del LV basata sul DHS dimostra che non tutte le alterazioni geometriche del LV sono associate ad elevato rischio cardiovascolare, ma identifica un numero molto ridotto di soggetti a rischio in confronto a metodi più tradizionali.

VALVULOPATIA AORTICA ED EMODINAMICA NON INVASIVA 2

O232

The ratio of contrast volume to glomerular filtration rate predicts acute kidney injury and mortality after transcatheter aortic valve implantation

Alessandro Sticchi (a), Alessandro Candreva (a), Azeem Latib (a), Filippo Figini (a), Alessandro Durante (a), Francesco Maisano (b), Santo Ferrarello (a), Chiara Bernelli (a), Luca Testa (c), Sandeep Basavarajaiah (a), Charis Costopoulos (a), Toru Naganuma (a), Alaide Chieffo (a), Matteo Montorfano (a), Micaela Cioni (a), Maurizio Taramasso (b), Ottavio Alfieri (b), Antonio Colombo (a)

(a) *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milano - Italy*, (b) *Department of Cardiothoracic Surgery, San Raffaele Scientific Institute, Milano - Italy*, (c) *Department of Cardiology, Clinical Institute S. Ambrogio, Milano - Italy*

Objective: The aim of this study was to assess the impact of the ratio of the volume of contrast medium to the glomerular filtration rate (V/GFR) on acute kidney injury (AKI) after transcatheter aortic valve implantation (TAVI).

Background: V/GFR has been shown to correlate with higher risk of AKI after percutaneous coronary intervention but has not been evaluated in patients undergoing TAVI.

Methods: We calculated V/GFR in 397 patients undergoing TAVI. AKI was defined as a VARC modified Risk, Injury, Failure, Loss and End-stage (RIFLE) kidney disease ≥ 2 . Receiver-operator characteristic (ROC) methods were used to identify the optimal sensitivity and specificity for the observed range of V/GFR. The predictive value of V/GFR for the risk of AKI was assessed using multivariable logistic regression.

Results: The incidence of AKI was 17.9%. The mean V/GFR ratio was 3.0 ± 2.7 in patients without AKI and 7.8 ± 8.8 in patients with AKI ($p < 0.001$). The ROC curve analysis showed fair discrimination between patients with and without AKI (C-statistic 0.85) at a V/GFR ratio of 3.2. At multivariable regression analysis V/GFR > 3.2 was an independent predictor of AKI (OR 3.4, 95% CI 1.0-6.1, $p < 0.001$) and long-term mortality (OR 3.3, 95% CI 2.0-5.2, $p < 0.001$).

Conclusions: A V/GFR > 3.2 is correlated with higher incidence of AKI and mortality after TAVI. So it is promising that this ratio can be used to calculate the maximum volume of contrast medium that can be given without significantly increasing the risk of AKI and mortality. Further study is needed to determine whether limiting contrast volume would improve patient outcome.

O233

Impact of aortic regurgitation after tavi on midterm follow-up

Emanuele Benvenuto (a), Patrizia Aruta (a), Vera Bottari (a), Marilena Mizzi (a), Maria Letizia Santonoceto (a), Alessio Di Landro (a), Simona Gulino (a), Alessandra Giarratana (a), Anna Marchese (a), Sebastiano Immè (a), Stefano Cannata (a), Martina Patanè (a), Marco Barbanti (a), Wanda Deste (a), Carmelo Sgroi (a), Daniela Giannazzo (a), Corrado Tamburino (a, b)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania, Italy*, (b) *Excellence through newest advances (ETNA foundation), Catania, Italy*

Aim: Transcatheter aortic valve implantation (TAVI) has emerged as an alternative to surgical aortic valve replacement for patients with severe symptomatic aortic valve stenosis and high surgical risk. Aortic valve regurgitation (AR) is the most frequent complication that might be associated with adverse outcome.

Methods and results: From June 2007 to June 2013, 380 consecutive patients underwent to TAVI, (n 81, 21.57% implanted EDW; n 298, 78.42% CVS). Population was segregated into two groups according to prosthetic aortic valve regurgitation after TAVI: trivial to mild 87.1% (n 331) and moderate to severe 12.89% (n 49). No difference was observed between the 2 groups in terms of mean STScore mortality (7.68 ± 7.12 vs 7.52 ± 6.87 ; p 0.8) and morbidity and mortality (32.41 ± 18.7 vs 32.24 ± 17.98 ; p 0.9) and age (80.69 ± 5.4 vs 80.7 ± 5.2 year; p 1). Significantly different was Logistic EuroSCORE (15.49 ± 13.81 vs 22.25 ± 17.18 ; p 0.002). No significant difference was observed in in-hospital mortality, that was respectively 7.25% (n 25) for the group with trivial to mild AR and 0% for the group with moderate to severe (p 0.09), and in mortality at median follow up of 24,7 months, respectively 19,3% (n 64) vs 18,3% (n 6) (p 0.9).

Conclusion: AR after TAVI is the most frequent complication. In our experience moderate to severe AR after TAVI doesn't increase morbidity and mortality at midterm follow up, longer follow up is needed for assessing impact on outcomes.

O234

Transcutaneous wireless ecg telemetry following transcatheter aortic valve implantation : 30 days follow-up

Saverio Muscoli (a), Gian Paolo Ussia (a), Domenico Sergi (a), Valeria Cammalleri (a), Francesco Vecchio (a), Karim Mahfouz (a), Dorotea Rubino (a), Francesca De Persis (a), Giuseppina Pascuzzo (a), Ersilia Mazzotta (a), Lucia Duro (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia*

Background: new-onset left bundle branch block (LBBB) and right bundle branch block (RBBB), complete atrioventricular block (AV3B) and atrial fibrillation (AF) frequently occur following transcatheter aortic valve implantation (TAVI). Often these arrhythmias need for new permanent pacemaker implantation (PPI) and they constitute an important clinical problem during and subsequently to TAVI. The pathophysiology and the exact time of onset of new conduction abnormalities has not yet been elucidated.

Methods: From June 2011 to May 2013, were recruited for TAVI 50 consecutive patients (mean age $80 \pm 8,3$, aortic valve area $0,7 \pm 0,2$ cm²; mean Logistic EuroScore $29,84 \pm 15,68\%$; mean STS mortality score $12,94 \pm 14,11\%$, frail patients $2,34 \pm 1$ %, QoL $8,22 \pm 1$, NHYA $2,9 \pm 0,3$). The transcutaneous wireless ECG telemetry of 13 consecutive patients (mean age $80,3 \pm 3,1$ years, 9 men, 4 women; Logistic Euro Score $29,6$) diagnosed with symptomatic severe aortic stenosis (valve area 0.59 ± 0.19 cm²) who underwent TAVI with a CoreValve Revalving System were analyzed immediately after the end of the procedure for a period of 14 days.

Results: there were no procedural deaths, and 30-day mortality was 7,7%. The incidence of complete LBBB and RBBB increased from 15,4% and 7,7% at baseline to 30,8 % and 15,4 % after the

procedure. At 14 days follow-up, the rate of LBBB and RBBB decreased to 23 % and 7.7 %, respectively. There were 1 cases of transient atrioventricular block Mobitz 1 observed after discharge. There were 2 cases of AV3B observed with transcutaneous wireless ECG telemetry after 3 and 6 six days after discharge treated promptly with PPI. There were 2 cases of AF, observed during hospitalization and after two days of discharge, treated successfully with pharmacological cardioversion. There was 1 case of unsustained ventricular tachycardia of 24 beats detected after 5 days of discharge. There were no cases of major ventricular arrhythmias.

Conclusion: the transcutaneous wireless ECG telemetry is a safe, effective and non-invasive system to monitoring patients underwent TAVI during hospitalization and during the days after discharge, making possible to detect new arrhythmias in the most critical periods after the procedure.

O235

Sostituzione aortica chirurgica e transcaterere: effetti sulla pressione centrale e sulla distensibilità arteriosa.

Francesca Cesana (a), Giuseppe Bruschi (b), Alberto Barosi (c), Stefano Pelenghi (b), Paola Sormani (a), Giulia Colombo (a), Sara Santacesaria (a), Luca Giupponi (a), Marta Alloni (a), Rita Facchetti (a), Antonella Moreo (d), Cristina Giannattasio (a, d), Luigi Martinelli (b), Silvio Klugman (c)

(a) Università Milano-Bicocca, Dipartimento di Scienze della Salute, Milano, Italia, (b) Cardiocirurgia, Osp. Niguarda Ca' Granda, Dipartimento Cardioracovascolare De Gasperis, (c) Cardiologia interventistica, Osp. Niguarda Ca' Granda, Dipartimento Cardioracovascolare De Gasperis, (d) Cardiologia IV, Osp. Niguarda Ca' Granda, Dipartimento Cardioracovascolare De Gasperis, Milano.

Background: La stenosi aortica (SAo) è la più comune valvulopatia cardiaca ed è anche manifestazione di un processo aterosclerotico coinvolgente sia la valvola che il sistema vascolare. Le evidenze riguardo agli effetti della sostituzione valvolare aortica sia chirurgica (SVAO) che transcaterere (TAVI) sulla funzione arteriosa sono limitate e pochi dati esistono di comparazione delle due metodiche. Scopo del nostro studio è di esaminare le modificazioni della distensibilità arteriosa e della pressione arteriosa centrale dopo l'intervento di SVAO o TAVI.

Metodi: Abbiamo arruolato 32 pazienti ipertesi (età media 78 ± 7 aa) con stenosi aortica severa sintomatica, sottoposti a SVAO ($n=16$, età 75 ± 7 aa) o TAVI ($n=16$, età 82 ± 6 aa). Abbiamo misurato la pressione arteriosa brachiale (PAB), quella centrale (PAC) e l'Augmentation Index (AIx, SphygmoCor), quale indice di stiffness arteriosa; abbiamo inoltre eseguito uno studio ecocardiografico transtoracico completo. Tutte le misurazioni sono state effettuate prima (T0) ed una settimana dopo l'intervento (T1).

Risultati: A T0 sia PAB che PAC sono risultate nel range di normalità (137 ± 19 e 73 ± 8 mmHg e 128 ± 17 e 74 ± 8 mmHg rispettivamente, media \pm DS), il gradiente transaortico medio era di 51 ± 13 mmHg e la frazione d'iezione conservata (56%). Dopo la sostituzione valvolare (SVAO e TAVI) vi è stata una riduzione del gradiente transaortico medio (-36 ± 16 mmHg, $p < 0.001$), della PAC sistolica e diastolica (-13 ± 19 e -5 ± 12 mmHg, $p < 0.01$ per entrambe), e dell'AIx ($-5\% \pm 14\%$, $p < 0.05$). Dividendo la popolazione in base al tipo di intervento si manteneva in entrambi i sottogruppi una significativa riduzione del gradiente medio (SVAO -35 ± 8 mmHg, TAVI -37 ± 20 mmHg, $p < 0.001$ per entrambe) mentre la riduzione della PAS brachiale, delle pressioni centrali e dell'AIx era significativo solo nel gruppo SVAO (PAS B: -16 ± 20 mmHg; PAS C: -22 ± 18 mmHg; PAD C: -8 ± 13 mmHg; AIx: -0.09 ± 0.09 %, $p < 0.05$).

Conclusioni: In pazienti ipertesi con SAO dopo la sostituzione valvolare sia chirurgica che transcaterere si ha riduzione del gradiente transvalvolare aortico massimo e medio. Nei pazienti con SVAO la sostituzione valvolare si associa anche ad una riduzione della pressione sistolica e della rigidità arteriosa, misurata come pressioni centrali e augmentation index. Ulteriori studi sono

necessari per discriminare se questi effetti di SVAO sul sistema cardiovascolare siano imputabili alle diverse condizioni basali dei pazienti (i pazienti TAVI sono più anziani) o all'effetto dell'intervento.

O236

Prognostic impact of post-procedural hyperglycemia on acute kidney injury after transcatheter aortic valve implantation.

Alessandro Candreva (a, b), Alessandro Sticchi (a), Azeem Latib (a), Francesco Giannini (a), Filippo Figini (a), Francesco Maisano (b), Santo Ferrarello (a), Chiara Bernelli (a), Sandeep Basavarajajah (a), Charis Costopoulos (a), Toru Nagamura (a), Alaide Chieffo (a), Matteo Montorfano (a), Micaela Cioni (b), Maurizio Taramasso (b), Ottavio Alfieri (b), Antonio Colombo (a)

(a) *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan – Italy*, (b) *Department of Cardiothoracic Surgery, San Raffaele Scientific Institute, Milan - Italy*

Objective: We sought to evaluate whether post-procedural glucose levels are associated with acute kidney injury (AKI) after transcatheter aortic valve implantation (TAVI).

Background: Peri-operative hyperglycemia, in individuals with and without diabetes, has been identified as a marker of AKI in cardiac surgery patients. This aspect is not known in TAVI setting.

Methods: We prospectively enrolled 422 patients undergoing TAVI. For each patient, plasma glucose level were assessed at hospital admission, 4 hours after the procedure and every day during hospitalization. Post-procedural hyperglycemia was defined as 2 consecutive blood glucose readings of 150 mg/dL or greater during 72 hours after TAVI. AKI was defined as stipulated in the consensus report from the VARC about standardized endpoint definitions. The predictive value of post-procedural hyperglycemia for the risk of AKI was assessed using multivariable logistic regression.

Results: Overall, 137 (32%) patients had post-procedural hyperglycemia and 138 (33%) patients developed AKI. Hyperglycemic patients had a 2-fold higher incidence of AKI than those without hyperglycemia (48% vs. 25%, $p < 0.001$). In-hospital mortality was higher in patients with hyperglycemia than in those without hyperglycemia (9.6% vs. 1.8%, $p < 0.001$). At multivariable regression analysis post-procedural hyperglycemia was an independent predictor of AKI (OR 2, 95% CI 1.3-3.1, $p = 0.002$) and in-hospital mortality (OR 4.4, 95% CI 1.5-13, $p = 0.007$).

Conclusions: Post-procedural hyperglycemia is correlated with higher incidence of AKI and mortality after TAVI. Randomized controlled trials are needed to determine whether post-procedural hyperglycemia management improves clinical outcome in patients undergoing TAVI and could become an adjunctive strategy of AKI prevention.

O237

Left bundle branch block occurring after transcatheter aortic valve implantation: what is the prognostic significance?

Donatella Tempio (a), Sergio Conti (a), Paola Pruiti (a), Salvatore Andrea Romano (a), Elisa Tavano (a), Claudio Liotta (a), Angelo Di Grazia (a), Corrado Tamburino (a), Valeria Calvi (a)

(a) *U.O di Aritmologia, Dipartimento Cardio-Toraco-Vascolare, A.O.U "Policlinico V. Emanuele", Catania*

Purpose: Left bundle branch block (LBBB) is the most common conduction disorder (CD) occurring after transcatheter aortic valve implantation (TAVI), especially with the use of CoreValve prosthesis. The onset of this disorder might be related to a direct compression of left bundle branch due to the prosthesis expansion. After surgical aortic valve replacement, LBBB has been associated with more frequent adverse outcomes, including permanent pacing and sudden cardiac death. Aim of the study was to evaluate the prognostic value of new onset LBBB in patients who underwent TAVI in order to assess whether a "prophylactic" pacing may be useful in preventing adverse events.

Methods: We retrospectively reviewed 167 patients undergoing TAVI between June 2007 and November 2010. All patients received percutaneous self-expanding CoreValve prosthesis. Twenty-nine patients (17%) were excluded from the analysis because of prior LBBB (n=6) or permanent pacemaker (n=16), and death before discharge (n=6). Finally, 138 patients were included in our analysis. In all these patients a 24-hours ambulatory electrocardiogram was recorded before and after the procedure and at 1, 6 and 12 months of follow-up in order to assess the presence of CD. Adverse events were defined as the occurrence of complete AVB, syncope, and cardiovascular death.

Results: All patients enrolled had a mean follow-up of 14 months. New onset of LBBB was reported in 48.5% of population (n=67). During follow-up the disorder regressed in 26.8%. We have not experienced a significant increase of complete AVB block (p=0.32), syncope (p=0.19) or cardiovascular death (p=0.56) in patients with LBBB compared to patients without this disorder during the follow-up period. The event rate was 30% (20/67) in patients with new LBBB versus 55% (39/71) in patients without LBBB (p=ns).

Conclusion: This series shows that new LBBB in patients undergoing TAVI is not associated to a higher risk of complete AV block or cardiovascular death at long term. Despite a worsening of atrioventricular conduction might be possible in patients with LBBB, a "prophylactic" pacing should be carefully evaluated.

CARDIOPATIA ISCHEMICA 2

O238

Cardiopatia ischemica cronica: I trial clinici che mettono a confronto rivascolarizzazione coronarica percutanea e terapia medica rispondono alla giusta domanda?

Doralisa Morrone (a, b), Mario Marzilli (a), William Weintraub (b)

(a) *Universita' di Pisa-Dipartimento Cardiotoracico*, (b) *christiana Care Health System-Newark-Delaware; USA*

Introduzione: Sempre più spesso i trials clinici che mettono a confronto terapia medica e rivascolarizzazione coronarica, nella cardiopatia ischemica cronica stabile, utilizzano indistintamente i termini di "coronaropatia" e "cardiopatia ischemica". Questo può creare confusione nei criteri di inclusione e di esclusione degli stessi trials e portare ad erronee ed incerte conclusioni. Il nostro scopo è stato quello di evidenziare se la popolazione dei trials clinici riflette nello specifico i pazienti con evidenza di ischemia ed in particolare quanti pazienti sono inclusi nei trials con la sola evidenza di aterosclerosi coronarica senza ischemia.

Metodi: Tutti i trials che mettono a confronto terapia medica vs rivascolarizzazione nell'angina cronica stabile sono stati individuate ed analizzati. Ciascun dato (numero di pazienti sottoposti a screening, numero dei pazienti arruolati, numero dei pazienti con test provocative positive o numero dei pazienti senza test provocativo) sono stati estratti dai seguenti trial: ACME I, ACME II, RITA I, RITA II, MASS I, MASS II, AVERT, ACIP and COURAGE. I dati pubblicati sono stati usati per calcolare il numero dei pazienti inclusi nei trials con test provocativo negativo, ma con stenosi coronarica significativa. Inoltre i dati pubblicati ci hanno permesso di calcolare il numero dei pazienti esclusi dai trials con test provocativo positivo o angina (ma senza evidenza di stenosi coronarica significativa all'angiografia).

Risultati: Più di 195.213 pazienti sono stati sottoposti a screening dal 1998 al 2011. Circa il 30% dei pazienti sono stati esclusi se i criteri angiografici non erano rispettati, anche in presenza di ischemia ad un test provocativo o angina; inoltre circa il 20% dei pazienti in ogni trial è stato incluso in assenza di ischemia.

Conclusioni: I Trials clinici hanno contribuito alla confusione fra malattia aterosclerotica e cardiopatia ischemica. Questo può limitare la capacità nell'interpretare i risultati, ma soprattutto rende

difficile applicare I risultati ottenuti alla pratica clinica in quanto la popolazione di studio rappresenta e' sempre meno il mondo reale.

O239

Ripartire dalle variabili cliniche per meglio valutare rischi e benefici della rivascularizzazione coronarica chirurgica e percutanea: una meta-regressione di trials clinici randomizzati.

Umberto Barbero (a), Claudio Moretti (a), Tullio Palmerini (b), Fabrizio D'Ascenzo (a), Pierluigi Omedè (a), Enrico Cerrato (a), Giuseppe Biondi-Zoccai (c), Fiorenzo Gaita (a)

(a) *Università di Torino, Dipartimento di Medicina Interna, Divisione di Cardiologia, Torino*, (b) *Policlinico Sant'Orsola-Malpighi, Dipartimento di Cardiologia, Bologna*, (c) *Università la Sapienza, Dipartimento di Scienze medico-chirurgiche e Biotecnologie, Roma*

Background: La malattia coronarica rappresenta ancora una delle prime cause di morte al mondo. Due tra le principali opzioni terapeutiche sono oggi la rivascularizzazione per via percutanea (PCI) e quella attraverso by-pass chirurgici (BPAC): ad oggi non è stata ancora definita con certezza l'influenza delle variabili cliniche del paziente sui rischi (stroke) e sui benefici (riduzione della mortalità, di infarto miocardico e della necessità di ulteriore rivascularizzazione) di queste due diverse procedure.

Scopo: Valutare l'impatto delle variabili cliniche del paziente candidato a rivascularizzazione coronarica ai fini del bilancio rischio/beneficio della PCI e del BPAC.

Metodi: Utilizzando il tasso di eventi come variabili dipendenti abbiamo effettuato una meta-regressione di trials clinici randomizzati (RCT) per testare l'ipotesi che le caratteristiche cliniche di base (età, sesso, diabete mellito, frazione di eiezione e precedenti infarti miocardici) potessero guidare la scelta tra le due metodiche, valutando come outcomes la morte, l'infarto miocardico, la necessità di rivascularizzazione lo stroke.

Risultati: Sono stati inclusi 19 RCT con 10.944 pazienti in tutto. La PCI ha dimostrato di ridurre significativamente il rischio di stroke, sia a 30 giorni (hazard ratio 0.36 [95% IC 0.20-0.62]) che dopo un follow-up medio di 12.1 mesi (hazard ratio 0.59 [95% IC 0.38-0.93]). Inoltre abbiamo riscontrato un'importante interazione tra il sesso femminile ed il beneficio offerto dalla PCI (B -0.12; p=0.03). Tuttavia, la PCI si accompagna ad un maggior rischio di dover ripetere la rivascularizzazione, sia nella popolazione in generale che nei pazienti con malattia coronarica multi vasale (hazard ratio 4.89 [95% IC 3.20-7.47] e hazard ratio 7.18 [95% IC 4.32-11.93]). Di nuovo, una relazione significativa in tal senso si ha con il sesso femminile (B 3.4; p=0.01) e, nei pazienti diabetici (B 1.8; p=0.002). Non sono state trovate ulteriori differenze o correlazioni significative.

Conclusioni: Dal nostro lavoro risulta che la rivascularizzazione percutanea offre una riduzione del rischio di stroke post-procedurale, soprattutto nelle donne, così come un maggior rischio di dover ripetere la rivascularizzazione stessa.

O240

Terapia con onde d'urto a bassa energia in pazienti con angina cronica refrattaria

Lorenzo Franceschini (a), Giulia Frigo (a), Serena Armani (a), Giulia Geremia (a), Lucia Frigo (a), Andrea Variola (a), Corrado Vassanelli (a)

(a) *Divisione di Cardiologia, Dipartimento di Medicina, Università di Verona - Italia*

Background: Il numero dei pazienti con angina cronica refrattaria è in continuo aumento; le loro storie cliniche sono sempre più complesse e comprendono numerosi interventi di rivascularizzazione percutanea (PCI) e/o chirurgica (CABG). Allo stato dell'arte le terapie non invasive che riducono i sintomi e migliorano la capacità funzionale in tali pazienti sono inadeguate rispetto alle necessità. La

terapia con onde d'urto a bassa energia è una nuova metodica, non invasiva e sicura, che promuove la rivascolarizzazione del miocardio ischemico mediante neo-angiogenesi.

Scopo: Indagare l'efficacia della terapia con onde d'urto a bassa energia nel ridurre i sintomi e migliorare la capacità funzionale dei pazienti con angina cronica refrattaria.

Metodi: Sono stati arruolati 8 pazienti già sottoposti a PCI e/o CABG con angina cronica refrattaria e con presenza di ischemia miocardica documentata tramite stress test (SPET o ecostress al dipiridamolo). Abbiamo utilizzato una macchina generatrice di onde d'urto con sonda ecocardiografica integrata per ottenere una precisa focalizzazione del fascio d'onde sull'area ischemica. Ogni paziente è stato sottoposto ad un trattamento di 9 sedute adeguatamente distanziate tra loro; in ciascuna seduta sono stati erogati in punti adiacenti dell'area ischemica tra i 1000 e i 1400 shot di onde d'urto. Al basale ed al termine del trattamento è stato eseguito un test da sforzo al cicloergometro ed è stata indagata la sintomatologia anginosa tramite la somministrazione di un questionario (Seattle Angina Questionnaire, SAQ) e la valutazione del CCS score (Canadian Cardiovascular Society score).

Risultati: In 7 pazienti su 8 è stata riscontrata la diminuzione di almeno una classe CCS. Alla valutazione dei SAQ 7 pazienti hanno riferito la riduzione del numero degli episodi anginosi ed un miglioramento della capacità funzionale, confermato dai risultati del test ergometrico; è complessivamente aumentata la soddisfazione riguardo al trattamento della patologia.

Conclusioni: Per quanto attualmente basati su un limitato numero di pazienti, i nostri risultati confermano l'efficacia dell'uso delle onde d'urto a bassa energia nel trattamento dell'angina cronica refrattaria, in termini di riduzione della frequenza e della soglia di comparsa degli episodi anginosi, nonché di miglioramento della capacità funzionale.

O241

Effetti della Ranolazina nei pazienti sintomatici con cardiopatia ischemica cronica. Una meta-analisi di trials randomizzati

Gianluigi Savarese (a), Giuseppe Rosano (b), Carmen D'Amore (a), Donatella Ruggiero (a), Francesca Musella (a), Bruno Trimarco (a), Pasquale Perrone Filardi (a)

(a) *Dipartimento di Scienze Biomediche Avanzate. Università degli Studi di Napoli "Federico II",*

(b) *Centro di Ricerca Clinica e Sperimentale. IRCCS San Raffaele, Roma*

Background: La Ranolazina è stata testata in numerosi trials clinici come terapia aggiuntiva nei pazienti con cardiopatia ischemica cronica. Lo scopo del nostro studio è stato di verificare mediante una meta-analisi gli effetti della Ranolazina sull'angina, il consumo di nitroglicerina, la capacità funzionale, i segni elettrocardiografici di ischemia e i parametri emodinamici nei pazienti con cardiopatia ischemica cronica.

Metodi: Sono stati selezionati i trials randomizzati che studiavano gli effetti della Ranolazina, paragonata ad un trattamento di controllo, sulla durata dell'esercizio, il tempo alla comparsa dell'angina, tempo al sottoslivellamento di 1 mm del tratto ST, assunzione settimanale di nitroglicerina e frequenza settimanale dell'angina. Sono stati anche esaminati gli effetti della Ranolazina, paragonata a controllo, sulla frequenza cardiaca e la pressione arteriosa.

Risultati: Sono stati inclusi nell'analisi 6 trials che hanno arruolato 9223 pazienti. Ai livelli di picco e valle, la Ranolazina paragonata al trattamento di controllo, ha incrementato significativamente la durata dell'esercizio, il tempo all'insorgenza dell'angina ed il tempo al sottoslivellamento di 1 mm del tratto ST. Inoltre, la Ranolazina, paragonata al trattamento di controllo, ha ridotto significativamente la frequenza settimanale dell'angina e il consumo settimanale di nitroglicerina. Infine, la Ranolazina, paragonata al gruppo di controllo, non ha significativamente ridotto la pressione arteriosa sistolica, diastolica e la frequenza cardiaca in posizione supina, la frequenza cardiaca e la pressione arteriosa diastolica in posizione eretta, sebbene abbia ridotto significativamente ma modestamente la pressione arteriosa sistolica in posizione eretta. All'analisi di sensibilità, i risultati non sono risultati influenzati dalla terapia di background.

Conclusioni: Nei pazienti con cardiopatia ischemica sintomatica, la Ranolazina, in aggiunta alla terapia convenzionale, ha efficacemente ridotto la frequenza di angina ed il consumo di nitroglicerina sublinguale, mentre ha prolungato il tempo di esercizio, il tempo all'insorgenza di ischemia e il tempo all'insorgenza dell'angina, con nessun sostanziale effetto sulla frequenza cardiaca e pressione arteriosa.

| Outcome | Mean Difference (R vs Control) | 95% Confidence Interval | p |
|---|-----------------------------------|----------------------------|--------|
| Exercise duration at trough levels of R | -31.899 seconds | 20.976 to 42.822 | <0.001 |
| Time to onset of angina at trough level of R | -37.976 seconds | 26.147 to 49.806 | <0.001 |
| Time to ST-segment depression at trough levels of R | -36.207 seconds | 24.269 to 48.145 | <0.001 |
| Exercise duration at peak levels of R | -33.451 seconds | 25.112 to 41.790 | <0.001 |
| Time to onset of angina at peak level of R | -35.940 seconds | 17.279 to 54.600 | <0.001 |
| Time to ST-segment depression at peak levels of R | -40.649 seconds | 19.919 to 61.378 | <0.001 |
| Weekly angina frequency | -0.687 episodes/week | -0.973 to -0.402 | <0.001 |
| Weekly nitroglycerin consumption | -0.534 times/week | -0.789 to -0.280 | <0.001 |
| Supine Systolic Blood Pressure | -0.647 mmHg | -1.431 to 0.0136 | 0.105 |
| Supine Diastolic Blood Pressure | 0.016 mmHg | -0.425 to 0.280 | 0.944 |
| Supine Heart Rate | -0.051 mmHg | -0.549 to 0.447 | 0.841 |
| Standing Systolic Blood Pressure | -1.553 mmHg | -2.363 to -0.743 | <0.001 |
| Standing Diastolic Blood Pressure | -0.404 mmHg | -0.862 to -0.055 | 0.084 |
| Standing Heart Rate | -0.162 mmHg | -0.697 to 0.374 | 0.555 |

R: Ranolazine

Table. Outcome Meta-analysis Results

O242**Platelet indices are not associated with occurrence of periprocedural myocardial infarction in patients undergoing percutaneous coronary angioplasty.**

Elisabetta Ricottini (a), Ilaria Cavallari (a), Giuseppe Patti (a), Fabio Mangiacapra (a), Vincenzo Vizzi (a), Antonio Cannatà (a), Rosetta Melfi (a), Annunziata Nusca (a), Marco Miglionico (a), Paolo Gallo (a), Andrea D'Ambrosio (a), Germano Di Sciascio (a)

(a) Department of Cardiovascular Sciences, Campus Bio-medico University of Rome

Background: Platelet indices such as platelet count, mean platelet volume (MPV), platelet distribution width (PDW) and MPV/P ratio have been proposed as markers of platelet activation; in particular MPV and MPV/P ratio have been also related to long term outcome in patients with coronary artery disease (CAD). No comprehensive data are available on the relationship between platelet indices and periprocedural outcome in patients undergoing percutaneous coronary intervention (PCI). At the same time, high on treatment platelet reactivity has been associated with increased incidence of periprocedural myocardial infarction (PMI) in PCI patients. Aim of this study was to investigate the correlation of platelet indices and platelet reactivity with occurrence of PMI in patients receiving PCI.

Methods: 502 consecutive patients treated with clopidogrel, undergoing PCI for various clinical syndromes had preprocedural measurement of platelet indices (platelet count, MPV, PDW and MPV/P ratio) and platelet reactivity; the latter was assessed by the point-of-care VerifyNow P2Y12 assay and expressed as P2Y12 reaction units (PRU). Primary end point was incidence of PMI (defined following the Third Universal Definition of Myocardial Infarction) according to tertiles of different platelet indices and platelet reactivity.

Results: Incidence of PMI in overall population was 6.6% (33 patients). Rates of PMI were not different among tertiles of platelet count (I tertile 6.0%, II tertile 7.1%, III tertile 6.5%; P=0.74). Similarly no difference in PMI incidence was observed in tertiles of MPV (I tertile 6.6%, II tertile 7.3%, III tertile 5.8%; P=0.86), PDW (I tertile 7.2%, II tertile 7.2%, III tertile 5.4%; P=0.74), MPV/P ratio (I tertile 6.6%, II tertile 6.0%, III tertile 7.1%; P=0.91). A significant difference in the occurrence of PMI was identified among PRU tertiles (I tertile 3 %, II tertile 5.4 %, III tertile 11.4 %; P=0.006). ; mean absolute PRU levels were significant higher in patients with PMI (262.4±66.7 vs 216.5±79.7;

P=0.001). No difference was observed in values of platelet indices between patients with and without PMI (platelet count $218.3 \pm 65.9 \times 10^3/\mu\text{l}$ vs $212.1 \pm 59.1 \times 10^3/\mu\text{l}$, P=0.56; MPV 10.63 ± 0.80 fL vs 10.77 ± 0.99 , P=0.43; PDW 12.92 ± 1.69 vs 13.27 ± 2.15 , P=0.36; MPV/P ratio 52.97 ± 15.90 vs 54.99 ± 17.46 , P=0.52).

Conclusion: This study showed no correlation between platelet indices and occurrence of PMI in patients undergoing PCI, confirming however that high on treatment platelet reactivity is associated with an increased incidence of PMI. Thus platelet indices alone are not able to identify patients at high risk of PMI, but use of a bedside assay for monitoring platelet reactivity remains an useful tool for periprocedural risk stratification.

O243

Impact Of Coronary Collaterals On Long Term Outcome In Patients Undergoing Primary Angioplasty For St-Elevation Myocardial Infarction

Oriana Sergnese (a), Carmine Biscione (a), Iside Stella Scarfò (a), Simona Aluigi (a), Giovanni Battista Forleo (a), Marco Di Luozzo (a), Fabrizio Clementi (a), Vincenzo Bernardo (a), Fabio Costantino Scirocco (a), Domenico Sergi (a), Francesco Romeo (a)

(a) *Department of Cardiology, University of Rome "Tor Vergata", Italy*

Background: In the last decades numerous studies demonstrated that the presence of coronary collateral flow have beneficial effect on the limitation of infarct size and the recovery of left ventricular function. The prognostic value of collateral circulation of the infarcted-related artery on long term clinical outcome in patient undergoing primary percutaneous coronary intervention (PCI) still remains controversial. We used our consecutive experience with primary angioplasty to examine the effect of collateral flow, assessed by the Rentrop Score, on clinical outcomes in patients undergoing primary angioplasty for acute myocardial infarction (MI).

Methods: 790 consecutive patients (483 m, 307 f, age 64.35 ± 13.70 years) underwent primary angioplasty for acute ST elevation myocardial infarction. Primary PCI was performed according to standard clinical Practice. Collateral flow to the infarct-related artery was graded according to the Rentrop classification: 38% with grade 0 (no visible filling of any collateral channel), 36% grade 1 (filling of the side branches of the infarct-related artery), 16% grade 2 (partial filling of the epicardial vessel of the infarct-related artery), and 10% grade 3 (complete collateral filling of the epicardial vessel). Patients were subject to a 2-year clinical follow-up (mean duration, 22 ± 16 months). The following clinical events were defined as endpoints: cardiac death, nonfatal reinfarction, and repeat revascularization percutaneous (PCI) or surgical (coronary artery bypass grafting). A combined endpoint (composite), defined as the occurrence of any endpoint (cardiac death or reinfarction or repeat revascularization) was also analyzed. The follow-up was performed prospectively.

Results: Our present study showed no relationship between the degree of collateral circulation and long-term prognosis in patients after acute MI. We didn't find a statistically significant correlation between Rentrop grade and peak cardiac enzyme elevation and diabetes mellitus. We could not find a significant impact of development of collateral circulation assessed by Rentrop grade on improvement of left ventricular ejection fraction after PCI, mortality and major adverse cardiovascular events. In our study, the presence of anterograde flow measured before the procedure according to the TIMI flow scale was inversely correlated with the development of coronary collaterals.

Conclusions: Coronary collateral circulation assessed with the angiographic Rentrop scale does not seem to play a protective role in the acute phase of MI and cannot serve as a predictor of better long-term clinical outcome in patients after STEMI treated with primary PCI.

FIBRILLAZIONE ATRIALE E STROKE

O244

Left atrial appendage closure followed by six weeks antithrombotic therapy – a prospective single center experience

Laura Perrotta (a, b), Stefano Bordignon (b), Britta Schulte-Hahn (b), Verena Urban (b), Daniela Dugo (c, b), Alexander Fürnkranz (b), Bernd Nowak (b), Boris Schmidt (b), KR Julian Chun (b)

(a) S.O.D. Aritmologia, Università degli Studi di Firenze, (b) Cardioangiologisches Centrum Bethanien, Markus Krankenhaus, Frankfurt am Main, Germany, (c) U.O. Elettrofisiologia e Cardioritmo, Dipartimento di Cardiologia, P.O. Ferrarotto, Catania

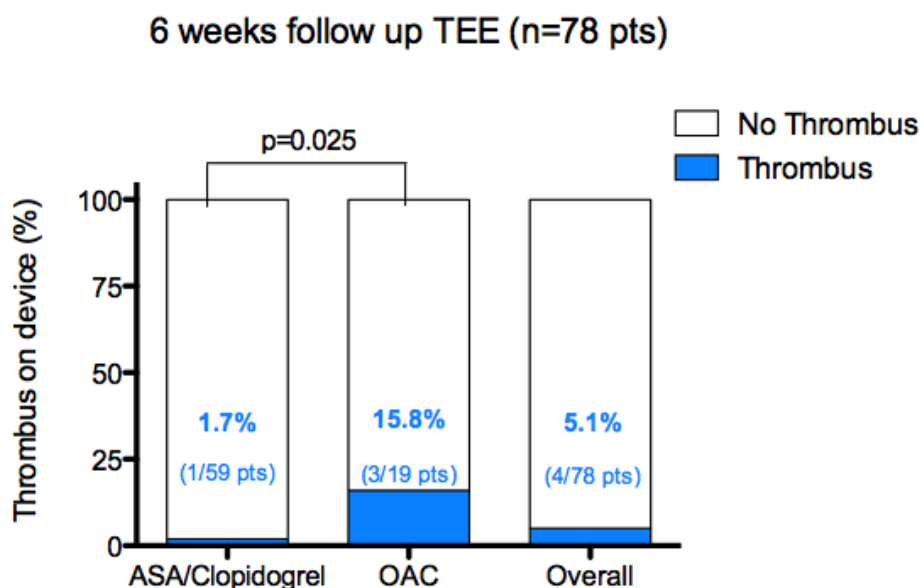
Background: Currently, two different LAA closure systems are available for stroke prevention in non-valvular atrial fibrillation (NVAF) but comparative data are lacking.

Objective: To prospectively compare procedural data and patient (pt) outcome for two contemporary LAA closure systems, followed by six weeks dual platelet inhibition (DPI).

Methods: NVAF pts, with high risk for stroke and contraindication or not willing to accept oral anticoagulation (OAC) were prospectively enrolled. Watchman™, Boston Scientific (group A) or Amplatzer Cardiac Plug™, St. Jude Medical devices (group B) were implanted. All pts received DPI or OAC for 6 weeks. After repeat TEE, switch to aspirin was performed in eligible pts.

Results: 80 pts were enrolled. There was no statistical difference in patient characteristics: CHA₂DS₂VASC: 4.1±1.5 vs. 4.5±1.8, HASBLED: 3.1±1.1 vs. 3.1±1.1, respectively. LAA closure was achieved in 78/80 (98%) pts (group A: 38/40, 95%, group B: 40/40, 100%), respectively. Procedural parameters were not different. Major procedural complications included air embolism and one delayed tamponade in each group. After 6 weeks one device dislodgment (group B) and four device related thrombi were detected (group A: n=3, group B n=1; See figure). Switch to aspirin was enabled in 94% (73/77 pts) after 6 weeks. During a median follow up of 364 days (Q1-Q3 283-539 days) no systemic embolism occurred, but 3 pts died (heart failure: n=2, bleeding: n=1).

Conclusions: Implantation of both LAA closure devices can be performed with high success rates in high-risk patients. Postprocedural 6 weeks antithrombotic therapy followed by aspirin appears to be a viable option.



O245

Qualità di vita e soddisfazione alla terapia anticoagulante dei pazienti italiani con fibrillazione atriale arruolati nel registro europeo prefer in af

Giuseppe Stabile (a), Assunta Iuliano (a), Pasquale Mollo (b), Duino Boncompagni (b), Livio Di Lecce (c), Fabio Romeo (c), Giulia Renda (d), Raffaele De Caterina (d)

(a) *Laboratorio di Elettrofisiologia, Clinica Mediterranea, Napoli*, (b) *Unità Operativa di Cardiologia, Ospedale F. Spaziani, Frosinone*, (c) *Direzione Medica, Daiichi-Sankyo Italia*, (d) *Istituto di Cardiologia, Università "G. D'Annunzio" c/o Ospedale SS. Annunziata, Chieti*

Razionale: La maggior parte dei pazienti italiani affetti da Fibrillazione Atriale (FA) sono sottoposti, per la prevenzione di eventi tromboembolici, a terapie croniche con farmaci antagonisti della vitamina K che necessitano di un monitoraggio continuo mediante test di laboratorio specifici (INR). Ad oggi sono poche le evidenze disponibili riguardanti la qualità di vita dei pazienti affetti da FA e la percezione che gli stessi pazienti hanno riguardo la terapia anticoagulante cronica che stanno assumendo e le procedure connesse.

Metodi: Nel registro PREFER in AF (The PREvention of thromboembolic events – European Registry in Atrial Fibrillation) sono stati arruolati, nel periodo compreso da Gennaio 2012 a Gennaio 2013, pazienti non selezionati affetti da FA nei seguenti paesi europei: Austria, Francia, Germania, Italia, Spagna, Svizzera e Regno Unito. Nel registro sono stati valutati, con appositi questionari validati e autosomministrati, la qualità di vita dei pazienti (EQ-5D) e la percezione da parte dei pazienti della terapia anticoagulante (PACT-Q2), in termini di aspettative e soddisfazione terapeutica. I dati di seguito riportati si riferiscono ai pazienti italiani e sono stati raccolti in occasione della visita basale dello studio.

Risultati: Nel Registro PREFER in AF sono stati arruolati 7243 pazienti in Europa, di cui 1888 (26%) in Italia, coinvolgendo 98 centri. Per quanto riguarda la qualità di vita (indagata con il questionario EQ-5D), il 55% dei pazienti italiani riferisce di non aver problemi nello svolgimento delle normali attività quotidiane, dato sovrapponibile a quello riscontrato negli altri paesi europei. Tuttavia solo il 37.7% dei pazienti italiani ha riferito di non sentirsi ansioso o depresso, rispetto ad una media europea del 53%. I risultati del questionario PACT-Q2 (compilato dal 58.4% dei pazienti italiani, n= 1103) hanno invece evidenziato interessanti differenze sulla percezione della terapia anticoagulante da parte dei pazienti italiani rispetto a quelli europei. Solo il 36% dei pazienti italiani (contro una media europea del 70.3%) non ritiene difficoltoso assumere il proprio trattamento anticoagulante. Solamente il 30.8% dei pazienti italiani (media europea: 57.8%) non si ritiene infastidito dall'assumere la propria terapia. Il 28.6% dei pazienti italiani (media europea: 57.7%) non ritiene problematico l'aggiustamento del dosaggio della terapia anticoagulante; il 30.2% (media europea: 65.7%) non ritiene affatto difficile pianificare il proprio tempo a causa della terapia anticoagulante. Solo il 21% dei pazienti italiani (media europea: 52.2%) non si ritiene infastidito dai controlli periodici richiesti dalla terapia, e soltanto il 25.7% (media europea: 51.1%) non ritiene difficoltoso dovere evitare alcuni cibi che possono interferire con la terapia anticoagulante orale.

Conclusioni: La valutazione della qualità di vita e, soprattutto, della percezione del trattamento assunto, espressa dai pazienti arruolati nel registro europeo PREFER in AF, ha evidenziato tra i pazienti italiani un alto livello di insoddisfazione e di difficoltà nella gestione della terapia anticoagulante, maggiore rispetto a quello osservato negli altri paesi europei.

Le possibili cause di queste differenze sono al momento di difficile interpretazione. I risultati del registro dopo 1 anno di follow-up potranno contribuire a chiarirle.

O246

Ischemia cerebrale silente in pazienti con fibrillazione atriale parossistica e persistente e in controlli in ritmo sinusale

Laura Corsinovi (a), Cristina Raimondo (a), Elisabetta Toso (a), Martina Pianelli (a), Matteo Anselmino (a), Domenico Caponi (b), Paolo Di Donna (b), Federico Cesarani (c), Fiorenzo Gaita (a), Marco Scaglione (b)

(a) *Divisione di Cardiologia, Azienda Ospedaliera Città della Salute e della Scienza, Torino, Università*, (b) *Reparto di Cardiologia, Ospedale C.Massaia, Asti*, (c) *Reparto di Radiologia, Ospedale C.Massaia, Asti*

Background: I pazienti con fibrillazione atriale (FA) presentano un rischio cinque volte superiore di eventi cerebrali sintomatici rispetto alla popolazione generale in ritmo sinusale (RS). La forma parossistica e persistente di questa aritmia vengono considerate avere un simile rischio tromboembolico. Pochi studi condotti su piccoli campioni hanno riportato una prevalenza di ischemia cerebrale silente (ICS) in pazienti affetti da FA che va dal 15% al 86%.

Scopo: Valutare la prevalenza ICS rilevata con risonanza cerebrale magnetica (RM) in pazienti con FA (sia parossistica sia persistente) rispetto a un gruppo di controllo con caratteristiche socio-demografiche e fattori di rischio simili in RS.

Metodi: Centottanta pazienti con FA (50% parossistici e 50% persistenti) e 90 controlli sono stati arruolati. Tutti i soggetti sono stati sottoposti a valutazione clinica, esame obiettivo neurologico e RM cerebrale.

Risultati: Almeno una ICS era presente in 80 (89%) pazienti con FA parossistica e in 83 (92%) pazienti con FA persistente (parossistica vs persistente; $p=0.59$) e in 41 (46%) controlli (FA parossistica vs controlli e FA persistente vs controlli; entrambe le $p<0.01$). Il numero medio di ICS era più alto nei pazienti affetti dalla forma persistente dell'aritmia rispetto a quella parossistica (41.1 ± 28.0 vs 33.2 ± 22.8 ; $p=0.04$), mentre i controlli presentavano numeri inferiori (12.0 ± 26.7 ; entrambe le $p<0.01$).

Conclusioni: I pazienti affetti da FA parossistica e persistente presentano una simile prevalenza di ICS che è superiore rispetto a controlli in RS. La forma persistente dell'aritmia correla con un più alto numero di ICS rispetto a quella parossistica.

O247

Initial experience using percutaneous left atrial appendage occluders. Clinical indications and follow-up

Fabrizio Guarracini (a, b), Patrizio Mazzone (b), Michele Opizzi (b), Silvio Romano (a), Carlo Ammendolea (b), Damiano Regazzoli (b), Alessandra Marzi (b), Gabriele Paglino (b), Francesco Melillo (b), Chiara Gardini (b), Maria Penco (a), Paolo Della Bella (b)

(a) *Cardiology Department, University of L'Aquila, Italy*, (b) *Arrhythmia Unit and Electrophysiology Laboratories, San Raffaele Hospital, Milano, Italy*

Purpose: Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and it is associated with an increased stroke risk, mainly due to cardiac embolism from the left atrial appendage (LAA). Interventional, percutaneous LAA closure may be considered in patients with a high stroke risk and contraindications for long term oral anticoagulation. In this study we report our experience with the LAA occluder WATCHMAN (Boston Scientific), Amplatzer Cardiac Plug device and Amplatzer AMULET device (St. Jude Medical).

Methods: A WATCHMAN device was implanted in 23 patients, an Amplatzer Cardiac Plug device in 14 patients and an Amplatzer AMULET device in 5 patients between August 2010 and May 2013. Clinical, procedural characteristics and follow up data were recorded in all patients.

Results: Mean age of the 42 patients (27, 66% males) was 69 ± 9 years old and mean left ventricle

ejection fraction was $50\pm 6\%$. 16 (38%) patients suffered from paroxysmal AF and 26 (72%) from long term persistent and chronic AF. Mean CHA₂DS₂-VASc and HAS-BLED scores were 3.58 ± 1.6 and 2.6 ± 1.25 , respectively. Main indications for LAA closure were gastrointestinal bleedings in 16 (40%) patients, intracranial hemorrhage in 5 (12%) patients and strokes despite VKA therapy in 12 (29%) patients. Successful LAA occlusion was performed in all patients. There were 2 periprocedural complications: 1 arterio-venous fistula requiring surgery, 1 mild pericardial effusion (no indication to drainage). No patient experienced device dislodgement, embolic events, stroke, major hemorrhages after a mean follow-up of 13 months.

Conclusions: Percutaneous LAA closure is a relatively feasible and safe procedure which can be performed by highly experienced operators to reduce stroke rate in patients with AF, high stroke risk, and contraindication to oral anticoagulants.

O248

Cancer as a risk factor for stroke in atrial fibrillation: a pharmacological-epidemiological study

Gentian Denas (a), Vittorio Pengo (a), Roberta Joppi (b), Elisa Cinconze (c), Luigi Mezzalana (b), Daniela Pase (b), Chiara Poggiani (b), Elisa Rossi (c), Seena Padayattil Jose (a), Paolo Prandoni (a)

(a) *University Hospital of Padua, Department of Cardiac, Thoracic and Vascular Sciences, Padua, Italy*, (b) *Pharmaceutical Department, Local Health Unit of Verona, Verona, Italy*, (c) *Health Care Systems Department CINECA – Interuniversity Consortium, Bologna, Italy*

Purpose: Pathophysiology of ischemic stroke in cancer patients has been mostly related to embolism other than that of cardiac origin. Stroke mechanisms in cancer patients may differ from those in patients without cancer, thus conventional anticoagulation might not always offer protection. We conducted this population-based cohort study, to test the hypothesis of whether stroke is more frequent in patients with atrial fibrillation (AF) despite long-term treatment with vitamin K antagonists (VKAs).

Methods: The ARNO database is a population-oriented database monitoring admissions to public and private hospitals (using ICD-9 codes) and out-of-hospital reimbursed drug prescriptions (using ATC codes). We extrapolated all individuals, aged 18 years and above, discharged with a primary or secondary diagnosis of nonvalvular AF in 2007, identifying those receiving VKAs during a 2 year follow-up. The rate of stroke and cancer was assessed.

Results: In 2007, of the 2862264 screened subjects 10368 were discharged from the hospital with diagnosis of nonvalvular AF (mean age 76 ± 11 years, 50.4% female). Of these, 5285 (51%, mean age 74 ± 9 years, 48% female) were treated with VKAs during follow-up, the rest did not receive anticoagulation. Stroke incidence among anticoagulated patients was 3.1% (165/5285) as opposed to 4.1% (208/5073) among the non-anticoagulated group. Amongst the anticoagulated patients, cancer was diagnosed during follow-up on 9.1% (15/165) of the patients with stroke as compared to 9.6% (490/5120) of the patients without stroke. There was no statistically significant difference in the rate of cancer in patients experiencing stroke during follow up (15/165, 9.1%) as compared to those who did not (490/5120 = 9.6%).

Conclusions: Cancer does not seem to be an adjunctive risk factor for stroke in patients with atrial fibrillation, treated with long-term VKAs.

O249

Fibrillazione atriale e implementazione della terapia anticoagulante nella vita reale: quali orientamenti, quali barriere?

Paolo Cimaglia (a), Igor Diemberger (a), Andrea Mazzotti (a), Christian Gagliardi (a), Beatrice Gardini (a), Jacopo Cristallini (a), Giuseppe Contarino (a), Matteo Ziacchi (a), Cristian Martignani (a), Mauro Biffi (a), Angelo Branzi (a), Giuseppe Boriani (a)

(a) Istituto di Cardiologia Università di Bologna

Obiettivi: analizzare l'impiego cronico della terapia anticoagulante (AC) nei pazienti affetti da fibrillazione atriale (FA) e identificare i predittori della sua introduzione nei pazienti non in terapia.

Materiali e metodi: tutti i pazienti affetti da FA che si sono recati presso l'Istituto di Cardiologia o le strutture ad esso afferenti di un Policlinico universitario da luglio 2012 a marzo 2013 sono stati consecutivamente considerati per l'inclusione in un registro prospettico osservazionale. Per ogni paziente sono stati raccolti dati riguardo l'anamnesi, le caratteristiche fisiche, le indagini strumentali (ecocardiogramma, ECG, Holter) e la terapia prima e dopo l'accesso.

Risultati: nello studio sono stati inclusi 520 pazienti, con un'età media di 72 ± 12 anni, più frequentemente maschi (61,7%). Le patologie principali erano: FA (39,7%), scompenso cardiaco (22,7%), cardiopatia valvolare (19,1%), cardiopatia ischemica (17,3%), cardiomiopatia ipertrofica (1,2%). La tabella 1 evidenzia il confronto fra la terapia antitrombotica prima della presentazione e quella in atto dopo l'accesso. La percentuale di pazienti in terapia AC è incrementata da 65,4% a 82,9% (85,5% nei pazienti con valore superiore a 1 dello score CHA₂DS₂-VASc [Congestive heart failure, Hypertension, Age >74 years, Diabetes, Stroke, Vascular disease, Age 65-74, Sex category]). La successiva analisi di regressione logistica multivariata dei parametri raccolti ha evidenziato come le variabili (esprese con OR: 95%IC; p value) correlate all'introduzione della terapia AC nei pazienti vergini alla

presentazione fossero: (a) CHA₂DS₂-VASc score (OR 1,91: 1,46-2,49; p<0,001) (b) HAS-BLED [Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile INR, Elderly, Drugs/alcohol concomitantly] score (OR 0,23: 0,13-0,40; p<0,001) (c) profilassi con farmaci anti-aritmici (OR 0,40: 0,17-0,96; p=0,04). Restringendo l'analisi alla sottopopolazione con forte indicazione all'inizio della terapia AC (CHA₂DS₂-VASc > 1) si evidenziava come gli unici parametri indipendentemente associati alla nuova prescrizione di terapia AC fossero l'età (OR 0,94: 0,91-0,98; p=0,003) e ancora la profilassi con farmaci anti-aritmici (OR 0,30: 0,12-0,72; p=0,008).

Conclusioni: Nonostante l'evidenza a supporto della terapia AC nella FA, la sua implementazione appare tuttora insufficiente. Ciò è condizionato, al contrario dell'evidenza, dal timore di eventi emorragici nei soggetti anziani e dal convincimento dell'efficacia della profilassi anti-aritmica nel prevenire gli eventi embolici. È auspicabile che l'introduzione dei nuovi anticoagulanti orali possa estendere l'impiego della terapia AC alla luce del profilo rischio/beneficio delle nuove molecole.

TABELLA 1. Regime antitrombotico (n° di pazienti e % sul totale dei pazienti)

| | | Terapia AA/AC dopo l'accesso | | | | | Totale | |
|---|--------------------|------------------------------|---------------|-----------------|----------------|---------------|--------------|--------------------|
| | | Nessuna | AA | AA ² | AC | AC+AA | | AC+AA ² |
| Terapia AA/AC prima della presentazione | Nessuna | 10 (1,9%) | 11 (2,1%) | 4 (0,8%) | 32 (6,2%) | 5 (1,0%) | 0 (0,0%) | 62 (11,9%) |
| | AA | 0 (0,0%) | 49 (9,4%) | 5 (1,0%) | 35 (6,7%) | 15 (2,9%) | 4 (0,8%) | 108 (20,8%) |
| | AA ² | 0 (0,0%) | 0 (0,0%) | 7 (1,3%) | 0 (0,0%) | 1 (0,2%) | 2 (0,4%) | 10 (1,9%) |
| | AC | 1 (0,2%) | 1 (0,2%) | 0 (0,0%) | 250 (48,1%) | 10 (1,9%) | 11 (2,1%) | 273 (52,5%) |
| | AC+AA | 0 (0,0%) | 1 (0,2%) | 0 (0,0%) | 8 (1,5%) | 52 (10,0%) | 2 (0,4%) | 63 (12,1%) |
| | AC+AA ² | 0 (0,0%) | 0 (0,0%) | 0 (0,0%) | 0 (0,0%) | 1 (0,2%) | 3 (0,6%) | 4 (0,8%) |
| Totale | | 11 (2,1%) | 62 (11,9%) | 16 (3,1%) | 325 (62,5%) | 84 (16,2%) | 22 (4,2%) | 520 (100%) |

AA = antiaggregante; AA² = doppio antiaggregante; AC = anticoagulante.

IL TRATTAMENTO PERCUTANEO DELL'INSUFFICIENZA MITRALICA: MITRACLIP

O250

Impatto dell'impianto di Mitraclip nei pazienti con insufficienza mitralica severa portatori di device biventricolari

Marco Belotti Cassa (a), Antonio Curnis (a), Alessandro Lipari (a), Manuel Cerini (a), Francesca Vassanelli (a), Elisa Locantore (a), Francesca Salghetti (a), Mohamed Elmaghawry (b), Abdallah Raweh (c), Federica Etori (a), Luca Bontempi (a)

(a) Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia, (b) Aswan Heart Centre, Aswan - Egypt, (c) Faculty of Medical Science, Ludes University, Lugano - Svizzera

Background: L'insufficienza mitralica severa nei pazienti (pz) sottoposti a resincronizzazione cardiaca (CRT) può, in alcuni pazienti, determinare una riduzione della risposta alla CRT. La riparazione percutanea della valvola tramite Mitraclip può portare ad un miglioramento della sintomatologia e della qualità di vita, ed è pertanto da considerarsi come ulteriore opzione terapeutica nei pz non-responder.

Scopo: valutare l'efficacia della riparazione percutanea mediante MitraClip nel migliorare il reverse remodelling e i parametri emodinamici nei pazienti affetti da scompenso cardiaco (SC) già sottoposti a CRT.

Metodi: Dall'Ottobre 2010 al Febbraio 2013 presso il Laboratorio di Emodinamica, previo screening ecocardiografico, 34 pazienti, affetti da insufficienza mitralica severa funzionale, sono stati sottoposti a procedura di riparazione valvolare tramite Mitraclip. Un sottogruppo di 11 pz era già stato sottoposto ad impianto di CRT e presentava le seguenti caratteristiche: sesso 6 maschi / 5 femmine; età: 70 ± 8 aa. Il 73% era affetto da SC con insufficienza mitralica severa funzionale su base ischemica e il 27% su base idiopatica. Il 73% (8) era in classe NYHA III e il 27% (3) in classe NYHA IV. In tutti i pazienti trattati con Mitraclip la frazione di eiezione (FE) basale era $\leq 30\%$ (media: $26,8 \pm 3,2\%$). Tutti i pazienti erano in terapia medica ottimizzata. Dopo la procedura di posizionamento di MitraClip e successivamente al 3°, 6°, 12° mese dall'intervento, tutti i pz sono stati sottoposti a rivalutazione clinica ed ecocardiografica con quantificazione dei seguenti parametri: classe NYHA, dosaggio del diuretico giornaliero assunto, grado dell'IM residua (da lieve 1+ a severa 4+), PAPs, diametri e volumi ventricolari (EDD; ESD; EDV; ESV), e frazione di eiezione (FE).

Risultati: Tutte le procedure di impianto percutaneo di MitraClip (34) sono state portate a termine con successo. Al follow up a 3-6-12 mesi dalla procedura, la classe funzionale NYHA è migliorata nel periodo periprocedurale e si mantiene stabile nel tempo (8 pazienti NYHA III e 3 pazienti NYHA IV al momento della procedura vs 9 pazienti NYHA II e 2 pazienti NYHA I al follow-up del 3° mese). Al momento dello screening il 91% dei pazienti (10) presentava IM di grado severo e il 7% (1) di grado medio, al follow-up a 90 giorni il 45% (5) mostrava IM residua di grado moderato e il 55% (6) di grado lieve. I valori di EDD si sono ridotti da $72,8 \pm 2,1$ mm a $70,2 \pm 1,4$ mm ($p = ns$) ed i valori di EDV da $220,3 \pm 14$ a $212,2 \pm 10$ ml ($p = ns$). La PAPs si è ridotta da $48,3 \pm 3$ a $37,5 \pm 2,5$ mmHg ($p = ns$). L'FE, infine, è passata da $26,8 \pm 3,2$ a $28 \pm 2,2\%$ ($p = ns$). Si è inoltre verificata una riduzione, non significativa, del dosaggio medio giornaliero del diuretico assunto.

Conclusioni: Sulla base dei nostri dati il trattamento percutaneo dell'IM severa su base funzionale nei pazienti non responder alla CRT si è dimostrato sicuro ed affidabile, portando ad un miglioramento clinico (riduzione classe NYHA) e ad una riduzione delle pressioni polmonari senza tuttavia apportare una significativa modificazione dei parametri di funzionalità ventricolare sinistra.

O251

**Can the euroscore predict the right ventricular systolic function after mitralclip implantation?
Preliminary data**

Marco Marzullo (a), Hannes Alessandrini (a), Christian Frerker (a), Thomas Thielsen (a), Peter Wohlmuth (b), Karl-Heinz Kuck (a), Ulrich Schäfer (a), Felix Kreidel (a)

(a) Division of Cardiology, Asklepios Klinik St. Georg, Hamburg, Germany, (b) Asklepios ProResearch, Hamburg, Germany

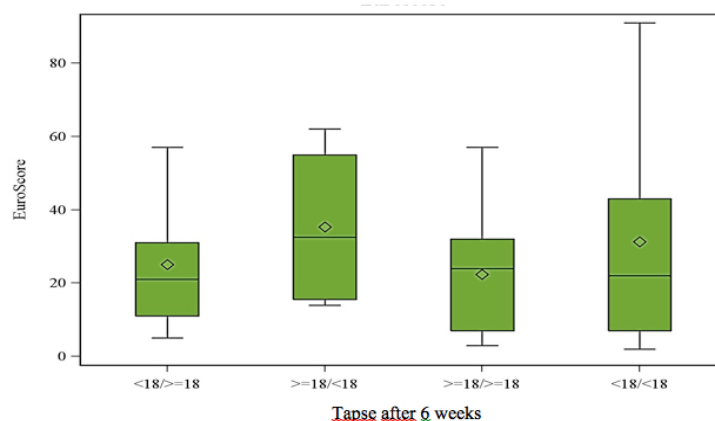
Background: The European System for Cardiac Operative Risk Evaluation (EuroSCORE) predicts the mortality associated with cardiac surgery. Due to the fact that this score is based on important clinical parameters, we aimed to test if this score, calculated before MitraClip® implantation (MCI), can predict the right ventricular systolic function (RVS), 6 weeks (6 W) after MCI.

Methods: Out of a total population of 323 patients (pts) with severe mitral regurgitation (MR) who underwent MCI, we retrospectively enrolled those pts for whom right heart transthoracic echocardiography and sufficient follow-up data were available. The RVS was assessed by TAPSE which was defined as reduced when <18 mm. Improvement of right ventricular function was defined by TAPSE > 18 mm.

Results: In 55 pts (22 female) with a mean age of 74 +/- 11 it was possible to measure TAPSE and MR, before and 6 W after MCI. Comparing the initial TAPSE to that measured after 6 W, we have found 4 Group of pts with different patterns of TAPSE development: Group 1 (n: 9), that normalizes its initially impaired TAPSE (pre: 13 [11, 15] mm; post: 19 [18, 20] mm); Group 2 (n: 4), that decreases its initially normal TAPSE (pre: 20 [19, 22] mm; post: 15 [14, 15] mm); Group 3 (n: 17) with permanently normal TAPSE (pre: 20 [18, 22] mm; post: 20 [19, 22] mm) and Group 4 (n: 25) with permanently pathological values of TAPSE (pre: 11 [9, 13] mm; post: 13 [12, 16] mm) (p < 0.05). Between the 4 groups there was no difference in MR grade reduction (Group 1: 1 [0.5, 1]; Group 2: 1.5 [1, 2]; Group 3: 1 [0.5, 1.5]; Group 4: 1 [0.5, 1.5]; p: 0.83) and EuroSCORE values (Group 1: 21 [11, 31]; Group 2: 33 [16, 55]; Group 3: 24 [7, 32]; Group 4: 22 [7, 43]; p: 0.76). Although not statistically significant, Group 2 showed to have a higher mean EuroSCORE than all other groups (Graphic).

Conclusion: This preliminary study shows that even if the EuroSCORE does not predict RVS function after MCI, there seems to be tendency that very high risk patients worsen their initially normal TAPSE after the procedure.

Graphic:



O252

Percutaneous mitral valve repair with the mitraclip® system in patients already treated with mitraclip

Margherita Ministeri (a), Salvatore Scandura (a), Carmelo Grasso (a), Sarah Mangiafico (a), Anna Maria Pistrutto (a), Marta Chiarandà (a), Fabio Di Pasqua (a), Giuseppe Ronsivalle (a), Sebastiano Immè (a), Andrea Arcidiacono (a), Stefano Cannata (a), Corrado Tamburino (a)

(a) *Cardiovascular Department, Ferrarotto Hospital, Catania, Italy*

Background and aim of the study: Percutaneous mitral valve repair with the MitraClip® System (Abbott Vascular, Abbott Park, IL, USA) is an emerging alternative of treatment in patients with severe mitral regurgitation (MR) at high risk for conventional surgical therapy. We report a single center experience about the feasibility and efficacy of this novel procedure in patients with prior MitraClip implantation and severe MR recurrence.

Materials and methods: From October 2008 to February 2013, 136 consecutive patients have undergone mitral valve repair with the MitraClip® System in our Department. Because of worsened clinical conditions and recurrence of $\geq 3+$ MR at follow-up, five of them (age 72 ± 9 years old, male 40%, EuroSCORE II ($11 \pm 6\%$), STS risk score for mortality $10 \pm 3\%$, STS risk score for morbidity or mortality $50 \pm 11\%$) have undergone a second procedure of MitraClip implant (REDO). Four patients (80%) had suffered from functional mitral valve disease and one patient (20%) from degenerative valvular disease. In selecting the patients for the procedure, TTE and TEE played a major role. The feasibility of the implant was assessed by considering the position of the previously implanted clip(s), the shape of the two orifices, the origin, the direction and the degree of the regurgitant jet(s), deciding in advance the position of the future clip(s), and finally assessing the mean transvalvular gradient and the mitral valve area [anatomical and by PHT], excluding the presence of mitral stenosis.

Results: The REDO was performed after a mean of 10 ± 8 months from the first procedure. Two patients were re-treated within one month from the first procedure, and these cases we would like to underline, because the final degree of mitral regurgitation at the end of the first procedure was $\leq 2+$, in stable hemodynamic conditions. MR recurrence is usually due to progressive left ventricle and mitral annulus dilation, although in these cases it could be due to mechanisms of leaflets' progressive stretching. One clip was implanted in 3 patients (60%), while 2 patients (40%) were treated with two clips. Mean anesthesia time was 165 ± 28 minutes; mean device time, defined as the time from guide insertion until delivery catheter removal, was 81 ± 24 minutes. For 4 patients (80%), a significant MR reduction (≤ 2) was observed at the end of the procedure and at discharge, in the absence of both significant mitral stenosis and intraprocedural complications. The fifth patient, who already had pericardial effusion at the beginning of the procedure, experienced cardiac tamponade during the implant. Pericardiocentesis was performed, but the puncture of a coronary caused the patient to be immediately transferred to Cardiac Surgery. She died during her hospital stay in ICU, two days after surgery. Another patient died for acute kidney injury and right heart failure 30 days after the REDO. A mean follow-up of 150 ± 54 days is available for the remaining three patients, who are in the lowest NYHA functional classes (NYHA II) and present a low degree of MR ($\leq 2+$).

Conclusions: In our experience, a REDO procedure of percutaneous mitral valve repair with the MitraClip System is feasible and effective, but a complete echocardiographic assessment has to be previously performed. A higher number of REDO procedures is essential to confirm its real usefulness, effectiveness and feasibility.

O253

La funzione ventricolare sinistra predice il miglioramento della funzione sistolica ventricolare destra dopo l'impianto del mitraclip

Marco Marzullo (a), Hannes Alessandrini (a), Christian Frerker (a), Thomas Thielsen (a), Peter Wohlmuth (b), Karl-Heinz Kuck (a), Ulrich Schäfer (a), Felix Kreidel (a)

(a) Division of Cardiology, Asklepios Klinik St. Georg, Hamburg, Germany, (b) Asklepios ProResearch, Hamburg, Germany

Background: Una compromessa funzione sistolica ventricolare destra (FSVD) è rilevante dal punto di vista prognostico per i pazienti (pz) con insufficienza mitralica (IM) severa. Questo studio ha lo scopo di verificare se la funzione sisto-diastolica ventricolare sinistra, valutata mediante ecocardiografia transtoracica bidimensionale, eseguita prima dell'impianto del MitraClip® (IMC), sia in grado di prevedere la normalizzazione di una iniziale ridotta FSVD.

Metodi: Considerando una popolazione totale di 323 pz, che a causa di una IM grave erano stati sottoposti ad IMC, abbiamo retrospettivamente studiato 121 pz consecutivi, per i quali erano disponibili i dati ecocardiografici (casi 155-276). Il criterio di inclusione per l'analisi è stato quello di considerare pz con una iniziale funzione sistolica ventricolare destra compromessa (TAPSE <18 mm). Il grado dell'IM e il TAPSE sono stati valutati 6 settimane e 6 mesi dopo la procedura. E' stata considerata migliorata la FSVD, quando il TAPSE era > 18 mm. La funzione sistolica (LVEF) e diastolica (E/E' Ratio) del ventricolo sinistro sono stati testati come predittori di miglioramento della FSVD (Wilcoxon-Test).

Risultati: 39 pazienti, di cui 12 di sesso femminile e con età media di 74 ± 11 anni, presentavano un iniziale TAPSE ridotto. 6 settimane dopo l'IMC, abbiamo riscontrato un TAPSE normalizzato in 12 pz (31%, Gruppo 1, TAPSE: 19 [18, 20] mm), mentre in 27 pz (69%) il TAPSE continuava ad essere patologicamente depresso (Gruppo 2, TAPSE: 13 [12, 16] mm) ($p < 0.05$). I pz del Gruppo 1 mostravano una LVEF significativamente più alta (59 [49, 61]% vs 27 [22, 33]%, Fig. 1) e anche un E/E' Ratio significativamente più basso ($E/E' > 12$: 0% vs 96%) rispetto ai pz del Gruppo 2 ($p < 0.05$). Non c'era, invece, alcuna differenza statistica (p : 0.64) per quanto riguarda la riduzione dell'IM tra i due gruppi (Gruppo 1: 1 [0.5, 1]; Gruppo 2: 1 [0.5, 2]). I risultati dopo 6 mesi (31% dei pz dei 39) non differivano da quelli ottenuti dopo 6 settimane (Fig. 2).

Conclusioni: Il miglioramento della funzione sistolica del ventricolo destro dopo l'impianto del MitraClip® è molto più probabile nei pazienti senza grave disfunzione ventricolare sinistra.

Fig. 1:

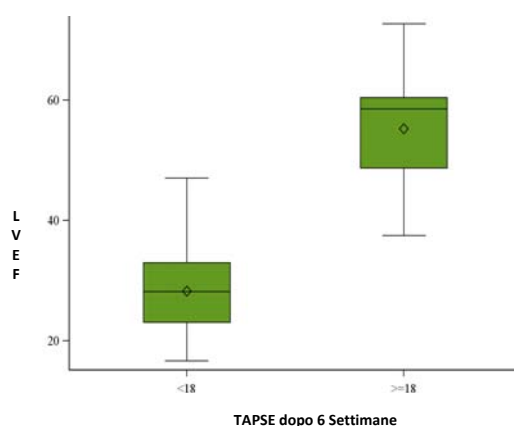
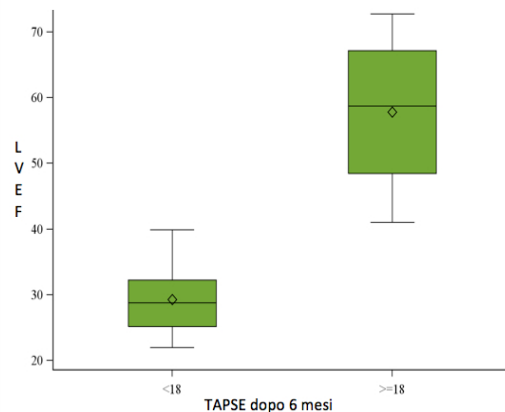


Fig. 2:



O254

Mitraclip implantation for severe mitral regurgitation in patients previously treated with surgical mitral valve repair – feasibility and in-hospital outcomes

Yohei Ohno (a), Carmelo Grasso (a), Guilherme F. Attizzani (a), Stefano Cannata (a), Sebastiano Immè (a), Marco Barbanti (a), Anna M. Pistritto (a), Sarah Mangiafico (a), Salvo Scandura (a), Davide Capodanno (a), Piera Capranzano (a), Corrado Tamburino (a)

(a) *Division of Cardiology, Ferrarotto Hospital, University of Catania*

Aims: Percutaneous mitral valve repair (PMVR) using MitraClip (MC) for severe MR has shown favourable outcomes. Nonetheless, evidence is lacking regarding the implantation of MC in patients previously treated with surgical mitral valve repair (SMVR). The aim of this study was to evaluate the feasibility and in-hospital outcomes of PMVR with MC in patients with severe MR who had previously undergone SMVR.

Methods: A total of 144 patients with moderate to severe (3+) or severe (4+) MR underwent PMVR with MC from August 2008 to April 2013 at Ferrarotto Hospital as part of the ongoing GRASP registry. Acute device success was defined as residual $MR \leq 2+$. The primary safety endpoint was the rate of MACCE, while primary efficacy endpoints were freedom from death, surgery for mitral valve dysfunction, or $grade \geq 3+$ MR during hospital stay. Herein, we report the outcomes of PMVR with MC in patients previously treated with SMVR.

Results: During the study period, 6 patients with previous SMVR and functional MR underwent MC implantation (median interval between procedures 5 years). Compared with the overall population, LVEF was equivalent (37 ± 7 vs. 38 ± 13 , $p=0.32$), whereas mean age (75 ± 3 vs. 72 ± 10 , $p<0.001$) and logistic EuroSCORE (20 ± 12 vs. 12 ± 14 , $p<0.001$) were higher. Acute device success was observed in all patients with the implantation of a single MC and no significant differences were revealed in device implantation time compared with the overall population (57.5 min vs. 58 min, respectively, $p=0.48$). Acute results after MC implantation demonstrate significant reduction in MR severity compared with baseline (0.5 ± 0.6 vs. 3.3 ± 0.8 , respectively, $p<0.001$) and no surgical mitral valve repair was required. One patient in whom PMVR was performed in the acute phase (i.e., 6 days after SMVR) died of multi-organ failure during hospital stay. Therefore, MACCE occurred in 1 patient during the hospital stay, while freedom from death, surgery for mitral valve dysfunction, or $grade \geq 3+$ MR was 83.3%.

Conclusions: In conclusion, PMVR with MC for patients with previous SMVR was shown to be feasible, safe, and effective in this small subset of patients. Long term follow-up as well as validation of our findings in larger populations are warranted.

O255

Percutaneous mitral edge-to-edge repair with the mitraclip system in elderly patients.

Marta Chiarandà (a), Salvatore Scandura (a), Carmelo Grasso (a), Margherita Ministeri (a), Sebastiano Immè (a), Sarah Mangiafico (a), Anna Maria Pistritto (a), Fabio Dipasqua (a), Andrea Arcidiacono (a), Davide Capodanno (a), Corrado Tamburino (a)

(a) *Divisione di Cardiologia, Ospedale Ferrarotto, Università di Catania.*

Background: Mitral regurgitation (MR) is the second most common valve disease requiring surgical intervention in Europe with a dismal prognosis if left untreated and its prevalence also increases progressively with age. Surgical valve repair or replacement is the treatment of choice for severe MR; nevertheless the indications for surgical intervention for MR in the elderly remain embroiled in controversy. Transcatheter mitral valve repair with the MitraClip System (Abbott, Abbott Park, IL, USA) has been recently indicated as a therapeutic alternative for patients with high surgical risk, frailty, associated comorbidities, or any contraindication to extracorporeal circulation.

Methods: From October 2008 to May 2013, 145 patients (age $72,13 \pm 10,66$ years, male 68%) with severe functional and degenerative MR were treated in our Institute with the MitraClip System. Among these, we treated 29 consecutive elderly patients, defined as subjects with ≥ 80 years old. In particular, 18 patients presented with functional disease and 11 patients with organic or degenerative MR. For the entire cohort, logistic EuroSCORE was $21 \pm 16,3$. Pre-interventional patients screening included trans-thoracic and trans-esophageal echocardiography for diagnosis confirmation and assessment of the anatomic parameters required for the procedure. According to echocardiographic and clinical data and together with heart surgeon, anesthetist and cardiologist we decided to treat the patient with MitraClip System. All the procedures were performed in the standard cardiac catheterization laboratory under general anesthesia with echocardiography and fluoroscopic guidance.

Results: Acute procedural success was observed in all patients (100%). A significant MR reduction $\leq 2+$ was observed after the procedure and at discharge. At 12 months follow-up 94% of patients had MR $\leq 2+$, while 24% of these patients showed MR $\leq 1+$. Two patients showed a worsening of mitral regurgitation from moderate to severe at 12 months of follow-up. New York Heart Association (NYHA) functional class changed from 2.9 ± 0.6 at baseline to 2.0 ± 0.7 ($p < 0.0001$) at discharge. Further improvement was observed after 12 months to mean NYHA class of 1.5 ± 0.5 . At 12-month follow-up three patients died for bronchopneumonia and respiratory failure, while cardiac deaths were not registered.

Conclusions: Percutaneous mitral valve repair with the MitraClip System is an effective therapeutic alternative in the elderly patients, with a prohibitive surgical risk, to favor symptomatic benefit over perioperative risk, and also improve short and mid-term outcome with regard to morbidity and mortality.

HIGHLIGHTS GIOVANI RICERCATORI – LAVORI INEDITI – SESSIONE 2

O256

Reprogramming epigenetic changes blunts p66Shc-induced vascular dysfunction in experimental and human obesity: insights for mechanisms-based strategies

Francesco Paneni (a), Giuliana Capretti (a), Sarah Costantino (b), Agostino Virdis (c), Sergio Chiandotto (a), Bianca Rocca (d), Thomas Luscher (b), Stefano Taddei (c), Massimo Volpe (a), Francesco Cosentino (a)

(a) Cardiology, Department of Clinical and Molecular Medicine, University of Rome "Sapienza", (b) Cardiovascular Research, Institute of Physiology, University of Zurich-Irchel, (c) Department of Clinical and Experimental Medicine, University of Pisa, Italy, (d) Department of Pharmacology, Catholic University, Rome, Italy

Introduction: Epigenetic signatures may represent key modulators of oxidative stress in patients with obesity. The mitochondrial adaptor p66^{Shc} is a major source of reactive oxygen species (ROS) in the vasculature. The present study was designed to investigate whether epigenetic regulation of p66^{Shc} mediates vascular dysfunction in human and experimental obesity.

Methods: Visceral fat arteries (VFA) were isolated from 10 obese and 10 age-matched healthy subjects. To characterize the role of p66^{Shc}, genetically obese mice (leptin deficient, $Lep^{Ob/Ob}p66^{WT}$) were crossed with $p66^{KO}$ to generate double-mutant mice ($Lep^{Ob/Ob}p66^{KO}$). Organ chamber experiments were performed to assess endothelium-dependent relaxations to acetylcholine (ACh, 10^{-9} - 10^{-4} mol/L). Mitochondrial superoxide anion (O_2^-) was assessed by ESR spectroscopy. mRNA and protein expression were determined by real-time PCR and immunoblotting. Chromatin immunoprecipitation (ChIP) was performed to investigate epigenetic modifications on p66^{Shc} promoter.

Results: Maximal endothelium-dependent relaxation was impaired in VFA from obese as compared with controls ($64.9\% \pm 4.8$ vs 93 ± 2.9 , $p < 0.01$). p66^{Shc} expression was increased in obese vessels (AU, 1.5 ± 0.3 vs 0.7 ± 0.2 , $p < 0.01$) and correlated with mitochondrial oxidative stress ($r = 0.76$, $p < 0.01$) and endothelial dysfunction ($r = -0.47$, $p < 0.01$). Demethylation and acetylation at lysine 9 of histone 3 (H3K9) were the main epigenetic changes found on p66^{Shc} promoter of obese subjects. Interestingly, H3K9 methyl-writing and acetyl-erasing enzymes SUV39H1 and SRC-1 were dysregulated in these vessels. Consistently, *Lep^{Ob/Ob}p66^{KO}* were protected against endothelial dysfunction and mitochondrial oxidative stress as compared with *Lep^{Ob/Ob}p66^{WT}*. Overexpression of SUV39H1 and knockdown of SRC-1 abolished p66^{Shc} upregulation and ROS generation in endothelial cells isolated from *Lep^{Ob/Ob}p66^{WT}*.

Conclusions: Reversible epigenetic signatures on p66Shc promoter drive obesity-induced vascular disease. Reprogramming these modifications may attenuate vascular damage in obese individuals.

O257

An analog of glyburide inhibits the cryopyrin inflammasome without affecting the glucose levels

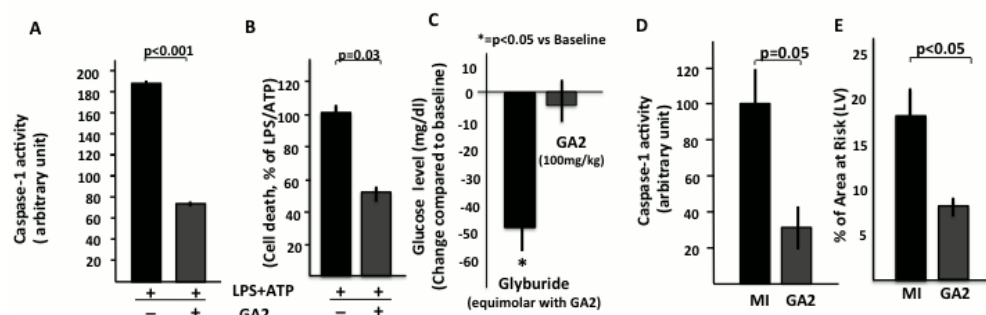
Carlo Marchetti (a, b), Nicla Tranchida (a), Eleonora Mezzaroma (a), Jeremy Chojnacki (a), Massimo Federici (b), Benjamin Van Tassel (a), Zhang Shijun (a), Antonio Abbate (a), Stefano Toldo (a)

(a) Virginia Commonwealth University, (b) Università di Tor Vergata

Background: The formation of the cryopyrin inflammasome in the heart during AMI amplifies the inflammatory response initiated by tissue injury and mediates further cardiac damage. Glyburide, a common anti-diabetic drug, increases the insulin release from the pancreatic beta cells. Recently has been shown that glyburide has inhibitory activity of cryopyrin *in vitro*. However, the use of glyburide as a cryopyrin inhibitor *in vivo* would require very high doses beyond those used in diabetes, which are associated with lethal hypoglycemia. The aim of this study was to measure the effects of a glyburide analogue, free of the cyclohexylurea moiety involved in insulin release, on the cryopyrin inflammasome.

Methods and Results: We synthesized a glyburide analogue (GA) that displayed no effect on glucose metabolism. HL-1 cardiomyocytes were treated with LPS (25 ng/ml) for 2 hours followed by ATP (5 mM) for 1 hour to induce the formation of the cryopyrin inflammasome as measured by increased caspase-1 activity and cell death. These effects were prevented by GA (Figure). GA was well tolerated and had no effects *in vivo* on the glucose levels of the mouse (Figure). Zymosan A (30mg/kg) induces peritonitis mediated by the cryopyrin inflammasome, and pre-treatment with GA (5, 20 and 100 mg/kg) limited the degree of leukocyte infiltration in the peritoneal cavity in a dose-dependent manner (all $p < 0.05$). Finally, treatment with GA (100 mg/kg) significantly inhibited the inflammasome (caspase-1 activity) in the heart and reduced infarct size in a murine model of ischemia (30 min) and reperfusion (24 hours) (Figure).

Conclusions: A newly designed glyburide analog (GA) inhibits formation of the cryopyrin inflammasome in cardiomyocytes and limits the infarct size following myocardial ischemia/reperfusion in the mouse, without affecting glucose metabolism.



O258

Mortalità e morbilità cardiovascolare nel “follow-up” a lungo termine di pazienti adulti con malattia di Ebstein

Giada Oliviero (a), Gabriele Egidy Assenza (a, b, c), Anne Marie Valente (b, c), Tal Geva (b), Francesca Romana Pulchinotta (b), Stephen Sanders (b), Camillo Autore (a), Frank Cecchin (b), Massimo Volpe (a, d), Michael Landzberg (b, c)

(a) *Sapienza Università di Roma” Medical School, Roma, Italy*, (b) *Department of Cardiology Boston Children’s Hospital, Boston, MA, USA*, (c) *Division of Cardiology, Department of Medicine, Brigham and Women’s Hospital, Boston, MA, USA*, (d) *Neuromed IRCCS, Pozzilli, Italy*

Introduzione: L’anomalia di Ebstein è una rara anomalia congenita che coinvolge elettivamente la valvola tricuspide ed il miocardio ventricolare destro. La malattia è caratterizzata da una marcata eterogeneità clinica con forme gravi che richiedono correzione chirurgica neonatale e forme lievi che decorrono asintomatiche. La maggior parte degli studi ha valutato l’impatto della correzione chirurgica sulla storia naturale della malattia, arruolando per lo più pazienti in età pediatrica. Il decorso clinico della malattia in pazienti adulti con e senza storia di correzione della valvulopatia non è definito

Scopo: Analizzare il decorso clinico della malattia di Ebstein in pazienti adulti.

Metodi: In questo studio retrospettivo di coorte, sono stati arruolati cento-tre pazienti adulti (oltre i 18 anni di età) affetti da malattia di Ebstein isolata e valutati consecutivamente presso il Boston Children’s Hospital. La diagnosi di malattia è stata posta in presenza di una apicalizzazione del punto di inserzione del lembo settale della valvola tricuspide $> 8\text{mm/m}^2$ di superficie corporea. Elettrocardiogramma a 12 derivazioni ed ecocardiogramma sono stati analizzati retrospettivamente. La data del primo controllo coincideva con la data dell’elettrocardiogramma. L’endpoint primario era morte per cause cardiovascolari, tachicardia ventricolare sostenuta o scarica appropriata di defibrillatore impiantabile automatico. L’endpoint secondario era intervento chirurgico indicato per correggere la valvulopatia tricuspidalica. I pazienti sono stati censiti al momento dell’ultima valutazione clinica o al momento del verificarsi di un endpoint primario. Un’analisi esplorativa uni- e multi-variata è stata eseguita includendo le principali variabili cliniche e strumentali.

Risultati: Dopo un follow-up medio di 9.2 ± 6.8 anni si sono verificati 9 endpoint primari e 33 endpoint secondari. L’analisi univariata ha identificato la durata del QRS > 130 ms e il sesso maschile come significativamente associati al verificarsi dell’endpoint primario (OR 1.02 [CI 1.01-1.05] p 0.03 e OR 4.48 [CI 1.05-19] p 0.03, rispettivamente). Analogamente, rigurgito tricuspide moderato o severo all’ecocardiogramma basale e disfunzione ventricolare destra sistolica moderata o severa sono risultati associati ad endpoint secondario (OR 11 [CI 4-31] p <0.001 , OR 7 [CI 1.8-29] p 0.003, rispettivamente).

Conclusioni: Mortalità e morbilità cardiovascolare complicano il decorso clinico dei pazienti adulti con malattia di Ebstein. La durata del QRS e il grado di rigurgito tricuspide influenzano il decorso della malattia.

O259

Increased oxidative stress contribute to cardiomyocyte dysfunction and death in patients with Fabry disease cardiomyopathy

Fernanda Scopelliti (a), Romina Verardo (c), Marco Tafani (b), Claudia Grande (c), Lidia Villanova (b), Matteo A Russo (b), Francesco Fedele (a), Andrea Frustaci (a), Cristina Chimenti (a)

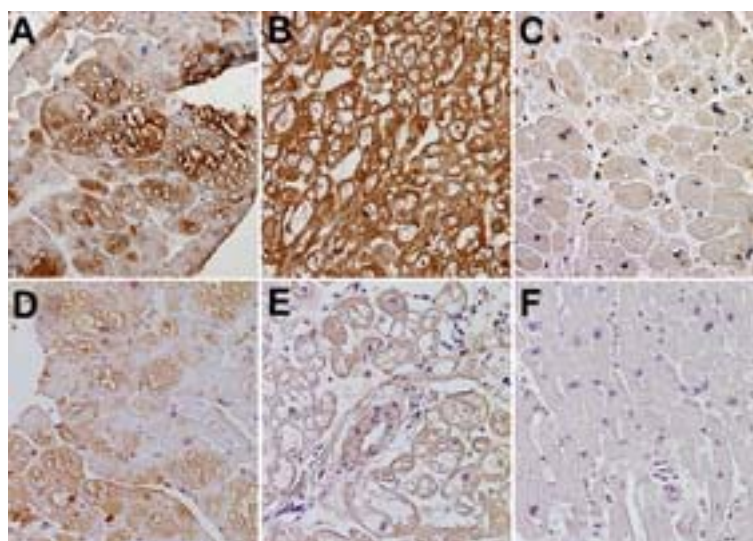
(a) *Department of Cardiovascular, Respiratory, Nefrologic, Anesthesiologic and Geriatric Sciences, La Sapienza*, (b) *Department of Pathology and Sperimental Medicine, La Sapienza University, Rome, Italy*, (c) *IRCCS L Spallanzani, Rome, Italy*

Background: Fabry disease (FD), an X-linked lysosomal deficiency of alpha-galactosidase A, is characterized by an early and progressive cardiac dysfunction. Aim of the study is to determine whether an imbalance of myocardial nitric oxide (NO) production with increase in oxidative stress contributes to cardiomyocyte dysfunction in FD cardiomyopathy.

Methods: Myocardial tissue from 18 patients with FD (11 M, 49.8±10.4 ys) was investigated for the expression of iNOS and nitrotyrosine by immunohistochemistry. Intensity of immunostaining was semiquantitatively evaluated as absent (grade 0), mild (grade 1), moderate (grade 2) and strong (grade 3). Western blot analysis for iNOS and nitrotyrosine was also performed. Oxidative damage to DNA was investigated by immunostaining for 8-hydroxydeoxyguanosine (8-OHdG), while apoptosis was evaluated by in situ ligation with hairpin probes.

Results: iNOS and nitrotyrosine expression was increased in patients with FD compared with controls (2.5 ±0.7 vs 0.2±0.4 for iNOS and 2.0 ±0.4 vs 0.1±0.1 for nitrotyrosine, p<0.001). In female patients a patchy distribution of positive immunostaining was observed (panel A=iNOS, panel D=nitrotyrosine) while in male patients the cardiomyocytes stained homogeneously (panel B=iNOS, panel E=nitrotyrosine) (controls: panel C=iNOS, panel F=nitrotyrosine). Western blot analysis confirmed an increase in FD cardiomyocyte protein nitration (3.5 fold, p<0.001). Eight-OHdG was expressed in 25% of cardiomyocyte nuclei from FD patients while it was absent in controls. Apoptosis of FD cardiomyocytes was 394 fold higher than in controls.

Conclusion: FD cardiomyopathy is characterized by an excessive myocardial NO production, resulting in oxidative stress, with an increase in cardiomyocyte protein nitration and DNA damage, leading to cell dysfunction and death. Therapeutic options with selective NOS inhibitors and antioxidants might improve cell function.



O260**Long term effects of bariatric surgery on peripheral endothelial function and on coronary microvascular function**

Pierpaolo Tarzia (a), Angelo Villano (a), Stefano Figliozzi (a), Giulio Russo (a), Rossella Parrinello (a), Priscilla Lamendola (a), Alfonso Sestito (a), Roberto Nerla (a), Gaetano Antonio Lanza (a), Filippo Crea (a)

(a) *Università Cattolica del Sacro Cuore-Policlinico Gemelli-Istituto di Cardiologia*

Background: We previously demonstrated that bariatric surgery (BS), in morbidly obese individuals, leads to a short-term significant improvement of endothelial function and coronary microvascular function. In this study we assessed whether BS maintains its beneficial effects at long-term follow up.

Methods: We studied 20 morbidly obese patients (age 43 ± 9 years, 12 women) without any evidence of cardiovascular disease, who underwent BS. Peripheral vascular dilator function was assessed by brachial artery diameter changes in response to post-ischemic forearm hyperaemia (FMD). Coronary microvascular function was assessed by measuring coronary blood flow (CBF) velocity response to i.v. adenosine (ADO) and to cold pressor test (CPT) in the left anterior descending coronary artery by transthoracic Doppler echocardiography. Patients were studied before BS, after 3 months from BS and at 4 ± 1.5 years follow up.

Results: Patients showed a significant improvement of anthropometric variables from baseline, both after 3 months and at follow up. Compared to baseline, FMD improved significantly at 3 months, and this improvement was observed also at long-term follow-up. Similarly, a significant improvement of CBF response to ADO and to CPT was found both at 3 months and at follow up (Table).

Conclusions: Our data show that, in morbidly obese patients, BS exerts beneficial and long lasting effects on peripheral endothelial function and on coronary microvascular dilator function, which can significantly contribute to the reduction of cardiovascular risk reported to be associated with this intervention.

Table

| | Baseline | 3-month follow up | 4±0.15 years follow up | P for groups |
|--------------------------|----------|-------------------|------------------------|--------------|
| FMD (%) | 6.6±2.8 | 8.6±1.6 | 9.9±2.8 | <0.01 |
| CBF to ADO | 1.8±0.4 | 2.6±0.7 | 2.6±0.5 | <0.01 |
| CBF to CPT | 1.3±0.2 | 2.2±0.4 | 2.4±0.4 | <0.01 |
| BMI (kg/m ²) | 46.5±5.8 | 36.3±6.1 | 29.3±6.3 | <0.01 |

FMD=flow mediated dilation; CBF=coronary blood flow; ADO=adenosine; CPT=cold pressor test; BMI=body mass index.

O261

The administration of a loading dose has no additive effect on platelet aggregation during the switch from ongoing clopidogrel treatment to ticagrelor in patients with Acute Coronary Syndrome

Gianluca Caiazzo (a), Salvatore De Rosa (a), Daniele Torella (a), Carmen Spaccarotella (a), Annalisa Mongiardo (a), Mariella Micieli (a), Salvatore Giampà (a), Eleonora Palella (a), Elio Gulletta (a), Ciro Indolfi (a)

(a) *Università Magna Graecia di Catanzaro*

Background: Ticagrelor (TICA) outreaches clopidogrel (CLO) in preventing cardiovascular events in Acute Coronary Syndrome (ACS). Despite a loading dose was scheduled in the PLATO trial by study design for all patients randomized to TICA, it could be unnecessary in patients with ongoing CLO therapy.

Aim of the present study was to assess whether TICA loading dose is necessary to maintain the level of platelet aggregation inhibition at the switch from CLO to TICA in patients with Acute Coronary Syndrome (ACS).

Methods and Results: Fifty patients with ACS and on CLO treatment were randomly assigned to a starting dose of TICA of 90 mg (Group 1) or 180 mg (Group 2), on top of aspirin treatment. Platelet aggregation was measured using multiple electrode aggregometry (MEA) and standard aggregometry (LTA) just before the switch and at 2, 6, 24 and 72h.

No relevant difference in platelet aggregation between the two study arms was observed at baseline ($p=0.256$). Residual platelet aggregation was significantly reduced in both arms 2h after the first administration of TICA ($p<0.001$ for both), with no difference in aggregation between groups (MEA= 176 ± 72 vs 181 ± 60 AU_{min}; $p=0.281$). Similar results were found with LTA.

Conclusions: Switching from CLO to TICA without re-loading dose is feasible and does not hinder platelet aggregation inhibition in ACS patients. These data are hypothesis generating for future appropriate-sized trials to test whether this therapeutic regimen is effective and safer on hard cardiovascular events.

DANNO CARDIACO SUBCLINICO IN PATOLOGIE ONCOLOGICHE E CONNETTIVALI

O262

Negative Effects of Trastuzumab Chemotherapy on Cardiac Mechanics. Role of Specific Myocardial Layers

Roberta Piras (a), Christian Cadeddu (a), Alessandra Piras (a), Mariele Dessi (a), Clelia Madeddu (a), Laura Orru' (a), Giovanni Mantovani (a), Marta Brizzi (a), Giuseppe Mercurio (a)

(a) *Department of Medical sciences "M Aresu" - University of Cagliari*

Background: Trastuzumab (TZB) has been shown to be extremely effective in breast cancer patients over-expressing HER-2. Careful cardiac monitoring is required when administered with anthracyclines, which can increase its toxicity. Myocardial deformation indexes associated with Speckle Tracking (ST) myocardial imaging have shown to be very sensitive in identifying left ventricular (LV) dysfunction in this setting.

Methods and Results: An observational, prospective study was designed to assess TZB-induced cardiac damage by ST technique in patients with HER-2 positive breast cancer treated with TZB sequentially following Epirubicin (EPI) treatment. Conventional echocardiographic parameters and ST based deformation indexes were analysed at baseline, after EPI treatment and one week after each two TZB administrations.

Results: Thirty-eight patients were enrolled from May 2012. A significant reduction in longitudinal Strain Rate (SR) (0.71 ± 0.16 s⁻¹ vs 0.81 ± 0.14 s⁻¹; $p < 0.05$) was observed after EPI treatment, while a significant increase in circumferential function (1.03 ± 0.31 s⁻¹ vs 0.71 ± 0.13 s⁻¹; $p < 0.01$) was highlighted. After the second TZB dose a marked reduction in circumferential function (0.69 ± 0.18 s⁻¹ vs 1.03 ± 0.31 s⁻¹; $p < 0.01$) and left ventricular (LV) apical rotation ($16.4^\circ \pm 5^\circ$ vs $28.3^\circ \pm 6.6^\circ$; $p < 0.001$) was observed, while no further reduction in longitudinal function was determined.

Conclusions: We evidenced that after anthracyclines longitudinal function is impaired while a compensatory increase in LV circumferential function and rotation is present. Following TZB we mainly observed toxicity of mid and sub-epicardial fibres, responsible mainly for circumferential function and left ventricle rotation. These effects could be related to the higher toxicity of TZB on hyperactive myocardial fibres after EPI treatment.

O263

Effects of ranolazine on myocardial deformation: a speckle tracking study.

Matteo Cameli (a), Matteo Lisi (a), Francesca Maria Righini (a), Stefania Sparla (a), Maurizio Losito (a), Cristina Di Tommaso (a), Valeria Curci (a), Stefano Lunghetti (a), Marta Focardi (a), Maurizio Galderisi (b), Sergio Mondillo (a)

(a) *Department of Cardiovascular Diseases, University of Siena, Siena, Italy*, (b) *Cardioangiology Unit with CCU, Department of Clinical and Experimental Medicine, Federico II University*

Background: Ranolazine is a novel antianginal medication that acts by improving altered sodium and calcium homeostasis. By preventing myocyte calcium overload, ranolazine has presented in vitro potential lusitropic effect. The aim of our study was to evaluate by speckle tracking the early effect of a therapy with ranolazine in patients with chronic ischemic cardiopathy.

Methods: In this prospective study, we treated 42 patients with chronic ischemic cardiopathy with stable angina symptoms with ranolazine (375 mg bid, titrated in case of not relieve of symptoms to 500 mg or 750 mg bid) for 6 months. Standard therapy chronic ischemic cardiopathy was conducted. Before and 3 and 6 months after the start of therapy, standard echo measurements, LV longitudinal strain parameters were measured in all patients. Global longitudinal strain (GLS) was obtained by averaging 4-, 3- and 2-chamber longitudinal strain.

Results: Of 42 patients, 37 reported less angina and 32 patients reported an increase in activity level. E/A and E'/A' ratio improved from baseline after 6 months of treatment (0.45 ± 0.1 vs $0.52 \pm 0.1\%$ and 0.42 ± 0.1 vs $0.55 \pm 0.1\%$, respectively $p = 0.001$ for both). No significant change in LV ejection fraction was found after treatment. GLS increased significantly after 6 months of therapy with ranolazine (-16.4 ± 2.4 vs $-19.6 \pm 2.6\%$, $p < 0.0001$).

Conclusions: 6 months treatment of ranolazine in symptomatic patients with chronic ischemic cardiopathy induced lusitropic effects, by improving E/A, E'/A' ratios and systolic subendocardial longitudinal myocardial deformation, traducing in a better control of symptoms and a greater functional capacity.

O264

Diagnosi precoce e ruolo degli inibitori del sistema renina-angiotensina-aldosterone nella cardiotoxicità da chemioterapici: follow up a 3 anni.

Daniela Di Lisi (a), Giuseppe Leggio (a), Giuseppe Vitale (a), Francesca Bonura (a), Giuseppina Novo (a), Salvatore Novo (a)

(a) *Cardiologia, Policlinico "P. Giaccone", Palermo*

Background: Negli ultimi anni, la cardiotoxicità da chemioterapici è divenuta un problema sempre più emergente e diversi studi sono stati effettuati al fine di identificare marker biochimici e indici ecocardiografici di disfunzione ventricolare sinistra (Doppler Tissutale e Strain Rate) molto più

sensibili rispetto agli indici ecocardiografici convenzionali nella identificazione precoce di disfunzione ventricolare sinistra indotta da chemioterapici.

Scopo: Valutare le alterazioni della funzione cardiaca durante trattamento chemioterapico, al termine del trattamento chemioterapico e a distanza di 2 anni dalla fine del trattamento chemioterapico mediante utilizzo di nuovi indici ecocardiografici di funzione sistolica e diastolica ottenuti mediante utilizzo del Doppler tissutale (E', A', S', E'/A', indice di TEI, EAS index), sia nei pazienti in trattamento con inibitori del sistema renina-angiotensina-aldosterone (ACEI, sartani) che nei pazienti non in trattamento con tali farmaci, al fine di correlare le alterazioni precoci della funzione cardiaca indotte dai chemioterapici con lo sviluppo futuro di grave disfunzione ventricolare sinistra e scompenso cardiaco e valutare il potenziale ruolo cardioprotettivo degli ACEI nella cardiotoxicità indotta da chemioterapici.

Metodi: studio prospettico su 82 pazienti affette da carcinoma della mammella in trattamento chemioterapico adiuvante con antracicline, taxani e trastuzumab. Le pazienti sono state divise in gruppi sulla base del trattamento chemioterapico effettuato e sulla base del concomitante trattamento con sartani o ACEI (gruppo A: FEC; gruppo B: FEC + trastuzumab + ACEI o sartani; gruppo C: trastuzumab). Tutte le pazienti sono state valutate al tempo T0 (prima di iniziare la chemioterapia), T1 (dopo 6 mesi dall'inizio del trattamento chemioterapico) e T2 dopo 2 anni dalla sospensione del trattamento chemioterapico mediante esecuzione di un ecocardiogramma e valutazione dei parametri di funzione sistolica e diastolica ventricolare sinistra convenzionali e ottenuti mediante TDI dell'anello valvolare mitralico (E', A', S', E'/A', indice di TEI e EAS index).

Risultati: gli indici di funzione sistolica e diastolica valutati mediante TDI hanno subito variazioni significative sia al T1 che T2 in tutti i pazienti e soprattutto nel gruppo in trattamento con antracicline (gruppo A). La FE non ha subito variazioni significative al T1. Al T2 si è osservata una riduzione significativa della FE nell'intera popolazione e nel gruppo A (FE: 62 \pm 0,15 al T0 vs 60 \pm 0,08 al T2, $p < 0,0001$) ma non si è osservata nel gruppo B e C. Nel gruppo B e C al T2 gli indici TDI hanno subito variazioni meno significative rispetto alle variazioni degli stessi indici nel gruppo A. S' nel gruppo B: 15,7 \pm 3,2 al T0 vs 12 \pm 7,4 al T2, $p = 0,006$. S'nel gruppo A: 13,8 \pm 2,98 al T0 vs 11,7 \pm 2,43 al T2, $p < 0,0005$).

Conclusioni: il TDI consente di identificare precocemente le alterazioni cardiache indotte dai chemioterapici consentendo di identificare i soggetti a maggior rischio di sviluppare disfunzione cardiaca severa e scompenso cardiaco e che quindi necessitano di iniziare un trattamento cardioprotettivo con inibitori del sistema renina-angiotensina aldosterone precocemente, una volta identificate le alterazioni della disfunzione ventricolare sinistra al TDI.

O265

Additional value of three-dimensional speckle tracking echocardiography in detection of subclinical anthracycline cardiotoxicity in breast cancer

Roberta Esposito (a), Ciro Santoro (a), Francesco De Stefano (a), Grazia Arpino (b), Rossella Lauria (b), Sabino De Placido (b), Giovanni de Simone (a), Maurizio Galderisi (a)

(a) Department of Translational Clinical Sciences, Federico II University Hospital, Naples, Italy,

(b) Department of Clinical and Surgical Medicine, Federico II University Hospital, Naples, Italy

Purpose: The subclinical diagnosis of chemotherapy-induced cardiotoxicity is a critical issue in the setting of oncologic patients in order to prevent overt heart failure and to avoid early treatment withdrawal. The present study aimed to assess the diagnostic power of real-time 3D Speckle Tracking Echocardiography (STE) in comparison with standard echo Doppler in detection of subclinical anthracycline (ANT) derived cardiotoxicity in breast cancer patients.

Methods: Fifty-five consecutive patients (F/M = 54/1, mean age = 48 years) with breast cancer were treated by multiple protocols including ANT (epirubicin, cumulative dose = 505 \pm 68 mg/m², range = 360-720 mg/m²) and cyclophosphamide and/or 5-fluorouracil for 3-4 cycles. Exclusion criteria included coronary artery disease, valve heart disease, overt heart failure, primary cardiomyopathies

and atrial fibrillation. Before starting and after treatment (3 months follow-up) all the patients underwent complete standard echo Doppler exam and real time 3D echo evaluation. Standard echo Doppler included determination of 2D ejection fraction (EF) and pulsed Tissue Doppler of the mitral annulus, with the calculation of the ratio between early diastolic velocity of mitral inflow and early diastolic velocity of mitral annulus (E/e' ratio). Real-time 3D echo was performed according to standardized methods (frame rate $\geq 40\%$ of individual heart rate) and included determination of left ventricular volumes and EF as well as 3D STE-derived global longitudinal strain (GLS), global circumferential strain (GCS), global area strain (GAS) and global radial strain (GRS) were also measured whenever feasible.

Results: All the patients completed the cycles of chemotherapy. None complained about symptoms and/or signs of heart failure such to interrupt the chemotherapy before the end of the cycles. Among standard echo Doppler parameters, 2D EF ($62.9 \pm 6.4\%$ after and $61.8 \pm 7.9\%$ before), transmitral E/A ratio and E velocity deceleration time were not significantly changed by treatment whereas E/e' ratio was higher after (7.25 ± 1.8) than before treatment (6.7 ± 1.7) ($p < 0.01$). Among 3D echo parameters left ventricular end-systolic volume was increased ($p < 0.01$) and EF reduced (58.8 ± 8 vs. $61.7 \pm 7.1\%$, $p < 0.02$) after treatment. Among 3D STE parameters, GLS ($p < 0.01$), GRS ($p < 0.001$), GCS ($p < 0.0001$) and GAS (-28.4 ± 5.9 vs. -31.6 ± 3.6 , $p < 0.0001$) were all significantly reduced after ANT. Worthy of note, 3D volumetric assessment was feasible in 35/55 patients (63.6%) and 3D STE in 33/55 patients (60%). The main causes of this low feasibility were left breast cancer location, previous radiotherapy and breast prosthesis implantation.

Conclusions: Our study demonstrates the potential superiority of real time 3D echocardiography in diagnosing subclinical cardiotoxicity of anthracyclines in breast cancer patients but also the suboptimal feasibility of this novel imaging technique in this clinical setting. Among standard echo Doppler parameters E/e' ratio appears to offer significant advantages over other standard echo Doppler parameters in revealing early signs of cardiotoxicity. These findings can have clinical implications in the imaging follow-up of breast cancer patients during treatment.

O266

Subclinical left ventricular myocardial impairment in scleroderma patients

Diletta Peluso (a), Seena Padayattil (a), Erica Pigatto (b), Franco Cozzi (b), Leonardo Punzi (b), Laura Puma (a), Umberto Cucchini (a), Denisa Muraru (a), Luigi P Badano (a), Sabino Iliceto (a)

(a) Department of Cardiac, Thoracic and Vascular Sciences. University of Padua, (b) Medicine, Rheumatology Unit. University of Padua

Purpose: Cardiac involvement is a malignant manifestation of systemic sclerosis (SSc) and represents one of the major cause of mortality. Usually its diagnosis occurs in patients with clinical manifestation of cardiac involvement. Speckle-tracking echocardiography (2D STE) is a novel echocardiographic technique able to assess myocardial mechanics. Therefore, we used 2DSTE to assess LV myocardial mechanics in SSc patients

Methods: 49 SSc patients (45 female; 57 ± 13 years), without known heart involvement, were compared with 43 age and gender-matched healthy volunteers. 29 patients were affected by limited and 20 by diffuse cutaneous form of SSc; ANA were positive in all patients with anti-centromere specificity in 15 patients, anti-Scl 70 in 18 and without specificity in 16. All study subjects underwent a complete echocardiogram including left ventricular (LV) volumes and ejection fraction (EF) measured by a three-dimensional echo (3DE) data set and longitudinal strain by 2D STE.

Results: SSc patients showed similar 3DE LV end-diastolic (96 ± 21 vs 90 ± 18 ml, $p = 0.19$) and end-systolic (35 ± 9 vs 32 ± 7 ml, $p = 0.15$) volumes, and EF (64 ± 4 vs 64 ± 4 %, $p = 0.62$) compared to controls. Similarly, LV diastolic function was normal in both SSc patients and controls (E/A 1.2 ± 0.4 vs 1.3 ± 0.4 , $p = 0.08$; E/e' 9 ± 4 vs 7 ± 2 , $p = 0.004$). However, global longitudinal strain was significantly lower in SSc patients than in controls (-20.6 ± 2.8 vs -21.7 ± 1.6 %, $p = 0.04$) although without reaching pathological values. A subanalysis among SSc patients showed no differences about 3DE LV EF and

global longitudinal strain (p=NS) among the different forms (diffuse/limited) of scleroderma disease and different antibody's specificity

Conclusions: patients with SSc demonstrated a statistically significant impairment of LV myocardial mechanics by 2D STE in presence of normal LV geometry and function. This suggests the presence of mild subclinical involvement of LV myocardium in SSc patients without clinical cardiac manifestation of the disease.

O267

Left ventricular function in rheumatoid arthritis during anti-tnf alpha treatment: a speckle tracking prospective study

Enrico Vizzardì (a), Ivano Bonadei (a), Edoardo Sciatti (a), Valentina Regazzoni (a), Eleftheria Trichaki (a), Mara Gavazzoni (a), Najat Ashofair (a), Riccardo Raddino (a), Antonio D'Aloia (a), Marco Metra (a)

(a) *Section of Cardiovascular Diseases, University of Study of Brescia*

Introduction: Rheumatoid Arthritis (RA) shows a high risk for cardiovascular disease, including heart failure, mainly in patients with preserved left ventricular (LV) function. Despite TNF alpha were implicated in the pathogenesis of myocardial remodelling, TNF alpha inhibition did not show any efficacy in patients with advanced heart failure and should be contraindicated in RA with cardiac complications.

Aim of the study: To assess the global LV systolic function, using global longitudinal strain (GLS) as a measure of myocardial deformation, in a group of RA patients before and during anti-TNF alpha treatment.

Patients and methods: We prospectively followed 13 patients affected by RA for one year during anti-TNF alpha treatment. Every subjects performed an echocardiography before starting anti-TNF drugs and after one year of treatment, considering EF, DTD (telediastolic diameter) and VTD (telediastolic volume) and global longitudinal strain (GLS). Ejection fraction (EF) was calculated by Simpson's biplane method. GLS was calculated using 2D speckle tracking as the mean GLS from three standard apical views (2, 3 and 4-chambers).

Results: 13 patients (female:male=7:6) showed a mean age at RA onset of 43 years (SD=13) and a mean follow up of 7 years (SD=4.8). Steroid and methotrexate were used in 84.6% and 100%, respectively, in association with etanercept (6 cases), adalimumab (7 cases) and infliximab (3 cases). Arterial hypertension was found in 5 patients. Patients globally showed a normal EF before and after one year of treatment (mean=65%±5.5 and 65.7%±4.7, respectively). GLS was not different before and after anti-TNF treatment (mean=-15.8%±2.58 and -16.7%±2.5, respectively). Five subjects with hypertension show a similar GLS than normotensive patients before starting anti-TNF alpha drugs (-16.4%±3 and -15%±1.8) and after one year (-17.2%±3.4 and -16.2%±1.2).

Conclusions: Anti-TNF alpha treatment do not significantly modify the myocardial contractility after 12 months.

FIBRILLAZIONE ATRIALE: RISULTATI DELL'ABLAZIONE E PREDITTORI DEL SUCCESSO

O268

Progressione a lungo termine da fibrillazione atriale parossistica a permanente in seguito a procedura di ablazione transcateretere. Studio retrospettivo di un singolo centro ad alto volume di procedure

Cristina Gallo (a), Alberto Battaglia (a), Matteo Anselmino (a), Davide Castagno (a), Marco Scaglione (b), Federico Ferraris (a), Domenico Caponi (b), Paolo Di Donna (b), Fiorenzo Gaita (a)

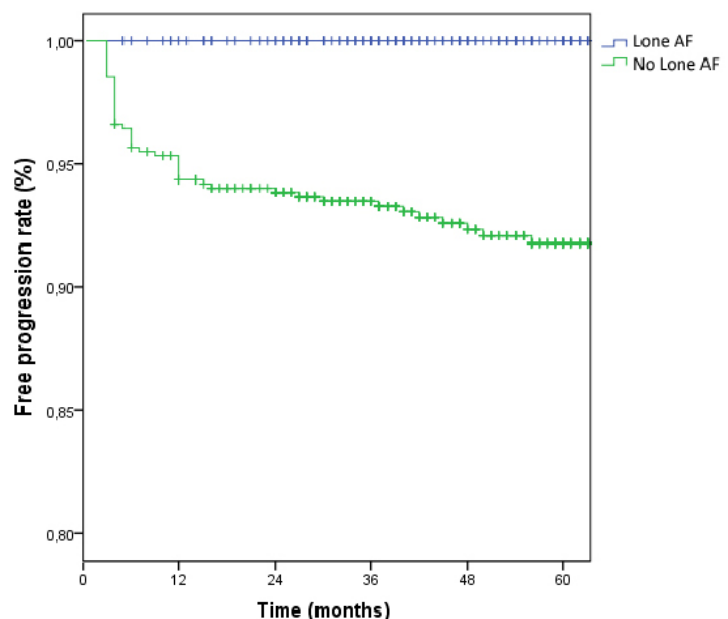
(a) Divisione di Cardiologia, Dipartimento di Medicina Interna, Università di Torino, (b) Divisione di Cardiologia, Ospedale Cardinal Guglielmo Massaia, Asti

Background: La storia naturale della Fibrillazione Atriale (FA) è caratterizzata da un progressivo incremento del burden aritmico sia in termini di frequenza che di durata degli episodi. L'evoluzione verso forme di FA permanente è sicuramente influenzata dalla presenza di comorbidità, cardiopatie strutturali sottostanti ma ad oggi pochi lavori descrivono l'influenza delle scelte terapeutiche intraprese dal Curante sull'evoluzione della aritmia.

Scopo: Descrivere il tasso di progressione ad FA Permanente a lungo termine in una ampia casistica di pazienti sottoposti ad ablazione transcateretere (TC) di FA in un unico centro di elettrofisiologia ad alto volume di procedure secondo un protocollo standardizzato di ablazione.

Metodi: 889 pazienti (età media 57 ± 11 anni, 78% maschi) afferenti per ablazione TC di FA (53% FA parossistica, 40% FA persistente, 6% FA Long Standing) dal 2001 al 2010 sono stati retrospettivamente valutati. Tutti i pazienti sono stati sottoposti ad isolamento delle vene polmonari riservando linee in atrio sinistro associate anche ad ablazione dei potenziali frammenti a pazienti con FA persistente/long standing, con cardiopatia sottostante, o in caso di recidiva dopo una prima procedura.

Risultati: Dopo un follow-up mediano di 61 mesi (IQR 38-84 mesi) 57 pazienti (6.4%) sono evoluti verso la forma permanente della aritmia con un tasso di evoluzione annuale verso FA Permanente del 1.25/100 pazienti. La progressione verso FA permanente è stata riportata con frequenza crescente fra i pazienti con, all'inizio del follow-up, FA Parossistica (2.7%), Persistente (10.0%) e Long Standing (14,5%; $p < 0.001$). Nessuno dei 266 pazienti (30%) con assenza di cardiopatia strutturale sottostante e/o comorbidità (lone FA) ha sviluppato la forma Permanente confronto al 9% dei 623 pazienti (70%) con cardiopatia o comorbidità sottostanti (vedi Figura, $p < 0.001$). Oltre a questi parametri anche l'età > 65 anni ($p = 0.023$), la presenza di cardiopatia strutturale ($p < 0.001$), l'ingrandimento atriale sinistro ($p < 0.001$), ed il $CHA_2DS_2VASc \geq 2$ ($p = 0.004$) sono risultati associati alla evoluzione verso FA Permanente. All'analisi multivariata, tuttavia, solo il tipo di FA e la presenza di cardiopatia strutturale sottostante e/o comorbidità si sono confermate indipendentemente associate alla evoluzione verso FA permanente (OR 1.6 $p < 0.001$ ed OR 11.3 $p < 0.001$, rispettivamente).



Conclusioni: La presenza di comorbidità/cardiopatia strutturale ed il tipo di FA predicono la evoluzione della FA a permanente nonostante la procedure di ablazione TC.

O269

The impact of termination strategies in atrial fibrillation ablation

Massimiliano Faustino (b), Carmine Pizzi (a), Luigi Santarella (a), Donato Capuzzi (b), Erjon Agushi (a), Tullio Agricola (c)

(a) *Dipartimento di Medicina Specialistica, Diagnostica e Sperimentale. Università Alma Mater Studiorum*, (b) *Casa di Cura Villa Pierangeli, Pescara*, (c) *Ospedale Civile di Pescara*

Background: During catheter ablation, atrial fibrillation (AF) can be terminated in various modes, directly in sinus rhythm or evolved into a regular atrial tachycardia (AT) and, subsequently, in sinus rhythm or after direct current (DC) cardioversion. The aim of the present study was to evaluate the influence of termination mode on clinical outcomes in patients who underwent an ablation approach aiming at AF termination.

Methods and results: This prospective study included 399 consecutive patients (62.7 ± 7.2) who underwent catheter ablation for drug-refractory persistent AF (4.6 ± 2.4 months), using a stepwise ablation approach. A 12-month follow-up with repeated Holter monitoring was carried out. In 136 patients, the AF was terminated by radiofrequency application during catheter ablation directly in sinus rhythm. In 194 patients, sinus rhythm was restored via AT and, in the remaining 69 patients, sinus rhythm was restored by DC cardioversion after catheter ablation. During the follow-up, the patients in whom AF terminated after AT had a lower recurrence rate of atrial tachyarrhythmias than the patients in whom AF had terminated directly in sinus rhythm or after dc-cardioversion (19.6% vs. 27.9% and 71% respectively; $p < 0.001$). The patients with recurrence of atrial arrhythmia who converted directly to sinus rhythm had a higher recurrence rate of AF (94.7%) as compared to patients who converted via AT (13.2%; $p < 0.001$). Multivariable logistic regression analysis demonstrated that termination of AF via AT during ablation (HR 0.44; 95% CI: 0.25-0.77, $P = 0.004$), DC cardioversion (HR 3.26; 95% CI: 1.57-6.77) and baseline atrial fibrillation cycle length, (HR 0.95; 95% CI: 0.92-0.98; $p = 0.005$) were significant independent factors predicting the recurrence of atrial arrhythmia.

Conclusions: The termination of AF after AT during catheter ablation is associated with a better clinical outcome in patients with AF.

O270

Efficacia a medio-lungo termine dell'approccio ablativo ibrido in pazienti affetti da fibrillazione atriale persistente

Francesca Salghetti (a), Antonio Curnis (a), Gianluigi Bisleri (d), Manuel Cerini (a), Alessandro Lipari (a), Francesca Vassanelli (a), Elisa Locantore (a), Marco Belotti Cassa (a), Mohamed Elmaghawry (b), Abdallah Raweh (c), Claudio Muneretto (d), Luca Bontempi (a)

(a) *Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia*, (b) *Aswan Heart Centre, Aswan - Egypt*, (c) *Faculty of Medical Science, Ludes University, Lugano - Svizzera*, (d) *Divisione di Cardiochirurgia - Spedali Civili; Università degli studi di Brescia - Italia*

Background: L'ablazione trans catetere della Fibrillazione Atriale (FA) persistente e persistente di lunga durata non ha fornito risultati soddisfacenti nel mantenimento del ritmo sinusale (RS) a medio lungo termine. La strategia combinata sequenziale toracoscopica epicardica e trans catetere endocardica ("ibrida") è una nuova opzione terapeutica in grado di superare gli inconvenienti e di migliorare i risultati.

Scopo: Valutare la sicurezza e l'efficacia nell'ablazione ibrida nel mantenimento a lungo termine del ritmo sinusale nei pazienti (pz) sintomatici affetti da FA persistente e persistente di lunga durata.

Metodi: 51 pz con FA persistente (9.8%) e persistente di lunga durata (90.2%), sintomatici nonostante il trattamento con 2 farmaci antiaritmici, sono stati consecutivamente arruolati da febbraio 2009 ad ottobre 2012 presso il Laboratorio di Elettrofisiologia, Divisione e Cattedra di Cardiologia e presso da Divisione e Cattedra di Cardiocirurgia degli Spedali Civili di Brescia. La popolazione presentava le seguenti caratteristiche: l'età era 63.2 ± 9.3 anni; il diametro atriale antero-posteriore era di 50.5 ± 8 mm; la durata della FA era 70 ± 30 mesi. Tramite approccio toracoscopico monolaterale destro, si eseguiva l'isolamento della parete posteriore dell'atrio sinistro e delle vene polmonari (box lesion) con un sistema di suzione ed ablazione a radiofrequenza (RF) monopolare. Al termine dell'intervento, la presenza di blocco della conduzione in entrata e/o in uscita dalla "box lesion" veniva testata con catetere decapolare posizionato in seno coronarico. Tutti i pazienti al termine dell'intervento sono stati sottoposti ad impianto di un loop recorder, per il monitoraggio continuo del ritmo cardiaco durante il follow up. A tre mesi dalla procedura chirurgica, tutti i pazienti venivano sottoposti a procedura elettrofisiologica trans-catetere per validare il blocco bidirezionale e/o chiudere con RF la lesione cardiocirurgica.

Risultati: L'ablazione per via toracoscopica è stata eseguita in tutti i pazienti ed è stata priva di complicanze. A termine dell'intervento, il blocco in uscita ed in entrata è stato ottenuto rispettivamente nel 100% e 88.3% (45/51) dei pz. A circa tre mesi, lo studio elettrofisiologico ha confermato blocco in uscita nel 94% (48/51), blocco in entrata nell' 83.3% (43/51), blocco bidirezionale nel 70.6% (36/51), blocco assente nel 5.8% (3/51). La riconnessione delle vene polmonari è stata riscontrata nel 15.7% (8/51) dei pz. Complessivamente si è proceduto a completamento della box lesion con RF nel 60.8% (31/51) dei pz. Ad un follow up di 36 ± 12 mesi l' 82.3% (42/51) dei pazienti era in RS ed il 68.7% (35/51) era in RS senza farmaci antiaritmici.

Conclusioni: L'approccio ibrido sequenziale cardocirurgico toracoscopico ed elettrofisiologico trans catetere si è dimostrato sicuro e più efficace delle procedure trans catetere isolate nel mantenimento del RS, a medio lungo termine, nei pz con FA persistente e persistente di lunga durata. Il sistema impiantabile di monitoraggio continuo del ritmo cardiaco (loop recorder) è lo strumento più accurato e sensibile per rilevare le recidive aritmiche, per quantificare il "burden" di FA e per guidare le successive scelte terapeutiche.

O271

Do novel noninvasive measurements of atrial function describe the mechanical behaviour of the chamber?

Anna Degiovanni (a), Lara Baduena (b), Gabriele Dell'Era (c), Eraldo Occhetta (a), Paolo Marino (a)

(a) SCDU Clinica Cardiologica, AOU Maggiore della Carità - Novara, (b) Cardiologia, Ospedale S.S. Trinità - Borgomanero, (c) SOC Cardiologia UTIC, Ospedale Santo Spirito - Casale Monferrato

Purpose: Over recent years pulmonary veins ablation has provided a new effective care for atrial fibrillation (AF), but also a powerful context for studying left atrial (LA) mechanical properties. Our purpose was to test if any relation existed between new noninvasive LA parameters, traditional descriptors of left ventricle (LV) diastolic function and invasive estimation of atrial stiffness (K_{la}).

Methods: In 23 patients undergoing AF ablation (NavX™ -guided ablation), with a wide range of atrial volumes, no or mild mitral regurgitation, a LA volume curve was obtained from a superior-anterior dimension of the cavity assuming a spherical shape. Time-adjusted LA pressure was also measured, simultaneously with M-mode data, in all patients by a large bore fluid-filled catheter introduced trans-septally. K_{la} was then calculated during the ascending limb of the V-loop and computed as Δ LA pressure, from the time of minimal to maximal systolic pressure, by Δ LA volume during this period. LA peak strain (PS), and SD of time-to-peak strain (SD-TP), taken as a measure of LA mechanical dispersion, besides LV longitudinal strain (LS), were assessed with 2D-speckle-

tracking echocardiography. LA volume, LV mass and mitral deceleration time (DT), taken as a measure of overall LV stiffness, were also computed.

Results: Data could be analyzed in 20 patients (7 in sinus rhythm and 13 in AFib) using a mean of 4 ± 1 beats analyzed each. They were divided into 3 groups according to increasing values of mean LA pressure (5.6-13.3 mmHg, n=6; 14.3-16.8 mmHg, n=7; 20.4-36.4 mmHg, n=7). Mean K_{la} averaged 2.8 ± 3.3 mmHg/ml/sqm, with values increasing along with progressive tertiles of mean LA pressure (p=0.06). Conversely, LA PS and LV LS decreased (p=0.029 and p=0.024). There were no changes in SD-TP, LA volume and DT across groups. Only LV mass was larger in the 3rd tertile, as compared with the other 2 (p=0.002). A stepwise multiple linear regression identified PS as the only significant predictor of K_{la} ($\beta=-0.24$, p=0.031), with no significant contribution from SD-TP, LA volume, LV mass, LS and DT.

Conclusion: LA PS and not volume, SD-TP or LV function data affect LA K_{la}. Thus LA PS can be used as a descriptor of LA passive mechanical properties.

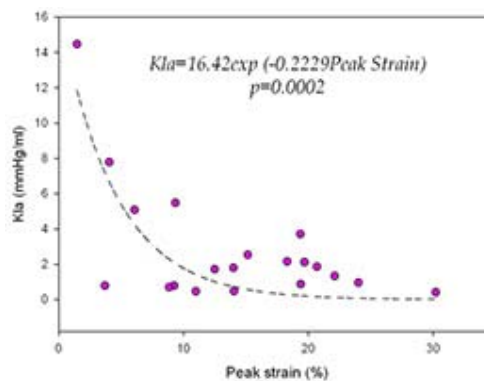


Figure. Relationship between K_{la} and PS.

O272

Valore prognostico del tempo totale di attivazione atriale misurato con tissue doppler imaging nel predire il mantenimento del ritmo sinusale dopo cardioversione elettrica di fibrillazione atriale

Stefano Maffè (a), Paola Paffoni (a), Pierfranco Dellavesa (a), Lorenzo Cucchi (a), Fabiana Signorotti (a), Luca Bergamasco (a), Franco Zenone (a), Anna Maria Paino (a), Niccolo' Franchetti Pardo (a), Lara Baduena (a), Umberto Parravicini (a)

(a) Divisione di Cardiologia - Ospedale SS Trinità, Borgomanero (Novara)

Background: Il tempo totale di attivazione atriale è stato identificato come predittore indipendente di insorgenza di nuovi episodi di fibrillazione atriale. La valutazione ecocardiografica mediante Doppler tissutale dell'intervallo tra l'inizio dell'onda P all'ECG e la contrazione sistolica atriale A' della parete laterale basale dell'atrio sinistro (PA-TDI time) permette di misurare il tempo di attivazione elettrica totale dell'atrio. Lo scopo del nostro studio è stato di valutare se il parametro PA-TDI time sia in grado di predire il mantenimento del ritmo sinusale in una popolazione di pazienti affetti da fibrillazione atriale persistente sottoposti a cardioversione elettrica esterna

Metodi: Abbiamo studiato una popolazione di 104 pazienti (58 M e 46 F, età media 70 ± 9) affetti da fibrillazione atriale persistente presente da più di un mese e sottoposta a cardioversione elettrica esterna con ripristino del ritmo sinusale. Tutti pazienti sono stati sottoposti a valutazione ecocardiografica completa dopo il ripristino del ritmo sinusale, con misurazione di tutte le variabili comunemente associate al rischio di fibrillazione atriale (volume atriale sinistro e destro, frazione d'eiezione atriale e ventricolare, grado valvulopatia mitralica e tricuspide, valutazione Doppler della fase diastolica) e del PA-TDI time. Il follow up è stato di un anno.

Risultati: Durante il follow up abbiamo registrato 34 recidive di fibrillazione atriale (32,7%) con un tempo medio alla recidiva di 6 ± 4 mesi. Confrontando i gruppi dei pazienti rimasti in ritmo sinusale

(n=70) con quello composto dai pazienti con recidiva aritmica (n=34) abbiamo evidenziato nei pz in ritmo sinusale una frazione di eiezione atriale sinistra significativamente più alta ($0,35\pm 0,11$ vs $0,30\pm 0,11$; $p=0,03$), un'onda A' più elevata ($5,3\pm 2,4$ vs $4,3\pm 1,8$; $p=0,02$), ma soprattutto un PA-TDI time significativamente più breve (133 ± 21 msec vs 171 ± 20 msec; $p=0,0001$). L'utilizzo di farmaci di profilassi antiaritmica (amiodarone, beta-bloccanti, farmaci IC, sotalolo) non ha mostrato differenze significative nei 2 gruppi. Anche l'analisi multivariata ha confermato il PA-TDI time come unico predittore indipendente di mantenimento del ritmo sinusale a distanza (Hazard Ratio 1,05; IC 95% 1,03-1,06; $p < 0,001$). L'analisi ROC ha determinato un valore di sensibilità del 91% e di specificità dell'87% per PA-TDI time con cut off di 152 msec

Conclusioni: PA-TDI time è significativamente aumentato nei pazienti con fibrillazione atriale recidivante, e rappresenta un ottimo parametro per valutare il mantenimento del ritmo sinusale a distanza dopo cardioversione elettrica.

O273

Baseline Low Left Atrial Pressure (lap) Identify Patients Without Non-pv Triggers And With A Higher Success Rate Following Catheter Ablation For Paroxysmal Atrial Fibrillation At The Index Procedure

Luigi Di Biase (a, b, c), Francesco Santoro (c), Chintan Trivedi (a), Pasquale Santangeli (a, c), John David Burkhardt (a), Prasant Mohanty (a), Sagamitra Mohanty (a), Javier Sanchez (a), Richard Hongo (e), Dhanujay Lakkireddy (f), Claude S. Elayi (g), Robert A. Schweikert (d), Andrea Natale (a)

(a) Texas Cardiac Arrhythmia Institute, St. David's medical center, Austin, Texas, USA, (b) Albert Einstein, College of Medicine, Montefiore Hospital, New York, New York, USA, (c) Department of Cardiology, University of Foggia, Foggia, Italy, (d) Akron General Hosp, Akron, OH, USA, (e) California Pacific Medical Ctr, San Francisco, CA, USA, (f) Univ of Kansas, Kansas City, MS, USA, (g) Univ of Kentucky, Lexington, KE, USA

Introduction: Although several studies have shown that in patients (pts) with paroxysmal AF (PAF) pulmonary vein (PV) isolation alone is sufficient to achieve freedom from AF, in some pts success rate is not satisfactory.

We sought to evaluate whether baseline left atrial pressure (LAP) plays a role in the identification of pts with lower recurrence rate.

Methods: 592 consecutive pts undergoing ablation for PAF have been included in this study. In all pts baseline LAP was recorded immediately after transseptal at index procedure. In the period between 3 to 6 months post ablation, irrespective of recurrences, pts underwent a left atrial catheterization to exclude the presence of PV reconnection. In case of reconnection, pts underwent re-isolation of the PVs and a third procedure was considered to confirm permanent isolation. PV antrum and posterior wall isolation was performed in all pts. All pts underwent challenge test with isoproterenol up to 20mcg/min to disclose for non-pv triggers. Non PV triggers were mapped but not ablated at index procedure. All patients underwent extensive follow-up.

Results: After LA catheterization, PVs were confirmed isolated in all pts. After 18.7 ± 8.6 months follow up, 167 (28.2%) pts had recurrences. Pts with recurrences had higher LAP (13.5 ± 3.7 mmHg vs. 10.5 ± 3.9 mmHg, $p < 0.001$) and higher prevalence of non pv triggers [79/167(47.3%) vs 38 /425 (8.9%) $p < 0.001$] higher risk of recurrence (HR=1.6, CI= (1.2, 2.2), $p=0.003$) and more non-pv triggers either sustained or not sustained (OR=1.73, CI= (1.15, 2.6) $p=0.009$). A cut-off value of ≤ 12 mmHg mean LAP seemed to identify pts without non PV triggers and with higher success rate.

Conclusion: Baseline low LAP identifies pts with paroxysmal AF without non pv triggers where pv antrum isolation alone is sufficient to achieve freedom from AF. A cut off value of 12 mmHg is proposed. No recurrence rate differences were found between pts with sustained and non sustained non pv triggers.

ARRESTO CARDIACO: DALLA PATOGENESI ALLE STRATEGIE ORGANIZZATIVE 1

O274

Idiopathic ventricular fibrillation in infancy: the role of genetic testing

Elisa Mastantuono (c), Roberto Insolia (a), Thomas Wieland (c), Federica Dagradi (a, b), Peter Lichtner (c), Alice Ghidoni (a), Tim Strom (c, d), Thomas Meitinger (c, d, e), Peter J. Schwartz (a, b, g), Lia Crotti (a, b, c)

(a) Section of Cardiology, Dept of Molecular Medicine, University of Pavia, Pavia, Italy, (b) Dept of Cardiology, Fondazione IRCCS Policlinico S. Matteo, Pavia, Italy, (c) Inst of Human Genetics, Helmholtz Zentrum München, Neuherberg, Germany, (d) Inst of Human Genetics, Technische Universität München, Munich, Germany, (e) Deutsches Zentrum für Herz-Kreislauf-Forschung, Munich Heart Alliance, Munich, Germany, (f) Dept of Family and Community Medicine, King Saud Univ, Riyadh, Saudi Arabia, (g) Cardiovascular Genetics Laboratory, Dept of Medicine, Univ of Cape Town, South Africa

Background: Ventricular fibrillation is the main cause of sudden cardiac death and in approximately 5% of the survivors no underlying cardiac diseases are identified and therefore the event is classified as idiopathic ventricular fibrillation (IVF). Genetic characteristics of IVF are still unclear, and current statements on genetic testing feasibility recommend comprehensive gene screening only in presence of clear clinical indications.

In this study we exploited the most up-to-date genomic techniques to molecularly investigate two infants with a documented episode of ventricular fibrillation and with no apparent underlying cardiac disease.

Methods: We ascertained two Caucasian unrelated patients that, at the age of respectively 4 months and 2 years, suffered of resuscitated cardiac arrest due to ventricular fibrillation. Both probands were investigated following the recommended clinical statements (cardiological visit, basal and Holter ECG, echocardiogram, cardiac MRI), whereas provocative stress testing with exercise was not performed because of the young age. Parents were evaluated with routine cardiological examination. Subsequently each proband and respective parents were investigated through whole-exome sequencing on the Illumina HiSeq 2500 platform to search for de novo genetic variants. Those variants identified in the probands, but absent in the parents, and in both publicly accessible (ESP, EC, 1000 genome) and internal exome (n= 2037) databases, were validated using conventional Sanger sequencing and then bioinformatically analysed.

Results: All the clinical investigations in the two probands were not conclusive for any form of primary electrical or structural cardiac disease. Accordingly diagnosis of IVF was established. Clinical evaluation in the parents was also negative.

In one proband (age 2 years) we identified a de novo missense variant in RYR2, the major gene associated with catecholaminergic polymorphic ventricular tachycardia (CPVT). This variant was absent in publicly or internal control populations and was predicted to have a functional effect through bioinformatic tools.

In the second case, we detected a de novo missense variant in the PARN gene, encoding a poly(A)-specific ribonuclease involved in the decay of eukaryotic messenger RNAs. However the biological plausibility of this result has to be further investigated.

Conclusions: The presented molecular approach allowed us to identify the genetic cause of ventricular fibrillation in a 2 years age patient, previously diagnosed as an IVF case: as a matter of fact an early form of catecholaminergic polymorphic ventricular tachycardia was identified. The available clinical elements were not sufficient to suggest the diagnosis of CPVT and stress testing, a leading clinical tool in the diagnosis of such an arrhythmogenic disease, is not practicable in early

stage of life. Accordingly we suggest to consider a comprehensive or target gene testing in those very young IVF cases in which complete clinical evaluation cannot be performed.

O275

A frequency based approach for discriminating between causative and non-causative genetic variants in Long QT syndrome

Valeria Novelli (a), Alberto Malovini (b, d), Riccardo Bellazzi (b, d), Carlo Napolitano (a, c), Silvia Priori (a, b, c)

(a) *Fondazione Salvatore Maugeri, Cardiologia Molecolare, Pavia*, (b) *Università degli Studi di Pavia*, (c) *New York Langone Medical Center, NYU*, (d) *Fondazione Salvatore Maugeri, Laboratorio di Informatica e Sistemistica per la Ricerca Clinica*

Purpose: Long QT Syndrome (LQTS) is defined as an arrhythmogenic disorder in a structurally normal hearts presenting with QT prolongation that is often associated with peculiar ST-T-wave morphology, syncope and sudden death. Up to today, there are hundreds of genetic variants in 13 different genes that are associated with this syndrome. Unfortunately, only few variants have been supported by in vitro functional studies to be pathogenic. The aim of our study was to calculate an allele frequency threshold that could be used to predict the deleterious effects of the genetic variants in absence of functional data.

Methods and Results: We collected functional data of 83 non-synonymous genetic variants associated with LQTS that have previously been reported in literature or characterized in our laboratory. Of these variants, 77 have been classified pathogenic and 6 as non-pathogenic by in vitro studies. The Exome Variant Server database (www.gs.washington.edu/EVS) was used to identify the minor allele frequency (MAF) of these variants, based on the exome sequencing data of 4,300 European American (EA) and 2,203 African American (AA) people. We calculated the optimal MAF threshold by estimating the frequency cut-off that guaranteed the highest Matthew's Correlation Coefficient (MCC) that discriminated causative from non causative variants, according to a resampling procedure. The estimated frequency threshold of 0.04% was then validated using data from 653 LQTS patients carrying single non-synonymous genetic variants in one of the main LQTS genes (*KCNH2*, *KCNQ1*, *SCN5A*, *KCNE1* and *KCNE2*). Results demonstrated that patients carrying rare variants ($MAF \leq 0.04\%$) were characterized by prolonged QTc duration (median QTc = 478 ms, IQR = 458–505 ms) compared with patients with low frequency variants ($MAF > 0.04\%$) (median QTc = 468 ms, IQR = 459–480 ms) (p -value=0.02). Furthermore, when we evaluated the discriminating potential of this calculated threshold to identify high-risk cardiac events (e.g. syncope, cardiac arrest), we demonstrated that patients carrying variants with $MAF < 0.04\%$ experienced cardiac events before the age of 40 in absence of therapy ($p=0.05$).

Conclusions: We identified a method, based on the allele frequency, for discriminating between genetic causative variants and those with a mild effect in LQTS patients in the absence of in vitro data. This may have relevance in assisting clinicians to correctly interpret genetic testing when deciding the causal effects of genetic variants.

O276

Is there a “dose effect” relationship between amount of myocardial fibrosis and arrhythmic risk in non-ischemic dilated cardiomyopathy?

Manuel De Lazzari (a), Martina Perazzolo Marra (a), Alessandro Zorzi (a), Giulia Vettor (a), Filippo Zilio (a), Veronica Spadotto (a), Federico Migliore (a), Maria Chiara Siciliano (a), Ana Susac (b), Benedetta Giorgi (b), Cristina Basso (b), Giuseppe Tarantini (a), Luisa Cacciavillani (a), Diego Miotto (b), Francesco Tona (a), Gaetano Thiene (b), Sabino Iliceto (a), Domenico Corrado (a)

(a) Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, Italy, (b) Department of Diagnostic and Medical Sciences, University of Padua, Padua, Italy

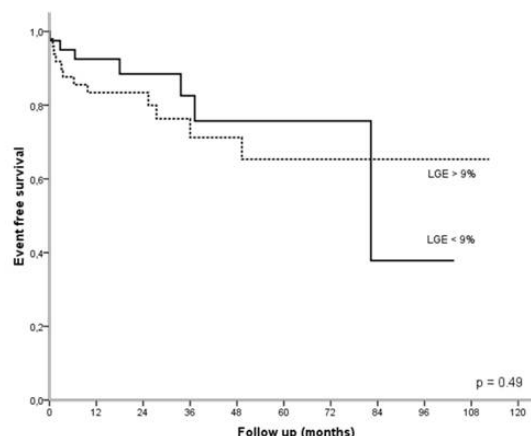
Background: Although risk stratification for sudden cardiac death (SCD) in non-ischemic dilated cardiomyopathy (NIDC) relies on left ventricular (LV) dysfunction, predictors indicating the myocardial substrates of tissue heterogeneity causing arrhythmias remain to be established.

Aim: The aim of the present study was to assess the role of presence and amount of late gadolinium enhancement (LGE) as detected by contrast-enhanced cardiac magnetic resonance (CE-CMR) for risk stratification.

Methods: 137 consecutive patients (108 males; median age 49 years) with NIDC ($EF \leq 50\%$) were prospectively enrolled. All patients underwent CE-CMR and were followed for the primary arrhythmic end point of sustained ventricular tachycardia (SVT), appropriate ICD intervention and sudden cardiac death (SCD). For each patient the LGE was classified and quantified as percentage of LV mass.

Results: LGE was identified in 76 patients (55.5%), as midwall/subepicardial stria and affected a median of LV mass of 9%. During the follow-up (median 3 years), 22 patients (16.1%) reached the primary arrhythmic end-point, in particular SVT in 8, SCD in 5, appropriate ICD interventions in 9. On univariate analysis, the variables significantly associated with the arrhythmic composite end point were the presence of LGE (HR 4.17; 95% CI 1.56-11.2, $p=0.005$), and not its amount (HR 1.94; 95% CI 0.98-1.09, $p=0.18$), and the presence of left bundle branch block (HR 2.43; 95% CI 1.01-5.41, $p=0.048$). Kaplan-Meier analysis revealed a significant correlation between the presence of LV-LGE and occurrence of malignant arrhythmic events ($p=0.002$). On multivariable analysis, after adjustment for LV EF, only the LGE presence, and not the extent, remained an independent predictor of malignant arrhythmic outcome (HR= 3.8; CI:1.3-10.4; $p=0.01$).

Conclusions: We found that demonstration of myocardial LGE in patients with NIDC is independently associated with an adverse arrhythmic prognosis while the measurement of scar amount does not provide additional prognostic value. In NIDC patients, LGE detection may contribute to assess the arrhythmogenic risk and to identify candidates for ICD therapy regardless the EF.



O277

The ryanodine receptor gene variant G1886S associated with the risk of appropriate ICD intervention and history of aborted SD in patients with heart failure

Pietro Francia (a), Carmen Adduci (a), Agnese Ricotta (a), Rosita Stanzone (b), Isabella Sensini (a), Arianna Uccellini (a), Alessandra Frattari (a), Cristina Balla (a), Maria Cotugno (b), Speranza Rubattu (a, b), Massimo Volpe (a, b)

(a) *Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza Università di Roma, Italy*, (b) *I.R.C.C.S. Neuromed, Pozzilli (IS), Italy*

Introduction: Genetic predisposition to ventricular arrhythmias in heart failure (HF) has been suggested. Ca²⁺ plays a crucial role in cardiac electrical stability. Spontaneous Ca²⁺ release through the cardiac ryanodine receptor (RyR2) during diastole induces delayed after-depolarization, leading to lethal arrhythmias. A Serine residue replacing Glycine at position 1886 (G1886S or rs3766871) causes a significant increase in the intracellular Ca²⁺ oscillation activity compared with cells expressing wild-type RyR2 protein. We investigated whether the G1886S variant of the RyR2 gene is associated with sustained VT/VF or history of aborted sudden cardiac death (SCD) in a population of HF patients carrying an implantable cardioverter-defibrillator (ICD).

Methods: We recruited a cohort of HF patients implanted with a primary or secondary prevention ICD. Primary prevention patients were followed from device implantation to the time of the first appropriate ICD intervention or routine follow-up visit. Patients were then divided in cases (secondary prevention patients or primary prevention patients that experienced appropriate ICD intervention for VT/VF) and controls (primary prevention patients that never experienced appropriate device intervention). All study subjects were genotyped with respect to the rs3766871 RyR2 gene variant. The association between the gene variant and case/control status was assessed by logistic regression analysis using a dominant genetic model. Multivariate analyses were adjusted for confounding factors.

Results: 170 HF patients with a primary (n= 146) or secondary (n= 24) prevention ICD were recruited. 59 patients (cases, 35%) had a least one appropriate ICD intervention during 31±23 months follow-up after device implantation (n= 35) or had the ICD implanted after sustained VT/VF or aborted SCD (n= 24). 111 patients (controls, 65%) received a primary prevention ICD but never experienced appropriate device intervention after a mean follow-up of 38±22 months.

Mean age was 63±11 years, and 86% of patients were males. HF etiology was ischemic in 59%. Mean ejection fraction was 27±8%. 38% of patients was implanted with a biventricular ICD.

The rs3766871 RyR2 minor allele variant was found significantly more often in cases than in controls (13.6 compared with 4.5%, p= 0.03). In logistic regression analysis the rs3766871 RyR2 minor allele variant was associated with appropriate ICD intervention or history of VT/ aborted SD (HR: 3.32; 95 % CI, 1.03– 10.36; p = 0.04).

Conclusions: In our study population patients carrying the rs3766871 minor allele variant of *RYR2* had a 3-fold greater HR for appropriate ICD intervention or history of aborted SCD as compared to subjects carrying the rs3766871 wild-type allele. Based on our results, it appears that the G1886S RyR2 gene variant may alter Ca²⁺ signaling in the failing heart, thus resulting in higher occurrence of life-threatening arrhythmias when other risk factors co-exist.

O278

Lo stato neurologico del paziente, entro le prime ore dalla ripresa dell'arresto cardiaco extraospedaliero non è predittivo di danno neurologico permanente: caso clinico.

Valentina Pelizzoni (a), Daniela Aschieri (a), Stefano Ferraro (a), Deborah Bertoncelli (a), Stefano Nani (b), Federico Guerra (c), Alessandro Capucci (c)

(a) *UO Cardiologia Osp. G. Da Saliceto Piacenza*, (b) *UO Emergenza Territoriale-servizio 118 Osp. G. Da Saliceto Piacenza*, (c) *Clinica di Cardiologia Ospedale Torrette Ancona*

Introduzione: Nel paziente resuscitato da arresto cardiaco, in particolare da fibrillazione ventricolare, vengono considerate prognostiche le condizioni neurologiche rilevate immediatamente dopo la ripresa di circolo. Nella nostra pratica clinica abbiamo riscontrato numerosi casi di pazienti, ripresi dopo arresto cardiaco, con stato neurologico suggestivo di lesioni cerebrali irreversibili, regredito nelle ore successive all'ospedalizzazione con risveglio del paziente senza danni neurologici. Riportiamo un caso clinico esemplificativo.

Caso clinico: un uomo di 60 anni, cadeva a terra privo di coscienza nel giardino di casa; la moglie, testimone della caduta, attira l'attenzione dei vicini che si recano sul posto e allertano il 118. Il paziente non è cosciente, presenta scariche tonico cloniche della durata di circa 2 minuti e respira male. Le pupille sono miotiche e lo sguardo risulta deviato a destra. In pochi secondi il paziente va in arresto respiratorio, gli astanti sul posto si procurano un defibrillatore (dae) ad uso pubblico, collocato a circa 100 metri dall'abitazione e lo applicano al paziente. Sono passati 4 minuti dal momento dell'arresto, il dae viene applicato al paziente, dato il riscontro di fibrillazione ventricolare viene consigliata ed erogata una scarica e, data l'assenza di segni vitali, gli astanti proseguono con la rianimazione cardiopolmonare. Dopo 2 minuti le manovre vengono interrotte per ripresa di respiro, polso centrale e periferico. Dopo 11 minuti dalla chiamata arriva sul posto l'auto medica del 118 che prosegue con l'intubazione oro-tracheale data la presenza di coma (GCS 4), il paziente viene caricato e trasportato in ambulanza all'ospedale di Piacenza. Durante il trasporto vengono rilevati segni di decerebrazione da parte del paziente e all'arrivo in ospedale viene immediatamente sottoposto a TAC encefalo, con risultato negativo. Viene sottoposto a procedura coronarografica che rileva coronarie indenni, anche l'ECG all'ingresso risulta negativo per lesioni ischemiche e/o aritmie. In anamnesi non patologie cardiologiche, familiarità per displasia aritmogena del ventricolo destro (il fratello è portatore di AICD). Data la persistenza di coma, il paziente viene sottoposto a ipotermia terapeutica con Artic Sun raggiungendo un target di 32-34°C per 36 ore, con successivo riscaldamento attivo (0,4°/h) con progressivo svezzamento dalla sedazione, rendendo possibile l'estubazione in 3° giornata. Quadro neurologico al risveglio sovrapponibile a quello anamnestico, assenza di lesioni neurologiche. Dopo l'impianto di AICD (all'ECO e RMN non vengono rilevate lesioni patologiche) il paziente viene dimesso in 10° giornata.

Conclusioni: nel paziente sopravvissuto da arresto cardiaco, lo stato neurologico registrato nelle ore successive al ROSC non è predittivo di danno neurologico.

O279

Endocardial homogenization of the scar improves the long-term outcomes of catheter ablation of ventricular arrhythmias in patients with ischemic cardiomyopathy and cardiac bypass surgery

Luigi Di Biase (a, b, c), Francesco Santoro (c), Pasquale Santangeli (a, c), John David Burkhardt (a), Prasant Mohanty (a), Corrado Carbucicchio (d), Javier Sanchez (a), Rong Bai (a), Sagamitra Mohanty (a), Chintan Trivedi (a), Antonio Dello Russo (a), Michela Casella (d), Richard Hongo (e), Dhanujay Lakkireddy (f), Robert A. Schweikert (g), Claude S. Elayi (h), Claudio Tondo (d), Andrea Natale (a)

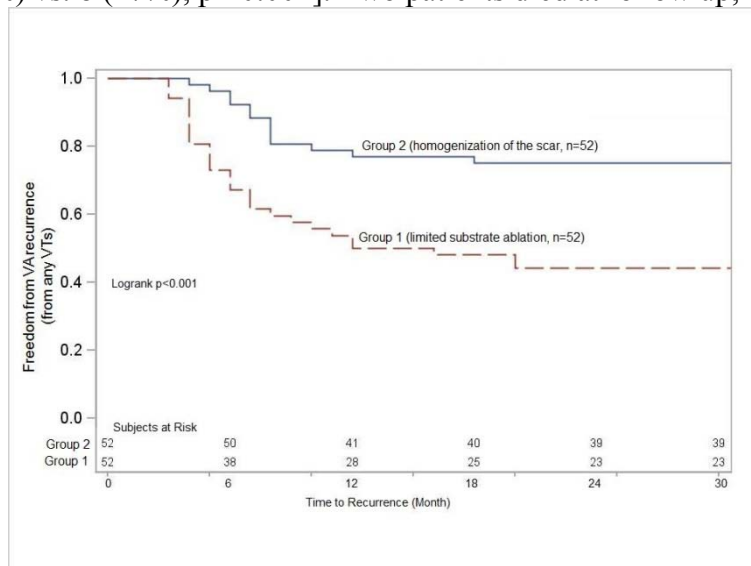
(a) Texas Cardiac Arrhythmia Institute, St. David's medical center, Austin, Texas, USA, (b) Albert Einstein, College of Medicine, Montefiore Hospital, New York, New York, USA, (c) Department of Cardiology, University of Foggia, Foggia, Italy, (d) Monzino Hosp, Milan, Italy, (e) California Pacific Medical Ctr, San Francisco, CA, USA, (f) Univ of Kansas, Kansas City, MS, USA, (g) Akron General Hosp, Akron, OH, USA, (h) Univ of Kentucky, Lexington, KE, USA

Background: Catheter ablation of ventricular arrhythmias (VA) has shown moderate success rate at long term follow-up in patients with ischemic cardiomyopathy and previous cardiac bypass surgery (CABG).

Objective: We compared two different substrate approaches for the treatment of these arrhythmias.

Methods: 104 consecutive patients with ischemic cardiomyopathy and with previous CABG underwent catheter ablation for VA. Patients were treated either with limited substrate ablation confined to the endocardial isthmus responsible for the VT (Group 1, n= 52, 82% male, 62±8 years, LVEF 27±5%), or underwent endocardial ablation of all abnormal potentials within the scar in sinus rhythm (homogenization of the scar, Group 2, n=52, 80% male, 61±10 years, LVEF 26±8%).

Results: Baseline characteristics were not different between groups. During a mean follow-up of 22±8 months, the VAs recurrence from any VTs was 56% (29/52 pts) in Group 1 and 25% (13/52 pts) in Group 2 (log-rank p<0.001) (figure). In addition, a higher number of patients were off AADs in group 2 vs group 1 [9 (70%) vs. 8 (27%), p <0.001]. Two patients died at follow up, one per group.



Conclusions: Ablation of ventricular arrhythmias in ischemic patients with previous CABG using endocardial homogenization of the scar significantly increases the freedom from any VTs at the long term follow up.

STENT DI NUOVA GENERAZIONE

O280

Bioresorbable Vascular Scaffold in off-label lesions: acute and 1 month follow-up clinical outcomes.

Claudia Tamburino (a), Giovanni Longo (a), Piera Capranzano (a), Davide Capodanno (a), Alessio La Manna (a), Carmelo Grasso (a), Carmelo Sgroi (a), Bruno Francaviglia (a), Guilherme Ferragut Attizzani (a), Yohei Ohno (a), Corrado Tamburino (a)

(a) *Cardiologia Universitaria Ospedale Ferrarotto*

Objectives: The aim of this study was to evaluate short-term clinical outcomes of bioresorbable vascular scaffold (BVS) implantation in off-label lesions.

Background: Clinical data associated with the real-world use of BVS in unselected, off-label lesions is missing.

Methods and results: A total of 47 unselected patients were treated with BVS implantation from March 2013 to mid May 2013, in a single center. Among these, 28 patients (59.6%) underwent BVS implantation in "off-label" lesions or settings, including: 12 (42.9%) ST-elevation myocardial infarction (MI); 9 (32.1%) non-ST elevation MI, 10 (35.7%) bifurcations; 2 (7.1%) chronic total occlusions (CTO); one (3.6%) left main; 2 (7.1%) full plastic jackets (≥ 60 mm length); and one (3.6%) in-stent restenosis. A total of 47 BVS were implanted, with a mean scaffold diameter of 3.21 ± 0.34 mm and a mean scaffold length of 24.6 ± 4.8 mm. Intra-coronary imaging (intravascular ultra-sound and/or optical coherence tomography) was used in all to confirm full expansion, good apposition of the scaffold and presence of dissection. A dissection post-BVS implantation was detected in 3 (10.7%) lesions and all were successfully treated. No adverse clinical events occurred during procedure and during hospitalization. A 30-day clinical follow-up was achieved in all patients. No adverse events occurred during follow-up.

Conclusions: BVS implantation was implanted in unconventional lesions or settings, demonstrating to have a safe profile in terms.

O281

Registro monocentrico di stent Absorb in biforcazioni coronariche in pazienti giovani

Renatomaria Bianchi (a), Paolo Calabrò (a), Luca Baldini (a), Roberto Padalino (a), Mario Crisci (a), Gaetano Di Palma (a), Elisabetta Moscarella (a), Vincenzo Diana (a), Luca Tarotto (a), Roberto Giordano (a), Serena Prizio (a), Ludovica D'Acerno (a), Donato Tartaglione (a), Maurizio Cappelli Bigazzi (a), Maria Giovanna Russo (a), Raffaele Calabrò (a)

(a) *Cardiologia Seconda Univeristà degli studi di Napoli AO dei Colli - Monaldi, Napoli*

Background: Lo stent coronarico riassorbibile meglio definito come "bioresorbable vascular scaffolds" – BVS è stato oggetto negli ultimi anni di numerosi studi clinici in pazienti selezionati in trials clinici con lesioni de novo, con particolare utilizzo nei soggetti giovani. Ancora poco discusso è il suo utilizzo in condizioni "off-label" quale setting delle SCA, occlusioni croniche e biforcazioni.

Scopo: Obiettivo del nostro studio è ottenere un registro degli stent Absorb in pazienti giovani (età < 60 anni) in biforcazioni coronariche con small side branch trattate con tecnica provisional stenting e valutarne:

- 1) incidenza della occlusione dello small side branch (SBO)
- 2) Incidenza di IMA periprocedurale
- 3) MACE a 30 giorni

Metodi: sono stati impiantati presso il nostro Laboratorio di Emodinamica 16 stent Absorb in 12 pazienti con malattia aterosclerotica coronarica per un totale di 13 lesioni in biforcazione. Sono stati

esclusi pazienti con side branch > 2.0 mm, con classificazione Medina 0.1.1 e 1.1.1 o dove era previsto trattamento in partenza con tecnica che prevedeva impianto di due stent. La definizione di SBO è flusso TIMI finale 0-1. I MACE valutati a 30 giorni sono TVR, IM, Morte.

Risultati: L'età media dei pazienti arruolati è di 47.3 anni con BMI di 25.8. La procedura è stata per via radiale in 11 casi (91%). I fattori di rischio erano i seguenti: 7 pazienti (58%) con Iperensione Arteriosa, 6 (50%) Fumatori, 5 (41%) con dislipidemia e 4 (33%) con Diabete. La presentazione clinica era angina stabile in 9 casi (75%) mentre in 3 casi (25%) NSTEMI-ACS a basso rischio (Grace Score <80). Tutti i pazienti erano in doppia terapia antiaggregante piastrinica con ASA 100 mg e Clopidogrel 75 mg (100%). La Classificazione lesioni coronariche era Ellis B1 in 2 casi (17%); B2 in 5 casi (30%) e C in 7 casi (53%). La Classificazione Medina 1-1-0 in 7 casi (58%) 1-0-0 in 4 casi (33%) e 0-1-0 in 2 casi (17%) La tecnica utilizzata per il trattamento della biforcazione è sempre stata il provisional stenting (100%).

La SBO si è verificata in 1 caso (8.3%) ed IMA periprocedurale in 2 casi (16.6%). A 30 giorni l'incidenza cumulativa di MACE è stata del 16.6%. Non si sono verificati decessi e/o sanguinamenti maggiori.

Conclusioni: L'utilizzo di BVS in biforcazioni non protette con small side branch < 2.0 mm in pazienti giovani ha mostrato buon risultato angiografico immediato e nel follow up a breve termine (30 giorni). Ulteriori studi clinici, prolungamento del follow up ed utilizzo di tecniche di imaging quali IVUS o OCT aggiungeranno nuovi dati per un maggiore utilizzo di questa tecnologia con attuale indicazione "off-label".

O282

Resorbable-polymer stent versus Unresorbable-polymer stent Deployment for coronary Intervention (RUDI-2) study Evidence from the 3139-patient

Mauro Pennacchi (a), Gennaro Sardella (a), Carlo Briguori (b), Roberto Garbo (c), Enrico Romagnoli (d), Michael Donahue (b), Giacomo Boccuzzi (c), Francesco Summaria (d), Giulia Conti (e), Emanuele Canali (e), Filippo Placentino (a), Simone Calcagno (a), Rocco Stio (a), Luigi Lucisano (a), Giuseppe Biondi Zoccai (f), Massimo Mancone (a), Francesco Fedele (a)

(a) Policlinico Umberto I, Sapienza University of Rome, Rome, Italy, (b) Clinica Mediterranea, Naples, Italy, (c) San Giovanni Bosco Hospital, Turin, Italy, (d) Policlinico Casilino, Rome, Italy, (e) Aurelia Hospital, Rome, Italy, (f) Department of Medico-Surgical Science and Biotechnologies, Sapienza University of Rome, Latina, Italy

Background: Second-generation drug-eluting stent (DES) with resorbable-polymers (biolimus-eluting stents [BES]) have been introduced into clinical practice with favorable results in comparison to first-generation DES. However, their risk-benefit balance in comparison to second-generation permanent-polymer DES, i.e. everolimus-eluting stents (EES) and zotarolimus-eluting stents (ZES) is uncertain.

Objectives: The aim of this study was to compare the long-term efficacy and safety of biodegradable-polymer with permanent-polymer drug-eluting stents in a large, real world, population.

Methods: Consecutive patients treated with BES, EES, or ZES at 4 high-volume centers were included. Baseline, procedural and long-term (>12 months) outcome data were collected. The primary end-point was the long-term rate of major adverse cardiac events (MACE). Extensive multivariable analyses with propensity adjustment were performed for hypothesis testing, yielding hazard ratios (HR) with 95% confidence intervals.

Results: A total of 3139 all-comers patients were included (818 [26.1%] receiving only BES, 1433 [45.7%] EES, and 888 [28.3%] ZES). Multivariable and propensity-adjusted analysis for long-term events showed that ZES had significantly higher rates of MACE in comparison to EES (HR=1.94 [1.20-3.13, p=0.007]), as well as of death (HR=2.92 [1.17-7.25], p=0.021), cardiac death (HR=2.87 [1.16-7.13], p=0.023), and myocardial infarction (HR=2.88 [1.22-6.77], p<0.05). Superiority of EES

in comparison to BES for the long-term risk of MACE was also shown (HR=0.59 [0.36-0.97], p=0.039). Conversely, BES and ZES yielded similar risks for long-term adverse events.

Conclusions: In this observational study of 3139 real-world patients, EES appeared superior to both BES and ZES, calling into question the hypothetical benefit of DES with resorbable polymers.

O283

Everolimus eluting bioresorbable vascular scaffolds in patients with st-segment myocardial infarction. safety feasibility and acute performance

Roberto Diletti (a), Robert Jan van Geuns (a), Patrick W. Serruys (a)

(a) *Interventional Cardiology Department, Thoraxcenter Erasmus MC, Rotterdam, The Netherlands*

Background: No data are currently available on the use of everolimus eluting bioresorbable vascular scaffolds (BVS) in patients presenting with ST-segment elevation myocardial infarction (STEMI).

Methods: The present report is a prospective, single arm, single centre study evaluating the safety, feasibility and performance of BVS for treatment of consecutive patients presenting with STEMI. Baseline quantitative coronary angiography and post-implantation optical coherence tomography (OCT) data were evaluated. Clinical outcomes are reported at 30-day follow-up.

Results: The intent-to-treat population comprises a total of 40 patients. The procedural success was 97.5% (39/40 patients). Mean door-to-needle time was 30.33 ± 18.51 min. Male gender was present in 31 patients (77.5%). Mean age was 57.9 ± 9.8 years. Pre-procedure TIMI flow was 0 in 52.6% of the patients; Thrombectomy was performed in 31 patients (79.5%), and additional balloon dilatation in 22 subjects (56.5%). After BVS implantation a TIMI flow III was achieved in 35 patients (89.7%), no reflow was observed in 1 case (2.6%), and distal embolization in 7 cases (17.9%). The post-procedure %diameter stenosis was $15.3 \pm 8.2\%$. MI SYNTAX score I and II were respectively 10.5 (7.5-15.0) and 8.0 (5.0-13.0).

OCT analysis was performed in a total of 25 patients. The mean lumen area was 7.76 ± 1.88 mm², minimum lumen area 5.61 ± 1.48 mm², minimum flow area 5.29 ± 1.54 mm², mean incomplete stent apposition area 0.131 ± 0.179 mm², mean prolapse area 0.58 ± 0.28 mm², mean intraluminal material area 0.013 ± 0.017 mm²; mean %malapposed struts $2.80 \pm 4.11\%$, scaffolds with >5% malapposed struts were 5.

At 30-days follow-up the MACE rate was 2.6%, this was due to a non-target vessel Non Q-Wave myocardial infarction (MI), Target vessel failure rate was 0%. No target vessel revascularisation, and target vessel MI were reported. No cases of cardiac death or scaffold thrombosis were observed.

Conclusion: The use of BVS in patients presenting with acute myocardial infarction was observed to be safe and feasible. Angiographic and OCT data showed optimal acute results with high rate of TIMI III flow, low residual stenosis and good apposition of the scaffold.

O284

Procedural and short-term clinical outcomes in patients treated with bioresorbable vascular scaffolds.

Giovanni Longo (a), Claudia Tamburino (a), Piera Capranzano (a), Davide Capodanno (a), Alessio La Manna (a), Carmelo Grasso (a), Carmelo Sgroi (a), Bruno Francaviglia (a), Guilherme F. Attizzani (a), Yohei Ohno (a), Corrado Tamburino (a)

(a) *Istituto di Cardiologia, Ospedale Ferrarotto, Catania*

Objectives: The aim of the study was to evaluate procedural and short-term safety and efficacy of bioresorbable vascular scaffolds (BVS) implantation in a real-world setting.

Background: Data associated with the real-world use of BVS in unselected lesions is missing.

Method and results: A total of 47 unselected patients were treated with BVS in a single center, from March to May 2013. In only 4 patients (8.5%) a metallic stent was also implanted. Clinical and angiographic characteristics of evaluated patients are summarized in Tables 1 and 2, respectively. Two third of patients were ≤ 65 years old. Most patients (63.8%) presented with an acute coronary syndrome and in all of these patients BVS were implanted in the culprit lesion. The left anterior descending was the vessel more often treated (47.2%). In one case a saphenous vein graft was treated. Ten (18.8%) BVS treated lesions were located at the bifurcation level; a total coronary occlusion was treated in 2 cases (3.8%); and 1 (1.9%) treated lesion was an in-stent restenosis. Lesions treated with BVS in overlapping were 13 (24.5%). A dissection post-BVS implantation was detected in 5 (9.4%) lesions and all were successfully treated. No adverse clinical events occurred during procedure and during hospitalization. A 30-day clinical follow-up was achieved in all patients. No adverse events occurred during follow-up.

Conclusions: This study showed that BVS use in unselected lesions was associated with good procedural and short-term safety and efficacy outcomes. Longer follow-up and larger samples are needed to confirm these promising results.

Table n. 1 – Clinical Characteristics

| | n. 47 |
|--------------------------|---------------|
| Age mean \pm DS, years | 60 \pm 9.36 |
| Age ≤ 65 | 33 (70.2) |
| Male, n (%) | 42 (89.4) |
| Hypertension, n (%) | 37 (78.7) |
| Diabetes, n (%) | 6 (12.8) |
| Insulin Dependent, n (%) | 2 (33.3) |
| Smoking, n (%) | 16 (34.0) |
| Dyslipidemia, n (%) | 26 (55.3) |
| Family History, n (%) | 23 (48.9) |
| Prior PCI, n (%) | 19 (40.4) |
| Prior CABG, n (%) | 2 (4.2) |
| CKD, n (%) | 16 (34.0) |
| Stable Angina, n (%) | 17 (36.2) |
| UA/NSTEMI, n (%) | 18 (38.3) |
| STEMI, n (%) | 12 (25.5) |

Table n. 2 – Angiographic Characteristics

| | n. 53 |
|-----------------------------------|------------------|
| Treated vessel, n (%) | |
| Left Anterior Descending | 25 (47.2) |
| Left Circumflex | 13 (24.5) |
| Right Coronary Artery | 15 (28.3) |
| Total number of BVS | 72 |
| Number of BVS per lesion | 1.36 |
| Lesion Type (ACC/AHA), n (%) | |
| Type A | 20 (37.7) |
| Type B ₁ | 22 (41.6) |
| Type B ₂ | 5 (9.4) |
| Type C | 6 (11.3) |
| Bifurcation, n (%) | 10 (18.8) |
| Chronic Total Occlusion, n (%) | 2 (3.8) |
| Overlap, n (%) | 13 (24.5) |
| Lesion Length (Mean \pm DS), mm | 30.32 \pm 11.7 |
| Proximal RVD (Mean \pm DS), mm | 3.11 \pm 0.9 |
| Distal RVD (Mean \pm DS), mm | 2.95 \pm 0.9 |
| BVS Length (Mean \pm DS), mm | 33.43 \pm 11.5 |
| BVS Diameter (Mean \pm DS), mm | 3.12 \pm 0.8 |
| In-Stent Restenosis n, (%) | 1 (1.9) |

RVD: Reference Vessel Diameter

O285

Avantgarde™ Carbostent implantation and short DAPT in high bleeding risk patients

Daniela Trabattoni (a), Franco Fabbicocchi (a), Piero Montorsi (b), Giuseppe Calligarsi (a), Giovanni Teruzzi (a), Alessandro Lualdi (b), Stefano Galli (a), Paolo Ravagnani (a), Cristina Ferrari (a), Antonio Bartorelli (b)

(a) *Centro Cardiologico Monzino, IRCCS- Dipartimento di Scienze Cardiovascolari, Milano*, (b) *Centro Cardiologico Monzino, IRCCS, Università degli Studi di Milano*

Background: Coronary stenting in patients who need undelayable surgery or who are at high risk of bleeding is challenging.

Aim: To evaluate safety and efficacy of a short dual antiplatelet therapy (DAPT) after Avantgarde™ Carbofilm-coated stent (CID Vascular, Saluggia, Italy) implantation in this high-risk subset of patients.

Methods: Patients with contraindications to standard DAPT duration (severe anemia 20%, thrombocytopenia 15%, scheduled surgery for cancer 30%, cardiac surgery for severe aortic valve stenosis 20% and intracranial hemorrhage 15%) were consecutively treated with Avantgarde™ stenting and clinically followed-up at 1 and 9 months.

Results: Seventy-five patients (70% male, mean age 72 ± 11 years) with 97 coronary lesions (5 LM; 43 LAD; 16 LCx-obtuse marginal; 30 RCA; 3 venous grafts) received Avantgarde™ Carbofilm-coated stents (mean stent n°/pt 1.25 ± 0.61). Multivessel stenting was performed in 53% of cases with one third of long lesions (31%; mean stented segment length 28.8 ± 19 mm; range 12-66 mm; stents >25 mm: 41%) and small vessels (<2.5mm: 12%) treated. High pressure stent postdilation (17.1 ± 2.4 atm) was performed in all cases. Procedural success was 100%. Average DAPT treatment lasted 18 ± 4.7 days (range 7-30 days). The cumulative incidence of in-hospital MACE was 5.3% (all post-procedural non-Q MI). Major bleeding occurred in two (2.5%) patients due to retroperitoneal (n=1) and cerebral (n=1) hemorrhage without clinical sequelae. At follow-up (>6 mos), currently available in 48 out of 75 (64%) patients, a low (10.9%) cumulative rate of death, myocardial infarction, recurrent angina and target lesion/vessel revascularization was observed. In-stent restenosis occurred in four (8.3%) patients so far and was treated with drug-eluting stent (n=2) or balloon (n=2). No early or late stent thrombosis occurred.

Conclusions: Real-world use of the Avantgarde™ Carbofilm-coated stent in high bleeding risk patients treated with short DAPT is safe and associated with excellent immediate and mid-term outcomes.

VALUTAZIONE NON INVASIVA DELLA CORONOPATIA

O286

Prognostic value of CT angiography in coronary bypass patients: a 73 months follow-up study.

Saima Mushtaq (a), Daniele Andreini (a, b), Gianluca Pontone (a), Edoardo Conte (a), Erika Bertella (a), Andrea Baggiano (a), Andrea Annoni (a), Alberto Formenti (a), Cesare Fiorentini (a, b), Mauro Pepi (a)

(a) *Centro Cardiologico Monzino IRCCS, (b) Department of Clinical Sciences and Community Health, Cardiovascular Section, University of Milan*

Purpose: Multidetector computed tomography coronary angiography (MDCT-CA) is a non-invasive and accurate tool for the detection of obstructive coronary artery disease and for the evaluation of coronary artery bypass graft (CABG) patency and MDCT-CA appears to have prognostic value in patients without previous revascularization. However, the prognostic value of MDCT-CA in CABG patients is still unclear. Aim of the present study is to investigate the long-term prognostic value of MDCT-CA in a large population of CABG patients.

Methods: Between March 2005 and April 2009, 721 CABG patients (mean age 66.8 ± 8.4 , 577 males) were enrolled in our study. Patients were classified by unprotected coronary territory (UCTs) or a summary of native vessel disease and graft patency: the coronary artery protection score (CAPS). The composite rate of hard cardiac events (cardiac death, non-fatal myocardial infarction, unstable angina) and all cardiac events (including revascularization) were end points of the study.

Results: 10 patients were excluded because MDCT-CA data set was uninterpretable. Of the remaining 711, clinical follow up (mean 73.5 ± 14 months) was obtained in 698 patients. By univariate analysis, the strongest MDCT-CA predictors of hard and all events were UCT 2 and 3 and CAPS 4 and 8. Cumulative event-free survival was 85% for hard events and 75% for all events in patients with UCT 0, 75% for hard events and 50% for all events in patients with UCT 1, 30% for hard events and 8% for all events in patients with UCT 2 and 10% for hard events and 2% for all events in patients with UCT 3. Cumulative event-free survival by CAPS ranging from 95% for hard events and 90% for all events in patients with CAPS 2 and 3% for hard events and 2% for all events in patients with CAPS 4.

Conclusions: MDCT-CA appears to be a promising tool for long-term risk stratification of CABG patients. Particularly, assessing prognosis by UCTs appears to have prognostic value in CABG patients more than CAPS score.

O287

Minima radiazione ionizzante nella diagnostica della cardiopatia ischemica mediante tomografia computerizzata

Stefano Bentivegna (a), Marco Cappelletti (b), Elena Ciortan (b), Roberto Moltrasi (b), Enrico Schwarz (a)

(a) *U.O. Cardiologia, Casa di Cura Igea, Milano, (b) U.O. Radiologia, Casa di Cura Igea, Milano*

La tomografia computerizzata multistrato per lo studio delle coronarie (cardioTC) è una valida alternativa alla coronarografia, codificata dalle linee guida 2010, in pazienti sintomatici con anamnesi negativa (appropriata in pz a rischio intermedio, sia con sintomi non acuti quanto in caso di acuzie con probabilità pre test bassa o intermedia), quanto in pz asintomatici con anamnesi negativa ma a rischio intermedio/alto. Le radiazioni degli scanner di penultima generazione rimanevano elevate, sconsigliandone impieghi su vasta scala; tuttavia, con la recente introduzione della cardioTC multistrato e acquisizione delle immagini in un solo ciclo cardiaco, si è notevolmente ridotta la dose di radiazioni, mantenendo invariato il livello di accuratezza diagnostica. Scopo dello studio è stato

valutare la riduzione, rispetto alle cardioTC precedenti a 64 strati, della dose di radiazioni ionizzanti somministrata al paziente

Materiale e Metodi: Dal gennaio 2010 al maggio 2013 abbiamo sottoposto 1443 pazienti a cardioTC coronarica con tecnologia Somatom Definition Flash (Siemens). L'età media era di 69.4 aa (d.s. 10.4). Tutti i pazienti erano a digiuno da almeno 6 ore, con frequenza cardiaca tra 60 e 80 bpm; è stato somministrato un betabloccante nel 48% dei casi e nitrato sublinguale nel 100%, per migliorare la vasodilatazione coronarica.

Risultati: L'acquisizione "monobattito" (in un solo ciclo cardiaco) è stata impiegata nel 54% dei casi (781 pz), con una dose media assorbita di 0.9 mSv (d.s. 0.44), ridottasi a meno di 0.7 mSv in 121 pz (8%). Nel rimanente 36% (524 casi) è stata impiegata un'acquisizione sequenziale con una dose media di 5.6 mSv (d.s. 3.7), mentre è stato necessario ricorrere alla tecnica spirale solo in 67 pz (4.6%), con un assorbimento medio di 8.7 mSv (d.s. 6.2). Considerati solo i 781 casi in cui è stato possibile acquisire con metodica "monobattito", l'assorbimento è risultato molto contenuto, attestandosi tra 0.7 e 1.3 mSv nel 65% dei casi. Tale dato è ben diverso dagli 11 ± 4 mSv, riportati in letteratura come dose media di una cardioTC a 64 strati

Conclusioni: I nostri dati hanno confermato che l'acquisizione "monobattito" (in un solo ciclo cardiaco), riduce l'emissione di radiazioni ionizzanti, pur mantenendo elevata la qualità diagnostica delle immagini, come già validato in studi di confronto con la coronarografia.

In più della metà dei casi è sufficiente un singolo battito per l'acquisizione, con una dose di radiazioni molto contenuta nel 65% dei casi (0.7-1.3 mSv), ed estremamente contenuta in un ulteriore 15.5% (<0.7 mSv).

Ciò apre nuove prospettive per la cardioTC, rendendola proponibile come primo approccio diagnostico in pazienti per i quali l'elevata radiazione assorbita era il principale limite, quanto in pazienti asintomatici ad alto rischio, essendo nota la ridotta sensibilità/specificità del test ergometrico. L'elevato valore predittivo negativo della metodica consente di risparmiare i rischi e le radiazioni di una coronarografia, ridimensionandone l'indicazione solo in quanto prodromica all'angioplastica.

O288

Myocardial perfusion imaging using dual-energy computed tomography: first experience

Erika Bertella (a), Gianluca Pontone (a), Daniele Andreini (a), Saima Mushtaq (a), Monica Loguercio (a), Sarah Cortinovis (a), Andrea Baggiano (a), Edoardo Conte (a), Andrea Daniele Annoni (a), Alberto Formenti (a), Maria Petullà (a), Mauro Pepi (a)

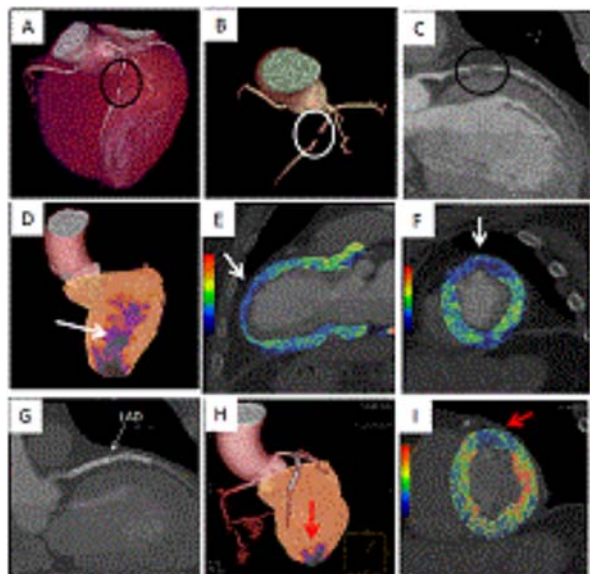
(a) Centro Cardiologico Monzino, IRCCS, Milano

Purpose: Evaluation of myocardial perfusion imaging (MPI) by single-energy computed tomography is limited by beam hardening (BH). Recently, dual-energy CT (DECT) has been introduced for a more reproducible MPI evaluation through the reduction of BH-artefacts by using monochromatic image reconstruction obtained with rapid switching between low and high tube voltage. We present the first human case of stress-CTP using DECT.

Methods and materials: A 61-year-old man referred for chest pain and equivocal stress ECG. To rule out the presence of significant coronary artery disease and ischaemia, a rest-stress DECT was performed (i.v. adenosine injection). A second rest-stress DECT was repeated after coronary angioplasty and stent implantation (PCI+stent).

Results: The exam showed chronic total occlusion (CTO) of the left anterior descending (LAD) coronary artery due to a non-calcified plaque (Panels A and B, arrows) without significant perfusion defect (Panels A and C). Under stress condition, DECT showed a large perfusion defect (18% of myocardial mass) of the anterior wall of the left ventricle (Panels D-F, arrows). Three days later, stress DECT showed patency of LAD stent (Panels G and H, arrows) and significant reduction of the perfusion defect (1.8% of myocardial mass) (Panels G, circle, and I). The total amount of contrast agent and effective radiation dose for a single rest-stress DECT was 120 cc and 4.4 mSv, respectively.

Conclusion: This case demonstrates that DECT may be a useful technique for simultaneous evaluation of coronary anatomy and myocardial perfusion.



O289

Multidetector Computed Tomography Angiography Evaluation of Coronaries Arteries with IntraCycle Motion Correction Algorithm.

Saima Mushtaq (a), Daniele Andreini (a, b), Gianluca Pontone (a), Erika Bertella (a), Edoardo Conte (a), Andrea Baggiano (a), Andrea Annoni (a), Sarah Cortinovia (a), Cesare Fiorentini (a, b), Mauro Pepi (a)

(a) Centro Cardiologico Monzino, IRCCS, (b) Department of Clinical Sciences and Community Health, Cardiovascular Section, University of Milan

Background: Multidetector computed tomography coronary angiography (MDCT-CA) is a reliable diagnostic modality for evaluating patients with suspected CAD, with high diagnostic performance for the detection of significant coronary lesions. However, previous multicenter studies have documented lack in the MDCT-CA diagnostic performance in case of high heart rate (HR), large coronary calcification and severely elevated body mass index. Coronary arterial motion is one of the most common limitations reported, with up to 12% of coronary artery segments judged as non-evaluable. Motion artifacts are more pronounced at higher heart rates and irregular heart rhythms. Among the numerous technological solutions offered to reduce motion artifact, a novel vendor-specific motion-correction (MC) algorithm, the IntraCycle Motion Correction SnapShot Freeze (SSF), has been developed. The method utilizes information from adjacent cardiac phases within a single cardiac cycle to characterize and compensate for coronary motion.

Purpose: To compare the global evaluability and image quality score of MDCT-CA with SSF to standard (STD) reconstructions.

Materials and Methods: 60 patients with HR variability > 5 bpm during the scanning irrespective of HR before scanning (46 patients) or with HR before the scanning > 70 bpm despite metoprolol iv administration (14 patients) were enrolled in our study (mean age $65,8 \pm 10,7$ years, 41 males). MDCT-CA studies for both SSF and STD reconstructions have been presented to two blinded readers in random sequence. The number of artifacts, sub-analysis of the type of artifacts, image quality score and global evaluability of coronaries were compared in the 2 groups.

Results: In 45 patients iv metoprolol (average dose 14 ± 7.7 mg) has been administered before scanning. The average HR during the scan was 67 ± 9 bpm. The post-processing with SSF in comparison to STD showed a significant lower number of severe artifacts (27 vs 178, $p < 0.0001$) and slice misalignment artifacts (8 vs 143, $p < 0.0001$), an improvement of image quality score (356 segments judged as excellent vs 129, $p < 0.0001$) and of global coronary evaluability (97% vs 80.6%, $p < 0.0001$).

Conclusions: Use of MC algorithm SSF facilitate improvements in image quality and global coronary evaluability in patients with high and variable HR.

O290

Approccio non invasivo per lo studio della malattia coronarica con tomografia computerizzata multistrato in soggetti asintomatici ad alto rischio

Oreste Fabio Triolo (a), Angelo Quagliana (a), Silvia Busalacchi (a), Salvatore Evola (a), Ludovico La Grutta (b), Massimo Midiri (b), Salvatore Novo (a)

(a) Dipartimento di Medicina Interna e Specialistica, AOU Policlinico "Paolo Giaccone", Università degli Studi di Palermo, (b) Dipartimento di Biopatologia e Biotecnologie Mediche e Forensi, AOU Policlinico "Paolo Giaccone", Università degli Studi di Palermo

Background: Lo scopo di questo studio è quello di verificare l'attendibilità e l'efficacia dello screening da noi attuato, basato sull'individuazione di soggetti asintomatici ma positivi ad almeno uno o più fattori di rischio cardiovascolari (FDRCV), e sottoporli successivamente ad un esame eco-Doppler carotideo. Ai pazienti con uno o più FDRCV o a coloro che presentavano un ispessimento medio-intimale (IMT) superiore a 0,9 mm, è stato proposto un test provocativo che, se dubbio o non conclusivo, ha fornito indicazione per l'esecuzione di una tomografia computerizzata multidetettore (TCMD) coronarica, previo consenso del paziente.

Metodi: Sono stati arruolati 150 pazienti consecutivi (32 maschi e 23 femmine, età media 60 anni), che presentavano uno o più FDRCV e/o IMT delle arterie carotidi o placca carotidea. Tutti i pazienti sono stati sottoposti ad anamnesi, elettrocardiogramma, ecocardiogramma e test ergometrico; della casistica totale, 55 pazienti presentavano un test ergometrico dubbio o non conclusivo, e pertanto questi ultimi sono stati invitati ad eseguire la TCMD coronarica per valutare la presenza di eventuali stenosi coronariche ed il valore del calcium score.

Risultati: per la TC coronarica è stato utilizzato un apparecchio Siemens a 128 strati. Per facilitare i calcoli statistici abbiamo assegnato ai diversi gradi di stenosi coronarica dei valori da 0 a 4. Dalla somma dei diversi tipi di stenosi abbiamo determinato un punteggio rappresentante la malattia aterosclerotica coronarica complessiva (score ATS coronarico). Dai calcoli statistici effettuati è derivato che non vi era correlazione tra l'IMT e la malattia coronarica ($p=0.75$) ma invece vi era correlazione statisticamente significativa tra la placca carotidea e la coronaropatia studiata con la TCMD ($p=0.02$); inoltre, la correlazione si manteneva significativa quando venivano confrontate le dimensioni della placca carotidea con lo score ATS coronarico valutato alla TCMD ($p=0.05$). Riguardo il valore di calcium score, esso correlava sia con le dimensioni della placca carotidea ($p=0.01$) che con la malattia coronarica ($p < 0.01$). Sono state altresì realizzate delle curve ROC in cui si è notato che la placca carotidea è predittiva di ATS coronarica con una specificità del 80% e sensibilità del 45,9%. Questo ultimo dato mostra, pertanto, che la presenza di una placca carotidea potrebbe probabilmente essere un indicatore di una eventuale lesione coronarica, mentre l'assenza di una placca carotidea, non escluderebbe, con buona probabilità, la presenza di malattia coronarica.

Conclusioni: la sfida odierna consiste nell'individuare i pazienti asintomatici ad alto rischio CV nei quali, probabilmente, con una più accurata ed opportuna prevenzione primaria, potremmo essere in grado di ridurre l'incidenza di eventi CV. Dai nostri risultati si evince che in pazienti asintomatici, con numerosi FDRCV, assenza di sintomi o sintomi atipici per ischemia miocardica, che non sono in grado di eseguire un test provocativo ovvero questo risultato dubbio o non conclusivo, un possibile risvolto nella pratica clinica potrebbe essere l'utilizzo della TCMD coronarica in alternativa alla

SIC | *Indice Autori*

coronarografia, in particolare in coloro che presentino un iniziale fenomeno di aterosclerosi preclinica evidenziabile con l'IMT carotideo. Inoltre, malgrado la probabilità di dovere intervenire con angioplastica coronarica o bypass aorto-coronarico in pazienti asintomatici ad alto rischio sia bassa, un intervento precoce in tal senso ci permetterebbe di risolvere quei casi di ischemia silente che, in alcune occasioni, possono slatentizzarsi con sindrome coronarica acuta e talvolta rivelarsi fatali.

O291

Diagnostic Accuracy of Computed Tomography Coronary Angiography for Evaluation of Coronary Artery Disease in High Risk Patients: A Comparison Between High Definition versus Standard Definition Scanner

Erika Bertella (a), Gianluca Pontone (a), Daniele Andreini (a), Saima Mushtaq (a), Monica Loguercio (a), Sarah Cortinovis (a), Andrea Baggiano (a), Edoardo Conte (a), Andrea Daniele Annoni (a), Alberto Formenti (a), Maria Petullà (a), Mauro Pepi (a)

(a) Centro Cardiologico Monzino, IRCCS, Milano

Purpose: the ability of computed tomography coronary angiography (CTCA) to detect quantitatively the stenosis is lower than invasive coronary angiography (ICA) due to the limited spatial resolution. Recently, a high-definition CTCA (HDCTCA) scanner, with improved spatial resolution has been developed. The aim of this study is to compare the diagnostic accuracy of HDCTCA versus standard definition 64-slice scanner (SDCTCA) in high-risk patients for coronary artery disease (CAD).

Material and Methods: One-hundred-eighty-four consecutive high risk patients for CAD and scheduled for ICA were studied by SDCTCA (Group 1; n=91) or HDCTCA (Group 2; n=93) before ICA and compared in terms of image quality (score 1: non-diagnostic to score 4: excellent), overall feasibility (Fe), sensitivity (Se), specificity (Sp), negative predictive value (NPV), positive predictive value (PPV) and accuracy using ICA as reference method.

Results: In a segment-based model Group 2 showed a higher image quality score (3.7 vs 3.4, $p<0.01$), overall Fe (97% vs 92%, $p<0.01$), Sp (96% vs 91%, $p<0.01$), PPV (81% vs 70%, $p<0.01$) and accuracy (97% vs 91%, $p<0.01$) in comparison with group 1. Moreover, group 2 showed a better agreement versus ICA for calcified plaques in comparison with group 1 (91% vs 58%, $p<0.01$). Finally, in a patient-based model group 2 showed a higher diagnostic accuracy versus group 1 (96% vs 87%, $p<0.05$).

Conclusions: The present study showed an improved feasibility and accuracy mainly in calcified coronary artery lesions in HDCTCA in comparison with SDCTCA suggesting a potential role of this technology in high-risk patients for CAD.

CARDIOPATIA ISCHEMICA: AL DI LA' DELLA PLACCA ATEROMASICA

O292

Glycosylated Haemoglobin but not resting Glycaemia is independently associated with coronary artery disease in patients without diabetes mellitus

Monica Verdoia (a), Alon Schaffer (a), Lucia Barbieri (a), Ettore Casseti (a), Virginia Di Ruocco (a), Pasquale Perrone-Filardi (b), Paolo Marino (a), Giuseppe De Luca (a)

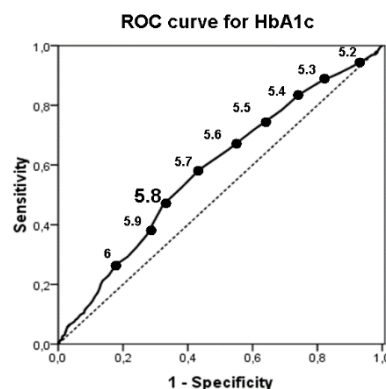
(a) Clinica Cardiologica, Ospedale "Maggiore della Carità", Università del Piemonte Orientale, Novara, I, (b) Dipartimento di Medicina, Scienze Cardiovascolari e Immunologiche, Università Federico II, Napoli, I

Background: Coronary artery disease (CAD) is the leading cause of mortality in developed countries. Abnormal glucose metabolism is a major determinant of CAD. Glycosylated haemoglobin (HbA1c) might offer more advantages in terms of prognostic information being a more stable and accurate parameter to evaluate glucose homeostasis as compared to fasting glycaemia. The association of HbA1c with CAD is less clear, with few data reported in non diabetic patients. Therefore, the aim of the current study was to evaluate among a consecutive cohort of patients without diabetes mellitus the relationship between HbA1c and CAD.

Methods: Our population is represented by a total of 1703 consecutive patients undergoing coronary angiography between April 2007 and October 2012, who did not meet the diagnostic criteria for diabetes mellitus, defined as previous diagnosis, specific treatment administration (oral or insulin), fasting glycemia > 126 mg/dL or HbA1c > 6.5%. We additionally evaluated IMT during hospitalization in 237 non diabetic patients.

Results: Patients were divided according to tertiles of HbA1c (< 5.5%, 5.5-5.8; > 5.8%). Glycosylated haemoglobin was associated with ageing ($p < 0.001$), hypercholesterolemia ($p = 0.01$), renal failure ($p = 0.006$), hypertension ($p = 0.002$), previous MI ($p = 0.004$), previous PCI ($p = 0.01$), indication to angiography ($p = 0.01$), use of ARB ($p = 0.01$), beta-blockers ($p = 0.03$), nitrates ($p = 0.02$), statins ($p = 0.008$), calcium antagonist ($p = 0.01$), diuretics ($p < 0.001$), ASA ($p < 0.001$), baseline glycaemia ($p < 0.001$), tryglicerides ($p = 0.02$) and uric acid ($p = 0.04$). Glycosylated Haemoglobin, but not resting glycaemia, was significantly associated with the prevalence of coronary artery disease (adjusted OR [95% CI] = 1.51[1.15-1.97], $p = 0.002$), with 5.8% identified by ROC curve as the best cut-off value in the prediction of CAD. IMT was measured in a consecutive cohort of 237 patients within hospitalization. HbA1c was significantly associated with CIMT and prevalence of carotid plaques.

Conclusions: This is one of the major study showing that among non-diabetic patients, high HbA1C, but not glycaemia, even within normal range, is significantly associated with the risk of proven CAD. Future large studies are certainly needed to further confirm our findings and to evaluate whether a more aggressive cardiovascular prevention can reduce the risk of CAD among patients with HbA1C > 5.8%.



O293

Macrophage migration inhibitory factor (mif) is associated with higher collateralization grade in patients with coronary chronic total occlusions

Luigi Di Serafino (a), Guy R. Heyndrikx (a), Stylianos A. Pyxaras (a), Gabor Toth (a), Frederic De Vroey (a), Jozef Bartunek (a), Bernard De Bruyne (a), William Wijns (a), Emanuele Barbato (a)

(a) *Cardiovascular Center Aalst OLV Clinic – Aalst (Belgium)*

Background: Chronically total occluded coronary artery (CTO) is often associated with collateral circulation that is only partially supplying to the lack of anterograde blood flow. Therefore, variable degree of residual myocardial ischemia might still be present. The macrophage migration inhibitory factor (MIF), secreted by endothelial cells, has been showed to promote in vitro the recruitment of the endothelial progenitor cells to the ischemic tissues. It is still unknown whether MIF is involved in collateral formation of patients (pts) with CTO.

Methods and Results: Blood collection for MIF evaluation was performed in 32 consecutive patients (n=32) undergoing to percutaneous coronary intervention (PCI) of CTO at three different sites: a) Femoral arterial sheath (ART); 2) Tip of the guiding catheter proximal to CTO (PROX); 3) Tip of the microcatheter distal to CTO (DIST) after the occlusion was crossed, but not yet dilated. MIF was also assessed at ART and PROX level in 10 patients with normal coronary arteries, who served as controls (CTRL). Degree of collateralization was assessed by Rentrop classification (0 to 3). Rentrop class ≤ 2 identified pts with Low Collateralization Grade (LCG; n=19), Rentrop class 3 identified pts with High Collateralization Grade (HCG; n=13). MIF was analyzed with a commercially available ELISA kit. Within CTO pts, a significant MIF increase was found across the 3 sampling sites (ART: 20.9 ± 7.4 vs. PROX: 28.0 ± 18.8 vs. DIST 39.4 ± 20.6 ng/ml, $p < 0.01$). MIF was significantly higher at DIST level in HCG as compared with LCG pts (45.2 ± 23.9 vs. 35.5 ± 17.6 ng/ml, $p = 0.05$), while no difference was found at PROX (26.5 ± 9.1 vs. 28.9 ± 21.7 ng/ml, $p = 0.41$) or ART level (18.7 ± 5.2 vs. 22.3 ± 8.4 ng/ml, $p = 0.42$). Within CTRL pts, MIF was not significantly increased at the 2 sampling sites (ART: 18.7 ± 7.4 vs. PROX: 15.6 ± 5.3 , $p = 0.10$). Compared with CTRL pts, MIF was found significantly elevated in CTO pts at PROX ($p = 0.05$), but not at ART ($p < 0.55$) level.

Conclusions: Higher MIF levels are found downstream to the arterial occlusion. This along with lower levels found proximal to the occlusion and at peripheral level suggest a loco-regional MIF production. In addition, the higher the MIF levels the higher the collateralization grade.

O294

High density lipoproteins and coronary artery disease: a single-centre cohort study

Alon Schaffer (a), Monica Verdoia (a), Lucia Barbieri (a), Gabriella Di Giovine (a), Ettore Cassetti (a), Paolo Marino (a), Giuseppe De Luca (a)

(a) *Clinica Cardiologica, AOU "Maggiore della Carità", Università del Piemonte Orientale, Novara*

Background: Coronary artery disease (CAD) is a major cause of mortality worldwide and impaired lipid profile represents a major risk factor for atherosclerosis. Special attention has recently been focused on high density lipoproteins (HDL), potentially modulating the development of vascular disease. Our study goal was to estimate the role of HDL cholesterol in predicting the prevalence and extent of CAD in patients undergoing coronary angiography.

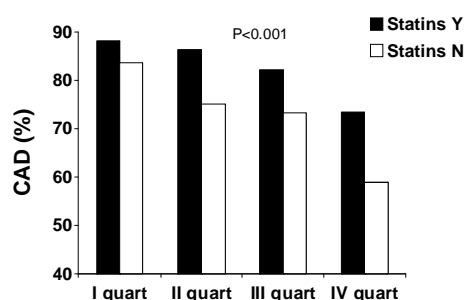
Methods: We included 3280 patients undergoing coronary angiography between March 2007 and October 2012. Fasting samples were collected for lipids levels assessment. Coronary disease was defined for at least 1 vessel stenosis $> 50\%$ as evaluated by QCA.

Results: Patients were divided according to HDL quartiles (<32 ; 32-38; 38-47; ≥ 47 mg/dL). Lower HDL related to age ($p < 0.001$), male gender ($p < 0.001$), diabetes mellitus ($p < 0.001$), renal failure ($p < 0.001$), smoking ($p < 0.001$), history of MI ($p < 0.001$), previous PCI, CABG and CVA ($p = 0.05$, $p = 0.04$, $p = 0.01$), and acute coronary syndrome ($p < 0.001$). Patients with lower HDL quartiles were

SIC | *Indice Autori*

more often on ACE-inhibitors ($p=0.01$), ARBs ($p=0.005$), beta-blockers ($p<0.001$), statins ($p<0.001$), nitrates ($p=0.02$) and antiplatelet agents ($p<0.001$). HDL levels were directly related to total cholesterol ($p<0.001$) and haemoglobin ($p<0.001$), while inversely with LDL ($p=0.002$), glycaemia, glycosylated haemoglobin, creatinine, triglycerides and WBC ($p<0.001$, respectively). By multivariate analysis we identified as positive predictors of lower HDL levels (< 32 mg/dL) male gender ($p<0.001$), diabetes mellitus ($p=0.03$), renal failure ($p=0.01$), higher LDL cholesterol ($p<0.001$), triglycerides ($p<0.001$) and WBC ($p < 0.001$), whereas ageing ($p < 0.001$), previous MI ($p=0.02$), levels of total cholesterol ($p < 0.001$) and haemoglobin ($p<0.001$), and treatment with ARBS ($p < 0.001$) and statins ($p=0.002$) were identified as negative predictors. HDL were significantly inversely associated with prevalence of coronary artery disease ($p<0.001$, adjusted OR[95%CI]= 1.35[1.25-1.45], $p<0.001$). At ROC curve analysis, HDL <44 mg/dL was identified as best predictive value of the risk of CAD, (adjusted OR[95%CI]= 1.61[1.24-2.1], $p<0.001$). Results were confirmed in statins treated and untreated patients.

Conclusions: In our study, male gender, previous MI, diabetes mellitus, renal failure, younger age, lower haemoglobin, higher LDL, triglycerides and WBC and no statin or ARB treatment were independent predictors of low HDL. We found a significant association between HDL and the risk of CAD, and identified a value < 44 mg/dL as the best cut-off in the prediction of CAD.



O295

Troponin levels after elective percutaneous coronary intervention: outcome and follow-up

Mariaconcetta Di Piazza (a), Salvatore Evola (a), Vito Bonomo (a), Angelo Quagliana (a), Vincenzo Sucato (a), Claudia Vicari (a), Rosaria Linda Trovato (a), Pietro Spatafora (a), Giuseppe Inga (a), Andrea Giuseppe Faraci (a), Salvatore Novo (a)

(a) Division of Cardiology, Department of Internal Medicine, Cardiovascular and Nephro-Urological Disease

Background: Percutaneous coronary intervention (PCI) has become the predominant procedure for coronary revascularization in patients with stable and unstable coronary artery disease. An elevation of troponin after a coronary procedure can not be automatically attributed to it.

Objectives: The objective of this study is to evaluate the post-procedural troponin levels in patients with stable angina and acute myocardial syndrome (UA / NSTEMI) undergoing elective PCI and to correlate the increase of this marker with the events at long-term follow-up.

Materials and Methods: 980 patients, undergoing elective coronary angiography are enrolled. Patients follow-up is obtained through scheduled telephone contacts, aimed to assess the health state and the incidence of MACE (stable angina, unstable angina, MI, stroke, heart failure, cardiac arrhythmias and death) using standard questions. Enrolled patients were 354.

Results: 93 patients of the 354 patients included in the study (32%) had an increase of troponin ≥ 0.12 ng / ml (99th percentile of the reference population) after PCI, 53 patients (18.5%) had an increase in troponin ≥ 0.36 ng / ml. At follow-up of 48 ± 25.9 months (range 84 to 12) the incidence of a first event is not significantly reduced with the post-procedural troponin increase (34.4% vs.

SIC | *Indice Autori*

31.8%), while the incidence of a second event is substantially unchanged (6.6%). Instead, the incidence of death is not significantly increased with the troponin post-PCI increase (4.3% vs 9.5%). The patients were also divided into four classes assigning a score from 0 to 3 for each level of troponin <0.12, <0.36, <0.6, ≥ 0.6 ng / ml respectively.

The relationship between troponin level-burden and the incidence of events indicated a negative relationship with the events themselves. The events incidence was higher in patients with the lowest troponin class (67.5% vs 30% for the first event $p = 0.7$, 5.9 vs 2.5% for the second event $p = 0.6$, 8.5% vs 2.5% for death, $p = 0.3$).

Conclusions: Troponin is a diagnostic key factor for cardiovascular diseases due to its specificity and high sensitivity for myocardial tissue. Thus, the increase of troponin after procedure is not synonymous of a worst prognosis, but, in all cases, the periprocedural damage must avoid.

O296

Comparison of high reloading Rosuvastatin and Atorvastatin pretreatment in patients undergoing elective PCI to reduce the incidence of Myocardial periprocedural necrosis

Luigi Lucisano (a), Gennaro Sardella (a), Simone Calcagno (a), Massimo Mancone (a), Mauro Pennacchi (a), Rocco Edoardo Stio (a), Filippo Placentino (a), Andrea Ceccacci (a), Alessandra Pecoraro (a), Francesco Fedele (a)

(a) *Departments of Cardiovascular Sciences, Umberto I Hospital, Sapienza University of Rome, Italy*

Background: Elective PCI may be complicated with elevation of cardiac biomarkers. Several studies suggested that pretreatment with statins may be associated with a reduction in periprocedural myocardial necrosis.

Objectives: To compare a reloading dose of Rosuvastatin and Atorvastatin administered within 24h before coronary angioplasty (PCI) in reducing the rate of periprocedural myonecrosis and major cardiac and cerebrovascular events (MACCE) in patients on chronic statin treatment undergoing elective PCI.

Methods: Three hundred and fifty patients with stable angina who underwent elective PCI were randomly assigned to receive pre-procedural of Rosuvastatin (40mg) (Rosuvastatin Group-RG n=175) or Atorvastatin (80mg) (Atorvastatin Group-AG n=175) reloading dose and a control group on chronic statin therapy without reloading (Control-Group-CG). The primary end-point was periprocedural myocardial necrosis and the occurrence of MACCE at 30-day, 6-12 months follow-up. Also we evaluate the rise of periprocedural troponin T serum levels $>3x$ upper limit of normal.

Results: Twelve and 24-hour post-PCI Creatine Kinase Muscle and Brain (CK-MB) elevation $>3x$ occurred more frequently in the CG than in the RG and in the AG (at 24-hours: 25.0 vs 7.1; $p=0.003$ and 25.0 vs 6.1; $p=0.001$). At 30-day, 6-and 12-month follow-up the incidence of cumulative MACCE was higher in CG than in the RG or AG (at 12-month: 41.0% vs 11.4% vs 12.0%; $p=0.001$). There was no difference between RG and AG in terms of myocardial post-procedural necrosis and MACCE occurrence at follow-up.

Conclusions: High-dose statin reloading improves procedural and long term clinical outcomes in stable patients on chronic statin therapy. Both Rosuvastatin and Atorvastatin showed similarly beneficial effects on procedural and long-term outcomes

O297

MTHFR polymorphism and risk of periprocedural myocardial infarction after coronary stenting

Monica Verdoia (a), Alon Schaffer (a), Ettore Casseti (a), Lucia Barbieri (a), Gabriella Di Giovine (a), Paolo Marino (a), Giuseppe De Luca (a)

(a) Clinica Cardiologica, AOU “Maggiore della Carità”, Università del Piemonte Orientale, Novara; Italia

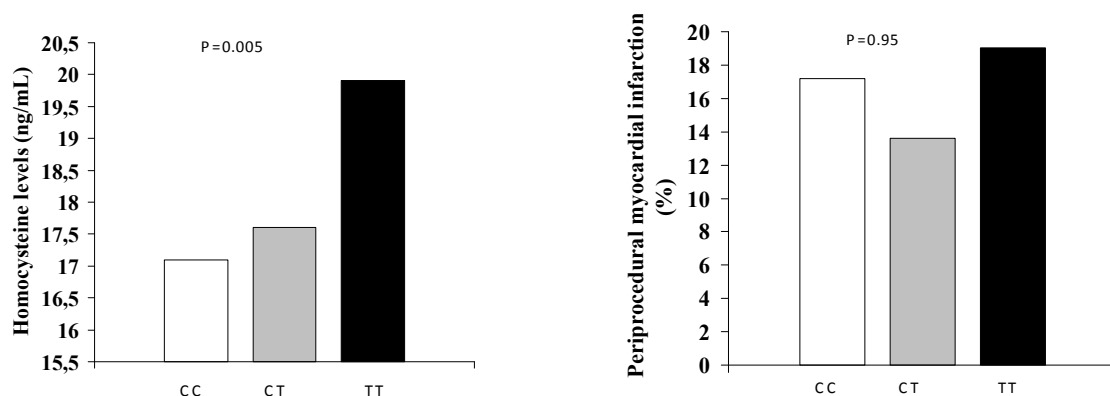
Background: Pro-thrombotic status and platelet hyper-reactivity still represent an important challenge, being the main determinants of complications and periprocedural myocardial infarction (PMI) after coronary stenting. Among thrombophilic conditions, hyperhomocysteinemia has been suggested to rise the risk of cardiovascular events. Methylenetetrahydrofolate reductase (MTHFR) is the crucial enzyme in homocysteine elimination pathway. A common genetic variant due to 677 C >T single nucleotide polymorphism (SNP) reduces the function of MTHFR enzyme, thus inducing hyperhomocysteinemia. In our study we investigated whether MTHFR 677 C >T polymorphism is associated with increased risk of periprocedural MI in patients undergoing coronary stenting.

Methods: We included 778 consecutive patients undergoing PCI. Homocysteinemia and genetic status were assessed at admission for all patients. Myonecrosis biomarkers were dosed at intervals from 6 to 48 hours after PCI. PMI was defined as CKMB increase by 3 times the ULN or 50% if elevated at the time of the procedure, while periprocedural myonecrosis for troponin I increase by 3 times the ULN or by 50% of the baseline value.

Results: 521 patients carried the MTHFR- T allele, 130 in homozygosis. No difference was found for main demographical and clinical features nor for biochemistry parameters, but for higher rate of statins treatment ($p=0.03$) in T- carriers. Polymorphic patients displayed significantly higher levels of homocysteine ($p=0.005$), with additive effect of the mutated T-alleles. Angiographic and procedural features were similar according to genetic status.

MTHFR polymorphism (677 C >T) was not associated with Periprocedural myocardial infarction (adjusted OR= 0.97[0.67-1.4], $p=0.87$) or periprocedural myonecrosis (adjusted OR=1.03[0.83-1.36], $p=0.82$). Same results were found at subgroup analysis in higher-risk subsets of patients.

Conclusion: MTHFR 677 C >T polymorphism is associated to higher homocysteine levels, however in patients undergoing PCI, this genetic variant does not influence the risk of periprocedural myocardial infarction.



RIABILITAZIONE

O298

Impatto della riabilitazione cardiologica ambulatoriale nei pazienti sottoposti a rivascolarizzazione coronarica: analisi dei dati di un singolo centro

Sara Doimo (a), Patrizia Maras (a), Kareem Salame (a), Alessio Della Mattia (a), Gianfranco Sinagra (a)

(a) Dipartimento Cardiovascolare - Az. Ospedaliero-Universitaria "Ospedali Riuniti", Trieste

Scopo dello studio: Scopo di questo studio è descrivere il ruolo di un Programma Ambulatoriale di Cardiologia Riabilitativa nel controllo dei fattori di rischio cardiovascolare, sull'andamento dei parametri clinico- strumentali e sull'outcome a 12 mesi dalla fine del percorso in una popolazione di pazienti sottoposti a rivascolarizzazione coronarica.

Materiali e Metodi: Dal 1 gennaio 2009 al 30 aprile 2010, 520 pazienti (pz) sono stati riferiti presso il nostro centro ed inseriti in un Registro. I pz con NSTEMI o PTCA sono stati seguiti con controlli clinico- strumentali sino al raggiungimento dei target indicati dagli statement internazionali. I pz con STEMI e CABG sono stati inviati anche ad un programma di attività fisica. Tutti i pz hanno usufruito di un counseling psicologico, nutrizionale e per l'interruzione del fumo.

Risultati: Abbiamo valutato 520 pz di età media $67,64 \pm 10,6$ anni, 171 (32,9%) donne, 349 (67,1%) uomini. 143 (27,5%) sono stati arruolati per STEMI, 85 (16,3%) per NSTEMI, 120 (23,1%) per PTCA e 172 (33,1%) post CABG. Il percorso riabilitativo ha avuto una durata media di $5,2 \pm 4,5$ mesi. In 62 pz (12%) la riabilitazione ambulatoriale è stata preceduta da una riabilitazione di tipo degenziale dei quali 88%, apparteneva al gruppo CABG/CABGV ($p=0,000$).

280 pz (54%) erano ipertesi, 171 (33%) diabetici, 395 (76%) dislipidemici e 161 (31%) fumatori. 106 pz (20%) avevano già avuto un IMA, mentre 28 (5%) avevano subito un precedente intervento di CABG, 53 (10%) soffrivano di BPCO, 77 (15%) avevano una diagnosi di insufficienza renale cronica e 52 (10%) di arteriopatia obliterante agli arti inferiori. 105 pz erano in classe NYHA 2-3, 39 avevano una frazione d'eiezione inferiore al 40%, 2 di essi erano portatori di ICD. Alla fine del programma riabilitativo, i valori pressori medi sono stati $136,4 \pm 18/77,9 \pm 9$ mmHg, mentre la frequenza cardiaca media era di $65 \pm 9,5$ bpm, 16,9% sono rimasti in classe NYHA 2-3. In tutti i sottogruppi i valori di colesterolo LDL erano < 100 mg/dl e l'HbA1c era $< 7\%$ nei pazienti diabetici. 18 pz hanno mantenuto una frazione d'eiezione inferiore al 40%, 4 hanno impiantato un ICD durante la riabilitazione ed 1 a 12 mesi dalla fine del percorso. Il 70,1% dei pazienti assumeva farmaci beta bloccanti, il 67,8% ACEi/Sartani, il 90,1% statine ed il 96,9% ASA. Intolleranze farmacologiche si sono manifestate nel 4,1% per i beta bloccanti, 7,3% per ACEi/Sartani e statine, nel 2,4% per ASA. A fine percorso 86,9% pazienti hanno smesso di fumare ($p=0,000$). 6 pazienti non hanno concluso il percorso riabilitativo. Durante la riabilitazione 6,2% dei pazienti sono stati ricoverati per ischemia inducibile. Nel follow up 6 mesi dalla fine della riabilitazione, si sono verificati 10 ricoveri per scompenso (SCC) e 34 per sindrome coronarica acuta (SCA), a 12 mesi, i ricoveri per SCC sono stati 2, mentre le SCA 1. A 12 mesi dal termine della riabilitazione 21 pazienti (4%) sono deceduti, 6 (28,5%) per cause cardiache.

Conclusioni: L'analisi dei dati mette in evidenza la fattibilità di un programma di cardiologia riabilitativa in pazienti del mondo reale non selezionati. Alla fine del programma, la terapia cardioprotettiva è stata ottimizzata con miglioramento degli indicatori di scompenso e degli indici di funzionalità cardiaca. Nonostante la complessità della popolazione, durante il follow up a 12 mesi si è registrata una bassa incidenza di eventi (scompenso, SCA e morte cardiaca).

O299

Work-related outcomes after myocardial infarction: implications of cardiac rehabilitation and occupational medicine.

Gennaro Ratti (a), Delfina Spacone (b), Cristina Capogrosso (a), Monica Lamberti (c), Donato Gerardi (c), Cosimo Fulgione (b), Gianfranco Ricciardi (b), Salvatore Latte (b), Paolo Tammaro (a), Gregorio Covino (a), Mario Volpicelli (a), Mario Mallardo (b), Paolo Capogrosso (a)

(a) *Cardiology/ICU, S. Giovanni Bosco Hospital, ASL NA 1 CENTRO, Naples, (b)*

Cardiology/Cardiac Rehabilitation, S. Gennaro Hospital, ASL NA 1 CENTRO, Naples, (c)

Occupational Medicine, Second University of Naples.

Background: Return to work following myocardial infarction (MI) is conditioned by non-cardiac diseases, angina pectoris, left ventricle ejection fraction (FE) and also exercise test results, but also is related to non-medical factors such as age, education, previous work status, job satisfaction and depression. Judgment about time of return to work and estimation of worker suitable time to return to work is complex. Rapid return to work after MI has economic profits but may result in patients' worsen physical and mental condition and quality of life. Cardiac Rehabilitation (CR). improve functional capacity and enhance a cardiac patient's ability to return to work. The educational and vocational counselling components of CR programs should further improve the ability of a patient to return to work. Therefore, the time to return to work, after an MI can vary greatly from about two weeks, to upwards of six weeks.

Aim: The purpose of this study was to evaluate work-related outcomes of patients at 3 months after a MI and to identify patient, disease, and intervention characteristics associated with these outcomes.

Methods: were evaluated 124 patients with recent MI (109 male/15 female), working age (48±11 years), 3 months after hospital discharge. The 88% had been subjected to percutaneous transluminal coronary angioplasty (PTCA). Enrolled in a program of intensive follow-up, after the hospitalization has returned to full-time work after a varying period between 1 and 2 months. Of these, 13 (10%) patients had professional work, 22 (17%) had sedentary work and 89 (72%) had manual work (manual move of loads). To determine work status before and after MI, work-related outcomes (absenteeism and perceived work performance) assessed by the Work Performance Scale (WPS) of the Functional Status Questionnaire. The WPS is scored by calculating the mean of the six responses and scores ranged from 1–4, with 4 being the highest level of work performance. The variable “*days missed from work*” (DMW) was assessed by asking respondents how many days they missed from work because of cardiovascular disease in the past 4 weeks. Variables considered for worse work-related outcomes. were FE (higher or lower than 45%), carrying out CR, functional capacity expressed as metabolic equivalents (METs) in exercise testing (higher or lower than 5). The data are expressed as mean ± SD; Statistical analysis was performed by Student T test for unpaired data and a p value <0,05 was considered statistical significant.

Results: Median WPS scores were lower for patients who had a lower ejection fractions at discharge (FE < 45% = 2.7 and FE ≥ 45% = 3.1; p <0,05), had lower functional capacity (METs < 5 = 3.0 and METs ≥ 5 = 3.3; p <0,05), and have not played CR after MI (No = 2.6 and Yes = 3.4; p <0,05). Regarding DMW the results were the following: no day of absence to work in the group that has carried out CR, FE ≥ 45% and with higher functional capacity (METs >5).

Conclusion: A poor ventricular function and poorer physical functioning, but especially the non-participation in a CR program were consistently related to worse work-related outcomes. This study demonstrates the need for a larger, broader study that includes health beliefs, treatment, and other job and patient factors that may influence work-related outcomes. This study also emphasizes not only the role of CR as an aid to return to work, but also the need for close collaboration between cardiologist and specialist in occupational medicine.

O300

Impact of Ambulatory Cardiac Rehabilitation in High Risk Patients with Diabetes After Coronary Revascularization: One Year Follow Up and Outcome

Alessio Della Mattia (a), Patrizia Maras (a), Sara Doimo (a), Kareem Salame (a), Gianfranco Sinagra (a)

(a) *Dipartimento Cardiovascolare - Az. Ospedaliero-Universitaria "Ospedali Riuniti", Trieste*

Purpose: From January 2009 to May 2010, we included in a registry 520 patients (pts) discharged from Cardiovascular-Surgical Department (CSD) admitted to Cardiac Rehabilitation (CR) for ambulatory program (AP) of CR and secondary prevention (SP). The aim of this analysis is to describe the impact of CR in a group of high risk pts with diabetes (group 1) compared to non-diabetic pts (group2).

Methods: All pts have been referred to the CR at discharge. 520 pts (mean age 68 ± 11 y) were admitted with STEMI/NSTEMI/PTCA/CABG (with or without valvular surgery). The AP includes nurse, dietetic and psychological counseling, physical training, quit smoking program and repeated clinical and instrumental evaluations (echocardiogram and stress test). The program lasted $5,2 \pm 4$ months and we analyze one year follow up (1Y-FUP).

Results: 171 pts were in group 1 [124 M(73%), 47 F(28%) ($p=0.039$), mean age $68 \pm 9,7$ years] and 348 in group 2 [224 M(64%), 124 F(36%), mean age 68 ± 11 y]. Group 1 compared with group 2 showed higher incidence of Chronic Renal Failure (25 vs 10%, $p=0.000$), 20 vs 21% had previous acute coronary syndrome (ACS), 12 vs 9.1% had ejection fraction (EF) $< 40\%$, 24 vs 18.5% were in NYHA class 2-3, 85.4 vs 72.1% have history of hypertension (HT), 26 vs 33% were smokers. At the end of RP, repeated laboratory findings were: LDLc 82 ± 27 vs 89 ± 28 mg/dL ($p=0.02$), triglycerides 120 ± 62 vs 140 ± 125 mg/dL, HbA1c $6,8 \pm 1,2$ vs $5,9 \pm 0,7\%$ ($p=0.00$), group 1 and 2 respectively. Systolic/diastolic arterial blood pressure was: $138 \pm 19/78 \pm 10$ vs $135 \pm 18/77 \pm 9$ mmHg, heart rate was similar (66 ± 9 vs 65 ± 10 bpm respectively), more diabetics quit smoking [80 vs 62% ($p=0.000$)]. Use of beta-blockers/ACE inhibitors/ASA/Statins at the end of RP was respectively: 74 vs 68%/77 vs 63% ($p=0.001$)/96 vs 97%/89 vs 91%. EF remained $< 40\%$ in 6.4 vs 7.2%. At 1Y-FUP, ACS occurred in 4.5 vs 1.2% ($p=0.030$), total deaths (TD) and cardiovascular deaths (CVD) were slightly superior in diabetics (4.9 vs 3.8%/1.9 vs 0.9%). Only 3 pts did not complete RP in both groups.

Conclusions: In our analysis group 1 pts showed higher prevalence of comorbidities, history of HT, elevated NYHA class and low EF. During CR both groups reached target values for SP and optimized successfully medical therapy. Only a small number of pts remained with an EF $< 40\%$ after RP. At 1Y-FUP ACS occurred significantly higher in group 1 than in group 2. TD and CVD remains low in both groups, but group 1 showed an increased propension of death.

O301

Insufficienza cardiaca avanzata ed assistenza ventricolare meccanica (lvad). Valutazione nell'ambito della riabilitazione cardiologica intensiva (rci)

Ornella Tortelli (a), Simona Alberini (b), Rino Frizzelli (a), Redenta Ghirardi (a), Fabia Mascaro (a), Claudio Pinzi (a), Cleante Scarduelli (a)

(a) *S.C Fisiop. e Riabil. Cardiorespiratoria-Az Osp*, (b) *Corso di Laurea in Fisioterapia-Università degli Studi di Brescia (anno 2010)*

Introduzione: L'insufficienza cardiaca terminale (ICT) è una patologia ad alto impatto assistenziale. Il trapianto cardiaco (TC) è il "gold standard" terapeutico. In soggetti selezionati non candidabili al TC l'assistenza meccanica ventricolare sx (LVAD) viene individuata come alternativa terapeutica permanente o "destination therapy".

Materiali e metodi: Sono stati considerati 4 pazienti (♂ età media 73 ± 2) affetti da ICT (classe NYHA IV) impiantati con LVAD (INCOR e JARVIK 2000) c/o la S.C di Cardiochirurgia di Mantova (2008-2010) e successivamente afferiti a RCI. Durante la degenza in terapia intensiva sono stati individuati i seguenti obiettivi gestionali: stabilizzazione clinica, gestione delle complicanze (tamponamento cardiaco, deficit SPE, alternanza ritmo sinusale e fibrillazione atriale, sanguinamento gengivale), verifica corretto funzionamento del device, inizio mobilizzazione ed FKT per prevenire la sindrome da allettamento. Gli obiettivi a breve e medio termine della RCI sono stati individuati nel recupero dell'autonomia funzionale, controllo della dispnea, gestione delle ferite chirurgiche, impostazione terapia anticoagulante ed antiaggregante, recupero della funzionalità respiratoria, controllo del dolore, riallenamento allo sforzo, educazione ad un corretto stile di vita con la collaborazione dei caregivers.

Discussione: Gli obiettivi del trattamento, compresi quelli educazionali, sono stati in gran parte raggiunti. Gli indicatori di outcome (6MWT, scala VAS dispnea, scala Borg) hanno indicato miglioramento nella capacità di esercizio e di tolleranza allo sforzo, e diminuzione dei sintomi angina, fatica, dolore arti inferiori e dispnea. Le difficoltà hanno riguardato principalmente il riallenamento mediante cyclette o treadmill, che non è stato completato da tutti i pazienti, e 6MWT che, soprattutto all'ingresso, non era alla portata delle condizioni generali dei pazienti.

Conclusioni: Nei pazienti impiantati con LVAD, è dimostrato che l'inizio precoce della fisioterapia comporta miglioramenti nella capacità di esercizio, se pur con performance fisica classificata come sub-ottimale, e della qualità di vita (studio REMATCH trial, 2001). Vengono descritti effetti positivi sul rimodellamento del ventricolo sx, sulla relazione pressione/volume e sulla funzione contrattile dei miociti. Da non dimenticare la funzione del nativo ventricolo sinistro che, contraendosi anche durante l'azione del device, contribuisce al miglioramento della gittata cardiaca. E' possibile restituire al paziente una sostanziale normale emodinamica a riposo e, specialmente con i sistemi LVAD portatili, una buona tolleranza allo sforzo. I pazienti con LVAD hanno una capacità di esercizio migliore dei pazienti dipendenti da dobutamina e pari a quelli classe NYHA II ed un minor consumo di ossigeno anche rispetto a pazienti in classe funzionale NYHA III.

O302

Outcome of cardiac rehabilitation (cr) in transcatheter aortic valve implantation patients(tavi): comparison with aortic valve replacement (avr) and predictor of mortality

Massimo Tidu (a), Zoia Bouslenko (a), Fabio Comazzi (b), Camillo Taglieri (a), Francesca Bertolin (a), Pantaleo Giannuzzi (c), Franco Tarro Genta (a)

(a) Salvatore Maugeri Foundation, IRCCS, Division of Cardiac Rehabilitation, Turin, Italy, (b) Salvatore Maugeri Foundation, IRCCS, Service of Bioengineering, Veruno, Italy, (c) Salvatore Maugeri Foundation, IRCCS, Division of Cardiac Rehabilitation, Veruno, Italy

Purpose: to evaluate outcome of TAVI compared to AVR for aortic stenosis after residential CR and to assess mortality predictors in TAVI.

Methods: from January 2010 to January 2012, 44 consecutive TAVI (41% male, age 82 ± 5 , 25 Edwards, 19 CoreValve) and 40 consecutive AVR (58% male, age 79 ± 3) were admitted to a 3-week CR program (walking, up to 30 minutes of cycling or treadmill daily session). Co-morbidity (cumulative illness rated state-comorbidity index) (CIRS-CI) score, echocardiography on admission and Disability (Barthel Index) (BI), Morse Fall Scale score (MFS), Six minute walking test distance (6MWT) on admission and at discharge were assessed.

Results: Compared to AVR, TAVI were significantly older, had lower left ventricle ejection fraction, higher CIRS-CI, MFS and lower BI both on admission and discharge. TAVI attended safely CR but tolerated a significantly lower workload with lower 6MWT on admission and discharge; however 6MWT gain was similar in both groups (Table). At follow up (range 6-24months) mortality was significantly higher in TAVI ($p=0.002$). BI and MFS at discharge, age and CIRS-CI were univariate predictors of mortality.

SIC | *Indice Autori*

Conclusion: CR in TAVI is safe, well tolerated (at the appropriate reduced workloads) and leads to a net disability recovery and exercise capacity improvement favoring a safe discharge and a relatively independent life at home. However higher disability and comorbidity in TAVI attending CR, compared to AVR, influenced survival at late follow up.

Table

| | TAVI (44) | AVR (40) | p |
|---|-------------|-------------|-------|
| CIRS-CI (M+-SD) | 4.8+-1.4 | 3.6+-1.3 | <0.01 |
| BI admission (M+-SD) | 62.1+-24.8 | 82+-17.7 | <0.01 |
| BI discharge(M+-SD) | 84.6+-17.8 | 94.8+-11 | <0.01 |
| 6MWT admission (m) (M+-SD) | 118.9+-94.9 | 192.8+-99.6 | <0.01 |
| 6MWT discharge (m) (M+-SD) | 217+- 91 | 322+- 89 | <0.01 |
| differences 6MWT discharge vs admission (m) (M+-SD) | 98.6+-86 | 129.8+-71 | NS |
| Exercise at >10W cycling or >1km/h treadmill (%) | 9 | 68 | <0.01 |
| MFS discharge(M+-SD) | 34.9 +-22.4 | 18.6+-11.4 | <0.01 |
| Left ventricular ejection fraction(%) | 55.1+-7.9 | 60.9+-6.6 | <0.01 |
| Death occurrence at follow up (%) | 36 | 6 | <0.01 |

O303

Effects of slow breathing training on respiratory pattern, left ventricular function, pulmonary pressure and functional capacity in patients with chronic heart failure and pulmonary hypertension

Gabriella Malfatto (a), Sabrina Salerno (a, c), Elisabetta Lisi (a, c), Carolina Lombardi (b), Valentina Giuli (a, c), Alessia Giglio (a), Paola Mattaliano (b, c), Francesca Ciambellotti (a), Giovanna Branzi (a), Katarzyna Styczkiewicz (d), Kalina Kawecka-Jaszcz (d), Gianfranco Parati (a, b, c)

(a) Dipartimento di Cardiologia, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano, Italia, (b) Centro di Medicina del Sonno, Dipartimento di Cardiologia, Istituto Auxologico Italiano IRCCS, Milan, (c) Università degli Studi, Milano Bicocca, Milano, Italia, (d) Department of Cardiology and Hypertension, Jagiellonian University Medical College, Krakow, Poland

Regular slow breathing (SB) is known to improve autonomic cardiac regulation and reduce chemoreflex sensitivity in chronic heart failure (CHF). A pilot study published by Parati et al. demonstrated that SB training improved NYHA class, exercise capacity, pulmonary function, ventricular ejection fraction and pulmonary pressure in CHF patients. We explored the possibility to use this SB system in real life, and investigated whether a period of non supervised training with regular SB at home could affect exercise capability and pulmonary pressure in unselected CHF patients.

Methods: We enrolled 33 CHF patients, (24 male, age 48 ± 84 years, NYHA II-III) to an unsupervised training period of 10-12 weeks. The device is a computerized box connected to a belt-type respiration sensor and to headphones; it generates musical tones (based on the user's breathing rate and inspiration ratio), which guide the user to progressively and effortlessly slow his or her breathing rate <10 breaths/min.

Patients learned to use the equipment for 18 minutes twice daily, but were not strictly followed up as in the previous study. In all patients, before enrollment and after the training period, we collected BNP levels and performed: polisomnography, 6MWT or cardiopulmonary test, echocardiography, Minnesota quality of life questionnaire.

Results: Three patients dropped from the study, 12 patients never or very seldom performed the training (non-adherent), while 21 patients performed enough sessions (70%) to be judged adherent and trained, as judged by the slowing in respiratory rate. In the 21 trained, SB training IMPROVED: NYHA class, EF, PAP, 6MWT, VEVC02 at CPT. SB DID not change: quality of life, BNP levels, peak VO₂, apnea indexes (only 6 pts had central apnea). In non-adherent pts no changes were observed.

Conclusions: In the real world, SB training is feasible only in about 1/3 of patients, since good adherence is requested. Changes in relevant variables are similar to those observed in the pilot study, therefore this type of training should be offered to selected and well motivated patients.

IPERTENSIONE POLMONARE 2

O304

Comparative survival of operable chronic thromboembolic pulmonary hypertension patients as compared to inoperable medically treated or untreated patients

Enrico Gotti (a), Cristina Bachetti (a), Massimiliano Palazzini (a), Enrico Monti (a), Alessandra Albinì (a), Claudia Bernabè (a), Elisa Conficoni (a), Nicole Rizzo (a), Gaia Mazzanti (a), Francesca Terzi (a), Alessandra Manes (a), Angelo Branzi (a), Nazzareno Galiè (a)

(a) Department of Specialized, Diagnostic and Experimental Medicine – DIMES – Bologna University Hospital

Background: pulmonary endarterectomy (PEA) is the treatment of choice for chronic thromboembolic pulmonary hypertension (CTEPH) patients. It is unclear whether the outcome of patients with inoperable CTEPH is influenced by the use of pulmonary arterial hypertension (PAH)-specific drugs.

Aim: to compare the survival of operable CTEPH patients who underwent PEA (OP-PEA), inoperable CTEPH patients medically treated with PAH-specific drugs (INOP-MT) and a control group of inoperable untreated CTEPH patients (INOP-C) in a single center.

Methods: between July 1996 and February 2013 we included 261 consecutive patients with CTEPH. All patients underwent right heart catheterization and 6-minute walk test (6MWT). Kaplan-Meier curves were used to estimate the survival of the three groups.

Results: the mean follow-up period was 43±37 months. One hundred and nine patients were included in the OP-PEA group, 118 in the INOP-MT group and 34 in the INOP-C group. In the INOP-MT group, 54 patients received phosphodiesterase type-5 inhibitors, 36 endothelin receptor antagonists, 5 prostanoids and 23 combination therapy.

Age was 63±14, 64±17 and 57±16 years in INOP-C, INOP-MT and OP-PEA respectively (P = 0.063 and < 0.001 for OP-PEA vs INOP-C and INOP-MT respectively). Baseline 6MWT was 324±125, 354±138 and 387±123 m in INOP-C, INOP-MT and OP-PEA respectively (P = 0.042 and 0.057 for OP-PEA vs INOP-C and INOP-MT respectively). Pulmonary Vascular Resistance was 9.9±5.9, 9.8±4.9 and 9.7±0.4 WU in INOP-C, INOP-MT and OP-PEA respectively (NS).

Kaplan-Meier survival of the three groups is reported in the table:

| Survival | 1 year | 3 years | 5 years | 10 years |
|-----------|--------|---------|---------|----------|
| INOP-C* | 81% | 75% | 58% | 26% |
| INOP-MT** | 95% | 85% | 70% | 55% |
| OP-PEA | 90% | 87% | 85% | 74% |

* P = 0.01 vs OP-PEA; **P = 0.13 vs INOP-C and OP-PEA

Conclusions: OP-PEA patients were younger, with a better baseline exercise capacity and had the best long term survival as compared to the inoperable groups. INOP-MT patients had an intermediate survival between OP-PEA and INOP-C groups.

SIC | *Indice Autori*

O305

Right ventricular remodeling in idiopathic pulmonary arterial hypertension: adaptive versus maladaptive morphology

Roberto Badagliacca (a), Beatrice Pezzuto (a), Roberto Poscia (a), Silvia Papa (a), Cristina Gambardella (a), Marco Francone (b), Mario Mezzapesa (a), Martina Nocioni (a), Susanna Sciomer (a), Francesco Fedele (a), Carmine Dario Vizza (a)

(a) *Sapienza University of Rome - Dept. of Cardiovascular and Respiratory Science*, (b) *Sapienza University of Rome - Dept. of Radiological Science*

Background: Pulmonary arterial hypertension (PAH) is a rare, progressive disease, characterized by an increase in pulmonary vascular resistance (PVR) leading to increased pulmonary artery pressure (PAP) and right ventricular (RV) systolic dysfunction. Severity of symptoms and survival in PAH are strongly associated with RV function and right heart failure is the main cause of death in these patients.

Objectives: To correlate RV morphological features to clinical and hemodynamic conditions, exercise tolerance and RV systolic function parameters, in order to describe the best RV adaptive remodeling pattern.

Methods: We enrolled in our study 60 consecutive idiopathic PAH (IPAH) patients, WHO functional class II to IV. Baseline evaluation at the time of diagnosis included medical history, physical examination, a non-encouraged 6-minute walk test (6MWT), right heart catheterization, echocardiographic and cardiac magnetic resonance (CMR) assessment. To address RV morphological adaptation, we divided the study population into two groups by the median value of RV mass/volume ratio (M/V ratio, 0.46).

Results. Despite similar PVR, mean PAP and compliance, patients with RV M/V ratio <0.46 had higher RV filling pressure, worse cardiac index (CI), more advanced WHO functional class and exercise tolerance impairment compared to patients with RV M/V ratio >0.46. Moreover, the former group had worse RV remodeling and systolic function evaluated by echocardiographic and MR imaging, compared to the latter group. A positive correlation was found between CI and most of the RV systolic function parameters, the most significant found with RV pulmonary arterial coupling. Interestingly, among RV systolic function parameters, TAPSE was not significantly different between the two groups of patients.

Results: A higher RV M/V ratio might represent the best RV adaptive remodeling pattern to increased chronic pressure afterload in IPAH, as it is associated to a more favourable RV morphologic condition and systolic function.

O306

Impaired contractile reserve as a major determinant of exercise induced pulmonary hypertension in systemic sclerosis patients

Giuseppina Giau (a), Christian Cadeddu (a), Martino Deidda (a), Marzia Lilliu (a), Mario Mura (a), Michela Farci (a), Stefano Del Giacco (a), Paolo Emilio Manconi (a), Giuseppe Mercurio (a)

(a) *Università degli Studi di Cagliari - Dipartimento di Scienze Mediche "M. Aresu"*

Introduction: Several studies evidenced high prevalence of myocardial systolic and diastolic dysfunction among patients with systemic sclerosis, related either to myocardial fibrosis or in some cases to a myocardial microvascular dysfunction. Exercise echocardiography has been used to identify a subset of SS patients with an inappropriate exercise-induced increase in PASP but the diagnostic role of this test is still unclear.

The aim of our study was to evaluate early signs of left ventricle impairment under exercise and their correlation to the inappropriate increase of pulmonary pressures under stress and to patient's functional state.

Methods: We studied 30 patients (age $60,2 \pm 10$ years; 3 male, 27 female) with systemic sclerosis and 20 control subjects matched for sex and age. Patients with Interstitial Lung Disease were excluded from the study. All patients performed a clinical evaluation, a 2D echocardiography associated with Tissue Doppler (TD) and speckle tracking (ST) imaging to evaluate left ventricular deformation indexes, and an exercise echocardiography to evaluate left ventricle contractile reserve (LVCR) and exercise pulmonary pressures. Finally a 6 minute walking test (6MWT) to evaluate the exercise tolerance was performed.

Results: Compared to controls SS patients showed an impaired diastolic function ($E/E' 10,9 \pm 3,7$ vs $7,6 \pm 2,1$; $p < 0,01$) associated with larger left atrial dimensions (LAVI $28,4 \pm 8,7$ vs $15,6 \pm 4,1$ mL/m²; $p < 0,01$). During exercise echocardiography we evidenced a reduced global longitudinal strain (GLS) compared to controls with a reduced delta GLS (Δ GLS $1,5 \pm 3,5$ vs $3,9 \pm 1,8$; $p < 0,05$). Moreover having 56% of SS patients stress PAPS > 40 mmHg we evidenced a significant correlation between stress PAPS and stress GLS ($r -0,52$; $p < 0,01$). Most importantly SS patients showed a reduced exercise tolerance at the 6MWT ($401,2 \pm 54,4$ vs $564,3 \pm 26,9$ p=0,003) and a significant correlation between stress GLS and exercise tolerance was evidenced ($r 0,41$; $p < 0,05$).

Conclusion: Our data demonstrated that in SS patients an early diastolic dysfunction is associated with a reduced LVCR, which showed to be strictly related to an inappropriate pulmonary pressure response to exercise and a reduced exercise tolerance.

These data underline the importance of exercise echocardiography for the preclinical screening of the left ventricle impairment in this population.

O307

A randomized open label study comparing first-line treatment with Bosentan or Sildenafil in Pulmonary Arterial Hypertension (PAH)

Gaia Mazzanti (a), Alessandra Albini (a), Massimiliano Palazzini (a), Cristina Bachetti (a), Enrico Monti (a), Enrico Gotti (a), Elisa Conficoni (a), Claudia Bernabè (a), Nicole Rizzo (a), Francesca Terzi (a), Alessandra Manes (a), Angelo Branzi (a), Nazzareno Galiè (a)

(a) Department of Specialized, Diagnostic and Experimental Medicine – DIMES – Bologna University Hospital

Background: the efficacy of Bosentan (B) and Sildenafil (S) for the treatment of PAH appears to be similar according to specific randomized controlled trials. Limited data is available on the direct comparison between these two drugs. Objectives: we compared short term hemodynamic and functional data and long term outcome of PAH patients treated with first-line S therapy (20 mg tid) or first-line B therapy (125 mg bid).

Methods: from November 2006 to April 2013 consecutive naïve patients were randomized to receive B or S. Short term evaluation was made by clinical assessment, 6-minute walk test [6MWT] and right-heart catheterization [RHC] at baseline and after 4.4 ± 3.0 months of therapy. Long term comparison was assessed by time to clinical failure, defined as the time from randomization to the first occurrence of death (all-causes), hospitalization for worsening PAH or combination therapy. Statistical analysis: Wilcoxon-Mann-Whitney test for short term analysis and Kaplan-Meier method for long term one.

Results: 200 PAH patients were randomized: 98 to the B group (mean age 54 ± 18 ; 41 % idiopathic-PAH [IPAH]; 25% PAH associated with congenital heart disease [PAH-CHD]; 17% PAH associated with connective tissue disease [PAH-CTD]; 11% PAH associated with portal hypertension [PoPAH]; 6% PAH associated with HIV infection [PAH-HIV]) and 102 to the S group (mean age 53 ± 17 ; 40 % were IPAH; 22% PAH-CHD; 19% PAH-CTD; 15% PO-PAH; 5% PAH-HIV). We excluded from short term study 10 patients (7 in the B group and 3 in the S group) due to lack of basal or control hemodynamic data. Moreover 13 patients (13%) in the B group and 11 (11%) in the S group did not complete the short term evaluation because of death (4 in B group and 6 in S one), adverse events, protocol violations or were lost to follow-up. Seventy-eight patients in the B group and 88 in the S

group completed the short term study; no statistical significant differences were found in hemodynamic and 6MWT median percent changes after S versus B treatment. The mean duration of follow up in long term evaluation was 26 ± 20 months. The event-free survival at 1, 2 and 3 years were 64, 50 and 39% in B group and 70, 58 and 44% in S group ($P=0.435$). At 1, 2, and 3 years 81, 73 and 64% patients in B group and 82, 71 and 59% in S group ($P=0.595$) had no hospitalizations or mortality for all causes. The overall survival estimates at 1, 2 and 3 years were 91, 83 and 75% in B group and 92, 86 and 78% in S group ($P=0.830$).

Conclusions: Short term and long term comparison between first line treatment with S or B shows no statistically significant differences.

O308

Genotype to phenotype correlations in heritable pulmonary arterial hypertension

Francesca Terzi (a), Massimiliano Palazzini (a), Cristina Bachetti (a), Alessandra Albinì (a), Enrico Monti (a), Claudia Bernabè (a), Gaia Mazzanti (a), Elisa Conficoni (a), Enrico Gotti (a), Nicole Rizzo (a), Alessandra Manes (a), Angelo Branzi (a), Nazzareno Galiè (a)

(a) *Department of Specialized, Diagnostic and Experimental Medicine – DIMES – Bologna University Hospital*

Purpose: Autosomal dominant inheritance of germline mutations of the bone morphogenetic protein receptor type 2 (BMPR2) gene are a major risk factor for heritable pulmonary arterial hypertension. In fact, germline mutations in BMPR2 have been found in familial as well as in clinically sporadic forms of idiopathic pulmonary arterial hypertension. This study was performed to investigate the rate of BMPR2 gene mutations in cases with clinically familial or sporadic IPAH followed in a single centre and to evaluate the correlation between genotype and phenotype.

Methods: Tests for BMPR2 mutations were performed in 238 IPAH patients (22 with a family history of and 216 clinically sporadic). Clinical and haemodynamic characteristics were compared between BMPR2 mutation carriers (BMPR2+) and not-carriers (BMPR2-).

Results: We identified mutations in 17 of 22 (77%) patients with a family history and in 38 of 216 (18%) with clinically sporadic IPAH patients. A BMPR2 mutation was also identified in 45 of 140 unaffected relatives (32%) who accepted to undergo the test. The mean age was 36 ± 13 years in BMPR2+ ($n=55$) patients and 45 ± 20 in BMPR2- ($n=183$) ($p<0.0001$). The right atrial pressure was 8 ± 4 mmHg in BMPR2+ and 7 ± 5 mmHg in BMPR2- ($p 0.4$); mean pulmonary arterial pressure was 59 ± 13 mmHg in BMPR2+ and 54 ± 16 mmHg in BMPR2- ($p 0.03$); pulmonary vascular resistance was 15 ± 7 WU in BMPR2+ and 12 ± 8 WU in BMPR2- ($p 0.019$); cardiac index was 2.4 ± 0.7 L/min/m² in BMPR2+ and 2.7 ± 0.9 L/min/m² in BMPR2- ($p 0.017$). 6MWD was 445 ± 97 meters in BMPR2+ and 395 ± 121 meters in BMPR2- ($p 0.002$). Survival at 1, 3 and 5 years was 98%, 94% and 86% in BMPR2- patients and 98%, 95% and 92% in BMPR2+ patients ($P=0.9$).

Conclusion: The presence of a BMPR2 mutation in patients with IPAH (either clinically familial or sporadic) is associated with a younger age and a more severe hemodynamic impairment at diagnosis but not with a worse exercise capacity and prognosis. The younger age of BMPR2+ patients may explain the similar survival and exercise capacity despite a worse haemodynamics as compared with BMPR2- patients.

O309

Right ventricular dyssynchrony is associated with more advanced right ventricular chamber remodeling and pump dysfunction in idiopathic pulmonary arterial hypertension

Roberto Badagliacca (a), Roberto Poscia (a), Beatrice Pezzuto (a), Silvia Papa (a), Cristina Gambardella (a), Marco Francone (b), Mario Mezzapesa (a), Martina Nocioni (a), Riccardo Rosati (b), Susanna Sciomer (a), Francesco Fedele (a), Carmine Dario Vizza (a)

(a) *Sapienza University of Rome - Dept. of Cardiovascular and Respiratory Science*, (b) *Sapienza University of Rome - Dept. of Radiological Science*

Background: RVD has been described in pulmonary arterial hypertension (PAH), but no evidence is available on its morphological determinants and its effect on systolic function.

Objectives. To evaluate the morphological determinants of right ventricular dyssynchrony (RVD) by echocardiographic and cardiac magnetic resonance (CMR) imaging and its effect on systolic function.

Methods: In 60 consecutive idiopathic PAH (IPAH) patients RVD was evaluated by 2D speckle-tracking echocardiography calculating the standard deviation of the times to peak-systolic strain for the 4 mid-basal RV segments (RV-SD4). Patients were grouped by the median value of RV-SD4 (19 ms) and compared for RV remodeling and systolic function parameters, WHO class, pulmonary hemodynamics and 6-minute walk test (6MWT).

Results: Despite similar pulmonary vascular resistance and mean pulmonary arterial pressure, patients with RV-SD4 >19 ms had advanced WHO class, worse 6MWT, RV hemodynamics, RV remodeling and systolic function parameters compared to patients ≤19 ms. The morphological determinants of RVD resulted RV end-diastolic area, LV diastolic-eccentricity index and RV mass-volume ratio ($r=0.69$; $r^2=0.47$; $p<0.0001$). The strongest inverse correlation was found between RV mid-basal segments postsystolic shortening (PSS) time and cardiac index (CI) ($r=-0.64$, $r^2=0.41$, $p=0.001$), accounting for the significant correlation between RV-SD4 and CI ($r=0.57$, $r^2=0.32$, $p=0.003$). A weaker correlation was found between CI and RV fractional area change ($r=0.33$, $p=0.009$), RV ejection fraction ($r=0.35$, $p=0.006$), pulsed-tissue Doppler systolic velocity ($r=0.26$, $p=0.04$) and RV 2D-strain ($r=0.37$, $p=0.004$).

Conclusions: In IPAH RVD is associated to a more advanced RV remodeling and contributes to pump dysfunction through PSS.

VALVULOPATIA MITRALICA: VALUTAZIONE E NUOVE TECNICHE DI EMODINAMICA INVASIVA 1

O310

Left atrial function analysis for prediction of cardiovascular outcomes in patients with moderate mitral valve regurgitation.

Matteo Cameli (a), Matteo Lisi (a), Francesca Maria Righini (a), Valeria Curci (a), Cristina Di Tommaso (a), Paolo Cameli (a), Stefano Lunghetti (a), Marta Focardi (a), Elisa Giacomini (a), Sergio Mondillo (a)

(a) Department of Cardiovascular Diseases, University of Siena, Siena, Italy

Background: Left atrial (LA) function assessed by 2D Speckle Tracking Echocardiography (2D-STE), has been demonstrated to be a marker of early cardiovascular risk, empowering standard LA functional evaluation. The present study applied LA functional analysis to patients with moderate mitral regurgitation (MR) for prediction of adverse cardiovascular outcomes.

Methods: This prospective study included 157 patients (mean age 66 ± 10 years, 46% men) with moderate MR who referred to echocardiographic laboratory for a general medical consultation. This population was followed for development of atrial fibrillation (AF), hospitalization for heart failure (HF), stroke, transient ischemic attack and cardiovascular death. Left atrial assessment was based on parameters such as LA area, LA volume, LA diameter, LA ejection fraction. 2D-STE was used for LA functional analysis, measuring Global peak atrial longitudinal strain (PALS) by averaging all atrial segments.

Results: Of 157 subjects at baseline, 61 had 82 new events during a mean follow-up of 3.0 ± 1.5 years. All LA parameters, traditional parameters, and parameters derived by speckle tracking echocardiography were independently predictive of combined outcomes ($p < 0.0001$ for all comparisons). Overall performance for prediction of cardiovascular events was greatest for global PALS (area under receiver operator characteristic curve: global PALS 0.85, indexed LA volume 0.72, LA ejection fraction 0.66, LA area 0.60, LA diameter 0.57). A graded association between degree of LA dysfunction and risk of cardiovascular events was evident only for global PALS.

Conclusions: This study demonstrated a strong and independent association between global PALS and adverse cardiovascular events that appears to be superior to the other conventional parameters of LA analysis in patients with moderate MR, underlining the potential additional power of this technique to better stratify patients with mitral valve regurgitation.

O311

Antiplatelet therapy after MitraClip implantation: results from a single centre study

Valeria Cammalleri (a), Gian Paolo Ussia (a), Saverio Muscoli (a), Giuseppina Pascuzzo (a), Ersilia Mazzotta (a), Roberta Serdoz (a), Francesca De Persis (a), Dorotea Rubino (a), Massimiliano Macrini (a), Massimo Marchei (a), Francesco Romeo (a)

(a) Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia

Background: Dual antiplatelet therapy (DAPT) with clopidogrel and aspirin is a widely accepted strategy in patients underwent trans-catheter mitral valve repair with MitraClip System (Abbott Vascular, Menlo Park, CA), using 300-mg loading dose of clopidogrel the day before the procedure, followed by daily dose of 75 mg of clopidogrel for 6 months plus aspirin 100 mg lifelong. Oral anticoagulation therapy (OAT) is currently recommended in patients with atrial fibrillation. Nevertheless controversies exist about the optimal therapy to adopt after MitraClip implantation. We report our institutional experience.

Methods: From November 2011 to June 2013, 44 consecutive patients (mean age 74 ± 7 years old, males 65%) underwent transcatheter MitraClip repair. The mean Logistic EuroSCORE and STS score were 24.7 ± 21 and $9.7 \pm 10\%$, respectively. Thirty-six patients (82%) presented with functional mitral valve disease and 8 patients (18%) with organic degenerative disease. The MitraClip System was successfully implanted in all patients with a significant reduction of MR ($\leq 2+$) maintained at discharge. The mean procedural time was 106 ± 42 minutes; one clip was implanted in 38% and two clips in 62% of patients. Twenty-one patients (48%) received ASA alone after the procedure; 10 (23%) patients were treated with DAPT; 8 patients (18%) with OAT plus ASA, and 5 (11%) patients were treated with OAT alone. Follow-up data were obtained by outpatient visits and telephone interviews 30 days, 6 and 12 months after the procedure. We evaluated the composite of major adverse events, defined as death from any causes, myocardial infarction, ischemic and hemorrhagic stroke, TIA, urgent or emergency conversion to surgery and bleeding.

Results: No adverse events occurred during in-hospital stay, except for one patient who developed acute femoral vein thrombosis treated successfully with OAT. Six patients died: among these, 2 patients were treated with ASA alone; 3 with DAPT; one with OAT alone. One case of gastrointestinal bleeding occurred at 12 months in a patient with DAPT. No cases of myocardial infarction, TIA/strokes, urgent or emergency conversion to surgery have been reported.

Conclusions: We suggest the use of ASA alone or OAT plus ASA for 6 months, when the anticoagulation is indicated in patients undergoing MitraClip procedure.

O312

Outcome of patients referred for MitraClip: treated vs. untreated high-risk candidates in a single center experience

Silvia Ajello (a), Azeem Latib (a), Alessandro Candreva (a), Nicola Buzzatti (b), Micaela Cioni (b), Andrea Guidotti (b), Antonio Colombo (a), Giovanni La Canna (b), Ottavio Alfieri (b), Francesco Maisano (b)

(a) *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan – Italy*, (b) *Department of Cardiothoracic Surgery, San Raffaele Scientific Institute, Milan - Italy*

Purpose: To evaluate the clinical outcomes of high surgical risk patients with functional mitral regurgitation (FMR) untreated or refused for MitraClip (MC) therapy, in which the mitral valve anatomy and the functional status were assessed in our single center experience.

Methods: From October 2008 to February 2013, 252 consecutive patients (mean age 69.8 ± 10.4 years) with FMR who underwent clinical and echocardiographic evaluation to assess MC suitability. Patients were analysed in 2 groups according to the management strategy: Group A included 105 pts treated with MC therapy, from the suitable group (total 140 pts). Group B included 55 pts from the unsuitable group (total 112 pts), refused because of unfavourable anatomy.

Patients in other groups were not analyzed: 21 patients from the suitable group with indication to MC therapy were not treated because of administrative reasons. Within the unsuitable group 29 pts underwent cardiac surgery, and 28 were not treated for baseline MR $\leq 2+$.

Results: Patients were 69.7 ± 10.2 years old in group A and 68.9 ± 9.4 years old in group B ($p=0.067$), with a prevalence of male gender (84.7% and 75%; $p=0.11$). Patients in Group A were more symptomatic at baseline (NYHA functional class III-IV 81.9% vs. 42%; $p<0.0001$). No differences were found in surgical risk scores (Logistic EuroSCORE $22.3 \pm 16.1\%$ vs. $22.1 \pm 13.7\%$; $p=0.55$, STS-Mortality $10.8 \pm 9.8\%$ vs. $7.2 \pm 7.9\%$; $p=0.22$).

In the two groups, patients in MR $\geq 3+$ were 96.2% and 87.3%, average EF was $28.3 \pm 11.3\%$ vs $26.7 \pm 12.1\%$, respectively.

The principal causes of unsuitability in group B were: insufficient coaptation (43.6%), asymmetric coaptation (34.5%), severe annular and posterior leaflet calcification, annulus dilatation, leaflets fibrosis or hypoplastic posterior leaflet (7.2%).

Follow-up time for group A was 13.7±12.8months and 27.1±22.5months for group B. Evaluation at last follow-up showed clinical improvement in Group A: 9.5% of patients were in NYHA functional classes III-IV vs. 32.6% (p=0.029), MR_{≥3+} in 18.3% vs. 36.9%(p=0.043); with comparable ventricular function(EF% 33.2±11.5% vs. 33.8±6.6; p=0.46).

Actuarial survival at 12months was respectively 88.9±3.5% vs. 69.5±7.3% (p=0.002) and at 24 months 80.2±5.2% vs. 57.0±8.1% (p=0.002).

In the follow-up period 33.3% vs.13.1% of patients experienced hospitalization for heart failure (p<0.0001).

Within Group B, patients with asymmetric coaptation showed better outcomes compared with patients with loss of coaptation: actuarial survival at 24months was respectively 84.4±10.2 and 55.3±11.9 (p=0.03) and hospitalization for heart failure event was 0% and 21.0% (p=0.139).

Conclusion: MC therapy for FMR is a valuable treatment for high-risk patients. In patients not suitable for MC implantation because of unfavourable anatomy, conservative treatment with medical therapy appears as inadequate as these patients have a higher mortality. Newer and alternative percutaneous mitral valve therapies are needed in patients with severe symptomatic MR refused for MC therapy.

O313

Stenosi valvolare aortica severa con basso flusso e basso gradiente a frazione di eiezione conservata: quantificazione e ruolo fisiopatologico dell'insufficienza mitralica funzionale

Giovanni Benfari (a), Andrea Rossi (a), Pompilio Faggiano (b), Steano Nistri (c), Giovanni Cioffi (d), Corrado Vassanelli (a)

(a) Sezione di Cardiologia, Dipartimento di Medicina, Università degli studi di Verona, (b) Divisione di Cardiologia, Spedali Civili di Brescia, (c) Servizio di Cardiologia, CMSR - Veneto Medica, Altavilla Vicentina, (d) Dipartimento di Cardiologia, Ospedale Villa Bianca, Trento

Background: Tra i pazienti con stenosi aortica severa è possibile distinguere sottogruppi con diverse caratteristiche emodinamiche e che presentano prognosi differente. I pazienti con basso flusso e basso gradiente (SA-LFLG) sono un gruppo difficile da inquadrare fisiopatologicamente. Non è chiaro se l'insufficienza mitralica funzionale (IMF), incidendo sull'impedenza globale del ventricolo sinistro, possa avere un ruolo in questo contesto.

Metodi: Pazienti consecutivi con area valvolare aortica (AVA_i) ≤ 0,6 cm²/m² e frazione d'eiezione (FE) > 50% hanno formato la popolazione in studio. I volumi telediastolico (VTD) e telesistolico (VTS) del ventricolo sinistro, la frazione di eiezione (FE) e il volume atriale sinistro (LA) sono stati misurati con il metodo di Simpson biplano. La velocità di accorciamento longitudinale (S-DTI) e di allungamento precoce (E-DTI) sono state misurate con Doppler tissutale. Area dell'orifizio rigurgitante effettivo (ERO), volume di rigurgito mitralico (RV) e frazione di rigurgito (RF) sono stati ottenuti con il metodo PISA. L'indice di compliance arteriosa sistemica (SAC) e di impedenza valvulo-arteriosa (Z) sono stati calcolati. I pazienti sono stati poi suddivisi in quattro gruppi definiti in base alla gittata sistolica indicizzata (SV_i) e al GM. **Risultati:** 136 pazienti sono stati inclusi (età media 78±9 anni, 56% femmine, FE media 66±7%, AVA media 0,46±0,1 cm²/m²). Il 25% (n=37) dei pazienti presenta basso SV_i (≤ 35 ml/m²) e, tra questi, il 50 % (n=17) mostra sia basso SV_i che basso GM (≤40 mmHg). Quest'ultimo gruppo è caratterizzato da GM 26±6 mmHg, SV_i 32±3 ml/m², AVA_i 0,47±0,08 cm²/m². Le differenze tra gruppi sono descritte nella tabella. Alla regressione logistica l'ERO è associato alla presenza di SA-LFLG (p=0,05), indipendentemente da VTD, E/E' e Z che invece perdono significatività (p>0,1).

Conclusioni: Tra i pazienti con stenosi aortica severa ed FE conservata, E/E', Z e soprattutto ERO sono i parametri che meglio caratterizzano il gruppo di pazienti SA-LFLG.

| | GM≤40 mmHg SV _i ≤35 ml/m ² | GM≤40 mmHg SV _i >35 ml/m ² | GM>40 mmHg SV _i ≤35 ml/m ² | GM>40 mmHg SV _i >35 ml/m ² | p-value ANOVA |
|----------|---|---|---|---|------------------|
| VTD (ml) | 87±29 | 109±20* | 90±20 | 114±25* | <0,0001 |

| | | | | | |
|--|-------------|-------------|-------------|-------------|---------|
| VTS (ml) | 31±12 | 38±13 | 35±11 | 38±14 | 0,2 |
| FE (%) | 64±8 | 66±7 | 62±7 | 67±6 | 0,076 |
| S-DTI (m/s) | 0,057±0,013 | 0,066±0,012 | 0,054±0,010 | 0,077±0,059 | 0,078 |
| E/E' | 17,00±7,36 | 10,98±4,63* | 11,48±4,23* | 13,13±5,43 | 0,002 |
| LA (ml) | 78±27 | 68±26 | 73±27 | 72±24 | 0,6 |
| ERO (cm ²) | 0,12±0,11 | 0,04±0,05* | 0,06±0,06 | 0,05±0,05* | 0,012 |
| RV (ml) | 23±21 | 7±9* | 12 | 9±10* | 0,012 |
| RF (%) | 38±35 | 10±13* | 26±26 | 13±15* | 0,001 |
| SPAP (mmHg) | 43±7 | 39±7 | 39±11 | 40±8 | 0,4 |
| SAC(ml×mmHg ⁻¹ ×m ⁻²) | 0,61±0,16 | 0,80±0,30 | 0,75±0,50 | 0,79±0,21 | 0,2 |
| Z (mmHg×ml ⁻¹ ×m ⁻²) | 5,01±1,02 | 4,00±0,56* | 5,77±1,11 | 4,31±0,65* | <0,0001 |

*significativamente differenti (p<0,05) rispetto al gruppo con basso flusso e basso gradiente in accordo con il test per i confronti multipli di Bonferroni

O314

Usefulness of real time 3D transesophageal echocardiography during mitralclip implant

Margherita Ministeri (a), Salvatore Scandura (a), Sarah Mangiafico (a), Marta Chiarandà (a), Anna Maria Pistrutto (a), Fabio Di Pasqua (a), Andrea Arcidiacono (a), Giuseppe Ronsivalle (a), Corrado Tamburino (a)

(a) Cardiovascular Department, Ferrarotto Hospital, Catania, Italy

Background and aim of the study: Transesophageal echocardiography (TEE) is essential for the procedure of percutaneous mitral valve repair with the MitraClip® System. It provides information on the morpho-functional characteristics of the mitral valve, assesses the degree of regurgitation and biventricular function and guides the operator during the following main steps of the procedure: performance of trans-septal puncture, axial orientation of the system, grasping of the leaflets, post-grasping assessment and release of the clip.

Methods and Result: The four basal TEE views (called “key views”) listed below are mainly used during the MitraClip procedure : a) mid-esophageal view (~ 0-90°) for the study of the interatrial septum (it allows to follow the catheters during the trans-septal approach); b) 2-chamber intercommissural view (~ 60°) showing part of the mitral valve scallops (P3-A2-P1) and the anterolateral and posteromedial commissures (it allows for the mid-lateral (ML) orientation of the MitraClip® System); c) long-axis mid-esophageal view (~ 120-150°) also defined as left ventricular outflow tract (LVOT) view which shows the P2-A2 scallops in addition to the aortic bulb and part of the ascending aorta (it allows for the antero-posterior (AP) orientation of the system); d) transgastric short-axis view (~ 0-30°), which shows the mitral valve in short axis (it allows guiding the clip perpendicularly to the coaptation line).

In our Institute, more than one hundred procedures have been carried out using both 2D and RT 3D echo imaging. We have realized that RT 3D can make various steps of the procedure easier and brifer and we list them below.

- Trans-septal puncture (in the upper posterior region of the interatrial septum, about 35-40 mm above the mitral plane). The “X-plane” modality view in 3D ultrasound provides at the same time an ultrasound view perpendicular to the reference view (concomitant visualization of the interatrial septum in the short-axis and bicaval views), helping the operator guide the Brokenbrough needle over the interatrial septum, in order to perform the puncture in the correct position;
- Axial orientation of the System. In this step too, the additional role of RT 3D TEE lies in having detailed information on the catheter position on 3 spatial planes all in a single echocardiographic image, avoiding the use of 3 different 2D views (2-chamber intercommissural view, long-axis view and transgastric short-axis view).
- Grasping. 3D RT TEE is useful but not essential for the anatomic assessment of graspingFinal assessment. 3D RT TEE is essential to assess the result of the mitral valve repair both from the

atrial and ventricular views, documenting any signs of eccentricity of the double orifice created by the device. Moreover, 3D color displays also provide good definition of the site(s) of residual regurgitation.

Conclusions: The use of combined 2D and 3D echo imaging during the MitraClip procedure can be associated with shorter procedural time and better results.

O315

Residual interatrial communication after transcatheter mitral edge-to-edge repair: different hemodynamic scenarios

Valeria Cammalleri (b), Gian Paolo Ussia (b), Saverio Muscoli (b), Massimo Marchei (b), Ersilia Mazzotta (b), Giuseppina Pascuzzo (b), Francesca De Persis (b), Dorotea Rubino (b), Francesco Romeo (b)

(b) Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia

Background: The clinical significance of the residual interatrial communication (IAC) after MitraClip repair in patients with severe left ventricular dysfunction is not well defined. We sought to assess the hemodynamic sequels and therapeutic strategies in patients who experienced a persistent IAC after the procedure.

Methods: From January 2012 to May 2013, 35 consecutive patients (mean age 74 ± 8 years) underwent transcatheter MitraClip repair for $\geq 3+$ mitral regurgitation (MR), as part of an ongoing, prospective study. Intraprocedurally iatrogenic IAC was identified with color flow Doppler in mid-esophageal short-axis view (30° - 60°) at the level of the aortic valve and bicaval view (80° - 110°); the larger color flow width at the level of the interatrial septum was recorded as the IAC diameter. Three-dimensional (3D) echocardiographic assessment was achieved in 60% cases.

Results: Acute procedural success was 100% and a 30-days survival of 97% was reported. Immediately after the procedure a residual IAC was present in all patients with an average diameter of 0.51 ± 0.39 cm. At 30 days IAC was detected in 81% of patients with a diameter of 0.45 ± 0.31 cm ($p=0.53$). To date three patients, who had severe left ventricular dysfunction and functional MR, developed different hemodynamic impairments secondary to the residual IAC, requiring percutaneous closure of the defect: a) late development of pure right heart failure; b) sudden systemic desaturation with pulmonary hypertension and c) severe low output syndrome with cardiorespiratory arrest.

Conclusion: Residual IAC is a common finding after MitraClip procedure, but some patients may develop serious complications, which have to be promptly identified, in order to select those patients who stand to benefit most from atrial septal defect closure and therefore improve outcomes. A careful hemodynamic and echocardiographic assessment, preferably using 3D visualization, is mandatory to estimate the impact of residual IAC.

PROGNOSI NELL'INSUFFICIENZA CARDIACA 2

O316

Una ridotta attività ferrossidasica predice la mortalità in pazienti affetti da scompenso cardiaco cronico ed è legata alla nitrificazione della tirosina e alla ossidazione della cisteina e della ceruloplasmina

Simone Binno (a), Stefano Tedeschi (a), Paolo Govoni (b), Simona Dancelli (b), Rossana Rocco (a), Vanni Vicini (a), Pietro Coghi (a), Giuseppe Regolisti (a), Alberto Montanari (a), Enrico Fiaccadori (a), Jacques de Champlain (c), Aderville Cabassi (a)

(a) *Università degli Studi di Parma, Dipartimento di Medicina Clinica e Sperimentale, Unità di Ricerca C*, (b) *Università degli Studi di Parma, Dipartimento di Scienze Biomediche e Biotecnologiche*, (c) *Université de Montreal, IRCM*

Introduzione: La nitrificazione e la ossidazione proteica sono presenti nelle fasi avanzate dello scompenso cardiaco e possono alterare la funzione delle proteine. L'attività Ferrossidasica I (FeOx I), responsabile dell'attività antiossidante della Ceruloplasmina (Cp), si riduce dopo nitrificazione della Cp mediata da perossinitrito (ONOO⁻). Abbiamo valutato la relazione fra FeOx I e Cp, le sue frazioni nitrosate ed ossidate e in una coorte di pazienti affetti da scompenso cardiaco cronico una possibile rilevanza clinica di FeOx I.

Metodi e Risultati: Novantasei pazienti consecutivi affetti da scompenso cardiaco cronico stabile (età 76±9 anni, classe NYHA media 2.9±0.8) e 35 controlli di pari età, sono stati inclusi nello studio. Sono state misurate attività FeOx I e FeOx II, Cp, Cp nitrosata, proteine nitrosate totali, come altri parametri espressione di attivazione neuroormonale ed infiammatoria (norepinefrina, BNP, PCR alta sensibilità (hsPCR)). Il follow-up clinico è durato 24 mesi. I livelli sierici di Cp, proteine nitrosate, BNP, norepinefrina ed hsPCR sono risultati elevati nei pazienti affetti da scompenso cardiaco vs controlli. L'attività FeOx I appare significativamente diminuita nei pazienti affetti da scompenso cardiaco (-20% vs CTR, P < 0,01) ed inversamente correlata alla Cp nitrosata (r = -0,305, P = 0,003) ma non alla Cp (r = 0,016, P = 0,872). I pazienti scompensati nel terzile inferiore di FeOx I hanno mostrato una mortalità raddoppiata (20 decessi, 64%) rispetto ai terzili intermedio (11 decessi, 33%) e alto (9 decessi, 28%). FeOx I risulta essere predittore di mortalità (HR 2,95, CI 1,29-6,75, P = 0,011) dopo aggiustamento per variabili cliniche (età, sesso, ipertensione, fumo) e biochimiche (sodiemia, filtrato glomerulare, hsPCR). In studi ex vivo, un calo di FeOx I (-47%, P < 0,01) si associava ad un incremento della nitrificazione della tirosina della Cp dopo esposizione a ONOO⁻ (0,15 mM) di siero da soggetti CTR (n=18); in esperimenti in vitro, l'incubazione di ONOO⁻ con Cp purificata ha determinato marcato calo di FeOx I (-78%, P < 0,001) ed un incremento sia della nitrificazione della tirosina che della ossidazione del gruppo sulfidrilico della cisteina. La preincubazione con glutatone ridotto (0,85 mM) è in grado di prevenire sia la nitrificazione della tirosina sia l'ossidazione delle cisteine indotta da ONOO⁻ sia il calo di FeOx I. La preincubazione con epicatechina (0,05 mM) è in grado di prevenire la nitrificazione della tirosina ma non l'ossidazione della cisteina, riducendo parzialmente il calo di FeOx I, suggerendo che sia l'ossidazione della cisteina sia la nitrosazione della tirosina concorrano nell'inibizione di FeOx I.

Conclusioni: La riduzione di FeOx I risulta legata alla nitrificazione delle Cp nei pazienti affetti da scompenso cardiaco. Sia la nitrosazione delle tirosine indotta da ONOO⁻ sia l'ossidazione delle cisteine sono coinvolte nell'inibizione di FeOx I. Valori più bassi di FeOx I sono associati a minor sopravvivenza nei pazienti con scompenso cardiaco cronico, fornendo informazioni prognostiche additive rispetto alle variabili cliniche e biochimiche.

O317

Correlazione tra livelli di acido urico sierico e frazione di eiezione in pazienti anziani affetti da insufficienza cardiaca

Eugenio R. Cosentino (a), Arrigo Cicero (a), Elisa R. Rinaldi (a), Martina Rosticci (a), Enrico Strocchi (a), Daniela Degli Esposti (a), Simone Faenza (a), Lucia Marconi (a), Domenico Maione (a), Claudio Borghi (a)

(a) *Dipartimento di Scienze Mediche e Chirurgiche, Ospedale Sant'Orsola-Malpighi Bologna*

Introduzione: un numero crescente di evidenze suggerisce che l'acido urico sierico è un fattore di rischio di malattia cardiovascolare, ma solo i dati preliminari supportano l'ipotesi che potrebbe essere coinvolto anche nella prognosi dello scompenso cardiaco.

Obiettivo: valutare la correlazione tra valori di acido urico sierico e la frazione di eiezione in una popolazione di pazienti con insufficienza cardiaca.

Metodi: per questo studio abbiamo valutato 487 pazienti affetti da insufficienza cardiaca (M = 291, 59,8%, F = 196, 40,2%, età media: 72 ± 11 anni) afferenti al nostro ambulatorio per la diagnosi e cura dello scompenso cardiaco. In tutti i pazienti veniva eseguita una valutazione clinica completa con determinazione dei principali parametri clinici, una valutazione laboratoristica con determinazione delle principali variabili biochimiche e metaboliche, e una strumentale ecocardiografica con determinazione della FE%.

Risultati: In un'analisi univariata, l'acido urico sierico sembra avere una forte correlazione inversa con la frazione di eiezione (FE%): $B = -4,392$, IC 95% $-5.427 - 3.357$, $p < 0.001$). Includendo nell'analisi multivariata età, indice di massa corporea, pressione arteriosa media (PAM), frequenza cardiaca, emoglobina, glicemia a digiuno, colesterolo LDL, colesterolo HDL, e creatinina, il miglior modello predittivo della FE era solo l'acido urico sierico ($B = -3,005$, 95% CI $-4.386 - 1.623$, $p < 0.001$) e MAP ($B = 0,241$, 95% CI $0.047 - 0.435$, $p = 0.015$). Ripetendo l'analisi per sesso, abbiamo confermato che l'acido urico sierico era un significativo forte predittore di FE negli uomini ma non nelle donne (dove PAM e BMI sono stati i migliori predittori). Ripetendo l'analisi sulla base del livello di obesità, non abbiamo trovato alcuna differenza nella capacità dell'acido urico sierico di predire FE in pazienti magri come in quelli obesi.

Conclusioni: l'acido urico sierico sembra essere inversamente correlato alla frazione di eiezione nei pazienti anziani affetti da insufficienza cardiaca, dopo la correzione per un gran numero di variabili cliniche, soprattutto negli uomini.

O318

Significato prognostico della fibrillazione atriale e del controllo della frequenza in pazienti ambulatoriali affetti da insufficienza cardiaca

Marco Triggiani (a), Alessandra Manerba (a), Annalisa Pizzuto (a), Laura Lupi (a), Elena Rocco (a), Giuseppe Milesi (a), Nicola Berlinghieri (a), Silvia Suardi (a), Clara Villa (a), Savina Nodari (a)

(a) *Dipartimento Specialità Medico-Chirurgiche, Scienze Radiologiche, e Sanità Pubblica. U.O. Cardiologi*

Background: La Fibrillazione Atriale (FA) è una comorbidity frequente nei pazienti (pts) affetti da insufficienza cardiaca (IC) e i meccanismi fisiopatologici che legano le due patologie non sono ancora del tutto chiariti. Nonostante diversi studi abbiano valutato la prognosi nei pts con entrambe le condizioni, il ruolo della FA come predittore indipendente di eventi nei pazienti affetti da IC è ancora incerto. Lo scopo di questo studio è stato quello di analizzare il ruolo prognostico della FA in relazione ai valori di frequenza cardiaca (FC) a riposo in pts affetti IC cronica.

Metodi: Abbiamo eseguito un'analisi retrospettiva dei dati clinici, laboratoristici ed ecocardiografici dei pts affetti da IC cronica con disfunzione sistolica ventricolare sinistra (FE < 45%) seguiti in follow-up presso il nostro Centro Ambulatoriale per lo Scompenso Cardiaco. Tutti i pazienti inclusi

nell'analisi erano in condizioni cliniche stabili (nessun evento né modifiche terapeutiche nei tre mesi precedenti). Abbiamo considerato come end-point composito primario la mortalità o il ricovero per IC o cause cardiovascolari (CV) a 1 anno di follow-up. Abbiamo quindi confrontato le caratteristiche e gli eventi dei pts in ritmo sinusale rispetto ai pts in FA stratificati secondo il valore mediano di FC a riposo (70 bpm).

Risultati: In totale sono stati inclusi nell'analisi 528 pts (età media $66,9 \pm 13$ anni; 82% maschi). Tutti i pts erano in terapia medica ottimizzata secondo le più attuali Linee Guida e la maggior parte di essi ($n = 485$; 92%) era in trattamento con beta-bloccante alla massima dose tollerata. L'endpoint composito si è verificato in 151 pazienti (28.6%). All'analisi multivariata la ridotta FE ($p < 0,002$), la classe NYHA più avanzata ($p = 0,007$) e la presenza di FA ($p < 0,001$) sono risultati predittori indipendenti di eventi. Dal confronto tra i pts in ritmo sinusale e i pazienti in FA è emerso che questi ultimi erano mediamente più anziani ($p < 0,0001$), più compromessi da un punto di vista emodinamico e funzionale (classe NYHA $2,04 \pm 0,79$ vs $1,82 \pm 0,7$, $p < 0,0001$) e mediamente avevano valori di FC a riposo più elevati ($p = 0,000$). Nel sottogruppo di pazienti in FA ($n = 121$; 23%), quelli con FC a riposo ≥ 70 bpm rispetto a quelli con FC a riposo < 70 bpm erano più emodinamicamente e clinicamente congesti, nonostante fossero trattati con dosi maggiori di beta-bloccante ($33,8 \pm 23$ vs $21 \pm 13,5$ mg/die, $p = 0,002$). La sopravvivenza libera da eventi era significativamente più bassa nei pts con FA e FC a riposo ≥ 70 bpm rispetto sia ai pts in FA con FC < 70 bpm che ai pazienti in ritmo sinusale.

Conclusioni: In pts ambulatoriali affetti da IC cronica e clinicamente stabili, la presenza di FA è associata a un aumentato rischio di eventi e il valore prognostico indipendente della FA sembra essere ancora più evidente nei pazienti con valori di FC a riposo più elevati. Nuovi studi prospettici sono pertanto necessari per la ricerca di nuove strategie (farmacologiche e non) di 'rate control' nei pazienti affetti da IC e FA permanente.

O319

Relazione tra terapia diuretica, introito di sodio, sodiuria e livelli plasmatici di Renina, Aldosterone, Copeptina e NTproBNP in pazienti in classe NYHA III-IV

Luciano De Biase (a), Giulia Scillitani (a), Sara Cangianiello (a), Patrizia Cardelli (b), Gerardo Salerno (b), Francesca Jacoangeli (a), Giovanna Gallo (a), Vivianne Presta (a), Ali Al Mohanil (a), Priscilla Milewski (a), Massimo Volpe (a)

(a) *Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Università Sapienza*, (b) *Diagnostica di laboratorio, Dipartimento di Medicina Clinica e Molecolare, Università Sapienza*

L'iponatremia, l'attivazione del Sistema Renina Angiotensina Aldosterone e dell'ADH sono fattori prognostici negativi nei pazienti con Scompenso Cardiaco (SC). Terapia medica, dieta e funzione renale sono coinvolti nella bilancia del sodio. Dati sulle relazioni fra queste variabili e l'attivazione neuroormonale sono scarsi, in particolare per quello che riguarda l'ADH.

Abbiamo studiato il bilancio del sodio, le variazioni dei livelli di Aldosterone, Renina, Copeptina (frammento stabile della pre-pro-vasopressina) e NT-proBNP dopo terapia diuretica e.v in 20 pazienti con SC in classe NYHA III-IV, afferenti al nostro DH che necessitavano di terapia diuretica e.v. Un prelievo per ormoni è stato effettuato prima dell'infusione di furosemide ($t=0$) e dopo 4 ore ($t=4$). Tutti i pazienti hanno effettuato una raccolta delle urine delle 24h il giorno precedente la terapia e.v. ed hanno compilato un questionario sull'introito settimanale di sodio.

I risultati hanno evidenziato un incremento significativo dei valori di Aldosterone in clinostatismo: t_0 : $245,7 \pm 149,5$ pg/ml; t_4 : $302,6 \pm 177,3$ pg/ml ($p = 0,04$), non associato ad incremento dei valori in ortostatismo ($p = 0,69$). La Renina è aumentata in ortostatismo: t_0 : $12,22 \pm 10,5$ ng/ml/h; t_4 : $15,52 \pm 11,87$ ng/ml/h ($p = 0,03$), ma non in clinostatismo ($p = 0,25$). La Copeptina è aumentata dopo la terapia: t_0 $30,31 \pm 4,544$ pg/ml; t_4 $36,54 \pm 12,05$ pg/ml ($p = 0,02$). I valori di NT-proBNP sono risultati simili al t_0 e t_4 ($p = 0,7$). I 6 pazienti iponatremici (Gruppo 1) avevano valori di Aldosterone, Renina, Copeptina e NT-proBNP maggiori rispetto agli altri (Gruppo 2). Aldosterone in clinostatismo:

Gruppo 1: $375,2 \pm 164,2$ pg/ml; Gruppo 2: $196,3 \pm 98,02$ pg/ml ($p=0,0069$). Aldosterone in ortostatismo: Gruppo 1: $540 \pm 363,9$ pg/ml; Gruppo 2: $235,5 \pm 142,2$ pg/ml ($p=0,01$). Renina in clinostatismo: Gruppo 1: $15,16 \pm 8,625$ ng/ml/h; Gruppo 2: $11,42 \pm 11,61$ ng/ml/h ($p=0,48$). Renina in ortostatismo: Gruppo 1: $15,30 \pm 9,189$ ng/ml/h; Gruppo 2: $10,90 \pm 11,06$ ng/ml/h ($p=0,20$). Copeptina: Gruppo 1: $34,96 \pm 4,405$ pg/ml; Gruppo 2: $29,56 \pm 3,939$ pg/ml ($p=0,04$). NT-proBNP: Gruppo 1: 4100 ± 2531 pg/ml; Gruppo 2: 2355 ± 1178 pg/ml ($p=0,04$). Osmolarità: pz normonatremici: $302,47 \pm 13,18$; Pz iponatremici: $287,65 \pm 11,13$. L'introito di sodio con la dieta è stato simile nei due gruppi; nel Gruppo 1 la sodiuria delle 24 h pari è stata superiore del 14% a quella del Gruppo 2. La terapia diuretica domiciliare nei due gruppi era maggiore nel Gruppo 2: Gruppo 1 $612,5 \pm 583,04$ mg; Gruppo 2 $1806,78 \pm 914,7$ mg.

Conclusioni: la terapia diuretica e.v. in pazienti con SC induce un'attivazione neuromonale con incremento di Copeptina e componenti del SRAA. NT pro BNP non si modifica probabilmente per il breve periodo di osservazione. I pz iponatremici avevano una maggiore attivazione ormonale di base e dopo terapia; ciò avvalorava la tesi di considerare l'iponatremia un fattore prognostico sfavorevole nei pazienti con SC. I nostri risultati aiutano a chiarire le modificazioni indotte dalla terapia diuretica e la relazione tra la medesima e la prognosi. Questa terapia andrebbe quindi riservata a pazienti che necessitano assolutamente di riduzione del sovraccarico di liquidi.

O320

Predictive value of early improvement of functional mitral regurgitation in patients with idiopathic dilated cardiomyopathy under optimal medical treatment

Davide Stolfo (a), Marco Merlo (a), Bruno Pinamonti (a), Marta Gigli (a), Stefano Poli (a), Andrea Giuseppe Porto (a), Concetta Di Nora (a), Giulia Barbatì (a), Andrea Di Lenarda (b), Gianfranco Sinagra (a)

(a) *Cardiovascular Department, Hospital and University of Trieste, Italy*, (b) *Cardiovascular Center, ASSI Trieste, Italy*

Purpose: In patients with idiopathic dilated cardiomyopathy (IDCM), the presence of significant functional mitral regurgitation (FMR) at enrolment is a known negative prognostic factor. However the behavior of FMR and the prognostic role of its early improvement under optimal medical treatment are still unclear. Our aim was to evaluate, in a large cohort of IDCM patients, the prognostic role of FMR reassessed after 6 months of optimized medical therapy.

Methods: We enrolled, from 1988 to 2009, 470 consecutive patients (males 70,2%; age $44,5 \pm 13,6$ years) with IDCM. For each patient echocardiographic data at baseline and after 6 (3-12) months were available. FMR was considered significant if "moderate" to "severe" at echocardiographic evaluation. We considered 3 groups: 1) patients with non-significant FMR at baseline and after 6 months, 2) patients with significant FMR at baseline and subsequent improvement, 3) patients with significant FMR after 6 months. Multivariate prognostic models at baseline and after 6 months were constructed and compared by net reclassification index (NRI).

Results: At baseline 177 of 470 patients (37.6%) had significant FMR; 16 patients (3%) died or underwent heart transplantation (HTx) before the second evaluation. Group 1, 2 and 3 counted 267 (54.9%), 97 (19.9%) and 110 (22.6%) patients, respectively. According to our multivariate model based on 6 months-follow-up data, improvement of FMR (HR 0.73; CI 95% 0.59-0.90; $p < 0,01$), higher left ventricular ejection fraction and NYHA classes I-II emerged as independent protective factors, together with female gender and shorter heart failure duration. This model permitted a more accurate risk classification at 48 months compared with a model based on baseline data (NRI 54% [95% CI: 23-84%]). Survival-free from death/HTx at 48 months of follow up was 94, 90, 75% in group 1, 2 and 3, respectively ($p < 0,001$).

Conclusions: Early improvement of significant FMR was found in 20% of IDCM patients and emerged as a favorable independent prognostic factor. Early re-evaluation of FMR together with

NYHA class and left ventricular ejection fraction showed an incremental power to predict outcome at 48 months with respect to baseline evaluation.

O321

Correlazione tra anemia e scompenso cardiaco: prevalenza del fenomeno.

Dario Buccheri (a), Davide Piraino (b), Maria Galifi (c), Paola Rosa Chirco (e), Giulia Teresi (f), Salvatore Giambanco (g), Nilla Manzullo (d), Pasquale Assennato (h), Salvatore Novo (i)

(a) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (b) *Policlinico Universitario "P.Giaccone" UO Cardiologia II con emodinamica*, (c) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (d) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (e) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (f) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (g) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*, (h) *Policlinico Universitario "P.Giaccone" UO Cardiologia II con emodinamica*, (i) *Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia*

Background: L'organizzazione mondiale della sanità definisce con il termine di anemia un valore di Hb <13,0 g/dl nell'uomo e <12,0 g/dl nella donna. Numerosi studi hanno dimostrato come tali valori sono di frequente riscontro in pazienti affetti da scompenso cardiaco, avvalorando l'ipotesi sull'esistenza di una correlazione significativa tra anemia ed insufficienza cardiaca.

Scopo: Studiare la prevalenza dell'anemia nei pazienti affetti da scompenso cardiaco mediante metodi basati sull'analisi dei numerosi studi clinici eseguiti, sui più recenti dati di letteratura in proposito e sulla comparazione tra le diverse casistiche ottenute anche mediante le informazioni derivanti dalla nostra esperienza di osservazione ambulatoriale ed ospedalizzazione di pazienti affetti da scompenso cardiaco cronico.

Metodi: I dati analizzati sono il risultato di studi quali il *SOLVD* (Studies Of Left Ventricular Dysfunction), il *Val-HeFT* (Valsartan Heart Failure Trial) ed il *COMET* (Carvedilol Or Metoprolol European Trial) che hanno mostrato una prevalenza di anemia nei soggetti con scompenso abbastanza significativa e comparati con i dati ottenuti dalla consultazione degli archivi storici relativi a pazienti ricoverati con diagnosi di scompenso cardiaco. Per ogni paziente sono state raccolte informazioni relative al sesso, l'età, la durata della degenza, la presenza di fattori di rischio per malattie cardiovascolari ed in particolar modo la presenza di diabete mellito, la classe NYHA di appartenenza, gli esami ematochimici con particolare attenzione ai valori di Hb ed ematocrito ed infine la presenza di insufficienza renale cronica.

Risultati: Tutte le osservazioni sono risultate concordi nell'indicare una importante relazione tra anemia ed insufficienza cardiaca quantificabile con una prevalenza percentuale che va dal 20% della maggior parte delle ricerche effettuate sino a circa il 50% degli altri studi considerati. Inoltre, l'anemia appare consistentemente più presente nei pazienti affetti da insufficienza cardiaca con età avanzata, con una più severa limitazione delle capacità funzionali e con la maggiore severità di un'altra comorbilità rappresentata dalla insufficienza renale cronica.

Conclusioni: Il nostro studio dimostra il valore prognostico che la compresenza di anemia assume in un'elevata percentuale di soggetti affetti da insufficienza cardiaca cronica, divenendo pertanto un importante fattore predittivo in termini di frequenza di ospedalizzazione e di aumentato rischio di mortalità nei pazienti con insufficienza cardiaca, indipendentemente dai meccanismi con i quali l'anemia stessa si instaura e dalla presenza di una funzione ventricolare cardiaca conservata o ridotta.

VASCULOPATIE PERIFERICHE E ICTUS

O322

Successful percutaneous lower extremity revascularization reduces major cardiovascular events in patients with critical limb ischemia.

Anna Sannino (a), Eugenio Stabile (a), Giuseppe Giugliano (a), Linda Brevetti (a), Vittorio Schiano (a), Evelina Toscano (a), Fernando Scudiero (a), Giovanni Esposito (a), Bruno Trimarco (a)

(a) *Università degli Studi di Napoli "Federico II"*

Background: Critical limb ischemia (CLI) is a marker for diffuse atherosclerosis and is associated with a robust occurrence of major adverse cardiovascular events (MACE) and amputation. Arterial revascularization is associated with a significant reduction of amputation rate. In the present study, we investigated whether successful lower limbs revascularization also reduces MACE in patients with CLI.

Methods: 74 consecutive patients with CLI at stage III and IV of Fontaine's classification and with ankle/brachial index ≤ 0.50 were enrolled in the study. According to the Trans-Atlantic Inter Society Consensus II recommendations, in all patients revascularization was attempted. 54 patients (72.9 %) underwent successful percutaneous lower extremity angioplasty (PTA), while 20 patients (17.1 %) were managed with conservative therapy only because of unsuccessful PTA and unsuitable for surgery. MACE incidence (including cardiovascular death, myocardial infarction and stroke) was prospectively analyzed.

Results: No baseline differences were observed among the groups. During a median follow-up of 13 months (interquartile range 5.0–38.0), MACE incidence was significantly lower in those patients who underwent successful revascularization when compared to those who could not be revascularized (14.8% vs. 40.0%, $p < 0.05$). Among MACE a robust decrease in overall mortality rate was observed after CLI revascularization. This result was also associated with a reduction of amputation rate and disability scores in revascularized patients.

Conclusions: This study shows that successful revascularization of patients affected by CLI is associated with a reduction in the occurrence of MACE. We believe that these data, if confirmed by larger registries or population studies, could be of value in supporting the importance of revascularization strategies to improve CLI patients outcome.

O323

Evidence from osteoprotegerine-RANKL system in explanted human carotid plaques and correlation with increased arterial stiffness.

Alessia Quattrone (c), Scipione Carerj (c), Giovanni Alongi (c), Alessandra Bitto (a), Giovanni De Caridi (b), Anna Terrizzi (c), Gabriele Luzzza (c), Ilaria Boretti (c), Roberta Manganaro (c), Vito Pipitone (c), Carmela Melania Barbaro (c), Giuseppe Oreto (c), Concetta Zito (c)

(a) *Pharmacology-Department of Clinical and Experimental Medicine, University of Messina*, (b) *Vascular Surgery-Department of Experimental Medical-Surgical Sciences, University of Messina*, (c) *Cardiology - Department of Clinical and Experimental Medicine, University of Messina*.

Background: Osteoprotegerin (OPG) is a member of the tumor necrosis factor (TNF)-related family and part of the OPG/receptor activator of NF- κ B ligand (RANKL)/receptor activator of NF- κ B (RANK) triad. The effects of OPG in the development of atheroma is dual: on one hand, OPG is capable to reduce the inflammatory process by binding RANKL, and therefore blocking NF- κ B-mediated inflammation; on the other hand, OPG can reduce the differentiation of mature osteoclast, allowing the calcification of atherosclerotic plaques. Furthermore, the production of OPG in endothelial cells may reflect endothelial dysfunction and arterial stiffness. However, the most of knowledge in this context is currently provided from serum levels of OPG and this accounts for its

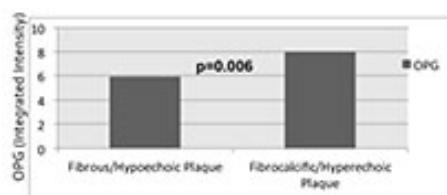
SIC | *Indice Autori*

low specificity. We wanted to investigate whether the expression of OPG and RANKL, in the carotid atherosclerotic wall, relates to a) carotid stiffness and b) cerebrovascular events (CVE). **Methods:** An ultrasound examination (UE) of carotid arteries was performed, through an Esaote My Lab 70 system, on a cohort of 22 patients (18 male, 72.3 ± 8.4 yrs) who underwent thromboendarterectomy. Physician that performed UEs was blinded from patient clinical history. Pulse wave velocity (PWV) and β index were measured as parameters of arterial stiffness. A blinded pathologist confirmed ultrasonographic carotid plaques morphology. A carotid specimen comprehensive of both plaque and plaque-free wall was analyzed in order to investigate by Western blot the expression of OPG and RANKL.

Results: Nine (41%) out of 22 patients previously had a CVE and 55% of them also showed a history of ischemic cardiomyopathy. The UE revealed that all patients with CVE had fibrous/hypoechoic plaques, in contrast those without CVE showed fibrocalcific/hyperechoic plaques. Moreover, an increased arterial stiffness was identified in the entire cohort (PWV= 10.8 ± 1.9 m/s, $\beta = 19.2 \pm 5.8$). Specimens' analysis revealed an enhanced expression of OPG particularly in fibrocalcific/hyperechoic plaques (7.94 ± 1 integrated intensity) rather than in fibrous/hypoechoic plaques (5.9 ± 1.1 integrated intensity, $p=0.006$). In addition, a negative correlation between CVE and OPG expression ($\rho = -0.67$, $p=0.008$) and between PWV and RANKL values ($r = -0.71$, $p=0.04$) was identified in overall cohort.

Conclusion: OPG expression is increased in patients with advanced atherosclerosis, particularly in those with fibrocalcific plaques but no CVE; the correlation between RANKL and PWV validates the role of arterial stiffness in the atherosclerotic process in elderly patients.

Osteoprotegerin Expression and Carotid Plaques Morphology (Surgical/Ultrasonographic)



O324

Drug-Eluting Balloon for treatment of superficial femoral artery in-stent restenosis. Two years results from an Italian registry.

Vittorio Virga (b), Eugenio Stabile (a), Luigi Salemme (b), Angelo Cioppa (b), Giuseppe Giugliano (a), Tullio Tesorio (b), Linda Cota (b), Grigore Popusoi (b), Armando Pucciarelli (b), Linda Brevetti (a), Anna Sannino (a), Vittorio Schiano (a), Giancarlo Biamino (b), Giovanni Esposito (a), Paolo Rubino (b)

(a) Università degli Studi di Napoli "Federico II", (b) Clinica Montevergine, Mercogliano

Background: The patency rate of treated SFA has been improved through use of the self-expanding nitinol stents. As the population with SFA stenting continues to increase, occurrence of in-stent restenosis (ISR) has become a thoughtful problem. The use of DEB has showed promising results in reducing restenosis recurrence in coronary stents. Accordingly, the purpose of this prospective registry was to evaluate the safety and efficacy, at 2 years, of the use of drug-eluting balloons (DEB) for the treatment of superficial femoral artery (SFA) in-stent restenosis (ISR).

Methods: From December 2009 to December 2010, 39 consecutive patients underwent PTA of SFA-ISR in our institution. All patients underwent conventional SFA PTA and final post-dilation with paclitaxel-eluting balloons (IN.PACT, Medtronic, Minneapolis, Minnesota). Clinical follow-up and SIC | *Indice Autori*

duplex ultrasonography scan were performed at 30 days, and at 3, 6, 12, 18 and 24 months post-procedure. Repeat angiography was performed when proximal flow velocity ratio (PVR) was between 2.4 and 5.0 (intermediate restenosis) and when the patient had clinical symptoms or > 5.0 (severe restenosis) regardless clinical symptoms and in case of stent occlusion.

Results: Technical and procedural success was achieved in every patient. No in-hospital major adverse cardiac and cerebrovascular events occurred. At 2 years, 2 patient died (1 due to heart failure and 1 due to myocardial infarction). Primary endpoint, primary patency rate at 24 months, was obtained in 70.3% (26 patients). The presence of an occlusive restenosis at the time of treatment was not associated with an increased restenosis rate, when compared with non-occlusive restenosis, at 2 years.

Conclusions: The data suggest that adjunctive use of DEB for the treatment of SFA-ISR represents a potentially safe and effective therapeutic strategy. These data should be considered hypothesis-generating to design a randomized trial.

O325

Ruolo delle statine sulla proliferazione neointimale nello stenting carotideo

Sandra Mastroianno (c), Giuseppe Di Stolfo (a), Carmela d'Arienzo (a), Danilo Ceriello (b), Maurizio Ruggieri (b), Aldo Russo (c), Giovanni Paroni (b), Raffaele Fanelli (a)

(a) UOC di UTIC-Cardiologia, Casa Sollievo della Sofferenza, IRCCS, San Giovanni Rotondo, (b) UOC di Chirurgia Vascolare, Casa Sollievo della Sofferenza, IRCCS, San Giovanni Rotondo, (c) UOC Servizio di Cardiologia, Casa Sollievo della Sofferenza, IRCCS, San Giovanni Rotondo

Background: L'angioplastica carotidea con impianto di stent (CAS) provoca un danno ed un denudamento della parete vasale che rappresentano un forte stimolo alla riendotelizzazione espressa come proliferazione neointimale; nonostante l'ampia letteratura in merito alla restenosi intracoronarica, non molti sono i dati riguardanti la proliferazione neointimale intrastent carotideo. La correzione di fattori di rischio come diabete, ipertensione, dislipidemia, fumo, limita la ripresa dell'aterosclerosi e di conseguenza riduce l'incidenza di restenosi a distanza ma non ha effetti significativi sulla proliferazione intimale precoce.

Obiettivo: L'obiettivo di questo studio osservazionale è valutare il ruolo dell'ipertensione arteriosa e della terapia con statine sulla proliferazione intimale in pazienti affetti da stenosi carotidea sottoposta a stenting.

Pazienti e metodi: Sono stati valutati 31 soggetti (16 maschi e 15 femmine, età media 72 ± 7.6), trattati con PTA e stenting (nitinolo) carotideo in 14 casi in carotide destra ed in 17 in carotide sinistra. La proliferazione neointimale media a 6 mesi è $564 \pm 67 \mu\text{m}$ (mediana $562 \mu\text{m}$) con un picco di velocità intrastent in carotide comune pari a $74.8 \pm 25.5 \text{ cm/sec}$.

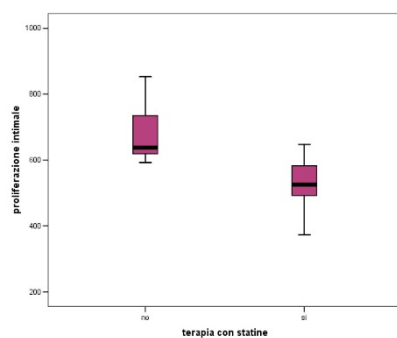


Fig.1 Distribuzione della proliferazione neointimale nei gruppi con e senza trattamento con statine

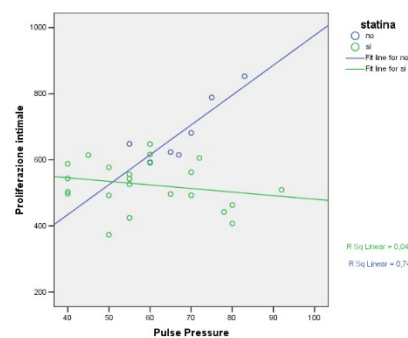


Fig.2 Correlazione tra *pulse pressure* e proliferazione neointimale in relazione al trattamento con statine

Risultati: I pazienti sono stati distribuiti in 2 gruppi, secondo l'assunzione di statine. I dati analizzati hanno mostrato una significativa differenza di proliferazione neointimale nei due gruppi ($679 \pm 93 \mu\text{m}$

vs $525 \pm 72 \mu\text{m}$, nel gruppo senza e con statina rispettivamente, $p=0.002$, fig.1). L'analisi di regressione lineare ha mostrato una correlazione tra i valori di *pulse pressure* e la proliferazione intimale nel gruppo che non assumeva statine (R square 7,40, $p=0.013$, fig.2), indipendentemente dall'assunzione di terapia antiipertensiva; tale correlazione non era presente nel gruppo in trattamento con statine.

Conclusioni: Il presente studio conferma il ruolo dell'ipertensione arteriosa nel determinare la proliferazione neointimale in paziente sottoposti a stenting carotideo, ed il ruolo protettivo delle statine nel ridurre il danno endoteliale indotto dall'ipertensione arteriosa.

O326

Magnetic resonance spectroscopy to detect functional improvement by adipose tissue-derived stromal cell transplantation in the ischemic hind limb in diabetic rats

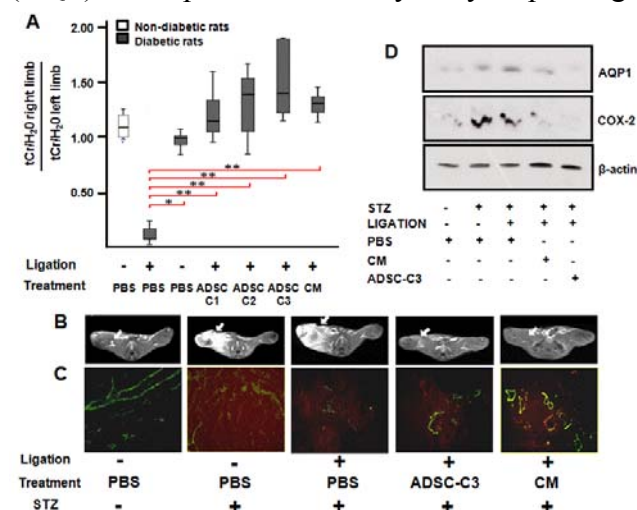
Rosalinda Madonna (a), Stefano Delli Pizzi (b), Armando Tartaro (b), Raffaele De Caterina (a)

(a) Department of Neuroscience and Imaging, Institute of Cardiology, "G. d'Annunzio" University – Chieti, (b) Department of Neuroscience and Imaging, Institute for Advanced Biomedical Technologies, "G. d'Annunzio" University – Chieti

Adipose tissue-derived stromal cells (ADSCs) are a prominent cellular source in regenerative medicine. We tested whether transplantation of ADSCs into ischemic muscular tissue of diabetic animals would attenuate the impairment in cell metabolism and microcirculatory with a combination of techniques including magnetic resonance imaging and spectroscopy (^1H -MRS).

Methods: We induced unilateral hind limb ischemia in male streptozotocin-treated rats and non-diabetic controls. One day after femoral artery ligation, 6 rats per group were randomly injected intramuscularly allogeneic ADSCs (C1: 10^6 , C2: 10^7 , C3: 10^8 cells/mL); or conditioned media from ADSC cultures (CM); or saline (control). Rats underwent magnetic resonance angiography (MRA); short time inversion recovery (STIR) edema-weighted imaging; ^1H -MRS; immunoblotting and immunofluorescence on both hind limbs for 4 weeks.

Results: T_1 -weighted and STIR images showed the presence of tissue swelling and signal hyperintensity respectively in tissue affected by occlusion. Mean total ratio of tissue creatine/water (tCr/water) for the occluded limb was significantly lower than for the non-occluded limbs in both non-diabetic and diabetic rats. At 4 weeks, ADSC and CM groups had greater recovery of tCr/water in ischemic limbs compared with controls in both diabetic- and non-diabetic rats (** $P < 0.01$; * $p < 0.05$) (Figure A), with less tissue swelling (Figure B), increased expression of α -sarcomeric actinin, vascular endothelial growth factor (VEGF) and hepatocyte growth factor (HGF), as well as increased vessel density (Figure C) and suppression of the up-regulation of water channel aquaporin (AQP)-1 and pro-inflammatory early response gene such as cyclooxygenase (COX)-2 (Figure D).



Conclusions: ADSCs improve ischemic muscle metabolism and increase neovasculogenesis in diabetic rats with hind limb ischemia. $^1\text{H-MRS}$ is a useful tool to monitor attempts at salvaging the ischemic tissues with cell-derived novel therapies.

O327

Impact on outcome of different types of carotid stents: results from the European Registry of Carotid Artery Stenting.

Eugenio Stabile (c), Pallav Garg (b), Alberto Cremonesi (a), Marc Bosiers (b), Bernhard Reimers (f), Carlo Setacci (d), Piergiorgio Cao (e), Andrej Schmidt (b), Horst Sievert (b), Patrick Peeters (b), Dimitrios Nikas (b), Martin Werner (b), Gianmarco de Donato (d), Giambattista Parlani (e), Fausto Castriota (a), Marius Hornung (b), Laura Mauri (g), Giuseppe Giugliano (c), Giovanni Esposito (c), Paolo Rubino (b)

(a) *Maria Cecilia Hospital, Cotignola*, (b) *Clinica Montevergine, Mercogliano*, (c) *Università degli Studi di Napoli Federico II*, (d) *Vascular and Endovascular Surgery Unit, Università di Siena*, (e) *Università di Perugia*, (f) *Mirano Hospital, Mirano*, (g) *Harvard Medical School, Boston, Massachusetts*

Background: At present few data exist on the impact on outcome of the use of different carotid stent types during neuroprotected carotid artery stenting (CAS). Aim of this study was to evaluate the outcomes associated with neuroprotected CAS in selected high volume centers according to different carotid stent design.

Methods: From January 2007 to December 2007, 1611 patients underwent neuroprotected CAS in eight European Centers (ERCAS registry). An independent clinical events committee adjudicated the events. All types of commercially available carotid stents were used (closed, open and hybrid cell designed). Open cell designed stent were classified according to cell free area ($< 7.5 \text{ mm}^2$ or $> 7.5 \text{ mm}^2$).

Results: 728 closed-cell, 456 hybrid-cell, 234 $< 7.5 \text{ mm}^2$ open-cell, and 193 $> 7.5 \text{ mm}^2$ open-cell stents were implanted. At 30-days 18 strokes occurred (1.12%; 7 (0.96%) in those treated with a closed-cell, 2 (0.44%) in those with a hybrid-cell, 3 (1.28%) in those with a $< 7.5 \text{ mm}^2$ open-cell, and 6 (3.10%) in those treated with a $> 7.5 \text{ mm}^2$ open-cell stent, $p=0.029$). Overall 30 days stroke and death rate was 1.36%, and no statistically significant difference was observed among the groups.

Conclusions: CAS is a reasonable alternative to carotid endarterectomy as it is associated with excellent outcomes when performed in well-experienced high volume centers. Data of the present study suggest that the use of open cell designed stent with free cell area $> 7.5 \text{ mm}^2$ is associated with an increased 30 days stroke risk. However, future randomized trials are needed to confirm this finding.

CARDIOLOGIA INTERVENTISTICA STRUTTURALE: IL PRESENTE E IL FUTURO

O328

Ventricular arrhythmias before and after transcatheter aortic valve implantation

Donatella Tempio (a), Sergio Conti (a), Paola Pruiti (a), Salvatore Andrea Romano (a), Elisa Tavano (a), Claudio Liotta (a), Angelo Di Grazia (a), Corrado Tamburino (a), Valeria Calvi (a)

(a) U.O di Aritmologia, Dipartimento Cardio-Toraco-Vascolare, A.O.U "Policlinico V. Emanuele", Catania

Purpose: Transcatheter aortic valve implantation (TAVI) is a therapeutic option for patients with severe aortic stenosis at high surgical risk. Although the procedure is associated with a reduction in total mortality, there is no data in the literature regarding the variability in the incidence of ventricular arrhythmias (VAs) after TAVI. The aim of this study is to assess the incidence of VAs before and after TAVI and to identify the prognostic value of these arrhythmias.

Methods: We enrolled 237 patients who underwent TAVI at our institution between June 2007 and November 2011 that completed at least one year of follow-up. Ninety-one patients were excluded from our study for the following reasons: presence of permanent pacemaker (PPM) before the procedure (n=24), new PPM implant after the procedure (n=27), death during the follow-up period (n=28), lost at follow-up (n=12). A total of 146 patients were included in our analysis. The presence of VAs was evaluated in all patients recording a 24-hrs Holter monitoring before the procedure and after 1 and 12 months. VAs were classified according to the classification of Lown in 5 grades: absence of ventricular ectopic beats (VEB) (grade 0); VEB occasional and isolated, less than 30/h (grade 1); VEB isolated and frequent, higher than 30/h (grade 2); VEB multifocal (grade 3); presence of pairs (grade 4a); ventricular tachycardia (grade 4b).

Results: Before the procedure, isolates VEB (grade 1-2) were present in 34.9% of patients (n=51). Among these patients, 10 patients (6.8%) had frequently VEB, more than 30/h. Complex VAs (grade 3-4) were present in 50.68% of the population (multifocal VEB in 32 pts, 21.9%; pairs in 25 pts, 17.1%; ventricular tachycardia in 14 pts, 9.6%). One month after the procedure we observed an increased incidence of arrhythmias of grade 2 (n=13, 8.9%), while grade 1 showed no significant change; a decrease incidence was found in grade 3 (n=25, 17.1%) and grade 4 (n=25, 17.1%). The follow-up at 12 months showed a further significant reduction in the frequency and severity of VAs. In particular after 1 year of the procedure, 36,3% of patients had isolates VEB (n=45 group 1, n=8 group 2), while the frequency of complex arrhythmias was reduced to 24.7% (multifocal VEB in 25 pts, 17.1%; couples 8 pts, 5.5% and ventricular tachycardia in 3 pts, 2.0%). The difference was statistically significant (Friedman test $p < 0.01$).

Conclusion: This study indicates that ventricular arrhythmias are common in patients with aortic valve stenosis. We observed a decrease in the incidence and severity of VAs since the first month after TAVI. The long-term follow-up showed a significant further reduction in the frequency of complex VAs. This may be related to the benefits determined by valve replacement on left ventricular function.

O329

Prosthesis performance after TAVI in severe aortic stenosis with low gradient and preserved ejection fraction

Elisa Covolo (a), Michela Facchin (a), Paola Angela Maria Purita (a), Marta Martin (a), Brunilda Hoxha (a), Rosaria Tenaglia (a), Chiara Fraccaro (a), Valeria Gasparetto (a), Ahmed Al Mamary (a), Filippo Zilio (a), Marco Mojoli (a), Alberto Barioli (a), Gianpiero D'Amico (a), Andrea Gratta (a), Tommaso Fabris (a), Gilberto Dariol (a), Augusto D'Onofrio (a), Gino Gerosa (a), Roberto Bianco (a), Demetrio Pittarello (b), Paolo Buja (a), Massimo Napodano (a), Sabino Iliceto (a), Giambattista Isabella (a), Giuseppe Tarantini (a)

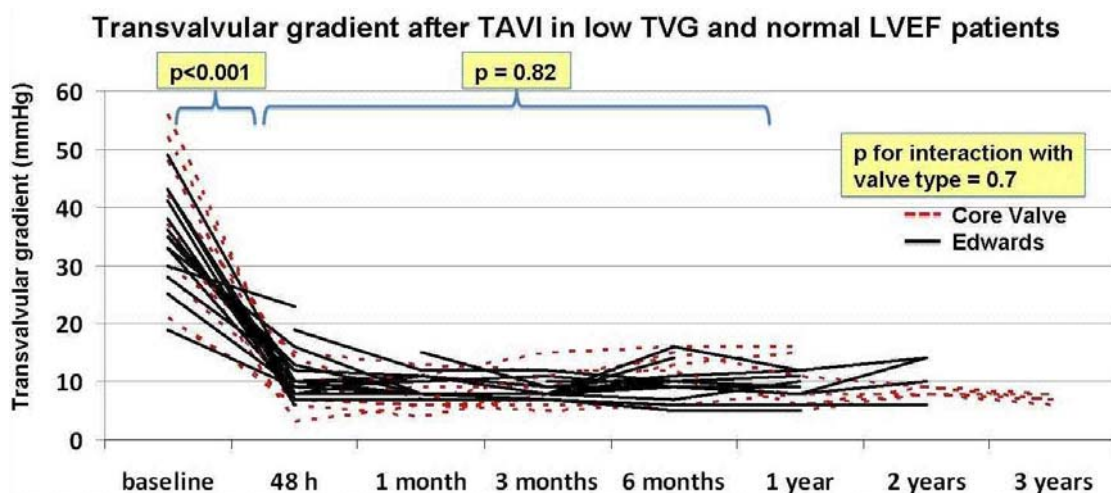
(a) Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari, Policlinico Universitario di Padova, (b) Anestesia e Rianimazione, Policlinico Universitario di Padova

Background: Severe aortic stenosis (SAS) with low transvalvular gradients (TVG), normal left ventricular ejection fraction (LVEF) represents 25% of AS preserved LVEF patients. Few data still exist about prosthesis performance and LV function after transcatheter aortic valve implantation (TAVI) in inoperable/high risk patients with symptomatic SAS, normal LVEF and low TVG.

Methods: Prospective single centre study enrolling consecutively all patient with an aortic valve area ≤ 1.0 cm², LVEF > 50 % and peak to peak TVG < 40 mmHg, evaluated invasively by cardiac catheterization and treated with TAVI. Follow-up echocardiogram evaluation (baseline and 48 hours, 1, 3, 6, 12, 24, 36 and 48 months after TAVI) was performed in order to assess prosthetic valve haemodynamic and left ventricle function improvement. Paired T-test were used to compare echo measurement at baseline and follow-up.

Results: From April 2007 to May 2012, 33 patients were included: mean age 81 ± 5 years, female 65%, body mass index 27 ± 4 Kg/m², coronary artery disease 59%. Study population presented low cardiac index (2.5 ± 0.4 mL/min/m², Fick oxygen consumption), high afterload (valvulo-arterial impedance 4.6 ± 1.3 mmHg/ml/m²) and pronounced concentric remodelling with small left ventricle cavity size (end diastolic volume index 58 ± 13 ml/m²). Low flow (stroke volume index ≤ 35 ml/m²) was observed in 26% of patients. Eleven patients (33%) were treated with Core Valve, 22 patients (66%) with Edwards. Ten patients (30%) showed discrepancies between invasive and non-invasive estimates of baseline TVG, with Doppler mean TVG ≥ 40 mmHg despite a peak-to-peak invasive TVG < 40 mmHg, underlining pressure recovery phenomenon. TAVI implantation reduced significantly mean TVG (35 ± 9 mmHg baseline vs 10 ± 4 mmHg 48 hours after TAVI, $p < 0.001$). During follow-up TVG remained low (see figure). Similarly end diastolic volume index and LVEF did not change. Paravalvular leak was absent or mild.

Conclusions: In patients with SAS/low TVG and normal LVEF, TAVI was associated with significant reduction in TVG, without prosthesis-patient mismatch nor significant paravalvular leak.



O330

Parachute®: percutaneous ventricular partitioning device implantation. Short-term echocardiographic and clinical results.

Claudia Tamburino (a), Alberto Arestia (a), Piera Capranzano (a), Sebastiano Immè (a), Martina Patanè (a), Flavia Girlando (a), Fabio Dipasqua (a), Salvatore Scandura (a), Sarah Mangiafico (a), Carmelo Grasso (a), Corrado Tamburino (a)

(a) *Cardiologia Universitaria Ospedale Ferrarotto*

Objectives: the aim of this study was to assess the impact of Parachute® device on post-anterior myocardial infarction left ventricle (LV) volumes and on functional status at 1-month follow-up.

Background: post-myocardial infarction LV dilatation and apex aneurysm have been associated with LV end-diastolic and end-systolic pressure increase leading to congestive heart failure. The Parachute® is emerging as a new interventional therapeutic option for this setting. The Parachute® is a self-expanding, nitinol, umbrella-shaped frame with an ePTFE membrane separating the ventricle and part of the aneurysmatic apex.

Methods and Results: This study included 7 patients undergoing Parachute® implantation between November 2012 and March 2013, in a single center. At baseline and 1-month follow-up the following were evaluated: echocardiographic LV end-diastolic (EDV) and end-systolic volumes (ESV); New York Heart Association (NYHA) class; and six minutes walking test (6-MWT). The EDV decreased from 192.7 ± 61.2 ml at baseline to 144.3 ± 39.6 ml at 1 month follow-up. Also the ESV decreased from 133.4 ± 52.7 ml at baseline to 94.6 ± 33.7 ml at follow-up. Significant 1-month improvements in NYHA class (from 2.6 ± 0.5 to 1.9 ± 0.4) and in the reached distance (from 406.4 ± 125.5 m to 452 ± 75.9 m) with the 6MWT.

Conclusions: This study showed significant improvements of LV volumes and functional capacity one month after Parachute® device implantation. Although promising, these are preliminary results, obtained in a small group of patients at short-term follow-up.

O331

Elective circulatory assistance during TAVI in patients with severe left ventricular dysfunction

Corrado Cavoza (a), Gloria DeMicheli (a, d), Andrea Audo (a), Maurizio Reale (b), Giorgio Ballestrero (b), Giorgio Taverna (b), Anna Maria Costante (b), Federica Provera (b), Giovanni Parodi (c), GianFranco Pistis (b), Domenico Mercvoglianò (a)

(a) *Cardiochirurgia Azienda Ospedaliera, Alessandria*, (b) *Cardiologia Azienda Ospedaliera, Alessandria*, (c) *Terapia Intensiva Cardiochirurgia Azienda Ospedaliera Alessandria*, (d) *Studio Radiologico Cento Cannoni, Alessandria*

Background: Severe left ventricular dysfunction negatively impacts short and long-term survival after conventional aortic valve replacement. A subgroup of these patients with very low ejection fraction ($EF \leq 20\%$) shows the highest operative risk. Transcatheter aortic valve implantation on cardiopulmonary bypass, might be beneficial and improved survival, allowing better tolerance of rapid pacing and precise valve deployment

Methods: Four patients discussed in an interdisciplinary team conference, after informed consent, underwent TAVI using the Edwards SAPIEN valve (Edwards Lifesciences, Irvine CA). According to our institutional transcatheter evaluation protocol, in every patient, a preoperative coronary angiogram, a transesophageal echocardiogram with Angio CT scan of chest for precise annulus measurement were performed.

Results: Transcatheter aortic valve implantation was performed in a hybrid operative theatre by an interdisciplinary team of cardiac surgeons, cardiologists and cardiac anesthetists.

Cardiopulmonary bypass was instituted via femoro-femoral in 3 patients, aorto femoral in 1 patients (transaortic approach). Median procedure time was 14 minutes. The transcatheter valves were

SIC | *Indice Autori*

implanted using femoral, transapical and transaortic approach. All patients survived to procedure and were discharged from hospital. Ejection fraction increased significantly at 6 months follow-up to.

Conclusions: TAVI with cardiopulmonary bypass support allows treatment of high risk patients with very low ejection fraction, relatively contraindicated for transcatheter aortic valve implantation.

O332

Percutaneous mitral valve repair using the mitraclip system in high-risk patients suffering from functional mitral regurgitation and low left ventricle ejection fraction

Marta Chiarandà (a), Fabio Dipasqua (a), Salvatore Scandura (a), Anna Maria Pistrutto (a), Carmelo Grasso (a), Sarah Mangiafico (a), Davide Capodanno (a), Sebastiano Immè (a), Massimiliano Mulè (a), Anna Maria Caggegi (a), Margherita Ministeri (a), Corrado Tamburino (a)

(a) *Divisione di Cardiologia, Ospedale Ferrarotto, Università di Catania.*

Background: Percutaneous mitral valve repair with the MitraClip® System (Abbott Vascular, Abbott Park, IL, USA) is an emerging alternative of treatment for high surgical-risk patients with severe mitral regurgitation (MR). We sought to evaluate the early and mid-term outcomes of this novel procedure, taking into specific account the results obtained in patient suffering from functional MR and low left ventricle ejection fraction (LVEF \leq 35%).

Materials and methods: From October 2008 to May 2013, 83 consecutive high-risk patients (age 72 ± 8 years, male 72%) suffering from functional mitral regurgitation and low left ventricle ejection fraction (mean LVEF $27\pm 5\%$; mean systolic Pulmonary Arterial Pressure (sPAP) 47 ± 14 mmHg) have undergone successful mitral valve repair with the MitraClip® System. All patients were selected for the procedure on the basis of their surgical risk, assessed by a multidisciplinary team composed of a local independent cardiologist and a cardiac surgeon, using the European System for Cardiac Operative Risk Evaluation (EuroSCORE II) and the Society of Thoracic Surgeons' risk score (STS score). At hospital admission 13 patients (18%) presented in NYHA functional class II; 60 patients (72%) presented in NYHA functional class III and 10 patients (12%) were in NYHA functional class IV. The mean EuroSCORE II was $13\pm 13\%$; the mean STS risk score for mortality was $8\pm 8\%$; the mean STS risk score for mortality or morbidity was $39\pm 18\%$;

Results: The MitraClip System was successfully implanted in all patients with a significant MR reduction ($\leq 2+$); one clip was implanted in 50 patients (60%), while 33 patients (40%) were treated with two clips. All the procedures were performed under general anesthesia. Mean general anaesthesia time was 135 ± 40 minutes. The median device implantation time, defined as the time from guide insertion until delivery catheter removal, was 69 ± 29 minutes, ranging from 160 to 21 minutes. A significant MR reduction and improved clinical conditions were observed at discharge. To date 7 patients have reached 2-year follow-up, most of them (80%) presenting in the lowest NYHA functional classes (40% in NYHA I; 60% in NYHA II); all of them have a low degree of MR ($\leq 2+$). To date 25 patients have reached 1-year follow-up; most of them (95%) are in the lowest NYHA functional classes (35% in NYHA I; 65% in NYHA II); the majority of them (90%) has a low degree of MR ($\leq 2+$). 29 patients have reached 6-month follow-up presenting in good clinical and instrumental conditions.

Four patients have undergone re-intervention (MitraClip REDO) for worsened degree of mitral regurgitation and worsened clinical conditions, with good procedural results (MR ≤ 2). Two of these patients died three and twenty-one months respectively after the REDO. To date we have registered 13 cases of death (17,5%); 9 of these were cardiac deaths (69%). As far as cardiac death is concerned, 3 patients died before 6-month follow-up, 3 patients died at 1-year follow-up; the remaining 3 ones died at two-year follow-up.

Conclusions: Percutaneous mitral valve repair with the MitraClip System seems to be feasible and accomplished with favourable short and mid-term safety and efficacy results, even for patients at particularly high surgical risk, suffering from severe MR and severely depressed LVEF ($\leq 35\%$)

O333

Impact of coronary artery disease severity on clinical outcomes in patients with severe aortic stenosis undergoing transcatheter aortic valve implantation

Giulio Giuseppe Stefanini (a), Stefan Stortecky (a), Davide Cao (a), Julie Rat-Wirtzler (a), Peter Juni (a), Thierry Carrel (a), Bernhard Meier (a), Peter Wenaweser (a), Stephan Windecker (a)

(a) *Bern University Hospital, Bern, Switzerland*

Background: Owing to the high prevalence of coronary artery disease (CAD) among elderly patients as well as similar risk factors for degenerative aortic stenosis (AS) and CAD, both conditions frequently coexist in patients undergoing transcatheter aortic valve implantation (TAVI). The impact of CAD on clinical outcomes after TAVI is still a matter of debate, moreover it remains unknown whether CAD severity exerts a gradient of risk in patients with AS undergoing TAVI.

Methods: A total of 445 consecutive patients with severe AS undergoing TAVI were included into a prospective registry between 2007 and 2012. The preoperative SYNTAX-score (SS) was determined from baseline coronary angiograms. In case of revascularization prior to TAVI, residual SS (rSS) was also determined. Clinical outcomes were compared between patients without CAD (N=158), patients with low SS (0-22, N=207), and patients with high SS (SS>22, N=80). The prespecified primary endpoint was the composite of cardiovascular death, stroke, or myocardial infarction (MI).

Results: At one year, CAD severity was associated with higher rates of the primary endpoint (no CAD: 12.5%, low SS: 16.1%, high SS: 29.6%; p=0.016). This was driven by differences in cardiovascular death (no CAD: 8.6%, low SS: 13.6%, high SS: 20.4%; p=0.029), whereas the risk of stroke (no CAD: 5.1%, low SS: 3.3%, high SS: 6.7%; p=0.79) and MI (no CAD: 1.5%, low SS: 1.1%, high SS: 4.0%; p=0.54) was similar across the three groups. Patients with high SS received less complete revascularization as indicated by a higher rSS (21.2±12.0 vs. 4.0±4.4, p<0.001) compared with patients with low SS. Of note, the highest rSS tertile (rSS>14) was associated with higher rates of the primary endpoint at 1 year (no CAD: 12.5%, low rSS: 16.5%, high rSS: 26.3%, p=0.043).

Conclusions: CAD is present in two-thirds of elderly patients with severe AS undergoing TAVI in routine clinical practice. Severity of CAD appears to be associated with impaired clinical outcomes at 1 year after TAVI. Patients with SS>22 receive less complete revascularization and have a higher risk of cardiovascular death, stroke, or MI as compared to patients without CAD or low SS.

IL TRATTAMENTO DELLE LESIONI CORONARICHE COMPLESSE

O334

Clinical outcome of patients with de novo coronary bifurcation lesions treated with the tryton side branch stent; a prospective multicenter single arm study

Gianpiero D'Amico (a), Paolo Buja (a), Massimo Napodano (a), Luigi La Vecchia (b), Mario Galli (c), Luca Favero (d), Michela Facchin (a), Marco Mojoli (a), Alberto Barioli (a), Giuseppe Musumeci (e), Giuseppe Grassi (g), Andrea Pavei (h), Francesco Caprioglio (h), Roberto Bonmassari (i), Carlo Cernetti (d), Leonardo Spedicato (l), Bernhard Reimers (f), Giambattista Isabella (a), Sabino Iliceto (a), Giuseppe Tarantini (a)

(a) Cardiology Clinic, Department of Cardiac, Thoracic and Vascular Sciences, University of Padua, Padua, (b) Department of Cardiology, S. Bortolo Hospital, Vicenza, Italy, (c) Cardiovascular Interventional Unit, Cardiology Department S. Anna Hospital, Como, Italy, (d) Cardiology Division, San Giacomo Hospital, Castelfranco Veneto, Italy, (e) Cardiovascular Department, Ospedali Riuniti di Bergamo, Bergamo, Italy, (f) Cardiovascular Department, Mirano Public Hospital, Mirano, Italy, (g) Cardiovascular Department, Ospedale dell'Angelo, Mestre, Italy, (h) Conegliano Hospital, Conegliano, Italy, (i) Catheterization Laboratory Cardiology Department, S. Chiara Hospital, Trento, Italy, (l) SOC di Cardiologia, Azienda Ospedaliero-Universitaria S. Maria della Misericordia, Udine, Italy

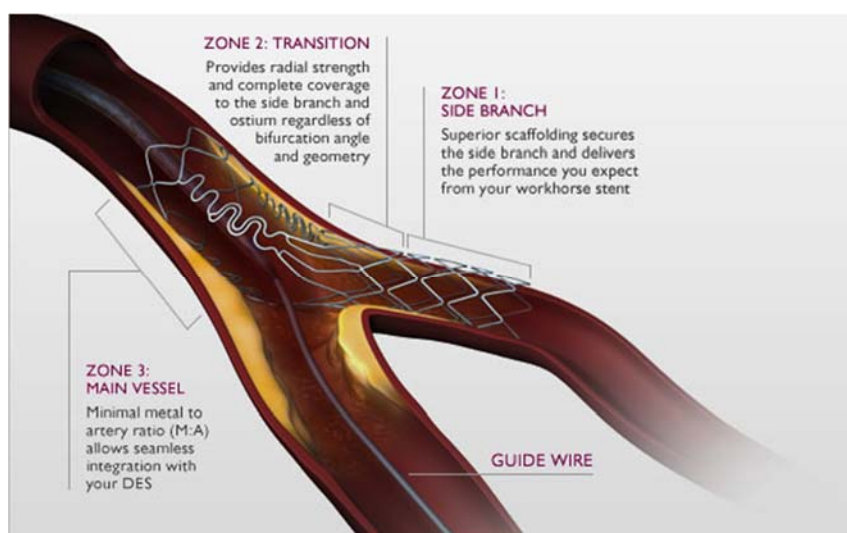
Background: Coronary bifurcation lesions represent a difficult problem regularly confronting interventional cardiologist, in part due to the lack of dedicated device.

Objective. To investigate the feasibility, safety and effectiveness of the Tryton™ Side Branch Stent (Tryton Medical, Durham, NC, USA), a dedicated bare metal stent deployed in conjunction with a standard drug-eluting stent to treat bifurcation lesions.

Methods: The SAFE-TRY is a prospective single arm multicenter registry including patients with de novo bifurcation lesions in native coronary arteries and syntax score <32. The primary endpoint was target vessel failure (TVF) at 30 days that comprised cardiac death, target vessel myocardial infarction and clinically driven target vessel revascularization. Secondary endpoints included device, angiographic and procedural success, 9-month major adverse cardiac and cerebrovascular event (MACCE), and stent thrombosis (ST) rates.

Results: Among 252 enrolled patients, 24% had diabetes and 35.3% unstable angina. True bifurcation lesions involving both branches occurred in 96.8% of cases with Medina classification 1.1.1 in 62%. The left anterior descending artery and the left main were treated in 70% and 8.3% of the patients, respectively. A 6 Fr guide catheter was used in 61% of the cases. Device, angiographic and procedural success rates were 99.6%, 99.6% and 97.2% respectively. The 30-day TVF was 2.8%; the 9-month MACCE rate was 13.7%, with target lesion revascularization being 4.4%. No definite ST occurred.

Conclusions: This prospective, multicenter study confirmed the feasibility, safety and effectiveness of the Tryton Side Branch stent to treat patients with de novo complex bifurcation lesions.



O335

TC occluso, descrizione di tre casi clinici.

Salvatore Arrotti (b), Alberto Minacapelli (b), Riccardo Maria Inciardi (b), Ilenia Marturana (b), Maria Stellina Spoto (b), Fabiola Cosentino (b), Claudia Vicari (b), Davide Piraino (a), Giuseppe Andolina (a), Pasquale Assennato (c), Salvatore Novo (b)

(a) Policlinico Universitario "P.Giaccone" UO di cardiologia interventistica ed emodinamica, (b) Policlinico Universitario "P.Giaccone" UO complessa di Cardiologia, (c) Policlinico Universitario "P.Giaccone" UO Cardiologia II con emodinamica

Background: L'occlusione acuta del tronco comune (TC) è un evento catastrofico che il più delle volte porta a morte il paziente prima dell'arrivo in ospedale per aritmie maligne o shock cardiogeno. Proprio per questo è raro ritrovare nella pratica clinica pazienti con occlusione completa del tronco comune non protetto. Il successo terapeutico nel trattamento del tronco comune occluso in emergenza è stato riportato solo raramente.

Scopo: Descrivere la presentazione clinica, il management terapeutico di tre pazienti con TC occluso, valutare il ruolo di un importante circolo collaterale dalla coronaria destra e l'efficacia di un tempestivo intervento di rivascularizzazione come unica possibilità di sopravvivenza per il paziente.

Metodi: Tra il 2012 e il 2013 sono stati individuati tre pazienti che all'esame coronarografico presentavano il tronco comune occluso. Di ognuno di loro è stata raccolta anamnesi, esame obiettivo, presentazione clinica, ECG, ecocardiogramma, coronarografia e tipologia di trattamento mettendoli a confronto.

Risultati: Tutti e tre i pazienti si presentavano uno STEMI antero-laterale con shock cardiogeno. La presentazione ECGgrafica era assai variabile in termini di ritardo di conduzione atrioventricolare (BAV, BBD) tra un paziente e l'altro. Tutti sono stati sottoposti ad angioplastica con stent medicato sul TC (figure 1 e 2).

Alla coronarografia solo un paziente su tre presentava un supporto circolatorio dalla coronaria destra (CD) in quanto documentata un origine anomala della circonflessa dallo stesso vaso.

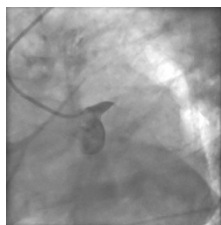


Figura 1: Pre-stenting

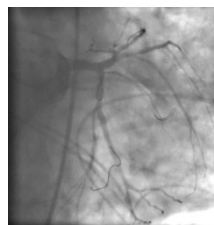


Figura 2: Post-stenting

In tutti e tre i casi è stato necessario posizionare un contropulsatore aortico per dare un supporto emodinamico. Inoltre è stato anche constatato che due pazienti su tre con il TC occluso sono andati incontro dopo la procedura di PCI all'impianto di ICD, entrambi per prevenzione primaria di morte cardiaca improvvisa a causa di una ridotta FE e per la presenza di eventi aritmici cui sono andati incontro nei successivi giorni di degenza. Tutti e tre i pazienti sono sopravvissuti al trattamento di rivascularizzazione, uno su tre è deceduto dopo un mese dalla dimissione in attesa di trapianto cardiaco, mentre gli altri due continuano ad essere seguiti in follow up.

Conclusioni: L'occlusione acuta del tronco comune è un'emergenza cardiologica che se diagnosticata e trattata in tempo può essere superata con buone percentuali di successo. La sopravvivenza di questi tre pazienti verosimilmente non può essere attribuita solo alla presenza di circoli collaterali dalla coronaria destra ma sicuramente anche alla tempestività e accuratezza del trattamento.

O336

Angioplastica laser assistita nelle lesioni coronariche complesse.

Milena Aste (a), Cecilia Viacava (a), Gian Paolo Bezante (a), Massimo Vischi (b), Claudio Brunelli (a), Manrico Balbi (a)

(a) *Cardiologia Universitaria, IRCCS A.O.U. San Martino – IST*, (b) *Cardiologia Ospedaliera, IRCCS A.O.U. San Martino – IST*

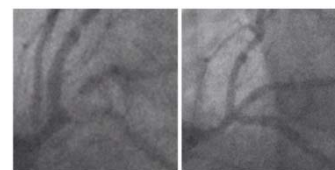
Background: Negli anni '90 numerosi studi hanno indagato l'utilità di devices ateroablativi nel trattamento percutaneo della malattia aterosclerotica coronarica; infatti la Food and Drug Administration nel 1992 approvò l'utilizzo dell'angioplastica laser assistita (ELCA) per il trattamento di lesioni ostiali, eccentriche, lunghe, moderatamente calcifiche, restenosi intrastent, lesioni refrattarie all'angioplastica convenzionale, e per il debulking di graft venosi. Tuttavia le metodiche di debulking come il laser, ma anche il rotablator e l'aterectomia direzionale, sono state nel tempo accantonate, per la complessità tecnica, per la significativa incidenza di restenosi da recoil del vaso, e per l'elevato tasso di complicanze come perforazioni, dissezioni e embolizzazioni distali; si stima che ad oggi il debulking sia praticato in meno del 5% delle procedure. Dal 2001 la tecnologia laser a eccimeri si è evoluta, con cateteri laser di dimensioni inferiori e di maggiore flessibilità, con una migliore capacità di penetrazione a fronte di una minore potenza sviluppata. Inoltre la tecnica flush-and-bathe ha ridotto ulteriormente il tasso di dissezioni. ELCA determina vaporizzazione della placca riducendo al minimo l'embolizzazione distale e diversi studi hanno dimostrato come sia utilizzabile anche in acuto (stunning piastrinico laser indotto). La manovrabilità, l'utilizzo di guide idrofiliche e la possibilità di proteggere il side branch sono i punti di forza di tale metodica. Bilodeau nel 2004 ha dimostrato come ELCA sia una valida alternativa alla rivascolarizzazione chirurgica in lesioni coronariche calcifiche complesse, con un accettabile tasso di complicanze periprocedurali.

Scopo: Valutare nel nostro centro la fattibilità e l'efficacia clinico strumentale di ELCA in pazienti sintomatici con coronaropatie complesse non aggredibili mediante angioplastica convenzionale.

Metodi: Da gennaio a maggio 2013 4 pazienti (età media 73+7,44 anni), 3 uomini e una donna, con angina instabile (1 restenosi intrastent, 3 stenosi coronariche non dilatabili) sono stati sottoposti a ELCA e impianto di stent medicati (numero di lesioni trattate 6: 2 IVA media, 1 M1, 1 Cx, 1 intermedio e 1 DX distale), in un paziente la lesione era alla biforcazione (IVA e Intermedio-Cx); in media stenosi preprocedurale 85% e stenosi postprocedurale 0%. Il picco TnI post procedurale è stato di 9,62+5,2 ug/dl. In tutti i casi il catetere laser ha crossato completamente la lesione (successo ELCA) e in tutti i casi è stato possibile posizionare stent medicati (successo procedurale) per un totale di 6 stent. In un caso particolarmente complesso oltre alla tecnica flush-and-bathe l'avanzamento del catetere laser ha richiesto il lavaggio con boli di mezzo di contrasto; in seguito si è verificata dissezione coronarica non limitante il flusso, sopralivellamento del tratto ST e ipotensione; la paziente è stata stabilizzata mediante posizionamento di contropulsatore e di multipli stent in sede di dissezione. Tutti i pazienti sono stati dimessi asintomatici. Non si sono verificati decessi, versamenti pericardici, né trombosi acute periprocedurali.

Conclusioni: Il nostro studio osservazionale mostra come, in Pazienti in cui l'angioplastica tradizionale non sia perseguibile, ELCA rappresenti ad oggi una valida metodica anche nella pratica clinica quotidiana.

In figura: Coronarografia dimostrante stenosi critica calcifica a livello di ramo intermedio e circonflesso ostiale: a destra prima della procedura, a sinistra risultato angiografico finale.



O337

Performance of 1st versus 2nd generation DES for the treatment of bifurcation lesions: 18 months data from an Italian multicenter registry.

Michela Facchin (a), Marco Mojoli (a), Elisa Covolo (a), Paolo Buja (a), Massimo Napodano (a), Filippo Zilio (a), Alberto Barioli (a), Gianpiero D'Amico (a), Brunilda Hoxha (a), Paola Purita (a), Marta Martin (a), Rosaria Tenaglia (a), Zanetti Claudia (a), Fabris Tommaso (a), Gasparetto Valeria (a), Ahmed Al Mamary (a), Gilberto Dariol (a), Giambattista Isabella (a), Sabino Iliceto (a), Giuseppe Tarantini (a)

(a) Dipartimento di Scienze Cardiologiche, Toraciche, Vascolari. Policlinico Universitario, Padova.

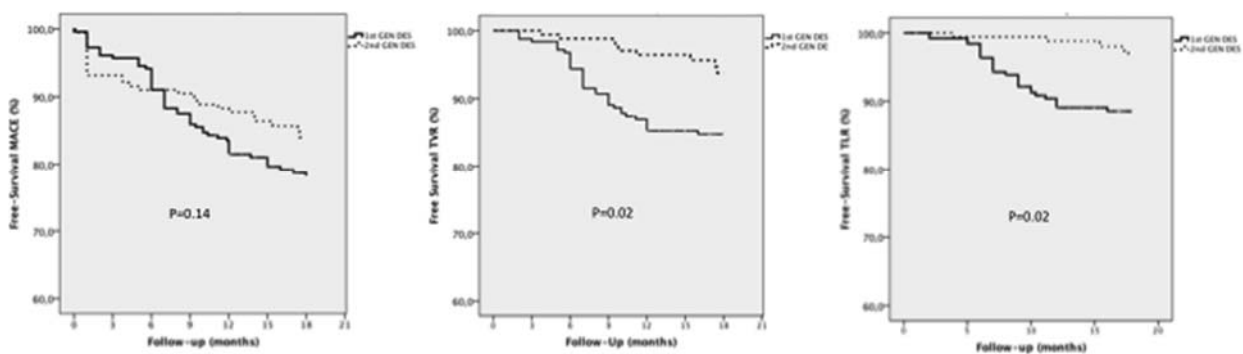
Background: Current evidence suggests the superiority of 2nd generation drug-eluting stents (DES) over 1st generation DES. However, less is known about the performance of the two types of stents in the setting of bifurcation lesions.

Objective: To assess the 18-months clinical outcomes with 1st generation DES (Paclitaxel-eluting and Sirolimus-eluting stents) compared to 2nd generation DES (Zotarolimus-eluting and Everolimus-eluting stents) for the treatment of true bifurcation lesions (according to Medina Classification), in a large unselected population.

Methods: Consecutive patients with at least one true bifurcation lesion, undergoing PCI between April 2003 and October 2012, with a follow-up of 18 months, were enrolled in 4 interventional centers in Italy and included in a prospective non-randomized registry. At follow-up we evaluated major adverse cardiac events (MACE, defined as all-causes death, myocardial infarction [MI], and target vessel revascularization [TVR]), target lesion revascularization (TLR), cerebrovascular accidents (CVA) and coronary artery bypass grafting (CABG).

Results: A total of 491 patients (1st generation DES n=275, 2nd generation DES n=216) were enrolled. Baseline clinical, angiographic and procedural characteristics were comparable, except for higher prevalence of diabetes mellitus in the first group (40.8% vs 30.3, p=0.03) and of hypercholesterolemia in the second group (74.5% vs 62.0%, p=0.01). Angiographic success was achieved in majority of patients in both groups (1st generation DES 97.7%, 2nd generation DES 95.8%, p=0.22). At a clinical follow up of 18 months, a similar incidence of MACE was observed in the 2 groups (MACE 20.9% vs 14.7%, p=0.11), instead an increase of rate of TLR and TVR were observed in 1st generation DES group (see figure for Kaplan Mayer curves). At multivariate logistic regression, including variables resulted significant at univariate analysis and clinically relevant features, 1st generation DES results independent predictor of TLR (p=0.06), TVR (p= 0.01) and MACE (p=0.05).

Conclusions: The treatment of bifurcation lesions seems to be improved in terms of MACE by the use of 2nd generation DES compared to 1st generation DES. Further studies are warranted to validate these results.



O338

Late thrombosis after double versus single drug-eluting stent use in the treatment of coronary bifurcations - A meta-analysis of randomized and observational studies

Fabrizio Ricci (a), Alessandro Corazzini (a), Marco Zimarino (a), Raffaele De Caterina (a), Marta Di Nicola (b)

(a) *Istituto di Cardiologia Università "G. D'Annunzio", Chieti*, (b) *Laboratorio di Biostatistica, Università "G. D'Annunzio", Chieti*

Objectives: We hypothesized that the higher risk of myocardial infarction (MI) documented after a routine double drug-eluting stent (DES) strategy (DDS) compared with a single DES strategy (SDS) with provisional stenting in percutaneous coronary interventions (PCIs) of bifurcation lesions is driven by an increased rate of DES thrombosis.

Background: The results of currently available randomized, controlled trials (RCTs) were inconclusive in the choice between SDS and DDS. Meta-analyses have shown an increased risk of MI in the DDS group, without identifying the underlying mechanism(s).

Methods: We performed a meta-analysis of 12 major (> 100 patients) studies of bifurcation DES PCIs: 5 RCTs and 7 nonrandomized observational studies, for a total of 6,961 patients. Random-effects models were used to calculate summary risk ratios (RRs). As a primary endpoint, we assessed the RRs and 95% confidence intervals (CIs) of definite DES thrombosis; death, MI, and target vessel revascularization (TVR) were evaluated as secondary endpoints.

Results: Compared with SDS, DDS had an increased risk of DES thrombosis (RR 2.31; 95% CI: 1.33 to 4.03) and MI (RR: 1.86; 95% CI: 1.34 to 2.60). Mortality (RR: 1.18; 95% CI: 0.85 to 1.65) and TVR (RR: 1.02; 95% CI: 0.80 to 1.30) were similar. The RRs of MI and DES thrombosis were associated ($p = 0.040$).

Conclusions: In PCI of coronary bifurcations, SDS should be the preferred approach, as DDS is associated with an increased risk of MI, likely driven by DES thrombosis.

O339

Impact of Drug-eluting Balloon for the Treatment of Restenotic Lesions Involving Coronary Bifurcations

Alessandro Candreva (a), Alessandro Sticchi (a), Azeem Latib (a, b), Toru Nagamura (a, b), Charis Costopoulos (a, b), Jacopo Oreglia (c), Luca Testa (d), Federico De Marco (c), Sandeep Basavarajajah (a, b), Francesco Giannini (a), Filippo Figini (a), Masanori Kawaguchi (a, b), Alaide Chieffo (a), Charbel Naim (a), Mauro Carlino (a), Matteo Montorfano (a), Francesco Bedogni (d), Antonio Colombo (a, b)

(a) *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan – Italy*, (b) *Interventional Cardiology Unit, EMO-GVM Centro Cuore Columbus, Milan, Italy*, (c) *Interventional Cardiology Unit, Ospedale Niguarda Ca' Granda, Milan, Italy*, (d) *Department of Interventional Cardiology, Clinical Institute S. Ambrogio, Milan, Italy*

Objectives: To report clinical outcomes in patients treated with drug-eluting balloon (DEB) for in-stent restenosis (ISR) involving a bifurcation lesion.

Background: Previous studies have examined the role of DEB in ISR but data on its use specifically at bifurcation sites is lacking.

Methods: We retrospectively evaluated all patients who underwent percutaneous coronary intervention with DEB for bifurcation ISR between February 2007 and November 2012.

Results: A total of 83 bifurcation restenoses (65 main-branch lesions and 73 side-branch lesions) in 77 patients in which DEB was used either in the main-branch and/or side-branch were analyzed. Thirty one (40.3%) patients were diabetic. The majority of restenosis was seen with first-generation drug-eluting stents (49.4%). Twenty-three (27.7%) bifurcations had already received a stent for a

previous ISR (stent-in-stent). During the median follow-up period of 390 days, 18 (23.4%) major cardiac adverse events occurred: 2 (2.6%) cardiac deaths, 2 (2.6%) periprocedural myocardial infarctions, and 15 (19.5%) TVR, of which 10 (13.0%) were target lesion revascularizations (TLR) (n=11/83, 13.3% per bifurcation). There were no cases of follow-up MI or stent thrombosis (definite and probable). TLR was more frequently recorded in the stent-in-stent group (n=10/23, 43.5%), as compared to the first restenosis group (n=1/60, 1.7%).

Conclusions: Our results demonstrate that DEB for bifurcation restenosis may be an acceptable treatment option, especially in cases where repeat stenting has not already been used for the treatment of a previous restenosis.

CARDIOPATIA ISCHEMICA NELL'ANZIANO

O340

Invasive treatment strategy in elderly patients with non ST elevation myocardial infarction. A propensity score analysis of a large monocentric retrospective study.

Jasmine Passerini Desideri (a), Elena Conti (a), Maria Beatrice Musumeci (a), Danilo Fusco (b), Luigi Zezza (a), Martina Ventura (b), Antonella Romaniello (a), Andrea Berni (a), Massimo Volpe (a), Camillo Autore (a)

(a) Sapienza University of Rome, Sant'Andrea Hospital, 2nd Faculty of Medicine, Rome, Italy, (b) Epidemiology Department of National Health System, Lazio Region, Rome, Italy

Background: Consistent benefit of invasive strategy (IS) in the management of myocardial infarction in elderly patients is not yet reported.

Objectives. In non ST elevation acute coronary syndromes (NSTEMACS) admitted within 48h of symptom onset, we aimed to determine in-hospital and 30-days mortality, and proportion of patients alive at 31 days to 6 months (T1) and 31 days to 12 months follow-up (T2). Cumulative rate of composite outcome (CO) of death/nonfatal MI/unstable angina was also analyzed at 30 days, 6 and 12 months.

Methods: A retrospective review of 453 consecutive patients > 75 yrs discharged after NSTEMACS at a single ICCU between 2006 and 2010 was conducted. IS (n=301) or conservative strategy (CS) (n=152) were chosen as per medical judgment. Multivariate regression models to test the association between strategy and outcomes were used and a sensitivity analysis performed. Variables introduced into the models were age, gender, admission creatinine clearance, ejection fraction, hemoglobin and Killip classes, admission heart rate, blood pressure and cardiac arrest, ST deviation, peak troponin level, time from admission to PCI, albumin serum levels.

Results: In-hospital, 8 (2.7%) and 14 (9.2%), at 30 days, 11 (3.7%) and 21 (13.8%), at T1 28 (9.3%) and 44 (29.0%), and at T2 40 (13.3%) and 57 (37.5%) patients died in the IS and CS group respectively. At 30 days 25 (8.3%) and 24 (15.8%), at T1 52 (17.3%) and 56 (36.8%), and at T2 74 (24.6%) and 64 (42.1%), patients achieved the combined CO in the IS and CS group respectively.

IS sizeably decreased adjusted in-hospital (OR 0.37, 95% CI 0.13-1.04, p = 0.0603), 30-days (OR 0.28, 95% CI 0.12-0.67, p = 0.004), T1 (OR 0.33, 95% CI 0.16-0.67, p = 0.0025) and T2 mortalities (OR 0.34, 95% CI 0.20-0.58, p = 0.0001).

IS correspondingly lowered cumulative rate of CO at 30 days (OR 0.55, 95% CI 0.28-1.07, p = 0.077), 6 months (OR 0.52, 95% CI 0.34-0.81, p = 0.003) and 12 months (OR 0.68, 95% CI 0.46-0.98, p = 0.0041). Further independent predictors of prognosis were also hemodynamic status (Killip class II-IV), or cardiac arrest at admission.

Conclusions: IS was independently associated with a three-fold lower mortality and two fold lower composite outcome in this high risk population at either brief, mid or long-term.

O341

Mezzo milione di ECG per il 118: tele-cardiologia d'urgenza nella regione Puglia.

Natale Daniele Brunetti (a), Giulia Dellegrottaglie (b), Giuseppe Di Giuseppe (b), Claudio Lopriore (b), Luisa De Gennaro (c), Saverio Lanzone (d), Pasquale Caldarola (e), Gianfranco Antonelli (f), Matteo Di Biase (a)

(a) Università di Foggia, (b) Cardio-on-Line Europe s.r.l. Bari, (c) U.O. Cardiologia Ospedale San Giacomo Monopoli (BA), (d) U.O. Cardiologia Ospedale Di Venere Bari, (e) U.O. Cardiologia Ospedale San Paolo Bari, (f) U.O. Cardiologia Ospedaliera Policlinico Bari

Background: Sempre più settori della medicina si giovano del supporto di metodiche di tele-medicina. Evidenze sperimentali mostrano come la registrazione pre-ospedaliera dell'ECG sia in grado di accorciare significativamente i tempi di riperfusione nei soggetti con infarto miocardico acuto e di migliorarne pertanto la prognosi.

Metodi: Dal 2004 è attivo nella regione Puglia un servizio di tele-cardiologia in grado di refertare in diretta gli ECG registrati dagli equipaggi del 118 regionale in sede di intervento. Un cardiologo in servizio presso la centrale di tele-cardiologia di Bari referta il tracciato ed è in grado di re-inviarlo al mittente tramite fax, smart-phone o internet. Sono di seguito riportati i dati risalenti al periodo 2004-2013.

Risultati: 559.767 ECG sono stati effettuati dagli equipaggi del 118 dal 2004 per sospetta urgenza cardiologica. Il numero in costante crescita degli ECG effettuati dal personale del 118 sottolinea l'utilità e l'affidabilità del supporto tele-cardiologico in un contesto di medicina d'urgenza (16.534 ECG nel 2005, 31.535 nel 2006, 42.854 nel 2007, 49.999 nel 2008, 69.198 nel 2009, 94.326 nel 2010, 106.870 nel 2011, 109.750 nel 2012). I sintomi riferiti dai pazienti sottoposti a valutazione mediante ECG pre-ospedaliero in tele-cardiologia sono stati dispnea (9%), lipotimia o sincope (21%), dolore toracico (23%), palpitazioni (7%) o altro. In 38.030 casi (6.8%) ECG ha rivelato aritmie significative, in 27.898 (5%) segni suggestivi per ischemia miocardica acuta con indicazione ad ulteriori accertamenti (monitoraggio ECG, dosaggio troponine, ricovero in UTIC).

Conclusioni: Il supporto tele-cardiologico può risultare estremamente utile al servizio 118 nella valutazione pre-ospedaliera dei soggetti con sospetta urgenza cardiologica. Un'unica centrale regionale è in grado di supportare le necessità di un servizio 118 di una regione di 4 milioni di abitanti come la regione Puglia.

O342

La diagnosi preospedaliera di STEMI: impatto sui tempi di riperfusione nei pazienti ad alto rischio

Antonio Bracco (a), Cristina Cacace (a), Roberto Floris (a), Federica Scano (a), Raimondo Pirisi (a), Mauro Cadeddu (a), Michela Congia (a), Massimo Ruscazio (a), Roberta Montisci (a), Luigi Meloni (a)

(a) Clinica Cardiologica, PO San Giovanni di Dio, AOU Cagliari, Università degli Studi di Cagliari

Introduzione: Uno degli elementi maggiormente determinanti sull'esito dell'intervento riperfusivo nei pazienti affetti da infarto acuto del miocardio con sopralivellamento del tratto ST (STEMI) è il ripristino del flusso coronarico nel più breve tempo possibile in maniera tale da bloccare l'avanzamento del fronte di necrosi. A tal fine diventa cruciale ridurre il tempo tra il primo contatto medico e l'inizio della una strategia riperfusiva. Dal 2008 in Sardegna la gestione del paziente con STEMI avviene attraverso la collaborazione tra la Rete Territoriale delle Emergenze Coronariche e la nostra Clinica Cardiologia AOU di Cagliari. Tale modalità permette una rapida diagnosi nella sede dell'evento e un trasporto diretto presso la sala di Emodinamica, grazie alla Teletrasmissione dell'ECG. La precoce riperfusione assume importanza ancor più rilevante nel sottogruppo dei pazienti

ad alto rischio cardiovascolare che, per l'instabilità clinica ed emodinamica, necessitano di un più rapido accesso alla terapia ripercussiva.

Scopo dello studio: Valutare l'impatto della Rete sui tempi di ripercussione nel sottogruppo dei pazienti ad alto rischio cardiovascolare.

Materiale e Metodi: Abbiamo studiato i pazienti con STEMI ad alto rischio cardiovascolare secondo le seguenti caratteristiche: età > 75aa, scompenso cardiaco (classe Killip > 2), shock cardiogeno e IMA esteso (ST sopralivellato ≥ 6). Dal 1 Gennaio 2008 al 30 Aprile 2012 sono stati trasportati dal 118 presso la nostra Emodinamica 178 pazienti affetti da STEMI, 92/178 (51.7%) risultavano ad alto rischio (AR), e li abbiamo confrontati con i pazienti ad alto rischio ricoverati nel 2007, precedentemente all'attivazione della Rete (controlli storici, CS) 28/54 (51.9%). Per ogni paziente abbiamo valutato i seguenti intervalli di tempo: Door To Balloon time (DTB time), dall'arrivo in Ospedale alla ripercussione; First medical contact-to-balloon time (FMC2B time), dal primo contatto medico alla riapertura del vaso di necrosi; Total Ischemic Time (TIT), dall'inizio dei sintomi alla ripercussione. Nel gruppo AR l'intervallo mediano D2B time ha subito una riduzione altamente significativa rispetto ai CS (52 minuti vs 88 minuti, $p=0.0005$). Il FMC2B time si è ridotto nei pazienti nel gruppo AR (98 minuti,) rispetto al CS (118 minuti), ma in modo non significativo ($p=0.183$). Il TIT nei pazienti del gruppo di studio è lievemente migliorato rispetto ai controlli storici (183 minuti vs 192 minuti, $p=0.7729$), ma non in modo significativo, sebbene dopo implementazione della rete la proporzione di pazienti trattati con PCI entro 2 ore dall'inizio dei sintomi è aumentata dal 7% dei CS al 13 % del gruppo AR.

Conclusioni: Il sistema della rete dell'emergenze coronariche integrato nella gestione dello STEMI ha contribuito a ridurre in modo significativo il ritardo intraospedaliero alla ripercussione e in minor misura FMC2B time anche nel sottogruppo di pazienti AR che traggono maggiore beneficio dalla tempestività della riapertura della coronaria responsabile dell'infarto. La scarsa riduzione del TIT per i pazienti ad AR è fortemente determinata dal tempo decisionale del paziente nel rivolgersi al 118. Pertanto una campagna educativa sanitaria adeguata della popolazione sul comportamento idoneo in caso di dolore toracico potrebbe tradursi in un'importante riduzione dei tempi decisionali.

O343

Sindrome coronarica acuta nell'anziano: dimensione del problema e outcome a breve termine

Laura Leoni (a), Cristina Cacace (a), Michela Congia (a), Antonio Bracco (a), Maria Francesca Marchetti (a), Valentina Pippia (a), Massimo Ruscazio (a), Luigi Meloni (a), Roberta Montisci (a)

(a) Clinica Cardiologica, PO San Giovanni di Dio, AOU Cagliari, Università degli Studi di Cagliari

Introduzione: Nel mondo Occidentale negli ultimi anni si è osservato un notevole incremento della vita media, con conseguente espansione della popolazione anziana. L'anziano può essere definito un paziente complesso, nel quale l'età, di per sé, costituisce un potente fattore prognostico di rischio per le sindromi coronariche acute (SCA) il cui outcome è influenzato da numerosi elementi come le molteplici comorbidità spesso riscontrate, il maggior rischio di effetti collaterali da farmaci a causa dei mutati meccanismi di assorbimento, metabolismo ed escrezione. Il tipo di gestione da adottare nel paziente anziano affetto da SCA non è sempre univoco, anzi in molti casi appare controverso per la non chiara percezione del rapporto rischio/beneficio potenzialmente derivante dal nostro intervento. Scopo del nostro studio è stato quello di valutare il reale impatto epidemiologico e le caratteristiche cliniche dei pazienti anziani ricoverati per SCA e il loro outcome clinico intraricovero.

Materiali e Metodi: dal mese di aprile 2009 a novembre 2012 sono stati ricoverati presso la nostra UTIC del P.O San Giovanni di Dio, AOU Cagliari 1266 pazienti con diagnosi di SCA, di cui 331(26%) pazienti avevano un'età ≥ 80 anni e questo gruppo rappresenta la popolazione del nostro studio.

Risultati: L'età media della nostra popolazione di studio era 84.9 ± 4 , di cui 166(50.2%) di sesso maschile. I maggiori fattori di rischio cardiovascolare erano l'ipertensione arteriosa (82%), il diabete

mellito (40.5%), il pregresso IMA (42%) e l'ipercolesterolemia (32.6%). Il 42.3% dei pazienti è stato riferito al nostro ospedale attraverso il servizio di Emergenza del 118, 109 pazienti (32.9%) avevano un quadro di STEMI e 222 (66.8%) di NSTEMI. All'ingresso i pazienti presentavano un GRACE score medio di 190.5 ± 32.9 e un CRUSADE score medio di 51.2 ± 12 e un filtrato glomerulare medio di 38.5 ± 16 ml/min. Una terapia invasiva (coronarografia entro 12 dall'esordio dei sintomi nello STEMI ed entro 72 ore nel NSTEMI) è stata la terapia di scelta in 218 (65.9%) pazienti. Ventidue pazienti (6.3%) hanno rifiutato di sottoporsi allo studio emodinamico, ma la motivazione più frequente nella scelta di una terapia conservativa è stata la presenza di molteplici comorbidità (62 pazienti, 18.7%) infatti i pazienti sottoposti a terapia conservativa erano più anziani (età media 86.5 ± 4.7 vs 84 ± 3.4 , $p=0.001$), soprattutto donne (62.8% vs 43%, $p=0.001$) presentavano un GRACE score e un CRUSADE score più elevato (198.7 ± 32.7 vs 186 ± 32.2 e 58.4 ± 11.1 vs 8.4 ± 11.2 , rispettivamente, $p < 0.0001$). Dei 222 pazienti sottoposti a studio emodinamico 143 pazienti sono stati sottoposti a PTCA+stent efficace e 7 pazienti a bypass aortocoronarico. Durante la degenza si sono verificati 57 decessi (mortalità 17.5%) 39 (21.9%) nel gruppo trattato con terapia conservativa e 18 (12.1%, $p=0.028$). All'analisi multivariata fattori indipendenti di morte intraricovero erano il GRACE score ($p=0.03$), la mancata ripercussione (0-028), la frazione d'eiezione ($p=0.030$) e l'assenza di terapia con ace inibitori.

Conclusioni: Nel nostro studio si evidenzia come i pazienti anziani costituiscono un importante numero tra i pazienti ricoverati per SCA e presentano un elevato profilo di rischio che spiega l'elevata mortalità intraricovero. Il sesso femminile, il profilo di rischio maggiore e una strategia terapeutica meno aggressiva sia come terapia medica che interventistica costituiscono fattori predittivi di mortalità. Appare quindi necessario anche nei pazienti anziani adottare una terapia più aggressiva come indicato nelle linee guida.

O344

Progetto di Teletrasmissione dell'ECG dal PS all'UTIC nei pazienti con STEMI

Cristina Cacace (a), Antonio Bracco (a), Roberto Floris (a), Maria Francesca Marchetti (a), Paola Tiddia (a), Rosanna Lacconi (b), Raimondo Pirisi (a), Massimo Ruscazio (a), Roberta Montisci (a), Luigi Meloni (a)

(a) Clinica Cardiologica, PO San Giovanni di Dio, AOU Cagliari, Università degli Studi di Cagliari, (b) Pronto Soccorso, PO San Giovanni di Dio, AOU Cagliari

La ripercussione coronarica con angioplastica primaria (PPCI) è la terapia d'elezione dei pazienti con infarto del miocardio con ST sopraslivellato (STEMI); il tempo è una variabile fondamentale per la prognosi. Il Servizio del 118 segue, ormai da anni con successo, un protocollo concordato con la nostra Cardiologia che, grazie alla teletrasmissione del tracciato ECG, consente di "by-passare" PS e UTIC, ottenendo un trasferimento diretto in Emodinamica del paziente e, conseguentemente, un più rapido accesso alla terapia ripercussiva. I pazienti che giungono autonomamente al PS vengono gestiti secondo un modello tradizionale: triage, visita medica, ECG, consulenza del cardiologo che, recatosi al PS conferma la diagnosi e contatta l'Emodinamica. Da questo modello di gestione, si evince la presenza di un ritardo intraospedaliero.

Scopo dello studio: Valutare nei pazienti con STEMI che afferiscono autonomamente al PS del nostro P.O. il ritardo tra la presentazione in Ospedale e la ripercussione coronarica (ritardo intraospedaliero). Presentare un nuovo modello di gestione degli STEMI nel nostro PS.

Materiale e Metodi: Abbiamo studiato 121 pazienti con STEMI presentatisi autonomamente al PS del nostro P.O. dal 1/1/2007 al 30/4/2012 (il 27.7% di tutti gli STEMI ricoverati nel nostro reparto). La popolazione esaminata mostrava una prevalenza di uomini (74%), e un'età media di $64,2 \pm 12,2$. Il 24,6% aveva un'età ≥ 75 anni. Per ogni paziente abbiamo valutato: 1) Time To Presentation (TTP) dall'esordio sintomatologico alla presentazione in PS; 2) Door To Balloon (DTB), dall'arrivo in PS alla riapertura del vaso di necrosi; 3) Total Ischemic Time (TIT), dall'inizio dei sintomi alla

riperfusion. Come misure di performance abbiamo considerato: 1) percentuale di pazienti riperfusi entro i primi 90 ,2) percentuale di pazienti riperfusi entro 120 minuti dall'ingresso in PS.

Risultati: I pazienti afferenti al PS hanno mostrato un DTB e un TIT significativamente maggiore dei pazienti gestiti secondo il protocollo 118-UTIC, mentre non si è osservata alcuna differenza nel TTP. Il 53% dei pazienti afferenti al PS viene riperfuso entro 90 minuti dall'arrivo in ospedale e il 77% entro 120 minuti. Considerando però il TIT, l'82% dei pazienti PS sono riperfusi oltre i 120 minuti dall'insorgenza dei sintomi. Il nuovo modello gestionale, proposto in questo studio, si basa sulla teletrasmissione dell'ECG dal PS alla nostra UTIC ed è finalizzato alla riduzione del ritardo intraospedaliero nell'effettuazione della PPCI. Una volta conclusa la fase di valutazione rapida (fast-track), il protocollo prevede la teletrasmissione dell'ECG a 12 derivazioni dal monitor-defibrillatore Lifepack alla Centrale della nostra UTIC. Confermata la diagnosi di STEMI e dopo teleconsulto tra il medico del PS e il cardiologo, questi all'erta immediatamente l'Emodinamica, per garantire l'esecuzione della PPCI nel più breve tempo possibile.

Conclusioni: IL 53% dei pazienti con STEMI che afferiscono al nostro PS viene riperfuso entro i 90 minuti. Il restante 47%, riperfuso tardivamente, è fortemente penalizzato dal ritardo intraospedaliero e rappresenta il target del nuovo modello di gestione dello STEMI proposto in questo studio. Si auspica che in futuro la nuova procedura possa contribuire a rendere più rapido il trattamento riperfusivo con PPCI, così come è avvenuto, negli ultimi 5 anni, in seguito alla positiva interazione con il 118.

O345

Tele-cardiologia per l'assistenza poli-ambulatorialistica a pazienti cronici e fragili in un progetto incentrato sul Care Manager Infermieristico: risultati preliminari del progetto pilota NARDINO.

Natale Daniele Brunetti (a), Giulia Dellegrottaglie (b), Pasquale Caldarola (c), Luisa De Gennaro (d), Giuseppe Di Giuseppe (b), Claudio Lopriore (b), Saverio Lanzone (e), Gianfranco Antonelli (f), Matteo Di Biase (a), Mina De Gennaro (g), Vito Piazzolla (g), Ambrogio Aquilino (g)

(a) Università di Foggia, (b) Cardio-on-Line Europe s.r.l. Bari, (c) U.O. Cardiologia Ospedale San Paolo Bari, (d) U.O. Cardiologia Ospedale San Giacomo Monopoli (BA), (e) U.O. Cardiologia Ospedale Di Venere Bari, (f) U.O. Cardiologia Ospedaliera Policlinico Bari, (g) A.Re.S. Puglia

Background: Tecnologie di tele-medicina trovano applicazione in settori sempre più ampi della medicina. La medicina di base può avvalersi in particolar modo del supporto tele-cardiologico, anche nella prospettiva di continue limitazioni alle risorse a disposizione della assistenza sanitaria di base. Nell'ambito di un progetto regionale di assistenza sanitaria per pazienti fragili e cronici incentrata sulla figura del Care Manager infermieristico e sull'associazionismo complesso della Medicina di Base (PROGETTO NARDINO), la tele-medicina e la tele-cardiologia in particolare possono fornire un supporto determinante.

Metodi: Dal 2004 è attivo nella regione Puglia un servizio di tele-cardiologia in grado di refertare in diretta gli ECG registrati dagli equipaggi del 118 regionale in sede di intervento. Un cardiologo in servizio presso la centrale di tele-cardiologia di Bari referta il tracciato ed è in grado di re-inviarlo al mittente tramite fax, smart-phone o internet.

I soggetti arruolati nel progetto NARDINO sono stati sottoposti a controllo ECG mediante supporto in tele-medicina in caso di patologie croniche cardiache o di sospetta malattia cardiaca acuta in soggetti assistiti per altre patologie. L'ECG è stato effettuato da Care-Manager Infermieristici e refertati dal cardiologo specialista disponibile in Centrale di tele-Cardiologia.

Risultati: 2,552 ECG con consulto cardiologico on-line sono stati effettuati a partire dal 2010. Il numero crescente di ECG effettuati dai Care-Manager sottolineano l'affidabilità del supporto specialistico tele-cardiologico nella medicina di base (40 ECGs al mese nel maggio 2010, 150 a dicembre 2012). L'84% degli ECG non mostrava alterazioni significative, l'1.4% ECG suggestive per STEMI, l'8.1% segni dubbi per ischemia con necessità di ulteriori approfondimenti (monitoraggio

ECG monitoring, dosaggio troponine, ricovero in UTIC), il 19.3% aritmie significative (tachicardia ventricolare, fibrillazione atriale, TPS).

Conclusioni: Il supporto specialistico tele-cardiologico può essere estremamente utile in un poliambulatorio per l'assistenza di pazienti fragili e cronici incentrata sulla figura del Care Manager Infermieristico e costituire una utile opportunità per conciliare qualità dell'assistenza di base con la riduzione dei costi.

HIGHLIGHTS GIOVANI RICERCATORI – LAVORI INEDITI – SESSIONE 3

O346

Autophagy and NLRP3/inflammasome formation in the cardiomyocyte are activated by the purinergic receptor P2X7

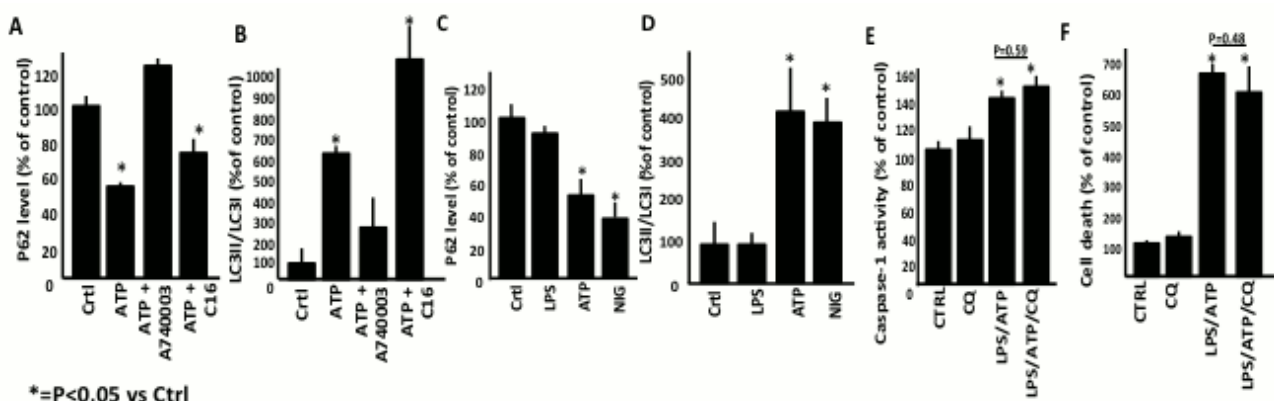
Carlo Marchetti (a), Nicla Tranchida (a), Eleonora Mezzaroma (a), Laura O'Brien (a), Benjamin Van Tassel (a), Antonio Abbate (a), Stefano Toldo (a)

(a) Virginia Commonwealth University

Background: Extracellular ATP induces autophagy via the P2X7 purinergic receptor (P2X7R). P2X7R is also involved in the activation of the NLRP3 inflammasome, a multiprotein complex necessary for caspase-1 activation and release of pro-inflammatory cytokines. The aim of this study was to study the role of P2X7R and the interplay of autophagy and inflammasome formation in response to extracellular ATP in cardiomyocytes.

Methods and Results: To test whether ATP induces P2X7R-mediated autophagy, HL-1 cardiomyocytes were treated with ATP (5mM) alone or in combination with A740003, a P2X7R inhibitor (0.2mM), or C16, a P2X4 receptor inhibitor (0.2mM). Autophagic flux was measured as conversion of LC3I to LC3II and p62 degradation. ATP induced degradation of p62 and conversion of LC3, which were prevented by the P2X7R inhibitor (Figure) only. P2X7R induces potassium (K^+) efflux. To test whether K^+ is involved in this mechanism, we treated the cells with Nigericin (20 μ M), a toxin that forms pores allowing for K^+ efflux, which induced p62 degradation and LC3II expression (Figure). LPS (25 ng/ml) prior to ATP or Nigericin was used to prime cardiomyocytes for the induction of the inflammasome. LPS alone did not induce autophagic flux (Figure) nor the inflammasome in cardiomyocytes, whereas LPS and ATP (or Nigericin) induced the activation of the inflammasome measured with caspase-1 activity and cell death ($P < 0.05$). Inhibiting the cryopyrin inflammasome with glyburide (400 μ M) or a caspase-1 inhibitor (Z-WEHD-FMK, 1 μ M) did not inhibit autophagic flux ($P < 0.05$), and inhibition of autophagic flux using chloroquine (30 μ M) had no effects on caspase-1 activity and cell death (Figure).

Conclusions: The P2X7R-mediated K^+ efflux in cardiomyocytes plays a dual role in response to extracellular ATP by simultaneously and independently mediating the induction of autophagy and formation of the NLRP3 inflammasome.



O347

miR-125a-5p modulates the phenotypic switch of vascular smooth muscle cells by targeting ETS-1

Clarice Gareri (a), Claudio Iaconetti (a), Jolanda Sabatino (a), Alberto Polimeni (a), Sabato Sorrentino (a), Francesco Passafaro (a), Maria Colangelo (a), Caterina Covello (a), Filomena Caria (a), Alessandra Carvelli (a), Andrea Tavernese (a), Annarita Carino (a), Daniele Torella (a), Antonio Curcio (a), Salvatore De Rosa (a), Ciro Indolfi (a)

(a) *Laboratorio di cardiologia molecolare e cellulare, Università Magna Graecia, Catanzaro*

Background: The phenotype switch of vascular smooth muscle cells (VSMCs) between a proliferative and a contractile status is a key process in the pathogenesis of atherosclerosis and vascular remodeling, including restenosis after vascular injury. Several studies suggest that microRNAs (miRs) are implicated in the regulation of VSMCs' phenotypic switch, hence influencing the development of vascular diseases. It is known that mir-125 is highly expressed in VSMCs of normal vascular wall but no data are available on its involvement in vascular disease. Thus, the aim of the present study was to evaluate the role, if any, of miR-125a-5p in modulation of smooth muscle phenotype.

Methods: In this study, we investigated the expression levels of miR-125a-5p in vessel wall on a rat carotid balloon-injury model. Gain-of-function and loss-of-function approaches were used to investigate the effect of miR-125a-5p on VSMCs in vitro. Expression of specific VSMCs markers (ACTA-2, MYH11, and CNN1) was detected by western blot analysis in vascular smooth muscle cells transfected with mimic- or inhibitor of miR-125a-5p, while a TaqMan assay was used to detect miRs levels. Moreover, the involvement of the transcription factor ETS-1 in the phenotypic switch of VSMCs in response to PDGF-BB and serum was evaluated. VSMCs proliferation was measured with EdU cell proliferation assay kit (Life Technologies).

Results: Expression levels of miR-125a-5p were strongly decreased in injured carotid arteries compared to control vessels and in cultured VSMCs in response to PDGF-BB and FBS. In addition, over-expression of the same miR in VSMCs was associated to an increase in VSMC-specific markers levels, such as ACTA-2, MYH11 and CNN1. On the contrary, functional inhibition of miR-125a-5p had the opposite effect, suggesting that constitutive levels of miR-125a-5p are essential for the expression of VSMC-specific genes. Importantly, EdU incorporation assay revealed that functional inhibition of miR-125a-5p results in increased VSMCs proliferation. The transcription factor ETS-1, known to be induced after arterial injury or exposure to PDGF-BB, is a putative target of miR-125a-5p. Accordingly, our data show that ETS-1 mRNA levels are modulated by miR-125a-5p over-expression and upon stimulation with PDGF-BB or FBS. Further experiments revealed that also ETS-1 protein levels followed the same pattern of modulation, as they were down-regulated in miR-125a-5p-treated VSMCs and up-regulated in VSMCs transfected with its inhibitor. Also interestingly, an inverse correlation was found between miR-125a-5p levels and VSMCs' proliferation. In fact, PDGF-BB-induced reduction in miR-125a-5p levels resulted in increased VSMCs' proliferation while its over-expression was responsible for a decrease in VSMCs' proliferation in vitro.

Conclusions: Results of the present study show for the first time that miR-125a-5p plays a key role in the regulation of VSMCs' phenotypic switch, hence representing an interesting potential therapeutic target for novel treatment approaches to vascular disease.

O348

Phenotype, Genotype and Natural History of Arrhythmogenic Dilated Cardiomyopathy

Anita Spezzacatene (a, b), Gianfranco Sinagra (b), Marco Merlo (b), Giulia Barbati (b), Dobromir Slavov (a), Andrea Di Lenarda (b), Xiao Zhu (a), Sharon Graw (a), Ernesto Salcedo (a), Matthew Taylor (a), Luisa Mestroni (a)

(a) *Cardiovascular Institute, University of Colorado, Colorado*, (b) *Cardiovascular Department, Hospital and University of Trieste, Italy*

Background: Arrhythmogenic dilated cardiomyopathy (aDCM) is a form of dilated cardiomyopathy (DCM) frequently encountered in clinical practice and characterized by severe ventricular arrhythmias. The purpose of this study was to determine the prevalence, genotype-phenotype correlations and long-term outcome predictors of aDCM, to implement current criteria for risk-stratification.

Methods: From February 1979 to November 2012, we studied 461 patients (364 families) with DCM enrolled in the Familial Cardiomyopathy Registry. Criteria for aDCM were DCM with VT, SD, AICD shock, syncope, cardiac arrest, PVC>1000/24h. A subgroup of patients was tested for DCM genes (*MYH6*, *MYH7*, *MYBPC3*, *TNNT2*, *TTN*, *LMNA*, *LAP2*, *SCN5A*, *DES*). For survival analysis, endpoints were: 1) death or heart transplant, 2) death, heart transplant or malignant ventricular arrhythmias (MVA), 3) MVA.

Results: Over a follow-up of 96±82 months (up to 20 years), we identified 211 patients (45.8%) with aDCM: among them 72 (15.6% of the total DCM population) experienced MVA during follow-up. When compared to DCM patients, aDCM patients had worse survival (endpoint 1: P=0.006; endpoint 2: P<0.001). Independent risk factors for endpoint 1 in the aDCM population were LVEF<34% and the presence of QRS>110 ms in V1-V3. There was a cumulative risk for death or heart transplant per additional risk factor. Predictors of MVA in the aDCM population were the presence of QRS>110 ms in V1-V3 and family history of MVA. aDCM was most frequent among *LMNA* (70.6%), *TTN* (54.5%) and *SCN5A* variant carriers (50%). Furthermore, nuclear envelope (*LMNA* and *LAP2*) variant carriers had worse NYHA (P=0.030) in spite of smaller LVEDD at baseline (P=0.003), and experienced more heart transplants (P=0.010). *TTN* carriers had worse event-free survival for endpoint 2 (P=0.037). Finally, *SCN5A* mutation carriers were younger at enrollment (P=0.004) compared to non-carriers, had prevalence of males (P=0.029) and epsilon waves (P=0.030).

Conclusions: In a large and extensively studied DCM cohort, we define a novel subpopulation characterized by prominent ventricular arrhythmia and different prognosis. Our results suggest that aDCM may benefit from more aggressive therapeutic interventions including modified ICD criteria.

O349

Effect of remote ischemic preconditioning on platelet activation and reactivity related to radiofrequency ablation for atrial fibrillation

Alessandra Stazi (a), Giancarla Scalone (a), Marianna Laurito (a), Maria Milo (a), Gemma Pelargonio (a), Maria Lucia Narducci (a), Rossella Parrinello (a), Stefano Figliozzi (a), Gianluigi Bencardino (a), Francesco Perna (a), Gaetano Antonio Lanza (a), Filippo Crea (a)

(a) *Università Cattolica del Sacro Cuore-Policlinico Gemelli-Istituto di Cardiologia*

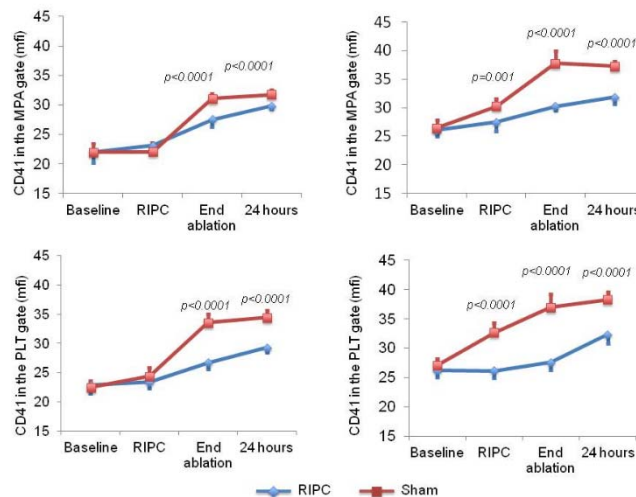
Background: Radiofrequency (RF) ablation of atrial fibrillation (AF) was shown to be associated with an increased risk of thromboembolic events in the post-procedural period. We previously showed that preventive application of short episodes of forearm ischemia (remote ischemic preconditioning [RIPC]) reduces platelet activation induced by exercise. In this study we assessed whether RIPC has any effect on platelet activation related to RF catheter ablation of AF.

Methods: We randomized 19 patients (54.7±11 years, 17 males) with paroxysmal AF, undergoing RF catheter ablation, to receive RIPC or sham RIPC (controls) immediately before the procedure.

RIPC was induced by 3 episodes of 5 minutes of forearm ischemia by cuff sphygmomanometer inflation at 5-minutes intervals; in the sham group the same protocol was applied, but the cuff was each time inflated at 10 mmHg. Blood samples were collected before and after RIPC/sham ischemia, at the end of ablation and 24 hours later. Platelet function was assessed by measuring by flow cytometry monocyte-platelet aggregate (MPA) formation, platelet CD41 expression in the MPA gate and platelet CD41 and CD62 expression in the platelet gate, in the absence (platelet activation) and in presence (platelet reactivity) of ADP stimulation, respectively.

Results: The 2 groups did not differ in clinical and laboratory variables, as well as in basal platelet variables. RF ablation induced an increased platelet activation in both groups, which persisted at 24 hours. However, compared to controls, RIPC patients showed a significant lower increase in all platelet variables during ablation, including MPA formation ($p<0.001$), CD41 in MPAs ($p=0.002$) and CD41 ($p<0.001$) and CD62 ($p=0.002$) in the platelet gate. Furthermore, compared to controls, RIPC was also associated with lower ADP-induced MPA formation ($p<0.0001$), CD41 in MPAs ($p<0.001$) and platelet CD41 ($p<0.001$) and CD62 ($p=0.005$) expression in the platelet gate during the procedure. All differences between the 2 groups persisted at 24 hours after the procedure. CD41 data in MPAs and in the platelet gate, with and without ADP stimulation, are shown in the Figure.

Conclusions: Our data show that remote IPC significantly reduces the increased platelet activation and reactivity associated with RF catheter ablation of AF.



O350

Profilo Clinico ed Outcome dell'Endocardite Infettiva in Friuli Venezia Giulia: Verso il Nuovo Sistema di Sorveglianza Prospettica Regionale

Alessio Della Mattia (a), Bruno Pinamonti (a), Elena Abate (a), Gian Luigi Nicolosi (g), Alessandro Proclemer (c), Daniela Pavan (d), Maria Grazia Baldin (i), Antonio Di Chiara (h), Flavio Faggioli (l), Tullio Morgera (l), Matteo Bassetti (f), Massimo Crapis (f), Sergio Venturini (f), Sara Doimo (a), Rita Belfiore (a), Ugolino Livi (c), Aniello Pappalardo (a), Pierluigi Viale (b), Roberto Luzzati (e), Gianfranco Sinagra (a)

(a) Dipartimento Cardiovascolare - Az. Ospedaliero-Universitaria "Ospedali Riuniti", Trieste, (b) U.O. Malattie Infettive - Policlinico "S. Orsola-Malpighi", Bologna, (c) Dipartimento Cardiotoracico - Az. Ospedaliero-Universitaria "S. Maria della Misericordia", Udine, (d) S.C. Cardiologia, Az. Ospedaliera "S. Maria dei Battuti", San Vito al Tagliamento (PN), (e) U.O. Malattie Infettive - Az. Ospedaliero-Universitaria "Ospedali Riuniti", Trieste, (f) Clinica di Malattie Infettive - Az. Ospedaliero-Universitaria "S. Maria della Misericordia", Udine, (g) S.C. Cardiologia, Azienda Ospedaliera "S. Maria degli Angeli", Pordenone, (h) Dipartimento Medico - U.O. Cardiologia, Az. per i Servizi Sanitari n.3, Tolmezzo (UD), (i) Dipartimento Medico, U.O. di

Cardiologia, Az. per i Servizi Sanitari n. 5, Palmanova (UD), (l) U.O. Cardiologia - Az. per i Servizi Sanitari n°2 Isontina - Gorizia e Monfalcone

Background: Nonostante i progressi diagnostici, terapeutici e del controllo delle complicanze, la mortalità legata all'endocardite infettiva (EI) non si è modificata negli ultimi 40 anni, rimanendo tuttora una sfida diagnostica e terapeutica. Il Registro delle Endocarditi Infettive del Friuli Venezia Giulia (REI-FVG) ha come obiettivo l'analisi epidemiologica accurata, al fine di ottenere una standardizzazione dei comportamenti nei diversi ambiti di competenza, nell'ottica della stesura di protocolli gestionali condivisi.

Metodi: Studio osservazionale, prospettico, multicentrico, avente come popolazione i pazienti con EI accertata o possibile secondo la classificazione di Duke. Il REI-FVG è stato analizzato da aprile 2004 a dicembre 2011, coinvolgendo le diverse unità operative di: Cardiologia, Cardiochirurgia, Medicina Interna, Terapia Intensiva e Malattie Infettive del Friuli Venezia Giulia (FVG). Il centro coordinatore è la Clinica di Malattie Infettive dell'Azienda Ospedaliero-Universitaria di Udine, supportato dalle Cardiologie Ospedaliere della rete ANMCO FVG. Il REI-FVG è costituito da un database informatico in formato Microsoft Access®.

Risultati: Da aprile 2004 a dicembre 2011 sono stati registrati 431 casi di EI [M: 293 (68%), F: 138 (32%), età media: 66±15 anni]. Il tasso d'incidenza annuale è di 4 casi/100000 abitanti (11 casi/100000 abitanti se si considerano pazienti con età > 65 anni). I pazienti con diagnosi di EI provengono prevalentemente dalle unità operative di Medicina Interna (44%), Malattie Infettive (19%) e Cardiologia (16%). I fattori di rischio maggiormente osservati sono: patologia valvolare (41%), protesi valvolare cardiaca (34%), diabete mellito (23%), scompenso cardiaco (23%) neoplasia (21%), insufficienza renale cronica (20%). Nei 6 mesi precedenti alla diagnosi di EI emerge: somministrazione di terapia antibiotica (51%), ricoveri ospedalieri (43%), infezioni (35%). Le emocolture hanno mostrato come popolazioni microbiche più rappresentate: Streptococchi non-bovis (18%), *S. aureus* (18%), *Enterococcus spp* (16%), *S. bovis* (11%), Stafilococchi coagulasi-negativi (11%); mentre nel 19% dei casi si sono riscontrate emocolture negative o non segnalate. La diagnosi ecocardiografica è stata possibile nel 95% dei casi. Le sedi maggiormente risultano: valvola aortica (49%) e mitrale (44%). Le complicanze osservate durante il ricovero: embolia settica (23%), scompenso cardiaco acuto (22%), insufficienza renale acuta (21%), aritmie (19%). Nel 76% dei casi le emocolture sono risultate positive, consentendo una terapia antibiotica mirata, altrimenti condotta in senso empirico-ragionato. La terapia cardiocirurgica è stata eseguita in 161 casi (37%), di questi nel 64% in regime d'urgenza. La guarigione con terapia medico-chirurgica è avvenuta nel 33% dei casi, con terapia medica senza esiti cardiaci nel 27%. Il decesso è stato osservato nel 19% dei casi.

Conclusione: Il registro ha consentito di delineare un profilo epidemiologico preciso della EI nella realtà del FVG. EI si configura come una patologia legata all'invecchiamento della popolazione generale, conseguente all'incremento delle comorbidità e alla maggiore invasività terapeutica. Un limite importante del registro è l'impossibilità di formulare appropriate valutazioni in merito al management prescrittivo. Questa analisi epidemiologica ha permesso di riconsiderare le schede di raccolta dati per l'avvio del nuovo sistema di sorveglianza prospettica regionale, con l'obiettivo della stesura di protocolli gestionali condivisi per il management della EI in FVG.

O351

Progressione tardiva della malattia coronarica nel cuore trapiantato: ruolo prognostico dello spessore intimale

Mario Sabatino (a), Marco Masetti (a), Luciano Potena (a), Valeria Pece (a), Nevio Taglieri (a), Paola Prestinenzi (a), Giorgio Bianchi (a), Gianni Dallara (a), Gaia Magnani (a), Francesco Grigioni (a), Claudio Rapezzi (a), Angelo Branzi (a)

(a) *Dipartimento di medicina specialistica diagnostica e sperimentale - Università di Bologna*

Background: La malattia coronarica del cuore trapiantato (CAV, cardiac allograft vasculopathy) rappresenta la principale causa di mortalità cardiovascolare a lungo termine dopo trapianto di cuore. L'ecografia intracoronarica (IVUS) ha mostrato una sensibilità superiore rispetto all'angiografia tradizionale nel rilevare lo sviluppo precoce della CAV, attraverso la valutazione dello spessore intimale coronarico nel primo anno dopo trapianto. Tuttavia, i fattori di rischio e le implicazioni prognostiche della progressione tardiva della malattia coronarica sono attualmente meno caratterizzati.

Scopi: Valutare il ruolo prognostico dei parametri IVUS di rimodellamento coronarico tardivo sulla prognosi cardiovascolare a lungo termine; identificare il contributo dei principali fattori di rischio metabolici nella progressione della CAV.

Materiali e metodi: In questo studio osservazionale retrospettivo sono stati considerati eleggibili tutti i pazienti adulti sottoposti a trapianto cardiaco con disponibile ecografia intracoronarica a 1 e 5 anni dal trapianto; i casi di trapianto combinato sono stati esclusi dallo studio. La prognosi è stata valutata in termini di mortalità cardiovascolare ed incidenza di eventi cardiovascolari non fatali (MACE) rilevati a partire dalla seconda valutazione IVUS.

Risultati: La popolazione dello studio è composta da 132 pazienti sottoposti a trapianto cardiaco tra il 1998 e il 2007. A 10 anni dall'IVUS l'incidenza di morte cardiovascolare è stata del 18%, quella di eventi non fatali del 35%. Complessivamente nella popolazione studiata si è osservata una variazione di geometria coronarica caratterizzata da riduzione del lume del vaso e aumento dello spessore e del volume intimale ($p < 0,01$). Tra le variabili IVUS solo l'aumento dello spessore intimale (MIT) ha mostrato una correlazione con la prognosi cardiovascolare successiva ($p = 0,04$). È stato individuato un cut off nell'aumento di MIT di 0,35 mm in grado di stratificare due gruppi di pazienti con differente rischio di morte cardiovascolare [RR 4,5 (1,4-16,9); $p = 0,01$] ed eventi non fatali [RR 4,94 (2,18-11,9); $p < 0,01$]. La progressione così caratterizzata ha mostrato una correlazione significativa con il sesso maschile ($p = 0,01$), eziologia ischemica della cardiopatia di base ($p = 0,03$), elevati livelli di trigliceridi nel primo anno post trapianto ($p = 0,03$) e ridotti livelli di colesterolo HDL a 5 anni ($p = 0,01$) e come valore medio dei 5 anni ($p = 0,03$). Il trattamento continuativo con acido acetilsalicilico a basse dosi ha mostrato inoltre un possibile effetto protettivo sull'incremento di MIT ($p = 0,01$).

Conclusioni: Questo studio fornisce per la prima volta l'evidenza che l'aumento della MIT costituisca un marker di prognosi cardiovascolare anche dopo il primo anno dal trapianto, identificando i pazienti ad elevato rischio cardiovascolare a lungo termine. L'analisi dei fattori di rischio suggerisce che il controllo degli indicatori di sindrome metabolica e la terapia con acido acetilsalicilico rappresentano potenziali strategie terapeutiche di prevenzione della progressione tardiva della CAV.

STRATEGIE DIAGNOSTICO – ORGANIZZATIVE NELLA SCA

O352

Time to reperfusion in un modello integrato di rete provinciale per l'angioplastica primaria 118 ed ECG pre-ospedaliero mediante supporto telecardiologico: dati preliminari Bari - BAT

Gaetano Di Pietro (a), Natale Daniele Brunetti (b), Angela Ivana Bruno (a), Ambrogio Aquilino (c), Giulia Dellegrottaglie (d), Giuseppe Di Giuseppe (d), Claudio Lopriore (d), Luisa De Gennaro (e), Saverio Lanzzone (f), Pasquale Caldarola (g), Gianfranco Antonelli (h), Matteo Di Biase (b)

(a) 118 Bari - BAT, (b) Università di Foggia, (c) A.Re.S. Puglia, (d) Cardio-on-Line Europe s.r.l. Bari, (e) U.O. Cardiologia Ospedale San Giacomo Monopoli (BA), (f) U.O. Cardiologia Ospedale Di Venere Bari, (g) U.O. Cardiologia Ospedale San Paolo Bari, (h) U.O. Cardiologia Ospedaliera Policlinico Bari

Background: La rete per il trattamento mediante angioplastica primaria costituisce il modello assistenziale più efficace per l'infarto miocardico acuto (IMA). La possibilità di effettuare un ECG pre-ospedaliero ha dimostrato di ridurre i tempi di trattamento e la mortalità in caso di IMA se associata ad un rapido accesso all'angioplastica primaria. Si riportano di seguito i risultati preliminari del registro provinciale Bari –BAT 118 - rete angioplastica primaria con ECG pre-ospedaliero mediante supporto tele-cardiologico.

Metodi: Dal 2004 è attivo nella regione Puglia un servizio di tele-cardiologia in grado di refertare in diretta gli ECG registrati dagli equipaggi del 118 regionale in sede di intervento. Un cardiologo in servizio presso la centrale di tele-cardiologia di Bari referta il tracciato ed è in grado di re-inviarlo al mittente tramite fax, smart-phone o internet.

302 soggetti trattati mediante angioplastica primaria per IMA e trasportati dal 118 regionale nelle province Bari – BAT dall'ottobre 2012 all'aprile 2013 sono stati arruolati in un registro provinciale. Sono stati riportati età e genere dei pazienti, orario di attivazione del 118, orario di diagnosi dell'IMA ed orario di trattamento mediante angioplastica primaria, località di diagnosi e località di trattamento. Sono stati quindi calcolati i tempi intercorrenti tra diagnosi e trattamento, anche al netto dei tempi di percorrenza. I soggetti arruolati sono stati quindi suddivisi in soggetti in cui la diagnosi di IMA è stata effettuata dal 118 mediante ECG pre-ospedaliero in telecardiologia (118-TeleC) e soggetti in cui la diagnosi è stata effettuata non dal 118, che si è limitato al trasferimento dalla struttura in cui è stato diagnosticato l'IMA alla sede hub di trattamento mediante angioplastica primaria dell'IMA (118-Transf).

Risultati: L'età media dei soggetti arruolati è stata di 67 ± 14 anni, il 27% dei soggetti era di genere femminile, il 42% ha avuto accesso all'angioplastica primaria mediante 118 ed ECG pre-ospedaliero con supporto tele-cardiologico (118-TeleC). Il tempo di trattamento medio è stato di $1:13 \pm 1:01$; il gruppo 118-TeleC ha ricevuto tempi di trattamento significativamente più brevi rispetto al gruppo 118-Transf ($0:41 \pm 0:17$ vs $1:34 \pm 1:11$, $p < 0.001$, $-0:53$). Anche al netto dei tempi di percorrenza, le differenze sono rimaste statisticamente significative ($0:19 \pm 0:14$ vs $1:03 \pm 1:09$, $p < 0.001$). Non sono state riscontrate differenze in base all'età dei soggetti, mentre la distanza tra il luogo di diagnosi e quello di effettuazione dell'angioplastica condiziona significativamente i tempi di trattamento ($r 0.38$, $p < 0.001$). Il gruppo 118-TeleC mostrava riduzioni significative dei tempi di riperfusione sia in caso di cath-lab disponibile nel comune della diagnosi o viciniore ($0:34 \pm 0:13$ vs $0:54 \pm 0:30$, $p < 0.001$) che in caso contrario, con tempi di trasporto necessariamente più prolungati ($0:52 \pm 0:17$ vs $1:41 \pm 1:14$, $p < 0.001$; $-0:49$ (-48,5%) vs $-0:20$ (-37%), $p < 0.05$). Confrontando le percentuali di soggetti trattati entro 1h dalla diagnosi, il gruppo 118-TeleC mostrava percentuali maggiori sia nel gruppo totale (85% vs 35%, $p < 0,001$), sia tra i soggetti provenienti da località vicine ad un hub per angioplastica primaria (96% vs 74%, $p < 0,001$), sia tra i soggetti in località lontane da hub (69% vs 29%, $p < 0,001$).

Conclusioni: Un modello assistenziale integrato 118 – ECG pre-ospedaliero mediante supporto telecardiologico è associato a tempi di trattamento dell'IMA significativamente ridotti in ambito un provinciale di oltre un milione e mezzo di abitanti come quello Bari-BAT.

O353

Analisi preliminare dei costi di un servizio regionale di telecardiologia per il supporto del 118

Natale Daniele Brunetti (a), Giulia Dellegrottaglie (b), Claudio Lopriore (b), Giuseppe Di Giuseppe (b), Saverio Lanzone (c), Luisa De Gennaro (d), Pasquale Caldarola (e), Gianfranco Antonelli (f), Matteo Di Biase (f)

(a) Università di Foggia, (b) Cardio-on-Line Europe s.r.l. Bari, (c) U.O. Cardiologia Ospedale Di Venere Bari, (d) U.O. Cardiologia Ospedale San Giacomo Monopoli (BA), (e) U.O. Cardiologia Ospedale San Paolo Bari, (f) U.O. Cardiologia Ospedaliera Policlinico Bari

Background: Sempre più settori della medicina si giovano del supporto di metodiche di telemedicina. Evidenze sperimentali mostrano come la registrazione pre-ospedaliera dell'ECG sia in grado di accorciare significativamente i tempi di riperfusione nei soggetti con infarto miocardico acuto e di migliorarne pertanto la prognosi. Riportiamo di seguito un'analisi preliminare dei costi di un servizio di telecardiologia con ECG preospedaliero per il servizio regionale 118 nella regione Puglia.

Metodi: Dal 2004 è attivo nella regione Puglia un servizio di tele-cardiologia (Cardio-on-line Europe s.r.l.) in grado di refertare in diretta gli ECG registrati dagli equipaggi del 118 regionale in sede di intervento. Un cardiologo in servizio presso la centrale di tele-cardiologia di Bari referta il tracciato ed è in grado di re-inviarlo al mittente tramite fax, smart-phone o internet.

Risultati: Nell'anno 2012 il servizio di telecardiologia ha eseguito per il 118 regionale 109.750 ECG con consulto telefonico on-line al costo di 1.833.333 euro. Il costo per ECG-più consulto online è stato di 16,7 euro, inferiore al costo secondo tariffario regionale per analoga prestazione (24,8-55,2 euro, 8,1-38,4 euro di risparmio per ECG/consulto, risparmio totale 891.759,5-4.219.379,5 euro). Il costo medio per escludere una patologia cardiologica è stato di 25,3 euro, mentre quello per riconoscere una patologia cardiologica già a domicilio del paziente è stato di 49,2 euro. Dato un numero di STEMI di 629 ed i dati di riduzione assoluta della mortalità con ECG pre-ospedaliero in letteratura, è possibile ipotizzare un numero di vite salvate per la sola patologia STEMI pari a 69/anno con un costo per anno di vita guadagnato corretto per qualità della vita (QALY) di 1562 euro. Al netto del risparmio calcolato il QALY considerando i soli soggetti affetti da STEMI di 802/-2033 euro, addirittura con un potenziale risparmio netto.

Rimane difficile da quantificare il risparmio aggiuntivo in termini di riduzione dell'invalidità e ritorno all'attività produttiva dei soggetti e quello correlato alla diagnosi di altre patologie cardiovascolari (sindromi coronariche acute non ST-sopra, aritmie).

Conclusioni: Il supporto tele-cardiologico può contribuire alla riduzione dei costi e risultare estremamente utile nella gestione delle malattie cardiovascolari mediante il servizio 118 nella valutazione pre-ospedaliera dei soggetti con sospetta urgenza cardiologica.

O354

Diagnostic utility of copeptin in addition to high-sensitivity cardiac troponin for the early diagnosis of Non-ST-Elevation acute coronary syndromes - The COPACS study

Rosa Di Scala (a), Fabrizio Ricci (a), Doranna De Pace (a), Raffaele De Caterina (a), Marta Di Nicola (b), Cristiano Massacesi (a), Gianni Cremonese (a), Serena Rossi (a), Ivana Cataldo (c), Marco Zimarino (a), Stefano Martinotti (c), Domenico Rotondo (a)

(a) Istituto di Cardiologia Università "G. D'Annunzio", Chieti, (b) Laboratorio di Biostatistica, Università "G. D'Annunzio", Chieti, (c) Laboratorio di Patologia clinica, Università "G. D'Annunzio", Chieti.

Aims: Rapid and reliable exclusion of acute myocardial infarction (AMI) during an emergency department (ED) triage is a major unmet clinical need. We aimed at verifying the non-inferiority of a single-sampling strategy of hs-cTn and copeptin compared with the dual hs-cTn sampling for the early diagnosis of Non-ST-Elevation Acute Coronary Syndromes (NSTE-ACS) versus Non Coronary Chest Pain (NCCP) in a selected cohort of consecutive patients admitted at the Emergency Department.

Methods: Copeptin, hs-cTnI, CK-MB and Myoglobin levels were sampled at presentation in 99 consecutive patients admitted to the ED for non-traumatic chest pain with onset within the previous 6 hours and without ST elevation on a 12-lead electrocardiogram (ECG). The diagnostic performance of a combination of hs-cTnI and copeptin, hs-cTnI and CK-MB, hs-cTnI and myoglobin on admission and 3 hours hs-cTnI serial sampling for NSTEMI diagnosis was studied with reference to the post-discharge diagnosis. The diagnostic accuracy of different biomarkers combinations was compared by means of receiver operating characteristic (ROC) curve analysis.

Preliminary Results: The adjudicated final diagnosis was NSTEMI in 10 patients (10.1%). At the time of admission/first blood sampling analysis combination of hs-cTnI and copeptin resulted in an area under the ROC curve (AUC) of 0.91 (95% confidence interval (CI): 0.83 to 0.95), which showed a trend toward improved diagnostic performance compared to the 0.88 (95% CI: 0.80 to 0.94) for hs-cTnI alone, 0.86 (95% CI: 0.77 to 0.92) for hs-cTnI/CK-MB and 0.83 (95% CI: 0.73 to 0.89) for hs-cTnI/myoglobin. A copeptin level <14 pmol/l in combination with a hs-cTnI <0.045 ng/ml correctly ruled out AMI with both a sensitivity and a negative predictive value of 100%. When compared to hs-cTnI alone, combination of hs-cTnI and copeptin improved classification of individuals with events, shown by a Net Reclassification Index (NRI) of 0.477 (p-value 0.033). Short-term follow-up at 30 days of patients with normal copeptin serum level was uneventful (out-of-hospital major adverse cardiovascular event rate 0%).

Conclusions: The combined single-sampling use of copeptin and hs-cTnI enables a rapid and reliable ruling out of NSTE-ACS, and may therefore obviate the need for prolonged monitoring and serial blood biomarker sampling in the majority of patients within 6 hours from chest pain onset. The diagnostic utility of copeptin may produce substantial cost-saving by reducing the total treatment cost of chest pain management in the Emergency Department.

O355

Nuovo protocollo di gestione congiunta del paziente che arriva in pronto soccorso con dolore toracico a medio-bassa probabilità di genesi ischemica: iter diagnostico e follow-up clinico

Laura Lupi (a), Giuseppe Milesi (a), Nicolò Dasseni (a), Elena Rocco (a), Marco Triggiani (a), Nicola Berlinghieri (a), Carlo Concoreggi (b), Davide Farina (c), Roberto Maroldi (c), Savina Nodari (a)

(a) *Dipartimento Specialità Medico-Chirurgiche, Scienze Radiologiche, e Sanità Pubblica, U.O. Cardiologi*, (b) *Dipartimento di Emergenza-Urgenza/Pronto Soccorso, Spedali Civili di Brescia*, (c) *Dipartimento Specialità Medico-Chirurgiche, Scienze Radiologiche, e Sanità Pubblica, U.O. Radiologia*

Introduzione: I pazienti (pz) afferenti al Dipartimento di Emergenza (DE) per dolore toracico di recente insorgenza e suggestivo per sindrome coronarica acuta (SCA) necessitano di un tempestivo ed accurato inquadramento teso alla stratificazione del rischio per procedere successivamente ad appropriate indagini diagnostiche e stabilire strategie terapeutiche.

Scopo dello studio: Verificare e validare l'appropriatezza del nostro percorso diagnostico in tali pz.

Metodi: Sono stati arruolati i pazienti consecutivamente afferiti presso il nostro DE per dolore toracico suggestivo per SCA in presenza di elettrocardiogramma 12-derivazioni ed indici di necrosi miocardica negativi al basale e al controllo a 6 e 12 ore. In tutti i pz sono stati eseguiti Ecocardiogramma e una stratificazione del rischio pre-test di coronaropatia sulla base di fattori quali

età, sesso, comorbidità e caratteristiche del dolore toracico (linee guida dolore toracico del 2010; National Institute for Health and Care Excellence). I pz a basso rischio (<30%) o intermedio (30-60%) sono stati sottoposti a test da sforzo al cicloergometro (TS) e/o a tomografia computerizzata (TC) coronarica in caso di TS controindicato o non diagnostico. Per i pz a rischio elevato (>60%) è stato eseguito Ecocardiogramma da stress (Eco stress). In caso di positività di almeno una tra queste indagini diagnostiche, è stata eseguita coronarografia con successivo ricovero in regime ordinario se riscontrata una coronaropatia significativa. In caso di negatività dei test diagnostici si è proceduto a dimissione del paziente e a follow-up telefonico a 60 giorni.

Risultati: 167 pazienti sono stati arruolati (età media 55 ± 11 anni, 56% maschi). Di questi, 150 (90%) avevano basso-intermedio rischio pre-test di coronaropatia: 133 (89%) sono stati sottoposti a TS, non diagnostico e completato da TC coronarica in 19 casi e positivo in 1 caso; 17 pazienti (11%) sono stati sottoposti direttamente a TC coronarica per presenza di controindicazioni al TS. Solo 4 delle 36 totali TC coronariche sono risultate positive. I restanti 17 pazienti (11%) presentavano un profilo di rischio pre-test elevato e sono stati sottoposti ad Eco stress, positivo in 2 casi. Tra tutti i pazienti arruolati, 7 (4%) hanno eseguito studio coronarografico e sono stati ricoverati per esecuzione di rivascolarizzazione coronarica percutanea; i restanti (96%) sono stati dimessi dal DE. Al follow-up telefonico eseguito a 60 giorni non sono stati riscontrati eventi cardiovascolari tra i pazienti dimessi.

Conclusioni: Il nostro percorso diagnostico sembra migliorare la gestione dei pazienti afferenti al DE per dolore toracico di recente insorgenza suggestivo per SCA, evitando l'ospedalizzazione anche nei pazienti ad intermedio ed altro rischio pre-test di coronaropatia.

O356

How to increase diagnostic accuracy of Hs-TnT in elderly population?

Maria Giulia Marini (a), Maria Teresa Cardillo (a), Annalisa Caroli (a), Gina Biasillo (a), Massimo Gustapane (a), Chiara Sonnino (a), Martina Zaninotto (b), Mario Plebani (b), Luigi Marzio Biasucci (a), Filippo Crea (a)

(a) Università Cattolica del Sacro Cuore Sede di Roma, (b) Ospedale Universitario di Padova

Background: Decision limits for high sensitivity troponin (hs-Tn) assays are derived from normal populations, without heart disease and relatively young; in the case of hs-TnT the value of 14 pg/ml is derived from a reference population of apparently healthy subjects aged between 20 and 70. This is quite different from the emergency department (ED) population, often characterized by older subjects with comorbidities, and leads to potential bias in particular in the elderly. As a matter of fact, elevated levels of hs-TnT were found in up to 22% of healthy subjects living in community who were more than 70 years old.

Methods: 452 pts with chest pain were enrolled in the ED, 392 (86%) without Acute Coronary Syndrome (ACS) and 60 (14%) with a diagnosis of ACS. The analysis was conducted according to the age, dividing the whole population in quartiles (1° quartile 18-50 years, 2° quartile 51-63 years, 3° quartile 64-75 years, 4° quartile 76-100 years).

Aim: Our aim was to determine which is better hs-TnT cut-off for each age group, in terms of sensitivity (SE) and specificity (SP), and whether this approach is superior to the current use of a single cut-off for all ages.

Results: Using the current cut-off of 14 pg/ml (manufacturer) in the 1st quartile AUC was 0.730, SE 50%, SP 97%; in the 2nd quartile AUC was 0.705, SE 53%, SP 89%; in the 3rd quartile AUC was 0.853, SE 90%, SP 80%, in the 4th quartile AUC was 0.662, SE 90%, SP 43%. Conversely, analysing the population in quartiles according to the best cut-off for age (BCO), in the 1st quartile BCO was 159.59 pg/ml (AUC 0.64, SE 50%, SP 99%). In the 2nd quartile BCO was 9.44 pg/ml (AUC 0.82, SE 74%, SP 81%). In the 3rd quartile BCO was 13.44 pg/ml (AUC 0.91, SE 95%, SP 81%). In the 4th quartile BCO was 38.7 pg/ml (AUC 0.88, SE 84%, SP 86%). No significant differences were found between the first three quartiles, but a highly significant improvement ($p < 0.0001$) was observed in

the fourth quartile using the BCO. We calculated the AUC value with the cut-off of 14 pg/ml in the first three quartiles and obtained a result of 0.8. Moreover, the use of BCO in the 4th quartile leads to a reduction of false positive cases (from 48 to 12) and an increase in positive predictive value (from 26% to 57%), with a Net Reclassification Index (NRI) of 33% in the last quartile. We also found that the main diagnosis in false positive patients was heart failure (31%).

Conclusions: Our results suggest that the recommended cut-off for hs-TnT (14 pg/ml) is appropriate only in the population aged up to 75 years and that in older people a higher cut-off should be used to obtain a greater diagnostic accuracy.

O357

Is a policy of measuring hs-TnT in all comers to Emergency Department with suspected myocardial infarction useful?

Maria Teresa Cardillo (a), Maria Giulia Marini (a), Chiara Sonnino (a), Gina Biasucci (a), Massimo Gustapane (a), Annalisa Caroli (a), Alessia Romito (a), Chiara Cordischi (a), Francesco Franceschi (a), Luigi Marzio Biasucci (a), Filippo Crea (a)

(a) *Università Cattolica del Sacro Cuore Sede di Roma*

Background: The most resourceful use of high sensitivity troponin T (hs-TnT) in Emergency Department (ED) is still a matter of debate. Our aim was to evaluate the efficacy of a policy based on the measure of hs-TnT in all comers to ED with chest pain or other condition at risk of myocardial infarction (MI) according to the physician in charge of the ED.

Methods: We examined the data-base of all pts admitted to our ED during the first four months of 2011 (January-April) who had hs-TnT measured upon arrival. During this time interval 3000 pts were screened with hs-TnT.

Results: Only 150 pts (5%) out of 3000 were discharged with a diagnosis of Acute Coronary Syndrome (ACS), either STEMI and NSTEMI-ACS. 614 pts (20%) had a different diagnosis of cardiac disease, mainly heart failure (141 pts), atrial fibrillation (151 pts), other arrhythmias (169 pts) and hypertensive crisis (100 pts). Only pts with variant angina (n=5) had negative hs-TnT in the cardiological population.

390 pts (13%) were discharged with diagnosis of chest pain of not cardiac origin, 220 pts (7%) had a diagnosis of syncope on not cardiac origin and a total of 1011 pts (33.7%) had a diagnosis of gastroenteric disease, pneumological disease, other infective disease and neurological conditions.

Although the mean levels of hs-TnT in the ACS and Myocarditis (n=5) populations were much higher than in the other groups (0,293 ng/ml and 0,538 ng/ml respectively), no cut-off value was found to allow a definite diagnosis of ACS ruling-out false positive conditions.

Conclusion: Our data suggest that a policy of hs-TnT measuring in all comers with suspected cardiac ischemia for any reason (symptoms, ECG, others) leads to correct identification of MI pts in only a small percentage (5%) of the population assessed and confirm that numerous conditions different from ACS are associated with raised levels of hs-TnT.

Thus, our data suggest that a more conservative approach in requiring hs-TnT in ED should be preferable.

O358

Troponin I levels in patients presenting at the Emergency Room: Insight into appropriateness

Riccardo Morgagni (a), Emanuela Raffone (a), Fabio Duranti (b), Massimo Pieri (b), Silvio D'Annibale (a), Maria Rita Dessi (b), Francesco Romeo (a)

(a) *U.O.C. di Cardiologia e Cardiologia Interventistica, Policlinico Universitario Tor Vergata, Roma*, (b) *U.O.S di Medicina di Laboratorio, Policlinico Universitario Tor Vergata, Roma*

Background: Acute coronary syndromes (ACS) are classified into two groups: ST elevation myocardial infarction (STEMI) and non ST elevation myocardial infarction (NSTEMI)/unstable angina (UA). Diagnosis and classification are based on the presence of two of the following criteria: 1) chest pain 2) ST-T abnormalities on ECG 3) raised cardiac markers concentration. European Society of Cardiology (ESC) guidelines on ACS define an elevated cTnI level as a measurement exceeding the 99th percentile of a reference control group with a coefficient of variation $\leq 10\%$. The new cardiac Troponins assays can detect very small elevations until now undetectable: sensitivity for detecting ACS including MI has been improved, even if some non-ACS conditions may also cause an elevated cTnI level (Myocarditis, Pulmonary Embolism, Stroke etc).

Aim: Aim of the study is to evaluate the appropriateness of the cTnI assays in suspected ACS.

Materials and Methods: We have evaluated cTnI values (analytical sensitivity: 0.015 ng/ml; normal range: 0-0.045 ng/ml) during one month (August 2012) in 450 patients presenting to the emergency room of our hospital with typical or atypical chest pain, abdominal pain, dyspnoea, heart rhythm abnormalities or asthenia. All patients underwent a cardiological evaluation, ECG and echocardiogram. All STEMI were sent to the cath-lab without waiting for cTnI results.

Results: Among 450 patients, 321 (72%) showed cTnI values under 99th percentile, while 129 (28%) showed values out of range. These patients underwent a careful clinical and instrumental follow up to rule out ACS. Patients with cardiac symptoms and increased cTnI (93 out of 129) were studied with coronary angiogram or cardiac CT. An ACS was confirmed in 15 on 129 (12%) pts only, therefore 114 out of 129 (88%) should be considered false positive results.

Conclusions: The detection of elevated cTnI levels alone is not sufficient for a diagnosis of acute ACS, and requires a careful assessment of clinical presentation to determine the source and severity of myocardial damage. Nevertheless, our findings suggest the need for a re-definition of the current cut-off values of cTnI, a proper triage process and a more accurate medical evaluation at admission. The high number of false positive results triggers expensive cardiological examinations to rule out ACS.

O359

Prognostic role of eosinophilic cationic protein in patients with st-elevation myocardial infarction treated by primary percutaneous coronary intervention

Francesco Fracassi (a), Marco Roberto (a), Nicola Cosentino (a), Asiya Imaeva (c), Giancarla Scalone (a), Domenico Schiavino (b), Giampaolo Niccoli (a), Filippo Crea (a)

(a) *Institute of Cardiology, Catholic University of the Sacred Heart, Rome, Italy*, (b) *Department of Internal Medicine and Gastroenterology, Catholic University of the Sacred Heart, Roma,*, (c) *Department of Atherosclerosis, Cardiology Research Center, Moscow, Russia*

Background: Eosinophilic cationic protein (ECP), a marker of eosinophil activation, predicts clinical outcome in stable patients undergoing elective coronary stenting. The aim of this study was to evaluate the prognostic role of admission ECP serum levels in patients with ST-elevation myocardial infarction (STEMI).

Methods: Consecutive patients presenting with STEMI and undergoing percutaneous coronary intervention within 12 hours of symptoms onset were enrolled. Angiographic analysis, including thrombus score (TS), TIMI flow, Myocardial Blush Grade (MBG), and ST-segment resolution (STR)

analysis were done. Clinical follow up was performed in all patients after 24 ± 3 months and Major adverse cardiac events (MACE) rate was recorded, having as primary end-point the combined rate of non-fatal myocardial infarction, death for cardiovascular causes and target lesion revascularization. Serum levels of ECP were measured prior to percutaneous coronary intervention by enzyme-linked immunosorbent assay in all patients.

Results: 181 patients (63.5 ± 12.8 years; male sex, 85%) were enrolled in the study. ECP levels were higher [18.0 (12.5 - 27.9)] in patients with high TS (4 or 5) as compared to those with low TS (2 or 3) [4.3 (2.5 - 5.2), $p < 0.001$]. There were no significant correlations among levels of ECP and angiographic reperfusion index (TIMI, MBG) or STR. At univariate analysis patients with MACE had higher ECP levels as compared to those without MACE [18.0 (6.9 - 25.2) vs 10.7 (4.8 - 18.5), $p = 0.04$]. At multivariate logistic regression ECP levels were independent predictor of MACE (OR=1.55, CI 95%: 1.06-2.23, $p = 0.023$), along with diabetes (OR=1.37, CI 95%: 1.03-2.19, $p = 0.024$) and ejection fraction (OR=1.12, CI 95 %: 1.01-2.37, $p < 0.05$).

Conclusions: In patients with STEMI treated by primary PCI, admission ECP levels are associated with a high thrombus burden and predict clinical outcome after 2 years.

IPERTENSIONE ARTERIOSA

O360

Correlation between body mass index and blood pressure in 12000 Italian high school students

Francesco Adamo (a), Alessandra D'Ambrosi (a), Maria Chiara Gatto (a), Azzurra Marceca (a), Paola Scarparo (a), Antonio Fusto (a), Ilaria Mancini (a), Nicolò Salvi (a), Maria Giovanna Vassallo (a), Alessandra Cinque (a), Bruno Brasolin (a), Massimo Mancone (a), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari

Introduction: The prevalence of childhood obesity has increased dramatically in the last years. Obesity is a widespread public health problem associated with substantial morbidity, impairment and health care resource burden. Although the obesity plays an important role in the development of hypertension, dyslipidemia, metabolic syndrome, type 2 diabetes mellitus and cardiovascular diseases.

Methods: From October 2010 to March 2013 we have evaluated 12108 high school students (Age 17.9 ± 1.57 and 55.98% female). Cardiovascular risk factors were collected using a medical history questionnaire. All students underwent to blood pressure and body mass index evaluation. We have divided our population in four groups: 9165 normal weight (G-A, 75.69%), 1323 overweight (G-B, 10.93%), 240 obese (G-C, 1.98%) and 1380 underweight (G-D, 11.40%). The underweight is a another eating disorder so we excluded it. For statistical analysis we have used t test. The statistical difference was considered significant only for $p\text{-value} \leq 0.05$.

Results: We observed 280 (2.31%) students with hypertension, 472 (3.90%) with isolated systolic hypertension. However, in the G-B and in G-C systolic blood pressure value average were significantly higher than in the G-A (G-B 123.22 ± 10.62 vs G-A 118.59 ± 10.05 $p < 0.0001$ and G-C 126.81 ± 12.74 vs G-A 118.59 ± 10.05 $p < 0.0001$). Also, significant results were observed for the diastolic blood pressure (G-B 72.66 ± 9.62 vs G-A 70.35 ± 19.15 $p < 0.01$ and G-C 75.38 ± 8.89 vs G-A 70.35 ± 19.15 $p < 0.01$).

Conclusion: Our study shows that in young people the overweight and obesity are associated with an increase of systolic and diastolic blood pressure. Finally it is essential to advance knowledge of obesity prevention by identifying potentially modifiable risk factors.

O361

Sincope ortostatica, ipertensione arteriosa essenziale e copatologie

Alberto Cereda (a), Maria Rita Vecchi (b), Claudia Colombo (a), Silvia Mauri (a), Desiree Ribeca (a), Marisa Varrenti (a), Miriam Stucchi (a), Mattia Pozzi (a), Paola Campadello (a), Stefania Meregalli (c), Maurizio Lunati (b), Cristina Giannattasio (a, d)

(a) Università Milano-Bicocca, Dipartimento di Scienze della Salute, Milano, Italia, (b) Cardiologia III, Elettrofisiologia, Osp.Niguarda Ca' Granda, Dipartimento Cardioracovascolare De G, (c) Divisione di Neurologia, Osp.Niguarda Ca' Granda, Milano, Italia, (d) Cardiologia IV, Osp.Niguarda Ca' Granda, Dipartimento Cardioracovascolare De Gasperis, Milano.

Introduzione: L'ipotensione ortostatica è una frequente causa di sincope e può causare importante morbilità, disabilità e anche la morte, a causa del potenziale rischio di gravi lesioni. La sincope causata da ipotensione ortostatica (SO) ha molti aspetti in comune con quella causata da disfunzione autonoma per cui è difficile la diagnosi differenziale. Scopo del nostro studio è stato quello di analizzare gli aspetti clinico – epidemiologici dei pazienti con S. Ortostatica per evidenziarne le peculiarità.

Metodi: Abbiamo analizzato retrospettivamente i dati clinici di 277 pazienti affetti da sincope afferenti all'ambulatorio dedicato del nostro ospedale e valutati secondo le Linee Guida GIMSI

Risultati: 198 dei pazienti analizzati avevano avuto una S. Neuromediata (SN), 38 una S. Cardio – aritmica (SC) e 41 Ortostatica. Quelli con SO erano più anziani di quelli con SN (63 ± 15 aa vs. 49 ± 23 aa, $p=0.0001$), mentre non c'erano differenze d'età tra SO e SC (63 ± 15 aa vs. 65 ± 15 aa, ns). La prevalenza di ipertensione trattata era superiore nella SO (43%) rispetto a SN (15%) ed SC (13%, $P < 0.0002$). Dall'anamnesi emergeva che nel gruppo con SO, il 15% dei era diabetico, il 17% aveva avuto un pregresso Ictus e il 12% soffriva di Parkinson.

Conclusioni: Dai nostri dati emerge che la sincope ortostatica è particolarmente frequente in pazienti anziani ipertesi in terapia, affetti anche da comorbidità potenzialmente lesive per i meccanismi omeostatici riflessi. In questa popolazione è pertanto importante far diagnosi di ipotensione ortostatica ed essere cauti nell'uso dei farmaci antipertensivi.

O362

Aumento della durata del QRS e del QT in una coorte di pazienti affetti da ipertensione arteriosa resistente afferenti ad un centro specialistico di riferimento.

Giuliano Tocci (a, b), Chiara Rossi (a), Flaminia Canichella (a), Beniamino Pagliaro (a), Caterina Santolamazza (a), Andrea Ferrucci (a), Massimo Volpe (a, b)

(a) Centro Diagnosi e Cura Ipertensione Arteriosa, UOC Cardiologia, Dipartimento Medicina Clinica Moleco, (b) IRCCS Neuromed, Pozzilli (IS), Italia

Introduzione: Le alterazioni elettrocardiografiche possono essere frequenti nei pazienti affetti da ipertensione arteriosa resistente (RHT).

Obiettivi: Valutare la durata degli intervalli elettrocardiografici (PQ, QRS e QT) in una coorte di pazienti affetti da RHT.

Materiali e Metodi: Tutti i pazienti sono stati sottoposti ad elettrocardiogramma (ECG) convenzionale a 12 derivazioni, del profilo pressorio completo (pressione arteriosa [PA] domiciliare, clinica, ambulatoriale 24 ore). Gli intervalli elettrocardiografici (PQ, QRS, QT) sono stati calcolati automaticamente, mentre l'intervallo QT corretto (QTc) è stato calcolato secondo la formula di Bazet: $QTc = QT/\sqrt{RR}$. La diagnosi di RHT è stata definita per valori di PA al di sopra dei limiti considerati normali (140/90 mmHg) in pazienti in terapia almeno tre classi di farmaci, tra cui un diuretico, a dosaggio adeguato.

Risultati: Da una popolazione complessiva di 1,578 pazienti con ipertensione arteriosa afferenti al nostro centro, sono stati selezionati 666 pazienti (42.2%) in terapia antipertensiva stabile da almeno

1 anno, di cui 175 (26.3%) affetti da RHT (367 maschi, età media 60.4 ± 11.7 anni, indice massa corporea 27.4 ± 4.1 kg/m², PA clinica media $154.6 \pm 17.7/95.7 \pm 10.6$ mmHg, PA ambulatoriale 24 ore media $144.9 \pm 13.0/88.5 \pm 9.6$ mmHg). La durata dell'intervallo PQ non è risultata differente (164.4 ± 26.2 vs. 163.2 ± 25.9 msec; $P=0.62$), mentre la durata del complesso QRS è risultata maggiore nel gruppo di pazienti con RHT rispetto ai pazienti con ipertensione essenziale (106.0 ± 41.1 vs. 100.2 ± 26.4 ; $P=0.05$). Gli intervalli QT (397.1 ± 41.7 vs. 386.6 ± 34.1 msec; $P=0.003$) e QTc (441.4 ± 44.6 vs. 406.1 ± 21.9 msec; $P=0.05$) sono risultati essere aumentati nel primo gruppo rispetto al secondo. La durata dell'intervallo QTc è risultata correlata all'aumento della MVS indicizzata ($r: 0.116$; $P=0.026$).

Conclusioni: I risultati di questa analisi condotta in pazienti con diagnosi di RHT afferenti ad un centro specialistico di riferimento dimostrano un aumento della durata degli intervalli QRS e QT al tracciato ECG di base come possibili marcatori di danno d'organo cardiaco.

O363

Miglioramento del rimodellamento vascolare e della funzione endoteliale in topi knock-out per il gene della transglutaminasi 2 trattati con angiotensina II

Carmine Savoia (a), Emanuele Arrabito (a), Lidia Sada (a), Serena Michelini (a), Lorenzo Pucci (a), Martina Briani (a), Carmine Nicoletti (b), Eleonora Candi (c), Ernesto L Schiffrin (d), Massimo Volpe (a)

(a) *Divisione di Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza università di Roma*, (b) *DAHFMO-Unità di istologie e Med Embr, Sapienza università di Roma*, (c)

Dipartimento di Medicina Sperimentale e Chirurgia, Fac di Medicina Università di Roma Tor Vergata, (d) *LDI for Medical Research, SMB. Davis-Jewish General Hospital, McGill University, Montreal Canada*

La transglutaminasi 2 (TG2) favorisce il legame delle proteine della matrice extracellulare. Abbiamo precedentemente dimostrato che l'angiotensina II (Ang II) regola positivamente l'espressione di TG2 in cellule muscolari lisce vasali di ratti ipertesi. Nel presente studio abbiamo studiato se TG2 può contribuire al rimodellamento vascolare indotto da AngII.

Topi knock-out per TG2 (TG2-K/O, 8 settimane, $n=6$) e wild type (WT) di controllo sono stati trattati con AngII (400 ng/kg/min) per 14 giorni e confrontati con rispettivi gruppi non trattati. La pressione arteriosa (PA) è stata misurata con metodo "tail-cuff". La vasodilatazione endotelio-dipendente e -indipendente è stata valutata in risposta all'acetilcolina (1 nM- 100 μ M) \pm L-NAME (100 μ M) e sodio-nitroprussiato (10 nM- 1 mM), rispettivamente, su preparati pressurizzati di arterie mesenteriche precontratte con norepinefrina (10 μ M). Il rapporto media-lume vascolare (M/L) e l'area di sezione trasversa (CSA) sono stati valutati su preparati pressurizzati.

PA era più elevata in TG2-K/O rispetto ai WT (120.3 ± 1.3 mmHg vs 88.3 ± 1.9 mmHg, $p < 0.05$), AngII ha aumentato la PA solo nei WT ($+28\%$ vs WT non trattati, $P < 0.05$), non in TG2-K/O. La vasodilatazione indotta dall'acetilcolina era preservata in WT non trattati e nei TG2-K/O trattati e non trattati con AngII. Solo WT trattati con AngII hanno presentato ridotta vasodilatazione all'acetilcolina (-50% vs WT non trattati, $p < 0.05$). L-NAME ha ridotto la vasodilatazione acetilcolina-dipendente in tutti i gruppi ad eccezione di WT trattati con AngII, suggerendo una riduzione della produzione di NO. La vasodilatazione endotelio-indipendente era simile in tutti i gruppi. M/L era ridotto in TG2-K/O rispetto a WT ($4.8 \pm 0.3\%$ vs $6.5 \pm 0.2\%$, $p < 0.05$). AngII ha aumentato M/L solo in WT ($+13\%$ vs WT non trattati, $p < 0.05$). M/L è risultato invariato in TG2-K/O trattati con AngII. CSA era simile in tutti i gruppi.

In conclusione il rimodellamento vascolare è meno marcato in TG2-K/O, nonostante presentino valori più elevati di PA. AngII non ha ridotto la funzione endoteliale e incrementato M/L in TG2-K/O. TG2 è coinvolta nelle alterazioni strutturali e funzionali indotte dell'AngII nelle arterie di resistenza.

HIGHLIGHTS GIOVANI RICERCATORI – LAVORI INEDITI – SESSIONE 4

O364

Interaction between gender and left ventricular reverse remodelling predicts survival at very long (9 years) follow-up in heart failure patients candidates to cardiac resynchronization therapy

Stefania Sacchi (a), Alessandro Paoletti Perini (a), Alessio Lilli (b), Simone Bartolini (a), Paolo Pieragnoli (a), Giuseppe Ricciardi (a), Paola Attana` (a), Giuseppe Mascia (a), Andrea Giomi (a), Laura Perrotta (a), Martina Nesti (a), Luigi Padeletti (a)

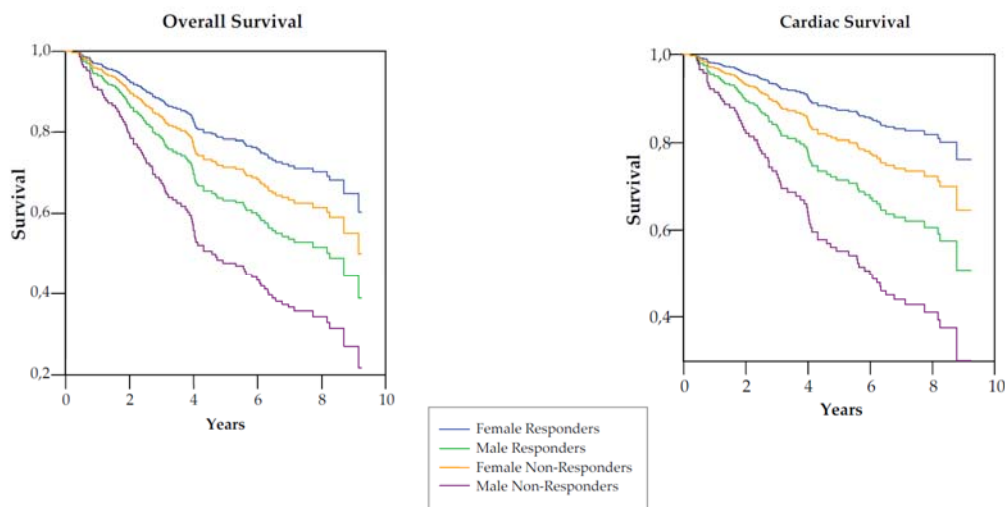
(a) Università degli Studi di Firenze - Dipartimento Cuore e Vasi, (b) Ospedale della Versilia, Viareggio - Unità Operativa di Cardiologia

Purpose: Cardiac Resynchronisation Therapy (CRT) reduces morbidity and mortality in heart failure patients. Left ventricular (LV) reverse remodelling and female gender are predictors of survival at mid-term Follow-Up (FU), but their interaction on long-term remains unknown. In this study we evaluated predictors of survival at very long-term (9 years) FU.

Methods: 189 consecutive CRT patients (38 females, 20%) had clinical and echocardiographic evaluation before implant and after 6 months. Responders were defined according to the percentage of reduction of LV End Systolic Volume (LVESV) from baseline to 6 month; 2 cut-offs (-10% and -25%) were evaluated. End-points of the study were overall and cardiac mortality.

Results: Overall survival at 1, 5 and 9 years, was 82%, 54% and 33%; median survival was 6.6 years. Female gender and reduction $\geq 25\%$ in LVESV were associated with higher overall and cardiac survival (log-rank test $p < 0.05$ for both). At Cox regression analysis, independent predictors of overall survival were female gender (HR 0.49), NYHA class (HR 0.63), age (HR 1.04) and reduction in LVESV $\geq 25\%$ (HR 0.64, $P < 0.05$ for all) but not reduction in LVESV $\geq 10\%$. Gender and LV reverse remodelling showed positive interaction in predicting survival (non responder-males vs responder-females HR 3.1, $P = 0.01$; for the whole regression model $P = 0.01$); interaction was stronger for cardiac death (HR 4.4, $P < 0.001$).

Conclusions: in CRT patients, gender, LV reverse remodelling at 6 months, age and functional status are predictors of survival at very long follow-up. Female gender and LV reverse remodelling show a positive interaction.



O365

Recombinant Alpha-1 antitrypsin protects the ischemic myocardium in the mouse

Carlo Marchetti (a), Eleonora Mezzaroma (a), Nicla Tranchida (a), Scott Rose (a), Benjamin Van Tassell (a), Tania Azam (b), Soohyun Kim (b), Charles Dinarello (b), Antonio Abbate (a), Stefano Toldo (a)

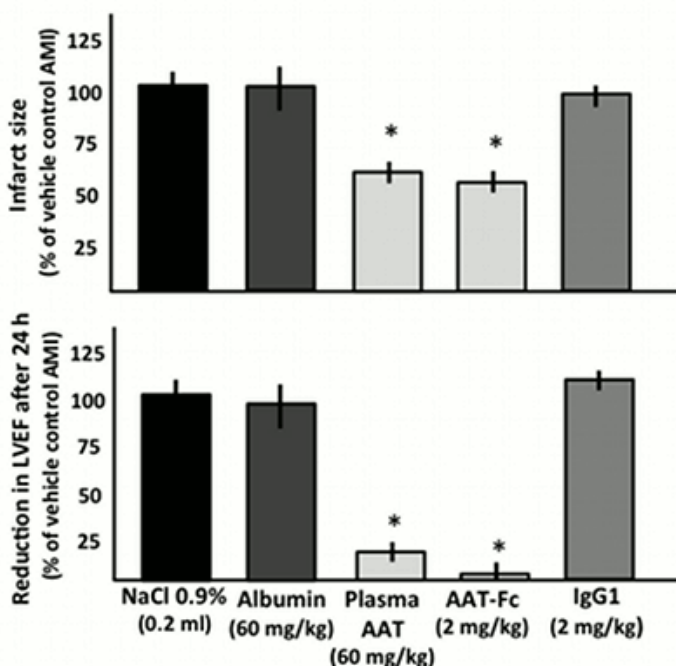
(a) Virginia Commonwealth University, (b) University of Colorado

Objectives: Alpha-1-antitrypsin (AAT) is a plasma protein, which inhibits neutrophil elastase and is available as a plasma-derivative therapeutic for AAT deficient patients. In experimental myocardial infarction (MI), plasma-derived AAT (pAAT) reduced ischemia-reperfusion (I-R) injury. Because the use of pAAT is hindered by limited supply, risk of viral transmission and degradation during the extensive isolation process, we evaluated a recombinant fusion protein composed of human AAT and human immunoglobulin (Ig) G1 Fc fragment (rAAT-Fc) in experimental MI.

Methods: Ten week old CD1 male mice underwent transient occlusion (30 min) of the left anterior coronary artery. rAAT-Fc (2 mg/kg) or pAAT (60 mg/kg) were administered (0.2 ml) upon reperfusion. NaCl 0.9% (0.2 ml), human i.v. IgG (2 mg/kg) or human albumin (60 mg/kg) were used as controls. After 24 hours, infarct size (tetrazolium chloride) and the caspase-1 activity was quantified in heart homogenates as a measure of the inflammatory injury to the heart. The left ventricular fractional shortening (LVFS) was measured by echocardiography at 24 hours and 7 days. A variant of rAAT-Fc lacking elastase inhibition activity was also tested.

Results: rAAT-Fc induced a dose-dependent reduction in infarct size and in caspase-1 activity in the heart tissue ($p < 0.05$ vs control; $p > 0.05$ vs pAAT, Figure). The effects on infarct size were reflected in a preservation of LV systolic function (LVFS) at 24 hours (Figure) and 7 days after a single administration. A modified rAAT-Fc without elastase inhibiting activity conferred comparable effects on infarct size, caspase-1 activity and LVFS ($p < 0.05$ vs control, $P > 0.05$ vs pAAT).

Conclusions: Recombinant AAT-Fc reduces inflammatory myocardial injury following ischemia-reperfusion in the mouse leading to preservation of viable myocardium and systolic function, independent of inhibition of neutrophil elastase.



O366

G protein-coupled receptors transfer by exosomes during pathological stress

Gianluigi Pironti (a, b), Giovanni Esposito (d), Howard A. Rockman (a, b, c)

(a) Department of Medicine, Duke University Medical Center, DUMC 3104, 226 CARL Building, Durham, NC 277, (b) Department of Cell Biology, Duke University Medical Center, Durham, NC 27710, USA., (c) Department of Molecular Genetics and Microbiology, Duke University Medical Center, Durham, NC 27710., (d) Dipartimento di Cardiologia, Università Federico II, Napoli via Pansini 5 80131 Napoli

Introduction: Recently it has been shown that exosomes play an important role in inter-cellular communication transferring mRNA, protein and microRNA between cells.

Hypothesis: Since GPCRs are key molecules in transmitting extracellular signals inside the cell, we have investigated whether exosomes may transport functionally competent GPCRs, as β 1AR and AT1R, from a donor to a target cell during following a pathologic stress.

Materials and Methods: Exosomes isolation was performed by ultracentrifugation of mice serum or Cell Culture Supernatant at 100.000 x g for 70 min and confirmed by T.E.M. analysis combined with immunogold labeling. To assess the presence of β 1AR or AT1R in exosomes, we used AT1R-HA over-expressing stable transfected cells and transgenic mice over-expressing Flag- β 1ARs in the heart (β 1AR Tg). Biochemistry analysis, confocal microscopy and radio β AR binding assays were performed to demonstrate the presence of β 1ARs and AT1Rs in the released exosomes and to evaluate the signaling after agonist stimulation.

Osmotic stretch was induced by adding double-distilled H₂O to the culture media at a ratio of 1:1 changing the osmolality from 285 to 147mosm/kg. Exosomes were isolated from sera of β 1AR Tg mice 1 week after transverse aortic constriction (TAC) and during control physiologic condition (Sham).

Results: Exosomes isolated from sera collected from TAC or Sham β 1AR Tg mice were transferred to the culture media of HEK 293 cells (recipient cells) and then analyzed by confocal microscopy. Flag- β 1ARs were consistently detected on the plasma membrane of HEK 293 cells after treatment with exosomes derived from TAC β 1AR Tg sera compared to Sham sera. Moreover, isoproterenol stimulation increased pERK and cAMP content in recipient 293 cells treated with exosomes derived from TAC β 1AR Tg consistent with the transfer of functionally competent β 1ARs.

In separate experiments, stably expressing AT1R HEK 293 cells underwent osmotic stretch to induce secretion of AT1R enriched exosomes. Using confocal microscopy detected transfer of AT1R enriched exosomes to recipient cells with evidence for functional competent AT1Rs after agonist stimulation as assessed by receptor internalization and activation of ERK signaling.

Conclusion: These findings suggest that pathologic stress such as pressure overload or osmotic stretch promotes release of microvesicles that contain functional competent β ARs and AT1Rs. Future studies will determine the in vivo consequences of exosome release into the circulation.

O367

Impatto delle ospedalizzazioni recenti sul trattamento e la prognosi degli STEMI

Alberto Vincenzo Pollina (a), Campo Gianluca (a), Tebaldi Matteo (a), Serenelli Carlotta (b), Roberto Ferrari (a)

(a) U.O. Cardiologia - Azienda Ospedaliero - Universitaria di Ferrara, (b) Dipartimento Cure Primarie, Azienda Sanitaria Locale di Ferrara

Background: In letteratura è noto che i pazienti con recente infarto miocardico acuto riammessi in ospedale per un intervento di chirurgia non cardiaca o per una complicanza emorragica hanno una prognosi peggiore. Meno nota è invece l'influenza che hanno recenti ospedalizzazioni sul trattamento dell'infarto con sopraelevazione del tratto ST (STEMI).

Obiettivo: Determinare la frequenza, le cause e l'impatto delle ammissioni ospedaliere nei 6 mesi precedenti a un ricovero per STEMI.

Metodi: Abbiamo incluso tutti i pazienti con STEMI sottoposti a PCI primaria dal Gennaio 2005 al Dicembre 2010, distribuiti in due gruppi a seconda che ci fosse stata una ospedalizzazione nei sei mesi precedenti o meno. Tutti i dati sono stati valutati e verificati da un revisore indipendente. Infine abbiamo analizzato i dati riguardanti mortalità, reinfarto, rivascolarizzazione coronarica (CR), scompenso cardiaco acuto/congestizio (HF) e sanguinamenti maggiori (SB) a un anno di follow-up dallo STEMI.

Risultati: complessivamente la popolazione oggetto di studio era di 1327 pazienti. Il 7% (n=92) era stato ospedalizzato nei 6 mesi precedenti lo STEMI; nel 31% (n=29) la causa del ricovero era di tipo cardiaco (14 SCA, 9 HF, 3 aritmie e 3 CR), mentre nel 72% (n=66) era di tipo non cardiaco (65% chirurgia, 11% sanguinamento gastro-intestinale, 24% per altre cause). Questi 92 pazienti erano più anziani (età media 72 ± 10 vs 66 ± 12 , $p < 0.01$) e con maggiore incidenza di precedenti eventi cardiovascolari. Al momento della procedura di PCI avevano una minore probabilità di ricevere inibitori delle Gp IIb/IIIa (39% vs 63%, $p < 0.01$), l'accesso radiale era meno usato (41% vs 54%, $p = 0.02$), meno frequentemente veniva impiantato uno stent (89% vs 95%, $p < 0.01$) e raramente si trattava di uno stent medicato (26% vs 43%, $p < 0.01$). La mortalità a un anno di questo sottogruppo di pazienti era più elevata (19% vs 10%, $p = 0.01$). I pazienti con ospedalizzazione per causa cardiaca prima dello STEMI erano più spesso ricoverati per SCA (48%). I pazienti con ospedalizzazione per causa non cardiaca prima dello STEMI erano più spesso ricoverati per interventi chirurgici (65%). All'analisi multivariata l'ospedalizzazione nei 6 mesi antecedenti allo STEMI emergeva come predittore indipendente di mortalità (HR 1.15, 95%CI 1.1-1.2, $p < 0.01$).

Conclusioni: I nostri dati sottolineano come i pazienti con STEMI con in anamnesi una recente ospedalizzazione siano un sottogruppo ad elevato rischio di maggiore mortalità e eventi avversi maggiori. Questo è indipendente dalle comorbidità e dalla causa della recente ospedalizzazione (cardiaca vs. non cardiaca).

O368

Athletes with prolonged QT interval: is QT hysteresis analysis a useful method to distinguish healthy athletes from LQTS patients?

Elena Gribaudo (a), Carla Giustetto (a), Chiara Scrocco (a), Natascia Cerrato (a), Elisabetta Toso (a), Marco Levetto (b), Giuseppe Parodi (b), Fiorenzo Gaita (a)

(a) Divisione di Cardiologia, Dipartimento di Scienze Mediche, Università di Torino, (b) Istituto di Medicina dello Sport, ASL TO1, Torino

Background: Competitive athletes have often a prolonged QT interval. Currently, genetic test is used to distinguish healthy athletes from LQT1 and LQT2 patients, but it is expensive, it takes a long timeline and it is negative in about 30% of cases with clinical diagnosis of long QT Syndrome.

Objectives: The aim of this study was to evaluate whether the trend of QT hysteresis could be used as a new diagnostic method to distinguish healthy athletes from LQTS subjects and, in these patients, to hypothesize the type of gene involved (LQT1, LQT2).

Methods: Four groups of subjects were created. LQT1: 6 subjects (3 males, mean age 24 ± 13 years) with prolonged QT interval at rest ECG (QT: 510 ± 67 ms) and positive genotype (KCNQ1 mutation). LQT2: 5 subjects (2 males, mean age 20 ± 3 years) with prolonged QT interval (QT: 490 ± 56 ms) and positive genotype (KCNH2 mutation). ATHLETES (ATH): 6 competitive sport athletes (5 males, mean age 15 ± 3 years) who were sent for further investigations from the Sport Medicine Institute after the recognition of a prolonged QT interval at basal ECG (QT: 480 ± 52 ms) or during exercise test; all of them had a negative genotype. Any group was compared with a control group (CTRL) with normal QT interval at resting ECG: CTRL_{LQT1/2} consisted of 19 subjects (10 males mean age 18 ± 5 years); CTRL_{ATH} consisted of 16 athletes (8 males, 16 ± 3 years).

All subjects underwent treadmill exercise test according to Bruce protocol. Hysteresis was calculated subtracting the QT interval measured at 80, 100 and 120 beats/min during exercise from the QT interval at the same heart rate (HR) into the recovery phase. QT and QTc values were expressed as mean \pm standard deviation and compared using Student's t test.

Results: In LQT1 group the QT hysteresis resulted to be significantly greater compared to CTRL group at all HR considered ($p < 0.001$ at 80, 100 and 120 bpm). Also in LQT2 group the QT hysteresis was significantly different from that of the CTRL ($p < 0.001$ at all the HR considered). There was also a significant difference in QT hysteresis between LQT1 and LQT2 groups at all HR considered ($p < 0.01$). Moreover the QT hysteresis in the LQT2 group had a positive value differently from that of all the other groups, in which it had a negative value. In ATH groups the QT hysteresis behaviour was similar to the CTRL group ($p = \text{NS}$ at all the HR considered). The QT hysteresis was significantly different between LQT1 and ATH groups at 100 and 120 bpm ($p = 0.05$ and $p = 0.02$). It was also different between LQT2 and ATH groups at all HR considered ($p < 0.03$).

Conclusions: Our results show that the QT hysteresis analysis allows to distinguish healthy athletes with prolonged QT interval from LQT1 and LQT2 patients, and LQT1 from LQT2 patients.

| GROUPS | Hysteresis at 120 | | Hysteresis at 100 | | Hysteresis at 80 | |
|------------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|
| | QT | QTc | QT | QTc | QT | QTc |
| LQT1 | -73.3 \pm 39.3 | -100.0 \pm 45.3 | -70.0 \pm 25.8 | -90.3 \pm 33.2 | -80.0 \pm 43.6 | -88.0 \pm 47.6 |
| LQT2 | +62.0 \pm 17.9 | +91.2 \pm 25.1 | +102.5 \pm 20.6 | +132.3 \pm 26.8 | +95.0 \pm 7.1 | +109.5 \pm 7.8 |
| ATHLETES | -26.7 \pm 12.1 | -35.3 \pm 2.7 | -26.7 \pm 5.3 | -32.5 \pm 6.8 | -20.0 \pm 28.3 | -14.5 \pm 16.3 |
| CTRL _{LQT1/2} | -30.5 \pm 13.9 | -43.3 \pm 19.7 | -36.3 \pm 12.1 | -47.2 \pm 15.7 | -32.9 \pm 12.7 | -35.3 \pm 17.2 |
| CTRL _{ATH} | -32.5 \pm 14.4 | -46.0 \pm 20.4 | -35.6 \pm 13.1 | -46.3 \pm 17.1 | -31.7 \pm 13.4 | -33.7 \pm 18.0 |

Table 1: QT and QTc hysteresis at 120, 100 and 80 bpm.

O369

Monocyte-Platelets Aggregates as Cellular Biomarker of Endothelium-dependent Coronary Vasomotor Dysfunction in Patients with Stable Coronary Artery Disease

Luigi Di Serafino (a), Karen Dierickx (a), Ioannis Ntarladimas (a), Stylianos A. Pyxaras (a), Leen Delrue (a), Bernard De Bruyne (a), William Wijns (a), Emanuele Barbato (a), Jozef Bartunek (a)

(a) Cardiovascular Center Aalst OLV Clinic – Aalst (Belgium)

Background: Monocytes-Platelets Aggregates (MPA) levels have been studied as cellular biomarker of in vivo platelet activation and found increased in patients with peripheral endothelial dysfunction and acute coronary syndrome. We investigated whether MPA levels are related to the functional significance of stable coronary lesions or endothelial-dependent coronary vasomotor function.

Methods and Results: 145 patients undergoing elective coronary angiography were prospectively enrolled. All patients underwent fractional flow reserve (FFR) measurement to assess the functional significance of coronary stenosis as a surrogate of inducible myocardial ischemia. Thirty randomly selected patients underwent pacing protocol to evaluate coronary endothelium-dependent vasomotor function. Whole blood was drawn before heparin administration and MPA levels were assessed at flow-cytometry. Patients were grouped according to the presence of inducible myocardial ischemia in the FFR + group (n=75) and FFR – group (n=70). In the FFR + group, platelets showed only a trend for an increased propensity to form aggregates with monocytes as compared with patients in the FFR – group (%MPA: FFR+ = 38.1 [25.7-56.6] vs FFR – = 34.0 [20.5-49.9], $p = 0.08$). Moreover, MPA levels did not significantly correlate with the extent of the coronary atherosclerosis. Of note, pacing induced coronary vasomotion response was similar in FFR+ and FFR- group of patients (%change in vessel diameter: 7.19% [6.01-10.9] vs 8.0% [0.81-9.80], $p = 0.78$). Yet, in patients with paradoxical vasoconstrictor response, MPA levels were significantly higher as compared to patients

with preserved endothelium-dependent vasomotion (28.3% [28.8-53.4] vs 20.5% [17.0-32.9], respectively, $p=0.01$). In addition, MPA levels inversely correlated with endothelium dependent vasomotor response as assessed from the relative change in the vessel diameter ($R^2=0.26$, $p<0.01$).

Conclusions: MPA levels were not related to the presence of functional significant coronary artery stenosis. In contrast, they were significantly higher in patients with abnormal coronary endothelial vasomotor response regardless of the presence of functionally significant coronary artery stenosis.

MIOCARDIOPATIE: SCIENZE DI BASE 2

O370

Functional screening identifies microRNAs inducing cardiac regeneration

Serena Zacchigna (a), Ana Eulalio (a), Miguel Mano (a), Matteo Dal ferro (b), Lorena Zentilin (a), Giulia Felician (a), Andrea Nordio (b), Gianfranco Sinagra (b), Mauro Giacca (a)

(a) *Molecular Medicine Laboratory, International Centre for Genetic Engineering and Biotechnology (ICGEB)*, (b) *Cardiovascular Department, Ospedali Riuniti and University of Trieste, Trieste, Italy*

In mammals, embryonic development of the heart depends on the increase in cardiomyocyte number, but shortly after birth cardiac myocytes stop proliferating and further growth of the myocardium occurs through hypertrophy of existing cardiomyocytes. The actual capacity of the mammalian heart to regenerate following injury is controversial. Several microRNAs - evolutionarily conserved small noncoding RNAs that regulate gene expression - have been implicated in different aspects of heart function and dysfunction, though only a few of them have been shown to control of cardiomyocyte proliferation, all exerting a negative role.

Here, we assessed the hypothesis that microRNAs may actively control cardiomyocyte proliferation in heart development and disease.

We performed a high-content, fluorescence microscopy-based high-throughput screening in rat neonatal cardiomyocytes using a library of microRNA mimics corresponding to all the annotated microRNAs (~1000 microRNAs). Proliferation was assessed combining different read-outs: EdU incorporation, Ki-67 expression, histone H3 phosphorylation and AuroraB-kinase localization to mid-bodies. The best candidates were tested *in vivo* by both injecting the synthetic microRNA intracardiacaally into the heart of newborn rats ($n=10$) and by delivering their coding sequence using AAV9 vectors intraperitoneally into neonatal mice ($n=10$) and into the infarct border zone after ligation of the coronary artery in adult mice ($n=30$), followed by histological, morphological and echocardiographic analysis.

We identified 38 microRNAs able to increase cardiomyocyte proliferation by at least 3-fold. Two of these microRNAs also induced proliferation of cardiomyocytes in normal hearts (0.15 ± 0.02 and 0.80 ± 0.08 EdU+ cells in miRNA-expressing and control hearts) and after myocardial infarction, resulting in significantly reduced scar size ($14.2\pm 1.5\%$ and $27\pm 2\%$ of the left ventricle) and improved cardiac function (ejection function at 60 days: $59\pm 2\%$ and $38\pm 6\%$ in miRNA-expressing and control hearts). Adult cardiomyocyte culture and *in vivo* fate mapping experiments indicate that these miRNAs directly act on differentiated cardiomyocytes, triggering partial disassembly of their cytoskeleton and re-entering into cell cycle.

In conclusion, the induction of cardiomyocyte proliferation *in vivo* by modulation of specific microRNAs might prompt the development of novel, exciting therapies against ischemic cardiomyopathy and heart failure.

O371

VEGF-releasing PLGA microspheres prevent apoptosis through the PI3-kinase/Akt axis and induce angiogenesis of adipose tissue-derived mesenchymal stromal cells

Rosalinda Madonna (a), Claudia Montero-Menei (b), Jean-Pierre Karam (b), Claudio Muscari (c), Maria Anna Teberino (a), Raffaele De Caterina (a)

(a) Institute of Cardiology, “G. d’Annunzio” University – Chieti, Italy, (b) INSERM U 1066, Laboratoire d’Ingénierie de la Vectorisation Particulaire, Université d’Angers, Anger, (c) Department of Biochemistry University of Bologna, Italy

Background: The success of tissue engineering implant relies on the ability of the scaffold to guide cell engraftment and vessel ingrowth into the ischemic tissue. Transplanted cells must be kept surviving in the hostile microenvironment to support tissue regeneration. Vascular endothelial growth factor (VEGF) is a potent angiogenic and anti-apoptotic factor, which may facilitate the engraftment of transplanted cells and guide angiogenesis.

Aim: To realize poly (lactide-co-glycolide) (PLGA) pharmacologically active microspheres (PAM) able to release VEGF and assess their ability to promote angiogenesis and prevent apoptosis of adipose tissue-derived mesenchymal stromal cells (AT-MSCs).

Methods and Results: Non-functionalized (empty) PAM or VEGF-loaded PAM were produced and coated with MSCs isolated from rat peri-epididimal AT at increasing cell : PAM concentrations. The release of VEGF from PAM occurred at a maximum rate of 0.7 ng/day per mg of PAM. The best ratio of adhesion was 4×10^4 cells per 0.5 mg of PAM. Cell-proliferation increased three fold after coating with VEGF-loaded PAM compared with AT-MSCs alone and AT-MSCs coated on empty PAM, while the adipogenic and osteogenic differentiation of AT-MSCs was unchanged. MTT analysis and cleaved caspase-3 expression (immunoblotting) revealed that AT-MSCs alone, and - to a higher extent the AT-MSCs coated on VEGF-loaded PAM - exhibited high resistance toward H_2O_2 -induced apoptosis, and this effect was dependent by VEGF/Akt axis since reverted by pre-incubation with Akt inhibitor LY294002 or anti-VEGF receptor antibody (Figure 1, panel A-B). PAM-VEGF enhanced AT-MSC tubulization in a Matrigel assay as compared with AT-MSCs alone or AT-MSCs coated on empty PAM (n=3 independent experiments, $P < 0.01$ vs controls, Figure 1, panel C).

Conclusions: VEGF-loaded PAM coated with AT-MSCs may have therapeutic applications for enhancing angiogenesis and AT-MSC survival in harmful microenvironment of post-ischemic tissues.

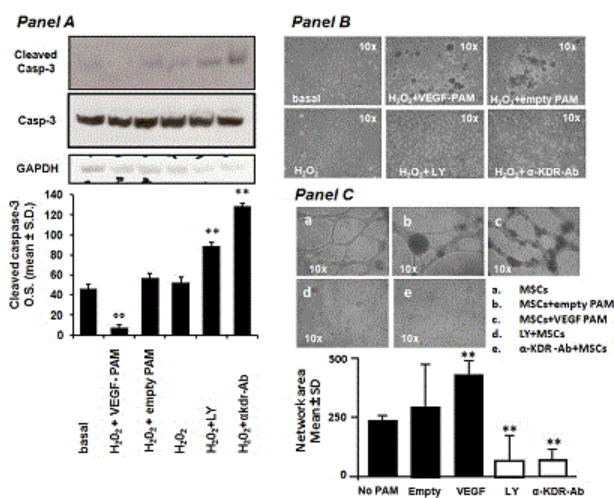


Figure 1

O372

La variante t2238c del gene dell'anp e il rischio di recidiva di infarto miocardico in una coorte italiana di pazienti con cardiopatia ischemica instabile. Uno studio retrospettivo.

Speranza Rubattu (a, b, c), Marco De Giusti (a), Alessio Farcomeni (d), Sebastiano Sciarretta (a), Sofia Abbolito (b), Filomena Comito (b), Sara Cangianiello (b), Ettore Greco Squillace (b), Eleonora Dito (a), Beniamino Pagliaro (a), Maria Cotugno (c), Simona Marchitti (c), Franca Bianchi (c), Sara Di Castro (c), Rosita Stanzone (c), Allegra Battistoni (a), Simone Burocchi (a), Massimo Caprinuzzi (a), Massimo Volpe (a, b, c)

(a) Dipartimento di Medicina Clinica e Molecolare, Facoltà di Medicina e Psicologia, Università Sapienz, (b) UOC Cardiologia, Ospedale S.Andrea, (c) IRCCS Neuromed, (d) Dipartimento di Sanità Pubblica e Malattie Infettive, Università Sapienza di Roma

Obiettivo: La variante T2238C del gene dell'ANP umano determina la sintesi di una forma modificata di α ANP che, attraverso l'attivazione del recettore NPR-C, contribuisce al danno ed alla disfunzione endoteliale. Il ruolo della variante T2238C/ANP come fattore di rischio predisponente ad eventi cardiovascolari acuti è stato precedentemente riportato in distinte popolazioni umane.

L'obiettivo del presente studio è stato di valutare, mediante un approccio retrospettivo, l'impatto dell'allele minore (MA) C2238/ANP sul rischio di recidiva di infarto miocardico (re-IMA), in una coorte italiana di pazienti con cardiopatia ischemica instabile.

Disegno dello studio e metodi: A questo scopo, 365 pazienti affetti da cardiopatia ischemica (maschi=80,5%; età media=61.8±10 anni), che presentavano un primo episodio di sindrome coronarica acuta e venivano successivamente seguiti con regolari controlli clinici per un periodo massimo di 26 anni, sono stati reclutati retrospettivamente. L'outcome cardiovascolare è stato analizzato e confrontato tra soggetti portatori e soggetti non portatori dell'allele minore C2238/ANP-MA.

Risultati: L'analisi multivariata ha rivelato che la dislipidemia ($p=0.01$) e lo stato di portatore della variante allelica C2238/ANP-MA ($p<0.05$), erano entrambi significativamente ed indipendentemente associati ad un aumentato rischio di re-IMA. Come previsto, le terapie con cardioaspirina e beta-bloccanti sono risultate significativamente associate ad un ridotto rischio di re-IMA ($p<0,02$).

Soggetti portatori della variante allelica C2238/ANP-MA, in particolare quelli di età superiore ai 55 anni, hanno mostrato episodi più precoci di infarto miocardico al follow-up (HR=1,43, IC: 1.066-1.911, $p=0,017$). La concomitante presenza di sindrome metabolica ha agito come fattore sinergico aumentando ulteriormente il rischio (HR=3,17, IC: 1,061-9,446, $p=0,038$). Le curve di sopravvivenza hanno confermato un aumento significativo del numero di eventi acuti coronarici nei pazienti portatori di C2238/ANP-MA ($p=0.03$).

Conclusioni: I risultati del nostro studio dimostrano che lo stato di portatore dell'allele minore per la variante T2238C del gene ANP umano rappresenta un fattore di rischio indipendente per re-IMA e deve essere considerato come un fattore prognostico negativo nei pazienti con cardiopatia ischemica instabile.

O373

Remote ischemia enhances balloon injury-induced endothelial dysfunction and neointimal area in rat carotid arteries: the role of miR-16

Sabato Sorrentino (a), Claudio Iaconetti (a), Alberto Polimeni (a), Jolanda Sabatino (a), Clarice Gareri (a), Annarita Carino (a), Francesco Passafaro (a), Maria Colangelo (a), Caterina Covello (a), Alessandra Carvelli (a), Filomena Caria (a), Andrea Tavernese (a), Antonio Curcio (a), Daniele Torella (a), Salvatore De Rosa (a), Ciro Indolfi (a)

(a) *Laboratorio di cardiologia molecolare e cellulare. Università Magna Graecia, Catanzaro*

Background: Peripheral artery occlusive disease is associated, in humans, with endothelial dysfunction in the coronary district, representing an important predictor of future cardiovascular events. Preliminary results from our group show that chronic peripheral ischemia enhances the vascular response to injury in rat carotid arteries. Several microRNAs (miRs) are involved in the regulation of vascular remodelling. MiR-16 regulates the proliferation of mesenchymal stem cells in pre-eclampsia in response to hypoxia and their modulation affects proliferation of EC in response to VEGF. Thus, the aim of the present study was to evaluate the role of miR-16 in mediating the vascular response to injury in a rat model of peripheral ischemia.

Methods: Proliferating endothelial cells were identified by using a monoclonal antibody kit (Roche) for the detection of bromodeoxyuridine (BrdU) incorporation into cellular DNA. Endothelial cell apoptosis was induced by H₂O₂ and measured by TUNEL assay. Inhibition of miR-16 resulted in increased endothelial cell proliferation and decreased apoptosis. Wistar male rats, were divided into the following groups: no treatment (sham); balloon injury on the carotid artery (BI); femoral artery ligation (AL); ligation of the femoral artery followed, after 21 days, by balloon injury of the carotid artery (AL+BI). At 21 days, real time RT-PCR showed a profound up-regulation of miR-16 levels within ECs extracted from the injured carotid artery of the AL+BI group compared to the BI group. The process of restenosis was assessed by immunohistochemical assay for hematoxylin-eosine.

Results: Mir-16 is constitutively expressed in both VSMCs and ECs from the rat carotid artery in basal conditions. A down-regulation of miR-16 levels was observed after balloon injury, which was more pronounced in the AL+BI group compared to the BI group, with an inverse effect on neointimal area. Interestingly miR-16 levels were up-regulated in ECs from the rat carotid artery after balloon-injury. Moreover, expression levels of miR-16 were higher in ECs from rats of the AL-BI group compared to rats receiving the sole BI procedure (10-fold increase over BI carotid group) suggesting that the presence of peripheral ischemia exerts a long-distance effect on ECs. Since the up-regulation of miR-16 was associated with the specific activation of the RhoA pathway, we sought for potential targets of miR-16 within this pathway. Through a bioinformatics approach, we could find highly conserved binding sites for miR-16 in the 3'UTR of ARHGDI1 (Rho-GDP dissociation inhibitor 1), an inhibitor of Rho signalling. Interestingly up-regulation of miR-16 was associated with a reduction of the ARHGDI1-transcript levels and a consequently higher activation of the RhoA pathway, with final effect of lower nitric oxide bioavailability. Accordingly, inhibition of miR-16 in ECs resulted in increased mRNA and protein levels of eNOS, with augmented NO production, while up-regulation of miR-16 resulted in increased NF-κB activation.

Conclusions: The expression levels of miR-16 are regulated in cells from the vascular wall in response to balloon injury. In particular, a downregulation of miR-16 in VSMCs is associated with a larger neointimal area after balloon injury in rats with peripheral ischemia, while its upregulation in ECs is responsible for the enhancement of balloon injury-induced endothelial dysfunction in rats with peripheral ischemia. The present results disclose a new regulatory mechanisms mediating vascular response to injury, providing additional targets for novel therapeutic strategies for the modulation of vascular remodelling.

O374

Apelin induces Tissue Factor expression in human umbelical vein endothelial cells

Francesca Ziviello (a), Grazia Pellegrino (a), Fabio Maresca (a), Vito Di Palma (a), Michele Bevilacqua (a), Stefano Conte (b), Vittorio Tagliatela (a), Plinio Cirillo (a), Bruno Trimarco (a)

(a) Department of Advanced Biomedical Sciences, Division of Cardiology, Federico II University, Naples, (b) Cardio-Thoracic and Respiratory Sciences, Second University of Neaples

Introduction: Adipocytes are nowadays recognized as cells able to produce and secrete a large variety of chemical mediators known as adipocytokines. Several evidences indicate that adipocytokines have direct effects on vascular cells. Although some adipocytokines have been extensively studied, many others are still poor investigated. Apelin is a recently identified adipokine not yet completely characterized for its pathophysiological role in cardiovascular disease. Increased levels of Apelin are measurable in the plasma of patients with coronary artery disease and specifically in those with acute coronary syndromes. Several studies have indicated that Tissue Factor (TF) plays a pivotal role in the pathophysiology of acute coronary syndromes by triggering the formation of intracoronary thrombi following endothelial injury. Aim of the present study was to investigate the effects of Apelin on TF in human endothelial cells.

Methods: Human Umbilical Vein Endothelial Cells (HUVECs) were stimulated with Apelin in a concentration range usually measurable in plasma of patients with acute coronary syndromes (10^{-10} M - 10^{-5} M) and then processed to evaluate TF-mRNA levels as well as TF expression by quantitative real-time RT-PCR and Immunoblot techniques, respectively. HUVEC stimulated with LPS (50 μ g/ml) served as positive control.

Results: We demonstrate that Apelin induces transcription of mRNA for TF (Figure 1). In addition, we show that this adipokine promotes expression of TF (Figure 2).

Conclusions: Data of the present study, although *in vitro*, indicate that Apelin, at doses measurable in plasma of patients with acute coronary syndromes, induces a procoagulant phenotype in human umbilical vein endothelial cells by promoting TF expression. These observations support the hypothesis that this adipokine might play a relevant role as an active partaker in athero-thrombotic disease.

Figure 1

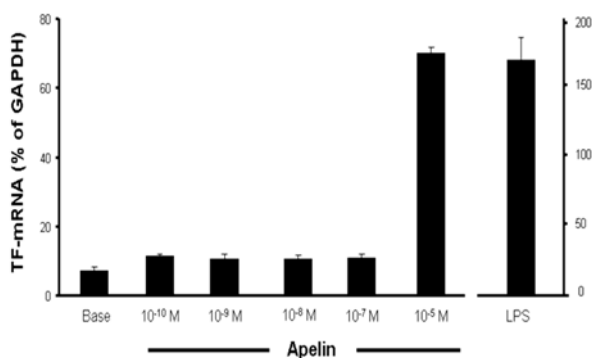
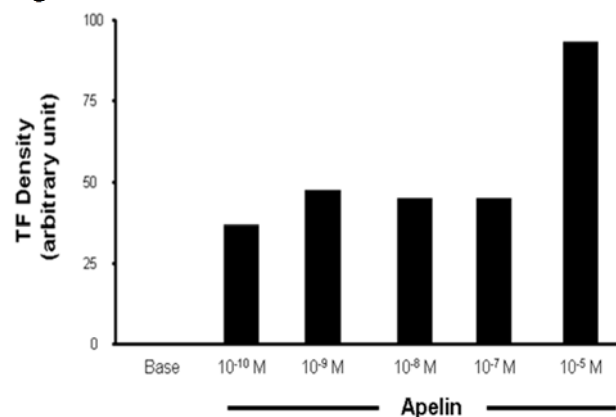


Figure 2



O375

Immune modulation by regulatory t cells preserves cardiac function and promotes cardiomyocyte proliferation after myocardial infarction

Andrea Nordio (b), Serena Zacchigna (a), Marco Anzini (b), Valentina Martinelli (a), Mauro Sturnega (a), Gianfranco Sinagra (b), Mauro Giacca (a)

(a) Molecular Medicine Laboratory, International Centre for Genetic Engineering and Biotechnology (ICGEB), (b) Cardiovascular Department, "Ospedali Riuniti" and University of Trieste, Italy

Background: In mammals, myocardial infarction triggers an inflammatory reaction that eliminates dead cells and forms a reparative scar. Evidence from various animal models, in which the immune response is variably impaired, suggests that suppression of inflammation may negatively interfere with scar formation, while allowing cardiomyocyte proliferation. Here we exploit different strategies to modulate the activation of the immune system after myocardial infarction, and in particular of the regulatory T cells (T-regs), and to evaluate the consequences of this modulation on myocardial infarction outcome.

Methods: Coronary artery ligation was performed to generate myocardial infarction into the following mouse strains (n = 8): C57BL/6, FVB and CD1 wild type mice (used as immunocompetent control mice), Athymic Nude-Foxn1nu mice (T cell-deficient), Fox Chase SCID mice (T and B cell-deficient), Fox Chase SCID BEIGE mice (T, B and NK cell-deficient), DEREK mice (expressing EGFP under the control of the T-reg-specific Foxp3 promoter), α -coll mice (in which EGFP expression is driven by the α -collagen promoter in fibroblasts). In some of these strains we specifically depleted T-regs by repeated injection of an anti-CD25 antibody (n=10). In parallel, we also injected EGFP+ T-regs, sorted from the lymph nodes of EGFP transgenic mice, in the border region of the infarct, immediately after coronary artery ligation (n=10). Myocardial function was evaluated over time by echocardiography. Cell proliferation was evaluated by repeated injection of EdU after infarction. Morphometric and immunophenotypic analysis of the scar, as well as of the border region, was performed at the end of each study. Frozen heart samples were also harvested at the end of the study to perform RT-PCR using Taqman probes.

Results: We found that immunodeficient mice performed better in terms of contractility relative to immunocompetent mice (contractility index: 5.0 ± 0.6 , 7.0 ± 1.1 , 6.1 ± 0.4 , 6.9 ± 0.7 in control, nude, SCID and SCID BEIGE mice, respectively). In accordance, injection of EGFP+ T-regs, which persisted in the heart for at least 1 week after injection, also reduced infarct size and preserved cardiac contractility after infarction (EF at 1 month: $35 \pm 6\%$ in control mice and $55 \pm 11\%$ in T-reg-injected mice). On the other hand, T-reg depletion resulted in depressed cardiac function (EF at 1 week: $55 \pm 6\%$ in control mice and $42 \pm 8\%$ in T-reg-depleted mice), increased infarct size ($18 \pm 4\%$ in control mice and $44 \pm 7\%$ in T-reg-depleted mice) increased number of major events (such as aneurysms, cardiac ruptures and deaths); histological analysis revealed that T-reg depletion resulted in increased inflammatory infiltration of the infarcted tissue (CD45+ cells: $8 \pm 4\%$ in control mice and $25 \pm 7\%$ in T-reg-depleted mice), as well as in a decreased number of fibroblasts (EGFP+ cells in α -coll mice: $60 \pm 9\%$ in control mice and $40 \pm 5\%$ in T-reg-depleted mice). Of notice, close to the site of T-reg injection, we observed a significantly increased number of EdU+ proliferating cardiomyocytes. Consistent with the functional effect exerted by T-reg depletion and injection, we observed that endogenous T-regs were recruited into the ischemic region very early after infarction (in DEREK mice), and that this recruitment was paralleled by increased expression of Foxp3, TGF- β and IL-10 (markers of T-regs), as well as of IL-2, the main T-reg chemoattractant.

Conclusions: Modulation of the immune system, and in particular local suppression of the immune system by T-reg activation at the site of myocardial infarction, improves cardiac function, protects from major cardiac events and stimulates cardiomyocyte proliferation.

O376

Uno specifico cluster di microrna regola l'esagerata risposta vasculoproliferativa dopo angioplastica sperimentale nei ratti diabetici

Christelle Correale (a), Carla Vicinanza (a), Roberta Tarallo (b), Giorgio Giurato (b), Iolanda Aquila (a), Mariangela Scalise (a), Fabiola Marino (a), Angelo Leone (a), Walter Sacco (a), Antonio Curcio (a), Georgina M. Ellison (c), Gianluigi Condorelli (d), Alessandro Weisz (b), Daniele Torella (a), Ciro Indolfi (a)

(a) *Institute of Cardiology, Magna Graecia University, Catanzaro, Italy*, (b) *Laboratory of Molecular Medicine and Genomics, University of Salerno, Salerno, Italy*, (c) *Department of Human Physiology, King's College London, London, UK*, (d) *National Research Council (CNR), Milan, Italy*

La prevalenza nel mondo del Diabete Mellito raggiungerà circa 300 milioni di persone entro il 2025, e più di tre quarti della mortalità nei pazienti con Diabete sarà causata dalle malattie cardiovascolari. E' noto che i pazienti diabetici hanno un'eccessiva morbilità e mortalità per malattia coronarica e in seguito ad interventi di rivascolarizzazione coronarica percutanea (PCI). I meccanismi che portano al rimodellamento vascolare dopo danno vasale, peggiore nei pazienti diabetici non sono completamente compresi. I microRNA (miR) sono una classe di piccoli RNA regolatori, noti per regolare più della metà dei trascritti genomici. Recentemente un gruppo di miR è stato riconosciuto come modulatore di programmi genetici chiave nella biologia, fisiologia e patologia vascolare. Tuttavia, poco si sa sulla regolazione dei miR sul rimodellamento vascolare nel Diabete Mellito. Pertanto, nel presente studio abbiamo valutato il profilo dei miR vascolari in animali di controllo non diabetici e negli animali con diabete di tipo 1 e di tipo 2. In Ratti Wistar maschi è stata somministrata Streptozotocina (100 mg/kg i.p.) per indurre diabete di tipo 1 e l'iperglicemia è stata trattata mediante somministrazione di Insulina (3 UI/due volte al giorno). Gli animali con livelli di glucosio costantemente superiori a 300 mg/dl (prima della somministrazione di Insulina) per 4 settimane consecutive sono stati arruolati nello studio come gruppo diabete di tipo 1 (DM-1). Ratti Zucker sono stati utilizzati come modello animale di diabete di tipo 2 (DM-2). Infine, ratti non diabetici, di uguale razza età e peso sono stati utilizzati come controllo (CTRL). Alcuni animali sono stati sacrificati al tempo 0 (baseline) e altri sottoposti ad angioplastica carotidea con palloncino 2F Fogarty per essere poi sacrificati dopo 2 o 14 giorni. Sono state asportate le carotidi destre sane o danneggiate e congelate per l'estrazione di mRNA e di proteine o fissate in formalina per l'istologia e l'immunoistochimica. Il Profilo dei miR e degli mRNA vascolari è stato ottenuto mediante RNA-Seq (whole Transcriptome Shotgun Sequencing). 2 giorni dopo danno, la proliferazione delle cellule muscolari lisce (SMC) e l'apoptosi è stata significativamente ($p < 0.05$) aumentata nelle arterie carotidiche del DM-1 e DM-2 rispetto al CTRL. 14 giorni dopo danno, si è osservata un'esagerata iperplasia della neointima e una alterata rigenerazione endoteliale negli animali diabetici vs controlli euglicemici. 2 giorni dopo danno, quando le SMC raggiungono il loro picco di attivazione, un insieme di miR sono specificamente down-regolati (3 miR) o up-regolati (2 miR) sia nel DM-1 e DM-2 (Diab-miRNA) rispetto al CTRL. Questi miR sono specificamente coinvolti nell'espressione e traduzione di mRNAs noti per essere regolatori chiave nello switch fenotipico delle SMC nelle malattie vasculoproliferative. Infatti, l'analisi del trascrittoma mediante RNASeq ha identificato specifici mRNA targets dell'attività di silenziamento genico dei miR disregolati nel Diabete. Tali targets sono stati validati mediante saggio di Luciferasi come direttamente modulati dai Diab-miRNA. Pertanto i miR vascolari sono differenzialmente regolati nel diabete mellito rispetto agli animali euglicemici di controllo. Il network di miR vascolari identificati nel fenotipo diabetico regola la trascrizione genica alla base dell'esagerata risposta iperplastica vascolare nel Diabete Mellito. Se confermati nell'uomo, questi dati potrebbero contribuire a svelare i meccanismi alla base dell'esagerato e alterato rimodellamento vascolare dopo danno nei pazienti diabetici e aprire nuove strade per lo sviluppo di terapie mirate per le patologie vasculo-proliferative nel Diabete.

O377

Aumentata espressione e funzione del recettore dell'angiotensina di tipo 2 in topi knock-out per la transglutaminasi 2 trattati con angiotensin II

Carmine Savoia (a), Emanuele Arrabito (a), Lidia Sada (a), Serena Michelini (a), Lorenzo Pucci (a), Martina Briani (a), Carmine Nicoletti (b), Eleonora Candi (c), Ulrike M Steckelings (e), Ernesto L Schiffrin (d), Massimo Volpe (a)

(a) Divisione di Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza Università di Roma, (b) DAHFMO-Unità di istologie e Med Embr, Sapienza università di Roma, (c) Dipartimento di Medicina Sperimentale e Chirurgia, Fac di Medicina Università di Roma Tor Vergata, (d) LDI for Medical Research, SMBD-Jewish General Hospital, McGill University, Montreal, Canada, (e) IMM Department of Cardiovascular and Renal Research, University of Southern Denmark, Odense, Denmark

La transglutaminasi 2 (TG2) può modulare l'interazione tra recettori favorendo la transaminazione e il legame delle proteine. L'angiotensina II (AngII) può regolare l'espressione e la funzione della TG2 e del recettore dell'AngII di tipo 2 (AT2). Abbiamo ipotizzato che AngII può ridurre espressione e la funzione di AT2 attraverso TG2.

Topi knockout per TG2 (TG2-K/O, 8 settimane di vita, 6 per gruppo) e topi wild-type (WT) di controllo sono stati trattati con AngII (400 ng/kg/min) per 14 giorni e confrontati con rispettivi gruppi non trattati. La reattività vascolare è stata valutata in risposta al nitroprussiato di sodio (SNP, 10 nM-1 mM), in arterie mesenteriche pre-contratte con norepinefrina (10 µM). L'attività funzionale di AT2 è stata valutata con curve dose-risposta all'agonista selettivo di AT2, il Composto 21 (C21, 1 nM-1 µM), in arterie mesenteriche pre-contratte con la norepinefrina. L'espressione di AT2 nell'aorta è stata valutata mediante immunoblotting.

La vasodilatazione indotta da C21 era simile in WT e in TG2-K/O non trattati. La vasodilatazione indotta da C21 è risultata incrementata solo in TG2-K/O trattati con Ang II (aumento di 2 volte vs TG2-K/O non trattati, $P < 0.001$). La vasodilatazione indotta da SNP era simile in tutti i gruppi. L'espressione del recettore AT2 è risultata simile in WT e TG2-K/O non trattati. L'espressione di AT2 è risultata ridotta in WT trattati con Ang II ($-36 \pm 6\%$ vs WT non trattati, $P < 0.01$), e significativamente aumentata in TG2-K/O trattati con Ang II ($+53 \pm 4\%$ vs TG2-K/O non trattati, $P < 0.001$).

In conclusione, l'AngII non è in grado di ridurre l'espressione e la funzione di AT2 in topi TG2-K/O. Pertanto, AngII può modulare negativamente l'espressione e la funzione del recettore AT2 attraverso TG2.

DISTURBI DEL SONNO E CARDIOPATIE

O378

Hypertension, heart failure and sleep related breathing disorders: results from the PROMISES (PROgetto Multicentrico Italiano Sonno E Scompenso) study.

Carolina Lombardi (a, b), Andrea Faini (a, b), Andrea Giuliano (a, b), Francesca Gregorini (a, b), Gabriella Malfatto (a, b), Francesca Santini (a, b), Jessica Franzetti (a, b), Valeria Rella (a, b), Maria Teresa La Rovere (b), Raffaele Ferri (b), Biancamaria Guarnieri (b), Walter Serra (b), Liborio Parrino (b), PierGiuseppe Agostoni (b), Federica Provini (b), Monica Puligheddu (b), Giuseppe Mercurio (b), Fulvio Bellocchi (b), Michele Correale (b), Pasquale Perrone-Filardi (b), Rosa Raimondo (b), Raffaele Calabro' (b), Rocco La Gioia (b), Gianfranco Parati (a, b)

(a) *Coordinator Center: IRCCS Istituto Auxologico Italiano, Milano ITALIA*, (b) *PROMISES Research Group*

Objective: Heart failure (HF) is an increasingly prevalent syndrome, affecting a growing number of people worldwide. Only few epidemiological studies on the prevalence of sleep related breathing disorders [SRBD, including obstructive (OSA) and central (CSA) sleep apneas] in patients with HF are available. Evidence from the Sleep Heart Health Study indicates that OSA is associated with a 2.38 relative risk of developing HF, independently of other known risk factors. Aim of our study was to further explore the relation between HF and SRBDs in the frame of ProMISeS study, based on a multidisciplinary database containing sleep and clinical data from HF patients referred to Italian heart failure centers.

Methods: 386 Consecutive HF patients, without acute cardiac decompensation episodes since at least 4 weeks, (316 men and 70 women, age range 22.9-89.9 y/o), have been so far enrolled.

Results: 316 (82%) HF patients (87% with systolic HF and 13% with diastolic HF) had sleep related breathing disorders (SRBD+= AHI>5). 197 patients (51%) had mainly OSA, 29 patients (7%) were affected mostly by CSA and 91 patients (24%) had both CSA and OSA (mixed SRBD).

Patients with SRBD were more frequently males (Odds ratio 1.94; p=0.039). When comparing SRBD- and SRBD+ groups, we observed statistically significant differences in fatigue score 2.3 ± 2.6 vs 3.5 ± 2.4 , p=0.004, plasma glucose (94.2 ± 54.7 vs 107.6 ± 39.6 mg/dl, p=0.0025) and EF (34.9 ± 10.8 vs 31.8 ± 8.7 %, p=0.031) but not in BMI (27.3 ± 5.8 vs 28.6 ± 5.0 Kg/m², p=0.14) and neck circumference (36.7 ± 5.1 vs 38.8 ± 5.2 cm, p=0.06).

The prevalence of hypertension was 58%, and in this subgroup of subjects 17% were SRBD- and the 83% SRBD+ (of which 75% with OSA or mixed SRBD). Hypertension could be identified as a major pathogenetic mechanism responsible for HF development in 3% of subjects, 82% of whom had OSA.

Conclusions: Our data for the first time provide a clear demonstration of the high prevalence of SRBD in Italian HF patients, SRBD+ patients being characterized by worse clinical conditions (higher fatigue score and glycemia, lower EF) than SRBD- subjects. Male gender was a risk factor both for CSA and OSA. Interestingly, our data indicate a closer association of HF with CSA (97% of patients with CSA have a EF <40%) than with OSA (OSA occurring in 50% of subjects with EF <40% but also in 59% of subjects with EF >40%). Moreover OSA and hypertension are frequently associated in our HF population suggesting a pathogenetic role of this association in the development of HF.

O379

A worse cardiac function revealed by TDI in patients with congestive heart failure and Cheyne-Stokes breathing.

Donato Lacedonia (a), Tommaso Passero (b), Michele Correale (b), Lucia Forte (a), Roberto Sabato (a), Armando Ferraretti (b), Antonio Totaro (b), Natale Daniele Brunetti (b), Maria Pia Barbaro Foschino (a), Matteo Di Biase (b)

(a) *Università degli Studi di Foggia - Istituto di Malattie dell'Apparato Respiratorio*, (b) *Università degli Studi di Foggia - Dipartimento di Cardiologia*

Background: Tissue Doppler Imaging (TDI) is used to better stratify dead risk in patients with congestive heart failure. Up today few studies have used this method to investigate the differences between patients with HF and Cheyne-Stokes breathing (CSB) with ones who haven't it. The aim of this study was to evaluate the impact of CSB on myocardic function by TDI.

Materials and Methods: 50 consecutive patients who afferent to Heart Failure Unit of University of Foggia were studied by conventional and Tissue Doppler echocardiography, and underwent to nocturnal poligraphy to evaluate the presence of sleep apnea and CSB.

Results: Mean age was $61,9 \pm 11,3$ years, LVEF $38,41 \pm 11,5\%$ and BMI was $31,6 \pm 3,9$. 10 patients (20%) had high prevalence of CSB during the night. There wasn't any differences between this group and others ones about age, BMI, LVEF but there were many differences at TDI. Respect to patients without CSB, in ones who had it, late diastolic peak velocity (A') was lower ($5,47 \pm 2,3$ vs $7,9 \pm 2,6$, $p=0,04$); the ratio of early to late diastolic velocity (E'/A') was higher ($1,70 \pm 1,48$ vs $0,76 \pm 0,31$, $p<0,01$); EAS index [$E'/(A' \times S')$] was higher ($0,36 \pm 0,29$ vs $0,16 \pm 0,11$, $p<0,01$) and Isovolumic Relaxation Time (IRT) was lower ($60,35 \pm 36,6$ vs $113,5 \pm 48,3$, $p=0,04$). There was also a positive correlation between percentage of CSB during the night and EAS index ($0,76$, $p<0,01$) and E'/A' ($0,88$, $p<0,001$). The presence of obstructive sleep apnea did not influenced this results.

Conclusions: Patients with HF and CSB have a worse cardiac function in compare with ones who haven't it. This condition is better evaluate by TDI that conventional echocardiography.

O380

Effetto della CPAP sulla funzione endoteliale e ventricolare destra e sinistra in pazienti affetti da OSAS severa

Enrico Vizzardì (a), Ivano Bonadei (a), Edoardo Sciatti (a), Valentina Regazzoni (a), Eleftheria Trichaki (a), Mara Gavazzoni (a), Riccardo Raddino (a), Marco Metra (a)

(a) *Sezione di Malattie Cardiovascolari, Università degli Studi di Brescia*

Introduzione: La sindrome delle apnee ostruttive notturne (OSAS) è una patologia comune delle vie aeree che spesso correla con patologie cardiovascolari, inducendo infiammazione vascolare dovuta all'ipossia, indotta dalla difficoltà respiratoria localizzata alle prime vie aeree.

Scopo: Valutare gli effetti della CPAP sulla funzione cardiaca, arteriosa centrale e periferica.

Materiali e Metodi: Sono stati valutati 6 pazienti (4M, 2F, età media $65 \pm 8,3$ anni) in assenza di fattori di rischio cardiovascolare se non elevato BMI ($35,08 \pm 5,54$ kg/m²), non ipertesi (PAS $124 \pm 17,15$ e PAD $73,33 \pm 10,8$ mmHg), in assenza di terapia medica, afferiti consecutivamente presso il nostro reparto per valutazione cardiologica in seguito a recente riscontro di OSAS severa. Tutti i pazienti sono stati valutati mediante ecocardiogramma TT (Vivid 7), rilevando i seguenti parametri: dimensioni cavitare (DTD) e spessore parietale ventricolare sinistro (SIV e PP), dimensioni aortiche prossimali in M-Mode (SV, GST, TT), pressioni di riempimento ventricolare sinistro (E, A, E/A, E/E') mediante Color Doppler pulsato (PW) e Tissue Doppler (TD) PW e TD global strain longitudinale ventricolare sinistro (GLS). Abbiamo inoltre valutato la funzione del ventricolo destro mediante escursione dell'anello tricuspidalico in M-Mode (TAPSE), frazione d'accorciamento ventricolare (FAC), myocardial performance index (MPI), speckle tracking strain longitudinale (2D-

ST), pressione sistolica polmonare (PAPs), pressioni di riempimento ventricolare destro (E, A, E/A, E/E'), volume ed area dell'atrio destro. Tutti i pazienti sono poi stati sottoposti a studio della funzione endoteliale mediante tonometria arteriosa periferica (peripheral arterial tone PAT) utilizzando il dispositivo EndoPAT 2000 (Itamar); la procedura implica presenza di disfunzione endoteliale per valori di RHI < 1.67 (calcolato automaticamente mediante il confronto tra il valore pre e post occlusione e l'arto controlaterale). Misure della rigidità vascolare centrale sono state ottenute per mezzo della misurazione della Pulse Wave Velocity brachio-tibiale e carotideo-femorale, dell'Augmentation Index brachiale e aortico, utilizzando il dispositivo Vascular Explorer (Enverdis Medical Solution). Tutti i precedenti parametri sono stati valutati nei pazienti non ancora trattati con CPAP (t0) e dopo 2 mesi dall'inizio di tale terapia (t1). I risultati tra le due popolazioni sono stati valutati mediante Test t di Student a due code per dati appaiati.

Risultati: Rispetto a t0, a t1 non sono state evidenziate differenze significative per quanto riguarda dimensione e spessore parietale e pressioni di riempimento ventricolare sinistro; abbiamo invece notato un miglioramento significativo nel GLS ($-13,50 \pm 1,38$ vs. $-15,22 \pm 1,13$; $p=0,04$) e, per quanto riguarda la funzione ventricolare destra, nella FAC ($0,37 \pm 0,10$ vs. $0,50 \pm 0,08$; $p=0,04$) e nel MPI ($0,53 \pm 0,04$ vs. $0,34 \pm 0,11$; $p=0,004$). È stato inoltre evidenziato un miglioramento significativo della PAPs ($32,16 \pm 3,49$ vs. $26 \pm 4,56$; $p=0,03$). Tutti i pazienti hanno mostrato una normale funzionalità macrovascolare e un'alterata funzione microvascolare; non sono risultate differenze significative tra t0 e t1 di RHI ($1,46 \pm 0,19$ vs. $1,48 \pm 0,48$; $p=0,93$).

Conclusioni: In questa piccola popolazione di pazienti affetti da OSAS, abbiamo evidenziato la presenza di disfunzione ventricolare sinistra preclinica e la presenza di disfunzione sistole – diastolica ventricolare destra, associati a disfunzione microvascolare ma non macrovascolare. La terapia con CPAP dopo due mesi ha migliorato la funzione ventricolare destra e le alterazioni precliniche della sistole ventricolare sinistra in tale gruppo di pazienti.

O381

Associazione tra apnee ostruttive nel sonno ed ipertensione arteriosa: quale ruolo sulla funzione diastolica del ventricolo sinistro?

Elisabetta Lisi (a, c), Carolina Lombardi (b), Andrea Faini (a, b), Laura Maria Lonati (a), Grzegorz Bilo (a), Sabrina Salerno (a, c), Paola Mattaliano (b, c), Francesca Gregorini (b), Jessica Rossi (a), Miriam Revera (a), Giovanna Branzi (a), Gianfranco Parati (a, b, c)

(a) Dipartimento di Cardiologia, Ospedale San Luca, Istituto Auxologico Italiano IRCCS, Milano, (b) Centro di Medicina del Sonno, Dipartimento di Cardiologia, Istituto Auxologico Italiano IRCCS, Milan, (c) Università degli Studi di Milano-Bicocca, Milano

Obiettivi: Le apnee ostruttive nel sonno (OSA) sono associate ad un aumentato rischio cardiovascolare. L'ipertensione arteriosa (IA) è frequente nei pazienti apnoici, specialmente in quelli con OSA severa. IA ed OSA severa possono contribuire in maniera indipendente allo sviluppo di disfunzione diastolica del ventricolo sinistro (VS), ma poco è noto sulla prevalenza di quest'ultima in presenza di IA e OSA lievi-moderate. Obiettivo dello studio è stato quello di valutare l'impatto di OSA lievi-moderate sulla funzione diastolica del VS in pazienti ipertesi controllati.

Metodi: Sono stati arruolati 94 pazienti consecutivi con IA essenziale (51 maschi, 43 femmine; età $57,8 \pm 11,7$ aa; BMI $28,0 \pm 4,2$ kg/m²), escludendo pazienti con valvulopatie, disturbi del ritmo, OSA severa (AHI ≥ 30) o trattate. Tutti i soggetti hanno eseguito polisonnografia cardiorespiratoria notturna, ecocardiocolorDoppler transtoracico, monitoraggio pressorio delle 24h. In 70 pazienti è stata valutata la funzione diastolica del VS mediante lo studio pattern di flusso transmitralico (picco di velocità diastolica precoce, onda E, e tardivo, onda A e rapporto E/A).

Risultati: Il 45.7% dei pazienti presentava OSA di grado lieve-moderato ($5 \leq \text{AHI} < 30$). Non è stata riscontrata alcuna differenza significativa nei valori medi di pressione arteriosa (PA) sistolica/diastolica delle 24 ore tra pazienti OSA e non-OSA ($128,7 \pm 11,4/77,7 \pm 7,6$ vs $125,4 \pm 12,5/76,5 \pm 7,0$ mmHg, rispettivamente, NS). La frequenza cardiaca (FC) media era

significativamente più elevata nei pazienti OSA rispetto ai non-OSA (73.2 ± 7.5 vs 69.3 ± 8.4 bpm, $p=0.02$). Il 31.4% dei pazienti presentava un pattern diastolico da alterato rilasciamento ($E/A < 0.8$) ed E/A risultava minore nei pazienti OSA rispetto ai non-OSA (0.9 ± 0.4 vs 1.2 ± 0.3 , $p=0.006$). Non vi erano differenze significative nella massa VS anche indicizzata per BSA e per altezza^{2.7} tra pazienti OSA e non OSA. Nessun paziente aveva ipertrofia concentrica del VS, mentre il 19.3% dei soggetti aveva rimodellamento concentrico, in assenza di differenze statisticamente significative tra OSA e non-OSA ed in assenza di correlazione con AHI, SpO₂ media e SpO₂ minima. I valori di SpO₂ media erano minori nei pazienti con pattern da alterato rilasciamento rispetto a quelli con normale funzione diastolica del VS (93.3 ± 1.6 vs $95.1 \pm 1.6\%$, $p < 0.001$), analogamente a quello che è stato riscontrato per il valori di SpO₂ minima (83.0 ± 5.8 vs $88.1 \pm 4.5\%$, $p=0.009$). In un modello di regressione logistica SpO₂ media e FC, corretti per età, sesso e BMI, correlavano significativamente con il pattern diastolico da alterato rilasciamento ($E/A < 0.8$).

Conclusioni: I nostri dati confermano l'elevata prevalenza di OSA in pazienti con ipertensione arteriosa e mostrano per la prima volta che anche le OSA di grado lieve-moderato, in pazienti con ipertensione arteriosa controllata, possono essere associate ad una precoce alterazione della funzione diastolica del ventricolo sinistro, indipendentemente da età, sesso e valori pressori ed in assenza di ipertrofia concentrica del VS. Inoltre i nostri dati suggeriscono che anche nelle OSA di grado lieve-moderato l'ipossiemia notturna sembra essere associata ad una precoce alterazione della funzione diastolica del VS.

ASPETTI PARTICOLARI DELLA FIBRILLAZIONE ATRIALE E DELLA CRT

O382

Atrial fibrillation in the Brugada Registry of the Piedmont region of Italy: prevalence and correlation with prognosis

Natascia Cerrato (a), Carla Giustetto (a), Elena Gribaudo (a), Paula Carvalho (b), Francesca Bianchi (c), Lorella Barbonaglia (d), Daniela Giachino (e), Maria Teresa Ricci (e), Elena Richiardi (f), Giulia Picciotto (a), Miriam Bortnik (g), Fiorenzo Gaita (a)

(a) *Divisione di Cardiologia, Dipartimento di Scienze Mediche, Università di Torino*, (b) *Divisione di Cardiologia, Ospedale Universitario San Luigi Gonzaga, Orbassano, Torino*, (c) *Divisione di Cardiologia, Azienda Ospedaliera Ordine Mauriziano, Torino*, (d) *Divisione di Cardiologia, Ospedale Sant'Andrea, Vercelli*, (e) *Dipartimento di Genetica Medica, Ospedale Universitario San Luigi Gonzaga, Orbassano, Torino*, (f) *Divisione di Cardiologia, Ospedale Gradenigo, Torino*, (g) *Divisione di Cardiologia, Ospedale Maggiore della Carità, Novara*

Purpose: A high incidence of atrial fibrillation/flutter (AF) has been reported in Brugada syndrome. Aim of our study was to analyze the prevalence of AF in patients with Brugada ECG pattern (BrECG) from the Brugada Registry of the Piedmont region of Italy and its correlation with prognosis.

Methods: Since 2001 patients with spontaneous or drug induced Brugada type 1 ECG consecutively observed in 11 Cardiology Divisions of the Piedmont Region of Italy were included in the Registry. In this study we focused on patients with history of AF, considering two groups: those in whom BrECG was unmasked by class IC antiarrhythmic drugs given for AF interruption or prevention and those in whom AF was documented after the diagnosis of BrECG. Recurrences of AF and onset of ventricular arrhythmias (sustained ventricular tachycardia, ventricular fibrillation, appropriate ICD shocks and sudden death) were evaluated at follow-up.

Results: Among the 556 Brugada patients in the Registry, 6 (1%) had aborted sudden death (aSD), 124 (22%) syncope, 426 (76%) were asymptomatic for ventricular arrhythmias. Overall, 47 (9%) had AF. Those with a diagnosis of AF before the identification of BrECG were 25: they were all asymptomatic for syncope and aSD, with a mean age of 60 ± 10 years; 11 (44%) were treated with hydroquinidine (HQ), 3 of whom discontinued the drug for minor side-effects; SCN5A mutation was

identified in 2. At a mean follow-up of 43 ± 34 months, none had ventricular arrhythmias nor documentation of spontaneous type 1 BrECG. Other 22 patients developed AF after the diagnosis of BrECG: mean age was 47 ± 15 years ($p=0.001$); 15 (68%) were asymptomatic, 5 (23%) had history of syncope and 2 (9%) of aSD; 15 (68%) had spontaneous type 1 ECG; 4 had SCN5A mutation and 1 SCN1B mutation. At a mean follow-up of 61 ± 43 months, ventricular arrhythmic events occurred in 3 patients, all with spontaneous type 1 and history of syncope or aSD; 6 patients received HQ treatment without side-effects and they had no recurrences of AF nor ventricular arrhythmias at follow-up.

Conclusions: Prevalence of AF in patients with Brugada ECG is higher than in the general population. Patients in whom Brugada pattern was unmasked by class 1C antiarrhythmic drugs given for AF are generally older and have good prognosis, similarly to the subjects with type 1 BrECG only unmasked by pharmacological test. Those who developed AF after the diagnosis of BrECG are younger and more often experienced syncope or aSD. HQ treatment has proved to be useful and safe in both groups.

O383

Fibrillazione atriale e beta talassemia major: ruolo predittivo della durata e della dispersione dell'onda P

Anna Rago (a), Vincenzo Russo (a), Federica Di Meo (a), Andrea Antonio Papa (a), Valerio Giordano (a), Anna Cristiano (a), Paolo Golino (b), Raffaele Calabrò (a), Gerardo Nigro (a), Maria Giovanna Russo (a)

(a) Dipartimento di scienze cardio-toraciche e respiratorie, Seconda Università di Napoli - AORN Monaldi, (b) Dipartimento di scienze cardio-toraciche e respiratorie. Seconda Università di Napoli - AORN Caserta

Introduzione: I pazienti affetti da beta-talassemia major (β -TM) presentano un'elevata incidenza di crisi parossistiche di tachiaritmie atriali. Nonostante precedenti studi in letteratura abbiano documentato una varietà di anomalie elettrocardiografiche nei pazienti talassemici, ancora poco si conosce circa la possibilità di predire l'insorgenza di fibrillazione atriale attraverso la misurazione di parametri elettrocardiografici quali la dispersione dell'onda P, indice che riflette la discontinua ed la non omogenea propagazione degli impulsi sinusali e l'allungamento del tempo di conduzione intratriale. Scopo del nostro studio è stato valutare il ruolo della durata massima dell'onda P (P max) e della dispersione dell'onda P (PD) come predittori di fibrillazione atriale (FA) nei pazienti affetti da β -TM con conservata funzione sistolica e diastolica cardiaca, durante un follow-up di 12 mesi.

Materiali e Metodi: Abbiamo arruolato nel nostro studio una popolazione selezionata di 50 pazienti β -TM (età $38,4 \pm 10,1$; 38 maschi) ed un gruppo controllo di 50 soggetti sani, appaiati per età e sesso. In ogni soggetto arruolato è stata effettuata una misurazione della durata e della dispersione dell'onda P all' ECG di superficie a 12 derivazioni ed un monitoraggio dell'eventuale insorgenza di aritmie atriali durante il periodo di osservazione mediante ECG Holter delle 24 ore, effettuato con cadenza trimestrale. I pazienti β -TM sono stati inoltre suddivisi in due gruppi sulla base del numero e della complessità dei battiti prematuri sopraventricolari al monitoraggio Holter (Gruppo 1: $< 30/h$, isolati, n: 35; Gruppo 2: $> 30/h$ con coppie, triplette o run di tachicardia sopraventricolare o fibrillazione atriale, n: 15).

Risultati: Il gruppo di pazienti talassemici, presentava un incremento dei valori di P max ($107,5 \pm 21,2$ vs $92,1 \pm 11$ ms, $P = 0,03$) e di PD ($41,2 \pm 13$ vs 25 ± 5 ms, $P = 0,03$) rispetto al gruppo controllo. Nella popolazione di pazienti β -TM, il Gruppo 2 mostrava un incremento statisticamente significativo della PD ($42,8 \pm 8,6$ vs $33,2 \pm 6,5$ ms, $P < 0,001$) e della P max ($118,1 \pm 8,7$ vs $103,1 \pm 7,5$ ms, $P < 0,001$) rispetto al Gruppo 1. Sette pazienti β -TM che avevano presentato episodi di fibrillazione atriale parossistica mostravano un significativo incremento della P max ($119,7 \pm 8,3$ vs $105,1 \pm 7,6$ ms, $P < 0,001$) e della PD ($45,1 \pm 8,4$ vs $35,2 \pm 6,5$ ms, $P < 0,001$) rispetto agli altri pazienti appartenenti al Gruppo 2. Inoltre, abbiamo rilevato un'associazione statisticamente significativa tra la P max (OR:

2,01; CI: 1,12-3,59; p:0,01) e la PD (OR = 2.06; CI: 1.17—3.64; p = 0.01) e l'insorgenza di fibrillazione atriale parossistica. La P min non si è dimostrata, invece, associata a rischio di fibrillazione atriale (OR: 0,99; CI: 0,25-3,40; P: 0,9). Il valore cut off della P max pari a 111 ms aveva una sensibilità del 80% ed una specificità del 87% nell'identificare i pazienti β -TM ad alto rischio di fibrillazione atriale. Il valore cut off della PD pari a 35,5 ms aveva una sensibilità del 90% ed una specificità del 85% nell'identificare questa categoria di pazienti.

Conclusioni: i nostri dati dimostrano che la durata massima e la dispersione dell'onda P rappresentano utili markers elettrocardiografici per identificare i pazienti β -TM ad alto rischio di insorgenza di fibrillazione atriale, anche quando la funzione cardiaca è conservata.

O384

La funzionalità renale nella stima del rischio di fibrillazione atriale dopo chirurgia delle valvole cardiache in pazienti con creatinina normale

Luca Rosario Limite (a), Nicole Cristell (a), Martina Berteotti (a), Alessandro Durante (a), Alessandra Laricchia (a), Giovanni Peretto (a), Maria Avitabile (a), Carlo Meloni (a), Stefano Benussi (a), Ottavio Alfieri (a), Paolo Guido Camici (a), Domenico Cianflone (a)

(a) IRCCS Ospedale San Raffaele & Università Vita-Salute San Raffaele, Milano, Italia.

Background: La Fibrillazione Atriale (FA) postoperatoria è un ambito di crescente interesse in cardiocirurgia data l'alta incidenza e gli effetti prognostici che ne conseguono: prolungamento dell'ospedalizzazione, ictus, scompenso cardiaco e morte. Le ultime linee guida suggeriscono l'uso di beta-bloccanti e di amiodarone in prevenzione dell'aritmia. Le correlazioni tra valori di filtrazione glomerulare e insorgenza di FA postoperatoria in pazienti con creatinina normale non sono state indagate.

Scopo: Valutare il rischio di sviluppare FA in seguito a intervento cardiocirurgico valvolare attraverso la stima della velocità di filtrazione glomerulare normalizzata per la superficie corporea (cGFR/BSA), in pazienti con anamnesi muta per FA e livelli di creatinina preoperatori nella norma.

Metodi: Da giugno 2011 a marzo 2013 sono stati ammessi nella nostra unità di riabilitazione cardiovascolare 722 pazienti. Abbiamo selezionato i 288 sottoposti a chirurgia della valvola mitrale o della valvola aortica con anamnesi muta per FA e livelli di creatinina preoperatori nella norma. Dall'ingresso fino alla dimissione, i pazienti sono stati monitorati con ECG telemetrato 24h/24h. Sono stati raccolti i valori di creatinina serici preoperatori, in 3°, in 8° e in 15° giornata postoperatoria. Abbiamo quindi calcolato i valori di cGFR/BSA (espressi come mediana e range interquartile) con la formula di Cockcroft-Gault e abbiamo analizzato l'incidenza di FA in ogni classe di funzione renale secondo la classificazione NKF K/DOQI.

Risultati: Tra i 288 pazienti (198 M e 90 F; età mediana 59 anni, IQR 50 – 69), in 132 (45,8%) c'è stata evidenza di FA al monitoraggio telemetrico. I pazienti che hanno sviluppato l'aritmia avevano livelli preoperatori di cGFR/BSA significativamente inferiori rispetto a coloro che non l'hanno sviluppata [81,0 ml/min/1,73 m² (66,3 – 97,4) vs. 95,4 ml/min/1,73 m² (80,9 – 110,7); p<0,0001]. La differenza tra i due gruppi si è mantenuta statisticamente significativa per l'intero ricovero. Analizzando i risultati di incidenza di FA in ogni stadio della classificazione NKF K/DOQI, abbiamo osservato che gli stadi superiori sono associati a maggiore incidenza di FA (p=0,0008): nello Stadio 1 (GFR> 90 ml/min) 36,5% (58/159), nello stadio 2 (GFR 60 – 90 ml/min) 61,1% (55/90) e nello stadio 3 (GFR 30 – 60 ml/min) 48,7% (19/39).

L'OR per lo sviluppo di FA postoperatoria nei pazienti in stadio 2 o 3 è stato 2,34 (1,46 – 3,77).

Conclusioni: Nella nostra casistica, nonostante tutti i pazienti avessero livelli di creatinina nell'intervallo di norma, solo 159 pazienti (55,2%) avevano funzionalità renale compatibile con lo stadio 1. I pazienti che hanno sviluppato FA mostravano valori di cGFR/BSA inferiori. Inoltre, gli stadi 2 e 3 della NKF K/DOQI erano associati ad un rischio aggiuntivo di sviluppare l'aritmia. Sulla base di queste osservazioni, riteniamo che il semplice calcolo della clearance della creatinina possa assumere un ruolo importante nella valutazione del rischio aritmico nei pazienti sottoposti a chirurgia

delle valvole, anche in quelli con valori normali di creatinina. Ulteriori studi sono auspicabili per individuare quali pazienti beneficino maggiormente di una terapia farmacologica preventiva.

O385

Baseline left ventricular size predicts ventricular tachyarrhythmias and survival following cardiac resynchronization therapy

Ilaria Ricceri (a), Alenya Bertini (a), Alessandro Paoletti Perini (a), Paola Attanà (a), Carmine Domenico Votta (a), Paolo Pieragnoli (a), Giuseppe Ricciardi (a), Marco Chiostrì (a), Iacopo Olivotto (a), Luigi Padeletti (a)

(a) *Università degli Studi di Firenze*

Background: In patients affected by chronic HF, CRT reduces hospitalizations and mortality, and improves LV performance by inducing ventricular reverse remodeling. Aim of the present study was to evaluate the association between LV dimensions pre-CRT and the relationship to CRT response and long-term development of VT.

Methods: Study enrolled 258 consecutive HF patients implanted with CRT-D. Echocardiogram parameters were assessed at baseline and every 6 months after device implantation. Occurrence of appropriate therapies delivered by the ICD was assessed. Patients were considered responders if LVESV reduction was $\geq 15\%$ at 6 month evaluation.

Results: Out of 258 CRT-D patients, 69 experienced at least 1 appropriate ICD therapy for VT/VF at a mean FU of 37 ± 24 months. At baseline VT patients had greater LV dimensions than non VT ones; at 6 months LV size confirmed to be statistically related to the occurrence of VT/VF needing ICD intervention. Similar percentage of responders and of non-responders had at least 1 arrhythmic ventricular episode (46% vs 54%, $P 0.353$). ROC curves identified a baseline LVDD cut-off value of 65.5 mm as the best predictor of VT ($p 0.012$). Univariable Cox regression identified baseline LVDD ($p 0.017$) and LVSD ($P 0.004$) as echocardiographic predictors associated with VT. Univariable Cox regression identified a Δ LVEDV ($P 0.029$), predictive of VT.

Conclusions: In CRT-D HF patients occurrence of ventricular arrhythmias needing ICD intervention seems to be related to baseline and 6 month LV dimensions rather than to the percentage reduction of LV end-systolic volume, the so-called reverse remodeling.

O386

CRT with quadripolar transvenous lead results in high response rate with a lower need of reprogramming.

Ambrogio Capria (b), Luca Santini (a), Germana Panattoni (a), Valentina Schirripa (a), Domenico Della Rocca (a), Valentina Minni (a), Aurora Sanniti (a), Alessandro Politano (a), Giulia Magliano (a), Domenico Sergi (a), Giovanni B Forleo (a), Francesco Romeo (a)

(a) *Cardiology Division, Tor Vergata University Hospital, Rome, Italy*, (b) *Internal Medicine Division, Tor Vergata University Hospital, Rome, Italy*

Introduction: The quadripolar left ventricle (LV) lead for Cardiac Resynchronization Therapy (CRT) allows more choices in lead placement with higher programming capability, compared to the conventional bipolar one. Still no data are available about the long term clinical outcomes of patients implanted with the quadripolar lead.

Aim: The primary outcome of the study was to evaluate the 12 months multiparametric response to the CRT and the need for pacing optimization reprogramming during the first 6 months after implantation of these devices.

Methods: Twenty-seven consecutive patients, with chronic heart failure ischemic or non ischemic in origin (16 vs 11). In prevalence male (20 vs 7), underwent implantation with either the quadripolar ($n = 14$; quadripolar group) or a conventional bipolar LV lead ($n = 13$; bipolar group).

Results: Baseline characteristics, procedure duration, and fluoroscopy time did not differ significantly between groups. The implantation success rate in both groups was $\geq 85\%$. We found in the bipolar group a poorer 3-month response, clinical (NYHA 2.1 ± 0.8 vs 1.7 ± 0.5 , $p < 0.05$, QoL total score 26.8 ± 10.5 vs 20.4 ± 10.5 , $p < 0.05$) and echocardiographic (LVEF 29.4 ± 9.8 vs 31.3 ± 9.9 , $p < 0.05$), that was corrected by our early reprogramming (at the 3 and 6 months follow-up), resulting in a similar 12-month percentage of CRT response, as reported in table 1 (mean \pm SD).

Conclusion: This prospective, controlled study provides strong evidence that CRT with the quadripolar LV lead results in low rates of need of an early reprogramming or optimization and seems effective for our patients, resulting in a high 12 months response rate.

| <i>Groups</i> | <i>Age</i> | <i>Responders</i> % | <i>Early reprogramming</i> rate/patients |
|-------------------|----------------|------------------------|---|
| All pts | 68.0 ± 8.4 | 88 | 0.88 ± 0.82 |
| Quadripolar Group | 67.1 ± 8.7 | 86 | 0.57 ± 0.66 |
| Bipolar Group | 69.1 ± 8.5 | 92 | 1.25 ± 0.75 |
| P | n.s. | n.s. | < 0.05 |

O387

Comparing outcomes in CRT-D patients with ischemic vs non-ischemic cardiomyopathy

Vanessa Porretta (a), Domenico Della Rocca (a), Paolo Vadalà (a), Saverio Muscoli (a), Germana Panattoni (a), Giuseppina Pascuzzo (a), Carlo Stazi (a), Laura Guddelmoni (a), Domenico Sergi (a), Luca Santini (a), Giovanni B Forleo (a), Francesco Romeo (a)

(a) Division of cardiology, University of Rome "Tor Vergata"

Background: Proper selection of patients with severe heart failure at high risk for sudden cardiac death (SCD) and increasing use of Biventricular Implantable Cardioverter Defibrillator Device (CRT-D) contribute to improved survival.

Aims: We aimed to detect potential differences in clinical characteristics and outcomes of CRT-D patients with dilated cardiomyopathy (DCM) of ischemic (group A:iDCM) and non-ischemic (group B: niDCM) etiology.

Methods: This is a single center prospective cohort study of patients (n=374) undergoing CRT-D implantation for prevention of SCD on the basis of criteria outlined in current practice guidelines.

Of 374 patients who underwent CRT-D implantation between April 2003 and July 2012, we selected only patients with CMD (n=157) and according to different etiology we divided them into 2 groups: patients with dilated cardiomyopathy of ischemic (group A:iDCM; n=88) and non-ischemic (group B: niDCM; n=69) etiology.

The primary goal of the registry was to gather information on overall mortality and incidence of appropriate ICD shock delivery. Follow-up was performed every 6 months. Clinical evaluation and device testing were carried out at each follow-up visit scheduled at 1, 3 and every 6 months after implantation. Patients with a follow up < 6 months were excluded from the study.

Results: Patients with CMD (n=157) who received CRT-D were older (age, 69.1 ± 10.6), more frequently male (81,5%) and had iDCM in 56,05% (n=88) and niDCM in 43,9% (n=69).

Mean LVEF in CRT-D patients was not different in iDCM and niDCM group (25.15 ± 6.5 vs. 23.55 ± 6.70 ; $p=0.16$). Diabetes (44,3% vs. 26.0%; $p=0.10$) and hypertension (86,3% vs. 73,9%; $p=0.52$) in iDCM patients were no significantly higher than in niDCM group. At the time of hospital discharge after CRT-D implantation, there was no significant difference in beta blocker (76,1% vs 73,9%; $p=0.90$), ACE inhibitor or Angiotensin II blocker use (73,8% vs. 79,7%; $p=0.75$).

During the mean follow-up period of 24.79 ± 15.80 months, mortality was 12,5% in iDCM and 7,2%

SIC | *Indice Autori*

in iDCM patients ($p=0,32$), ATP had occurred in 7,9% of iDCM and in 4,3% of inDCM ($p=0,38$) and shock in 9,09% of iDCM and in 5,8% of inDCM ($p=0,47$).

Conclusion: Clinical characteristics, co-morbidities and medication are not different in iDCM and inDCM group. Patients with severe heart failure had similar beneficial outcome after CRT-D implantation irrespective of etiology, e.g. iDCM or inDCM.

IMPATTO DELL'IPERTENSIONE SUL CIRCOLO SISTEMICO

O388

The systolic blood pressure vs oxygen consumption slope at the cardiopulmonary exercise test predicts carotid atherosclerosis

Francesco Radico (a), Fabrizio Ricci (a), Alfonso Tatasciore (a), Francesco Iachini Bellisarii (a), Marta Di Nicola (a), Doranna De Pace (a), Marco Zimarino (a), Raffaele De Caterina (a)

(a) "G. D'Annunzio" University - Institute of Cardiology and Center of Excellence on Aging – Chieti

Background: Exercise-induced hypertension (EX-HTN), defined as a peak of systolic blood pressure (SBP) during exercise greater than 210 mmHg in men and 190 mmHg in women (Framingham criteria), is a marker of subclinical target organ damage in several studies. The slope of SBP increase related to oxygen consumption ($\Delta\text{SBP}/\Delta\text{VO}_2$) is a new cardiopulmonary exercise test (CPET) parameter describing the BP level at any given metabolic rate. An abnormally steep $\Delta\text{SBP}/\Delta\text{VO}_2$ slope during exercise, i.e. ≥ 3.6 mmHg/mL/min/kg, would be related to an increased vascular stiffness or an impaired peripheral vasodilator response, both playing a crucial role in the pathogenesis of EX-HTN. We hypothesized that such slope predicts subclinical atherosclerosis assessed as the Intima-Media Thickness (IMT) of the common carotid artery.

Methods: Forty-five uncomplicated hypertensive patients (34 men, mean age 67.2 ± 9.5 years) underwent both CPET and carotid ultrasonographic investigations. We used the area under the ROC curve (AUC) to evaluate the diagnostic performance of the peak SBP (Framingham criteria) vs the $\Delta\text{SBP}/\Delta\text{VO}_2$ slope for predicting IMT (>0.8 mm).

Results: We found a direct and significantly relationship between $\Delta\text{SBP}/\Delta\text{VO}_2$ and IMT (Spearman's $\rho=0.577$; $P<0.001$) in entire group. By ROC curve analysis, a $\Delta\text{SBP}/\Delta\text{VO}_2$ slope ≥ 3.6 mmHg/mL/min/kg predicted an increased IMT (AUC 0.83; 95% CI 0.69-0.92), with sensitivity of 80% (95% CI 61.4–92.2) and specificity of 86.7% (95% CI 59.5–98.0). The diagnostic performance of peak SBP during exercise for IMT was significantly ($P<0.004$) worse (AUC 0.53; 95% CI 0.38-0.68).

Conclusions: In uncomplicated hypertensive patients EX-HTN, detected by $\Delta\text{SBP}/\Delta\text{VO}_2$ at the CPET, predicts early carotid artery atherosclerosis assessed by IMT, and does so better than by the simple Framingham criteria.

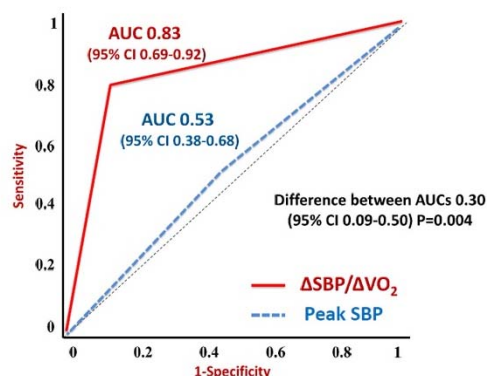


Figure: ROC curves for $\Delta\text{SBP}/\Delta\text{VO}_2$ slope vs peak SBP during exercise for prediction of IMT

O389

Alterazioni strutturali precoci dell'apparato cardiovascolare in giovani ipertesi di recente diagnosi

Carmine Savoia (a), Lorenzo Pucci (a), Allegra Battistoni (a), Giuseppino Massimo Ciavarella (a), Lidia Sada (a), Serena Michelini (a), Marta Salvati (a), Massimo Volpe (a)

(a) *Divisione di Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza università di Roma*

Background: Le alterazioni funzionali e strutturali precoci dell'apparato cardiovascolare contribuiscono alla fisiopatologia dello sviluppo dell'ipertensione arteriosa e delle complicanze cardiovascolari. La velocità dell'onda di polso (PWV) e l'augmentation index (AI) sono parametri indicativi delle alterazioni strutturali responsabili dell'aumento della rigidità dell'aorta in corso di ipertensione arteriosa e correlano con la prognosi cardiovascolare.

Metodi: Abbiamo indagato i parametri indicativi delle alterazioni strutturali a livello dell'aorta e le correlazioni con lo sviluppo delle modifiche strutturali a livello cardiaco in soggetti ipertesi di recente diagnosi. Sono stati studiati 19 pazienti con recente diagnosi di ipertensione secondo i criteri ESH/ISH 2007 non in trattamento farmacologico, peraltro sani, e confrontati con soggetti normotesi sovrapponibili per età, sesso e BMI. Sono stati valutati la pressione arteriosa periferica, i parametri derivati dall'analisi dell'onda di polso valutati con metodo tonometrico (Sphygmocor- pressione centrale, Subendocardial Viability Ratio - SEVR, AI, PWV) e quelli derivati dall'esecuzione di ecocardiocolorDoppler cardiaco (ECD).

Risultati: L'analisi descrittiva (medie \pm ds), il confronto tra gruppi (t student) e l'analisi di correlazione ha mostrato che i due gruppi sono risultati sovrapponibili per età (44.5 \pm 1.4) sesso e BMI risultato nel range di normalità. La pressione centrale aortica era aumentata negli ipertesi (131 \pm 7,8/92 \pm 6,1mmHg vs 107 \pm 10,6/75 \pm 8,5; p<0.001). La PWV era simile nei due gruppi. L'AI era significativamente aumentato nei pazienti ipertesi rispetto ai normotesi (22 \pm 9% vs 14,7 \pm 10%; rispettivamente; +49,6%; p <0,05) mentre il SEVR era simile nei due gruppi. La frazione di eiezione del ventricolo sinistro era preservata e simile nei due gruppi mentre la massa ventricolare sinistra (MVS h^{2.7}) era aumentata negli ipertesi (38,7 \pm 8,3g vs 26,3 \pm 10,3g; +47%; p 0,002) pur se in limiti normali. La Midwall Fractional Shortening (MFS) era aumentata negli ipertesi (38,6% \pm 5,7 vs 34,8% \pm 3,5; +11%; p < 0,04). Tra i parametri di stress della parete ventricolare lo Stroke Work era aumentato negli ipertesi rispetto ai normotesi (115 \pm 29,8 vs 91,9 \pm 22,7 g m m²; + 25% P 0,032). La pressione sistolica centrale nell'aorta correlava positivamente e significativamente con l'AI (Rho 46%; p 0,047) solo nei pazienti ipertesi. Il SEVR correlava positivamente solo nei pazienti ipertesi con i seguenti parametri derivati dall'ECD: MVS h^{2.7} (Rho 72%; p 0,003), Stroke Volume (Rho 71%; 0,003), lo Stroke Work (Rho 67%; 0,007) e la MFS (Rho 72%; p 0,002).

Conclusioni: I pazienti ipertesi di recente diagnosi presentano alterazioni dei parametri di rigidità dell'aorta del tutto precoci e strettamente correlate al regime pressorio con la possibilità di contribuire al determinismo delle iniziali alterazioni dei parametri di performance cardiaca sia sistolici che diastolici.

O390

baPWV e malattia coronarica: ruolo della rigidità arteriosa nella valutazione preliminare all'esame coronarografico.

Beniamino Casillo (a), Francesco Natale (a), Alessandro Ranieri (a), Roberto Rondine (a), Claudia Concilio (a), Alessandro Siciliano (a), Chiara Di Lorenzo (a), Chiara Cirillo (a), Vincenzo Avitabile (a), Fabrizio De Rosa (a), Paolo Verrazzo (a), Chiara Granato (a), Paolo Calabrò (a), Maria Giovanna Russo (a), Raffaele Calabrò (a)

(a) *Cardiologia Sun, Azienda Ospedaliera dei Colli (Monaldi)*

Background: La rigidità arteriosa è un noto fattore di rischio per le malattie cardiovascolari. Nel nostro istituto, abbiamo valutato l'associazione tra la rigidità arteriosa, come determinato dalla velocità dell'onda di polso braccio-caviglia (baPWV), e l'entità della malattia aterosclerotica coronarica, come rilevato dall'angiografia coronarica convenzionale, in pazienti con dolore toracico tipico senza precedente storia di malattia cardiaca.

Metodi: Abbiamo analizzato i dati di 251 pazienti che si sono sottoposti ad un esame coronarografico per sospetta malattia coronarica, tra giugno 2010 e luglio 2011.

Risultati: Dall'analisi multivariata la baPWV, oltre al sesso maschile, l'età, il livello di colesterolo LDL e di emoglobina glicosilata, è risultato essere un predittore statisticamente significativo ($p < 0,05$) di malattia aterosclerotica coronarica significativa (diametro della stenosi $> 50\%$).

Conclusione: La PWV correla significativamente con la malattia aterosclerotica coronarica significativa, pertanto la sua valutazione potrebbe essere impiegata nella selezione dei pazienti da sottoporre ad esame coronarografico.

O391

Evoluzione della rigidità arteriosa nel tempo in una popolazione generale del nord Italia

Fabio Bertacchini (a), Anna Paini (a), Massimo Salvetti (a), Carlo Aggiusti (a), Deborah Stassaldi (a), Claudia Agabiti Rosei (a), Giulia Rubagotti (a), Giulia Maruelli (a), Claudia Chillè (a), Francesco Mattavelli (a), Vittoria Marinone (a), Enrico Agabiti Rosei (a), Maria Lorenza Muiasan (a)

(a) *Clinica Medica, Università degli studi di Brescia*

Background: La velocità dell'onda di polso carotido-femorale (PWV) è un predittore indipendente di eventi cardiovascolari. Attualmente sono disponibili pochi dati circa le modificazioni della PWV nel tempo.

L'obiettivo di questo studio prospettico è quello di valutare le modificazioni della rigidità arteriosa in un campione di popolazione generale del Nord d'Italia (Studio Vobarno).

Pazienti e metodi: in 227 soggetti (42% maschi, età 50 ± 4 anni, 51% ipertesi alla visita basale) sono stati effettuati esami ematochimici, misurazione della pressione arteriosa (PA) clinica e delle 24 ore e la PWV ad una visita basale (BAS) e al FU dopo 5.1 ± 0.4 anni.

Risultati: In tutta la popolazione la PWV è aumentata da 8.28 ± 1.27 al BAS a 8.51 ± 3.2 m/s al FU ($p < 0.05$; change: 0.22 ± 1.25 m/s). La cfPWV è significativamente aumentata negli ipertesi (IE) (da 8.61 ± 1.41 a 8.90 ± 1.40 , $p < 0.01$) ma non nei normotesi (NT) (da 7.97 ± 1.03 a 8.11 ± 1.11 , p n.s). Le modificazioni assolute della PWV dal BAS al FU sono aumentate progressivamente passando da -0.052 ± 0.108 nei NT, a 0.480 ± 0.163 negli ipertesi trattati fino a 0.483 ± 0.138 negli ipertesi non trattati (p for trend < 0.01); anche dopo aver corretto per i possibili fattori confondenti (età, sesso, IMC, PWV al basale e le modificazioni della PA media) tale andamento è rimasto statisticamente significativo. All'analisi multivariata le variabili associate in modo indipendente alla progressione della PWV sono risultate: età (beta 0.18, $p < 0.01$), PWV e PA media al BAS (beta -0.55, $p < 0.01$ e beta 0.18, $p < 0.01$, rispettivamente) e le modificazioni della PA media durante il FU (beta 0.20, $p = 0.001$).

Conclusioni: In una popolazione generale del Nord d'Italia i principali determinanti della progressione della rigidità arteriosa durante un follow-up di 5 anni sono risultati essere l'età, la PWV e la PA media misurate alla visita basale e le modificazioni nel tempo della PA.

O392

Correlazione fra volume atriale sinistro, rigidità arteriosa e pressione arteriosa clinica e delle 24 ore in una popolazione generale del nord Italia

Deborah Stassaldi (a), Massimo Salvetti (a), Anna Pains (a), Fabio Bertacchini (a), Giulia Rubagotti (a), Giulia Maruelli (a), Claudia Agabiti Rosei (a), Carlo Aggiusti (a), Claudia Chillè (a), Vittoria Marinone (a), Francesco Mattavelli (a), Enrico Agabiti Rosei (a), Maria Lorenza Muiesan (a)

(a) *Clinica Medica, Università degli studi di Brescia*

Premesse: I dati disponibili indicano che l'aumento delle dimensioni dell'atrio sinistro (AS) si associa ad un incremento del rischio di eventi cardiovascolari. La valutazione del volume atriale sembra in grado di fornire una stima più accurata della prevalenza di dilatazione AS. Le relazioni esistenti fra pressione arteriosa clinica e delle 24 ore, rigidità arteriosa e volume dell' AS sono state sino ad oggi poco studiate.

Scopo dello studio: Analizzare le relazioni esistenti fra volume dell'AS, valutato con ecocardiografia bidimensionale, rigidità arteriosa e pressione arteriosa (clinica e delle 24 ore) in una popolazione generale del Nord Italia.

Metodi: 250 soggetti (56±4 anni, IMC 26±5, 57% maschi) partecipanti allo studio Vobarno sono stati sottoposti ad esami ematochimici ed alla misurazione della pressione arteriosa sistolica (PAS) e diastolica (PAD) clinica e delle 24 ore. Sono state valutate la velocità dell'onda di polso carotido-femorale (PWV) e, mediante ecocardiografia, la struttura e la funzione del ventricolo sinistro (VS). Il volume dell'AS è stato valutato con il metodo area-lunghezza nelle proiezioni apicali 4-camere e 2-camere.

Risultati: il volume dell'AS è risultato correlato in maniera significativa con indice di massa corporea (IMC) ($r=0.34$, $p<0.001$), PAS: clinica $r=0.21$, 24 ore $r=0.26$ ($p<0.01$ per entrambe), PAD: clinica $r=0.16$, 24 ore $r=0.20$ ($p<0.05$ per entrambe); con pressione differenziale (PP): clinica $r=0.16$, 24 ore $r=0.20$ ($p<0.05$ per entrambe), con FC 24 ore ($r=-0.22$, $p<0.01$), glicemia $r=0.13$ ($p<0.05$) e indice di massa VS (IMVS) ($r=0.55$, $p<0.001$). All'analisi multivariata il volume AS è risultato correlato in modo indipendente a IMC ($\beta=0.33$, $p<0.01$), sesso maschile ($\beta=0.28$, $p<0.01$), frequenza cardiaca delle 24 ore ($\beta=-0.24$, $p<0.01$), PAS 24 ore ($\beta=0.15$, $p<0.05$), e PWV ($\beta=0.11$, $p<0.05$). Aggiungendo al modello l'IMVS le variabili correlate in modo indipendente al volume dell'AS sono risultate essere IMVS ($\beta=0.43$, $p<0.01$), IMC ($\beta=0.17$, $p<0.01$), FC 24 ore ($\beta=-0.17$, $p<0.01$).

Conclusioni: In una popolazione generale del Nord Italia il volume dell'AS è più strettamente correlato ai valori di PA delle 24 ore che a quella clinica, ed alla massa VS.

O393

Analisi delle correlazioni tra il rapporto spessore di parete/lume delle arteriole retiniche e valori di pressione arteriosa centrale e delle 24 ore

Claudia Agabiti Rosei (a), Maria Lorenza Muiesan (a), Anna Pains (a), Massimo Salvetti (a), Carlo Aggiusti (a), Anna Cancarini (b), Sarah Duse (b), Francesco Semeraro (b), Damiano Rizzoni (a), Enrico Agabiti Rosei (a)

(a) *Clinica Medica, Università degli studi di Brescia*, (b) *Clinica Oftalmologica, Università degli studi di Brescia*

Obiettivo: Il rapporto spessore di parete/lume (o wall-to-lumen) delle arteriole retiniche potrebbe rappresentare un parametro di danno microvascolare. Precedenti studi hanno evidenziato una

correlazione tra la struttura delle arteriole retiniche ed i valori di pressione arteriosa (PA) brachiale clinica e delle 24 ore, ma anche della PA centrale. In questo studio è stato analizzato l'importanza relativa dei valori della PA brachiale clinica e delle 24 ore e della PA centrale sul rapporto wall-to-lumen delle arteriole retiniche.

Metodi: E' stato misurato il rapporto wall-to-lumen delle arteriole retiniche in 267 soggetti (129 maschi, età 54 ± 7 anni) usando una tecnica di analisi con flussimetria laser doppler (Heidelberg retina flowmeter, Heidelberg Engineering). Sono state inoltre misurate la PA clinica e delle 24 ore; la PA centrale e l'augmentation index (Ai) sono stati determinati mediante l'analisi dell'onda di polso (Sphygmocor).

Risultati: nei pazienti con ipertensione arteriosa essenziale mai trattati ($n=56$) è stato osservato un rapporto wall-to-lumen più elevato rispetto ai soggetti normotesi ($n=115$) (0.37 ± 0.19 vs. 0.30 ± 0.13 , $p=0.05$). Non sono state osservate differenze statisticamente significative tra i pazienti ipertesi trattati ($n=96$) e i non trattati. Il rapporto wall-to-lumen e l'area della sezione trasversa delle arteriole retiniche sono risultate correlate in modo significativo con la PA sistolica e con la PA differenziale (PP) clinica ($r=0.23$, $p=0.005$ e $r=0.18$, $p=0.005$), con la PA sistolica e la PP delle 24 ore ($r=0.28$, $p=0.0001$, $r=0.19$, $p=0.003$) e con la PA e la PP centrale ($r=0.20$, $p=0.01$ e $r=0.21$, $p=0.001$). Includendo nell'analisi di regressione multipla i diversi parametri pressori, solo la PA sistolica media delle 24 ore è risultata associata in modo indipendente all'aumento del rapporto wall-to-lumen delle arteriole retiniche.

Conclusioni: in questo gruppo piuttosto ampio di pazienti ipertesi e soggetti normotesi la PA sistolica delle 24 ore sembra essere il principale determinante dell'aumento del rapporto spessore di parete/lume delle arteriole retiniche.

O394

Distensibilità carotidea in soggetti di una popolazione generale del nord Italia

Carlo Aggiusti (a), Anna Pains (a), Massimo Salvetti (a), Deborah Stassaldi (a), Fabio Bertacchini (a), Giulia Rubagotti (a), Giulia Maruelli (a), Claudia Agabiti Rosei (a), Claudia Chillè (a), Vittoria Marinone (a), Francesco Mattavelli (a), Enrico Agabiti Rosei (a), Maria Lorenza Muiesan (a)

(a) *Clinica Medica, Università degli studi di Brescia*

Premesse: I determinanti della rigidità aortica sono stati analizzati in numerosi studi in passato, ma attualmente sono disponibili pochi dati riguardo i determinanti della rigidità arteriosa locale valutata a livello carotideo.

Lo scopo di questo studio è stato quello di individuare i fattori associati agli indici di distensibilità arteriosa valutata a livello carotideo in una popolazione generale del Nord d'Italia (Studio Vobarno).

Pazienti e metodi: 183 soggetti (61% femmine, età 55 ± 4 anni, 53% ipertesi, 59% trattati) sono stati sottoposti ad esami ematochimici ed a misurazione della pressione arteriosa clinica e delle 24 ore. Tutti i pazienti sono stati sottoposti a eco-color-doppler carotideo con un sistema (ArtLab, Esaote, Italy) basato su tecnologia di echotracking ad alta risoluzione al fine di misurare la distensione, la distensibilità (Dist), il coefficiente di distensibilità (CDist), il coefficiente di compliance (CC) e il modulo elastico di Young (Einc) su un segmento carotideo della lunghezza di 4 cm.

Risultati: nella tabella sono riportate le principali correlazioni tra Dist, CDist ed Einc e le caratteristiche cliniche ed i parametri pressori. All'analisi multivariata le variabili associate in maniera indipendente a Dist, CDist ed Einc sono risultate: età (rispettivamente $\beta=-0.22$, $\beta=-0.22$ e $\beta=0.18$, tutti $p<0.01$), IMC (rispettivamente $\beta=-0.18$, $\beta=-0.18$ e $\beta=0.14$, tutti $p<0.05$), PA media (rispettivamente $\beta=-0.34$, $\beta=-0.33$ e $\beta=0.40$, tutti $p<0.001$) e il sesso femminile (rispettivamente $\beta=0.19$, $\beta=0.18$ e $\beta=-0.15$, tutti $p<0.05$). Analizzando le differenze legate al sesso sono stati osservati valori significativamente inferiori di Dist e CC nelle donne (365 ± 97 vs 427 ± 124 μm , $p<0.001$ e 0.63 ± 0.24 vs 0.83 ± 0.29 $\text{mm}^2/\text{kPa-1}$, $p<0.001$, rispettivamente). Dopo aver considerato, in un modello multivariato, l'effetto dei possibili fattori confondenti, distensione (345 vs 456 μm , $p<0.001$), CDist (23.4 vs 30.3 $\text{kPa-1} \times 10^{-3}$, $p<0.001$) e CC (0.61 vs 0.87 $\text{mm}^2/\text{kPa-1}$, $p<0.001$) sono risultati

significativamente inferiori nelle donne e nello stesso gruppo Einc è risultato significativamente più elevato (0.45 vs 0.34 kPa*103, p=0.007).

Conclusioni: in una campione di popolazione generale età, sesso femminile, IMC ed i valori di PA clinica e delle 24 ore sono associati ad un aumento della rigidità locale carotidea.

| | Dist | | CDist | | Einc | |
|--------------------------|---------|-------|---------|-------|--------|-------|
| | r | P | r | p | R | p |
| Età (anni) | -0.240* | 0.001 | -0.241* | 0.001 | 0.210* | 0.005 |
| IMC (Kg/m ²) | -0.192* | 0.01 | -0.192* | 0.010 | 0.169* | 0.024 |
| PAS clinica (mmHg) | -0.501* | 0.001 | -0.477* | 0.000 | 0.511* | 0.000 |
| PAD clinica (mmHg) | -0.181* | 0.015 | -0.184* | 0.014 | 0.262* | 0.000 |
| PAM clinica (mmHg) | -0.374* | 0.001 | -0.362* | 0.000 | 0.422* | 0.000 |
| PAS 24 ore (mmHg) | -0.207* | 0.006 | -0.198* | 0.009 | 0.222* | 0.003 |
| PAD 24 ore (mmHg) | -0.183* | 0.016 | -0.191* | 0.012 | 0.207* | 0.006 |
| PAM 24 ore (mmHg) | -0.127 | 0.094 | -0.125 | 0.099 | 0.166* | 0.029 |

O395

Modificazioni delle proprietà delle arterie in soggetti ipertesi in terapia combinata esposti ad ipossia ipobarica acuta ad alta quota. Risultati del progetto HIGHCARE-ANDES

Andrea Giuliano (a, b), Paolo Salvi (a), Grzegorz Bilo (a), Miriam Revera (a), Andrea Faini (a), Francesca Gregorini (a), Sergio Caravita (a, b), Carolina Lombardi (a), Elisabetta Salvioni (d), PierGiuseppe Agostoni (d, e), Cecilia Anza (c), Jose Manuel Sosa (c), Francisco Villafuerte (c), Giuseppe Mancina (b), Gianfranco Parati (a, b)

(a) Dipartimento di Scienze cardiovascolari, neurologiche e metaboliche, Ospedale S.Luca, IRCCS Istituto, (b) Dipartimento di Scienze della Salute, Università di Milano-Bicocca Milano ITALIA, (c) Universidad Peruana Cayetano Heredia Lima PERU, (d) Centro Cardiologico Monzino Milano ITALIA, (e) Università degli Studi di Milano, Milano ITALIA

Razionale: L'esposizione all'ipossia ipobarica in alta quota (AQ) induce complesse ed articolate variazioni di diversi parametri cardiovascolari tra cui le proprietà meccaniche delle arterie. Lo studio di tali variazioni è di grande importanza, considerando che sono numerosissime le persone che, per lavoro o per svago, si recano in alta quota ogni anno e che, tra questi soggetti, molti sono ipertesi e già in terapia farmacologica. In letteratura sono pochi gli studi che hanno valutato gli effetti cardiovascolari dell'ipossia ipobarica in pazienti ipertesi e nessuno studio ha finora indagato quale possa essere l'effetto di un trattamento farmacologico antiipertensivo in tali condizioni, a confronto con quanto osservato a livello del mare.

Scopo di questo studio (nell'ambito del progetto HIGHCARE-ANDES) è stato valutare le variazioni delle proprietà elastiche delle arterie in un gruppo di soggetti con ipertensione arteriosa di grado lieve durante esposizione acuta ad ipossia ipobarica da AQ, randomizzati in doppio cieco a ricevere placebo (PL) o telmisartan 80mg + nifedipina GITS 30mg qd (T/N).

Metodi: 100 soggetti residenti a livello del mare con ipertensione arteriosa lieve, non trattati o dopo 4 settimane di wash-out, sono stati randomizzati (1:1) in doppio cieco a ricevere PL o T/N. 89 soggetti hanno completato lo studio (età media 56.4±17.6, 52M/37F, BMI 28.2±3.5 kg/m²). Per mezzo della tecnica tonometrica (PulsePen-DiaTecne), è stata valutata la velocità dell'onda di polso carotideo-femorale (cfPWV), l'Augmentation Index (AIx), il SubEndocardial Viability Ratio (SEVR, indice indiretto di perfusione miocardica) e la pressione centrale sistolica (PCS) dopo 6 settimane di terapia al livello mare (LM, Lima - Perù) ed in esposizione acuta ad alta quota (AQ, Huancayo Perù, 3260m slm), entro 24 ore dall'arrivo. L'AIx è stato corretto per la frequenza cardiaca (FC=75 bpm, AIx75). La pressione arteriosa sistolica e diastolica periferica è stata misurata mediante un apparecchio

oscillometrico validato (AND UA 767-PLUS-30), la pressione media (PAM) e la PCS sono state derivate mediante software PulsePen. La FC è stata ricavata dal segnale ECG.

Risultati: In tabella sono riportati i valori espressi come media \pm SE per ogni condizione.

| Parametro | LM (Lima) | | AQ (3260m slim) | |
|--------------|--------------------|---------------------|------------------------|------------------------|
| | PL | T/N | PL | T/N |
| PAM mmHg | 95,9 \pm 1,42 | 89,6 \pm 1,36 # | 103,4 \pm 1,42 *** | 92,5 \pm 1,35 ## |
| PCS mmHg | 114,5 \pm 1,86 | 106,8 \pm 1,66 # | 123,8 \pm 1,91 *** | 111,4 \pm 1,54 ## |
| FC bpm | 68,72 \pm 1,70 | 66,72 \pm 1,62 | 80,92 \pm 1,70 *** | 78,19 \pm 1,60 *** |
| Alx75 | 10,81 \pm 2,00 | 6,32 \pm 1,92 | 15,68 \pm 2,00 | 8,40 \pm 1,90 # |
| Cf_PWV m/sec | 8,600 \pm 0,226 | 7,564 \pm 0,213 # | 8,330 \pm 0,223 | 7,680 \pm 0,214 # |
| SEVR | 1,679 \pm 0,0360 | 1,653 \pm 0,0344 | 1,412 \pm 0,0360 *** | 1,453 \pm 0,0340 *** |

BAS Vs AQ: *** $p < 0,001$ - PL Vs T/N: # $p < 0,05$; ## $p < 0,005$

Conclusioni: I nostri dati dimostrano per la prima volta, in pazienti ipertesi, il verificarsi di alterazioni della forma d'onda di polso dovute a esposizione acuta ad ipossia ipobarica in AQ, con aumento dell'ampiezza dell'onda di polso, di PAM e di PCS e riduzione del SEVR. Il nostro studio mostra inoltre che una terapia con T/N è in grado non solo di ridurre un indicatore di rigidità arteriosa quale la cfPWV sia a LM che in AQ, ma anche di limitare significativamente gli incrementi di PAM e PCS indotti da AQ, dimostrando come la combinazione T/N possa garantire una maggiore elasticità arteriosa nell'ipertensione anche durante esposizione all'AQ.

GRAVIDANZA E CARDIOPATIE

O396

La gravidanza nelle donne guch: l'influenza della gestazione sulla cardiopatia

Elettra Pomiatto (a), Elisa Mazzotti (a), Paola Angela Maria Purita (a), Eleonora Secco (a), Rosaria Maria Tenaglia (a), Giulio Rizzoli (a), Piero Andrea Pellegrino (b), Luciano Daliento (a)

(a) Dipartimento di Scienze Cardiologiche Toraciche e Vascolari. Università di Padova, (b) Dipartimento di Pediatria Salus Pueri. Università di Padova

Scopo del lavoro: Valutare se la gravidanza è un fattore indipendente di mortalità e morbilità nella GUCH community e valutare i possibili rischi per il nascituro.

Materiali e Metodi: Studio retrospettivo dal 2008 al 2012. 72 pazienti e 89 gravidanze esitate in parto, aborto o IVG. Per caratteristiche della popolazione vedi tabella 1. Abbiamo analizzato l'esito della gravidanza, l'epoca e la modalità del parto, le caratteristiche cliniche (classe NYHA) e morfo-funzionali; la terapia cardiologica pre, durante e post gestazione. Infine abbiamo analizzato l'outcome fetale attraverso la comparsa di IUGR, l'indice Apgar a 1 e 5 minuti e la ricorrenza della cardiopatia.

Risultati: Abbiamo osservato 74 parti (73 nati vivi, 1 morte endouterina), 8 aborti spontanei (entro la 14 settimana gestazionale), 6 IVG <90 giorni, 1 IVG > 90 giorni per malformazione del feto. La nostra analisi ha riguardato le pazienti con una gravidanza oltre la 14 settimana. La classe NYHA pre gravidanza era I in 68 pazienti (90,67%), II in 7 pazienti (9,33%). Durante la gravidanza 5 pazienti (7,35%), sono passate dalla classe NYHA I alla classe II mantenuta stabilmente anche dopo il parto (con peggioramento dei parametri ecocardiografici), 4 (66,3%) sono passate dalla classe NYHA I alla III, condizione in 3 casi (75%) reversibile nel postpartum. Il peggioramento della classe funzionale è correlato con il numero delle gravidanze. Non abbiamo osservato casi di morte materna. Il peso medio dei neonati, e l'indice di Apgar a 1 e 5 minuti erano nella norma, 15 casi di parto pretermine (20,27%, 237 \pm 21 giorni); di questi, 6 (40%) su indicazione cardiologica per peggioramento clinico materno. Sono stati riscontrati 3 casi di IUGR (4,10%) e 4 feti portatori di cardiopatia congenita (5,48%), di questi 3 sono nati vivi, 1 caso di morte endouterina.

Conclusioni: In generale la gravidanza non è controindicata nelle pazienti GUCH anche per le cardiopatie complesse ma il rischio di un peggioramento stabile della condizione emodinamica è correlato al numero di gravidanze. Paradossalmente le cardiopatie congenite semplici sembrano avere un più significativo peggioramento del quadro clinico, verosimilmente perché, l'asintomaticità pre-

gravidanza nasconde una stabilità emodinamica labile non in grado di adattarsi alle modificazioni che la gravidanza comporta.

| | n° pazienti | n° gravid anze | gravidanze a termine | aborto spontaneo | IVG | durata gestazion e | Parto Vaginal e (PV) | Parto cesareo (TC) |
|--------------------------|----------------|----------------------|-------------------------|---------------------|---------|--------------------------|----------------------------|--------------------------|
| semplici operate | 19 | 22 | 17(77,2%) | 4 (18,1%) | 1(4,5%) | 269,53 ± 18,15 | 9 (53%) | 8 (47%) |
| semplici non operate | 22 | 30 | 25 (83%) | 2 (6%) | 3 (10%) | 267,2 ± 15,32 | 8 (32%) | 17(68%) |
| complesse operate | 28 | 34 | 31(91,1%) | 2(5,8%) | 1(2,9%) | 266,3 ± 25,83 | 10(32,%) | 21 (67,8%) |
| complesse non operate | 3 | 3 | 1(33,3%) | 1(33,3%) | 1(33,%) | 258 | 0 (0,0%) | 1(100%) |

Tabella 1. CC semplici = DIA, DIV, PFO, VAB, PDA, fistola coronaria

CC complesse = ToF, TGA, CAV, DIA o DIV associati ad altre anomalie, LVDO, RVDO

O397

Maternal Gestational Diabetes Mellitus and Fetal Heart: follow up of 78 cases in a third level center

Carmela Morelli (a), Concetta Ricci (a), Giovanni Di Salvo (a), Fiorella Fratta (a), Laura Di Pietto (a), Regina Sorrentino (a), Nicola Di Virgilio (a), Giuseppe Santoro (a), Giovanbattista Capozzi (a), Maria Giovanna Russo (a)

(a) *Pediatric Cardiology - AORN dei Colli – AO Monaldi, SUN, Naples*

Introduction: Poorly controlled gestational diabetes mellitus (GDM) complicates 1.5% of pregnancies. Its effects on fetal heart are well known.

Aim: Aim of our study was to describe the incidence of fetal heart hypertrophy and fetal congenital heart disease in a population of fetuses referred for fetal echocardiography in our third level center (AORN dei colli - AO Monaldi, Second university of Naples) for poorly controlled GDM.

Population: Since January 1995 to April 2013 we practiced 8143 fetal heart scans, 78/8143 (1%) were referred for poorly controlled GDM. Mean gestational age at fetal echocardiography was 20.3 +/- 1.5 weeks. We excluded mothers affected by type I diabetes mellitus. We diagnosed 1219/8143 (16%) consecutive fetuses with CHD. 15/1219 (1%) were in fetuses whose mothers were affected by poorly controlled GDM.

Results: GDM fetuses' cardiac ventricular walls were thicker after the period of 28 - 34 weeks in 32/78 (41%) cases. Hypertrophy regressed during the first three months of life in 27/32 (84%) neonates. 5/32 (16%) children are still affected by hypertrophic cardiomyopathy at a mean age of 7+/-2 years.

Moreover, we observed 15/78 (19%) CHD (median gestational age: 21 weeks). 7/15 (46%) atrial septal defects; 5/15 (33%) ventricular septal defects; 1/15 (7%) transposition of the great arteries; 1/15 (7%) aortic valve stenosis and 1/15 (7%) pulmonary atresia with VSD.

Among the 78 fetuses, we did not observe fetal deaths, so 100% were alive at birth. Deliveries occurred at a mean gestational age of 38.6 weeks. Survival was 99% (77/78): 1/78 (1%) died at 14 days of life after switch operation for transposition of the great arteries.

Conclusions: Poorly controlled gestational diabetes mellitus is a relatively rare but potentially serious condition. In our population, 47/78 (60%) of mothers delivered heart-affected babies: 15 (32%) CHD and 32 (68%) affected by ventricular hypertrophy.

O398

Il ruolo della gravidanza nella progressione delle cardiopatie congenite e acquisite

Paola Angela Maria Purita (a), Elisa Mazzotti (a), Elettra Pomiatto (a), Eleonora Secco (a), Rosaria Maria Tenaglia (a), Giulio Rizzoli (a), Luciano Daliento (a)

(a) *Dipartimento di Scienze Cardiologiche Toraciche e Vascolari. Università di Padova*

Introduzione e scopo: Il numero di donne portatrici di una cardiopatia congenita che raggiungono l'età fertile è in aumento. Parimenti sono molte le patologie cardiache acquisite che, rimaste latenti o stabili per anni, possono rendersi evidenti o progredire durante la gestazione. Scopo del nostro lavoro è analizzare il numero e la tipologia di cardiopatie che consentono la gravidanza e vedere se questa sia un fattore di rischio per la progressione della patologia.

Materiali e metodi: Studio retrospettivo dal 2008 al 2012. 138 gravidanze e 118 pazienti. 72 (89 gestazioni) con cardiopatia congenita (CC) (61,02%); 46 pazienti (49 gravidanze) con cardiopatia acquisita (CA) (38,98%). Abbiamo analizzato: 72 CC di cui 41 anomalie semplici: 11 (pervietà del forame ovale (PFO) (4 corrette e 7 non corrette), 9 difetti interatriali (DIA) (7 corrette e 2 non corrette), 9 valvole aortiche bicuspidi (VAB) native, 7 difetti interventricolari (DIV) (3 corrette e 4 non corrette), 4 pervietà del dotto arterioso (PDA) corrette chirurgicamente, 1 fistola coronaria corretta chirurgicamente; 31 pazienti con cardiopatie complesse di cui 28 operate: 12 tetralogie di Fallot (ToF), 3 trasposizioni delle grandi arterie (TGA) corrette mediante switch venoso, 2 canali atrio-ventricolari (CAV) completi, 1 CAV parziale, 1 DIV associato a CoA, 1 DIV associato a PDA, 1 CoA associata a stenosi aortica (SA), 2 stenosi polmonari (SP) associato a DIV o DIA, 2 DIV associati a insufficienza aortica (IA) o a SA, 1 drenaggio venoso polmonare anomalo totale (DVPAT), 1 ventricolo sinistro a doppia uscita (LVDO) corretto con secondo Fontan, 1 ventricolo destro a doppia uscita (RVDO) con I-TGA; 3 CC complesse non corrette chirurgicamente: 1 malattia di Ebstein, 1 sdr di Marfan, 1 DIV associato a VAB; 27 valvulopatie acquisite di origine post-reumatica o post-endocarditica; 10 cardiomiopatie dilatative (CMPD), 6 secondarie (4 ipertensive, 1 secondaria a talassemia major, 1 secondaria a miocardite) e 4 primitive; 6 cardiomiopatie ipertrofiche (CMPI) 5 non ostruttive e 1 ostruttiva; 2 cardiopatie aritmogene del ventricolo destro (ARVC); 1 cardiomiopatia restrittiva secondaria ad amiloidosi cardiaca. Di queste pazienti abbiamo analizzato l'esito della gravidanza, la mortalità materna in gravidanza e puerperio e eventuali peggioramenti della cardiopatia.

Risultati: Studio in corso. Delle 138 gravidanze analizzate, 115 sono esitate in parto; di queste 74 in pazienti con CC (64,35%), 41 in pazienti con CA (35,65%); 11 aborti spontanei, 8 in pazienti con CC (72,73%), 3 in pazienti con CA (27,27%), 10 IVG <90 giorni, 6 in pazienti con CC (60%), 4 in pazienti con CA (40%); 2 IVG > 90 giorni, una per ogni gruppo ed eseguite per malformazione fetale. In 69 pazienti con CC la diagnosi era pre-gravidanza (95,83%), in 3 pazienti (2 DIA e 1 PFO) la patologia cardiaca si è resa evidente durante la gestazione (4,16%). In 39 pazienti con CA la diagnosi era pre-gravidanza (84,78%), e in 11 casi (23,91%) la patologia era stata precedentemente corretta; in 7 casi la patologia cardiaca si è manifestata nel corso della gravidanza (15,22%). 4 pazienti (valvulopatia post-reumatica) hanno richiesto procedure di valvuloplastica o sostituzione valvolare post gravidanza. Non si sono riscontrate morti materne, ma dopo il parto hanno richiesto osservazione in UCIC/ISTAR 4 pazienti CC (5,56%) e 7 con CA (15,22%).

Conclusioni: La cardiopatia di base non influenza l'esito della gravidanza. Le CA vanno incontro con più frequenza a parto pretermine e/o scompenso emodinamico rispetto alle CC dato che la patologia di base spesso non è nota in precedenza o è sottovalutata.

O399

Gravidanza e scompenso cardiaco senza cardiopatia evidente: rebus per il cardiologo

Valentina Benetti (a), Maria Antonia Prioli (a), Alessandra Cristofaletti (a), Corinna Bergamini (a), Giacomo Mugnai (a), Stefano Loreto (b), Elena Giulia Milano (a), Giulia Dolci (a), Corrado Vassanelli (a)

(a) *Dipartimento ad Attività Integrata Cardiovascolare e Toracico, U. O. C. di Cardiologia dU, AOUI Ver*, (b) *Unità Operativa di Radiologia, AOUI Verona*

Introduzione: In gravidanza il sistema cardiocircolatorio materno subisce alcuni adattamenti per assicurare un'adeguata perfusione placentare. Tali modificazioni possono causare, se esagerate, stadi iniziali di scompenso in donne sane, aggravare patologie cardiovascolari già note o svelare anomalie vascolari misconosciute. In questo caso una paziente affetta da una malformazione artero-venosa (MAV) intra-epatica complessa, asintomatica nel periodo pre-gravidico, manifestava durante la gestazione segni di scompenso emodinamico prevalentemente destro.

Descrizione del caso: donna di 36 anni gravida alla 28° settimana, secondipara, giungeva alla nostra osservazione per tosse, edemi declivi bilaterali ed episodio di tachicardia parossistica sopraventricolare risolto con adenosina in pronto soccorso una settimana prima. All'esame obiettivo: SatO₂ periferica 99% in aria ambiente, marcato turgore giugulare, soffio sistolico 3-4/6 al mesocardio e apofisi xifoidea. In anamnesi attività sportiva svolta a livello agonistico fino alla prima gravidanza, avvenuta 2 anni prima e complicata dagli stessi sintomi, regrediti dopo 3 mesi dal parto. Agli ematochimici: Hb 8,8 g/dL, p-NT-proBNP 199 ng/L, D-Dimero 0,95 mg/L. All'emogasanalisi arteriosa: pO₂ 126 mmHg, pCO₂ 22 mmHg in aria ambiente. All'ECG: lieve ritardo di conduzione della branca destra, onda T negativa in V1 e V2 e difasica in V3. Alla radiografia del torace: accentuazione della trama vascolare. All'ecocardiografia: sezioni destre e atrio sinistro dilatati in modo rilevante; indici di funzionalità sistolica dei ventricoli nella norma (FE VSx 63%; TAPSE 30 mm); PAPs 55 mmHg. QP/QS = 1,8; non evidenti difetti settali o ritorni venosi anomali polmonari. All'ecocolordoppler degli arti inferiori veniva esclusa una trombosi venosa profonda, all'ecocolordoppler dei vasi del collo la presenza di fistole artero-venose.

La paziente veniva trattata con terapia diuretica (calo ponderale di 6 kg) e riposo con miglioramento soggettivo e clinico. Partoriva per via vaginale alla 36° settimana una bambina sana di 2650 g e APGAR 9/10. Quattro mesi dopo il parto si avevano la remissione dei sintomi e la riduzione della pressione sistolica polmonare stimata (35 mmHg); persistevano, tuttavia, il turgore giugulare e la dilatazione, all'ecocardiografia, delle quattro camere cardiache (in particolare atrio destro e vena cava inferiore).

La paziente veniva sottoposta a RMN cardiaca che escludeva anomalie vascolari intra ed extracardiache e polmonari, a cateterismo cardiaco destro che escludeva una ipertensione polmonare primitiva (documentando normali pressioni e resistenze polmonari) ma evidenziava una SatO₂ pari a 88% in arteria polmonare. Nel sospetto, quindi, di shunt artero-venosi a livello sistemico, la paziente veniva sottoposta ad ecografia dell'addome con riscontro di MAV epatiche.

Discussione: La gravidanza comporta transitori cambiamenti emodinamici tra i quali la riduzione delle resistenze periferiche (per un circolo placentare a bassa resistenza in parallelo al restante albero cardiovascolare) e l'aumento della gittata cardiaca. In questa donna tali modificazioni si sono aggiunte ad un sistema emodinamico che presentava già un circolo in parallelo a basse resistenze, rappresentato dalle multiple MAV intra-epatiche, ed hanno determinato per questo uno scompenso cardiaco. La diagnosi eziologica è stata fatta con ritardo per l'impossibilità di sottoporre la paziente ad alcuni esami diagnostici in gravidanza e la rarità della diagnosi stessa.

ATEROSCLEROSI PRECLINICA

O400

Cardiovascular risk factors and global pulse wave velocity in postmenopausal women

Maria Maiello (a), Michele Gesualdo (b), Marco Matteo Ciccone (b), Pasquale Palmiero (a)

(a) ASL Brindisi, Equipe Cardiologia Distrettuale, Brindisi, (b) Università di Bari, Cattedra di Cardiologia, Bari

Objective: goal of our study was to investigate major determinants among common cardiovascular risk factor of aortic stiffness on 320 consecutive women using an echocardiographic method to calculate Global Pulse Wave Velocity (PWVg), useful to relate the PWVg to the absolute risk of major cardiovascular events through cardiovascular risk factors estimation.

Patients and methods: 321 consecutive women, mean age was 59,9 years were studied. Individuals were categorized as hypertensive or not. Hypercholesterolemia and diabetes mellitus were defined. Aortic stiffness was assessed by PWVg measured with pulsed Doppler, the interval between the beginning of QRS complex and the foot of the systolic upstroke in the Doppler spectral envelope was calculated at the aortic valve site and at the right common femoral artery. PWVg was calculated between the aortic valve and right common femoral artery by dividing the straight line distance between the two by the transit time, different than PWVc, between carotid and femoral arteries.

Results: all population mean PWVg was 8.2 m/s. 85(26,5%) women were hypertensive(H), mean age 59,7 years, mean PWVg was 7,9 m/s. 118(36,7%) women were hypertensive and hypercholesterolemic(HC), mean age 63,5 years, mean PWVg was 8,3 m/s. 30(9,5%) women were hypertensive and diabetic(HD), mean age 61,8 years, mean PWVg was 7,8 m/s. 36(11,2%) women were hypertensive, diabetic and hypercholesterolemic(HDC), mean age 61,9 years, mean PWVg was 9,3 m/s. 52(16,1%) women without any cardiovascular risk factor were our control group(CG), mean age 49,7 years, mean PWVg was 6,5 m/s. There was a highly significant statistical difference in PWVg between HDC women and each other group: $p < 0,0005$ vs CG, $p < 0,01$ vs H, $p < 0,03$ vs HC e $p < 0,05$ vs HD. No significant statistical difference in PWG was observed comparing the others group. There was no significant statistical difference for age among all groups, except for CG, made by younger women.

Conclusion: PWVg was highly increased in women affected by hypertension, diabetes and hypercholesterolemia all at once. As just assessed in our previous manuscript, and here confirmed, hypertension is the major determinant for PWVg on women. The only addition of diabetes or hypercholesterolemia did not increase PWVg in a significant way, while the addition of both do it. Our study supports the usefulness of the assessment of aortic stiffness as a marker of cardiovascular disease and to identify at an early stage subjects at risk for cardiovascular events.

Key words: aortic stiffness, pulse wave velocity, women, hypertension, diabetes, hypercholesterolemia

O401

Lipid ratios as predictors of subclinical atherosclerosis

Francesca Macaione (a), Francesco Cuttitta (a), Giuseppina Novo (a), Egle Corrado (a), Angela Sansone (a), Vincenzo Sucato (a), Alfonso Lo Presti (a), Giuliana Pace (a), Salvatore Evola (a), Salvatore Novo (a)

(a) *University Hospital “P. Giaccone” division of Cardiology*

Background: this study aimed to appraise the role of lipid ratios (Non-high-density lipoprotein cholesterol [non-HDL-C]/HDL-C ratio, low-density lipoprotein cholesterol [LDL-C]/HDL-C ratio and triglycerides [TG]/HDL-C ratio) as predictors of subclinical carotid atherosclerosis.

Methods: 418 asymptomatic subjects underwent a medical assessment, biochemical analyses and a carotid ultrasound examination. Two groups were individualized in the study population: subjects with (cases, 208) and without (controls, 210) subclinical carotid atherosclerosis.

Results: the two groups were significantly different about lipid ratios ($p < 0.0001$). The adjusted odds ratios for subclinical atherosclerosis by lipid ratios, showed that only non-HDL-C/HDL-C ratio ($p = 0,0011$), and TG/HDL-C ratio ($p < 0,0001$) showed correlation with subclinical carotid atherosclerosis. The Pearson correlation test showed that the non-HDL-C/HDL-C ratio and the TG/HDL-C ratio were positively interrelated ($p < 0,0001$). The area under the receiver operating characteristic (ROC) curves were 0.828 for non-HDL-C/HDL-C ratio and 0.869 for the TG/HDL-C ratio ($p = 0,051$).

Conclusions: this study showed that non-HDL-C/HDL-C ratio and the TG/HDL-C ratio were significant predictors of subclinical carotid atherosclerosis after adjustment for conventional risk factors.

O402

Preclinical atherosclerosis and endothelial dysfunction

Maria Chiara Signorello (a), Luigi Gianturco (a), Chiara Colombo (a), Daniele Stella (a), Fabiola Atzeni (b), Piercarlo Sarzi - Puttini (b), Maurizio Turiel (a)

(a) *IRCCS Galeazzi Orthopedic Institute, University of Milan, Italy*, (b) *Rheumatology Unit, L. Sacco University Hospital, Milan, Italy*

Background: Clinical and biochemical data suggest that autoimmune diseases are associated with endothelial dysfunction and enhanced atherosclerosis. In the past, our group demonstrated cardiovascular (CV) involvement in rheumatoid arthritis, but it is unknown whether the same can be referred to primary Sjogren syndrome (pSS). Recently Pulse Wave Velocity (PWV) and longitudinal strain were used to assess preclinical myocardial and vascular impairment. The aim of our study was to investigate preclinical CV involvement in a group of ambulatory pSS patients by means of these echo parameters.

Methods: We enrolled 22 pSS outpatients (6 males, 16 females mean age 60.1 ± 7.8 years) who full filled the ACR classification criteria without clinical evidence of CV disease and 22 healthy controls matched for age and sex. All subjects underwent conventional echocardiography for acquisition of an apical 4 chamber view and next, speckle tracking analysis was performed off-line to obtain global longitudinal strain. At the same time, carotid artery ultrasonography was performed using a radio frequency data processing able to calculate vascular stiffness as local PWV.

Results: Global longitudinal strain values were significantly lower in pSS patients compared to controls (median 15.28%, IQR 12.3-16.2 vs 19.8%, IQR 19.3-20.4, $p < 0.0001$), as well as carotid PWV (right median 8.8 m/s, IQR 7.3-10.3 vs median 6.9 m/s, IQR 6.6-7.1, $p < 0.0001$; left median 8.9 m/s, IQR 8-10 vs 6.9 m/s, IQR 6.4-7.1, $p < 0.00001$). We didn't find any significant differences for other standard echo parameters.

Conclusions: pSS patients without clinical evidence of CV disease showed an early impairment of myocardial deformation and endothelial function before clinical signs or symptoms of atherosclerosis. These new parameters may be used as early markers of enhanced atherosclerosis in preclinical stage of pSS.

O403

Aterosclerosi preclinica in presenza di sindrome metabolica: un predittore indipendente di eventi cardio e cerebro-vascolari in un follow-up di 20 anni.

Salvatore Novo (a), Angelica Peritore (a), Rosaria Linda Trovato (a), Francesco Paolo Guarneri (a), Daniela Di Lisi (a), Giuseppina Novo (a)

(a) UOC di Cardiologia, AOU Policlinico "P.Giaccone", Dipartimento di Medicina Interna e Specialistica, Palermo.

Background: La sindrome metabolica (SM) è costituita da un insieme di fattori di rischio cardiovascolare tra cui obesità addominale, alterata tolleranza al glucosio, dislipidemia (basso HDL-C e trigliceridi elevati) e ipertensione arteriosa, ed è stata riconosciuta, nel corso di diversi studi, responsabile di disfunzione endoteliale che, a sua volta, rappresenta il primo step nel processo aterosclerotico. L'incremento di spessore intima-media (IMT) o il riscontro di placca carotidea asintomatica (PCA) rappresentano, inoltre, un importante predittore di eventi cardiovascolari. Il nostro studio è stato rivolto a valutare il ruolo dell'aterosclerosi preclinica carotidea sulla previsione di eventi cardiovascolari durante un follow-up di 20 anni in una popolazione di soggetti adulti anche in rapporto alla presenza o assenza di sindrome metabolica.

Metodi: La popolazione in studio è composta da 529 pazienti asintomatici (età media $62 \pm 12,8$ anni), divisi in due gruppi in base ai risultati della valutazione ecografia carotidea: un gruppo senza lesioni aterosclerotiche (198 pazienti) e un secondo gruppo con aterosclerosi preclinica (IMT aumentato o PCA: 331 pazienti). In ciascun gruppo, sono stati identificati due sottogruppi di soggetti con e senza sindrome metabolica. Gli eventi cardiovascolari sono stati studiati in un follow-up di 20 anni: infarto miocardico acuto, angina pectoris, attacco ischemico transitorio, ictus, aneurisma aortico addominale, trombo-endo-arteriectomia e morte cardiovascolare. Le differenze tra i gruppi sono state confrontate con il test Chi-quadro per variabili categoriali. Inoltre, la sopravvivenza libera da eventi è stata testata con la funzione di Kaplan-Meier. Un valore di $p < 0,05$ è stato considerato statisticamente significativo.

Risultati: si sono verificati 242 eventi, 144 tra i pazienti con SM e 98 tra i controlli sani (57,4% vs 35,2%, $p < 0,0001$). 63 eventi si sono verificati in pazienti con carotidi normali, mentre 179 eventi si sono verificati in pazienti con aterosclerosi preclinica (31,8% vs 54,1%, $p < 0,0001$). Tra i 144 eventi totali registrati in pazienti con SM, 36 si sono verificati nel sottogruppo con carotidi normali e 108 nel sottogruppo con aterosclerosi preclinica (45% vs 63,15%, $p = 0,0099$). Allo stesso modo, tra i 98 eventi totali registrati in pazienti senza SM, 27 si sono sviluppati nel sottogruppo con carotidi normali e 71 nel sottogruppo con aterosclerosi carotidea (22,88% vs 44,37%, $p = 0,0003$). Tra i 63 eventi totali riscontrati nei pazienti senza lesioni aterosclerotiche, 36 eventi sono stati registrati nel sottogruppo con SM e 27 nel sottogruppo senza SM (45% vs 22,88%, $p = 0,0018$). Inoltre, tra i 179 eventi totali riscontrati nei pazienti con lesioni aterosclerotiche 108 si sono verificati nel sottogruppo affetto da SM e 71 nel sottogruppo di controlli sani (63,15% vs 44,37%, $p = 0,0009$). Infine, confrontando il sottogruppo senza SM e senza lesioni aterosclerotiche con il sottogruppo affetto da SM ed aterosclerosi preclinica, nel secondo gruppo si è registrata una incidenza decisamente superiore di eventi cardiovascolari (22,88% vs 63,15%, $p < 0,0001$). La funzione di Kaplan-Meier ha mostrato un miglioramento della sopravvivenza nei pazienti senza lesioni aterosclerotiche rispetto ai pazienti con alterazioni ecografiche carotidee ($p = 0,01$, HR: 0,7366, CI: 0,5479-0,9904).

Conclusioni: L'aterosclerosi preclinica ha prodotto un significativo incremento del rischio di eventi cardiovascolari, soprattutto se associata a sindrome metabolica.

O404

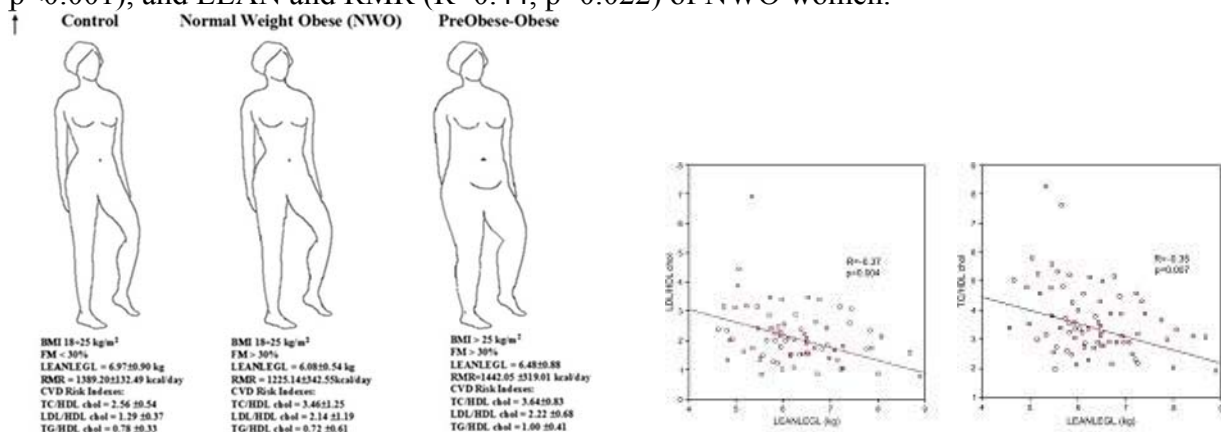
Normal weight obese syndrome: a possible risk for cardiovascular disease

Marco Alfonso Perrone (a), Domenico Sergi (a), Laura Di Renzo (a), Luisa Gigliotti (a), Antonino De Lorenzo (a), Francesco Romeo (a)

(a) Faculty of Medicine and Surgery, University of Rome "Tor Vergata"

Background and aims: Obesity, an independent risk factor for cardiovascular disease (CVD), has been associated with the early development of coronary atherosclerosis in adolescents and young women. Subjects with a normal body mass index (BMI), but high body fat (BF) content (Normal Weight Obese syndrome NWO), showed a significant 2.2-fold increased risk for CV mortality (HR=2.2; 95% CI, 1.03–4.67) in comparison to the low BF group¹. We determined the relationship among body fat distribution and selected CVD risk factors to distinguish normal weight obese from controls with normal metabolic profiles.

Methods and results: We analyzed anthropometric variables, body composition by DXA, RMR by indirect calorimetry and biohumoral variables of 86 clinically healthy Caucasian Italian women. Significant differences were observed in the biochemical HDL-cholesterol values between NWO and controls and pre-obese-obese. Significant correlations were found among cardiovascular risk indexes, LEAN of the right part of the trunk and TC/HDL (R=-0.69, p<0.001) and LDL/HDL (R=-0.72, p<0.001), and LEAN and RMR (R=0.44, p=0.022) of NWO women.



Conclusions: In normal weight obese women the cardiovascular risk indexes are related to metabolic variables and to body fat mass distribution. NWO individuals showed a relationship between the decrease in LEAN of the left leg and an increase in CVD risk factors. We suggest that LEAN distribution seems to be a potential predictor of CVD.

¹Abel Romero-Corral, Virend K. Somers, Justo Sierra-Johnson, Yoel Korenfeld, Simona Boarin, Josef Korinek, Michael D. Jensen, Gianfranco Parati, and Francisco Lopez-Jimenez. Normal weight obesity: a risk factor for cardiometabolic dysregulation and cardiovascular mortality. *Eur Heart J.* 2010 Mar;31(6):737-46

De Lorenzo A, Del Gobbo V, Premrov MG, Bigioni M, Galvano F, Di Renzo L. Normal-weight obese syndrome: early inflammation?. *Am J Clin Nutr.* 2007 Jan;85(1):40-5.

O405

La valutazione della stiffness locale attraverso il segnale in radiofrequenza, è più sensibile della misura dello spessore medio intimale carotideo?

Giuseppina Novo (a), Riccardo Di Miceli (a), Dario Orlando (a), Monica Lunetta (a), Annalisa Graceffa (a), Salvatore Novo (a)

(a) Unità Operativa di Cardiologia, A.O.U.P. "Paolo Giaccone".

Background: L'irrigidimento delle arterie è il risultato di alterazioni precoci delle pareti vascolari. La valutazione della stiffness delle pareti vasali carotidee, con sistemi eco basati sulla radio frequenza, è innovativa e potrebbe migliorare la predizione del rischio oltre la semplice misura dell'IMT.

Lo scopo del nostro studio è stato valutare le variazioni dello spessore medio intimale carotideo (CCA IMT) e della stiffness locale per descrivere, in modo non invasivo, la presenza di malattia vascolare precoce in pazienti con fattori di rischio cardiovascolare e normale IMT carotideo (<0,9 mm).

Metodi: abbiamo studiato 50 pazienti (età media 42 anni \pm 14), senza storia di eventi cardiovascolari e “normale” IMT. Abbiamo valutato i fattori di rischio cardiovascolare tradizionali, l'IMT carotideo e la rigidità arteriosa locale con tecnologia Quality Arterial Stiffness, basata sul segnale in radio frequenza (RFQAS - ESAOTE, Italia). Sono stati misurati il coefficiente di distensibilità (CD), il coefficiente di compliance (CC), la velocità dell'onda di polso (PWV), i parametri α e β in pazienti con e senza i tradizionali fattori di rischio cardiovascolare. 25 soggetti con fattori di rischio (età media 49 \pm 13) sono stati confrontati con 25 controlli senza fattori di rischio cardiovascolare (età media 36 \pm 12).

Risultati: i valori medi di CD (0.030 1/kPa \pm 0.014 vs. 0.022 1/kPa \pm 0.016; $P < 0.05$) e CC (1.087 mm²/kPa \pm 0,47 vs. 0.864 mm²/kPa \pm 0.41; $P < 0.05$), erano significativamente inferiori, mentre il PWV (6,21 m/s \pm 1.74 vs. 7,68 m/s \pm 2.07; $P < 0.05$) e β (7,67 m/s \pm 4.09 vs. 10,45 m/s \pm 5.58; $P < 0.05$) erano significativamente più alti nei soggetti con fattori di rischio cardiovascolare rispetto ai controlli. Non abbiamo osservato nessuna differenza significativa nelle misure di IMT tra i due gruppi (0.530 \pm 0.99 vs. 0.626 \pm 0.127; $P = 5.68$).

Conclusioni: le alterazioni della distensibilità vascolare potrebbero preannunciare l'insorgenza della malattia vascolare prima della manifestazione dei sintomi o del rilevamento delle lesioni aterosclerotiche.

CARDIO - RISINCRONIZZAZIONE

O406

Targeting the Site of Late Electrical Activation in Quadripolar Left Ventricular Lead Using Intracardiac Electrograms Improves Acute Hemodynamic Response to Biventricular Pacing

Amarild Cuko (a), Massimo Saviano (a), Mario Baldi (a), Luke C McSpadden (b), Kyungmoo Ryu (b), Luigi Giannelli (a), Alessia Pappone (a), Cristiano Ciaccio (a), Andrea Petretta (a), Raffaele Vitale (a), Gabriele Vicedomini (a), Carlo Pappone (a)

(a) Department of Arrhythmology, Maria Cecilia Hospital, GVM Care & Research, Cotignola (RA), Italy, (b) St. Jude Medical, Sylmar, California, USA

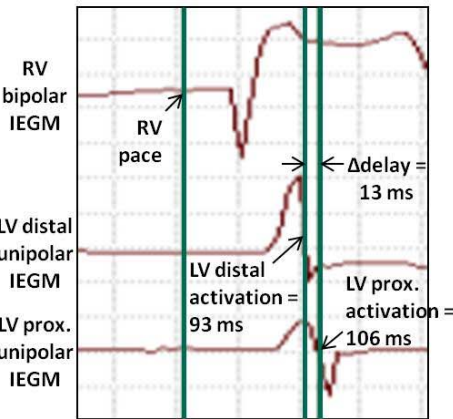
Introduction: As many as 40% of patients (pts) do not clinically respond positively to conventional cardiac resynchronization therapy (CRT), so pts undergoing CRT may benefit from an individualized left ventricular pacing (LVP) site. We hypothesized that selecting an LVP site based on electrical activation time during right ventricular pacing (RVP) could improve acute hemodynamic response.

Methods: Forty-one pts receiving a CRT implant (Unify Quadra MP™ or Quadra Assura MP™ CRT-D and Quartet™ LV lead, St. Jude Medical) underwent LV hemodynamic assessment using a pressure-volume loop system (Inca, CD Leycom). LV pressure was recorded during biventricular pacing with LVP at each of two LV sites (one distal, one proximal) in a quadripolar LV lead. Each pacing intervention was performed twice in a randomized order with RVP (BASELINE) repeated after each intervention. Electrical activation time at both LV sites was computed during RVP using intracardiac electrograms available on the device programmer (figure A).

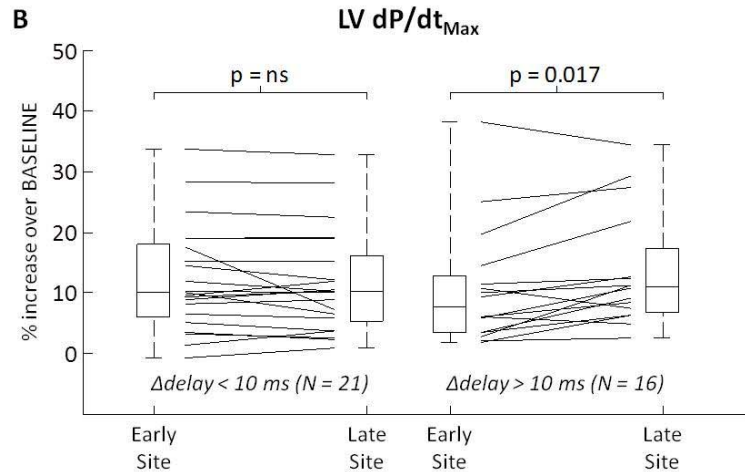
Results: Pressure recordings were obtained in 37/41 pts. The mean difference in RVP induced electrical conduction delay between the early activated site and the late activated site along the quadripolar LV lead (Δ delay) was 11.8 \pm 8.9 ms (range: 0–33 ms). There was no difference in dP/dt_{Max} relative to BASELINE in pts with Δ delay <10ms (12.3 \pm 8.8% vs. 11.6 \pm 8.6%, $p = 0.3$), however, pts with Δ delay >10ms received significant dP/dt_{Max} benefit from pacing at the site of late activation (10.7 \pm 9.8% vs. 13.5 \pm 9.5%, $p = 0.017$, figure B).

Conclusions: Targeting the site of late activation for LVP significantly improves acute hemodynamic response to CRT and offers a simple way to optimize the LVP site with multipolar LV leads. Pressure-Volume loop assessment is a valuable tool to evaluate acute hemodynamic response to CRT. Additional studies may help determine the overall clinical utility of these findings.

A Device Programmer Screenshot



B



O407

Risposta a lungo termine alla terapia di resincronizzazione: esperienza di un singolo centro

Elisa Locantore (a), Luca Bontempi (a), Manuel Cerini (a), Alessandro Lipari (a), Francesca Vassanelli (a), Marco Belotti Cassa (a), Francesca Salghetti (a), Mohamed Elmaghawry (b), Abdallah Raweh (c), Antonio Curnis (a)

(a) Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia, (b) Aswan Heart Centre, Aswan - Egypt, (c) Faculty of Medical Science, Ludes University, Lugano - Svizzera, (d) Biotronik Italia Spa

Background: La terapia di resincronizzazione cardiaca (CRT) è stata validata nel trattamento dei pazienti (pz) con severa disfunzione ventricolare sinistra ed in presenza di un QRS superiore a 120 msec. L'efficacia nel migliorare i parametri emodinamici e clinici è stata dimostrata in ampi trials clinici. Meno noto è il mantenimento a lungo termine di tali benefici.

Scopo: Verificare la persistenza della risposta alla CRT, in termini di incremento della frazione d'eiezione (FE) ad un follow up di lunga durata nei pazienti con cardiopatia dilatativa ischemica (CAD) rispetto ai pazienti con cardiopatia dilatativa non ischemica (NON CAD).

Metodi: 270 pz, di cui 221 maschi e 49 femmine, sono stati sottoposti ad impianto di ICD biventricolare presso il Laboratorio di Elettrofisiologia della Divisione e Cattedra di Cardiologia degli Spedali Civili di Brescia. Sono state considerate due popolazioni: 118 pz con cardiopatia dilatativa ischemica (CAD) e 152 con cardiopatia dilatativa non ischemica (NON CAD). All'impianto, la FE nel gruppo CAD era 27.8 ± 5.6 % e nel gruppo NON CAD era 26.6 ± 6.9 %. I dati ecocardiografici del follow up sono stati raccolti a 12 ± 2 mesi e a 60 ± 8 mesi. La FE è il parametro ecocardiografico utilizzato per quantificare la risposta alla CRT. Sono stati considerati "Responders" alla CRT pz con incremento relativo della FE ≥ 15 % rispetto al basale.

Risultati: A 12 mesi, FE gruppo CAD = 33.4 ± 8.3 % e FE gruppo NON CAD = 34.7 ± 10.6 %. Nei pz CAD, il 64.1% ha risposto alla CRT, con un incremento assoluto della FE di 10.5 ± 3.1 %, mentre nei pz NON CAD i responders sono stati il 76.8% ($p < 0.05$), con un incremento assoluto della FE del 12.8 ± 4.7 %. A 60 mesi la FE nel gruppo CAD era 33.7 ± 9.1 % e nel gruppo NON CAD era 37.8 ± 10.9 %; il numero dei pz Responders è rimasto pressoché invariato in entrambi i gruppi (CAD 62.8 % vs NON CAD 76.8%) ($p = ns$); anche l'incremento in termini assoluti della FE si è mantenuto

costante rispetto a quanto osservato a 12 mesi, sia nei Responders CAD ($10.5 \pm 3.1\%$ vs $10.3 \pm 4.3\%$ $p = n.s.$) che nei Responders NON CAD ($12.8 \pm 4.7\%$ vs $13.6 \pm 5.2\%$ $p = n.s.$). Il trend nel mantenimento dei risultati della CRT, in termini di variazioni assolute della FE, è divergente tra i Responders dei due gruppi ma in maniera non significativa. In particolare, la percentuale dei Responders con un aumento assoluto della FE $\geq 10\%$ è passata dal 40.0% a 12 mesi al 42.7% a 60 mesi nel gruppo CAD e dal 24.6% al 49.6% nel gruppo NON CAD ($p < 0.01$).

Conclusioni: Sulla base dei dati raccolti, l'incremento della FE in risposta alla CRT è avvenuto principalmente entro i 12 mesi dall'impianto in entrambi i gruppi analizzati. Nell'arco di tempo tra i 12 e i 60 mesi i benefici ottenuti dalla CRT sono stati mantenuti, complessivamente con minime variazioni della FE nelle rispettive popolazioni.

O408

Ottimizzazione della stimolazione biventricolare in acuto con metodica cruenta: esperienza di un singolo centro

Alessandro Lipari (a), Antonio Curnis (a), Manuel Cerini (a), Francesca Vassanelli (a), Elisa Locantore (a), Marco Belotti Cassa (a), Francesca Salghetti (a), Mohamed Elmaghawry (b), Abdallah Raweh (c), Luca Bontempi (a)

(a) Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia, (b) Aswan Heart Centre, Aswan - Egypt, (c) Faculty of Medical Science, Ludes University, Lugano - Svizzera

Background: L'insufficienza cardiaca è attualmente uno dei problemi sanitari di maggior rilevanza nei paesi occidentali. La terapia di resincronizzazione cardiaca, nel corso degli ultimi 15 anni, è stata ampiamente validata, in termini di efficacia e sicurezza, nello scompenso cardiaco. Tuttavia esiste ancora una quota di circa il 15-20 % che non beneficia di tale terapia. Tra i fattori che possono contribuire alla riduzione di tale percentuale, ha un ruolo fondamentale la programmazione del device.

Metodi: Dal Settembre 2011 a Maggio 2013, presso il Laboratorio di Elettrofisiologia ed Elettrostimolazione degli Spedali Civili di Brescia, 50 pazienti sono stati sottoposti a monitoraggio semi-invasivo con sistema Most-Care al termine dell'impianto di CRT-D, al fine di quantificare le variazioni emodinamiche secondarie alle diverse modalità di pacing e di programmazione dei ritardi AV e VV e di ottimizzare la programmazione dei dispositivi biventricolari durante l'impianto stesso. Di questi pazienti (39 maschi e 11 femmine; età media $72 \pm 10,4$ anni) il 12% era affetto da cardiomiopatia dilatativa idiopatica, l'88% su base ischemica, in classe NYHA III e IV, frazione di eiezione del ventricolo sinistro $< 35\%$, durata basale del complesso QRS ≥ 120 msec e pertanto candidati, in accordo alle indicazioni delle attuali linee guida, ad impianto di dispositivo biventricolare. Tutti i pazienti erano in condizioni cliniche stabili ed in terapia medica ottimizzata. Sono stati esclusi dall'arruolamento allo studio i pazienti con stenosi aortica severa, i portatori di protesi aortica, ed i pazienti con fibrillazione atriale, al fine di ottenere una popolazione più omogenea in considerazione della minore affidabilità della metodica PRAM in presenza di queste condizioni. Prima della procedura di impianto, un introduttore arterioso veniva posizionato in arteria radiale e connesso al Most-Care mediante un trasduttore di pressione standard. Sono stati presi in considerazione i seguenti parametri emodinamici: Cardiac Output (CO), Stroke Volume (SV), l'indice di rendimento cardiaco (CCE), il dP/dt .

Risultati: Tutte le procedure di impianto di ICD biventricolare (50 in totale) sono state portate a termine con successo e tutti i pazienti hanno dato il loro consenso ad essere arruolati nello studio. Most-Care PRAM è stato in grado di valutare un miglioramento dei parametri emodinamici nel 100% delle misurazioni. Il CO è migliorato del $14.1 \pm 7,98\%$; lo SV del $10,9 \pm 12,3\%$; la CCE del $16,4 \pm 198\%$; il dP/dt del $8,7 \pm 6,2\%$ e la durata del QRS all'ECG di superficie si è ridotta del $14.7 \pm 14.87\%$. Tale variazione, in percentuale è stata inoltre confermata alle misurazioni dei medesimi parametri all'ecocardiogramma: la CO è migliorata del $15,3 \pm 8,2\%$ e lo SV del $13,1 \pm 12,7\%$. Inoltre, non è

stata dimostrata alcuna correlazione tra la riduzione della durata del complesso QRS all' ECG di superficie ed il miglioramento dei parametri emodinamici.

Conclusioni: La nostra esperienza ha evidenziato che PRAM è una metodica affidabile nella ottimizzazione della programmazione della CRT se paragonata ad una metodica accettata quale l'ecocardiogramma transtoracico. Si tratta di un monitoraggio emodinamico semi-invasivo semplice, sicuro, veloce e riproducibile. In futuro sarà necessario, oltre alla validazione dell'affidabilità, anche la validazione dell'utilità della metodica nel predire la risposta alla terapia di resincronizzazione.

O409

Impact of CRT on right ventricle in HF patients at 6 months follow up

Ambrogio Capria (a), Fabiana Romeo (a), Luca Santini (a), Riccardo Morgagni (a), Fortunata Condemi (a), Valentina Minni (a), Valentina Schirripa (a), Alessandro Politano (a), Giulia Magliano (a), Giovanni B. Forleo (a), Domenico Sergi (a), Francesco Romeo (a)

(a) *Cardiology Dpt, University Hospital Policlinico "Tor Vergata" Rome, Italy*

Background: The prognostic value of ultrasound evaluation of right ventricular (RV) performance in patients with congestive heart failure (CHF) is still a matter of investigation, regarding its pathophysiological role in the functional response to the cardiac resynchronization therapy (CRT).

Methods: We studied 20 patients, aged 74.4 ± 8.6 , with severe CHF, ischemic (10) or non-ischemic (10) in origin, with a left ventricular ejection fraction $<35\%$, NYHA class 3, treated with a 4-lead CRT. All patients, in optimal pharmacological treatment, underwent an echocardiographic evaluation that included the measurement of the right atrial diameter and ventricular area, PAPs, tricuspid annular plane systolic excursion (TAPSE) and right diastolic function; 8 patients were in chronic atrial fibrillation. The follow-up is actually recorded at 1, 3 and 6 months.

Results: The data at baseline and at 6 months follow-up, reported as mean \pm SD, are summarized in the table:

| Times | | | | | | | | DVDX | Atr.dx | | |
|-----------|---------------|----------------|----------------|----------------|-----------------|----------------|---------------|----------------|-----------------|----------------|--------------|
| | NYHA | LVEF% | PAPs | RVEDA | LVDEA | TAPSE | E/A VDX | an.tricusp. | diam.ML | PAPm | 6MWD |
| Baseline | 2,9 \pm 0.5 | 27 \pm 6.4 | 31,0 \pm 7.0 | 18.7 \pm 6.3 | 55.8 \pm 31.4 | 19,3 \pm 4.4 | 0,9 \pm 0.4 | 35,5 \pm 7.2 | 38,0 \pm 10.4 | 16.3 \pm 6.0 | 146 \pm 97 |
| Follow-up | 2,3 \pm 0.7 | 34,2 \pm 8.5 | 31.1 \pm 8.4 | 18,8 \pm 8.8 | 38.6 \pm 7.9 | 16.4 \pm 6.9 | 1.4 \pm 0.6 | 31.4 \pm 4.5 | 36.1 \pm 8.5 | 13.8 \pm 9.1 | 316 \pm 99 |
| P | <0,01 | <0,05 | ns | ns | ns | ns | <0.05 | ns | ns | ns | <0,01 |

We recorded, at the 6-month follow-up, significant changes of the NYHA, 6MWD and LVEF paired to significant changes of right E/A ratio and positive changes of the VdTD, DVDx and TAPSE values, that are related to the 6MWT and NYHA class; moreover, the PAPs and PAPm showed only an early but transitory and non-significant improvement.

Conclusions: The echocardiographic evaluation of the right ventricle evaluation adds, in our patients with CHF, significant issues that seem useful to understand the systemic functional response of the right heart to the CRT-treatment; it is likely that the right atrial and ventricular response to the CRT is progressive to occur but play a significant role in the systemic response to the CRT, suggestive of a positive right heart remodelling. Our data, even if still preliminary and involving a small series of patients, are significant because irrespective of the target heart rate and rhythm, but should be confirmed by a longer follow-up on a greater series of patients.

O410

Cardiac memory in cardiac resynchronization therapy: a vectorcardiographic comparison of biventricular and left ventricular pacing

Laura Perrotta (a), Martina Nesti (a), Giulia Pontecorboli (a), Paolo Pieragnoli (a), Giuseppe Ricciardi (a), Fabio Fantini (a), Luigi Padeletti (a, b)

(a) S.O.D. Aritmologia, Università degli Studi di Firenze, (b) Ospedale Gavazzeni, Bergamo

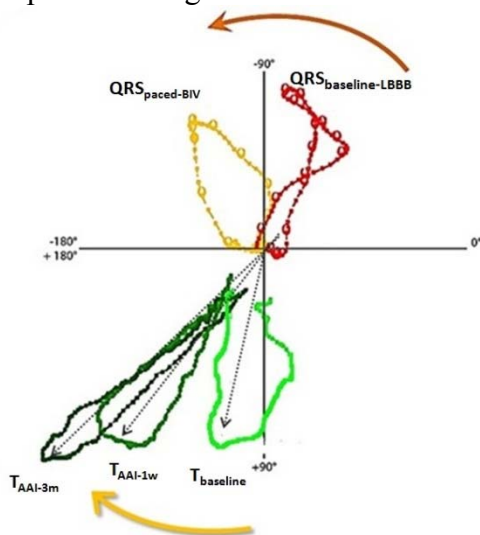
Introduction: ‘Cardiac memory’ (CM) refers to a change in repolarization induced by an altered pathway of activation, manifested after resumption of spontaneous ventricular activation (SVA).

Objective: to investigate for the first time in humans the effects of left ventricular (LV) pacing on CM development through vectorcardiography (VCG).

Methods and Results: We studied 15 patients with heart failure (HF) and left bundle branch block (LBBB) treated with cardiac resynchronization therapy (CRT). Eight patients underwent biventricular (BIV) stimulation, 7 underwent LV stimulation only. VCG was acquired during SVA at baseline and during AAI and DDD pacing immediately after and 7 and 90 days after the implant. At baseline, in both groups, the QRS and T vectors angles were those specific of LBBB pattern. During DDD pacing, in BIV patients QRS vector angle changed to the right and upward otherwise in LV patients no significant differences were observed.

After 7 days, during AAI pacing, T vector angle changed significantly only in BIV patients, following the direction of the paced QRS and amplitude significantly increased with a further significant increase at 90 days (see figure). In LV patients, only a significant increase of T vector amplitude was observed at 7 days ($p=0.02$) and at 90 days ($p=0.018$ vs baseline).

Conclusion: In patients with LBBB, BIV stimulation induces cardiac memory development as a significant change in T vector magnitude and angle, while LV stimulation doesn’t induce significant modifications in QRS and T vector angles and CM is manifested only as a significant T vector amplitude change.



O411

Initial experience with a novel multi-vector impedance monitoring system in CRT-D recipients.

Germana Panattoni (a), Giovanni B Forleo (a), Valentina Schirripa (a), Lida P Papavasileiou (b), Domenico G Della Rocca (a), Gianmarco A Volpe (a), Federico Bernardini (a), Fabio Ticconi (a), Giulia Magliano (a), Domenico Sergi (a), Luca Santini (a), Francesco Romeo (a)

(a) *Cardiology Division, Tor Vergata University Hospital, Rome, Italy*, (b) *Electrophysiology, Pacemaker & ICD Unit, Hygeia Hospital, Athens, Greece*

Aims: We investigated the performance of a new intrathoracic multi-vector impedance monitoring system for the prediction of heart failure (HF) events in consecutive device-implanted patients.

Methods: Eighty HF patients implanted with biventricular defibrillators with multi-vectors impedance monitoring capability were prospectively enrolled. Clinical HF status and impedance data were assessed during follow-up and if patients presented with an alert or HF deterioration.

Results: During follow-up (8.0±4.4 months), 56 events of device-alert for fluid index increase were identified in 29 patients and a total of 39 HF events (defined by worsening of HF signs and symptoms) occurred in 23 patients. The sensitivity and positive predictive value (PPV) for HF deterioration was 61.5% and 42.9%, respectively. False-positive alerts occurred in 19/80 patients (23.8%), for an episode rate of 0.60 a year. Among all clinical HF events, decompensation caused hospitalization in 13 cases (33.3%), 7 of them were preceded by an alert condition (53.8%) resulting in a sensitivity of 53.8% and a PPV of 17.9%.

Conclusions: The present study confirms the feasibility and clinical usefulness of this novel multi-vector impedance monitoring system. It is worthwhile to perform larger studies to assess its actual clinical value in HF patients.

O412

Evaluation of patients undergoing cardiac resynchronization therapy: complex role of right ventricular function

Giuseppe Ricciardi (a), Paolo Pieragnoli (a), Elena Sticchi (a), Francesca Ristalli (a), Paola Attanà (a), Ilaria Ricceri (a), Cinzia Fatini (a), Luigi Padeletti (a), Rosanna Abbate (a), Gian Franco Gensini (a, b), Antonio Michelucci (a)

(a) *Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy*, (b) *Fondazione Don Carlo Gnocchi ONLUS, Centro S.Maria agli Ulivi-IRCCS, Florence, Italy*.

Background: Right ventricular function (RVF), and in particular tricuspid annular plane systolic excursion (TAPSE), is useful to identify responders to cardiac resynchronization therapy (CRT). Right ventricular dysfunction has been also associated with renal impairment, so possibly representing a mechanistic link between heart failure and renal dysfunction. We investigated the relationship between TAPSE and both renal markers and echocardiographic parameters in heart failure (HF) patients scheduled for CRT with defibrillator (CRT-D).

Methods: Eighty-eight HF patients in sinus rhythm on optimal medical therapy [median age 67(29-89) yrs, males/females 75/13, ischemic etiology:47%, NYHA class II-IV, left ventricular ejection fraction (LVEF) lower than 40%], undergoing CRT-D were studied. Forty-five (51%) patients showed narrow QRS (<120 ms) with systolic dyssynchrony; remaining patients had QRS > 120ms and left bundle branch morphology.

All subjects underwent conventional echocardiography to assess left ventricular end-diastolic and end-systolic volume, left ventricular mass, tricuspid annular plane systolic excursion (TAPSE), and diastolic function (E/E', E/A). The interventricular delay (IVD) was calculated as the difference between the aortic pre-ejection time and the pulmonary pre-ejection time at PW Doppler. Systolic asynchrony was assessed by calculating the standard deviation of the time to peak systolic velocity in ejection phase of the 12 left ventricular segments, and the cut-off value was 32.6 ms.

Baseline (before CRT-D) renal function was evaluated using usually adopted [creatinine, glomerular filtration rate, estimated by the abbreviated Modification of Diet in Renal Disease equation (MDRD), and blood urea nitrogen (BUN)] and emerging parameters [cystatin C (CystC) and neutrophil gelatinase-associated lipocalin (NGAL)].

Results: By evaluating the relationship between TAPSE and both traditional and emergent renal parameters, a significant positive correlation with eGFR (MDRD) ($p=0.04$), and a significant negative correlation with CystC ($p=0.02$) and NGAL ($p=0.02$) was found. TAPSE significantly correlated with NT-proBNP levels ($p=0.02$), indexed left ventricular end-diastolic and end-systolic volume (LVEDV: $p=0.005$; LVESV: $p=0.03$) and left ventricular mass (LV mass: $p=0.03$), and with inter-ventricular delay (IVD: $p=0.006$). No significant correlations between TAPSE and Yu-index, E/E' and E/A were observed.

Conclusions: Our results indicate that RVF is linked to renal function, left ventricular remodeling, and inter-ventricular delay, thus confirming the relevance of right ventricle in the evaluation of systolic dysfunction.

O413

Analysis of influence of previous PMK/ICD implant on CRT outcomes

Valentina Minni (a), Luca Santini (a), Germana Panattoni (a), Valentina Schirripa (a), Karim Mahfouz (a), Pierdomenico Cicco (a), Marianna Sgueglia (a), Federico Bernardini (a), Domenico Sergi (a), Giulia Magliano (a), Giovanni B Forleo (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia, Università degli Studi di Roma, Policlinico Tor Vergata*

Background: Large clinical trials support the role of cardiac resynchronization therapy (CRT) as an important therapeutic option in Heart Failure (HF); however 30% of patients do not improve clinically after CRT. The aim of our study was to evaluate if the previous PMK/ICD implant could influence the outcomes of patients receiving CRT.

Methods: We evaluated one hundred twenty-eight consecutive patients implanted at our Institute. All patients were followed for at least 6 months follow up. At the baseline and during follow-up analyzed clinical variables were 6-min walking test (6MWT) distance, echocardiographic parameters (LV end-systolic volume, LV end-diastolic volume and LV ejection fraction) and Minnesota living with heart failure (HF) questionnaire for quality of life (QoL) assessment.

Seven patients died before they completed 6 months follow up. We divided the remaining patients into two groups: 27 pts with previous PMK/ICD implant (group A) and 94 patients underwent to first CRT implant (group B).

Results: At the baseline no statistically significant differences were found between two groups. After 6 months follow-up no statistically significant differences were found between two groups concerning reverse remodeling: Δ LVED volume ($-11,01 \pm 139,98$ in group A vs $-14,21 \pm 75,69$ in group B, $p=ns$) and Δ LVES volume ($-11,61 \pm 111,36$ in group A vs $-18,21 \pm 63,53$ in group B, $p=ns$) and Δ EF ($5,31 \pm 10,58$ group A vs $5,51 \pm 11,96$ group B), the distance covered in 6MWT (Δ 6MWTd: $114,37 \pm 126,56$ group A vs $159,56 \pm 124,69$ group B) and in Minnesota Quality of Life score (Δ QoL score: $2,7 \pm 33,63$ group A vs $-5,27 \pm 24,02$).

Conclusions: CRT is well established as a treatment for heart failure in patients with severely impaired LV systolic function and evidence of ventricular dyssynchrony. Previous PMK/ICD seems not to influence clinical and echocardiographic variables.

ELETTROCARDIOGRAFIA NEGLI ATLETI

O414

J point elevation is associated with an increased interventricular septal thickness in elite professional football players

Luigi Biasco (a), Yvonne Cristoforetti (a), Davide Castagno (a), Gianpasquale Ganzit (b), Carlo Gabriele Gribaudo (b), Fiorenzo Gaita (a)

(a) Università di Torino, Dipartimento di Scienze Mediche, Divisione di Cardiologia, (b) Istituto di Medicina dello Sport

Background: J point elevation is common in athletes, nevertheless the influence of structural changes associated with the athlete's heart is still debated. Our aim was to investigate the prevalence of J point elevation and the associated clinical, electrocardiographic and echocardiographic characteristics in elite soccer players.

Methods and Results: Clinical, electrocardiographic and cardiopulmonary exercise test data from 332 male professional soccer players were analyzed. For 235 (70.7%) athletes echocardiographic data were also available. J point elevation was defined as an elevation ≥ 1 mm in at least two contiguous leads. Univariate and multivariable analyses were performed to assess the associated characteristics. Overall, 118 (35.6%) athletes showed a J point elevation ≥ 1 mm. At multivariable analysis a significant direct association of interventricular septum thickness (OR 1,224 95%CI 1,014-1,478; $p=0,036$) and Sokolow Lyon index (OR 1,031 95% CI 1,002-1,060, $p=0,033$) and an inverse association of baseline heart rate (OR 0.985, CI 95% 0.945-0.993, $p=0.011$) with J point elevation were observed.

Conclusions: Correlation between J point elevation and interventricular septum thickness suggests a possible mechanistic role of exercise induced left ventricular hypertrophy as basis for J point elevation.

O415

EKG abnormalities distribution between competitive and no competitive athletes in a population of 12.000 young Italian students

Maria Giovanna Vassallo (a), Alessandra Cinque (a), Maria Chiara Gatto (a), Massimo Mancone (a), Alessandra D'Ambrosi (a), Antonio Fusto (a), Iliaria Mancini (a), Francesco Adamo (a), Azzurra Marceca (a), Paola Scarparo (a), Giuseppe Giunta (a), Francesco Fedele (a)

(a) Università Sapienza di Roma. Policlinico Umberto I Dipartimento di scienze cardiovascolari

Introduction: The implementation of 12-lead EKG screening of young no competitive athletes is still controversial. The aim of our study is to evaluate the difference in the EKG abnormalities distribution between competitive and no competitive athletes.

Methods: From October 2010 to March 2013, we evaluated prospectively 12108 high school students (Age $17,9 \pm 1,57$ and 55,98% female); from these we analyzed 1048 athletes: 682 no competitive athletes and 366 competitive athletes. They were screened using an anonymous medical history questionnaire and 12-lead EKG. For statistical analysis we used the t test and Fisher's test, when appropriate. The statistical difference was considered significant only for $p\text{-value} \leq 0.05$.

Results: There was no significant statistical difference between distributions of EKG abnormalities in two groups, except for the sinus bradycardia and right ventricular conduction delay (Table 1).

Conclusions: Our study evidenced that in competitive and no competitive athletes the distribution of EKG abnormalities is similar. Therefore these results suggest that EKG screening is recommended also in no competitive athletes.

EKG finding

| | N. | % of abnormal in no competitive athletes EKGs | % of abnormal in competitive athletes EKGs | p value |
|------------------------------------|-----|---|--|---------|
| Right-axis deviation | 48 | 4.7% | 4.4% | 0.88 |
| Left ventricular hypertrophy | 62 | 4.7% | 8.2% | 0.12 |
| Right ventricular hypertrophy | 2 | 0.3% | - | 0.55 |
| Right bundle branch block | 22 | 1.5% | 3.3% | 0.07 |
| Left bundle branch block | 2 | 0.5% | - | 0.54 |
| Right ventricular conduction delay | 204 | 17.9% | 23.5% | 0.03 |
| Premature atrial contraction | 10 | 0.9% | 1.1% | 0.51 |
| Sinus Tachycardia | 48 | 10.5% | 3.3% | 0.16 |
| Sinus Bradycardia | 98 | 7.3% | 13.1% | 0.002 |
| Early repolarization | 96 | 10.3% | 7.1% | 0.09 |

O416**Stratificazione del rischio aritmico di morte improvvisa in atleti non competitivi mediante monitoraggio ECG dinamico long time Nuubo**

Maurizio santomauro (a), Luigi Matarazzo (a), Giuseppina Langella (a), Vincenzo Poli (a), Sabato Cioffi (a), Veronica Russolillo (a), Vincenzo De Amicis (a), Marco Mucerino (a), Carla Riganti (b), Fabio Marino (c), Carlo Vosa (a)

(a) Dipartimento di Cardiologia, Cardiochirurgia e Emergenze Cardiovascolari, Università Federico II Nap, (b) Direzione Sanitaria, AOU Federico II Napoli, (c) Centro di Ingegneria Biomedica NUUBO, Madrid, Spagna

Introduzione: Atleti competitivi, in apparente buona salute, presentano frequentemente aritmie ventricolari maligne. Alcuni di essi possono presentare malattie cardiovascolari insospettite e potenzialmente mortali che hanno come esito la morte aritmica improvvisa. Rimane non risolto per gli atleti con aritmie ventricolari complesse, il rischio di morte cardiaca improvvisa associato con la partecipazione a competizioni sportive anche amatoriali.

Pazienti e metodi: La presenza di palpitazioni e di 3 BEV nell'elettrocardiogramma ha guidato la selezione di 155 atleti non agonisti che sono stati sottoposti a test da sforzo massimale al cicloergometro, ecocardiogramma mono e 2D con Doppler, ECG dinamico sec Holter long time NUUBO nECG SUITE comprensivo di analisi dell'Heart Rate Variability. Gli atleti sono stati suddivisi in tre gruppi, in base al numero dei BEV: (A) n. 21 con = 2000 BEV/7 gg.; (B) n. 53 con = 100 < 2000 BEV/7 gg.; (C) n. 81 con <100 BEV/7 gg.

Risultati: Anormalità cardiache sono state rilevate in 6 atleti (esaminati anche con MRI, scintigrafia nucleare) del gruppo (A). In questi 6 atleti è stata dimostrata la presenza di prolasso mitralico con rigurgito (n. 3), miocardite (n.1), cardiomiopatia ipertrofica (n. 2). Gli atleti del gruppo (A) hanno dimostrato, rispetto a quelli del gruppo (B) e (C) valori più elevati di QTcD (74.8±26.4 vs 64.2±22.7) e di Tp-Te (137.8±11.4 vs 116.4±16,2). Dall'analisi di correlazione lineare è stato dimostrato che negli atleti di gruppo (A) la DTRV (dispersione del tempo di recupero ventricolare) è significativamente correlata con la durata del QRS e del QT, misurato sull'ECG di superficie o calcolato dalla media registrata all'esame dinamico secondo Holter long time NUUBO: QTcD vs QT: r=0.444 p=0,011.

Conclusioni: Questa coorte di atleti non agonisti rappresenta una popolazione di soggetti nei quali la presenza di battiti ectopici ventricolari (BEV) ha richiesto esami più approfonditi che hanno consentito di slatentizzare delle alterazioni strutturali che altrimenti non sarebbero mai state ricercate.

Queste alterazioni strutturali sono state evidenziate soltanto in atleti di gruppo (A), con un elevato numero di BEV, tuttavia le loro aritmie ventricolari non erano differenti da quelle di atleti dei gruppi (B) e (C) senza alterazioni cardiache dimostrabili. Mediante l'ECG di Holter tradizionale di 24/h, i BEV possono essere evidenziati nel 40%-75% di atleti in apparente buona salute. L'incidenza, la prevalenza e la complessità di queste aritmie aumentano con l'età. La chiarificazione della loro patogenesi continua ad essere confusa dall'intervento di molti meccanismi elettro-fisiologici e anatomici che talvolta però possono essere evidenziabili solo con nuove tecniche molto complesse (MRI, biopsie endo-miocardiche e studi genetici). Perciò gli studi futuri di popolazioni di atleti e di soggetti apparentemente sani, nei quali si evidenziano BEV numerosi e complessi, devono essere pianificati in modo da stabilire quando gli esami cardiologici convenzionali devono essere integrati dalle metodiche più complesse.

O417

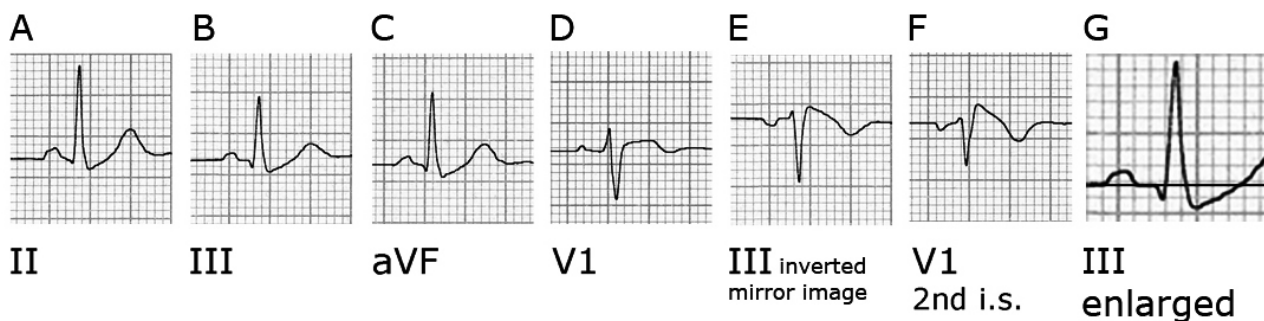
Does limb leads analysis improve brugada pattern recognition?

Pasquale Crea (a), Giuseppe Picciolo (a), Francesco Luzzza (a), Giuseppe Oreto (a)

(a) Dipartimento di Medicina e Farmacologia, Università di Messina

Background: Brugada pattern (BP) is usually diagnosed by right precordial leads analysis. Sodium channel dysfunction localized in a small region (the right ventricular outflow tract) is likely the reason why only electrodes lying upon the affected area are able to record the abnormal potentials. In some non-diagnostic ECGs, only “high” right precordial leads, recorded at the 3rd or 2nd intercostal space (i.s.) reveal BP, whereas limb leads analysis is usually considered not relevant for the diagnosis. Aim of the present study was to assess whether inferior leads analysis improves BP recognition.

Methods: We analysed 52 ECGs with type 1 Brugada pattern; in each case, leads V1 and V2 had been recorded at the 4th, 3rd and 2nd i.s. We analyzed standard leads II, III and aVF looking for superiorly concave ST segment depression ≥ 0.05 mV with a duration ≥ 0.08 sec. (Figure, panel G).



Results: In 33 patients (65%) an ascending superiorly concave ST segment depression ≥ 0.05 mV with a duration ≥ 0.08 sec was observed in the inferior leads. This occurred in 27/33 cases (81%) for lead II; in 22/33 (66%) for lead III and 23/33 (69%) for lead aVF. 19 patients (35%) did not show any significant ST segment abnormality in those leads. ST segment depression in lead II was observed in 21 out of 40 (53%) cases with BP evident in V1-V2 recorded at 4th i.s., and also in 6 out of 12 cases with BP diagnosed only at the 3rd or 2nd i.s. The Figure shows an example of BP not evident in V1 at the 4th i.s. (panel D) but only at the 2nd i.s. (panel F); there is, however, a clear depression of J point and ST segment in the inferior leads (1.5 mm in lead III, panel G). It is worth noting that the inverted mirror image of lead III is almost identical to lead V1 recorded at the 2nd i.s. In other words, the abnormal electrical activity recorded by a “high” lead V1 is evident, in this patient, also in lead III. This confirms the assumption that BP signs can also be recognized in the limb leads.

Conclusion: Brugada ECG findings (ST segment elevation) are commonly observed in the right precordial leads. Specular ECG changes, however, often occur in the limb leads, as an expression of a superiorly directed ST segment and J wave vector. Whenever standard ECG analysis is non-diagnostic, namely no J wave or elevated ST segment is evident in conventional V1 or V2 leads,

superiorly concave ST segment depression in the inferior leads pinpoints the need for moving the V1 and V2 electrodes 1 or 2 i.s. higher in order to improve BP recognition.

CELLULE PROGENITRICI ENDOTELIALI: PRECONDIZIONAMENTO

O418

Endothelial progenitor cells recruitment correlate with coronary artery disease severity

Federica Massaro (a), Maria Elena Lucia Picoi (a), Niccolò Mancini (a), Chrysanthos Grigoratos (a), Uberto Bortolotti (a), Cristian Scatena (b), Giuseppe Naccarato (b), Generoso Bevilacqua (b), Rossella Di Stefano (a), Alberto Balbarini (a)

(a) *University of Pisa, Department of Surgery, Medical, Molecular and Critical Area Pathology, Pisa, Ita*, (b) *University of Pisa, Departement of Translation Research on New Technologies in Medicine and Surgery*.

Purpose: Despite numerous studies investigating the level and function of peripheral blood Endothelial Progenitor Cells (EPCs), no scientific evidence concerning the presence and role of EPCs in human being myocardium exists. Our study aimed to investigate the correlation between EPC density in myocardium and coronary artery disease (CAD) severity.

Methods: A population of 28 patients (pts) was enrolled in this study. 17 consecutive CAD pts, 7 affected by one vessel coronary disease (CAD1), 5 pts by two vessel coronary disease (CAD2), 5 pts by three vessel coronary disease (CAD3), were confronted with 11 pts undergoing Isolated Valve Surgery with no CAD (IVS). Right atrial appendage segment was collected during cardioplegia induction and immunohistochemistry was used to identify CD34+ and KDR+ cells, expected to be EPCs.

Results: The mean age of the enrolled population was 76 ± 6 years with no significant difference between the two groups ($p=n.s.$). As expected, we observed an higher prevalence of cardiovascular risk factors in patients with more severe CAD. Our results demonstrated a twofold increase in the mean EPC density of CAD pts ($0,316\pm 0,270$ EPC/mm²) compared with IVS pts ($0,146\pm 0,117$ EPC/mm²) with a statistically significant difference ($p < 0.05$). Moreover, in the group of pts with advanced CAD (CAD2+CAD3) EPC density was significantly higher ($p=0,045$) than in the group with less severe and no CAD pts (CAD1+IVS). In these two groups average EPC density was respectively $0,364\pm 0,323$ and $0,200\pm 0,152$ EPC/mm².

Conclusions: In our study we observed a significant correlation between tissutal EPC density and CAD severity. We hypothesize that progression of CAD disease and the consequent chronic ischemia is a stimulus to increase bone marrow mobilization, recruitment and homing in myocardium. These results allow us to support the hypothesis of EPC involvement in the reparative mechanisms of ischemic myocardium.

O419

Effetti divergenti del pre- e post- condizionamento ischemico sulla funzione microvascolare postischemica

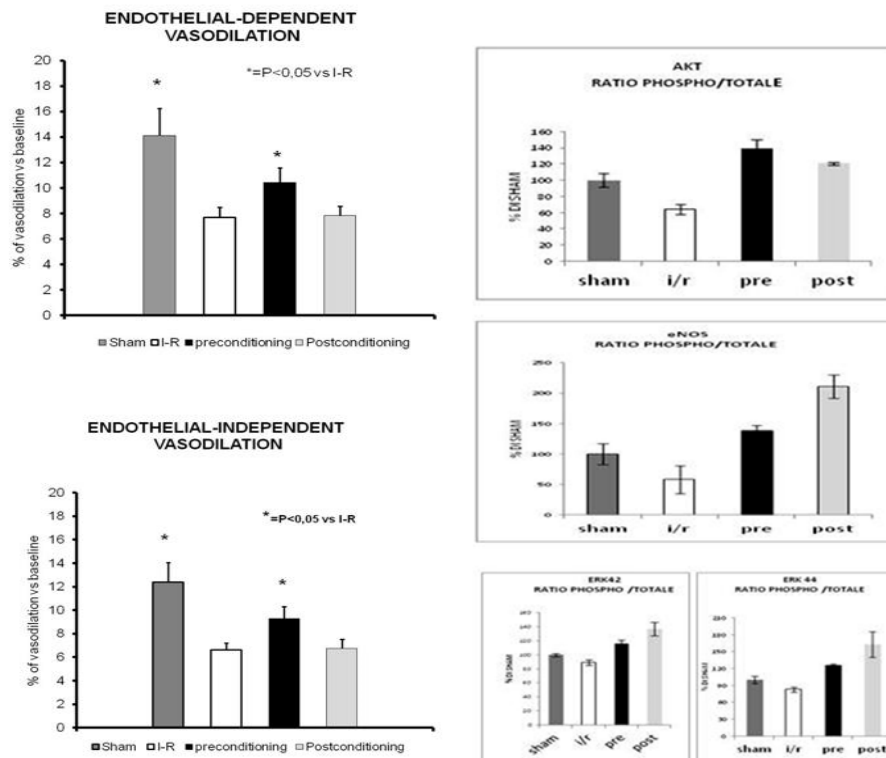
Cinzia Zuchi (b), Serena Vitale (b), Stefano Coiro (b), Maria Cristina Marchetti (a), Giuseppe Ciliberti (b), Andrea Chiocchini (b), Gianluigi Saponara (b), Miriam Compagnone (b), Dario Turturiello (b), Isabella Tritto (b), Graziella Migliorati (a), Carlo Riccardi (a), Giuseppe Ambrosio (b)

(a) *Farmacologia, Tossicologia e Chemioterapia, Università di Perugia*, (b) *Cardiologia e Fisiopatologia Cardiovascolare, Università di Perugia*

Un breve periodo di ischemia/riperfusione (I/R) che si verifica prima (precondizionamento; preC) di una prolungata ischemia o all'inizio della riperfusione (postconditioning; postC) riduce la necrosi SIC | *Indice Autori*

tissutale. Il preC protegge anche i vasi. Scopo dello studio era studiare se anche il postC protegge il microcircolo postischemico, e i meccanismi alla base della protezione. Fondamentali per la cardioprotezione sono l'attivazione delle cascate regolatorie della "reperfusion injury signalling kinase (RISK) pathway; inoltre, negli effetti protettivi di preC e postC è coinvolta la generazione di ossido nitrico, che è anche il principale mediatore della vasodilatazione endoteliale. Il muscolo cremastere di ratto era sottoposto a 90 min di I e 90 min di R. Alla fine della R, la risposta vasodilatante endotelio- dipendente e indipendente era valutata mediante superfusione locale con 10^{-4} M acetilcolina e 10^{-5} M sodio nitroprussiato. Abbiamo quindi valutato mediante Westren Blotting l'attivazione di MAPK ERK-1/2, Akt, e l'espressione di eNOS.

L'I/R riduceva la riserva vasodilatante, sia endotelio endotelio- dipendente e indipendente (a sinistra). Solo il preC era in grado di preservare la riserva vaso dilatante. La valutazione dei potenziali meccanismi protettivi mostrava una analoga attivazione delle vie protettive (a destra).



Quindi nel nostro modello il danno microvascolare sembra avere una genesi prevalentemente ischemica, che si verifica soprattutto a carico dei miociti vascolari. Studi ulteriori sono necessari per meglio precisare i meccanismi dell'effetto protettivo sulla funzione microvascolare, e il ruolo di altre vie (STAT3/STAT5, GSK3 β , apoptosi) in questo fenomeno.

O420

Cardiac remote ischemic preconditioning reduces periprocedural myocardial infarction for patients undergoing percutaneous coronary interventions: a meta-analysis of randomized clinical trials.

Fabrizio D'Ascenzo (a), Claudio Moretti (a), Erika Cavallero (a), Enrico Cerrato (a), Umberto Barbero (a), Giorgio Quadri (a), Pierluigi Omedè (a), Abhiram Prasad (c), Giuseppe Biondi-Zoccai (b), Fiorenzo Gaita (a)

(a) Division of Cardiology, University of Turin, (b) Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome, Latina, It, (c) Division of Cardiovascular Diseases and Department of Internal Medicine, Mayo Clinic and Mayo Foundation

Introduction: The cardioprotective effect of remote ischemic preconditioning (RIPC) in patients undergoing Percutaneous Coronary Intervention (PCI) remains to be established.

Methods: Pubmed, Cochrane and Embase were systematically searched for randomized controlled trials of RIPC in patients undergoing PCI. Peri-procedural myocardial infarction (PMI) was the primary end point (defined as troponin elevation >3 times upper reference limit) and C-reactive Protein (CRP) was a secondary end point.

Results: 5 studies with 731 patients were included. The median age of the patients was 62 (59-68) years old, 25% being female (23-33), 29% (25-33) had diabetes mellitus, and 26.5% (19-31) presenting with multivessel disease.

RIPC significantly reduced incidence of PMI (odds ratio: 0.58 [0.36, 0.93]; I2 43%), with a greater benefit when performed using the lower limb (0.21 [0.07-0.66]) compared to the upper limb (0.67 [0.46-0.99]). This reduction was enhanced for patients with multivessel disease (Beta -0.05, p 0.01), and did not vary according to age (Beta 0.06, p 0.19), female gender (Beta -0.03, p 0.14) and diabetes mellitus (Beta -0.03, p 0.09). Absolute risk difference was of -0.10 [-0.19, -0.02], with a Number Needed to Treat of 10 [6-50] patients to avoid one event. CRP -0.69 [-1.69, 0.31] was not significantly reduced by RIPC.

Conclusion: RIPC reduced the incidence of PMI following PCI, especially when performed in the lower limb and for patients with multivessel disease.

O421

Role of endothelial progenitor cells in poldistrictual atherosclerosis

Maria Elena Lucia Picoi (a), Ottavia Balbi (a), Federica Massaro (a), Niccolò Mancini (a), Chrysanthos Grigoratos (a), Maria Chiara Barsotti (a), Tatiana Santoni (a), Paola Collecchi (b), Rossella Di Stefano (a), Alberto Balbarini (a)

(a) University of Pisa, Department of Surgery, Medical, Molecular and Critical Area Pathology, Pisa,, (b) University of Pisa, Departement of Translation Research on New Technologies in Medicine and Surgery

Purpose: Endothelial progenitor cells (EPCs) are a heterogeneous population that originates from tissues and bone marrow. Their importance lies in their ability to localize in areas of endothelial damage promoting neovascularization and reendothelization. No studies in literature evaluated the correlation between the number of district affected by atherosclerosis and the EPC levels in peripheral blood. Therefore we compared the levels of CD34+ cells and CD34+KDR+ (phenotypical EPC markers) in patients with atherosclerotic disease of one, two and three districts (coronary arteries, carotid arteries and lower limbs peripheral arteries) and in healthy controls.

Methods: 40 consecutive patients (mean age 68 +/- 14 years) underwent echo color Doppler of cerebro-afferent vessels and lower limb and finally coronary arteriography, the latter as a preoperative assessment. 12 patients had no significant atherosclerotic involvement (ATS0), 10 patients had one district involved (ATS1), 10 with two districts involved (ATS2) and 8 with three districts involved (ATS3).

Results: In healthy patients the blood level of EPC / ml was 85.73, in ATS1 pts was 69.97, in ATS2 pts was 57.69, in ATS3 pts was 24.24, showing a decreasing trend in the increasing number of districts involved. A statistically significant reduction of EPCs was observed in the comparison between patients with poor or absent atherosclerosis (ATS0 + ATS1) and patients with poldistrictual atherosclerosis (ATS2 + ATS3) (p= 0.02). Furthermore, the linear regression corrected for cardiovascular risk factors, showed a statistically significant inverse correlation between the number of districts concerned and the number of EPC / ml (p = 0.03).

Conclusions: Our study showed an inverse correlation between EPC levels and severity of atherosclerosis. The more the atherosclerotic disease is diffuse, the more the number of EPCs in the circulation decreases. Therefore we could hypothesize a role of EPC levels as an index of atherosclerotic disease severity or as a prognostic marker.

O422

Catestatin postconditioning induces anti-apoptotic and pro-angiogenic factors: possible role in limiting cardiac maladaptive remodeling

Francesca Tullio (a, c), Tommaso Angelone (b, c), Teresa Pasqua (b, c), Daniela Amelio (b), Maria Carmela Cerra (b, c), Carmelina Angotti (a, c), Maria-Giulia Perrelli (a, c), Pasquale Pagliaro (a, c), Claudia Penna (a, c)

(a) *Università di Torino, Dipartimento di Scienze Cliniche e Biologiche*, (b) *Università della Calabria, Dipartimento di Biologia Cellulare*, (c) *Istituto Nazionale per le Ricerche Cardiovascolari, Bologna*

Background: Myocardial infarct size is a major determinant of prognosis. Ischemic preconditioning with brief coronary occlusion and reperfusion before a sustained period of coronary occlusion with reperfusion limits infarct development. Ischemic postconditioning (I-PostC) uses repetitive brief coronary occlusion during early reperfusion of myocardial infarction and reduces infarct size. Also pharmacological postconditioning (P-PostC) can reduce ischemia/reperfusion (I/R) injury and can be obtained with drug infusion at beginning of reperfusion. Both pre- and post-conditioning may limit reperfusion injury *via* Reperfusion-Injury-Salvage-Kinases (RISK)-pathway. However in the presence of comorbidities the effectiveness of these cardioprotective strategies is blunted. In particular, we have shown that I-PostC cannot reverse the increase of ischemia/reperfusion damages induced by hypertension/hypertrophy in spontaneously hypertensive rat (SHR) heart model. Since plasma concentrations of the pro-angiogenic Chromogranin A (CgA)-derived peptide, Catestatin (CST), are decreased in hypertensive patients and in their offspring, and since exogenous CST rescues blood pressure values in arterial hypertension of CgA knockout mice, we aimed to study whether, in a hypertensive model (SHR), P-PostC with CST infusion in early reperfusion (CST-Post) protects limiting infarct size and apoptosis and promoting angiogenic factors. We also aimed to confirm the involvement of the RISK pathway activation in these CST effects.

Methods and Results: the effects of CST-Post on infarct size, apoptosis and pro-angiogenic factors were studied in isolated hearts of SHR, which underwent the following protocols: (a) 30-min ischemia and 120-min reperfusion (I/R); (b) 30-min ischemia and 20-min reperfusion (I/R-short), both with and without CST-Post (75nM for 20-min at the beginning of reperfusion). For comparative purpose infarct size was studied in Wistar-Kyoto control hearts in which infarct size resulted smaller than in SHR. CST-Post reduced significantly infarct size in both strains. After 20-min reperfusion, CST-Post induced phosphorylation of RISK elements, and specific inhibitors of the RISK pathway blocked the CST-Post protective effects against infarct size in the 120-min reperfusion groups. Moreover, apoptosis (evaluated by TUNNEL and ARC levels) was reduced by CST, which also enhanced pro-angiogenic factors (i.e., HIF-1 α and eNOS expression) after two-hours of reperfusion.

Conclusions: here, we confirm that CST-Post can limit reperfusion damages and can reverse the hypertension-induced increase of I/R susceptibility *via* RISK-pathway modulation. Moreover, here we show, for the first time, that CST-Post triggers antiapoptotic and pro-angiogenic factors, thus suggesting CST-Post as an anti-maladaptive remodelling treatment.

O423

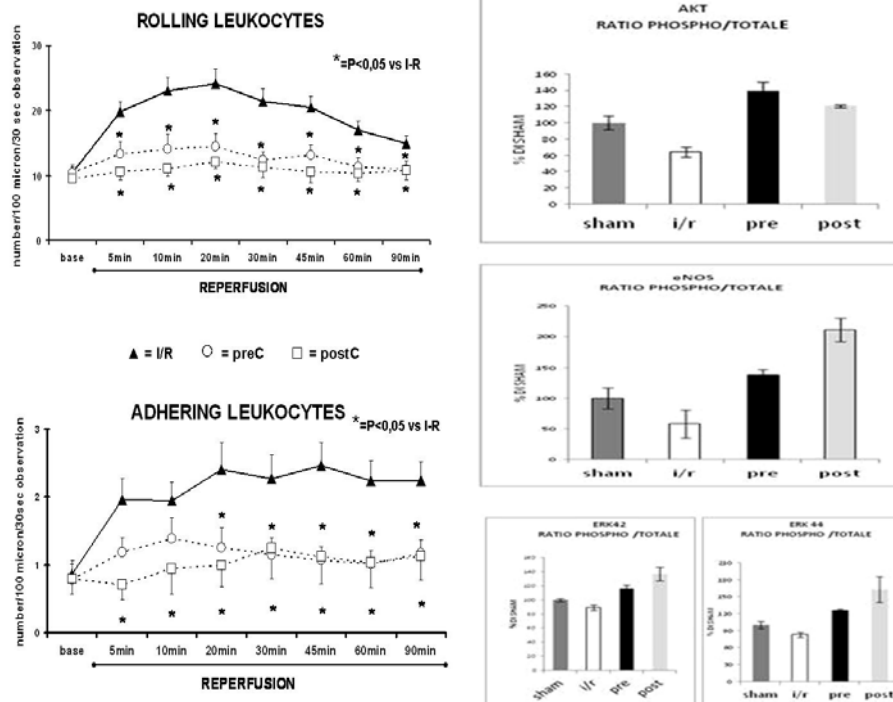
Effetti del pre- e post- condizionamento ischemico sul reclutamento leucocitario nei tessuti post-ischemici

Stefano Coiro (b), Serena Vitale (b), Cinzia Zuchi (b), Maria Cristina Marchetti (a), Giuseppe Ciliberti (b), Andrea Chiocchini (b), Miriam Compagnone (b), Gianluigi Saponara (b), Dario Turturiello (b), Isabella Tritto (b), Graziella Migliorati (a), Carlo Riccardi (a), Giuseppe Ambrosio (b)

(a) *Farmacologia, Tossicologia e Chemioterapia, Università di Perugia*, (b) *Cardiologia e Fisiopatologia Cardiovascolare, Università di Perugia*

Il preconditionamento ischemico (preC) è efficace nel ridurre l'infiltrazione dei neutrofilii nei tessuti postischemici.

Tuttavia, poiché il verificarsi di un attacco ischemico è imprevedibile, la sua applicazione clinica è stata finora molto limitata. Abbiamo quindi valutato direttamente se il postC possa inibire il reclutamento dei neutrofilii nel microcircolo durante riperfusione postischemica, e paragonato i suoi effetti con quelli del preC. Il muscolo cremastere di ratto era sottoposto 90 min di ischemia (I) seguiti da 90 min di riperfusione (R). Il postC era indotto all'inizio della R con 5 cicli di 10 sec di R e 5 sec di I. Il preC era indotto prima dell'I con 5 min di I e 10 min di R. Il reclutamento leucocitario era monitorato mediante videomicroscopia intravitale, valutando il rolling e l'adesione ferma alla parete vascolare dei leucociti marcati con rosso di acridina. Al termine dell'esperimento era valutata mediante Western Blotting l'attivazione di ERK, Akt, ed eNOS. L'I/R si accompagnava a un marcato aumento dell'interazione leucociti-endotelio; sia il preC che il postC erano in grado di ridurre questo fenomeno (pannello di sinistra). La valutazione dei potenziali meccanismi protettivi mostrava una analoga attivazione delle vie protettive (pannello di destra).



Quindi, anche il postcondizionamento ischemico è in grado di ridurre il reclutamento dei neutrofilii nei tessuti. Questo è un punto potenzialmente molto importante, poiché potrebbe risultare nella riduzione del fenomeno del no-reflow, con notevoli implicazioni cliniche.

HIGHLIGHTS GIOVANI RICERCATORI – LAVORI INEDITI – SESSIONE 5

O424

Three-dimensional (3D) echocardiography in dilated cardiomyopathy: right atrial volumes and function and left ventricular 3D Speckle tracking study

Roberta Ancona (a), Salvatore Comenale Pinto (a), Pio Caso (a), Fortunato Arenga (a), Maria Gabriella Coppola (a), Raffaele Calabrò (a)

(a) Non invasive Cardiology, Chair of Cardiology, Department of Cardiology, Second University of Naples

Background: right atrial (RA) size and function have clinical and prognostic value in dilated cardiomyopathy (DCM). 3D echo(E) and speckle tracking provide robust and reproducible data to measure RA volumes and RA and left ventricular (LV) function. Purpose: to obtain RA volumes and ejection fraction (EF) by 3DE and RA deformation properties by 2D speckle tracking and LV function by 3D Speckle tracking in DCM, and to look for their clinical importance in management and prognosis.

Methods: by 3DE (software Auto LVQ GE Healthcare and Tomtec 4D) and by speckle tracking echocardiography we studied 80 subjects: 50 (mean age: 62 yrs) patients (pts) with DCM and 30 healthy controls. All pts underwent coronary angiography except controls and all had LV ejection fraction (EF)<35%. By E9GE we measured RA maximum and minimum volumes by tracing RA endocardial borders at ventricular end-systole and end-diastole, both by biplane method, 3D and 4D methods; all volumes were indexed for body surface. By Speckle tracking, in apical 4-chambers view, we measured 2D longitudinal systolic RA Strain (S) and Strain rate (SR), at level of RA free wall (basal, medium and apical segments) and 3D LV deformation properties (peak of global longitudinal, circumferential, radial and area S). We measured LV volumes and EF by 2DE and 3DE; and propagation velocity(Vp) by color M-mode; we calculated wedge pressure(PCWP) by E/Ea ratio.

Results: RA maximum volumes were significantly higher in DCM pts (90,5±28,2 ml by Auto LVQ, 85,4±23,6 ml by Tomtec4D) than in controls(43,09±11,21 ml by Auto LVQ, 41,68±12,22 by Tomtec4D;p<0,01). In DCM pts we found significantly lower values of longitudinal systolic RA S for all segments (35±15% basal;24±11% medium;15±4,5% apical) than in controls(> 80% basal;62,5±9,6% medium;26,5±3,5% apical; p<0,01); lower values of longitudinal RA SR for all segments(2,5±0,8 S-1 basal;1,8±0,7 S-1 medium;1,2±0,5 S-1 apical) than in controls(basal 5,1±0,71S-1;medium 3,33±0,61S-1;apical 2,1±0,26S-1;p<0,01); lower 3D LV deformation properties than in controls (3D longitudinal S:-7,6±3,3%vs-19±3,1%, 3D circumferential S:-8,7±2,8%vs-15,3±2,6%, 3D radial S:19±7,9% vs48±9%, 3D area S:-14±5,1%vs-30,1±3,6%;p<0,001). Pts with higher RA volumes and lower RA S and SR had higher E/Vp values and higher PCWP by E/E', and had more symptomatic illness independently from LVEF and 3D LV S.

Conclusions: in DCM 3DE and speckle tracking provide simple and reliable values of RA volumes and function. RA volumes and deformation properties are expression of illness clinical severity, and may be predictive of adverse clinical events.

O425

Use of Tryton dedicated side branch stent versus two stent technique with 1st or 2nd generation DES for the treatment of bifurcation lesions. 9-months results from an Italian multicenter registry.

Marco Mojoli (a), Michela Facchin (a), Paolo Buja (a), Massimo Napodano (a), Filippo Zilio (a), Gianpiero D'Amico (a), Elisa Covolo (a), Alberto Barioli (a), Brunilda Hoxha (a), Marta Martin (a), Claudia Zanetti (a), Paola Angela Maria Purita (a), Tommaso Fabris (a), Rosaria Tenaglia (a), Valeria Gasparetto (a), Ahmed Al Mamary (a), Gilberto Dariol (a), Giambattista Isabella (a), Sabino Iliceto (a), Giuseppe Tarantini (a)

(a) Dipartimento di Scienze Cardiologiche, Toraciche, Vascolari. Policlinico Universitario, Padova.

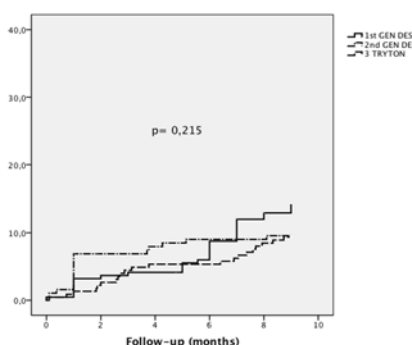
Background: Treatment of bifurcation lesions accounts for approximately 20% of all percutaneous coronary interventions (PCI) and is associated with increased risk of adverse cardiac events compared with PCI of non-bifurcation lesions. Therefore, several techniques based on one or two-stent techniques as well as dedicated bifurcation stents have been developed to improve clinical outcomes.

Objectives: We aimed to assess the mid-term clinical outcomes when using a dedicated bare metal side-branch stent (Tryton™, Tryton Medical, Durham, NC) plus a DES (on the main branch) in comparison with a two stent technique, either with two 1st generation DES (Paclitaxel-eluting or Sirolimus-eluting stents) or with two 2nd generation DES (Zotarolimus-eluting or Everolimus-eluting stents) for the treatment of coronary true bifurcation lesions, in an “all-comers” population.

Methods: Consecutive patients who underwent PCI between April 2003 and October 2012, with at least one true bifurcation lesion (according to Medina classification), were enrolled in 24 interventional centers in Italy in a prospective, non randomized registry, with a follow-up of 9 months. At follow-up we evaluated major adverse cardiac events (MACE), including all-causes death, myocardial infarction (MI), and target vessel revascularization (TVR).

Results: A total of 684 patients were enrolled (1st generation DES n=239, 2nd generation DES n=216, Tryton n=229). Groups were matched by main clinical features (age, gender, prevalence of diabetes mellitus). The other baseline clinical, angiographic and procedural characteristics were comparable. Angiographic success was achieved in the majority of patients in all groups (1st generation DES 97.7%, 2nd generation DES 95.8%, Tryton 96.0 p=0.238). At 9 months of follow up, there was a trend favouring the Tryton group and the 2nd generation DES group over 1st generation DES in terms of MACE (1st generation DES 15.8%, 2nd generation DES 10%, Tryton 9.3%, p=0.070, see figure for Kaplan Meier curve), mainly driven in the Tryton group by a reduction of MI rates (4% vs 6.3% vs 1.3%, p = 0.025). Rates of target lesion revascularization (TLR) and target vessel revascularization (TVR) were lower for the 2nd generation DES group (TLR 7.5% vs 0.5% vs 3.1%, p<0.0001; TVR 10.5% vs 0.9% vs 5.2%, p<0.0001).

Conclusion: In our “all comers” population undergoing PCI of a true bifurcation lesion, the use of Tryton side branch stent plus DES showed similar efficacy in terms of MACE compared to a two stent technique with 2nd generation DES.



O426

ECG characteristics of J point elevation and J waves and long term outcome of elite soccer players with J point elevation

Luigi Biasco (a), Yvonne Cristoforetti (a), Davide Castagno (a), Gianpasquale Ganzit (b), Carlo Gabriele Gribaudo (b), Fiorenzo Gaita (a)

(a) *Università di Torino, Dipartimento di Scienze Mediche, Divisione di Cardiologia*, (b) *Istituto di Medicina dello Sport*

Background: The ECG characteristics of J point elevation, the incidence of different J waves morphologies and their relationships with long term outcome in elite athletes are poorly known.

Aim: To describe the ECG characteristics of J point elevation and J waves in elite soccer players and their impact on long-term outcome.

Methods and Results: ECG from 332 male professional soccer players were analyzed and long-term follow-up data were obtained. Overall, 118 (35.6%) showed a J point elevation ≥ 1 mm (ELE J group) while 214 (64.4%) showed an isoelectric J point (ISO J group). J point elevation was more frequently observed in subjects with slower heart rate (ISO J group: 59.8 ± 13.6 bpm vs. ELE J group: 54.6 ± 10.0 bpm, $p < 0.001$), positive Sokolow Lyon index (RR for positive Sokolow index 1.392 95% CI $1.045-1.853$, $p=0.034$), shorter QRS duration (ISO J group 85.1 ± 9.7 ms vs. ELE J group: 82.5 ± 9.4 ms, $p=0.019$) and shorter corrected QT interval (ISO J group 391.8 ± 30.3 ms vs. ELE J group 384.4 ± 29.1 ms, $p=0.032$). In ELE J group, average J point elevation was 1.9 ± 0.9 mm (range between 1 and 6 mm). Mean number of leads showing a J point elevation (including V1-V3) was 3.4 ± 1.4 (range between 2 and 8 leads). The morphology of the QRS-ST transition was defined as early repolarization without J wave, notched and slurred J wave, in accordance with current definitions. Fifty-three athletes showed early repolarization without J wave, while 34 showed a notched and 8 slurred J waves. Twenty-three subjects showed in different leads more than one single morphology of the QRS-ST transition: 7 both notched and slurred J waves, 12 notched J waves and ER without J wave, 1 slurred J waves and ER without J wave, while the combination of notched, slurred and ER without J wave was evident in 3 athletes. Subjects with notched, slurred J waves and ER without J wave respectively showed a progressive lengthening of the QRS complex duration (notched J waves 78.8 ± 8.8 ms; slurred J waves 81.3 ± 8.3 ; ER without J wave: 85.7 ± 9.9 ; $p=0.005$). Considering only athletes with a single morphology of the QRS-ST transition, 40 subjects showed a J point elevation in the lateral (V4 to V6) leads, 26 in the anterior (V1 to V3) leads, 17 in the inferior (II, III and aVF) leads, 7 both in the anterior and lateral leads and 5 in the inferior and lateral leads. In the ELE J group, an ascending ST segment was evident in 95 (80.5%) athletes while horizontal descending in 23 (19.5%). The combined presence of J point elevation, slurred J wave and horizontal descending ST segment, recognized in the general population as a possible marker of arrhythmic risk, was rare, manifest only in 4 (1.2%) athletes. Over a long term follow-up (median 13,3 years; interquartile range 10,1-17,03 years) no differences in survival were observed between groups (0% vs. 0,01%, $p=0.294$).

Conclusions: J point elevation is common in athletes while the presence of J waves is evident only in the 12% of our population and rare are also those morphologies associated with an increased arrhythmic risk in the general population. QRS durations may influence the morphology of QRS-ST transition. After a long-term follow-up, no significant differences in survival were observed between athletes with and without J point elevation.

O427

Epigenetic Dynamics at the SERCA2A Gene in Pressure Overload-Induced Heart Failure

Gabriele Giacomo Schiattarella (a), Cinzia Perrino (a), Roberta Bottino (a), Flora Ilaria Laurino (a), Fabio Magliulo (a), Simona Keller (b), Tiziana Angrisano (b), Giovanni Esposito (a), Lorenzo Chiariotti (b), Bruno Trimarco (a)

(a) *Dipartimento di Scienze Biomediche Avanzate - Università Federico II di Napoli*, (b)

Dipartimento di Medicina Molecolare e Biotecnologie Mediche - Università Federico II di Napoli

Background: Pathological cardiac hypertrophy represents the earliest adaptive response of the heart to several different injuries, such as myocardial infarction, hypertension and aortic stenosis. Prolonged cardiac hypertrophy is characterized by altered gene expression including re-induction of fetal genes such and repression of adult genes. Whether epigenetic modifications of the DNA sequence, in particular DNA methylation and histone modifications are involved in these processes is currently unclear. In the present study we hypothesized that modifications of DNA methylation and/or chromatin state may underlie the transient and/or stable changes of cardiomyocytes gene expression program during pressure overload-induced HF.

Methods: To test this, we evaluated genome global methylation and sarcoplasmic reticulum Ca^{2+} ATPase (SERCA2A) specific gene methylation on cardiac samples from mice after 8 weeks of pressure overload induced by transverse aortic constriction (TAC) and control mice (SHAM) by quantitative chromatin immunoprecipitation assay (ChIP), methylation analysis and massARRAY methylation analysis. Furthermore, we performed real-time PCR analysis to evaluate mRNA levels of specific epigenetic modifiers at the SERCA2A gene regulatory region such as KDM2A, H3K36, DNMT-1 and DNMT3b.

Results: Compared to SHAM hearts, TAC mice displayed a significant reduction in SERCA2A mRNA levels (SERCA2A mRNA levels fold SHAM: TAC: 0.1 ± 0.04 , $p < 0.05$). Repression of SERCA2A expression in TAC hearts was associated with non significant increases in DNA methylation. However, significant changes in histone modifications were identified, including increased methylation at K27 and K9 on histone 3, reduced methylation of K4 of histone 3 at the SERCA2A gene promoter after TAC. Furthermore, SERCA2A gene regulatory region after TAC was characterized by a significant recruitment of DNA methyltransferase H3K36, DNMT-1 and DNMT3b (H3K36 % input: SHAM: 0.1 ± 0.04 , TAC: 0.5 ± 0.07 , $p < 0.05$; DNMT-1 % input: SHAM: 0.03 ± 0.003 , TAC: 0.08 ± 0.003 , $p < 0.05$; DNMT-3b % input: SHAM: 0.05 ± 0.005 , TAC: 0.1 ± 0.006 , $p < 0.05$) and a significant reduction of DNA demethylase KDM2A at SERCA2A promoter (KDM2A input: SHAM: 0.07 ± 0.003 , TAC: 0.01 ± 0.004 , $p < 0.05$).

Conclusions: This study demonstrates, for the first time, the crucial role of epigenetic modifications of SERCA2A gene in pressure overload-induced heart failure.

O428

Hemodynamic effects of levosimendan on pulmonary circulation in patients with acute decompensated heart failure and reactive pulmonary hypertension

Benedetta Nusca (a), Aurora Ilaria Danza (a), Temistocle Taccheri (a), Veronica Moriconi (a), Gianmarco Schiaffini (a), Alberto Foà (a), Roberta Carnesale (a), Mauro Pennacchi (a), Massimo Mancone (a), Carmine Dario Vizza (a), Francesco Fedele (a)

(a) *Università Sapienza di Roma. Policlinico Umberto I Dipartimento di scienze cardiovascolari*

Background: Pulmonary Hypertension (PH) is a negative prognostic factor in Heart Failure (HF) patients and reactive PH is an independent predictor of death in patients with Acute Decompensated Heart Failure (ADHF). Levosimendan (L) has inotropic and vasodilatory effects. L enhances calcium sensitivity of the myofilament and acts as an agonist of adenosine triphosphate (ATP-) dependent potassium channels.

Aim: The aim of our prospective observational study is to analyze the hemodynamic effects of L on pulmonary circulation in patients with ADHF and reactive PH.

Methods: We prospectively analyzed a population of 10 pts (58.2 ± 14.17 years old, 50% men) admitted to our hospital with diagnosis of ADHF and reactive PH established by RHC (PAPm>25 mmHg, PWP>15 mmHg and TPG>12 mmHg). All of them were treated with L for 24h without loading dose. At baseline and after 6, 12, 24 hours of treatment we assessed: heart rate(HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), systolic pulmonary arterial pressure (sPAP), diastolic pulmonary arterial pressure (dPAP), mean pulmonary arterial pressure (mPAP), right atrial pressure (RAP), wedge pressure (WP), cardiac output (CO), cardiac index (CI), arterial oxygen saturation (SaO₂), mixed venous oxygen saturation (SvO₂), arterial-venous O₂ difference, systemic vascular resistance (SVR) and pulmonary vascular resistance (PVR).

Results: After L infusion there were no significant differences in HR, SBP, DBP, RAP and WP; compared to baseline, mPAP decreased at 6, 12, 24 hours ($p<0,07$; $p<0,06$; $p<0,01$ respectively). We observed significant increase of SvO₂ ($p<0,01$) and decrease of arterial-venous O₂ difference ($p<0,05$) after 24h infusion. Systemic vascular resistance had a significant decrease ($p<0,02$) after 24h L infusion. Total PVR showed a significant decreased at 6h ($p<0,04$), 12h ($p<0,04$) and 24h ($p<0,02$) of L infusion; pre-capillary pulmonary vascular resistance had a significant decrease at 24h ($p<0,043$); no significant differences were observed in term of post-capillary pulmonary resistance after L infusion.

Conclusion: 24h L infusion in pts with ADHF and reactive PH has favorable effects on mPAP and PVR. Moreover, L, as consequence of hemodynamic improvement, reduce arterial-venous O₂ difference.

O429

One- and twelve-month safety and efficacy outcomes of patients undergoing edge-to-edge percutaneous mitral valve repair (from the grasp registry)

Margherita Ministeri (a), Carmelo Grasso (a), Salvatore Scandura (a), Davide Capodanno (a), Sarah Mangiafico (a), Marta Chiarandà (a), Anna Maria Pistritto (a), Fabio Di Pasqua (a), Stefano Cannata (a), Giuseppe Ronsivalle (a), Sandra Giaquinta (a), Corrado Tamburino (a)

(a) *Cardiovascular Department, Ferrarotto Hospital, Catania, Italy*

Background and aim of the study: Surgical mitral valve repair (or replacement) is the standard treatment for patients with severe ($\geq 3+$) mitral regurgitation (MR) on the basis of current guideline criteria. Indeed, overall mortality from mitral valve surgery for some categories of patients can be significant. The MitraClip (Abbot Vascular, Abbot Park, Illinois) procedure is a percutaneous approach that mimics the surgical edge-to-edge Alfieri technique by promoting mechanical tissue coaptation between the mitral leaflets. Data from the EVEREST studies and the results of registries in Europe and the United States suggest that the MitraClip procedure has a high procedural success rate, a low rate of procedural events, and early improvements in functional NYHA class, MR grade, walking distance and quality of life. However, current 2012 European Society of Cardiology guidelines make a soft class IIb statement on the use of MitraClip therapy in patients with symptomatic severe primary MR who fulfill the echocardiographic criteria of eligibility, are judged inoperable or at high surgical risk by a “heart team,” and have life expectancy >1 year, reflecting the paucity of published series with follow-up extending beyond 30 days.

The aim of this study is to report on the 30-day and 1-year outcomes of percutaneous mitral valve repair with the MitraClip technique in patients with grade $\geq 3+$ MR at high risk for conventional surgical therapy enrolled in the prospective Getting Reduction of Mitral Insufficiency by Percutaneous Clip Implantation (GRASP) registry.

Materials and methods: Acute device success was defined as residual MR $\leq 2+$ after clip implantation. The primary safety end point was the rate of major adverse events at 30 days. The

primary efficacy end point was freedom from death, surgery for mitral valve dysfunction, or grade $\geq 3+$ MR at 30 days and 1 year. A total of 117 patients were treated. Eighty-nine patients (76%) presented with functional MR and 28 patients (24%) with organic MR.

Results: Acute device success was observed in all patients. Device implantation time significantly diminished with experience and varied significantly between cases with 1 versus ≥ 2 clips. No procedural mortality was recorded. Major adverse events occurred in 4 patients at 30 days (4.3%). Deterioration to MR $\geq 3+$ was recorded in 25% of patients with degenerative MR and 7% of those with functional MR at 1 year. No surgery for mitral valve dysfunction occurred within 1 year. Freedom from death, surgery for mitral valve dysfunction, or grade $\geq 3+$ MR was 96.4% and 75.8% at 30 days and 1 year, respectively. No significant differences were noted in the primary efficacy end point between patients with degenerative MR and those with functional MR.

Conclusions: In conclusion, percutaneous mitral valve repair with the MitraClip technique was shown to be safe and reasonably effective in 117 patients from a real-world setting.

TECNICHE DI IMAGING NELLE MIOCARDIOPATIE

O430

Left ventricular outflow tract planimetry by 3D echocardiography predicts obstruction and heart failure symptoms in hypertrophic cardiomyopathy

Chiara Calore (a), Angela Polo (a), Denisa Muraru (a), Luigi Badano (a), Paola Melacini (a), Sorina Mihaila (b), Diletta Peluso (a), Laura Puma (a), Gonenc Kocabay (a), Giulia Rizzon (a), Sabino Iliceto (a)

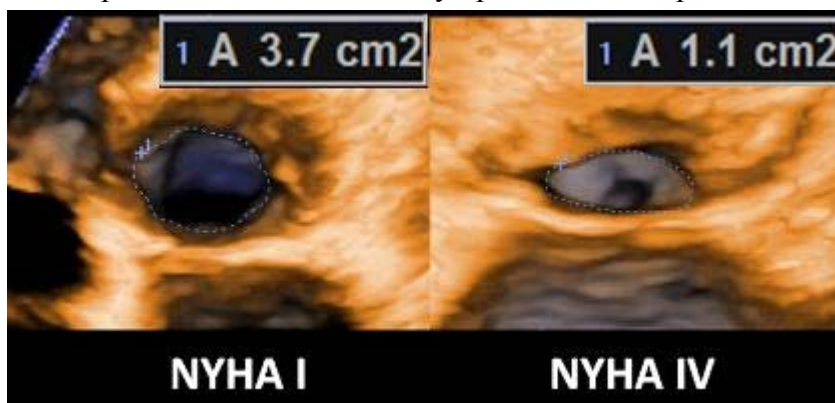
(a) Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari. Università di Padova, (b) University of Medicine and Pharmacy Carol Davila, Bucharest, Romania

Purpose: Three-dimensional echocardiography (3DE) enables a fast and reliable measurement of left ventricular outflow tract area [LVOT(A)] in patients with hypertrophic cardiomyopathy (HCM). Whether 3DLVOT(A) at rest could predict symptomatic status in HCM is currently uncertain.

Methods: In 31 HCM patients (pts) with LV ejection fraction >50%, 3D LV full-volume datasets (38±6 vps) were obtained by transthoracic 3DE. A comprehensive LV analysis by 3DE was done (including volumes and mass) and the smallest 3DLVOT(A) during systole was planimetered on 3D LV rendered images using EchoPac BT12 (GE Vingmed, N). LVOT maximal gradient was assessed by continuous Doppler, and Valsalva maneuver was performed if no significant LVOT obstruction at rest (gradient < 30 mmHg) was present. Symptomatic status was defined by NYHA class (II-IV).

Results: Pts with obstructive HCM (n=11) had smaller LVOT(A) than those with non-obstructive forms (n=20): 1.98±0.51 vs 3.45±0.67 cm² (p<0.001). Significant correlation between 3DLVOT(A) planimetry at rest and maximal provokable LVOT gradient was identified (r=0.70, p<0.0001). 3DLVOT(A) in HCM (AUC=0.87), as well as maximal gradient and 3D LV mass/end-diastolic volume ratio (AUC 0.86 and 0.84, respectively, p<0.001) were closely related with symptomatic status (Figure). A cut-off value of 3DLVOT(A) <2.6 cm² had 82% sensitivity and 86% specificity to predict heart failure symptoms (NYHA II-IV).

Conclusion: LVOT area planimetry by transthoracic 3D echocardiography at rest emerged as a clinical predictor of heart failure symptoms in HCM patients.



LVOT area in asymptomatic vs symptomatic

O431

Are the Preferential Patterns of Myocardial Iron Overload Preserved at the CMR Follow-Up?

Antonella Meloni (a), Petra Keilberg (a), Claudio Ascoti (b), Vincenzo Positano (a), Antonio Cardinale (c), Anna Pietrapertosa (d), Monia Minati (e), Massimo Midiri (f), Letizia Gulino (a), Massimo Lombardi (a), Alessia Pepe (a)

(a) CMR Unit, Fondazione G. Monasterio CNR-Regione Toscana and Inst. of Clinical Physiology, Pisa, Italy, (b) Struttura Complessa di Cardioradiologia-UTIC, P.O. "Giovanni Paolo II", Lamezia Terme, Italy, (c) UO Pediatria, Ospedale S Maria alla Gruccia, Montevarchi, Italy, (d) Servizio Regionale Talassemie, Policlinico, Bari, Italy, (e) U.O.C. Diagnostica per Immagini e Interventistica, Policlinico "Casilino", Roma, Italy, (f) Istituto di Radiologia, Policlinico "Paolo Giaccone", Palermo, Italy

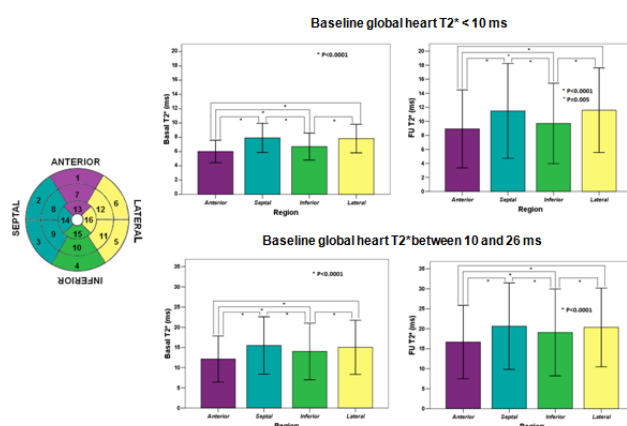
Background: T2* multislice cardiac magnetic resonance (CMR) allows quantification of the segmental distribution of myocardial iron overload (MIO). We aimed to determine if a preferential pattern of MIO was preserved between two CMR scans in thalassemia major (TM) patients.

Methods: Among the 812 TM patients with a CMR follow-up (FU) study at 18±3 months, we selected 259 patients with significant MIO at baseline (global heart T2* <26 ms). Three short-axis views of the left ventricle were acquired and analyzed using a 16-segment standardized model. The T2* value on each segment was calculated, as well as the global value. Four main circumferential regions (anterior, septal, inferior, and lateral) were defined.

Results: The selected patient population was divided into two groups: severe (N=80, global T2* < 10 ms) and mild-moderate MIO (N=179, global T2* 10-26 ms). During the FU all patients were regularly chelated with excellent/good compliance in the 90 % of the cases.

For each group, there was a significant improvement in the global heart as well as in regional T2* values (see Table). For the whole patient population as well as for both two groups, at the baseline the mean T2* value over the anterior region was significantly lower than the mean T2* values over the other regions and the mean T2* over the inferior region was significantly lower than the T2* values over the septal and the lateral regions. The same pattern was present at the FU, with a little difference for patients with mild-moderate MIO (see figure).

| Region | Baseline T2* (ms) | FU T2* (ms) | P (paired) |
|---|-------------------|-------------|------------|
| Baseline global heart T2* < 10 ms | | | |
| Global | 7.3 ± 1.7 | 10.7 ± 5.9 | <0.0001 |
| Anterior | 6.0 ± 1.6 | 8.9 ± 5.6 | <0.0001 |
| Septal | 7.9 ± 2.0 | 11.5 ± 6.7 | <0.0001 |
| Inferior | 6.7 ± 1.9 | 9.7 ± 5.7 | <0.0001 |
| Lateral | 7.8 ± 1.9 | 11.6 ± 6.0 | <0.0001 |
| Baseline global heart T2* between 10 and 26 ms | | | |
| Global | 17.6 ± 4.9 | 23.5 ± 8.6 | <0.0001 |
| Anterior | 14.9 ± 4.7 | 20.2 ± 8.3 | <0.0001 |
| Septal | 18.9 ± 5.8 | 24.7 ± 9.8 | <0.0001 |
| Inferior | 17.3 ± 5.9 | 23.3 ± 9.9 | <0.0001 |
| Lateral | 18.3 ± 5.4 | 24.3 ± 8.6 | <0.0001 |



Conclusions: A preferential pattern of iron store in anterior and inferior regions was present at both baseline and FU CMRs, with an increment of T2* values at FU due to a basal CMR-guided chelation therapy. The anterior region seems to be the region in which the iron accumulates first and is removed later. Our data confirm the segmental T2* cardiac MR approach useful for identifying early iron deposit and for tailoring chelation therapy.

O432

Relationship of 3D left ventricular mass with systolic and diastolic function indices in hypertrophic cardiomyopathy

Chiara Calore (a), Francesca Santi (a), Denisa Muraru (a), Luigi Badano (a), Paola Melacini (a), Sorina Mihaila (a), Genti Denas (a), Paola Naso (a), Simona Casablanca (a), Sabino Iliceto (a)

(a) *Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari. Università di Padova*

Background: Massive left ventricular (LV) hypertrophy is associated with an increased risk of sudden death in hypertrophic cardiomyopathy (HCM). Due to the highly asymmetric distribution of hypertrophy, three-dimensional echocardiography (3DE) enables the most accurate approach for quantifying LV mass (LVM) by ultrasound.

Aims of this study: 1) to assess 3DLVM in HCM pts and its correlation with indices of LV systolic and diastolic function; 2) to compare the relationship between 3DLVM and conventional measurements of LV hypertrophy.

Methods: In 32 pts with HCM (51±13 yrs, 20 men), 2D and 3D LV datasets were analyzed using GE EchoPac BT12 software. LV hypertrophy was quantified by M-mode LVM, 3DLVM and maximal wall thickness (MWT) on 2D images and on 3D multi-slice (after dataset alignment). LV systolic function was assessed by 3D ejection fraction (LVEF), peak global 2D (2DLS) and 3D longitudinal strain (3DLS), 3D circumferential strain (3DCS) and 3D area strain (3DAS). Strain parameters were analyzed as absolute values. Biplane left atrial volume (LAV), average myocardial diastolic velocities (e' average), E/e' and pulmonary vein flow (S/D and Ar-A) were recorded as indices of LV diastolic function.

Results: 3DLVM had a close correlation with LV longitudinal deformation: $r=-0.74$ for 2DLS and -0.70 for 3DLS ($p<0.001$ for both). 3DLVM had a modest inverse relationship with LVEF ($r=-0.46$), 3DCS ($r=-0.46$) and 3DAS ($r=-0.49$, $p<0.01$ for all). Among LV diastolic function indexes, 3DLVM was related with e' average ($r=-0.50$, $p=0.005$), E/e' average ($r=0.40$, $p=0.03$) and LAV ($r=0.42$, $p=0.02$). No correlations of 3DLVM with pulmonary vein profile were found. There was a closer relationship between 3DLVM and 3DMWT ($r=0.65$), than with 2DMWT ($r=0.59$). M-mode LVM significantly overestimated LV hypertrophy in comparison with 3DLVM (306.5 g vs 202.8 g, $p<0.0001$), and showed a fair correlation with 3DLVM ($r=0.73$).

Conclusions: 3DLVM correlated better with longitudinal LV systolic function than with circumferential function and diastolic function indices in HCM. 3DLVM had only a fair relationship with conventional 2D indices of LV hypertrophy, reflecting the limitations of 2D imaging in assessing its extent and asymmetric distribution in HCM.

O433

Impaired rotational mechanics and strain revealing subclinical left ventricular dysfunction in children with neuromuscular disorders: a speckle tracking study

Lilia Oreto (a), Concetta Zito (a), Maurizio Cusmà-Piccione (a), Maria Pia Calabrò (b), Gianluca Vita (c), Sonia Messina (c), Giuseppe Vita (c), Maria Sframeli (c), Francesco De Luca (b), Moemen Mohammed (a), Angela Nicotera (a), Giuseppe Oreto (a), Scipione Carerj (a)

(a) *Cardiology - Department of Clinical and Experimental Medicine. University of Messina*, (b) *Department of Paediatrics, University of Messina*, (c) *Department of Neurosciences; "Nemo Sud" Clinical Centre, University of Messina*

Background: Neuromuscular disorders (NMD) involve cardiovascular system progressively over time. Heart failure usually manifests in the second decade, while younger children show invariably an apparently normal myocardial global function. Evidence of early impairment of LV function could be useful to guide patient-tailored early cardio-protective therapy, in order to delay progression of the disease. We aimed to identify early subclinical dysfunction in children affected by Duchenne

Muscular Dystrophy (DMD) and Becker Muscular Dystrophy (BMD), evaluating myocardial mechanics through longitudinal and circumferential deformation and rotation.

Methods: We analyzed echocardiography recordings of 28 children with NMD (22 DMD, 10±3 yrs, and 6 BMD, 11±2.8 yrs) and normal global left ventricular function, (ejection fraction (LVEF) >50%). Beyond conventional echocardiographic parameters of systolic and diastolic function, we analyzed global and regional longitudinal strain (LS), circumferential strain (CS), basal and apical rotation, twisting and untwisting rate, using a speckle-tracking software (Echopac GE, Vivid 7 workstation). Results were compared with those collected from 22 age-matched healthy children.

Results: LVEF was within the normal range in our population (61±5% and 59±4%, respectively in DMD and BMD patients), although lower than in normal controls (69±4%, p=0.012 and p=0.020, respectively). There was no statistically significant difference between groups concerning other conventional systolic and diastolic parameters. Results from global strain and rotations are detailed in the table. Furthermore, analysis of the regional patterns of deformation revealed that CS was reduced in patients, markedly in the inferior, posterior and lateral segments, particularly at the basal level both in DMD (p=0.008 vs. ctrl) and BMD patients (p=0.04 vs. ctrl). In contrast, only patients with BMD showed a significant reduction of CS at the apical level (p=0.013 vs ctrl). Likewise, basal rotation was significantly reduced in DMD patients, while apical rotation decreased significantly in BMD patients, following the same “pattern” as circumferential deformation. Due to the prevalent apical dysfunction, only BMD patients showed significantly decreased twisting and untwisting rate.

Conclusions: Myocardial mechanics is significantly altered in young children with NMD, even when global LVEF is within the normal range. In addition, different regional patterns of LV mechanics can be identified in DMD and BMD patients: significant impairment of basal rotation is present in DMD patients whereas prevalent alteration of apical rotation, twist and untwisting is observed in BMD group. This different spectrum of changes in LV mechanics could play a role in the different timing of onset and progression of overt cardiomyopathy in the muscular dystrophy.

| Variable | Controls | DMD | BMD | Ctrl vs DMD | Ctrl vs BMD | DMD vs BMD |
|--------------------|--------------|--------------|--------------|-------------|-------------|------------|
| Global LS, % | -23.7 ± 3.01 | -20.5 ± 2.21 | -19.3 ± 2.93 | p=0.023 | p=0.013 | p=ns |
| Global CS, % | -22.4 ± 2.55 | -18.2 ± 3.86 | -17.2 ± 1.74 | p=0.005 | p=0.012 | p=ns |
| Basal Rotation, ° | -6.04 ± 3.03 | -3.77 ± 3.01 | -5.18 ± 2.05 | p=0.023 | p=ns | p=ns |
| Apical Rotation, ° | 6.87 ± 3.05 | 5.87 ± 6.24 | 2.86 ± 2.38 | p=ns | p=0.023 | p=ns |
| Twist, ° | 12.9 ± 4.79 | 8.80 ± 7.67 | 6.57 ± 4.09 | p=ns | p=0.009 | p=ns |
| Untwisting, °/sec | -122.9 ± 32 | -118.8 ± 51 | -82.6 ± 41.6 | p=ns | p=0.025 | p=0.045 |

O434

Myocardial abnormalities of T2-STIR magnetic resonance in hypertrophic cardiomyopathy: a predictor of electrical myocardial instability

Giancarlo Todiere (a), Lorena Piscicella (b), Elisabetta Zachara (b), Federica Re (b), Andrea Barison (a), Piergiorgio Masci (a), Massimo Lombardi (a), Giovanni Donato Aquaro (a)

(a) *Fondazione Toscana Gabriele Monasterio*, (b) *Cardiologia 2 Azienda Ospedaliera San Camillo-Forlanini*

Background: Myocardial hyper intensity in T2-STIR images (HyT2) on MRI is usually considered a marker of acute tissue damage secondary to ischemic or inflammatory insult. Myocardial signal abnormalities on T2-STIR images were also demonstrated in a proportion of patients with HCM and it was hypothesized they were caused by ischemic events. Furthermore myocardial ischemia due to microvascular disease was related to worse prognosis and it is considered as a trigger for arrhythmic episodes. The aim of the current study was to evaluate whether myocardial abnormalities on T2-STIR images were better predictor of non sustained ventricular tachycardia (NSVT) at 24-hours Holter ECG monitoring than other MRI-derived parameters.

Methods: we enrolled consecutive patients with HCM who underwent a MRI examination. Clinical evaluation was based on collection of clinical status (NYHA class, syncope, chest pain, palpitations), and conventional primary prevention risk factors for sudden death, on recordings of 24 hours (h) ECG Holter monitoring in a time interval between three months before and after the MRI scan. MRI was performed using two 1.5 Tesla system: a Signa Hdx (GE Healthcare) and a 1.5 Tesla Magnetom Avanto (Siemens) with cardiac phased array multichannel coils. T2-STIR images were evaluated using a visual assessment and the HyT2 was defined as signal intensity higher than mean plus 2 standard deviations (SD) of skeletal muscle. LGE and its extent were defined as signal intensity higher than the average signal intensity of the region of interest plus 6 SD.

Results: 65 patients completed the MRI examination (51 males, 50 ± 17 years). 22 subjects (34%) presented NSVT at 24 h ECG Holter monitoring. On T2 STIR images HyT2 was detected in 27 patients (42%). Subjects with HyT2 had higher left ventricle (LV) mass index than those without (127 ± 46 vs 95 ± 27 g/m², $p=0.001$). HyT2 was detected in 3/36 (8%) of patients with no arrhythmic risk factor, in 14/18 (78%) of patients with one risk factor, in 7/8 (88%) of those with 2 risk factors and in 3/3 with 3 risk factors. LGE was positive in 61 patients (93%) with a median extent of 9% of LV mass. A linear relation was found between the extent of LGE and LV mass index ($p<0.01$). Patients with HyT2 had greater extent of LGE than those without (15 ± 11 vs 7 ± 9 % of LV mass, $p < 0.001$). 21 patients with NSVT (95%) had HyT2 and only 6 patients with HyT2 had no NSVT at 24 h ECG Holter monitoring, then patients with HyT2 had higher prevalence of NSVT than those without ($p<0.0001$). The presence of myocardial enhancement at LGE images was not associated to occurrence of NSVT ($p = 0.35$): 39 patients with a positive LGE (64%) had no NSVT but all the patients with NSVT had a positive LGE. At logistic regression analysis HyT2 was the best independent predictor of NSVT at 24 h ECG Holter monitoring.

Conclusions: The presence of HyT2 is strictly related to the occurrence of NSVT and it is the best predictor of NSVT at 24 h ECG Holter monitoring. Therefore it is an accurate marker of acute electrical instability and severity of the disease.

O435

Mitral valve abnormalities correlate with left ventricular remodelling and obstruction in hypertrophic cardiomyopathy: a quantitative 3D transthoracic echocardiographic study

Chiara Calore (a), Denisa Muraru (a), Luigi Badano (a), Paola Melacini (a), Sorina Mihaila (b), Paola Naso (a), Simona Casablanca (a), Alessia Ortile (a), Seena Padayattil Jose (a), Sabino Iliceto (a)

(a) Dipartimento di Scienze Cardiologiche, Toraciche e Vascolari. Università di Padova, (b) University of Medicine and Pharmacy Carol Davila. Bucharest, Romania

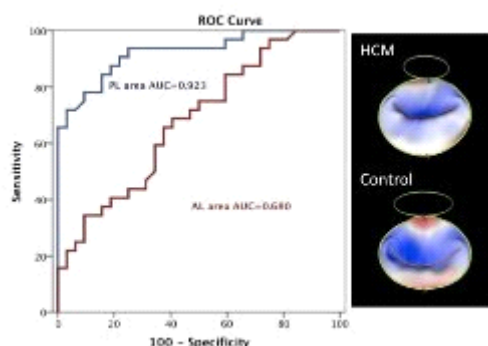
Background: Elongated mitral valve (MV) leaflets were described as a morphological marker of hypertrophic cardiomyopathy (HCM) at magnetic resonance. 3D echocardiography (3DE) may provide better insights on the non-planar MV geometry than linear measures.

Methods: In 32 HCM pts (97% with mild mitral regurgitation) and 32 age- and gender-matched controls, a 3D LV dataset (38 ± 6 vps) containing the MV was acquired by transthoracic approach. MV and LV 3D geometry were quantitated by semi-automatic softwares (TomTec 4D MV assessment 2.1 and GE EchoPac BT12). Reproducibility was assessed in 15 subjects.

Results: MV analysis was fast (<2 min) and reproducible (ICC 0.87-0.98 for intra-, 0.78-0.95 for interobserver). Compared to controls, HCM pts had significantly larger and more spherical MV annulus and increased leaflet tenting ($p<0.001$ for annulus area, leaflet tenting; 0.04 for sphericity). In HCM pts, anterior (ALA) and posterior (PLA) leaflet areas were larger than in controls (ALA 6.9 ± 1.9 cm² vs 5.6 ± 1.6 cm², $p=0.006$; PLA 7.3 ± 2.8 cm² vs 3.6 ± 1.2 cm², $p<0.001$), and a reversed relative contribution to mitral annular area (MAA) in favor of PLA was identified (PLA/MAA: 61 ± 16 % in HCM vs 46 ± 13 % in controls, $p<0.001$). In HCM pts, PLA/MAA ratio was correlated with dynamic gradient ($r=0.53$), 3D LV mass ($r=0.43$) and LV mass/end-diastolic volume ratio

($r=0.70$, $p<0.001$). A $PLA>4.64$ cm² enabled an excellent discrimination of pts from controls (AUC 0.923, with 84% Sv and Sp), superior than ALA (AUC 0.680)(Figure).

Conclusions: In HCM, a relatively larger contribution of PLA to overall MAA was identified by 3DE. PLA was correlated with LV remodelling and dynamic obstruction. Non-invasive quantification of MV geometry by transthoracic 3DE is clinically feasible and may have important diagnostic and therapeutic implications.



ROC curves for PLA and ALA

ARRESTO CARDIACO: DALLA PATOGENESI ALLE STRATEGIE ORGANIZZATIVE 2

O436

Laici come first responders nel trattamento dell'arresto cardiaco: sopravvivenza quintuplicata e riduzione del tempo di intervento.

Valentina Pelizzoni (a), Daniela Aschieri (a), Giovanni Quinto Villani (a), Stefano Nani (b), Antonio Cavanna (b), Davide Toscani (b), Federico Guerra (c), Alessandro Capucci (c)

(a) UO Cardiologia Osp. G. Da Saliceto Piacenza, (b) UO Emergenza Territoriale-servizio 118 Osp. G. Da Saliceto Piacenza, (c) Clinica di Cardiologia Ospedale Torrette Ancona

Background: In caso di sospetto arresto cardiaco gli operatori della centrale 118 di Piacenza provvedono all'attivazione del "codice blu" che prevede l'invio di un mezzo di soccorso avanzato (118-ACLS), un'ambulanza di volontari (BLS-D) e di una pattuglia dotata di defibrillatore. I defibrillatori dal 1999 sono in dotazione alle auto di Carabinieri, Polizia di Stato e Polizia Municipale che percorrono le strade di Piacenza e provincia. Le pattuglie vengono allertate via radio dalla centrale 118 e si recano presso il luogo dell'arresto cardiaco applicando il defibrillatore (DAE). Il loro addestramento è basato unicamente sull'utilizzo del DAE senza manovre di RCP. Il loro addestramento è basato unicamente sull'utilizzo del DAE senza manovre di RCP. Scopo. Confrontare la percentuale di sopravvivenza in caso di arresto cardiaco codificato dalla centrale operativa 118 come codice blu rispetto a un arresto cardiaco non codificato come tale.

Metodi: E' stato condotto uno studio prospettico osservazionale su tutti i casi di arresto cardiaco nell'area urbana di Piacenza nell'anno 2012 dove sono operative le pattuglie delle forze dell'ordine di Polizia di Stato, Polizia Municipale, Vigili del Fuoco e Carabinieri. Sono stati valutati i casi in cui è stato attivato il codice blu, è stato valutato l'esito del soccorso, il ritmo di primo riscontro, il first responders e la sopravvivenza.

Risultati: 335 pazienti sono stati colpiti da arresto cardiaco a Piacenza e Provincia. Il codice blu è stato attivato in 247 casi, 108/247 per veri arresti cardiaci, 139/247 per casi di sospetto arresto cardiaco, non confermato all'arrivo dei soccorritori. In 247/335 casi sono iniziate le manovre

rianimatorie ed è stato collegato il DAE, in 88/335 pazienti è stato constatato il decesso senza procedere a tentativi di rianimazione. Dei pazienti rianimati, 195/247 (78,95%) sono morti a domicilio, 30/247 (12,15%) sono morti entro 24 ore, 19/247 (7,69%) sono stati dimessi vivi senza danni neurologici e 3/247 (1,21%) sono sopravvissuti con danni neurologici maggiori. I ritmi di primo riscontro sono risultati: fibrillazione ventricolare (FV) in 62/335 casi (18,51%), asistolia in 258/335 casi (77,01%), altro ritmo in 15/335 casi (4,48%). In particolare, 19/335 sono stati trattati da laici, sopravvivenza 4/19 pazienti (21%), 184/335 sono stati trattati da personale dei mezzi BLS, sopravvivenza 9/184 pazienti (4,9%), 132/335 sono stati trattati dal 118, sopravvivenza 6/132 (4,5%). (21% vs 4,9% $p < 0,05$; 21% vs 4,5%: $p < 0,05$; 4,9% vs 4,5%: $p = ns$). Il tempo di arrivo è risultato $5,79 \pm 6,1$ min per i laici, $8,66 \pm 6,4$ min per i BLS e $9,86 \pm 5,4$ min per il 118. ($5,79 \pm 6,1$ min vs $8,66 \pm 6,4$ min: $p < 0,05$; $5,79 \pm 6,1$ min vs $9,86 \pm 5,4$ min: $p < 0,05$; $8,66 \pm 6,4$ min vs $9,86 \pm 5,4$ min: $p = ns$).

Conclusioni: I pazienti trattati dal personale laico, grazie al ridotto tempo di intervento e alla percentuale maggiore di casi di FV, presentano una sopravvivenza da arresto cardiaco globale 5 volte maggiore rispetto ai pazienti trattati dagli altri soccorritori. Il futuro dei sistemi di defibrillazione precoce si dovrebbe basare sulla obbligatorietà dei defibrillatori semiautomatici sulle pattuglie delle forze dell'ordine coordinate dal 118 attraverso l'attivazione del Codice Blu.

O437

Serum Opn and Gal-3 to predict the risk of appropriate ICD intervention in heart failure

Pietro Francia (a), Carmen Adduci (a), Lorenzo Semprini (a), Marina Borro (b), Agnese Ricotta (a), Isabella Sensini (a), Daria Santini (a), Alessandra Frattari (a), Cristina Balla (a), Maurizio Simmaco (b), Massimo Volpe (a, c)

(a) *Cardiologia, Dipartimento di Medicina Clinica e Molecolare, Sapienza Università di Roma, Italy*, (b) *DiMa, Dipartimento di Medicina Clinica e Molecolare, Sapienza Università di Roma, Italy*, (c) *I.R.C.C.S. Neuromed, Pozzilli (IS), Italy*

Introduction: Excessive fibroblast proliferation and extracellular matrix remodelling provide electrical heterogeneity entailing ventricular tachycardia/fibrillation (VT/VF) in heart failure (HF) patients. Plasma Osteopontin (OPN) and Galectin-3 (Gal-3) are fibrosis markers and may reflect the extension and complexity of the arrhythmogenic substrate. We determine whether plasma OPN and Gal-3 predict the risk of sustained VT/VF in a population of primary prevention implantable cardioverter-defibrillator (ICD) recipients with HF.

Methods: 75 patients with HF were followed from ICD implantation to the time of first ICD-treated or recorded sustained VT/VF. Patients underwent baseline clinical and echocardiographic evaluation and blood sample collection for the assessment of plasma OPN and Gal-3. The primary endpoint was the time to the occurrence of the first sustained VT/VF.

Results: Patients with coronary artery disease (CAD) had higher plasma OPN (79.8 ± 44.0 vs 66.0 ± 31.8 ng/ml; $p = 0.04$). Both Gal-3 ($r = -0.38$; $p = 0.01$) and OPN ($r = -0.27$; $p = 0.01$) were negatively related to estimated glomerular filtration rate (eGFR). OPN and Gal-3 were positively correlated to each other ($r = 0.42$; $p < 0.001$). After a mean follow-up of 29 ± 17 months, 20 patients (27%) had at least one sustained VT/VF. Of these, 4 sustained VTs were only monitored, while 16 VT/VF triggered appropriate ICD intervention. Patients with VT/VF had higher concentrations of plasma OPN and Gal-3 (97.4 ± 51.7 vs 65.9 ± 31.3 ng/ml; $p = 0.002$ and 19.7 ± 8.5 vs 16.2 ± 6.2 ng/ml; $p = 0.05$, respectively). In univariate analysis, OPN (log-OPN, HR 32.4; 95%CI 3.9-264.7; $p = 0.001$) and Gal-3 (HR 1.05; 95%CI 1.00-1.11; $p = 0.04$) predicted sustained VT/VF. OPN independently predicted VT/VF even after correction for age, sex, CAD, eGFR and ejection fraction (log-OPN, HR 37.6; 95% CI 3.8-367.0; $p = 0.002$), whereas Gal-3 showed borderline significance (HR 1.05; 95%CI 0.99-1.11; $p = 0.05$). In Kaplan-Meier analysis, patients with plasma OPN > 74 ng/ml and Gal-3 > 17 ng/ml showed statistically significant ($p = 0.006$ for OPN and $p = 0.04$ for Gal-3) and marked stepwise increase of VT/VF occurrence.

Conclusions: Plasma OPN and Gal-3 associate with clinical features that are relevant to prognosis and predict sustained VT/VF in HF patients at high risk for SCD. Larger prospective studies should outline the role of these biomarkers in predicting SCD on top of conventional risk stratification.

O438

Cardiopatía aritmogena del ventricolo dx e cardiomiopatía ipertrofica: attivazioni appropriate e inappropriate, storm aritmici e complicanze post impianto di defibrillatore

Jacopo Cristallini (a), Beatrice Gardini (a), Paola Battistini (a), Paolo Cimaglia (a), Matteo Ziacchi (a), Cristian Martignani (a), Igor Diemberger (a), Mauro Biffi (a), Elena Biagini (a), Giuseppe Contarino (a), Guido Rocchi (a), Claudio Rapezzi (a), Angelo Branzi (a), Giuseppe Boriani (a)

(a) *Istituto di Cardiologia, Ospedale Sant'Orsola, Università di Bologna, Bologna - Italy*

Scopo: valutare i risultati a distanza dell'impianto di cardioverter-defibrillatore (ICD) in termini di sopravvivenza dei pazienti (pz), occorrenza di attivazioni appropriate o inappropriate, eventuali complicanze e ricoveri per cause cardiologiche.

Materiali e metodi: Sono stati reclutati 117 pz sottoposti ad impianto di ICD tra il 1992 e il 2011 per un elevato rischio di eventi aritmici con un follow-up minimo di 7 mesi. Di questi, 39 erano affetti da cardiopatía aritmogena del ventricolo destro (ARVC) (69% maschi, età mediana 48 anni) e 78 erano affetti da cardiomiopatía ipertrofica (CMPI) (69% maschi, età mediana 50 anni). Gli impianti sono stati effettuati in prevenzione primaria nel 62% nel primo gruppo, e nel 95% nel secondo gruppo.

Risultati: La durata mediana del follow-up è stata di 75 mesi per la popolazione con ARVC e di 65 mesi per la popolazione con CMPI. Il numero di deceduti non è risultato differente nelle due popolazioni (10% in entrambi i gruppi). Le attivazioni appropriate dell'ICD sono risultate significativamente maggiori nelle ARVC (62% contro 37%, con una sopravvivenza mediana libera da interventi appropriati rispettivamente di 23 e 46 mesi; $p=0.001$), mentre non vi era differenza tra i due gruppi per il numero di attivazioni inappropriate. Gli storm aritmici sono risultati più frequenti nella popolazione con ARVC rispetto quella con CMPI (15% contro 1%, ad una mediana di 74 contro 65 mesi, $p=0.0089$). L'incidenza complessiva di complicanze correlate all'ICD e agli elettrocateri è risultata significativamente maggiore nei pz con ARVC rispetto a quelli con CMPI (41% contro 19% con una prima complicanza ad una mediana rispettivamente di 45 e 53 mesi, $p=0.01$). In particolare, decubito della tasca si è verificato nel 15% della casistica con ARVC (ad una mediana di 75 mesi) e nel 3% della casistica con CMPI (ad una mediana di 65 mesi) ($p=0.016$) e undersensing nel 13% dei pz con ARVC e nel 3% dei pz con CMPI (rispettivamente ad una mediana di 66 e 63 mesi, $p=0.028$). Non vi sono state invece differenze significative in termini di incidenza di ematoma, frattura di catetere, endocardite su catetere, oversensing, perforazione del ventricolo destro intraoperatoria, TVP della succlavia. La gestione delle complicanze sopracitate si è tradotta in un numero maggiore di ricoveri nel gruppo della ARVC rispetto a quello della CMPI (72% contro 47% dei pz ad una mediana di 28 contro 45 mesi, $p=0.028$).

Conclusions: L'analisi di un'ampia casistica di pz affetti da ARVC, confrontata con la CMPI evidenzia come l'impianto di ICD sia altamente efficace nell'interrompere le tachiaritmie ventricolari maligne, ma sia associato a problematiche di rilievo nel corso del follow-up, tali da richiedere un'adeguata sorveglianza ed eventuali reinterventi per il ripristino dell'integrità del sistema. Al momento attuale l'indicazione all'impianto di ICD nella ARVC vede ancora una quota rilevante di impianti limitati ai pz in prevenzione secondaria, mentre sono in corso di sviluppo metodiche più sofisticate di stratificazioni del rischio, al fine di meglio candidare i soggetti all'impianto in prevenzione primaria.

O439**Progetto di cardioprotezione di una manifestazione pubblica nazionale: dalla teoria alla pratica clinica.**

Valentina Pelizzoni (a), Daniela Aschieri (a), Stefano Nani (b), Margherita Spezia (a), Paolo Rebecchi (c), Federico Guerra (d), Alessandro Capucci (d)

(a) UO Cardiologia Osp. G. Da Saliceto Piacenza, (b) UO Emergenza Territoriale-servizio 118 Osp. G. Da Saliceto Piacenza, (c) Direzione Provinciale ANPAS Piacenza, (d) Clinica di Cardiologia Ospedale Torrette Ancona

Piacenza è stata la prima città europea protagonista di un progetto di defibrillazione precoce: nel 1998 erano stati introdotti i defibrillatori semi-automatici (DAE) sulle ambulanze delle pubbliche assistenze, sulle pattuglie delle forze dell'ordine e nei luoghi pubblici, a disposizione dei cittadini formati, per combattere la morte cardiaca improvvisa. Recentemente Piacenza ha ospitato una manifestazione di grande portata, l'adunata nazionale degli Alpini; solitamente la popolazione della città conta circa 180.000 persone, nei 3 giorni della festa Piacenza ha assistito a un incremento demografico di circa 450.000 ospiti. Per tale manifestazione è stato studiato un piano di emergenza sanitaria dettagliato, in particolare è stato studiato un progetto di cardio-protezione dell'intera città, affinché ogni possibile cittadino colpito da arresto cardiaco venisse defibrillato entro un tempo massimo di 5 minuti. I defibrillatori sono stati così disposti:

| Tipo struttura | N.strutt. con DAE | Sede |
|--|-------------------|----------|
| Punti medici | 3 | Fissa |
| Punti primo intervento (con infermieri o soccorritori) | 7 | Fissa |
| Ambulanze BLS in servizio ordinario e aggiuntivo | 15 | Mobilità |
| Ambulanze BLS a disposizione in periferia della città | 5 | Mobilità |
| Ambulanze ACLS | 3 | Mobilità |
| DAE ad uso pubblico dislocati vicino agli accampamenti | 50 | Fissa |
| Squadre volontari a piedi e in moto | 14 | Mobilità |
| Pattuglie forze ordine con defibrillatore | 5 | Mobilità |

Le postazioni fisse e i tragitti percorsi dai mezzi mobili sono state studiate per garantire una capillare protezione in ogni zona della città, in particolare le aree interessate da sfilate e accampamenti.

Caso clinico: il terzo giorno della manifestazione un uomo di 72 anni, cadeva a terra privo di coscienza nella zona dell'ammassamento degli alpini in attesa della sfilata. Un amico, testimone della caduta, e milite di un'associazione di volontariato sanitario, allerta il 118 e inizia a praticare la rianimazione cardiopolmonare. Il paziente non è cosciente, e respira male, il 118 attiva immediatamente il cosiddetto "codice blu" che prevede la chiamata per via telematica delle pattuglie con defibrillatore, attiva il mezzo ACLS più vicino e allerta la squadra di volontari a piedi con defibrillatore presenti in zona. In 2 minuti giunge sul posto una pattuglia di vigili urbani, applica il DAE ed eroga le prime scariche. 2 minuti dopo giungono sul posto anche i volontari della squadra a piedi che collaborano alla rianimazione del paziente. Dopo 7 minuti dall'evento (data la difficoltà a raggiungere il luogo per la presenza di moltissime persone in strada) arriva il mezzo ACLS, prosegue con la rianimazione e trasporta il paziente in ospedale con polso centrale presente e in respiro spontaneo. Viene sottoposto a coronarografia d'urgenza e dopo circa due ore si sveglia spontaneamente senza riportare danni neurologici permanenti.

Conclusioni: Questo caso dimostra l'importanza di un progetto di cardioprotezione in occasione di manifestazioni con elevato afflusso di persone. Per salvare una persona colpita da arresto cardiaco occorre intervenire entro 5 minuti per prevenire danni anossici cerebrali e consentire al paziente un pieno recupero delle funzioni neurologiche.

FATTORI DI RISCHIO CARDIOVASCOLARE IN ETA' PEDIATRICA E ADOLESCENZIALE

O440

Distribution of cardiovascular risk factors in athletes and no athletes in a population of 12.000 Italian student

Paola Scarparo (a), Azzurra Marceca (a), Alessandra D'Ambrosi (a), Noemi Bruno (a), Antonio Fusto (a), Iliaria Mancini (a), Francesco Adamo (a), Maria Chiara Gatto (a), Maria Giovanna Vassallo (a), Alessandra Cinque (a), Massimo Mancone (a), Bruno Brasolin (a), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari

Introduction: Regular physical exercise is recommended by medical community. It is associated with a decrease in all cause-mortality, particularly with cardiovascular causes. The aim of our prospective observational study is to detect the prevalence of cardiovascular risk factors (CvRFs) in a population of young Italian students, athletes (G-A) and no athletes (G-B). We considered both competitive and noncompetitive athletes.

Methods: From October 2010 to March 2013, we prospectively evaluated 12115 students (Age 17.88 ± 1.57 years old; 56% female) 8117 (67%) no athletes (G-B) and 3998 (33%) athletes (G-A). Anamnestic risk factors were collected using a medical history questionnaire. All students underwent to blood pressure and body-mass index evaluation. For statistical analysis we used the t test and Fisher's test, when appropriate. The statistical difference was considered significant only for p-value ≤ 0.05 .

Results: In young population there isn't a significant difference in the prevalence of high normal blood pressure value in two groups. In no athletes systolic (SBP) and diastolic blood pressure (DBP) average was significantly higher than athletes (SBP: G-A 115.00 ± 7.07 vs G-B 118.72 ± 9.00 , $p < 0.0001$; DBP: G-A 65.00 ± 7.07 ; G-B 68.83 ± 9.25 ; $p < 0.0001$). The body mass index (BMI) mean was significantly lower in G-A compared to G-B (22.63 ± 3.70 vs 23.34 ± 1.25 ; $p < 0.0001$). Moreover we observed that 22% of no athletes with BMI > 25 had a SBP > 130 mmHg and only 12% with BMI < 25 had a SBP > 130 mmHg.

Conclusions: Our prospective observational study evidenced that the physical exercise decrease the blood pressure and BMI. Moreover the overweight is associated to an increase of systolic blood pressure also in young people.

O441

Analisi del carico pressorio diurno e notturno in una popolazione di bambini con obesità sottoposti a monitoraggio ambulatoriale delle 24 ore.

Giuliano Tocci (a, b), Andrea Ferrucci (a), Anna Rita Mazzotta (c), Simona Bianchi (c), Filomena Ianniello (c), Maria Pia Villa (c), Massimo Volpe (a, b)

(a) Centro Diagnosi e Cura Ipertensione Arteriosa, UOC Cardiologia, Dipartimento Medicina Clinica Moleco, (b) IRCCS Neuromed, Pozzilli (IS), Italia, (c) Centro di Medicina del Sonno, UOC Pediatria, Dipartimento Organi di Senso e Neuroscienze.

Introduzione: L'obesità in età pediatrica è stata associata ad un aumento del rischio di sviluppare ipertensione arteriosa stabile in età adulta.

Obiettivi: Valutare il carico pressorio notturno in un coorte di bambini con obesità.

Materiali e Metodi: Bambini con obesità, definita per un indice di massa corporea (IMC) percentile $> 95^{\circ}$, sono stati sottoposti a valutazione della pressione arteriosa (PA) clinica ed ambulatoriale delle

24 ore. Il carico pressorio diurno e notturno è stato definito per numero o percentuale di rilevazioni pressorie sopra soglia ed espresso come percentuale sul totale delle rilevazioni. I bambini sono stati distinti in tre gruppi: gruppo A (normopeso), IMC <90° percentile; gruppo B (sovrappeso), IMC 90-95° percentile; gruppo C (obesi), IMC >95° percentile.

Risultati: Sono stati inclusi nel presente studio 133 bambini (86 maschi, età media 11.9±8.9 anni, IMC medio 27.4±4.9 kg/m², IMC medio percentile 118.7±3.1, superficie corporea media 1.5±0.3 m², PA clinica media 124.4±13.6/75.8±10.3 mmHg, PA 24 media 24 ore 118.0±11.2/66.6±7.1 mmHg), distribuiti n=40 nel gruppo A, n=40 nel gruppo B ed n=41 nel gruppo C. Sebbene nell'ambito dei valori considerati normali, i valori medi di PA sono risultati essere aumentati al crescere del valore di IMC sia alla misurazione clinica (118.9±12.3/75.1±8.5 vs. 124.2±12.5/75.5±10.4 vs. 129.9±14.0/77.1±11.7 mmHg; P<0.001 *trend*) che ambulatoriale 24 ore (112.8±10.5/65.8±8.1 vs. 116.8±8.4/66.6±6.3 vs. 124.4±11.6/67.6±6.8 mmHg; P<0.001 *trend*). La percentuale di letture sopra soglia per la PA sistolica sono risultate essere maggiori nel gruppo C rispetto agli altri gruppi, sia nel periodo diurno (8.8 vs. 10.8 vs. 24.8, P=0.012 *trend*) che nel periodo notturno (11.2 vs. 17.1 vs. 37.6; P=0.03 *trend*).

Conclusioni: I risultati di questa analisi dimostrano come, seppure nell'ambito dei valori considerati normali per la misurazione pressoria clinica ed ambulatoriale delle 24 ore, soggetti in età pediatrica con obesità hanno un carico pressorio aumentato, particolarmente per la PA sistolica.

O442

Personalità degli adolescenti ed implicazioni sull'aderenza alla Dieta Mediterranea e alla regolare attività fisica.

Anna Antonia Valenzano (a), Veronica Bosco (a), Armando Ferraretti (b), Michela Perrella (b), Tommaso Passero (a), Antonio Totaro (b), Francesco Musaico (b), Fiorella De Rosa (b), Michele Correale (b), Natale Daniele Brunetti (b), Giuseppe Cibelli (a), Matteo Di Biase (b)

(a) *Università degli Studi di Foggia - Dipartimento di Medicina Clinica e Sperimentale*, (b) *Università degli Studi di Foggia - Dipartimento di Cardiologia*

Introduzione: Il benessere psicofisico degli adolescenti può essere collegato alla personalità, all'alimentazione e all'attività fisica.

Scopo dello studio: Descrizione in merito allo stato nutrizionale, all'aderenza alla dieta mediterranea, ad una regolare attività fisica degli adolescenti della provincia di Foggia. Cercare di "caratterizzare", attraverso semplici questionari, adolescenti con personalità differenti con maggiore o minore inclinazione all'attività fisica o all'aderenza alla dieta mediterranea.

Materiali e Metodi: Sono stati arruolati 180 alunni (98 maschi e 82 femmine), di età compresa tra i 14 e i 19 anni (16,29 ± 1,5). Sono stati tutti sottoposti ad indagine nutrizionale (recall 24h), valutazione ponderale e staturale, calcolo del BMI, delle circonferenze corporee e della psicometria, valutazione del livello dell'attività fisica con test "PAQ-A", valutazione dell'aderenza alla Dieta Mediterranea con test "Kidmed" e valutazione delle Cinque Dimensioni della Personalità con il questionario "BFQ".

Risultati: Il 39% del campione di alunni di scuola media superiore della capitanata ha una scarsa aderenza ai principi della Dieta Mediterranea. Personalità più scrupolose, amichevoli, altruiste, ed aperte alla cultura hanno dimostrato una buona aderenza dei principi della Dieta Mediterranea. Personalità più dinamiche ed energiche sono quelle più predisposte all'attività fisica.

Conclusioni: L'utilizzo di semplici questionari ha permesso di riconoscere personalità tra gli adolescenti meno inclini a seguire i principi della dieta mediterranea e meno inclini all'attività fisica, così permettendo di convergere su di loro un maggiore impegno per una corretta educazione sanitaria.

O443

Distribution of abuse and behavioral risk factors and correlation with blood pressure and BMI in 12000 high school students

Azzurra Marceca (a), Alessandra D'Ambrosi (a), Noemi Bruno (a), Antonio Fusto (a), Ilaria Mancini (a), Francesco Adamo (a), Paola Scarparo (a), Maria Chiara Gatto (a), Maria Giovanna Vassallo (a), Alessandra Cinque (a), Massimo Mancone (a), Francesco Fedele (a)

(a) "Sapienza" Università di Roma; Policlinico "Umberto I"; Dipartimento di Scienze Cardiovascolari

Introduction: In Italy the young population life-style behaviors are changing. Instead tobacco use, alcohol intake, drugs abuse or sedentary behavior are continuously increasing.

Methods: From October 2010 to March 2013 we prospectively evaluated 12108 high school students (Age $17,9 \pm 1,57$ and $55,98\%$ female). Cardiovascular risk factors were collected using a medical history questionnaire. All students underwent to blood pressure and body mass index evaluation. For statistical analysis we used Kruskal-Wallis test for independent samples. The statistical difference was considered significant only for $p\text{-value} \leq 0,05$.

Results: In our population the risk factors distribution ($n=12108$) showed: 3499 smokers (28,9%), 3019 alcohol consumers (24,9%) and 987 drugs abusers (8,2%). We evaluated the prevalence of hypertension (2,3%), isolated systolic hypertension (3,9%), overweight (11,3%) and obesity (2,0%). In alcohol consumers systolic (SBP) and diastolic (DBP) blood pressure and body mass index (BMI) values were significantly higher than in no alcohol consumers (p values: 0,0001; 0,0001 and 0,007 respectively). In smokers systolic (SBP) and diastolic (DBP) blood pressure values were significantly higher than in no smokers (p values: 0,0001 and 0,02 respectively). Also in drugs abusers systolic (SBP) and diastolic (DBP) blood pressure values were significantly higher than in no abusers (p values: 0,0001 and 0,0001 respectively).

Conclusion: Our study evidences that abuse and behavioral risk factors are associated with an high risk to develop hypertension and obesity, also in the young people. Therefore lifestyle intervention is recommended in young population to prevent cardiovascular diseases.

O444

Asymmetric dimethylarginine: higher intrauterine growth restriction leads to more reduced excretion

Pier Paolo Bassareo (a), Enrica Marini (a), Giuseppina Giau (a), Angela Zedda (a), Federica Torri (a), Giuseppe Mercurio (a)

(a) UOC Cardiologia ed Angiologia-Dipartimento di Scienze Mediche "M. Aresu"-Università di Cagliari

Introduction: Prematurity at birth is an emerging risk factor for the development of early cardiovascular disease. High hematic levels of asymmetric dimethylarginine (ADMA) are associated with the future development of adverse cardiovascular events. The ADMA/ symmetric dimethylarginine (SDMA) ratio is a marker of ADMA catabolism. A high ADMA/SDMA ratio is suggestive of reduced ADMA excretion.

This study aimed: *a*) at verify the presence of a statistically significant difference between ADMA/SDMA ratio in a group of young grown up subjects who were born preterm with an extremely low birth weight (ex-ELBW) and a group of healthy adults born at term; *b*) at seek correlations between ADMA/SDMA ratio in ex-ELBW and anthropometric and clinical parameters (gender, chronological age, gestational age, birth weight, and length of stay in Neonatal Intensive Care Unit).

Methods: Thirty-seven ex-ELBW subjects (11 males [M] and 26 females [F], aged 17-28 years, mean age $22,2 \pm 1,8$ years) were compared with 37 controls (11 M and 26 F). ADMA/SDMA ratio levels were assessed for each patient in the study.

Results: ADMA/SDMA ratio was increased in ex-ELBW subjects compared to controls (1.42 ± 0.31 vs 0.95 ± 0.14 , $p < 0.002$), and correlated inversely with birth weight ($r = -0.68$, $p < 0.0001$), and gestational age ($r = -0.54$, $p < 0.0005$).

Conclusions: ADMA catabolism is significantly decreased in ex-ELBW subjects compared to controls, underlining a probable correlation with intrauterine growth restriction. These results suggest the onset of early circulatory dysfunction predictive of increased cardiovascular risk in these subjects.

O445

Effetti delle apnee ostruttive del sonno sulla funzione cardiovascolare in una popolazione di bambini con obesità.

Giuliano Tocci (a, b), Andrea Ferrucci (a), Anna Rita Mazzotta (c), Simona Bianchi (c), Filomena Ianniello (c), Maria Pia Villa (c), Massimo Volpe (a, b)

(a) Centro Diagnosi e Cura Ipertensione Arteriosa, UOC Cardiologia, Dipartimento Medicina Clinica Moleco, (b) IRCCS Neuromed, Pozzilli (IS), Italia, (c) Centro di Medicina del Sonno, UOC Pediatria, Dipartimento Organi di Senso e Neuroscienze.

Introduzione: L'obesità in età pediatrica e la sindrome delle apnee ostruttive notturne (OSAS) sono stati associati allo sviluppo di complicanze cardiovascolari e sembrano condividere la stessa patogenesi su base infiammatoria e metabolica.

Obiettivi: Valutare il profilo pressorio clinico ed ambulatoriale delle 24 ore in un coorte di bambini con obesità e diversi livelli di gravità di OSAS.

Materiali e Metodi: Bambini con obesità, definita per un indice di massa corporea (IMC) percentile $>95^{\circ}$, sono stati sottoposti a polisonnografia convenzionale (OSAS). Previo consenso dei genitori, tutti i bambini sono stati sottoposti a misurazione della pressione arteriosa (PA) clinica ed ambulatoriale delle 24 ore. Per ogni bambino sono stati inoltre registrati parametri antropometrici, clinici, metabolici e respiratori.

Risultati: Sono stati inclusi nel presente studio 38 bambini (età media 10.2 ± 2.4 anni, IMC medio 27.7 ± 3.8 kg/m², PA clinica media $123.7 \pm 12.4/84.2 \pm 7.6$ mmHg, PA 24 ore media $115.9 \pm 8.1/65.9 \pm 6.4$ mmHg, PA media notturna $109.8 \pm 11.3/58.3 \pm 8.1$ mmHg, indice apnea-ipopnea (AHI) 11.98 ± 20.49 n/h, saturazione notturna ossigeno $96,74 \pm 2,47\%$). Non sono state osservate differenze significative tra i due gruppi di pazienti in termini di parametri antropometrici, metabolici e pressori. Sebbene i valori pressori medi notturni non siano diversi ($109.7 \pm 9.5/59.4 \pm 7.0$ mmHg vs. $109.9 \pm 12.7/57.7 \pm 8.9$ mmHg; $P=0.96$ e $P=0.50$), sono stati registrati un numero maggiore di misurazioni dei valori di PA sistolica (21.1 vs. 14.7 ; $P=0.43$) o diastolica (16.4 vs. 8.9 ; $P=0.14$) al di sopra dei valori soglia nel gruppo di bambini obesi con OSAS.

Conclusioni: I risultati preliminari di questo studio dimostrano che i bambini obesi con OSAS hanno un maggior carico di PA nelle ore notturne, che potrebbe rappresentare un marcatore precoce per lo sviluppo di complicanze cardiovascolari in età adulta. Ulteriori analisi su un campione di popolazione più ampio e con un più lungo periodo di osservazione potranno eventualmente confermare tale ipotesi.

PREVENZIONE RISCHIO CARDIOVASCOLARE

O446

Effetto di un intervento dietetico su soggetti affetti da scompenso cardiaco cronico

Anna Antonia Valenzano (a), Andreina Cafagna (a), Gianvito Porcelli (a), Antonio Armando (b), Tommaso Passero (b), Armando Ferraretti (b), Francesco Fiorella (b), Fiorella De Rosa (b), Giuseppina Merolla (b), Natale Daniele Brunetti (b), Michele Correale (b), Giuseppe Cibelli (a), Matteo Di Biase (b)

(a) *Università degli Studi di Foggia - Dipartimento di Medicina Clinica e Sperimentale*, (b) *Università degli Studi di Foggia - Dipartimento di Cardiologia*

Introduzione: la Sindrome Metabolica aumenta il rischio di sviluppare un quadro di scompenso cardiaco nei soggetti senza apparenti cardiopatie, mentre nei soggetti già scompensati aumenta il rischio di eventi cardiovascolari maggiori.

Scopo dello Studio: Descrivere, in una popolazione di pazienti affetti da scompenso cardiaco cronico, attraverso un'indagine alimentare e la rilevazione dei parametri antropometrici, le alterazioni dello stato nutrizionale e dell'assetto ponderale; verificare la capacità di ottenere una significativa riduzione dei parametri ponderali, operando un intervento dietetico ipocalorico; verificare l'impatto della dieta ipocalorica sull'entità della massa grassa totale e viscerale e su altre variabili metaboliche, ritenute fattori di rischio di insorgenza di sindrome metabolica.

Materiali e Metodi: 51 pazienti, di età compresa tra 32 e 90 anni (età media $62,9 \pm 9,8$ anni), di cui 32 maschi e 19 femmine, sono stati arruolati nel periodo compreso tra settembre 2012 e marzo 2013. Sono stati rilevati i parametri antropometrici relativi al peso, all'altezza, al BMI e fisici, relativi alla FC, alla PAS. È stata effettuata la rilevazione dei dati strumentali necessari per la determinazione della composizione corporea e, infine, è stata condotta un'indagine alimentare per determinare la quantità e la qualità dei nutrienti ed il relativo apporto calorico. Nel corso della prima visita è stata assegnata una dieta ipocalorica personalizzata. Dopo 2 mesi, i pazienti sono stati sottoposti a controllo ponderale per il calcolo del BMI e alle rilevazioni strumentali per la determinazione della composizione corporea, sono stati anche valutati i differenti fattori di rischio cardiovascolare.

Risultati: al controllo clinico dopo la dietoterapia, sono risultati significativi, la riduzione del BMI, del peso e della circonferenza corporea; la percentuale di soggetti affetta da sindrome metabolica è stata ridotta. La percentuale di soggetti affetti dai singoli fattori di rischio che determinano la sindrome metabolica, è andata anche riducendosi alla fine della dietoterapia.

Conclusioni: due mesi di dietoterapia in pazienti affetti da scompenso cardiaco cronico hanno comportato una riduzione del numero di pazienti con sindrome metabolica e scompenso cardiaco cronico, in tal modo il profilo di rischio dei pazienti veniva ridotto.

O447

Prevenzione secondaria ed aderenza alla terapia: risultati a 4 anni di un programma di follow up intensivo.

Gennaro Ratti (a), Cristina Capogrosso (a), Cosimo Fulgione (b), Gianfranco Ricciardi (b), Gregorio Covino (a), Mario Volpicelli (a), Paolo Tammaro (a), Salvatore Latte (b), Antonio Lizzadro (a), Mario Mallardo (b), Paolo Capogrosso (a)

(a) *UOC di Cardiologia/UTIC- PO S. Giovanni Bosco - ASL Napoli 1 CENTRO*, (b) *UOC di Cardiologia/Riabilitazione Cardiologica- PO S. Gennaro - ASL Napoli 1 CENTRO*

Background: Dopo la fase acuta di una sindrome coronarica acuta (SCA) sussistono spesso, soprattutto per le prescrizioni multiple, problemi di aderenza alla terapia. Un periodo particolarmente "vulnerabile", risulta essere la fase successiva alla dimissione. Molte evidenze dimostrano infatti che già nei primi mesi dopo l'evento acuto, l'aderenza ai trattamenti si riduce. Perciò la prima visita di SIC | *Indice Autori*

controllo dopo la dimissione rappresenta la una tappa fondamentale insieme alla Riabilitazione Cardiologica per identificare i pazienti più a rischio di sospensione dei trattamenti e per incominciare ad educare il paziente alla gestione della propria malattia.

Scopo: Abbiamo voluto verificare gli effetti di un programma ambulatoriale di un follow up intensivo (risultati a 4 anni) sull'aderenza (valutata con questionari validati) alla terapia a lungo termine (relativamente ai 4 principali farmaci cardiologici *evidence based*) in prevenzione secondaria.

Materiali e metodi: Abbiamo valutato 369 pazienti giunti alla nostra osservazione per SCA con età media 47 ± 11 anni (267 M/102 F) (Gruppo A). Alla dimissione dopo l'evento acuto, oltre alla programmazione di un ciclo di riabilitazione cardiologica, veniva dato un appuntamento per un controllo ambulatoriale post-dimissione (dopo un periodo di 20 ± 5 giorni), nel cui contesto veniva programmata una visita ambulatoriale dopo 3 mesi e successivamente ogni 6 mesi (per un follow up di 4 anni). Al reclutamento ed al termine del follow up di 4 anni, venivano somministrate (per valutare l'aderenza alla terapia) la *Adherence to Refills and Medications Scale* (ARMS) (Questionario di 12 items), la *Morisky Adherence Scale* (Questionario di 4 items), e si valutava quanti dei farmaci *evidence-based* (sono stati considerati in particolare i seguenti farmaci: Omega 3, ACE-inibitori/Sartani, Statine, Beta-bloccati, Aspirina) venivano assunti. Come popolazione di controllo è stato considerato un gruppo di pazienti (avviato e seguito con un normale programma ambulatoriale) costituito da 177 pazienti con età media 51 ± 9 anni (Gruppo B). L'analisi statistica è stata condotta mediante test t di Student. Un valore di $p < 0,05$ è stato assunto come limite di significatività statistica.

Risultati: Fra i 2 gruppi non sono state osservate differenze significative al reclutamento riguardo ai valori della *Morisky Adherence Scale* (Gruppo A $3,3 \pm 0,8$ vs Gruppo B $3,4 \pm 0,6$: p NS), della ARMS (Gruppo A 17 ± 18 vs Gruppo B 19 ± 9 : p NS) ed il numero di farmaci *evidence-based* assunti dal paziente. Differenze sono state invece osservate al termine del follow up di 4 anni, sia per quanto riguarda gli score di aderenza alla terapia (*Morisky Adherence Scale*: Gruppo A $3,1 \pm 0,9$ vs Gruppo B $2,2 \pm 0,9$: $p < 0,05$) (ARMS: Gruppo A 20 ± 7 vs Gruppo B 28 ± 9 : $p < 0,05$) che per il numero di farmaci assunti dal paziente (Gruppo A 3 ± 1 vs Gruppo B 2 ± 1).

Conclusioni: I risultati sembrano non solo proporre un programma di follow up intensivo come possibile strategia per motivare il paziente a continuare la terapia in prevenzione secondaria, ma anche enfatizzare il ruolo della dimissione dopo l'evento acuto, quale momento formativo ed informativo per il paziente; ma soprattutto essa è un momento organizzativo del programma di la Riabilitazione Cardiologica e del successivo follow up più adeguato al rischio individuale.

O448

Benefici del trattamento con statine nei soggetti anziani in prevenzione primaria. Una meta-analisi

Gianluigi Savarese (a), Antonio M Gotto (b), Stefania Paolillo (a), Carmen D'Amore (a), Teresa Losco (a), Francesca Musella (a), Oriana Scala (a), Giuseppe De Luca (c), Bruno Trimarco (a), Pasquale Perrone Filardi (a)

(a) Dipartimento di Scienze Biomediche Avanzate. Università degli Studi di Napoli "Federico II",

(b) Weill Cornell Medical College, New York, USA, (c) Divisione di Cardiologia, Università del Piemonte Orientale, Novara

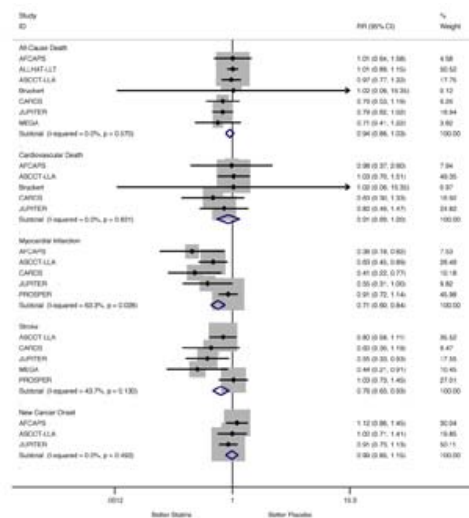
Background: Dato che l'età media della popolazione sta rapidamente avanzando, la prevenzione delle malattie cardiovascolari (CV) negli anziani è particolarmente importante. Nel paziente anziano con pregressi eventi CV, l'uso delle statine è raccomandato dalle linee guida, mentre per quanto riguarda l'impiego di questi farmaci nel paziente anziano senza pregressi eventi cardiovascolari l'evidenza è ancora limitata. Lo scopo del nostro studio è verificare se le statine riducono la morte per tutte le cause e gli eventi CV nei soggetti anziani senza pregressa malattia CV.

Metodi: Sono stati ricercati tramite MEDLINE, Cochrane, ISI Web of Science e SCOPUS tutti gli studi sull'utilizzo delle statine nei pazienti in prevenzione primaria. I criteri di inclusione sono stati: randomizzazione a trattamento con statina o placebo; età alla randomizzazione > 65 anni;

registrazione di almeno 1 evento clinico tra morte per tutte le cause, morte CV, infarto del miocardio, stroke e nuova insorgenza di cancro. La meta-analisi è stata utilizzata per studiare l'effetto dei trattamenti sugli outcomes. La meta-regressione è stata utilizzata per studiare l'influenza di potenziali variabili confondenti sui nostri risultati. La presenza di publication bias è stata esaminata tramite il test di Macaskill modificato.

Risultati: Sono stati inclusi nell'analisi 8 trial randomizzati che arruolavano 24,647 soggetti (42.7% femmine; età media 73.0±2.9 anni; follow-up medio 3.5±1.5 anni). Le statine, paragonate con il placebo, hanno ridotto significativamente il rischio di infarto del miocardio del 39.4% (RR: 0.606; 95% CI: 0.434 a 0.847; p=0.003) ed il rischio di stroke del 23.8% (RR: 0.762; 95% CI: 0.626 a 0.926; p=0.006). Al contrario non è risultato significativamente ridotto il rischio di morte per tutte le cause (RR: 0.941; 95% CI: 0.856 a 1.035; p=0.210), morte CV (RR: 0.907; 95% CI: 0.686 a 1.199; p=0.493) e rischio di nuova insorgenza di cancro (RR: 0.989; 95% CI: 0.851 a 1.151; p=0.890).

Conclusioni: Nei soggetti anziani ad alto rischio CV ma senza già stabilita malattia CV, le statine riducono significativamente l'incidenza di infarto del miocardio e stroke, ma non prolungano la sopravvivenza nel breve termine.



O449

Smoking do modify cv risk – italian data of cv aspire study

Franco Mondello Malvestiti (a), Renzo Imperiali (b), Pablo Mallaina (a)

(a) Primary Care BU Europe, Pfizer, Walton Oaks, UK, (b) ASL di Varese, Distretto di Tradate, Italy

Background and aim: Smoking is considered one of the major risk factors for cardiovascular disease (CVD), since the introduction in Italy of the smoking ban in 2003, CV events appear to be reduced by between 4 and 13%. The prevalence of smoking, which causes in Italy around 85.000 deaths/year, is still high, with estimates of about 20.8% of the population. We conducted European multicentre cross-sectional survey to evaluate the CV risk in smokers attending general practice centers and the CV risk attributable to smoking.

Methods: in Italy 443 consecutive smokers were included from 27 general practitioners on the occasion of their medical examination. Patients older than 40 years, smoking >10 cigarettes /day, having recently carried out lab tests for lipids and measurements of blood pressure were enrolled after having given informed consent. Besides smoking history, patients were assessed with the Fagestrom test for evaluating tobacco addiction. The cardiovascular (CV) risk of smokers was calculated through the evaluation of three different standard assessment tools: the Framingham test, and charts of “progetto CUORE” and SCORE. The parameters included for CV risk were: smoking, age, sex, blood

pressure and possible drug treatment, cholesterol levels, LDL / HDL ratio, presence of diabetes, history of coronary artery disease. The calculation of the CV risk attributable to smoking was performed by evaluating a virtual control group with the same characteristics of the patients except with the absence of smoking. The change in the relative risk of CV disease was calculated using the following formula: (CVD risk smoking - CVD risk non-smoking)/CVD risk non-smoking.

Results: Smokers included in the study were predominantly male (58.8%) and had a mean age of 58.2 years (SD 10.32). The Fagestrom test indicated a moderate degree of addiction (with an average score of 4.5 - SD 2.45) while the average smoking duration was 35.5 years (SD 12.0); this population had on average 3 (SD 3.18) previous attempts at quitting. In this population the highest CV risk was the 10 years CVD risk (20,2%), followed by the 10 years Coronary Heart disease (15,8%) and the 10 years hard Coronary Heart disease (12,9%). The increased CV risk in smokers compared to the control group (simulated in non-smokers) was highest for CV mortality at 10 years (95%), followed by: four years intermittent claudication (75,0%), 10 years Coronary CV events (67,8%), 10 years hard coronary heart disease (56,0%), 10-year CHD (51,9%) and 10 years CVD to (29,3%).

Conclusions: This survey reinforces the importance of smoking as a major risk factor for CV disease and disability in Italy. The use of different tools for prediction of cardiovascular risk (Framingham test, Progetto CUORE and SCORE chart) have confirmed consistently the negative effect of smoking on the prevalence of cardiovascular disease and particularly, with regard to the risk of CV mortality in this population, it appears to be increasing almost the double. These risk assessment tools serve as a reminder to physicians of the size of the contribution that smoking makes to CV risk and could be used more frequently by the physicians to convince their smoker patients to quit smoking.

O450

Studio randomizzato di valutazione dell'efficacia e sicurezza di verbascoside in pazienti con fattori di rischio cardiovascolare

Rita Pavasini (a), Gianluca Campo (a), Jlenia Marchesini (a), Roberto Ferrari (a)

(a) Azienda ospedaliero-universitaria S.Anna-Ferrara.

Background: Negli ultimi anni si è osservata un'importante crescita dell'uso dei prodotti nutraceutici in cardiologia. Alcuni degli esempi più recenti sono i nutraceutici usati con successo per il controllo dei livelli di colesterolemia (soprattutto nei pazienti intolleranti alle statine) e per l'extrasistolia sopraventricolare sintomatica. Il verbascoside è un prodotto di origine vegetale del gruppo dei glicosidi fenil-propanoidi. Nei primi studi su animali e uomo ha dimostrato interessanti proprietà anti-infiammatorie, anti-aterogene e anti-ossidanti. In uno studio condotto dal nostro gruppo su sangue di volontari sani con fattori di rischio cardiovascolare, ha dimostrato di ridurre significativamente l'aggregazione piastrinica indotta da acido arachidonico (AA) e adenosina difosfato (ADP).

Obiettivo dello studio: Valutare gli effetti del verbascoside per os vs. placebo sui valori di reattività piastrinica (RP) in individui con fattori di rischio cardiovascolare (FRCV).

Metodi: Sono stati arruolati individui senza precedenti eventi cardiovascolari ma con almeno un FRCV tra età >60 anni, dislipidemia, diabete, ipertensione, fumo, circonferenza addominale >102 nei maschi o >88 nelle femmine. I soggetti arruolati sono stati randomizzati in doppio - cieco a placebo o verbascoside 50 mg o verbascoside 100 mg per due settimane. La RP è stata valutata con l'aggregometria tradizionale (dopo stimolo con AA 1 µM e ADP 5 µM) al basale e dopo due settimane.

Risultati: Complessivamente sono stati arruolati 100 pazienti. L'83% dei pazienti presentava almeno 2 FRCV. Trentatre sono stati randomizzati a placebo, 33 a verbascoside 50 mg e 34 a verbascoside 100 mg. Tra i tre gruppi non erano presenti differenze significative tra le caratteristiche basali. I valori di RP al basale non differivano tra i tre gruppi sia dopo stimolo con AA (50±12 vs. 49±10 vs. 51±15, p=0.9, rispettivamente) sia dopo stimolo con ADP (58±12 vs. 58±12 vs. 60±12, p=0.8, rispettivamente). Come atteso, dopo due settimane, i valori di RP non differivano rispetto al basale nel gruppo placebo (AA: 50±12 vs 50±12, p=0.9; ADP: 58±12 vs. 58±12, p=0.9). Lo stesso

andamento si è osservato nel gruppo verbascoside 50 mg (AA: 49 ± 10 vs. 48 ± 10 , $p=0.9$; ADP: 58 ± 12 vs. 56 ± 10 , $p=0.8$). Contrariamente la somministrazione di verbascoside 100 mg ha ridotto significativamente sia la RP indotta da AA (51 ± 15 vs. 38 ± 20 , $p < 0.01$) sia quella da ADP (60 ± 12 vs. 49 ± 16 , $p=0.01$). Nessun paziente ha riferito effetti avversi di alcun genere dovuti alla somministrazione di verbascoside e/o ha dovuto sospendere prematuramente la somministrazione.

Conclusioni: Il nostro studio ha confermato in vivo quanto era stato dimostrato in vitro. Verbascoside alla dose di 100 mg/die riduce significativamente, in pazienti con fattori di rischio cardiovascolare, i valori di reattività piastrinica indotti da AA e ADP. Questi dati risultano particolarmente interessanti perché nell'ambito della prevenzione primaria gli antiaggreganti attualmente in commercio non sono raccomandati dal momento che gli eventi avversi (emorragie gastrointestinali) equivalgono i benefici (riduzione incidenza infarto). Un prodotto nutraceutico senza effetti collaterali potrebbe quindi essere un'interessante alternativa e futuri studi saranno necessari per dimostrarne le possibili applicazioni ed efficacia.

O451

Aderenza alla Dieta Mediterranea e abitudini alimentari in una popolazione di donne in pre-menopausa.

Sonia Pennella (a), Cristina Rosi (c), Alberto Farinetti (b), Anna Vittoria Mattioli (a)

(a) Università degli studi di Modena e Reggio Emilia Dip Scienze della Vita, (b) Università degli studi di Modena e Reggio Emilia Dip di Scienze Mediche e Chirurgiche Materno-Infant, (c) Azienda AUSL di Modena, Servizio di dietistica

Background: La Dieta Mediterranea (Med D) è stata identificata come l'alimentazione più favorevole per la prevenzione delle malattie cardiovascolari soprattutto nell'ambito di uno stile di vita corretto. Scopo del presente studio è stato quello di analizzare l'aderenza alla Dieta Mediterranea e le diverse fonti di antiossidanti in un gruppo di donne in pre-menopausa residenti in Emilia Romagna.

Metodi: Sono state valutate 500 donne in pre-menopausa (età compresa tra 45-52 anni) visitate a livello ambulatoriale nell'ambito di un Progetto di prevenzione. Sono state escluse donne con pregresso evento cardiovascolari, diabete, ipertensione nota e in trattamento. Le donne sono state sottoposte a indagine alimentare attraverso un questionario auto-somministrato validato, seguito da un colloquio con la dietista Abbiamo calcolato l'aderenza alla Med D utilizzando lo score validato da Panagiotakos. E' stato inoltre valutato l'apporto di antiossidanti secondo categorie di alimenti. Il questionario misurava inoltre il consumo di cereali, ortaggi, legumi, frutta, pesce, latticini, numero di tazze di caffè espresso, snack al cioccolato e il consumo di bevande quali soda e vino. Venivano quindi analizzate le abitudini di vita in rapporto al consumo di alcool e di caffeina.

Risultati: L'aderenza alla Med D calcolata secondo lo score era 32.4 ± 4.7 . La mediana dello score era 28.1 (Q1-Q3 range 25-36). L'intake di vino era 2.3 ± 1.6 bicchieri/die. Analizzando l'assunzione di alcool nei diversi giorni della settimana emerge un picco di consumo durante il week end. Il vino viene consumato con il pasto serale (67% delle donne) o come aperitivo (55%). Le donne che non consumano mai vino erano il 2% mentre le donne che consumano vino tutti i giorni erano pari al 10%. L'assunzione di superalcolici era riferita come occasionale. L'assunzione di caffeina avviene prevalentemente attraverso caffè espresso (3.4 ± 2.1 tazze al dì nelle donne consumatrici abituali), il 24,6 % delle donne non consuma caffè ma predilige l'assunzione di the. L'assunzione di caffeina attraverso alimenti ricchi di cioccolato viene riferita come occasionale dall'89% delle donne intervistate.

Conclusioni: L'aderenza alla Med D nella popolazione da noi esaminata di donne in età pre-menopausale è relativamente bassa, come atteso in base alle abitudini alimentari e alla produzione agricola tipica della Regione valutata. L'alcool viene consumato in quantità moderata e prevalentemente al pasto. L'abitudine di consumare vino a pasto viene mantenuta anche nel gruppo con elevata attività fisica ed elevata percezione dell'utilità di uno stile di vita corretta. Stratificando

la popolazione in base a quartili di score di Med D emerge che le donne con minor aderenza alla Med D sono mediamente più obese e non svolgono attività fisica. La Dieta è una componente importante dello stile di vita e influenza profondamente diversi fattori di rischio cardiovascolare, pertanto la presenza di un'alimentazione scorretta condiziona la comparsa precoce di aterosclerosi.

IL CUORE SINISTRO NELL'INSUFFICIENZA CRONICA

O452

Studio della meccanica rotazionale del ventricolo sinistro nei pazienti candidati a terapia di resincronizzazione cardiaca

Stefania Sacchi (a), Carmine Domenico Votta (a), Alessandro Paoletti Perini (a), Paola Attanà (a), Ilaria Ricceri (a), Giuseppe Ricciardi (a), Paolo Pieragnoli (a), Luigi Padeletti (a)

(a) *Università degli Studi di Firenze*

Background: Nonostante la terapia di resincronizzazione cardiaca (CRT) rappresenti un efficace strumento terapeutico nei pazienti con scompenso cardiaco di grado avanzato, una quota considerevole di soggetti non ne trae beneficio. Il 2-D speckle tracking è una metodica ecocardiografica di recente introduzione che consente una valutazione qualitativa e quantitativa delle deformazioni miocardiche e quindi dell'asincronia meccanica.

Obiettivo: Valutare mediante metodica 2-D speckle tracking la meccanica rotazionale e torsionale del ventricolo sinistro in soggetti candidati a terapia di resincronizzazione cardiaca ed investigarne l'eventuale potere predittivo di risposta alla CRT.

Metodi: Cinquantacinque pazienti candidati a CRT sono stati sottoposti, prima dell'impianto, ad esame ecocardiografico tradizionale e 2-D speckle tracking. Tra i parametri rotazionali sono stati considerati: 1) twist del ventricolo sinistro 2) untwisting rate 3) rotazione media della base e dell'apice 4) ritardo fra picco di rotazione più precoce e picco di rotazione più tardivo dei segmenti basali e di quelli apicali 5) ritardi fra picchi di rotazione di segmenti opposti sia a livello della base che dell'apice. A sei mesi dall'impianto, i pazienti sono stati rivalutati clinicamente ed ecocardiograficamente. La risposta alla CRT è stata definita in base alla riduzione del volume telesistolico del ventricolo sinistro di almeno il 15% rispetto al valore basale.

Risultati: Cinquantacinque pazienti (42 maschi, età media 66 ± 9 anni) con severa disfunzione ventricolare sinistra (FE media $29\% \pm 3$) sia di origine ischemica (nel 44% dei casi) che non ischemica sono stati sottoposti ad impianto di ICD biventricolare. A 6 mesi dall'impianto, 30 pazienti su 55 sono risultati "responders" alla CRT. Alla valutazione 2-D speckle tracking basale, nel gruppo "responder" è stato osservato rispetto al gruppo "non-responder" un maggior ritardo fra il picco di rotazione più precoce e il picco di rotazione più tardivo sia dei segmenti della base ($220,20\text{ms} \pm 133,29$ vs. $150,48\text{ms} \pm 113,31$ rispettivamente; $p=0.04$) che dei segmenti dell'apice ($218,67\text{ms} \pm 123,36$ vs. $134,56\text{ms} \pm 117,32$ rispettivamente; $p=0.008$). E' stato inoltre osservato un maggior ritardo fra il picco di rotazione del segmento antero-settale e quello posteriore sia a livello della base [$55,5\text{ms}$ (24 to 115,25) vs. 20ms (4,5 to 65) rispettivamente; $p=0.019$] che dell'apice [131ms (48,5 to 212) vs. 25ms (0 to 63) rispettivamente; $p<0.001$]. All'analisi multivariata, il ritardo fra il picco di rotazione del segmento antero-settale e quello posteriore a livello dell'apice si è dimostrato un predittore indipendente di risposta alla CRT (sensibilità 96%, specificità 57% al valore di 97,5 ms).

Conclusioni: Nei pazienti candidati a terapia di resincronizzazione cardiaca il ritardo fra il picco di rotazione del segmento antero-settale e quello posteriore a livello dell'apice del ventricolo sinistro costituisce un predittore indipendente di risposta alla CRT.

O453

Left atrial function measured by cardiac magnetic resonance in patients with heart failure: clinical associations and prognostic value

Pierpaolo Pellicori (a), Jufen Zhang (a), Elena Lukaschuk (a), Paola Putzu (a), Pierluigi Costanzo (a), Anil Joseph (a), Christos Bourantas (a), Thanjavur Bragadeesh (a), Andrew Clark (a), John Cleland (a)

(a) *Hull York Medical School - University of Hull*

Background: Left atrial (LA) volume is an important marker of cardiac dysfunction, portending an adverse cardiovascular outcome in heart failure (HF), but LA function is rarely measured.

Methods: Out-patients referred with suspected HF who underwent cardiac magnetic resonance imaging (CMRI) were included in this analysis. HF was defined as the presence of relevant symptoms and signs and a left ventricular ejection fraction (LVEF) <50% or amino-terminal pro-brain natriuretic peptide (NT-proBNP) ≥ 400 pg/ml (or ≥ 125 pg/ml if taking loop diuretics). LAEF was defined as (LA maximum-LA minimum)/LA maximum volume measured in 2 and 4 chamber views.

Results: Of 982 patients enrolled, 664 fulfilled the criteria for HF and were in sinus rhythm. The median (IQR) LAEF was 42 (31-51) % in patients with HF and 55 (48-61) % in patients who did not ($p < 0.001$). Patients with HF in the lowest quartile of LAEF (23%; IQR: 17-28%) had lower LV and right ventricular (RV) EF, and greater LV and RV mass and plasma NTproBNP than those in the highest quartile of LAEF (56%; IQR: 53-61%). Log [LAEF] and log [NTproBNP] were correlated ($r = -0.410$, $p < 0.001$). 394 (59.3%) patients with HF died or were admitted with HF during a median follow up of 883 (IQR 469-1626) days and 101 (15.2%) developed AF. In a multivariable Cox model, LAEF, but not LVEF, was independently associated with mortality (HR for 10% increase: 0.82 (95%CI: 0.74-0.87), $p < 0.001$), competing with NTproBNP, in the model. Age (HR for 10 years increase: 1.62 (95%CI: 1.23 - 2.14) $p < 0.001$) and LAEF (HR for 10% increase: 0.81 (95%CI: 0.66-0.90), $p = 0.044$) predicted incident AF.

Conclusions: In patients with HF, LAEF predicts adverse outcome independently of other measures of cardiac dysfunction.

O454

L'indice di potenza di picco/massa nella stratificazione del rischio dei pazienti con scompenso cardiaco cronico avanzato

Alda Huqi (a), Doralisa Morrone (a), Giacinta Guarini (a), Simone Sorbo (a), Lauro Cortigiani (b), Mario Marzilli (a), Frank L. Dini (a)

(a) *Dipartimento Cardio-Toracico, Malattie Cardiovascolari I, Ospedale Cisanello, Pisa*, (b) *Malattie Cardiovascolari, Ospedale Campo di Marte, Lucca*.

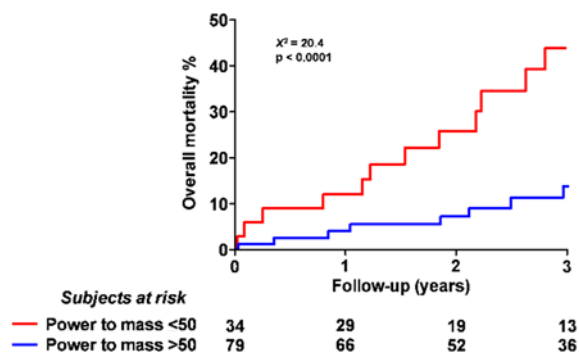
Background: La frazione d'eiezione (FE) e' un parametro prognostico largamente validato. Tuttavia, nei pazienti con scompenso cardiaco (SC), i quali per definizione hanno una bassa FE, l'utilizzo di parametri alternativi assume un significato importante. In un precedente studio abbiamo dimostrato che l'indice potenza di picco/massa, esprime la performance cardiaca e derivato mediante l'ecocolordoppler cardiaco, ha un valore additivo sulla FE nella stratificazione del rischio dei pazienti con SC avanzato. L'obbiettivo di questo studio e' quello di validare la capacita' di discriminazione prognostica dell'indice potenza di picco/massa nei pazienti con SC cronico, sottoposti ad ecostress alla dobutamina.

Metodi: Sono stati arruolati 116 pazienti (95 maschi, eta' media 68 ± 10 , FE media 35 ± 7) con SC cronico, sottoposti ad ecostress alla dobutamina (fino a 40 mcg/kg/min con atropina 1 mg), risultato negativo per i criteri ecocardiografici. La potenza di picco (W), e' stata calcolata come il prodotto tra lo stroke volume di picco (ml), pressione arteriosa media (mmHg), frequenza cardiaca (bpm), e la

massa ventricolare mediante l' M-Mode. I parametri prognostici valutati includevano morte, ricovero per SC, rivascolarizzazione miocardica, intervento appropriato del defibrillatore.

Risultati: L'indice di potenza di picco/massa media nei pazienti sottoposti ad ecostress alla dobutamina e' risultato 70 ± 30 W/g. Durante un follow up medio di 35 mesi, sono stato registrati 29 morti, 37 ricoveri per SC, 6 procedure di rivascolarizzazione miocardica e 2 interventi appropriati del defibrillatore. All'analisi univariata i predittori di eventi futuri sono risultati l'eta' (95% CI 1.049 a 1.158; $p < 0.001$), la FE (95% CI 0.95 a 1; $p = 0.048$) e l'indice di potenza di picco/massa (95% CI 0.96 a 0.99; $p = 0.01$). Un valore di cut off di potenza di picco/massa >50 W/g ha identificato i pazienti con SC cronico con prognosi migliore (figura 1).

Conclusioni: L'indice di potenza di picco/massa e' utile nella stratificazione del rischio dei pazienti con SC cronico, con valori > 50 W/g suggestivi di prognosi medio termine migliore.



O455

Un pattern di riempimento ventricolare sinistro di tipo restrittivo e' inevitabilmente presente nelle cardiomiopatie restrittive? Il caso dell'amiloidosi cardiaca al

Francesco Musca (a), Francesco Salinaro (b), Roberta Mussinelli (b), Michele Boldrini (b), Ambra Raimondi (b), Francesco Cappelli (c), Federico Perfetto (c), Giovanni Palladini (d), Giampaolo Merlini (d), Stefano Perlini (b, d)

(a) U.O. di Cardiologia 4, Dipartimento CardioToracoVascolare, Ospedale Niguarda Ca' Granda - Milano, (b) Istituto di Clinica Medica II - Fondazione IRCCS Policlinico San Matteo - Università degli Studi di , (c) Centro Regionale per le Amiloidosi Sistemiche, A.O.U. Careggi - Firenze, (d) Centro per lo Studio e la Cura delle Amiloidosi Sistemiche, Fondazione IRCCS Policlinico San Matteo

Background e scopo dello studio: L'Amiloidosi Cardiaca AL (CA) rappresenta l'archetipo di cardiopatia restrittiva ed è quasi sempre rappresentata da quadri clinici di insufficienza cardiaca a frazione d'eiezione (FE) conservata. Scopo dello studio è stato quello di valutare e caratterizzare gli indici ecocardiografici di (dis)funzione diastolica nei pazienti con CA. **METODI:** sono stati inclusi nello studio 374 soggetti consecutivi, non ancora trattati, con prima diagnosi di amiloidosi AL posta tra il 2008 e il 2010. In 258 (68%) soggetti è stato riscontrato un interessamento cardiaco da amiloidosi in accordo con i criteri della Società Internazionale dell'Amiloidosi. In 219 (85%) pazienti con interessamento cardiaco in cui la frazione d'eiezione risultava essere conservata ($FE >50\%$), è stata effettuata una stadiazione della disfunzione diastolica in 3 gradi secondo le linee guida delle Società di Ecocardiografia Europea e Americana.

Risultati: inaspettatamente, la presenza di una severa disfunzione diastolica (grado 3, pattern restrittivo) è stata evidenziata solo in 1/3 dei pazienti (82 pz, 37.4%), mentre in 84 (38.4%) e 53 pazienti è stato riscontrato rispettivamente un grado II e I di disfunzione diastolica. I livelli sierici di NT-proBNP mostravano un significativo e progressivo incremento di concentrazione con il deteriorarsi degli

indici di funzione diastolica. Come mostrato nella tabella 1, la massa miocardica indicizzata del ventricolo sinistro (LVMI), indice indiretto della quantità di deposito di amiloide, è risultata similmente aumentata nei pazienti con disfunzione diastolica di grado II e III rispetto a quelli con grado I. I pazienti con severa disfunzione diastolica (grado 3) sono risultati più giovani, e con una più marcata compromissione degli indici di funzione sistolica come l'escursione sistolica longitudinale dell'anello mitralico (MAPSE) e la frazione di accorciamento centro parietale (Midwall fractionale shortening, MWFS %).

Conclusioni: La presenza di severa disfunzione diastolica con un evidente pattern di riempimento restrittivo del ventricolo sinistro è presente in solo in 1/3 della popolazione di pazienti con CA. Pur in presenza di valori di FE nei limiti di norma, la disfunzione diastolica si associa ad un progressivo deterioramento degli indici di funzione sistolica (segnatamente di quelli regionali); in particolare i pazienti con severa disfunzione diastolica sono più giovani e presentano una più marcata depressione degli indici di funzione sistolica, ad indicare una maggiore aggressività della malattia.

| PARAMETRI | GRADO I | GRADO II | GRADO III | p |
|--------------------------|------------------------|----------------------|-----------------------|--------------|
| Età (anni) | 70 (64.75-73.25) | 68.5 (58-73) | 62 (54.75-67.75) | 0.043* |
| Atrio sx Vol. (ml) | 53.75 (40.55-68) | 68 (55.72-83.32) | 71 (52-103) | 0.002*§ |
| LVMI (g/m ²) | 143.56 (126.95-174.57) | 181.9 (150.72-200.8) | 181.25 (154.08-198.3) | 0.003*§ |
| FE (%) | 65.17 (59.18-68.76) | 64.4 (58.7-67.74) | 59.7 (55.4-63.74) | 0.005# |
| MAPSE (mm) | 12.7 (8.6-15.12) | 8.9 (7-12.1) | 7.2 (5.5-8.3) | <0.001§ # |
| MidwallFS (%) | 13.58 (9.95-15.96) | 11.83 (9.98-14.28) | 9.12 (8.03-10.84) | <0.001# |

I valori sono espressi come mediana (range); *:grado III vs grado I e II; #: grado III vs grado I; §: grado II vs grado I.

TAVI

O456

Impact of diabetes on early and mid-term VARC outcomes in TAVI patients: insights from a multicenter registry.

Federico Conrotto (c), Fabrizio D'Ascenzo (c), Francesca Giordana (c), Maurizio D'Amico (c), Stefano Salizzoni (d), Corrado Tamburino (a), Giuseppe Tarantini (b), Patrizia Presbitero (e), Marco Barbanti (a), Valeria Gasparetto (b), Mauro Mennuni (b), Massimo Napodano (b), M.L. Rossi (b), Michele La Torre (d), Pierluigi Omedè (c), Paolo Scacciatella (c), Gaetana Ferraro (c), Walter Grosso Marra (c), Giuseppe Biondi Zoccai (f), Claudio Moretti (c), Mauro Rinaldi (d), Fiorenzo Gaita (c), Sebastiano Marra (c)

(a) Ferrarotto Hospital, University of Catania, (b) Division of Cardiology, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, (c) Città Della Salute e della Scienza, Division of Cardiology, University of Turin, (d) Città Della Salute e della Scienza, Division of Cardiac Surgery, University of Turin, (e) Istituto Humanitas, Division of Cardiology, Milan, (f) Department of Medico-Surgical Sciences and Biotechnologies; Sapienza University of Rome

Aims: Several factors have been identified as predictors of early and midterm events after TAVI, but incidence and prognostic impact of diabetes, especially insulin dependent, on their short and mid-term outcomes remains to be defined.

Methods and results: All consecutive patients undergoing TAVI at our Institutions were enrolled, and divided according to diabetes status. All-cause mortality at 30-day or in-hospital (as for VARC definition) and at follow up was the primary end point, while peri-procedural complications, rate of myocardial infarction, stroke, re-intervention at follow-up the secondary. All end points were adjudicated according to VARC definitions.

Between June 2007 and December 2011, 511 patients were enrolled: 361 without diabetes, 78 with orally treated/diet controlled diabetes, 72 with insulin treated diabetes. Orally treated/diet controlled diabetes patients were more frequently female while insulin treated diabetes patients were younger. VARC mortality was not significantly higher in orally treated/diet controlled diabetes patients and insulin treated diabetes compared with not diabetic patients (6.4%, 9.7%, 4.7%, $p=0.09$). Bleedings, vascular complications, post procedural acute kidney injury and peri-procedural stroke were not significantly different in the three groups. At a median follow-up of 400 days insulin treated diabetes patients had a significantly higher mortality rate (33.3% vs 18.6%, $p=0.01$) and higher myocardial infarction incidence (8.3% vs 1.4%, $p=0.002$) if compared with orally treated/diet controlled diabetes patients. Stroke and re-interventions at follow-up were similar in the three groups. After multivariable adjustment insulin treated diabetes was independently correlated with death (HR 1.75, 95% CI 1.1-2.8) and myocardial infarction (HR 5.6, 95% CI 1.5-20.5).

Conclusion: Diabetes does not significantly affect rates of complications in TAVI patients. Insulin treated diabetes, but not orally treated/diet controlled diabetes, is independently associated with death and myocardial infarction at mid-term follow-up, and should be included into future TAVI dedicated scores.

| | No-Diabetes n=361 (%) | Orally Treated Diabetes n=78 (%) | Insulin Treated Diabetes n=72 (%) | P |
|----------------------|--------------------------|---|--|-------------|
| Death | 67 (18.6) | 13 (16.6) | 24 (33.3) | 0.01 |
| Cardiovascular death | 42 (11.6) | 8 (10.2) | 11 (15.3) | 0.51 |
| Stroke | 9 (2.4) | 1 (1.3) | 4 (5.5) | 0.27 |

| | | | | |
|-----------------------|---------|---|---------|--------------|
| TIA | 4 (1.1) | 0 | 1 (1.4) | 0.91 |
| Myocardial infarction | 5 (1.4) | 0 | 6 (8.3) | 0.002 |
| Re-intervention | 3 (0.8) | 0 | 0 | 0.29 |

O457**Incidence, predictors and impact on prognosis of systolic Pulmonary Artery Pressure and its improvement after Transcatheter Aortic Valve Implantation; a multicenter prospective retrospective registry**

Fabrizio D'Ascenzo (a), Federico Conrotto (a), Stefano Salizzoni (b), Marco Luciano Rossi (d), Freek Nijhoff (c), Valeria Gasparetto (e), Marco Barbanti (f), Marco Mennuni (d), Pierluigi Omedè (a), Walter Grosso Marra (a), Giorgio Quadri (a), Francesca Giordana (a), Corrado Tamburino (f), Giuseppe Tarantini (e), Patrizia Presbitero (d), Massimo Napodano (e), Pieter Stella (c), Giuseppe Biondi Zoccai (g), Piergiuseppe Agostoni (e), Claudio Moretti (a), Maurizio D'Amico (a), Sebastiano Marra (a), Mauro Rinaldi (b), Fiorenzo Gaita (a)

(a) Città della Salute e della Scienza Hospital, Division of Cardiology, University of Turin, (b) Città Della Salute e della Scienza Hospital, Division of Cardiac Surgery, University of Turin, (c) University Medical Center Utrecht, (d) Istituto Humanitas, Division of Cardiology, (e) Division of Cardiology, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, (f) Ferrarotto Hospital, University of Catania, (g) Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome

Aim: Elevated values of systolic Pulmonary Artery Pressure (sPAP) represents a common finding in patients with aortic stenosis and severe left ventricular hypertrophy. Prognostic impact of sPAP and of its potential improvement after transcatheter aortic valve implantation (TAVI) remains to be determined.

Methods: All consecutive patients undergoing TAVI in 5 European Institutions were enrolled, and divided into two groups according to sPAP evaluated with echocardiography: <40 mmHg and >40 mmHg. All-cause mortality at follow-up of at least one year was the primary end point, while 30 days mortality, periprocedural complications, myocardial infarction, stroke and re-intervention rates at follow-up the secondary ones.

Results: Among 674 patients enrolled, 319 (47%) had sPAP>40 mmHg. This was associated with higher mortality at 30 days (4.5% vs 8.5% p=0.03), and at a median follow-up of 477 days (17% vs 26% p=0.03). Improvement of sPAP was reported in 113 (27%) patients, occurring more frequently in absence of moderate or severe mitral regurgitation and of right ventricle dysfunction. At multivariate adjustment, reduced renal function, insulin dependent diabetes mellitus, sPAP>40 mmHg were independent predictor of all cause mortality, improvement in sPAP values was related to a better survival, while ejection fraction did not.

Conclusion: Elevated values of sPAP represent a common finding in patients undergoing TAVI. This parameter along with its improvement may be used to stratify risk and determine prognosis for patients undergoing TAVI.

O458

Incidence and predictors of peri-procedural complications and all cause mortality after TAVI: a meta-analysis.

Francesca Giordana (a), Fabrizio D'Ascenzo (a), Claudio Moretti (a), Federico Conrotto (a), Freek Nijhoff (b), Stefano Salizzoni (f), Marco Mennuni (e), Marco Barbanti (c), Valeria Gasparetto (d), Marco Luciano Rossi (e), Nedy Brambilla (c), Maurizio D'Amico (a), Sebastiano Marra (a), Mauro Rinaldi (f), Fiorenzo Gaita (a)

(a) Città della Salute e della Scienza Hospital, Division of Cardiology, University of Turin, (b) University Medical Center, Utrecht, (c) Ferrarotto Hospital, University of Catania, (d) Division of Cardiology, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, (e) Istituto Humanitas, Division of Cardiology, Milan, (f) Città Della Salute e della Scienza Hospital, Division of Cardiac Surgery, University of Turin

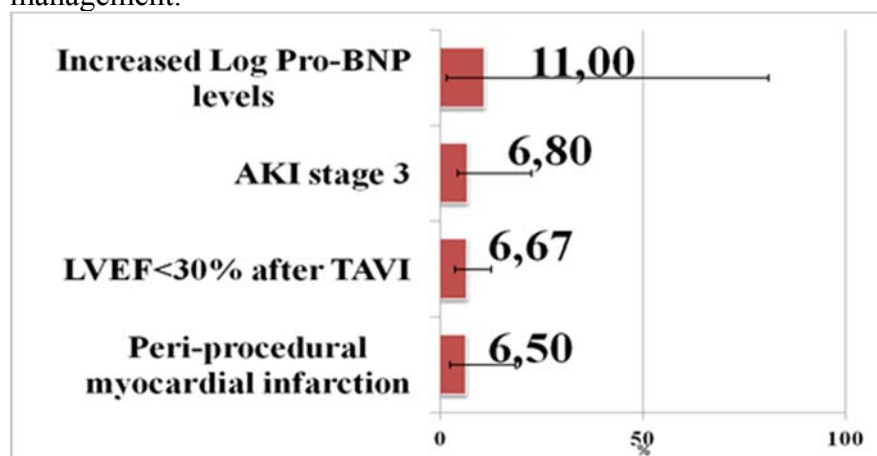
Aim: TAVI has gained a central role for interventional treatment of aortic stenosis even in high risk patients, but properly due to large burden of comorbidities of this population, an accurate assessment of peri-procedural complications and of adverse events remains to be defined.

Methods: Pubmed and Cochrane Collaboration were systematically searched for articles reporting incidence and independent predictors (assessed through meta-analysis) of peri-procedural complications (Acute Kidney Injury, Life-threatening and major bleedings, Major Vascular complications and Place maker implantations adjudicated according to TAVI) and of 30 days and more than 1 year mortality.

Results: 27 studies with 10039 patients were included. Median age was 82.4 ± 1.5 , 5461 (54.4%) being female with an history of coronary artery disease and/or myocardial infarction in 6065 (64.4%) and of renal insufficiency in 5152 (51.3%). At 30 days, mortality rate was of 7.7% (698): AKI occurred in 906 (11.2%), life-threatening and major bleedings in 1491 (19.9%), major vascular complications in 900 (11.6%) and Pace-maker implantation in 1317 (14.9%). After a follow up of 401.6 ± 354 days, 1818 (22.4%) of patients died.

AKI stage 2-3 (OR 18: 6.25-52), pre-procedural hospitalization for heart failure (OR 9.4: 2.6-35), peri-procedural myocardial infarction (OR 8.5: 2.6-33.5) and increased pro-BNP levels (OR 5.4: 1.7-16.5) were the most important predictors of 30 days mortality, while increased Pro-BNP levels (OR 11: 1.5-81), AKI stage 3 (OR 6.8: 2.6-15.7), Left Ventricle Ejection Fraction less than 30% (OR 6.7: 3.5-12.8) and peri-procedural myocardial infarction (OR 6.5: 2.3-18.1) represented the most significant risk factors for mid-term mortality.

Conclusions: Both for 30 days and mid-term mortality, pro-BNP levels and Left Ventricle Ejection Fraction and AKI and peri-procedural myocardial infarction represent the most significant predictors of adverse events, identifying high risk patients both for indications to TAVI and for subsequent management.



O459

Feasibility, safety and efficacy according to valvular academic research consortium 2 criteria of transcatheter aortic valve implantation in patients with severe bicuspid aortic valve stenosis

Gennaro Giustino (a), Chiara Bernelli (a), Alaide Chieffo (a), Michela Cioni (a), Matteo Montorfano (a), Francesco Maisano (a), Azeem Latib (a), Michela Cera (a), Eustachio Agricola (a), Chiara Gerli (a), Remo Daniel Covello (a), Lisa Franco (a), Pietro Spagnolo (a), Ottavio Alfieri (a), Antonio Colombo (a)

(a) Cardiothoracic Department, San Raffaele Scientific Institute, Milan, Italy

Background: Transcatheter aortic valve implantation (TAVI) represents an off-label indication in patients with bicuspid aortic valve stenosis. However in patients at high risk for conventional surgery, TAVI could still represent an alternative therapeutic approach.

Objective. The aim of this study is to assess feasibility, safety and efficacy of TAVI specifically in patients affected by severe BAV stenosis.

Methods: From November 2007 to May 2013 all patients with severe BAV stenosis treated with TAVI procedure were included in this analysis. Patients were deemed inoperable because of high STS and Logistic EuroSCORE in 1 case, hepatic failure in 3 cases and other cardiac surgical risk factors in the remainders. Outcomes were assessed using Valvular Academic Research Consortium 2 (VARC-2) definitions.

Results: Among 526 surgical high-risk patients who underwent TAVI in our Institution, only 9 (1,7%) had severe BAV stenosis. Among them 3 had hepatic cirrhosis, 1 alcohol-related and 2 HCV-related. Two patients had history of ascending aortic aneurysm, 1 of aortic coarctation. Patients were aged $73 \pm 8,7$ years, all of them were in New York Association (NYHA) functional classes II and III. The mean Logistic EuroSCORE was $18,08 \pm 17,17$ and the STS score was $4.16 \pm 3,51$. The mean aortic valve area was $0,61 \pm 0,16$ and the mean gradient was 55 ± 12 . They were all treated using a transfemoral approach, and, 5 of them under conscious sedation and 4 under general anesthesia. Corevalve prosthesis (Medtronic Inc, Minneapolis, Minnesota) was implanted in 4 patients, Edwards SAPIEN THV in 3 and Edwards Sapien XT valve (Edwards Lifesciences, Irvine, California) in the other 2. Device success occurred in 7 patients, of the remainders 1 had an aortic dissection (this patient died at day 45 for hypovolemic shock) and 1 a residual perivalvular AR graded 3+. In patients in which the procedure was successfully done, the mean postimplantation prosthetic gradient was $7,9 \pm 2,7$ mmHg and, $\leq 1+$ periprosthetic leaks in 4 cases, 2 + in 2 cases and 3 + in 1 case. Life threatening bleeding occurred in 1 patient (cardiac tamponade due to right ventricular perforation by temporary pacemaker, then this patient died at day 14 for septic shock) and, a major bleeding event occurred in another one (Prostar failure requiring surgical cut down). No other VARC adverse events were observed at 30 days in successfully procedures. During a median follow-up of 364 days (IQR 197 – 1834) all patients survived without any complication, except 1 who died 364 days after the procedure of hepatic failure due to the underlying chronic hepatopathy. All survivors were in NYHA class I or II. According to the composite VARC endpoints, early safety (< 30 days) was achieved in 6 patients, clinical efficacy (> 30 days) in 5 patients and time-related valve safety in 6 patients.

Conclusion: Basing on this study, TAVI can be a possible treatment in patients with severe BAV stenosis at high surgical risk. However, improvements must be made in patient selection and avoidance of fatal procedural complications.

O460

Mid-term prognostic value of coronary artery disease in patients undergoing Transcatheter Aortic Valve Implantation: a meta-analysis of adjusted observational results.

Fabrizio D'Ascenzo (i), Federico Conrotto (i), Francesca Giordana (i), Claudio Moretti (i), Maurizio D'Amico (i), Stefano Salizzoni (l), Michele La Torre (l), Martin Thomas (a), Muhammed Zeeshan Khawaja (a), David Hildick-Smith (b), Gian Paolo Ussia (c), Marco Barbanti (c), Corrado Tamburino (c), John Webb (d), Renate B Schnabel (e), Moritz Seiffert (e), Sandra Wilde (e), Hendrik Treede (e), Valeria Gasparetto (f), Massimo Napodano (f), Giuseppe Tarantini (f), Patrizia Presbitero (g), Marco Menunni (g), Giuseppe Biondi Zoccai (h), Mauro Rinaldi (l), Fiorenzo Gaita (i), Sebastiano Marra (i)

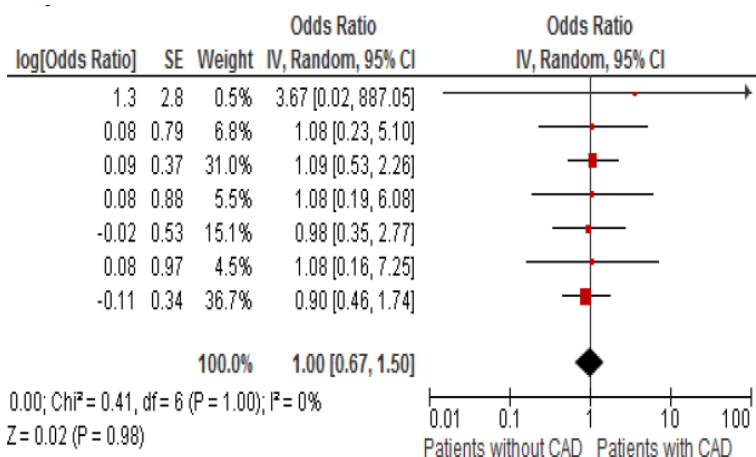
(a) Guy's and St. Thomas' NHS Foundation Trust, London, United Kingdom, (b) Sussex Cardiac Centre, Brighton and Sussex University Hospitals, Brighton, (c) Invasive Cardiology Division of Cardiology — Ferrarotto Hospital, University of Catania, Catania, (d) St. Paul's Hospital, Vancouver BC, (e) University Heart Center Hamburg, (f) Division of Cardiology, Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, (g) Division of Cardiology, Humanitas, Milan, (h) Department of Medico-Surgical Sciences and Biotechnologies; Sapienza University of Rome, (i) Division of Cardiology, University of Turin, (l) Division of Cardiac Surgery, University of Turin

Aims: Coronary artery disease (CAD) negatively affects prognosis in patients undergoing surgical aortic valve replacement, consequently being appraised in the most common used risk score. Our meta-analysis aims to clarify the prognostic role of CAD on mid-term survival in patients undergoing TAVI.

Methods: A systematic literature review was performed looking for studies reporting multivariate predictors of adverse outcomes in patients undergoing TAVI and pooled, when appropriate, using a random-effect method.

Results: 960 citations were first screened and finally 7 studies (2472 patients) were included. Diagnosis of CAD was reported in 37% to 51% of patients and 1169 Edwards SAPIEN and 1303 CoreValve prostheses were implanted. After a median follow up of 452 days (357-585) 24% of patients (19-33) died, and 23 (14-32) for cardiovascular death. At pooled analysis of multivariate approach, diagnosis of coronary artery disease did not increase risk of death (OR 1.0, 95% CI, Confidence Interval, 0.67-1.50). Moreover, also after excluding the three studies with slight differences in definition of CAD, the results did not change (0.99 [0.61, 1.62]), as also without the only study non evaluating left ventricular function in the multivariate analysis (1.00 [0.67, 1.50]: all CI 95%).

Conclusion: CAD does not affect mid-term TAVI outcome: this finding should be weighted to accurately evaluate risk and strategies for patients with severe aortic stenosis.



O461

Safety and efficacy according to valvular academic research consortium 2 criteria of transcatheter aortic valve implantation in patients with scleroderma and severe aortic stenosis

Gennaro Giustino (a), Chiara Bernelli (a), Alaide Chieffo (a), Michela Cioni (a), Matteo Montorfano (a), Francesco Maisano (a), Azeem Latib (a), Anna Salerno (a), Eustachio Agricola (a), Chiara Gerli (a), Remo Daniel Covello (a), Lisa Franco (a), Pietro Spagnolo (a), Ottavio Alfieri (a), Antonio Colombo (a)

(a) *Cardiothoracic Department, San Raffaele Scientific Institute, Milan, Italy*

Background: Sclerodermic patients with severe aortic stenosis are at high cardiac surgical risk because of anatomically hostile chest, pulmonary hypertension, porcelain and / or sclerotic aorta, left ventricular sisto-diastolic dysfunction, and other comorbidities. Transcatheter aortic valve implantation (TAVI) could represent an excellent therapeutic options in scleroderma patients affected by severe aortic stenosis deemed inoperable for conventional surgery.

Objective: The aim of this study is to report the feasibility, safety and efficacy of TAVI specifically in patients affected by systemic sclerosis and severe aortic valve stenosis.

Methods: From November 2007 to May 2013 all patients with systemic sclerosis treated with TAVI procedure were enrolled in this study. Patients were deemed inoperable because of surgical hostile chest in all of them, porcelain aorta in 2 and pulmonary hypertension in 3. Outcomes were assessed using Valvular Academic Research Consortium 2 (VARC-2) definitions.

Results: Among 526 surgical high-risk patients who underwent TAVI in our Institution, only 5 (0,9%) had systemic sclerosis. Among them 3 had pulmonary hypertension and 2 had CREST syndrome. Patients were aged 67 ± 5 years, in New York Association (NYHA) functional classes II and III. Of note, the mean Logistic EuroSCORE was $5,67 \pm 0,89$ and the STS score was $4.82 \pm 0,65$. The mean aortic valve area was $0,66 \pm 0,28$ and the mean gradient was $58 \pm 6,59$. They were all treated using a transfemoral approach under conscious sedation. Corevalve prosthesis (Medtronic Inc, Minneapolis, Minnesota) was implanted in 2 patients, Edwards SAPIEN THV in 1 and Edwards Sapien XT valve (Edwards Lifesciences, Irvine, California) in the other two. The procedure was successfully performed in all patients. The mean post-implantation prosthetic gradient was $7,4 \pm 1,94$ mmHg, and ≤ 1 + peri-prosthetic leaks were observed in all but 1 patient. Minor vascular complications, according to VARC-2 definitions, were encountered in 1 patient. Conduction disturbances occurred in 1 patient (left bundle branch block). No other VARC adverse events were observed at 30 days. During a median follow-up of 171 days (IQR 106 – 759) all patients survived without any complication, except 1 who died 670 days after the procedure for an ischemic stroke of non-identified etiology. All survivors were in NYHA class I or II.

Conclusions: The present series suggests that TAVI procedure is feasible in patients with systemic sclerosis and severe aortic stenosis, leading to mid- and long-term clinical and hemodynamic improvement.

SINDROMI CORONARICHE ACUTE: GESTIONE E TRATTAMENTO

O462

Morphological-biohumoral correlations in acute coronary syndromes: pathogenetic implications

Rocco Montone (a), Mario Gramegna (a), Roberta Panico Antonazzo (a), Leonardo Cataneo (a), Nicola Cosentino (a), Francesco Fracassi (a), Marco Roberto (a), Giampaolo Niccoli (a), Filippo Crea (a)

(a) *Institute of Cardiology, Catholic University of the Sacred Heart, Rome, Italy*

Background: Mechanisms of coronary instability are multiple and still elusive. We aimed to identify homogeneous groups of patients with a common mechanism of coronary instability by the integration of culprit plaque morphology, as assessed by optical coherence tomography (OCT), with circulating biomarker levels.

Methods: We enrolled 84 patients [50 patients with Non-ST-Elevation (NSTE)-ACS and 34 with stable angina] who underwent OCT evaluation of culprit lesion and blood measurements of 5 inflammatory biomarkers: C-reactive protein (CRP), matrix metalloproteinases (MMP)-9 and -2, myeloperoxidase (MPO) and Cystatin-C. NSTE-ACS were classified according to culprit lesion morphology as either plaque rupture (PR), plaque erosion (PE) or smooth plaque without thrombus or rupture (SP).

Results: PR, PE and SP were present in 46%, 24% and 30% of NSTE-ACS patients respectively. No patient with SA showed rupture, erosion or thrombus. Inflammatory biomarker levels were higher in patients with NSTE-ACS as compared with those with SA ($p < 0.05$) with the exception of Cystatin-C, similar between the two groups ($p = 0.32$). Among NSTE-ACS patients, those with PR had higher CRP and MMP-9 serum levels as compared to PE or SP patients ($p = 0.001$ and $p = 0.03$, respectively). Patients with PE had higher MPO plasma levels as compared to PR or SP patients ($p < 0.001$). Patients with SP had higher Cystatin-C serum levels as compared to those with PR or PE ($p = 0.009$). At multivariate analysis CRP and MMP-9 levels were independently associated with PR (OR 1.48, 95% CI 1.10-1.98, $p = 0.009$ and OR 1.10, 95% CI 1.02-1.19, $p = 0.008$, respectively), MPO with PE (OR 1.04, 95% CI 1.01-1.05, $p = 0.04$) and Cystatin-C with SP (OR 6.66, 95% CI 1.31-13.84, $p = 0.01$).

Conclusions: Among NSTE-ACS three subsets of patients can be identified by combining OCT findings with biomarkers levels. Thus, they may have different causes of coronary instability and they may benefit from different therapeutic strategies.

O463

Angioplastica primaria e outcome nel paziente anziano: quando il rene fa la differenza

Lorenzo Baldi Caproriti (a), Matteo Ghione (a), Martino Cheli (a), Gian Paolo Bezante (a), Francesco Abbadessa (b), Corinna Giachero (b), Massimo Vischi (b), Antonio Zingarelli (b), Francesco Chiarella (b), Antonio Barsotti (a), Claudio Brunelli (a), Manrico Balbi (a)

(a) *Clinica Malattie dell'apparato cardiovascolare, Università degli studi di Genova*, (b) *U.O. Cardiologia, IRCCS Az. Ospedaliera Universitaria San Martino, IST, Genova*

Background: Nell'ambito delle regioni italiane, la Liguria ha il primato dell'età media più elevata (+4 aa rispetto alla media nazionale); in tale contesto sono stati valutati i fattori in grado di influenzare l'outcome a sei e a dodici mesi nei pazienti con diagnosi di STEMI trattati con angioplastica primaria.

Materiali e metodi: tutti i pazienti con diagnosi di STEMI giunti nella nostra sala di emodinamica entro 12 ore dall'esordio dei sintomi tra il 1/1/2010 e il 1/1/2012 sono stati inclusi. Abbiamo valutato retrospettivamente l'impatto sul rischio di morte di differenti variabili quali i fattori di rischio cardiovascolare, la presentazione clinica, le modalità e i tempi di trattamento.

Risultati: Abbiamo valutato un totale di 307 pazienti (età media di $69,8 \pm 13$ anni).

SIC | *Indice Autori*

La mortalità a 30 giorni, 6 mesi e 12 mesi è stata rispettivamente del 11.4%, 15% e 17.9%.

I seguenti fattori di rischio sono stati associati con un' aumentata mortalità a sei mesi: l'IRC (HR 12.78; 95% CI, 5.63-29; $p < 0.001$), l'utilizzo del contropulsatore aortico (IABP) (HR 11.7; 95% CI, 3.27-41.86; $p < 0.001$), un TIMI Risk Score > 4 (HR 8.47; 95% CI, 3.99-17.97; $p < 0.001$), la nefropatia da mezzo di contrasto iodato (CIN) (HR 8.25; 95% CI, 3.5-10.44; $p < 0.001$), una classe Killip III o IV (HR 6.22; 95% CI, 2.38-16.24; $p < 0.001$) e i sanguinamenti maggiori, definiti con i criteri del trial ACUITY-HORIZONS (HR, 3.29; 95% CI, 1.47-7.38; $p = 0.008$) e con i criteri del trial TIMI (HR, 2.88; 95% CI, 1.38-6.02; $p = 0.007$).

L'utilizzo dello IABP (HR 14.26; 95% CI, 3.63-55.77; $p < 0.001$), l'IRC (HR 11.35; 95% CI, 5.47-23.55; $p < 0.001$), la CIN (HR 6.09; 95% CI, 2.64-14.06; $p < 0.001$), una classe Killip III o IV (HR 5.79; 95% CI, 2.26-14.85; $p < 0.001$), l'uso di un pacemaker temporaneo (HR 4; 95% CI, 1.04-15.43; $p = 0.031$), e i sanguinamenti maggiori definiti sia con i criteri del trial ACUITY-HORIZONS (HR 3.38; 95% CI, 1.57-7.26; $p = 0.003$) sia con i criteri del trial TIMI (HR 2.72; 95% CI, 1.35-5.45; $p = 0.007$) e una frazione di eiezione inferiore al 45 (HR 2.17; 95% CI, 1.05-4.5; $p < 0.001$) erano associati ad un' aumentata mortalità a 12 mesi.

Un tempo door-to-balloon inferiore a 90 minuti (HR, 0.52; 95% CI, 0.28-0.98; $p = 0.046$), un TIMI grade flow > 3 (HR, 0.4; 95% CI, 0.19-0.87; $p = 0.02$) e l'utilizzo degli inibitori della Gp IIb/IIIa (HR, 0.47; 95% CI, 0.26-0.88; $p = 0.012$) sono stati associati ad una ridotta mortalità a 12 mesi.

Conclusioni: L'insufficienza renale cronica pre-esistente, la nefropatia da mezzo di contrasto e i sanguinamenti maggiori sono tra i più importanti fattori in grado di influenzare l'outcome in questa popolazione. I nostri dati confermano l'importanza della prevenzione e del trattamento precoce della disfunzione renale nella popolazione anziana con STEMI.

O464

Integration of Single-Photon Emission Computed Tomography (SPECT) and Cardiac Computed Tomography (CCT) for the triage of patients with equivocal stenoses in clinical practice

Luigi Di Serafino (a), Gabor Toth (a), Stylianos A. Pyxaras (a), Joost Geraedts (b), Hugo Declercq (b), Piet Vanhoenacker (b), Bernard De Bruyne (a), William Wijns (a), Emanuele Barbato (a), Carlos Van Mieghem (a)

(a) Cardiovascular Center Aalst OLV Clinic – Aalst (Belgium), (b) St. Blasius hospital - Dendermonde (Belgium)

Purposes: The aim of this study was to evaluate the diagnostic accuracy of sequential CCT and SPECT imaging in the evaluation of patients with CAD and at least one equivocal stenosis detected at CCT, in comparison with invasive coronary angiography (ICA) and FFR.

Methods: All consecutive patients with stable angina and at least one equivocal stenosis (% diameter stenosis between 30-70%) detected at CCT (Dual source CT), underwent SPECT followed by ICA and FFR measurement. Intravenous (IV) adenosine infusion was used as stressor for SPECT. At quantitative coronary angiography, a lesion was considered significant when the %DS was $> 50\%$. FFR was measured for all equivocal stenosis detected by CCT using a 0.014" pressure guide wire system (St Jude Medical Systems). Maximum hyperemia was induced by IV adenosine infusion. An $FFR \leq 0.80$ was used as threshold to define a functionally significant stenosis.

Results: A total of 54 patients were prospectively enrolled and 126 stenosis were evaluated. Using SPECT, inducible myocardial ischemia was detected in only 32 patients. At ICA, 50 stenosis (40%), in 32 patients (59%), were found to be anatomically significant. Using FFR, only 38 stenosis (30%), in 30 patients (56%), were determined as being functionally significant: these patients subsequently underwent revascularization. In comparison with ICA, CCT showed high sensitivity (90%) and lower specificity (77%), when assessing anatomical severity of CAD. In comparison with FFR, CCT was suboptimal for determining the functional significance of a stenosis (sensitivity: 90%, specificity: 25%). Combining CCT with SPECT imaging (hybrid imaging), as compared with FFR,

did not significantly improve diagnostic accuracy (sensitivity:63%, specificity:46%). In addition, hybrid imaging was significantly less sensitive (63% vs 90%, $p<0.05$) as compared with CCT alone. Considering patient management, the FFR result was used as decisive to proceed with revascularization. The noninvasive hybrid approach resulted in appropriate patient triage in 75% of the patients: 18 of the 24 patients who underwent revascularization were correctly identified, 16 of the 30 patients who were treated medically had a normal CCT-SPECT result.

Conclusion: In patients with equivocal stenosis at CCT, the combination with SPECT imaging did not improve diagnostic accuracy to detect ischemia-provoking CAD. This combination of tests did not result in reliable patient management.

O465

Histopathological characteristics of coronary thrombus in patients with acute myocardial infarction and large thrombus burden

Alessandra Tanzilli (a), Bruna Cerbelli (b), Massimiliano Scappaticci (a), Khaled Mukred (a), Mariano Pellicano (a), Nino Cocco (a), Gaetano Tanzilli (a), Carlo Gaudio (a), Pietro Gallo (b)

(a) Dept of Heart and Great Vessels, "Sapienza" University of Rome., (b) Dept of Pathological Sciences, "Sapienza" University of Rome

In the setting of ST- segment elevation myocardial infarction, primary percutaneous coronary intervention (pPCI) in patients with a large thrombus burden is a challenging clinical situation. The features of large intracoronary thrombus have been identified as independent predictors of a higher total embolic volume and of no reflow. On the other hand, the dynamic process of intracoronary thrombus formation in STEMI patients is poorly understood. We sought to analyze the "in vivo" composition of coronary thrombus in this subset of pts.

Methods: Intracoronary thrombi were obtained by thromboaspiration in 22 out of 25 consecutive STEMI patients presenting for pPCI within 12 h from symptom onset. Material was fixed in formalin, embedded in paraffin, and serially sectioned and mounted on glass slides. The sections were stained with Haematoxylin and Eosin (H&E) for light microscopy.

Results:

| Variables | Total (n = 22) | Fresh thrombus (n = 3) | Fresh & lytic thrombus (n = 12) | Complete lytic thrombus (n = 5) | Organized thrombus (n = 2) |
|---|-------------------|---------------------------|---------------------------------------|---------------------------------------|----------------------------------|
| Occluded Coronary Artery | | | | | |
| LCA | 14 | 3 (21%) | 9 (64%) | 2 (14%) | 0 (0%) |
| LAD | 10 | 3 (30%) | 6 (60%) | 1 (10%) | 0 (0%) |
| LCxA | 4 | 0 (0%) | 3 (75%) | 1 (25%) | 0 (0%) |
| RCA | 8 | 0 (0%) | 3 (37%) | 3 (37%) | 2 (26%) |
| Pre-coronary Time | | | | | |
| median time (h) | | 8.0 | 4.0 | 7.0 | 5.0 |
| Angiography: Plaque Morphology | | | | | |
| Ulcerated | 13 | 1 (8%) | 8 (62%) | 2 (15%) | 2 (15%) |
| Irregular/eroded | 4 | 1 (25%) | 2 (50%) | 1 (25%) | 0 (0%) |
| Smooth | 1 | 0 (0%) | 1 (100%) | 0 (0%) | 0 (0%) |
| Information non-obtainable | 4 | 1 (25%) | 1 (25%) | 2 (50%) | 0 (0%) |
| Presence of Plaque Material | | | | | |
| Soft material (lipidic core) | 3 | 1 (33%) | 1 (33%) | 1 (33%) | 0 (0%) |
| Hard material (fibrous cap) | 3 | 0 (0%) | 3 (100%) | 0 (0%) | 0 (0%) |
| No detectable plaque material | 16 | 2 (13%) | 8 (50%) | 4 (25%) | 2 (13%) |
| Morphology of Aspirated Thrombus | | | | | |
| Fibrin network | | | | | |
| Coarse or medium-sized | 15 | 3 (20%) | 10 (67%) | 2 (13%) | 0 (0%) |
| Thin or variable (head vs. tail) | 7 | 0 (0%) | 2 (28%) | 3 (43%) | 2 (28%) |
| Number of erythrocytes | | | | | |
| Abundant | 15 | 2 (13%) | 10 (67%) | 1 (7%) | 2 (13%) |
| Scarce | 7 | 1 (14%) | 2 (28%) | 4 (58%) | 0 (0%) |
| Number of neutrophils | | | | | |
| Abundant | 13 | 0 (0%) | 8 (61%) | 4 (31%) | 1 (8%) |
| Scarce/focal | 9 | 3 (34%) | 4 (44%) | 1 (11%) | 1 (11%) |
| Features of lysis | | | | | |
| Vacuoles of granulocytic thrombolysis | | | | | |

| | | | | | |
|---------------|----|---------|---------|---------|---------|
| Abundant | 7 | 0 (0%) | 4 (57%) | 3 (43%) | 0 (0%) |
| Absent/scarce | 15 | 3 (21%) | 8 (53%) | 2 (13%) | 2 (13%) |

Conclusions: The “in vivo” observations of thrombus structure demonstrate the lack of association between pathological findings and ischemic time. Our data suggest that in the subset of pts with large thrombus burden occlusive thrombi develop in a protracted and recurring course which is relevant to the efficacy of various antithrombotic treatments.

O466

Treatment of no-reflow during primary angioplasty: head to head dipyridamole versus verapamil

Massimiliano Scappaticci (a), Khaled Mukred (a), Mariano Pellicano (a), Nino Cocco (a), Alessandra Tanzilli (a), Flavio Tafani (a), Suleiman Al Kindy (a), Gaetano Tanzilli (a), Carlo Gaudio (a)

(a) Dept of Heart and Great Vessels, “Sapienza” University of Rome.

Microvascular obstruction (MVO) commonly occurs following percutaneous coronary interventions (PCI), may lead to myocardial injury, and is an independent predictor of adverse outcome. The role of vasodilators in prevention of MVO has been studied in several randomized clinical trials. No previous studies have assessed the possible role of dipyridamole for treatment of no-reflow during primary PCI.

Methods: Forty-six consecutive patients (age 64±13 years, 37 men) with no reflow during primary PCI were randomized to initial treatment with either dipyridamole (0.56 mg/kg i.c.) or verapamil (1 mg i.c.). Patients with unsuccessful response to the first drug were then switched to the second one (from dipyridamole to verapamil and vice versa). Angiographic end-points were similar in the two groups: TIMI flow was 2.9±0.3 versus 2.8±0.4 (P=0.28), corrected TIMI frame count (cTFC) 26.4±8.8 versus 31.6±11.4 (P=0.14) and TIMI myocardial perfusion grade (TMPG) 2.1±1.2 versus 1.7±1.2 (P=0.12) in dipyridamole and verapamil group, respectively.

Results: Optimal myocardial perfusion (TMPG-3) was achieved by 56% of patients with dipyridamole and 39% with verapamil (P=0.38). In patients with persistent no-reflow administration of dipyridamole on top of verapamil resulted in a significant further improvement of cTFC (from 31.6±11.4 to 24.6±5.7 P=0.009) and of TMPG (from 1.7±1.2 to 2.6±0.7, P=0.007). Conversely, verapamil did not induce a significant improvement in coronary flow (cTFC changed from 26.4±8.8 to 24.5±8.5, P=0.28 and TMPG from 2.1±1.2 to 2.4±1.2, P=0.13). There were no significant side effects induced by dipyridamole, while verapamil caused AV block in 9% of cases.

Conclusions: Dipyridamole is a safe and effective first-line drug for treatment of no-reflow. Dipyridamole can also be successfully used in patients with incomplete response to verapamil.

O467

Accesso arterioso nella p-pci: la scelta influenza l'outcome anche in una popolazione di anziani

Lorenzo Baldi Caproriti (a), Matteo Ghione (a), Martino Cheli (a), Gian Paolo Bezante (a), Francesco Abbadessa (b), Corinna Giachero (b), Massimo Vischi (b), Antonio Zingarelli (a), Francesco Chiarella (b), Antonio Barsotti (a), Claudio Brunelli (a), Manrico Balbi (a)

(a) *Clinica Malattie dell'apparato cardiovascolare, Università degli studi di Genova*, (b) *U.O. Cardiologia, IRCCS Az. Ospedaliera Universitaria San Martino, IST, Genova*

Obiettivo: L'accesso radiale in corso di P-PCI ha dimostrato ridurre l'incidenza degli episodi di sanguinamento maggiore, le complicanze vascolari locali e la mortalità complessiva a breve e a lungo termine. Abbiamo analizzato l'influenza della scelta tra l'accesso femorale e radiale sulla mortalità a sei e dodici mesi dalla procedura di angioplastica per STEMI su una popolazione anziana residente nella provincia di Genova.

Materiali e metodi: Tutti i pazienti con diagnosi di STEMI trattati con P-PCI tra il Gennaio 2010 e il Gennaio 2012 sono stati inclusi retrospettivamente. L'incidenza di complicanze maggiori del sito di accesso, di sanguinamenti maggiori e la mortalità a sei, dodici e diciotto mesi sono state messe in relazione al sito di accesso.

Risultati: Abbiamo arruolato 307 pazienti (80.1% maschi) con età media era di $69,8 \pm 13$ anni. La maggior parte (78.2%) è stata trattata con accesso femorale. La prevalenza dei principali fattori di rischio cardiovascolare è risultata omogenea nei due gruppi, ad eccezione dell'insufficienza renale cronica (approccio femorale: 35,8% vs approccio radiale: 17,9%; $p < 0,05$) e del fumo di sigaretta (approccio femorale: 28,7% vs approccio radiale: 44,7%; $p < 0,05$)

La mortalità nel gruppo trattato con accesso femorale è stata maggiore a sei (17,5% vs 4,5%; $p = 0,006$), a dodici (20,4% vs 7,6%; $p = 0,017$) e a diciotto mesi (18,75% vs 15,87%; $p = 0,59$) dalla procedura. L'approccio radiale si è associato ad una maggiore sopravvivenza a sei (HR 0,22; 95% CI, 0,07-0,75; $p = 0,006$) e a dodici mesi (HR 0,32; 95% CI, 0,12-0,84; $p = 0,017$). Le complicanze vascolari maggiori, meno frequenti con l'utilizzo dell'accesso radiale (9% femorale vs 1,6% radiale; $p = 0,05$), non hanno influenzato significativamente l'outcome a sei, a dodici e a diciotto mesi ($p < 0,05$). I sanguinamenti maggiori (15,3% femorale vs 4,8% radiale; $p < 0,05$) sono stati associati con un' aumentata mortalità a 12 mesi dalla P-PCI (29,6% vs 13,4%; $p = 0,05$).

Conclusioni: L'accesso radiale permette di incrementare la sopravvivenza complessiva a sei e a dodici mesi di distanza dalla P-PCI in una popolazione di soggetti anziani con STEMI verosimilmente attraverso una effetto combinato di riduzione dei sanguinamenti maggiori e delle complicanze vascolari.

VALVULOPATIE MITRALICA: VALUTAZIONE E NUOVE TECNICHE DI EMODINAMICA INVASIVA 2

O468

Anaesthesiological management using Remifentanil-based deep sedation and spontaneous breathing during transcatheter edge-to-edge repair

Valeria Cammalleri (a), Gian Paolo Ussia (a), Saverio Muscoli (a), Ersilia Mazzotta (a), Giuseppina Pascuzzo (a), Dorotea Rubino (a), Francesca De Persis (a), Massimiliano Macrini (a), Ruggero Mango (a), Pasquale De Vico (b), Francesco Romeo (a)

(a) Dipartimento di Cardiologia, Università di Tor Vergata, Roma, Italia, (b) Dipartimento di Anestesia, Università di Tor Vergata, Roma, Italia

Background: Transcatheter MitraClip repair for treatment of mitral regurgitation is a novel therapeutic option in surgical high-risk patients. Usually the procedure is performed under general anesthesia, requiring echocardiographic transesophageal monitoring throughout the intervention. As general anesthesia can be associated with potential hemodynamic and respiratory complications, we have developed an approach where MitraClip procedures are done under deep sedation and spontaneous breathing. We report here our initial experience.

Methods: From September 2012 to April 2013, 17 consecutive patients with MR>3+ underwent transcatheter MitraClip procedure under deep sedation. The median logistic EuroSCORE was 14,87% (IQR 9,74-37,85), STS-score for mitral valve replacement 12,17% (IQR 5,18-16,13) and for mitral valve repair 7,23% (IQR 4,09-10,57). All patients received midazolam and fentanyl citrate as anaesthesia inductors, followed by continuous infusion of Remifentanil hydrochloride, according to the hemodynamic status. Once sedation was achieved, the TEE probe was placed and the procedure performed in a standard fashion.

Results: All interventions were completed without general anesthesia, except for two patients, who required orotracheal intubation at the end of the procedure. The median procedural time was 82 minutes (IQR 36-117) and the median device time was 38 minutes (IQR 17-66). One clip and two clips were implanted in seven and ten patients, respectively. Acute procedural success was achieved in all cases. One patient died after 13 days for pulmonary infective complication; the others had an uneventful in-hospital stay and were discharged at a median of 4 days (IQR 3-10) after the procedure. At 30-day follow-up a persistent MR reduction and improvement in NYHA functional class were observed.

Conclusions: Transcatheter edge-to-edge repair under deep sedation with spontaneous breathing may be a viable alternative, with particular advantages in patients at high risk for general anaesthesia.

O469

Undersized mitral annuloplasty with asymmetric ring for non-ischemic mitral regurgitation

Giuseppe Gatti (a), Luca Dell'Angela (b), Marina Bollini (a), Angela Poletti (a), Lorella Dreas (a), Donatella Ussi (a), Bruno Pinamonti (b), Gianfranco Sinagra (b), Aniello Pappalardo (a)

(a) Division of Cardiac Surgery, University Hospital "Ospedali Riuniti", Trieste, Italy, (b) Division of Cardiology, University Hospital "Ospedali Riuniti", Trieste, Italy

Objective: The Carpentier-McCarthy-Adams IMR ETlogix® annuloplasty ring is designed specifically to treat the mitral annular dilation and the derived mitral leaflet tethering that are prevalent at the medial aspect, characteristic of ischemic mitral regurgitation. Occasionally, some patients with non-ischemic mitral regurgitation (NIMR) may present an ischemic-like pattern of mitral apparatus deformation. In the present study, we reviewed our experience in the use of the IMR ETlogix ring for these patients.

Methods: Between December 2005 and November 2012, the IMR ETlogix ring was implanted in 16 consecutive patients (mean age: 71.4±10.7 years, range: 41–84) with grade ≥2+ NIMR (graded from 0 to 3+). The mean ring size was 26.6±2.4 mm. Tricuspid valve annuloplasty (n=9), aortic valve surgery (n=7), atrial fibrillation ablation (n=3), aortic root replacement (n=1), and myocardial biopsy (n=1) were concomitant procedures. Preoperatively, all patients were in NYHA class III–IV; left ventricular ejection fraction was <0.5 in eight patients; the expected operative risk according to the logistic EuroSCORE was 10.6±5.9%. Using two-dimensional echocardiography, postoperative changes in the mitral annular diameter (MAD), tethering area (TA), and tenting height (TH) of the mitral valve in four-chamber, two-chamber, and long-axis views, were assessed at mid-systole.

Results: One (6.2%) hospital (non-valve related cardiac) death occurred. At follow-up (mean: 4.9±2.3 years; range: 0.2–7.1), NYHA class was improved (p=0.003), and mitral regurgitation was well controlled within grade 1+ for the 15 remaining patients. The MAD, TA and TH were each decreased in all three echocardiographic views (p<0.0001). The MAD reduction was greater in the long-axis view. All patients had no or low (<7 mmHg) transmitral mean pressure gradient.

Conclusions: Undersized mitral annuloplasty with the IMR ETlogix ring restored the mitral apparatus geometry and competence in patients with NIMR and asymmetric pattern of mitral apparatus deformation.

O470

MitraClip therapy in patients with functional or degenerative mitral regurgitation: a single center clinical experience.

Alessandro Candreva (a), Azeem Latib (a), Maurizio Taramasso (b), Andrea Guidotti (b), Nicola Buzzatti (b), Micaela Cioni (b), Silvia Ajello (a), Giovanni La Canna (b), Ottavio Alfieri (b), Antonio Colombo (a), Francesco Maisano (b)

(a) *Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan – Italy*, (b) *Department of Cardiothoracic Surgery, San Raffaele Scientific Institute, Milan - Italy*

Aims: The MitraClip device (Abbott Vascular, Menlo Park, CA) is an emerging percutaneous procedure to treat both functional and degenerative mitral regurgitation (FMR & DMR). This procedure is generally indicated for patients who are not eligible for surgical treatment, because of a high surgical risk. Nevertheless, MitraClip procedure is largely safe, well-tolerated and effective. We report mid-term outcomes of MitraClip implantation in inoperable or high-risk surgical candidates with both FMR & DMR.

Methods and results: From October 2008 to October 2012, 136 patients were treated in our institution (mean age 71.5±10.8 years, male gender 77.2%). All patients were periodically followed-up: mean follow-up time was 15.3±12.4 months, median 11.5 months, interquartile range (IQR) 5–23.6 months, minimum 0.1 month maximum 48.3 months.

In 98 patients (72%) the mechanism of MR was functional (FMR), where in 75.5% was attributable to ischemic reason and 24.5% was idiopathic, while it was degenerative (DMR) in 38 (28%).

The following mean surgical risk scores were calculated: LogEuroSCORE (21.3±15%), STS Mortality (10.9±9.7%) and STS Morbidity and Mortality (45.6±23.6%).

At admission, 77.2% of patients were in NYHA class III or IV. Median proBNP value was 1895pg/ml (IQR 1064.1 – 3531) and was higher in FMR patients (2508pg/ml, p-value<0.001).

Main comorbidities were: chronic renal failure (48.5%), chronic obstructive lung disease (29.4%), peripheral vascular disease (19.1%), cerebrovascular disease (10.3%).

All patients underwent standardized assessment of mitral valve anatomy by 3D-transoesophageal echocardiogram. EVEREST clinical and anatomical criteria were fulfilled in 47.1%, mean EF value was 36.6±17.3, LVEDD 65.7±9.5, VLES D 49.5±11.9, PAPs 48.1±15.2.

Procedural success (MR ≤2+) was achieved in 92.6%. Mean procedural time was 100.6±47.02 minutes. It was 117.3±52.1 in the first 50 treated patients and 88.2±45.5 in the last 50. Most patients

(87, 64.0%) received two clips, while one clip was used in 44 cases (32.3%) and three clips in 5 (3.7%). Median length of stay was 4.8day (IQR 3.8-7day).

30-day mortality was 2.2% (3pt); post-procedural adverse events included: renal failure (19.8%), IABP (11.4%), blood transfusion (11.4%), infections (3.7%). Notably, there were no cerebrovascular events (0%) or AMI (0%). At discharge, MR was $\leq 2+$ in 88.2% of patients (with no difference between FMR and DMR p-value=0,43).

Actuarial survival at 12 months was $89 \pm 2.9\%$ in the overall population, not significantly different in two groups (DMR $89.5 \pm 5\%$, FMR $87,4 \pm 4\%$; p-value=0.25). At 12 months follow-up, EF was $41.9 \pm 14.4\%$ (significantly increased compared with pre-procedure value; p-value=0.03), freedom from MR $>2+$ was $74.4 \pm 3.9\%$ (DMR 76.2 ± 7.9 , FMR 79.2 ± 4.6 ; p-value=0.7).

At latest follow-up, 87.7% of patients were in NYHA class I and II. Overall MR reduction (pre-procedure vs. latest follow-up) was: 0 in 2.4%, 1+ in 17.1%, 2+ in 37.8%, 3+ in 36.6% and 4+ in 6.1%.

Conclusions: MitraClip is a safe and effective procedure in high risk patients with FMR and DMR. Improvement of functional status is stable overtime and MR reduction is durable in most patients.

O471

Functional parameters to assess clinical benefits after MitraClip implantation

Valeria Cammalleri (a), Gian Paolo Ussia (a), Saverio Muscoli (a), Giuseppina Pascuzzo (a), Ersilia Mazzotta (a), Roberta Serdoz (a), Dorotea Rubino (a), Francesca De Persis (a), Massimiliano Macrini (a), Francesco Romeo (a)

(a) *Dipartimento di Cardiologia. Università di Tor Vergata, Roma. Italia*

Background: MitraClip System (Abbott Vascular, Abbott Park, IL, USA) is a catheter-based therapy intended to reduce mitral regurgitation (MR) developed as alternative to surgical approach for patients considered at high risk for conventional cardiac surgery or do not undergo surgery. NYHA functional class, six-minutes-walking distance (6MWD), N-terminal pro-brain natriuretic peptide (NT-proBNP) plasma level and quality of life (QoL) are parameters of paramount importance in evaluating the efficacy and the clinical impact of the procedure.

Methods: In patients underwent MitraClip repair in our institute, we evaluated NYHA functional class and 6MWD before the procedure, at the discharge and after 30 days. During the walking test we calculated the distance walked, blood oxygen saturation and perception of dyspnoea during exertion using the Borg scale. During the hospitalization, before the procedure and the day of discharge, BNP serum levels have been collected. Furthermore we calculated QoL using a questionnaire designed for self-administration that provides easily information about perceived health status. The questionnaire, which consists of five items to assess mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, was administered at baseline and 30 days after the procedure. Acute procedural success was defined as stable implant of one (or more) clip(s) resulting in MR $\leq 2+$.

Results: From November 2011 to May 2013, 40 consecutive patients (mean age 74 ± 7 years old, male 72%) underwent transcatheter MR repair with one (37,5%) o two MitraClip (62,5%). Thirty-two patients (80%) presented with functional mitral valve disease and 8 patients (20%) with degenerative disease. The mean of left ventricle ejection fraction was $35 \pm 15\%$. The acute procedural success was obtained in all patients. At discharge 82% of patients had MR $\leq 1+$; 18% MR 2+. At 30 days of follow-up 72% of patients had MR $\leq 1+$; 23% MR 2+ and 5% MR 3+. During in-hospital stay one patient died for pneumonia at the 13 day after the procedure. Overall NYHA functional class improved from 3.3 ± 0.7 at baseline to 1.8 ± 0.5 at discharge (p<0.0001), and 1.8 ± 0.7 after 30 days (p<0.0001 when compared with baseline; p=ns when compared with discharge). 6MWD improved significantly from a median of 95 m (IQR 67,50-170) at baseline to 174 m (IQR 103-202,50) at discharge (p<0.002) and 180 m (IQR 135-220) at follow-up (p=0.005 when compared with baseline; p=0.066 when compared with discharge). NT-proBNP plasma levels decreased from a median of

6347 pg/mL (IQR 2534,75-10315,75) at baseline to a median of 1657,5 pg/mL (IQR 1003,25-4274, p=0.002) at discharge. On the other hand QoL compromising improved from a score of 8.6 ± 1.6 at baseline to 7.8 ± 1.7 after 30 days (p=0.034).

Conclusions: MitraClip System lead to a significant short-term improvement in symptoms, functional status and quality of life in patients considered at high risk for conventional cardiac surgery. NYHA class, 6MWD and QoL are useful measurement of functional capacity easily performed, not expensive and repeatable. In addition in the subset of heart failure patients with functional MR and severe left ventricle dysfunction, NT-proBNP can be very useful not only in diagnosis but also in monitoring the results after MitraClip implant.

CUORE E RENE 2

O472

La restrizione salina nello scompenso cardiaco severo: tollerabilità ed applicabilità.

Luisa Musiari (a), Luisella Boeti (a), Almerina Biggi (a), Giovanna maria Pelà (a), Daniele Arduini (b), Diego Ardissino (b), Alberto Montanari (a)

(a) Dipartimento di Medicina Clinica e Sperimentale, Università di Parma, (b) Dipartimento Cardio-Nefro-Polmonare, Azienda Ospedaliero-Universitaria di Parma

Background: Il controllo dell'apporto di sale nella dieta è un problema rilevante nelle fasi avanzate dello scompenso cardiaco e tuttora è controversa la necessità di una estrema restrizione sodica per contrastare la ritenzione idrosalina caratteristica dello scompenso già nelle prime fasi e alla base del peggioramento e della instabilità clinica.

I pazienti con sintomi e segni riferibili a ritenzione idro-salina sono sottoposti a terapia diuretica.

L'utilizzo prolungato di diuretico comporta spesso un peggioramento della funzione renale con evidente necessità di incrementare ulteriormente il dosaggio del diuretico stesso. La restrizione sodica può quindi interferire sulla ritenzione idrosalina e favorire la stabilizzazione clinica senza necessità di potenziare la terapia farmacologica.

Scopo: 1) Verificare se l'aderenza alla dieta iposodica nello scompenso cardiaco determini un miglioramento nell'evoluzione della malattia con maggiore stabilità clinica nei pazienti in avanzate classi NYHA in termini di riduzione dei ricoveri ospedalieri, contenimento del trattamento farmacologico e benessere soggettivo.

2) Dimostrare la validità di un monitoraggio a basso costo quale il dosaggio degli elettroliti urinari nella gestione anche ambulatoriale dello scompenso. 3) Dimostrare come una corretta informazione del paziente possa aumentare la compliance alla prosecuzione domiciliare della dieta iposodica.

Metodi: In questo studio sperimentale longitudinale prospettico sono stati reclutati 24 pazienti (20 maschi e 4 femmine, età: 69 ± 5.0 anni) in classe di scompenso NYHA III-IV, già in terapia ottimizzata. Ai pazienti è stato consegnato uno schema scritto contenente le indicazioni da seguire per mettere in pratica una corretta dieta iposodica. Di base (T 0) e a 60 giorni (T 1) sono stati dosati parametri urinari (Na, K, Creatinina), controlli ematochimici (elettroliti, creatinina, azotemia, BNP) e del peso corporeo, pressione arteriosa, saturazione periferica di ossigeno, grado di dispnea e segni obiettivi di scompenso cardiaco. Dati espressi come $M \pm SD$ ed analizzati con t-test per dati appaiati.

Risultati: L'escrezione sodica urinaria passò da 0.1 ± 0.03 (T 0) a 0.06 ± 0.03 mEq/mg creatinina (T 1) (p < 0.001); la creatininemia da 1.4 ± 0.6 a 1.3 ± 0.5 mg/dl; la sodiemia da 139.5 ± 2.3 a 139 ± 1.5 ; la potassiemia da 4.2 ± 0.1 a 4.3 ± 0.5 ; il BNP da 1004 ± 1174 a 814 ± 731 pg/ml; il peso corporeo 76.5 ± 13.7 a 75.7 ± 15.3 Kg; la PAS da 120.2 ± 21.4 a 122.8 ± 22 mmHg, la PAD da 75.6 ± 13 a 75.8 ± 10.2 mmHg; la saturazione periferica dell'ossigeno da 96.7 ± 2.8 a 96.8 ± 2.5 % (p ns per tutti i parametri). La riduzione del grado soggettivo di dispnea e la compliance dei pazienti sono stati rilevati dal questionario consegnato ai pazienti. Dei 24 pazienti analizzati solo 3 sono stati ricoverati in ambiente ospedaliero; 1 paziente ha ridotto la terapia diuretica e per i rimanenti non si sono rese

necessarie modificazioni terapeutiche.

Conclusioni: Alla restrizione salina nei pazienti scompensati non si accompagnano eventi avversi, con una stabilità clinica e di sodiemia, potassiemia e funzione renale, associata ad ottima compliance, come indicato dalla riduzione dell'escrezione sodica, cui ha contribuito un corretto *counseling*. Tenendo conto della semplicità e del basso costo, il monitoraggio del rapporto Na/creatinina urinari appare un utile mezzo di valutazione dell'aderenza alla restrizione salina. Questo studio necessita di essere esteso a più popolazioni di pazienti scompensati.

O473

Concomitant use of hypertonic saline solution and intravenous (iv) furosemide vs. iv furosemide alone for treating diuretic-resistant heart failure: systematic review and meta-analysis

Renato De Vecchis (a), Armando Pucciarelli (a), Carmelina Ariano (a), Claudia Esposito (b), Salvatore Cantatrione (a)

(a) *Cardiology Unit, Presidio Sanitario Intermedio "Elena d'Aosta", Napoli, Italy*, (b) *Institute of Hygiene and Preventive Medicine, Second University of Napoli, Napoli, Italy*

Background: The treatment of advanced congestive heart failure (CHF) includes intravenous (iv) inotropic agents, diuretics, venous ultrafiltration and hemodialysis. All of these therapeutic modalities have been proven to be not associated with a better prognosis and some of them are limited by difficult availability and high costs in patients with CHF. Compared to high-dose furosemide alone, the simultaneous administration of hypertonic saline solution (HSS) and iv furosemide showed better clinical results with a good safety.

Methods: A meta-analysis of the relevant studies was carried out by including the articles which evaluated the combined therapy with HSS plus iv furosemide versus iv furosemide alone in patients hospitalized for acute CHF. The all-cause mortality and the risk of re-hospitalization for acutely decompensated heart failure (ADHF), whose effect sizes were expressed using the relative risk (RR), were assumed as primary outcomes of interest. Secondary outcomes were length of hospital stay, weight loss, and variation of serum creatinine, whose effect sizes were represented using the weighted mean difference (WMD).

Results: Based on five randomized controlled trials involving 1032 patients treated with HSS and furosemide vs. 1032 patients treated with iv furosemide alone assumed as controls, a decrease in all-cause mortality in patients treated with HSS plus furosemide was proven (RR = 0.56; 95% CI = 0.41 - 0.76, p = 0.0003). Likewise, based on four randomized controlled trials with 1012 patients treated with HSS and 1020 controls, the combined therapy with HSS plus furosemide was shown to be associated with a decreased risk of ADHF-related rehospitalization (RR = 0.50; 95% CI = 0.33 - 0.76, p = 0.001). Besides, the combined therapy with HSS plus furosemide was found associated with decreased length of hospital stay (p = 0.0002), greater weight loss (p < 0.00001), and better preservation of renal filtration function (p < 0.00001).

Conclusions: The results of this meta-analysis show that in diuretic-resistant CHF patients the supplementary HSS administration as a therapeutic adjunct for iv furosemide is able to decrease mortality and heart failure-related hospitalizations. Moreover, based on this meta-analysis, this combined therapy is associated with increased weight loss, decreased mean length of hospital stay and better preservation of renal function in CHF patients. Pending further validation, there are sufficient grounds to include HSS in the therapeutic armamentarium as a first-line option in the management of CHF, to be used to correct more effectively and quickly the clinical congestion even seemingly refractory to diuretics in the advanced stages of CHF.

O474

In-hospital mortality due to ischemic stroke and renal function: the database of hospital admissions of the Emilia-Romagna region of Italy.

Roberto Manfredini (a), Alfredo De Giorgi (a), Alessandra Mallozzi Menegatti (a), Marco Pala (a), Christian Molino (a), Claudia Parisi (a), Elisa Misurati (a), Isabella Bagnaresi (a), Ruana Tiseo (a), Alda Storari (b), Fabio Fabbian (a)

(a) *Clinica Medica, Azienda Ospedaliera-Universitaria (AOU) di Ferrara*, (b) *Nefrologia, Azienda Ospedaliera-Universitaria (AOU) di Ferrara*

Background: Stroke is a major medical and social problem, and represents a major cause of death and of disability both in the developed and developing countries [Norrving & Kissela, *Neurology* 2013]. In the period of time included between 1990 and 2010, the years of life lost due to premature mortality due to stroke increased by 17-28% [Lozano et al, *Lancet* 2012]. Although the relationship between renal dysfunction and stroke is well known [Fabbian et al, *Clin Appl Thromb Hemost* 2012], the topic is still matter of debate in our Country. The aim of this study was to evaluate in-hospital mortality due to stroke and renal dysfunction in the Emilia-Romagna region of Italy.

Methods: We considered all cases of ischemic stroke (first event) recorded in the database of hospital admissions for the Emilia-Romagna region, Italy, from 1999 to 2009. The inclusion criterion was the presence, as a main discharge diagnosis, of acute stroke according to International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). Age and diagnoses of chronic kidney disease (CKD), end-stage renal disease (ESRD), atrial fibrillation (AF) were collected. In-hospital mortality for ischemic stroke was the main outcome indicator considered. For statistical analysis, Charlson comorbidity index (CCI) for administrative database was used for statistical calculations, with the exclusion of renal dysfunction and cerebrovascular disease, and multivariate logistic regression analysis were used.

Results: Along the considered period, 186219 cases of first episode of stroke were recorded, of whom 1.626 (0.9%) had CKD, and 819 (0.4%) had ESRD. The main age of subjects without renal dysfunction, with CKD, and with ESRD was 76 ± 12 , 75 ± 13 and 76 ± 12 years, respectively ($p < 0.001$). Acute ischemic cerebral events were 154026, and 12997 died during hospitalization.

In-hospital mortality in the three groups of patients was 11.6%, 33.9% and 30.6% ($p < 0.001$) respectively.

In-hospital mortality was independently associated with CKD (OR 4.052 [95% CI 3.592-4.571], $p < 0.0001$), ESRD (OR 3.806 [95%CI 3.147-4,604], $p < 0.0001$), AF (OR 2.198 [95%CI 2.105-2.296], $p < 0.0001$), and CCI (OR 1.168 [95%CI 1.148-1.189], $p < 0.0001$).

Conclusions: Previous findings reported an association between in-hospital mortality due to myocardial infarction and renal impairment [Fabbian et al, *Int Urol Nephrol* 2012 Epub]. This seems to be confirmed also for in-hospital mortality due to acute ischemic cerebrovascular events. Patients with renal impairment are usually elderly, and are likely to have multiple comorbidities capable to worsen renal function as well [Smyth et al, *Age Ageing* 2013]. Again, most medical inpatients have just a reduced kidney function on admission, and mortality rises with it [Yong et al, *QJM* 2013]. In conclusion, acute ischemic stroke was independently associated with comorbidities, atrial fibrillation, and different degree of renal dysfunction.

O475

Elevated plasma neutrophil gelatinase associated Lipocalin (NGAL) in acute heart failure is associated with acute kidney injury and adverse outcome

Matteo Beltrami (a), Gaetano Ruocco (a), Beatrice Franci (a), Maria Stella Campagna (a), Ranuccio Nuti (a), Claudio Ronco (b), Alberto Palazzuoli (a)

(a) *Department of Internal Medicine and Metabolic Diseases, Cardiology Section University of Siena Italy*, (b) *Department of Nephrology, St. Bortolo Hospital, Vicenza, Italy*

Background: Neutrophil Gelatinase-associated Lipocalin (NGAL) has been involved in cardiovascular diseases, its prognostic role has been described in both acute and chronic heart failure (HF). To support this hypothesis, we measured plasma NGAL levels in patients admitted for acute decompensated HF. We evaluated the role of NGAL in predicting cardiac death and HF rehospitalization during a 6 month follow-up period.

Methods: Plasma NGAL levels were measured in 179 patients within 48 hours. All patients were submitted to a renal function evaluation by measurement of creatinine, estimated glomerular filtration rate (eGFR), blood urea nitrogen (BUN) and B-type natriuretic peptide (BNP) during hospitalization.

Results: Patients with cardio-renal syndrome (CRS) had higher NGAL levels in comparison with subjects with preserved renal function (241 ± 218 and 130 ± 80 ng/ml $p=0,0001$). In the subgroup that developed worsening renal function (WRF), NGAL levels were significantly increased respect to patients without WRF (272 ± 205 vs 136 ± 127 ng/ml $p=0,0001$). The ROC curve analysis showed that a cut-off value of 134 ng/ml is associated to WRF with high sensitivity and specificity (92% and 71 % AUC 0,83 $p=0,001$). Multivariable COX regression analysis showed that a cut-off of 134 ng/ml was the only marker correlated to cardiac events (HR 1,75 $p<0,001$). Follow-up analysis confirmed that NGAL >130 ng/ml was associated with cardiac events during 6 months follow-up period.

Conclusions: NGAL measurement enables the identification of patients with HF and CRS. Therefore it appears to be a sensible tool for WRF prediction as well as an early marker of poor outcome after discharge.

O476

In advanced even normonatremic heart failure, the addition of hypertonic saline solution to intravenous furosemide shows renoprotective effects: a case-control study.

Renato De Vecchis (a), Armando Pucciarelli (a), Giuseppina Di Biase (b), Carmelina Ariano (a), Salvatore Cantatrione (a)

(a) *Cardiology Unit, Presidio Sanitario Intermedio "Elena d'Aosta", Napoli (Italy)*, (b) *Neurorehabilitation Unit, Clinica "S.Maria del Pozzo", Somma Vesuviana (Italy)*

Background: During intensive therapy of chronic heart failure (CHF) patients with marked fluid retention using high doses of intravenous (iv) furosemide, the additional effect of agents which might exert osmotic attraction of interstitial fluids has been proposed. They are thought to impede the impairment of renal blood supply and glomerular filtration rate, which may be caused by a combined action of cardiac preload acute reduction, hypotension and neurohormonal activation.

Methods: We therefore assessed in CHF patients with NYHA class III and BNP values from 800 to 1500 pg/ml, who were treated with iv furosemide, the predictors of iatrogenic short term creatinine impairment by means of a case-control observational study from two centers. Patients with CHF had been treated for 6–8 days with iv loop diuretics alone or with an additional iv administration of other agents [hypertonic saline solution (HSS), albumin, mannitol, inotropic support etc.]. A rise in serum creatinine ≥ 0.3 mg/dl from baseline was considered as worsening renal function (WRF).

Results: A total of 15 cases and 38 controls were enrolled. At univariate analysis, serum creatinine basal value ≥ 2.2 mg/dl, absence of HSS in the therapeutic protocol, hyposodic diet and refractory

oligoanuria were associated with an increased risk of WRF precipitated by iv diuretic therapy. At multivariate analysis as a predictor of loop diuretic-related renal function impairment, we found a serum creatinine ≥ 2.2 mg/dl at baseline (OR: 63.33, 95% CI: 3.68–1088.73, $p=0.0043$) and the absence of HSS in the therapeutic regimen (OR: 25.05, 95% CI: 2.07–302.53, $p=0.0113$). Moreover, in multivariate analysis ascites had some predictive value of renal deterioration (OR: 13.28, 95% CI: 1.005 – 175.41, $p=0.0495$).

Conclusions: After unloading iv diuretic therapy, WRF seems to occur more frequently in CHF patients who had already showed hematochemical evidence of marked renal damage at baseline and in those with clinical picture of ascites. Furthermore, the addition of HSS small volumes to iv loop diuretic therapy seems to effectively reduce the occurrence of iatrogenic WRF, diuretic-related. This may be due to the fact that HSS promotes vascular refilling and prevents the fall of renal blood flow as induced by the reduction of arterial effective circulating volume, so as to minimize tubuloglomerular feedback and neurohormonal hyperactivation responsible for renal vasoconstriction, diuretic resistance and possible deterioration in glomerular filtration function in CHF patients treated with high doses of iv loop diuretics.

O477

Clinical determinants of renal arterial resistance index, a marker reflecting cardiorenal syndrome

Valeria Antoncetti (a), Agata Puzzovivo (a), Annalisa Doronzo (a), Francesco Monitillo (a), Valeria Paradies (a), Gaetano Citarelli (a), Nicoletta Corrieri (a), Massimo Iacoviello (a), Stefano Favale (a), Marco Matteo Ciccone (a)

(a) University of Bari, Department of Cardiology, Bari, Italy

Renal Resistance Index (RRI) is a parameter reflecting intrarenal vascularization which could provide information about renal function different from glomerular filtration rate (GFR). In order to better understand its possible clinical usefulness, we sought to evaluate the independent clinical correlates in a group of chronic heart failure (CHF) outpatients.

We enrolled 250 outpatients (78% males, 64 ± 13 years, NYHA class 2.2 ± 0.6 , left ventricular ejection fraction, LVEF, $34 \pm 10\%$) with CHF (ESC criteria) due to left ventricular systolic dysfunction, in stable clinical conditions and in conventional therapy. All patients underwent a clinical evaluation, routine chemistry, echocardiogram and renal echo-Doppler evaluation. Peak systolic velocity and end diastolic velocity of a segmental renal artery was obtained by pulsed Doppler flow and RRI was then calculated.

RRI was significantly correlated with age, NYHA class ($r: 0.29$; $p < 0.001$), pulmonary arterial systolic pressure ($r: 0.37$; $p < 0.0001$), estimated central venous pressure ($r: 0.29$; $p < 0.001$), mitral regurgitation ($r: 0.33$; $p < 0.001$), tricuspid regurgitation ($r: 0.42$; $p < 0.001$), logarithm of NT-proBNP ($r: 0.45$; $p < 0.001$), and GFR-MDRD ($r: -0.48$; $p < 0.001$). Moreover, RRI was significantly greater in diabetic and hypertensive patients. Table shows the variables that remained significantly associated to RRI in a forward stepwise logistic regression model.

In conclusion, RRI is a parameter evaluating reno-vascular function which is independently associated with both GFR and factors modifying renal flow such as diabetes (micro- and macroangiopathy) and right ventricular pressures. These results strengthen the different information carried by this parameter and its clinical possible usefulness in order to better characterise cardiorenal syndrome.

| Dependent variable | Independent variable | Sequential R2 value | p value |
|------------------------|-----------------------------|---------------------|---------|
| Renal resistance index | Age | 0.28 | 0.001 |
| | Pulmonary systolic pressure | 0.38 | 0.001 |
| | GFR | 0.42 | 0.001 |

| | | | |
|--|-------------------------|------|-------|
| | Diabetes | 0.45 | 0.002 |
| | Log NT-proBNP | 0.47 | 0.005 |
| | Central venous pressure | 0.48 | 0.03 |
| | | | |

CIRCOLAZIONE CORONARICA

O478

Asymmetric dimethylarginine predicts extent and functional significance of coronary atherosclerosis

Fabio Mangiacapra (a, b), Chiara Demartini (a), Argyrios Ntalianis (b), Olivier Muller (b), Leen Delrue (b), Karen Dierickx (b), William Wijns (b), Bernard De Bruyne (b), Germano Di Sciascio (a), Emanuele Barbato (b)

(a) *Campus Bio-Medico University of Rome*, (b) *Cardiovascular Center Aalst*

Background: Elevated plasma levels of asymmetric dimethylarginine (ADMA) are associated with endothelial dysfunction and atherogenesis. We assessed the correlation of plasma ADMA levels with extent and functional significance of coronary atherosclerosis.

Methods: We enrolled 281 patients (pts) with suspected coronary atherosclerosis disease (CAD) undergoing coronary angiography. CAD extent was evaluated on angiogram by Bogaty score (stenosis score and extent index). In the presence of intermediate coronary stenosis (>30% diameter stenosis; n=235), ischemic potential was assessed by fractional flow reserve (FFR). Blood samples were collected prior to coronary angiography to measure plasma ADMA levels.

Results: We observed across tertiles of ADMA levels increasingly higher values of both stenosis score (2.24±1.70 vs. 2.89±1.99 vs. 2.95±1.82, p=0.015) and extent index (0.53 [0.27-0.73] vs. 0.54 [0.33-0.80] vs. 0.66 [0.40-1.04], p=0.003). The association between ADMA levels and extent index remained significant after multivariate adjustment (p=0.005). Pts with ischemic stenosis (i.e. FFR≤0.80, in at least one vessel; n=113) had significantly higher ADMA levels compared with patients without ischemic stenosis (0.51 [0.43-0.63] vs. 0.46 [0.39-0.58] μmol/L, p=0.005; Figure 1). Plasma ADMA levels were independent predictors of positive FFR after adjustment for extent index (odds ratio 7.35, 95% confidence interval 1.05-56.76, p=0.046).

Conclusions: Plasma ADMA levels are predictive of coronary atherosclerosis severity, discriminating patients with ischemic stenosis.

O479

Correlazione tra insufficienza renale cronica e severità di malattia coronarica in pazienti affetti da sindrome coronarica acuta senza sopralivellamento del tratto ST

Matteo Beltrami (a), Gaetano Ruocco (a), Marco Pellegrini (a), Carlo Pierli (b), Ranuccio Nuti (a), Alberto Palazzuoli (a)

(a) *Dipartimento di Medicina Interna, UOS Malattie Cardiovascolari Ospedale S Maria alle Scotte, Università di Siena*, (b) *UOC Emodinamica, Policlinico Santa Maria alle Scotte*

Background: L'insufficienza renale (IR) costituisce una patologia frequentemente associata nei pazienti affetti da malattia coronarica condizionandone spesso l'approccio clinico-terapeutico e la prognosi. Numerosi dati epidemiologici documentano che i pazienti affetti da cardiopatia ischemica ed IR hanno una prognosi a breve e lungo termine peggiore, tuttavia non è del tutto nota l'associazione che caratterizza le due patologie e il relativo nesso fisiopatologico.

Obiettivi: A tale scopo abbiamo studiato una popolazione di pazienti affetti da sindrome coronarica acuta NSTEMI (SCA) analizzando le caratteristiche generali, i fattori di rischio associati, la funzione renale, il picco di troponina e l'estensione della malattia coronarica.

Metodi: Abbiamo sottoposto ad angiografia coronarica una popolazione di 219 pazienti di cui 100 con IR definita con un $GFR < 60$ ml/min/1.73m² (SCA-IR) e 119 con funzione renale preservata definita con un $GFR > 60$ ml/min/1.73m² (SCA-PR). In tutti i pazienti sono stati inoltre calcolati il Gensini Score ed il Syntax score. Abbiamo inoltre comparato tali indici angiografici sulla base dello stadio di insufficienza renale (CKD) (CKD I: GFR tra 60 e 45 ml/min/1.73m²; CKD II: GFR tra 45 e 30 ml/min/1.73m² e CKD III: GFR inferiore a 30 ml/min/1.73m²).

Risultati: Nel gruppo dei pazienti con SCA-IR abbiamo trovato un aumento della prevalenza di diabete (SCA-IR 58% vs SCA-PR 40%) e ipertensione (SCA-IR 66% vs SCA-PR 51%). Nei pazienti con SCA-IR abbiamo riscontrato un picco di troponina significativamente maggiore rispetto ai pazienti SCA-PR ($2,7 \pm 4$ ng/mL vs $1,9 \pm 2,25$ ng/mL $p=0,004$). I pazienti con SCA-IR dimostravano un incremento significativo di malattia trivasale rispetto ai pazienti con SCA-PR (34% vs 21%). L'analisi del Gensini Score ha mostrato un incremento dei valori nei pazienti con SCA-IR (62 ± 23 vs 39 ± 19 $p=0,01$). La misurazione del Syntax score è risultata ancora più significativa nei pazienti con SCA-IR (14 ± 4 vs 9 ± 3 $p=0,006$). In particolare i pazienti con un grado di IR di grado avanzato (CKD III) dimostravano una estensione della malattia coronarica più marcata rispetto ai pazienti con CKD I valutata tramite il Syntax score (16 ± 3 vs 14 ± 2 $p=0,006$). Abbiamo inoltre evidenziato una relazione inversa tra lo stadio di CKD ed estensione di malattia sia per quanto riguarda il Gensini score che il Syntax score ($r=-0,22$ $p=0,02$). Infine la frequenza della malattia trivasale nei pazienti con SCA-IR ed CKD III è risultata significativamente maggiore rispetto alla popolazione con CKD II e CKD I (CKD III: 56 %, CKD II: 37% e CKD I: 23%).

Conclusioni: L'insufficienza renale appare associata con la gravità e l'estensione della malattia coronarica. Tale correlazione si manifesta in maniera ancora più significativa nei pazienti con insufficienza renale avanzata. I suddetti dati angiografici se confermati in un campione più ampio, potrebbero spiegare il peggioramento dell'outcome in questa sottopopolazione di pazienti.

O480

Thrombotic events and plaque progression in HIV-infected patients with acute coronary syndromes: insights from an international contemporary registry

Enrico Cerrato (a), Fabrizio D'Ascenzo (a), Giuseppe Biondi-Zoccai (a), Andrea Calcagno (g), Davide Capodanno (f), Corrado Tamburino (f), Sebastiano Cassese (e), Adnan Kastrati (e), Gennaro Sardella (i), Francesco Fedele (i), Massimo Mancone (i), Umberto Barbero (a), Stefano Bonora (g), Pierluigi Omede (a), Antonio Abbate (b), Didier Carrie (c), Javier Escaned (d), Claudio Moretti (a), Darryn Appleton (b), Fiorenzo Gaita (a)

(a) Division of Cardiology, Città della Salute "Molinette" Hospital, University of Turin, Turin, Italy, (b) VCU Pauley Heart Center, Richmond, VA, (c) Department of Cardiology, Rangueil Hospital, Toulouse, France, (d) Division of Cardiology, San Carlos Hospital, Madrid, Spain, (e) Deutsches Herzzentrum, Munich, Germany, (f) Division of Cardiology, Ferrarotto Hospital, University of Catania, Italy, (g) Division of Infectious Disease, Amedeo di Savoia Hospital, Turin, Italy, (h) Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome, Latina, Ita, (i) Department of Cardiovascular and Pulmonary Sciences, Policlinico Umberto I Sapienza, University of Rome

Aims: HIV patients are at high risk of subsequent cardiac events after an Acute Coronary Syndrome (ACS), while remain unclear if this vulnerability depends from enhanced thrombosis or progression of plaque.

Methods: All consecutive patients with HIV infection receiving standard (highly active antiretroviral therapy) HAART therapy presenting with ACS in our centers from January 2001 to September 2012 were studied, recording clinical data regarding the cardiac history and HIV treatment, as well details

about the coronary intervention procedures. Cardiac death, new myocardial infarction or revascularizations and in-stent thrombosis were recorded as co-primary end points. We enrolled 201 patients, 179 (89%) male with a median age of 53 (47-62) years, 96 (48%) presenting STEMI (ST Segment Elevation Myocardial infarction). After a median of 701 (284-1237) days, 30 (15%) of patients died, 12 (6%) for cardiac reason, 20 (10%) suffered a myocardial infarction, 29 (15%) a subsequent revascularization and 7 (3.8%) a stent thrombosis with an overall incidence of 44 (21.6%) MACE. Patients that experience MACE did not differ for cardiovascular risk factor or treatment of choice while showed a higher rate of chronic renal failure (9, 20.5% vs 8, 5.4% p=0.002) and multivessel/left main disease at presentation (30, 68.2% vs 70, 47.6% p=0.017). At the multivariable adjustment, the only independent predictor of MACE was the multivessel/left main disease (HR 2.54; CI 95% 1.16-5.58; p=0.020) whereas CD4 count <200 cells/mm³ (HR 3.65; CI 95% 1.13-11.8; p=0.031) and not being treated with nucleoside-reverse transcriptase inhibitors (HR 11.36; CI 95% 2.59-49.72.; p=0.001) were respectively independent predictor of new myocardial infarction and cardiac death. No predictors of repeated revascularization were identified.

Conclusions: CD4 count and HAART therapy are clinical predictors of subsequent thrombotic events while not seem to influence the progression of plaque that is represented by repeated revascularization.

O481

Concordance of angiographic and electrocardiographic indexes of microvascular obstruction identifies a high risk patients group: role of myocardial haemorrhage

Valentina Loria (a), Elena Falcioni (a), Francesco Fracassi (a), Nicola Cosentino (a), Carmela Napolitano (b), Luigi Natale (b), Antonella Lombardo (a), Giampaolo Niccoli (a), Lorenzo Bonomo (b), Filippo Crea (a)

(a) *Institute of Cardiology, Catholic University of the Sacred Heart, Rome, Italy*, (b) *Department of Bioimaging and Radiological Sciences, Institute of Radiology, Catholic University, Rome*

Background: ST-segment resolution (STR) and angiographic flow parameters are indexes of microvascular obstruction (MVO) after primary percutaneous coronary intervention (PPCI). We aimed at assessing by cardiac magnetic resonance (CMR), anatomical features underlying concordance of angiographic and electrocardiographic (ECG) indexes of MVO.

Methods and Results: 41 consecutive patients, undergoing PPCI within 12h of symptom onset, were enrolled. Angiographic MVO was defined as a final TIMI flow 2 or final TIMI flow 3 with myocardial blush grade <2, while ECG-MVO as a STR<70% at 90 minutes post-PPCI. Patients were classified based on angiographic and ECG indexes as myocardial reperfusion (44%), concordance of angiographic and ECG-MVO (34%) and discordance of MVO indexes (22%). All patients underwent in-hospital CMR, that assessed infarct size (IS), myocardial salvage index (MSI) and haemorrhage. Echocardiographic data at 6 months follow-up were compared to those obtained in-hospital according to reperfusion status. Patients with concordance had larger IS, lower MSI and a higher rate of intramyocardial haemorrhage [33% (25%-41%), 15% (10%-29%), and 88%, respectively] as compared to those with myocardial reperfusion [12% (9%-16%), 66% (52%-79%), and 0%; Ba-p<0.001, Ba-p<0.001, and p<0.001, respectively] or with discordance [25% (21%-39%), 35% (20%-48%), and 7%; Ba-p=0.03, Ba-p=0.002, and p=0.04, respectively]. After 6 months, ejection fraction significantly decreased in patients showing concordance (p<0.001), increased in patients with angiographic and ECG myocardial reperfusion and did not change in patients with discordant indexes.

Conclusions: Concordance of angiographic and ECG indexes of MVO reflects more severe myocardial and microvascular damage translating into unfavourable left ventricular remodelling at follow-up.

O482

Riduzione della riserva coronarica in pazienti affetti da sclerosi sistemica

Alessia Faccini (a), Eustachio Agricola (a), Michele Oppizzi (a), Alberto Margonato (a), Maurizio Galderisi (b), Maria Grazia Sabbadini (a), Stefano Franchini (a), Paolo Guido Camici (a)

(a) *Università Vita-Salute San Raffaele e Istituto Scientifico San Raffaele, Milano, Italia*, (b) *Università Federico II, Napoli, Italia*

Obiettivi: Scopo di questo studio è valutare in modo non invasivo la prevalenza e l'entità della riduzione della disfunzione del microcircolo cardiaco in pazienti affetti da sclerosi sistemica privi di sintomi di pertinenza cardiaca, stratificando successivamente i risultati in base al sottotipo di malattia (forma diffusa dSSc vs forma limitata lSSc).

Metodi: Abbiamo arruolato 19 pazienti, di cui 7 dSSc e 12 lSSc, tutti con anamnesi negativa per malattia aterosclerotica coronarica. Abbiamo quindi stimato in ciascuno i valori di riserva coronarica (CFR) mediante ecocolorDoppler: è stato misurato il picco di velocità diastolica sulla discendente anteriore al basale e dopo somministrazione di dipiridamolo (0.84 mg/kg/6min), definendo la CFR come il rapporto tra il valore ottenuto dopo lo stimolo iperemico e quello ottenuto al basale. Abbiamo inoltre valutato la cinetica segmentaria in condizioni basali e dopo dipiridamolo. Abbiamo infine arruolato 20 soggetti sani come controlli.

Risultati: L'età media dei pazienti è stata di 51.9 ± 13.6 anni (16 donne and 3 uomini), mentre l'età media dei controlli è stata di 37.1 ± 10.8 anni (5 donne and 15 uomini) ($p=0.001$). La CFR media è risultata essere 1.96 ± 0.62 nei pazienti e 2.69 ± 0.47 nei controlli ($p<0.001$). Valori ridotti di CFR (<2) sono stati riscontrati nei pazienti in maniera significativamente maggiore rispetto che nei controlli: 10 pazienti (52.6%) hanno presentato una ridotta CFR, mentre tutti i controlli hanno mostrato una CFR >2 (10/19 vs 0/20; $p<0.001$). E' stato inoltre identificato un trend verso valori più bassi di CFR nella dSSc rispetto alla lSSc (1.72 ± 0.32 vs 2.1 ± 0.51 ; $p=0.06$), riscontrando una più alta prevalenza di ridotta CFR nella dSSc rispetto alla lSSc (6/7 vs. 4/12; $p=0.05$). Infine, è stata osservata una relazione inversa tra la durata di malattia e i valori di CFR nei pazienti affetti da lSSc (coefficiente di correlazione -0.583 ; $p=0.046$). Nessun paziente o controllo ha mostrato anomalie della cinetica di parete in seguito a somministrazione di dipiridamolo.

Conclusioni: L'assenza di anomalie della cinetica segmentaria, in associazione alla mancanza nell'anamnesi di una storia di coronaropatia aterosclerotica, ci permette di ipotizzare che la riduzione della CFR sia probabilmente dovuta a disfunzione del microcircolo cardiaco. Nel nostro studio la disfunzione del microcircolo cardiaco è stata identificata in circa la metà dei pazienti affetti da sclerosi sistemica arruolati, tutti asintomatici per sintomi di pertinenza cardiaca; questo è particolarmente evidente in pazienti affetti dalla forma diffusa, mentre nella forma limitata sembra che tale disfunzione si manifesti più tardivamente. Questi dati sottolineano l'importanza di una valutazione cardiaca approfondita in tutti i pazienti affetti da sclerosi sistemica, anche in uno stadio precoce di malattia e anche tramite la misurazione della CFR.

O483

Correlazione tra dinamica di flusso e meccanica di parete in pazienti con STEMI e frazione d'iezione conservata: echo-piv e speckle tracking echocardiography a confronto

Sara Cimino (a), Gianni Pedrizzetti (b), Gianni Tonti (c), Francesco Cicogna (a), Valentina Petronilli (a), Laura De Luca (a), Donatella Cantisani (a), Carlo Iacoboni (a), Francesco Fedele (a), Luciano Agati (a)

(a) Department of Cardiology, "Sapienza" University, Roma, Italy, (b) Department of Engineering and Architecture, University of Trieste, Italy, (c) SS. Annunziata Hospital, Sulmona, AQ, Italy

Background: Precedenti studi basati su modelli matematici e computazionali, hanno dimostrato che il flusso di sangue all'interno del ventricolo sinistro ha le caratteristiche di un vortice che si forma durante la fase di riempimento diastolico. È stato poi dimostrato che, nel cuore sano, il flusso ematico vorticoso viene indirizzato verso il tratto d'efflusso del ventricolo sinistro e che tale struttura, che corrisponde ad una fisiologica distribuzione spaziale delle pressioni sulle pareti cardiache, ottimizza l'utilizzo dell'energia cinetica impressa al sangue favorendone la conservazione. Come già pubblicato dal nostro gruppo, i parametri energetici del ventricolo sinistro (dissipazione energetica), calcolati mediante analisi Echo-PIV in pazienti con un primo STEMI si dimostrano alterati rispetto ad una popolazione di sani, mostrando inoltre, nei pazienti, una correlazione direttamente proporzionale tra frazione d'iezione (FE) e dissipazione energetica (DE), come a dimostrare l'esistenza di fenomeni di compenso nelle prime fasi post-infarto. Il significato di tali parametri in termini di rimodellamento ventricolare sinistro rimane ancora da chiarire. Per quanto riguarda le nuove tecniche di studio della funzione ventricolare sinistra lo strain globale longitudinale (GLS) ha dimostrato di essere un parametro più sensibile nell'identificare una disfunzione anche precoce rispetto alla FE.

Scopi: confrontare i parametri energetici di flusso con i parametri di funzione meccanica del ventricolo sinistro (FE e GLS) nei pazienti con un primo STEMI e FE > 50% che rappresentavano, nello studio originario, la popolazione a DE più elevata.

Metodi: sono stati arruolati 20 pazienti con un primo STEMI e FE > 50%. Tutti i pazienti sono stati sottoposti ad intervento di rivascolarizzazione miocardica mediante angioplastica primaria e successivamente ad ecocardiogramma 2D con valutazione Speckle tracking (Tomtec Imaging) per il calcolo del GLS, ecocardiogramma 3D per il calcolo della FE e studio ecocontrastografico con analisi Echo-PIV (Hyper Flow 6.2.1.5.) per il calcolo della DE.

Risultati: Non si evidenzia una correlazione lineare significativa tra FE e DE (coefficiente di correlazione di Spearman=0,3; p=0,33). Si evidenzia invece una correlazione lineare significativa tra GLS e DE (coefficiente di correlazione di Spearman=0,6; p=0,041, r²=0,36).

Conclusioni: In accordo a quanto precedentemente pubblicato in base a dati ottenuti sulla popolazione originaria che comprendeva pazienti con vari gradi di disfunzione ventricolare sinistra post-infartuale, abbiamo voluto dimostrare l'esistenza di una correlazione tra parametri energetici e meccanica di parete anche all'interno del solo gruppo di pazienti a FE conservata. I nostri risultati suggeriscono che, anche in assenza di un'evidente disfunzione ventricolare sinistra, la DE ha una relazione direttamente proporzionale con la funzione meccanica di parete. Tale correlazione è evidenziabile quando la DE viene confrontata con lo strain longitudinale, che è noto essere parametro più sensibile di disfunzione ventricolare sinistra rispetto alla FE (calcolata con eco 3D).

SHOCK CARDIOGENO

O484

Extracorporeal membrane oxygenation support system as bridge to solution in refractory cardiogenic shock

Antonio Loforte (a), Giuseppe Marinelli (a), Emanuele Pilato (a), Sofia Martin Suarez (a), Luciano Potena (a), Francesco Grigioni (a), Fabio Caramelli (a), Guido Frascaroli (a), Giorgio Arpesella (a)
(a) Bologna University, S. Orsola-Malpighi Hospital, Dept of Cardiovascular Surgery and Transplantation

Background: The RotaFlow (Maquet, Jostra Medizintechnik AG, Hirrlingen, Germany) and Levitronix CentriMag (Levitronix LCC, Waltham, MA) centrifugal pumps as central or peripheral veno-arterial extracorporeal membrane oxygenation (ECMO) support systems have been investigated as treatment for patients with refractory cardiogenic shock (CS).

Methods: Between January 2001 and December 2012, 119 consecutive adult patients were supported on RotaFlow (n=104) or CentriMag (n=15) ECMO, at our institution (79 men; age 57.3±12.5 years, range: 19-78 years). Indications for support were: failure to wean from cardiopulmonary bypass in the setting of postcardiotomy (n=47) and primary donor graft failure (n=26); post-acute myocardial infarction CS (n=11); acute myocarditis (n=3); and CS on chronic heart failure (n=32).

Results: A central ECMO setting was established in 69 (57.9%) patients while peripherally in 50 (42.01%). Overall mean support time was 10.9±8.7 days (range: 1-41 days). Forty-two (35.2%) patients died on ECMO. Overall success rate, in terms of survival on ECMO (n=77), weaning from mechanical support (n=51; 42.8%) and bridge to heart transplantation (n=26; 21.8%), was 64.7%. Seventy (58.8%) patients were successfully discharged.

Stepwise logistic regression identified blood lactate level and CK-MB relative index at 72 h after ECMO initiation, and number of PRBCs transfused on ECMO as significant predictors of mortality on ECMO [p=0.010, odds ratio (OR)=2.94; 95% confidence interval (CI)=1.10–3.14; p=0.010, OR=2.82, 95% CI=1.014 - 3.72; and p=0.011, OR=2.69; 95% CI=1.06–4.16; respectively].

No significant differences were seen by comparing RotaFlow and CentriMag populations in terms of device performance.

Conclusions: Patients with a poor hemodynamic status may benefit by rapid central and peripheral insertion of ECMO. The blood lactate level, CK-MB relative index and PRBCs transfused should be strictly monitored during ECMO support.

O485

Shock cardiogeno post arresto cardiaco: deve essere ancora considerato una controindicazione all'ipotermia terapeutica?

Nicola Gasparetto (a), Daniele Scarpa (a), Francesca Prevedello (a), Giuseppe Tarantini (a), Chiara Salotti (a), Armando Marzari (a), Sabino Iliceto (a), Luisa Cacciavillani (a)

(a) Clinica Cardiologica, Dpt di Scienze Cardiologiche, Toraciche e Vascolari, Università di Padova

Introduzione: L'ipotermia terapeutica (IT) è una possibile causa di ipotensione nei pazienti post arresto cardiaco (AC). L'ipotermia, infatti, può causare ipovolemia, può ridurre la contrattilità miocardica e la frequenza cardiaca portando ad una riduzione della portata cardiaca. Per questi motivi, puramente teorici, le attuali indicazioni all'IT considerano l'instabilità emodinamica o lo shock cardiogeno (SC) una controindicazione.

Con questo studio abbiamo analizzato l'impatto dell'instabilità emodinamica e dello SC sull'outcome e sulle complicanze dei pazienti post AC trattati con IT.

Metodi: E' stata eseguita un'analisi retrospettiva di tutti i pazienti trattati con IT per un AC da Novembre 2010 a Maggio 2013. L'intera popolazione è stata divisa in due gruppi: i pazienti con grave instabilità emodinamica/SC prima dell'induzione dell'IT (gruppo 1) e quelli con emodinamica stabile (gruppo 2). Di tutti i pazienti sono stati raccolti i dati riguardanti l'AC e la permanenza in terapia intensiva cardiologica con particolare riguardo alle eventuali complicanze e all'outcome.

Risultati: Il gruppo 1 è composto da 16 pazienti (età 58.3 ± 10.6 anni, 2 femmine) mentre il gruppo 2 da 41 pazienti (età 60.8 ± 15.3 anni, 9 femmine). I due gruppi sono simili riguardo il tipo di cardiopatia, le tempistiche dell'AC, il numero di shock erogati, la dose di adrenalina e amiodarone somministrati durante la rianimazione e i risultati dei test di laboratorio all'ingresso in ospedale ($p > 0.05$). La mortalità intraospedaliera è del 37.5% nei pazienti appartenenti al gruppo 1 e del 21.9% nei pazienti del gruppo 2 ($p = 0.35$). La sola causa cardiovascolare è la responsabile del decesso nel 25% nel gruppo 1 e nel 9.7% nel gruppo 2 ($p = 0.08$). Un outcome neurologico favorevole alla dimissione ospedaliera (Cerebral Performance Category 1 e 2) è ottenuto dal 46.7% dei pazienti del gruppo 1 vs 47.5% di quelli del gruppo 2 ($p = 0.99$). Il tasso di complicanze, in termini di sanguinamento, eventi tromboembolici, aggravamento/insorgenza di instabilità emodinamica e aritmie non differisce significativamente tra i due gruppi ($p > 0.05$).

Conclusioni: La presenza di SC nei pazienti post AC trattati con IT non ha un impatto negativo sulla prognosi. L'IT è un trattamento sicuro e perseguibile nei pazienti con SC e dal punto di vista clinico pertanto non può essere considerato una controindicazione. Alla luce di questo risultato, confermato anche da altre segnalazioni in letteratura siamo pertanto concordi nel ritenere che lo SC debba essere rimosso dalla lista delle controindicazioni dell'IT.

O486

Mild therapeutic hypothermia after out-of-hospital cardiac arrest secondary to myocardial infarction: echocardiographic data

Matteo Cameli (a), Stefano Lunghetti (a), Raffaella De Vito (a), Margherita Padeletti (a), Flavio D'Ascenzi (a), Romina Navarri (a), Cristina Di Tommaso (a), Paolo Cameli (a), Roberto Favilli (a), Sergio Mondillo (a)

(a) Department of Cardiovascular Diseases, University of Siena, Siena, Italy

Background: Recent studies suggest a reduced mortality in survivors of cardiac arrest subjected to mild therapeutic hypothermia (TH), but the underlying mechanisms are not yet clear. The aim of our study was to analyze effects on left ventricular (LV) myocardial performance of mild therapeutic hypothermia in patients admitted after successful resuscitation from out-of-hospital cardiac arrest secondary to acute ST-elevation myocardial infarction (STEMI).

Methods: 5 consecutive patients (mean age 62 ± 7 years) admitted after successful resuscitation from out-of-hospital cardiac arrest secondary to anterior STEMI were enrolled. Hypothermia was performed via intravascular cooling by rapid infusion of cold saline (34°C), maintained for 24 hours. All patient underwent successful percutaneous revascularization. Transthoracic eco Doppler was performed in all patients during TH and 48 h after the end of TH. The echocardiographic images were analyzed off-line to calculate global longitudinal strain (GLS), obtained by averaging 4-, 2- and 3-chamber view longitudinal strain values.

Results: Rewarming induced a significant increase in heart rate from 62 to 70 beats per minute. Despite the increase of LV end diastolic diameter and volume (from 46 ± 8.0 to 51 ± 8.9 mm, $p = 0.06$ and 50 ± 11.2 to 62 ± 14 ml, $p = 0.001$, respectively), after rewarming was evident an increase of LV ejection fraction and in particular of GLS (from 42.5 ± 4.5 to $51.7 \pm 4.3\%$, $p = 0.01$ and -9.0 ± 2.1 to $-14.5 \pm 2.2\%$, $p < 0.0001$, respectively) and a reduction of E/A ratio (from 1.8 ± 0.9 to 1.3 ± 0.8 , $p = 0.001$).

Conclusions: In patients treated with mild therapeutic hypothermia admitted after successful resuscitation from out-of-hospital cardiac arrest secondary to STEMI, successfully reperfused, after rewarming, it is evident an increase of global LV systolic performance with a better diastolic pattern.

O487

Efficacia e sicurezza della contropulsazione aortica nei pazienti con shock cardiogeno post infarto miocardico acuto

Nicola Gasparetto (a), Francesca Prevedello (a), Chiara Salotti (a), Daniele Scarpa (a), Giuseppe Tarantini (a), Francesca Santi (a), Armando Marzari (a), Sabino Iliceto (a), Luisa Cacciavillani (a)

(a) *Clinica Cardiologica, Dpt di Scienze Cardiologiche, Toraciche e Vascolari, Università di Padova*

Introduzione: Lo shock cardiogeno (CS) rimane la principale causa di morte nei pazienti con infarto miocardico acuto (IMA). La terapia cardine è rappresentata dalla rivascolarizzazione miocardica con angioplastica primaria che può essere associata all'utilizzo di farmaci inotropi/vasopressori e, nel caso in cui non si raggiunga la stabilità emodinamica, devices meccanici di supporto al circolo, come il contropulsatore aortico (IABP) o l'ossigenazione extracorporea a membrana (ECMO). Un recente trial clinico randomizzato (IABP-SHOCK II) ha dimostrato come l'utilizzo dell'IABP nello SC post IMA (in una popolazione con pressione arteriosa media (PAM) di 68.5 mmHg) non era in grado di ridurre la mortalità a 30 giorni.

Con questo studio retrospettivo caso/controllo abbiamo voluto analizzare l'efficacia e la sicurezza dell'utilizzo dell'IABP come terapia complementare all'angioplastica primaria verificando inoltre l'estendibilità del risultato dell'IABP-SHOCK II trial in una popolazione con un quadro emodinamico più compromesso.

Metodi: Sono stati arruolati tutti i pazienti con SC post IMA ricoverati tra Marzo 2010 e Maggio 2013 trattati con IABP. Ciascuno di essi è stato appaiato (1 a 1) con un controllo, trattato nello stesso periodo per SC, ma non sottoposto a contropulsazione aortica. L'appaiamento è avvenuto per età, genere, storia di pregressa cardiopatia, tipologia di IMA (con soprasslivellamento del tratto ST o senza soprasslivellamento ST), numero di vasi con lesioni critiche (>75%), livello di creatinina sierica, valore picco dei lattati arteriosi ed utilizzo dell'ECMO. Lo SC è stato definito in accordo con le più recenti linee guida.

Risultati: Sono stati arruolati 22 casi (età 71 ± 12.6 anni, 6 femmine) e 22 controlli (età 71.7 ± 11.4 anni, 6 femmine). La mediana della PAM all'ingresso/esordio dello SC era simile nei due gruppi di pazienti (casi: 60 mmHg [IQR=55-66], controlli: 63 mmHg [IQR=56-67] $p=0.23$). Il numero e la dose di inotropi utilizzati non differivano significativamente tra i due gruppi di pazienti ($p=0.62$) come anche la funzione ventricolare in termini di frazione d'eiezione del ventricolo sinistro alla risoluzione del quadro di shock (casi: $36.5 \pm 15.2\%$, controlli: $35 \pm 13.6\%$). Le complicanze considerate in termini di emorragia, complicanze vascolari, insufficienza renale acuta e stroke nei due gruppi sono risultate analoghe ($p>0.05$) mentre l'evoluzione in blocco atrioventricolare di II grado/avanzato/completo che ha richiesto l'impianto di pacemaker è risultata maggiore nei pazienti non trattati con IABP (27.3%) rispetto quelli con IABP (0%) ($p=0.021$). Dieci (45.4%) pazienti nel gruppo trattato con IABP sono deceduti a 30 giorni, tra i controlli invece i decessi sono stati 13 (59.1%) ($p=0.36$).

Conclusioni: L'utilizzo dell'IABP nei pazienti con SC post infartuale risulta essere un trattamento sicuro ma non si associa ad un miglioramento della sopravvivenza a 30 giorni. I nostri dati pertanto confermano il risultato dell'IABP-SHOCK II trial estendendolo ad una popolazione più compromessa dal punto di vista emodinamico.

PROBLEMATICHE TECNICHE NELL'ESTRAZIONE DEI CATETERI CARDIACI

O488

Infezione di sistema CRT-D in responder: rimuovere anche il catetere epicardico ventricolare sinistro?

A Magnani (a, b), E Facchini (a, b), A Degiovanni (a, b), MV Di Ruocco (a, b), L Ferrarotti (a, b), E Occhetta (a, b), PN Marino (a, b)

(a) Clinica cardiologica AOU Maggiore della Carità, Novara, Italy, (b) Università degli studi del Piemonte Orientale, Novara, Italy

Maschio di 67 anni, affetto da cardiomiopatia dilatativa ipocinetica con coronarie indenni (2003 e 2011); presenti anche una broncopneumopatia cronica ostruttiva (ex-forte fumatore) ed una storia di pregresso potus.

A 11/2008 episodio di edema polmonare acuto con conferma ecocardiografica del quadro di cardiomiopatia dilatativa (FE 25%, VTD 354 ml, VTS 267 ml), in presenza di ritmo sinusale con BBS 200 ms; Viene sottoposto ad impianto di ICD bifocale (fallito tentativo di incannulare il seno coronarico).

Seguono frequenti episodi di scompenso cardiaco per cui nel 2/2009 viene nuovamente tentato, con successo, l'inserimento di un catetere in seno coronarico.

La soglia ventricolare sinistra sale progressivamente fino ad impedire la cattura e forza la disattivazione della stimolazione dal seno coronarico (12/2010); a distanza di 2 mesi si rileva peggioramento del quadro ecocardiografico (2/2011: FE 18%, VTD 385 ml, VTS 314 ml) per cui si effettua impianto di un catetere epicardico ventricolare sinistro.

A distanza di soli 3 mesi si conferma l'efficacia della terapia di resincronizzazione cardiaca [CRT] (6/2011: FE: 30%, VTD 204 ml, VTS 143 ml).

A 12/2012 comparsa di piccola fistola sottoclaveare che coinvolge una farfalla di fissaggio, trattata con revisione chirurgica locale ed antibioticoterapia vista la complessità dell'impianto (tampone positivo per *Staphylococcus epidermidis*).

A 2/2013 viene nuovamente ricoverato per iperpiressia con brividi ed emocolture seriate positive per *Staphylococcus haemolyticus*, *Staphylococcus epidermidis* e *Peptostreptococcus anaerobius*.

L'ecocardiogramma non evidenzia vegetazioni, mentre la PET total-body mostra due sedi di captazione, rispettivamente a livello della zona sottoclaveare di precedente revisione chirurgica (quindi a livello del transito elettrocateri ma con tasca ICD indenne) ed a livello cardiaco epicardico in corrispondenza del punto dove confluiscono il catetere in seno coronarico e quello epicardico. Abbiamo quindi proceduto all'estrazione completa del sistema endocavitario, sezionando preventivamente il catetere epicardico in zona extratoracica apparentemente indenne.

Il paziente ha continuato il trattamento antibiotico e la nuova PET, a distanza di 1 mese, ha mostrato solo lieve captazione in sede sottoclaveare sinistra, a testimonianza di come il precedente rilievo di captazione epicardica fosse a carico della punta del catetere in seno coronarico.

Dopo completa negativizzazione degli indici di flogosi e delle emocolture è stato eseguito il reimpianto di CRT-D con accesso da destra, recuperando la connessione al catetere epicardico mediante unipolarizzazione ed utilizzo di un adattatore OsypkaVKU17 + prolunga Medtronic6981M tunnelizzata in sottocute.

Il paziente è attualmente asintomatico, con CRT-D bene funzionante.

O489

Esperienza di un singolo centro sull'estrazione di cateteri da stimolazione o da defibrillazione cardiaca permanente: analisi dei fattori che influenzano l'utilizzo di tecniche assistite

Francesca Vassanelli (a), Luca Bontempi (a), Alessandro Lipari (a), Manuel Cerini (a), Elisa Locantore (a), Marco Belotti Cassa (a), Francesca Salghetti (a), Mohamed Elmaghawry (b), Abdallah Raweh (c), Francesco Chiusso (d), Alessio Gargaro (d), Antonio Curnis (a)

(a) Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia, (b) Aswan Heart Centre, Aswan - Egypt, (c) Faculty of Medical Science, Ludes University, Lugano - Svizzera, (d) Biotronik Italia Spa

Background: Negli ultimi anni si è verificato un costante incremento del numero di impianti di dispositivi da stimolazione (PACE MAKER) o da defibrillazione (ICD) cardiaca. A questo si è fisiologicamente associato un aumento delle complicanze e delle problematiche legate alla gestione di questi device. Tra queste quelle di maggior rilevanza sono rappresentate dal malfunzionamento e dall'infezione. L'estrazione di cateteri con approccio endovascolare si è dimostrato essere la terapia più efficace in queste situazioni. Tale terapia si avvale di diverse metodiche e tecnologie. Le due maggiormente utilizzate, oltre la semplice trazione manuale sono rappresentate da estrattori meccanici o estrattori potenziati ad energia laser.

Scopo: Valutare i fattori che possono influenzare l'utilizzo di una tecnica estrattiva rispetto ad un'altra.

Materiali e Metodi: dal gennaio 2009 al dicembre 2012 sono stati estratti 899 cateteri in 469 pazienti, di età 68.4 ± 12.8 anni. Le indicazioni ad estrazione erano: infezione (66%), malfunzionamento (26%), upgrading (8%). L'età media dei cateteri era di 68 ± 59 mesi. Sono stati presi in considerazione i seguenti parametri e inseriti in una analisi multivariata: tipo di catetere, fissaggio catetere, età del catetere, indicazione all'espianto, sesso ed età del paziente.

Risultati: 873 cateteri (98.2%) sono stati completamente rimossi. Le complicanze maggiori e minori si sono state rispettivamente in quattro (0.8%) e tre (0.6%) pazienti. Non ci sono stati decessi. Tecniche di estrazione assistita sono state adottate nel 52% dei cateteri estratti. Ad un'analisi multivariata l'utilizzo di sheath laser o meccanici è risultato associato all'età del catetere (OR 1.34, 95% CI 1.3-1.4, $p < 0.001$), all'estrazione di cateteri con doppio coil (OR 2.3, 95% CI 1.3-4.1, $p = 0.005$), all'indicazione per malfunzionamento (OR 1.6, 95% CI 1.1-2.4, $p = 0.015$), al sesso femminile (OR 1.59, 95% CI 1.0-2.43, $p = 0.029$). Non sono risultati significativi l'età del paziente, il fissaggio passivo e la presenza di vegetazione.

Conclusioni: I fattori associati all'utilizzo di tecniche di estrazione assistita (estrattore Laser o Meccanico) ad una analisi multivariata nella nostra ampia casistica sono risultate essere: l'età del catetere, la presenza di doppio coil di defibrillazione, l'indicazione per malfunzionamento, il sesso femminile.

O490

Sopravvivenza di un gruppo di pazienti sottoposto ad estrazione cateteri con laser ad eccimeri con potenza di 80 Hz

Mohamed Elmaghawry (b), Luca Bontempi (a), Manuel Cerini (a), Alessandro Lipari (a), Francesca Vassanelli (a), Elisa Locantore (a), Marco Belotti Cassa (a), Francesca Salghetti (a), Abdallah Raweh (c), Antonio Curnis (a)

(a) Dipartimento di Cardiologia - Spedali Civili; Università degli studi di Brescia - Italia, (b) Aswan Heart Centre, Aswan - Egypt, (c) Faculty of Medical Science, Ludes University, Lugano - Svizzera

Background: L'estrazione dei cateteri è una procedura complessa, generalmente eseguita in condizioni potenzialmente pericolose per la vita quali infezioni e malfunzionamenti dei device.

La metodica di estrazione Laser-Sheath ad eccimeri offre alcuni importanti vantaggi in termini di efficacia e sicurezza, in particolar modo in presenza di aderenze molto tenaci.

Scopo: Valutazione della sopravvivenza a medio termine (1 anno) di pazienti sottoposti ad estrazione utilizzando la metodica Laser con Sheath potenziate ad 80 Hertz.

Metodi: Tra Dicembre 2011 e Dicembre 2012, presso il Laboratorio di Elettrofisiologia ed Elettrostimolazione sono stati reclutati 75 pazienti consecutivi sottoposti ad estrazione cateteri utilizzando il Laser-Sheath potenziato 80 hz. Di questi 62 erano maschi (82,6%), età media $67,1 \pm 13,4$ anni, 21 diabetici (28%), 33 ipertesi (44%), 23 affetti da insufficienza renale cronica (30,6%) e 45 (60%) erano stati sottoposti precedentemente a riposizionamento elettrocateri. Al momento della procedura 34 (45,3%) pazienti presentavano una FE $\leq 45\%$ (media $44 \pm 15,6\%$). Le indicazioni all' estrazione cateteri erano nel 36% dei casi malfunzionamento, infezione nel 60% e il 4% per altre cause.

Risultati: Tutti i 135 cateteri sono stati estratti con successo completo e non ci sono state complicanze durante la procedura. Solo 1 caso di tamponamento cardiaco tardivo si è verificato entro le 12 ore dall' estrazione. Non si è verificato alcun decesso correlato alla procedura. Nel periodo di follow-up (341 ± 98 giorni) 4 pazienti sono deceduti. 1 di questi pazienti è morto due settimane dopo la procedura, durante lo stesso ricovero. Aveva 68 anni, sottoposto ad impianto PM per BAV II Grado 3 settimane prima e con indicazione ad estrazione cateteri per manifestazioni sistemiche di endocardite e infezione della tasca. Al momento della procedura il paziente era dispnoico a riposo, con FE del 20%. Sia le emocolture che il tampone tasca, ma non le culture dei cateteri, hanno documentato infezione da *Staphylococcus Aureus*. I restanti 3 pazienti sono deceduti nei 6 mesi successivi alla procedura di estrazione cateteri: 2 per scompenso cardiaco e 1 per neoplasia gastrica.

Conclusioni: L' estrazione cateteri con eccimeri ad 80 Hz si è dimostrata una procedura sicura ed efficace. Al follow up, i decessi osservati tra i pazienti trattati erano associati ad un trattamento tardivo, alla sottostante cardiopatia in fase terminale ed alle comorbidità.

O491

Estrazione transvenosa degli elettrocateri (tle): la nostra esperienza

Antonio Ragusa (a), Valeria Terranova (a), Ivana Rinaldi (a), Alberto Arestia (a), Vincenzo Schillaci (a), Claudio Liotta (a), Angelo Di Grazia (a), Corrado Tamburino (a), Valeria Calvi (a)

(a) U.O. Elettrofisiologia e Cardioritmo – Azienda O.U. Policlinico-V.E., Università di Catania

Introduzione: Nel corso degli ultimi anni il numero di nuovi impianti e sostituzioni di PM e ICD è andato incontro ad un progressivo aumento, determinando inevitabilmente un incremento delle complicanze, infettive e non, che richiedono spesso l'espianto dell'intero sistema di stimolazione o defibrillazione (cardiac implantable electronic device, CIED). Ne deriva che è aumentato il numero delle procedure di estrazione transvenosa degli elettrocateri (transvenous lead extraction, TLE), peraltro destinate ad andare incontro ad un costante ulteriore incremento. L'obiettivo di questo studio consiste nel riportare l'esperienza del nostro centro nella TLE.

Metodi: Da febbraio 2010 a maggio 2013, 74 pazienti sono stati sottoposti a TLE. Tutte le procedure sono state eseguite nella sala di elettrofisiologia con stand-by cardiocirurgico. La tecnica di estrazione utilizzata prevedeva l'impiego di stiletto e trazione manuale, associata o meno all'impiego di cannule. Il successo della procedura era rappresentato dalla completa rimozione di tutti gli elementi costituenti il CIED.

Risultati: Su un totale di 74 pazienti (61 maschi e 13 femmine, età media $67,6 \pm 13,2$ anni) sono stati estratti 149 elettrocateri: 53 atriali (35,6%), 77 ventricolari destri (46 di defibrillazione, 30,9%, e 31 di pacing, 20,8%) e 19 collocati in seno coronarico per la stimolazione ventricolare sinistra (12,7%). Le indicazioni alla TLE erano rappresentate da infezione locale (56,8%), infezione sistemica (9,4%), elettrocateri non funzionanti (28,4%), up-grade del CIED (2,7%), decubito del device (2,7%). Il successo clinico è stato ottenuto in 73 procedure (98,6% delle procedure totali). In un caso

il risultato è stato parziale, mentre in un caso si è reso necessario il ricorso all'intervento cardiocirurgico per rimuovere una vegetazione localizzata dapprima sull'elettrocattetero ventricolare destro e successivamente embolizzata in arteria polmonare destra dopo l'estrazione dell'elettrocattetero stesso. Non si è registrato alcun decesso.

Conclusioni: Nella nostra esperienza la TLE si è dimostrata una procedura sicura ed efficace, con bassa incidenza di complicanze maggiori. Ciononostante la procedura va comunque eseguita in centri che possano avvalersi di assistenza cardiocirurgica, anche se in un prossimo futuro l'acquisizione di maggior manualità da parte degli operatori e l'introduzione di nuove strumentazioni potranno determinare un'ulteriore riduzione dei rischi legati alla TLE.

O492

Predictors of advanced lead extraction based on a systematic stepwise approach.

Fabrizio Guarracini (a, b), Patrizio Mazzone (b), Carlo Ammendolea (b), Silvio Romano (a), Simone Sala (b), Nicoleta Sora (b), Gabriele Paglino (b), Maria Penco (a), Paolo Della Bella (b)

(a) *Cardiology Department, University of L'Aquila, Italy*, (b) *Arrhythmia Unit and Electrophysiology Laboratories, San Raffaele Hospital, Milano, Italy*

Purpose: Lead extraction (LE) techniques have evolved from simple traction to extraction with dilators and powered sheaths with very high success rates. Based on the systematic implementation of a stepwise approach (Figure 1), we aimed to identify those characteristics that can predict the need for advanced LE techniques.

Methods: Between April 2005 and March 2012, 213 consecutive LE procedures were performed and 462 leads were extracted using an initial superior approach. Advanced techniques for LE (step 4 according to our stepwise approach) were used in 127 patients (59.4%).

Results: Younger patient age (OR=0.963, p=0.002), longer duration of the initial implantation (OR=1.013, p=0.002), the number of extracted leads (OR=2.184, p<0.001) and the presence of right ventricular defibrillator leads (OR=2.144, p=0.049) independently predicted the necessity of using step 4 in multivariate analysis. A prediction tool was created taking into account 4 categorical variables derived even from Receiver Operating Curve analysis of quantitative characteristics (age <70.7 years, implant duration >37 months, extraction of at least 2 leads, one of them being a defibrillator lead). The absence of all the four characteristics was accompanied by 0% positive predictive value for the requirement of step 4 for LE, while the co-existence of all four risk factors is characterized by 87% requirement of advanced LE.

Conclusion: In most of the patients with indication for LE, use of a powered sheath extraction is necessary in order to obtain clinical success. We have identified four patient and lead characteristics that may help the operator plan the means of extraction.

O493

Estrazione transvenosa di elettrocatteteri per dispositivi cardiovascolari impiantabili mediante tecnica manuale: esperienza di un singolo centro supportato da un centro di riferimento

Maddalena Zingaro (a, b), Graziella Malerba (a), Maria Carmela Mascolo (a), Gianni Luzzi (a), Roberta Trotta (a), Zefferino Palamà (a), Ezio Soldati (b), Luca Segreti (b), Giulio Zucchelli (b), Stefano Favale (a), Maria Grazia Bongiorno (b)

(a) *Malattie dell'Apparato Cardiovascolare, DETO, Università di Bari*, (b) *Malattie Cardiovascolari II, Ospedale Nuovo S. Chiara, Pisa*

Background: Il numero crescente di impianti di pacemaker e defibrillatori ha portato ad un aumento delle infezioni correlate ai dispositivi impiantabili; inoltre la continua immissione sul mercato di elettrocatteteri diversi tra loro per caratteristiche tecniche, materiali di costruzione, conduttori, isolanti ha portato negli anni ad un aumento delle advisories e recalls. Tutto ciò ha determinato un relativo

aumento del numero di procedure di estrazione. La tecnica di estrazione percutanea mediante dilatatori meccanici appare una metodica efficace e caratterizzata da un profilo di sicurezza correlato al training, all'esperienza e competenza degli operatori. In questo lavoro viene presentata l'esperienza di un singolo centro supportato da un centro di riferimento europeo.

Metodo e Risultati: Tra febbraio 2011 e maggio 2013 sono stati sottoposti a procedura di estrazione di CIED con tecnica manuale 64 pazienti (età media 68 anni, 48 maschi) in accordo con le raccomandazioni dell'Heart Rhythm Society (47 infezioni, 10 endocarditi, 7 malfunzionamenti di elettrocatteteri). Mediante tale tecnica sono stati rimossi 137 elettrocatteteri (media dei mesi dall'impianto 52.1; 51 impiantati in atrio destro, 68 in ventricolo destro, 18 in seno coronarico). La rimozione completa dei CIED è avvenuta nel 100% dei casi, in assenza di complicanze maggiori peri e post-operatorie. Tra le complicanze minori: due ematomi di tasca in sede di espanto, in corso di terapia anticoagulante, risolti mediante posizionamento di drenaggio in aspirazione continua; sette casi di anemia post-operatoria che hanno richiesto emotrasfusione; due casi di versamento pericardico lieve; un caso di migrazione di una piccola porzione di guaina di elettrocatteteri in un ramo del circolo polmonare senza alcuna ripercussione clinica.

Conclusioni: La nostra esperienza conferma che l'estrazione transvenosa di CIED mediante approccio manuale con tecnica meccanica è sicura ed efficace. La continua collaborazione con un centro di riferimento è fondamentale per la gestione dei pazienti in quanto contribuisce a ridurre il numero delle complicanze del singolo centro.