Poster

Coronary: Acute coronary syndrome, general

P1

RELATIONSHIP BETWEEN ATHEROSCLEROTIC CORONARY BURDEN AND MAJOR VENTRICULAR ARRHYTHMIAS IN ACUTE CORONARY SYNDROME PATIENTS

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Introduction. The severity and complexity of coronary atherosclerotic burden among patients who develop major ventricular arrhythmias (MVA) [i.e., sustained ventricular tachycardia (SVT) and/or ventricular fibrillation (VF)] during an acute coronary syndrome (ACS) is unknown. The aim of this study is to assess the relationship between coronary artery disease (CAD) severity and complexity using the SYNTAX score (SS) and the development of MVA in patients admitted for ACS treated with percutaneous coronary intervention (PCI).

Methods. We carried out a single-centre, cross-sectional study consecutively enrolling all patients presenting at our large-volume PCI centre between January 2017 and December 2020 with a diagnosis of STE- or NSTE ACS and who developed SVT or/and VF prior or within 48 hours after PCI. A comparison group was extracted from the same registry including all patients who in the same timeframe had an ACS treated with PCI, without the development of MVA.

Results. Among the 981 ACS patients enrolled, MVA were detected in 141 subjects (14%). Patients with MVA showed a higher SS [27 points; IQR 21-32 vs 13 points; IQR 8-19] *p*=0.001], more lesions with length >20 mm (65% vs 35%; p=0.001), more chronic total occlusion (13% vs 5%; p=0.01), more ostial (21% vs 11%; p=0.02) and bifurcation lesions (35% vs 20%; p=0.001), and more thrombus-containing lesions (18% vs 10%; p=0.01) as compared with the control group. No differences appeared in the number of calcific lesion (16% vs 10%; p=0.07) and in severe vessel tortuosity (9% vs 8%; p=0.8). After multivariate analysis, SS >22 emerged as an independent predictor of MVA [OR, 2.5; CI 1.4-4.6; p=0.001] along with lesion length >20 mm [OR, 2.1; CI 1.3-3.3; p=0.001] and chronic total occlusion [OR, 1.16; CI 1.1-1.2; p=0.001].

Conclusions. According to our experience, an increased atherosclerotic burden (represented by a high SYNTAX score) is associated with a higher MVA risk in the setting of an invasively managed ACS. Thus, we may hypothesize that severe and complex atherosclerosis increases the electrophysiological remodeling and instability of the myocardium at risk and therefore it may concur to the development of MVA.

P2

CASE SERIES OF CARDIAC ARREST SECONDARY TO SPONTANEOUS CORONARY ARTERY DISSECTION

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Introduction. Cardiac arrest secondary to a spontaneous coronary artery dissection (SCAD) represents a challenging scenario. It deserves specific considerations due to the dramatic presentation and the need for secondary sudden cardiac death prevention.

Methods. We collected clinical data of four women admitted during the last two years in the Coronary Care Unit of Parma University Hospital, whose presentation of SCAD were cardiac arrest due to ventricular fibrillation.

Results. Three patients survived the acute phases. One patient, being considered at high risk of SCAD recurrence, received a subcutaneous implantable cardioverter-defibrillator (S-ICD). *Acute management of cardiac arrest related to SCAD* deserves specific considerations. Our case series illustrates the importance of prompt resuscitation manoeuvres and early defibrillation. We propose a flow chart of management of cardiac arrest in patient with suspect of SCAD. *Evaluating risk of SCAD recurrence and sudden cardiac death* The management of SCAD patients complicated by malignant ventricular arrhythmias and cardiac arrest is challenging. Looking at published registries, it appears that SCAD patients are more likely to suffer from ventricular arrythmia or sudden cardiac death than non-SCAD MI patients. The risk-benefit ratio of ICD implantation in these patients remain uncertain. Evaluation of scar burden with CMR can help stratify the global arrhythmic risk, especially as extensive myocardial scar with a residual impaired LVEF increases the risk of future arrhythmic events. In our series, only one patient underwent S-ICD implantation, and the decision was mainly driven by the finding of underlying arteriopathy affecting other vascular territories, suggesting a potentially higher rate of SCAD recurrence. For this particular subset of patients, we propose an algorithm that combines predisposing factors and myocardia injury quantification data that could be useful for the estimate of the risk of malignant arrythmias, as well as the risk of recurrence of SCAD, but needs to be validated in larger case studies.

Conclusions. The acute management of cardiac arrest related to SCAD deserves specific consideration. The residual myocardial damage, predisposing and precipitants factors should be evaluated in order to estimate the SCAD recurrence and sudden cardiac death risks.

P3

DISSEZIONE CORONARICA SPONTANEA: INCIDENZA E RUOLO PROGNOSTICO DEI FATTORI DI RISCHIO NON TRADIZIONALI

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Introduzione. L'eziologia e la prognosi della dissezione coronarica spontanea (SCAD) è tutt'ora poco definita. Recentemente l'interesse si è focalizzato sui fattori di rischio non tradizionali (NT-RF), classificati convenzionalmente nelle seguenti categorie: fattori correlati al sesso (sex-related [SR]), più frequentemente associati al sesso femminile (sex predominant) e correlati al genere (gender-related GR]). L'obiettivo della nostra analisi è stato quello d valutare l'incidenza e il ruolo prognostico dei NT-RF nella popolazione di donne con SCAD arruolate presso il laboratorio di Emodinamica dell'Azienda Ospedaliero-Universitaria di Parma.

Metodi. Abbiamo arruolato 62 pazienti consecutive affette da sindrome coronarica acuta (SCA)secondaria a SCAD ricoverate presso il reparto di Cardiologia dell'AOU di Parma da gennaio 2013 a novembre 2021. La popolazione in studio è stata suddivisa in due gruppi in base alla presenza o meno di NT-RF. Abbiamo valutato le caratteristiche cliniche e angiografiche nei gruppi di studio e l'occorrenza di eventi avversi cardiovascolari maggiori (MACE) al follow-up.

Risultati. Cinquantuno pazienti (82.3%) erano affetto da NT-RF, nel dettaglio 41 (66.0%) erano affetti da SRNT-RF, 40 (64.5%) erano affetti da GR-NT-RF. La presentazione clinica più frequente è stata l'infarto miocardico NSTEMI (43 pazienti, 72,6%) rispetto all'infarto STEMI (17 pazienti, 27,4%). Nei due gruppi in studio non sono state riscontrare differente nella distribuzione dei fattori di rischio tradizionali, nella presentazione clinica e nelle caratteristiche angiografiche. A un follow-up mediano di 23 mesi (intervallo interquartile: 11;57), 11 (17.7%) dei pazienti ha presentato MACE. Comparato al gruppo privo di NT-RF, i pazienti con NT-RF ha presentato un trend verso una maggior occorrenza di MACE, senza raggiungere la significatività statistica (19,6% vs 9,1%; p=0,4).

Conclusioni. La prevalenza dei NT-RF nelle pazienti affette da SCA secondaria a SCAD è molto elevata e si associa ad un trend verso una maggior incidenza di MACE al follow-up. La stima del rischio di tale malattia è difficile a causa della scarsa validità dei modelli predittivi in uso. È auspicabile la diffusione e l'utilizzo da parte della comunità clinica di modelli di analisi del profilo di rischio che incorporino i NT-RF.

P4

MORTALITÀ CORRELATA ALL'ETÀ NEI PAZIENTI STEMI: INFORMAZIONI DA UN ANNO DI ESPERIENZA DI UN CENTRO HUB DURANTE LA PANDEMIA

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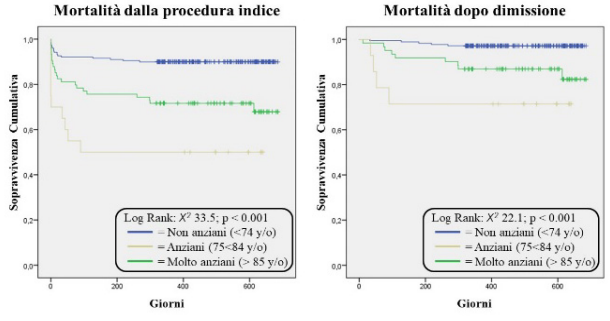
Introduzione. Il numero globale di pazienti anziani è in costante aumento. L'età è un importante fattore di rischio cardiovascolare non

modificabile associato a grave comorbidità. I pazienti anziani ricoverati per infarto miocardico con sopraslivellamento del tratto ST (STEMI) hanno una prognosi sfavorevole, un tasso relativamente basso di trattamento invasivo con un basso tasso di successo. I pazienti anziani sono fragili e complessi, caratteristiche aggravate dalla pandemia per motivi clinici e organizzativi. Scopo del nostro studio era valutare l'impatto dell'età, concentrandosi su anziani e molto anziani, sulla mortalità acuta e a medio termine nei pazienti STEMI ricoverati in ospedale durante il periodo della pandemia.
Metodi. Abbiamo analizzato retrospettivamente tutti i pazienti ricoverati nel nostro centro Hub dal 15 marzo 2020 al 15 marzo 2021 con diagnosi di STEMI.
Risultati. Abbiamo raccolto 283 pazienti STEMI divisi in tre gruppi in base all'età (non anziani "Not-O" <74 anni, anziani "O" 75-84 anni, molto anziani "Very-O" <85 a/o o). I tre gruppi non differivano per i principali fattori di rischio e le caratteristiche cliniche. Lo STEMI anteriore era il più rappresentato (45,9%). Tutti i pazienti sono stati trattati con PCI primaria con una percentuale di successo del 96,1%, indipendentemente dall'età. I pazienti Very-O avevano un'incidenza significativamente maggiore di MACE in ospedale rispetto ad altri gruppi (Not-O 10,6% vs O 24,3% vs Very-O 35,0%; p<0,001), una mortalità più elevata (Not-O 7,4% vs O 17,6% vs Very-O 30,0%; p:0,02) e una percentuale significativa di morte cardiaca (Not-O 4,2% vs O 13,5% vs Very-O 25,0%; p<0,001). Gli unici due predittori indipendenti di mortalità intraospedaliera erano la frazione di eiezione (EF) [OR: 0,902 (IC 95%) 0,868-0,938; p<0,0001] e infezione da COVID-19 [OR: 3,177 (IC 95%) 1,212-8,331; p=0,019]. Al follow-up (430+/-208 giorni) i tassi di sopravvivenza diminuiscono significativamente lungo i gruppi di età (Not-O 2,9% vs O 14,8% vs Very-O 28,6%; p<0,0001) e gli unici due predittori indipendenti di mortalità al follow-up erano EF [OR: 0,935 (IC 95%) 0,891-0,982; p=0,007] ed età [OR: 1,06 (IC 95%) 1,018-1,110; p=0,019]. Le curve di sopravvivenza secondo Kaplan Mayer sia comprensive della fase acuta dell'evento sia analizzando i soli pazienti sopravvissuti alla fase acuta/ricovero dimostrano una sopravvivenza diversa a medio termine a seconda della fascia di età considerata (Figura).
Conclusioni. In conclusione, i nostri risultati suggeriscono che nei pazienti molto anziani, anche trattati in modo invasivo ed equivalente a pazienti più giovani, tutte le procedure accessorie che possono essere eseguite dovrebbero essere accuratamente ponderate in termini di equilibrio rischio-beneficio e reale incidenza sulla qualità della vita a causa della scarsa prognosi a medio termine indipendentemente.



P5

CORONARY ARTERY ECTASIA: INCIDENCES AND FOLLOW-UP

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Coronary artery ectasia (CAE) is a rare coronary anomaly and it's found in approximately 1-5% of patients who undergo coronary angiography or autopsy.
Many studies have shown that patients with CAE should be treated as a high-risk group for coronary events. We reviewed coronary angiography of 11645 patients referred to our cathlab for coronary angiography, 271 patients of these had coronary artery ectasia (CAE) with an incidence of 2.3%, and 70 patients had as first clinical manifestations an acute coronary syndrome.
In these patients with acute coronary syndrome (ACS) were 70, and percutaneous coronary angioplasty was performed in 76%. Coronary artery ectasia was focal in 72% of patients and diffuse in the others.

Risk factors		Clinical manifestations	
Hypertension	71%		
Smoking	68%	Angina	74.2%
Diabetes	45%	ACS	25.8%
Hypercholesterolemia	66%		

105/271 pts have no significative coronary stenosis (<50%). Mean follow-up was 48 months. One patients, male of 55 years old with previous ACS treated with PCI and DES of the right coronary, after three years had an ACS treated with a PCI for acute occlusion of stent. At follow-up four patients with previous PCI and stenting and one without significative coronary stenosis died for extracardiac causes. The other patients were asymptomatic at follow up. 70% of patients continued to receive single antiplatelet therapy prescribed at discharge.
Conclusions. CAE may predispose arteries to slow flow and frequently angina is the reported symptom; impaired blood flow can modify endothelial cells and activate inflammatory mechanisms that can cause platelet aggregation and thrombus formation predisposing to myocardial ischaemia. Our data confirm that: (i) coronary artery ectasia change the normal coronary physiology; (ii) no difference was demonstrated in the incidence of risk factors between CAE and coronary artery disease; and (iii) presence of coronary artery ectasia requires close clinical follow-up with the maintenance of an appropriate antiplatelet therapy indefinitely and a strictly control of risk factors.

P6

APPRAISING FEATURES AND OUTLOOK OF WOMEN DISCHARGED AFTER AN ACUTE CORONARY SYNDROME MANAGED INVASIVELY: ANALYSIS BASED ON THE 23,702-PATIENT PRAISE MULTICENTER REGISTRY

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Background. Acute coronary syndromes (ACS) are a common cause of morbidity and mortality, irrespective of sex. While several studies have focused on ACS at admission or long-after the acute event, limited if any research is available on sex-based comparison of patients discharged after ACS. We aimed at appraising the outlook of women discharged after ACS, exploiting a large multinational registry.
Methods. Details on women enrolled in the PRAISE multicenter registry, a large database spanning 23,702 patients included between 2003 and 2019, were systematically collected. We focused on patient and procedural features, medications at discharge, and 1-year outcomes. The primary endpoint was the composite of death, myocardial infarction, or major bleeding after discharge. Secondary outcomes were the individual components of the primary endpoint.
Results. Characteristics of 17,804 men and 5,466 women discharged after ACS were collected. Several baseline differences were found, including risk factors and history of prior revascularization (all p<0.05). At discharge, men underwent radial access more frequently, and received also more commonly beta-blockers, renin-angiotensin system inhibitors, and statins (all p<0.05). Focusing on antithrombotic therapy, men received more frequently prasugrel, whereas women receive more commonly clopidogrel (all p<0.05). At 2-year follow-up incidence of death, reinfarction, major bleeding, non-fatal major bleeding were significantly higher in women (all p≤0.01). All such differences were however due to residual confounding and did not hold true at multivariable analysis, with the exception of major bleeding, which was surprisingly lower in females at adjusted analysis (odds ratio=0.70 [95% confidence interval: 0.52-0.94], p=0.017).
Conclusions. This extensive registry analysis shows that women were treated less aggressively and had apparently worst outcomes 2 years after discharge for ACS. These findings are a urgent reminder of the need for more aggressive management of women with ACS.

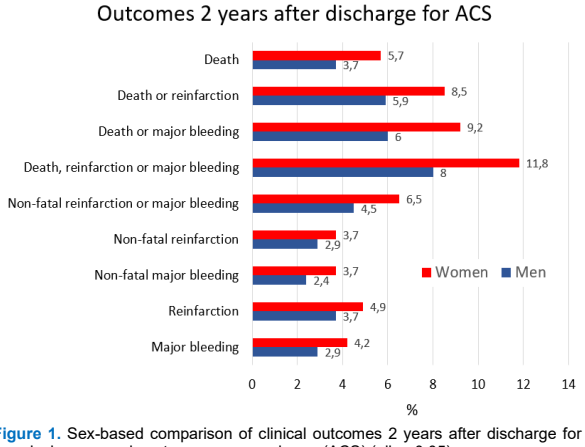

Figure 1. Sex-based comparison of clinical outcomes 2 years after discharge for an invasively managed acute coronary syndrome (ACS) (all p<0.05).

P7

UNSUPERVISED MACHINE LEARNING WITH CLUSTER ANALYSIS IN PATIENTS DISCHARGED AFTER AN ACUTE CORONARY SYNDROME: INSIGHTS FROM A 23,270 PATIENT STUDY

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Background. Characterization and management of patients with acute coronary syndromes (ACS) remain challenging, and it is unclear whether currently available clinical and procedural features can suffice to inform adequate decision making.

Methods. Details on patients discharged after an ACS were obtained by querying an extensive multicenter registry, detailing patient features as well as management details. Clinical outcomes included fatal and non-fatal cardiovascular events at 1-year follow-up. After missing data imputation, two unsupervised machine learning approaches (k-means and Clustering Large Applications [CLARA]) were used to generate separate clusters with different features. Bivariate and multivariable-adjusted analyses were performed to compare different clusters for clinical outcomes.

Results. 23,270 patients discharged after ACS were included. Two clusters were identified by k-mean algorithm (k1 and k2), and two clusters by CLARA algorithm (C1 and C2). Differences in 2-years outcomes between k1 and k2 and between C1 and C2 were substantial. K2 cluster (N=21,988) in comparison with k1 cluster (N=1,282) had significantly higher occurrence of death (9.5% vs 3.8%, p<0.001), reinfarction (7.2% vs 3.7%, p<0.001), and major bleeding (6.0% vs 3.0%, p<0.001). Similarly, C1 cluster (N=11,268) showed a worse prognosis than C2 cluster (N=12,002): death (4.8% vs 3.5%, p<0.001), reinfarction (4.5% vs 3.4%, p<0.001), and major bleeding (3.6% vs 2.8%, p=0.001). Most associations did not hold at multivariable analysis based on supervised learning techniques, with the exception of major bleeding (odds ratio=1.37 [95% confidence interval 1.02-1.83] for the k1/C1 subcluster vs k1/C2 subcluster, p=0.039.

Conclusions. A machine-learning based clustering approach is effective at face value to inform on the prognosis of patients with ACS managed invasively. These findings can be leveraged to inform decision-making in this setting, but also highlight the potential role of cluster analysis in first-in-man and preapproval studies of medical devices.

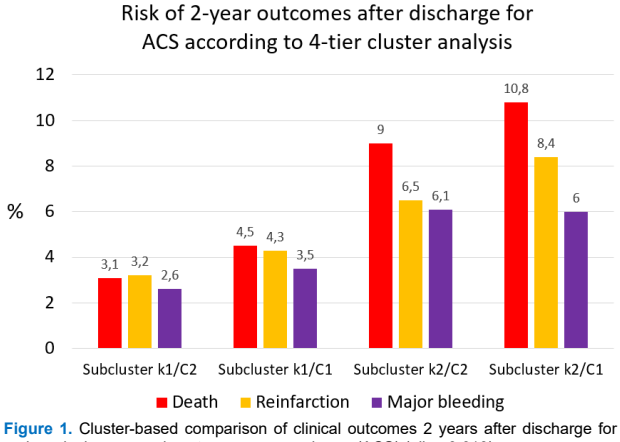

Figure 1. Cluster-based comparison of clinical outcomes 2 years after discharge for an invasively managed acute coronary syndrome (ACS) (all p<0.010).

P8

VALUTAZIONE DI ESITO PER I PAZIENTI SOTTOPOSTI A PCI (PERCUTANEOUS CORONARY INTERVENTION) PRIMARIA PER INFARTO MIOCARDICO CON SOPRASLIVELLAMENTO DEL TRATTO ST (STEMI) NELLA PROVINCIA AUTONOMA DI TRENTO. MONITORAGGIO DELLA RETE STEMI DURANTE LA PANDEMIA COVID-19

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Introduzione. Il tempo door-to-balloon (DTB) è uno dei parametri principali che condizionano la prognosi dell'infarto STEMI con indicazione all'intervento di angioplastica coronarica transluminale percutanea (PCI) urgente. Secondo le linee guida internazionali il tempo massimo consentito dal primo contatto medico alla PCI sono 120 minuti e tempi di circa 90 minuti sono considerati uno standard accettabile. Il monitoraggio regolare della rete STEMI è fondamentale per implementare e migliorare le performance. A partire dal 2003, con revisioni periodiche, questo processo ha interessato anche la Provincia di Trento (PAT), con un modello Hub&Spoke con la sala di emodinamica dell'Ospedale S. Chiara di Trento operativa h 24/7 e implementazione del servizio di elisoccorso h 24/7.

Metodi. Analisi retrospettiva di registro prospettico a partire dall'1/1/2018 fino al 31/12/2021 sui dati relativi ai pazienti con STEMI con indicazione alla rivascolarizzazione urgente nella PAT, possibilità di accesso alla PCI urgente, tempistiche, e outcome clinici. Analisi delle tempistiche door-to-balloon, total ischemia time, tempo spoke to hub, patient delay e hospital delay nei pazienti afferenti al centro Hub direttamente dal territorio o dai centri Spoke, caratteristiche cliniche e di presentazione dei pazienti, il successo della rivascolarizzazione e l'outcome (mortalità intraospedaliera ed a 30 giorni). È stata inoltre eseguita una valutazione dell'impatto della pandemia di Covid-19 sull'efficienza della rete STEMI tramite un confronto tra le tempistiche di accesso dei pazienti alla PCI primaria (pPCI) durante il periodo Covid-19 e le differenze di outcome.

Risultati. Dei 959 pazienti analizzati complessivamente nel registro, il 97.9% è stato sottoposto a pPCI, con un tasso di successo procedurale (TIMI 2-3 finale) del 95.6%. La pPCI è stata eseguita nel 49,6% dei casi entro 120 minuti dalla diagnosi; nel 62,9% dei pazienti centralizzati direttamente al centro Hub dal territorio. I pazienti afferiti direttamente al Centro Hub hanno una presentazione clinica più severa (esordio con arresto cardiaco extraospedaliero (OHCA) 73 vs 0, Shock Cardiogeno 83 vs 22, p<0,001, STEMI anteriore 44,4% vs 37,3%). La mortalità complessiva è stata del 5,84%, (34,3% e 31,3% nei pazienti con STEMI e shock cardiogeno e STEMI esorditi con OHCA, rispettivamente). Non vi sono state differenze statisticamente significative nella mortalità tra i pazienti afferiti direttamente al centro Hub o trasferiti dai centri Spoke. Durante il periodo Covid vi è stata una riduzione significativa degli accessi per STEMI (-21%) con un aumento significativo del tempo di ischemia totale e un minor utilizzo dell'elisoccorso. Non vi sono state differenze significative di mortalità nei due periodi presi in esame.

Conclusioni. La rete trentina dell'infarto STEMI ha mostrato una buona performance soprattutto nei pazienti con accesso alla rete direttamente dal 118 e centralizzati precocemente. Non vi sono state differenze significative di mortalità intraospedaliera nel periodo Covid rispetto al periodo precedente pur con un aumento significativo del tempo di ischemia totale. È necessario migliorare la strategia di educazione sanitaria volta alla popolazione al fine di un riconoscimento precoce dei sintomi per garantire una rivascolarizzazione più rapida.

P9

QUADRO CORONAROGRAFICO DI PAZIENTI EXTRAEUROPEI RICOVERATI PER INFARTO MIOCARDICO ACUTO

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Introduzione. Le malattie cardiovascolari rappresentano ancora oggi la principale causa di morte in Italia, essendo responsabili del 34,8% di tutti i decessi. Un aspetto spesso trascurato nella lettura dei dati statistici è quello relativo alla composizione demografica del nostro Paese, in costante variazione a causa dei continui flussi migratori. Esistono ad oggi pochissimi dati di prevalenza delle malattie cardiovascolari tra le minoranze etniche, in particolare residenti in Italia. È percezione comune che soggetti provenienti dall'Asia del sud (Bangladesh, Pakistan, India) e dall'Africa del nord (Egitto, Marocco) abbiano maggior incidenza e quadri più complessi di cardiopatia ischemica. Mancano, tuttavia, chiare evidenze che supportino questa tesi. Di seguito riportiamo i dati relativi all'analisi demografica di un registro complessivo di tutte le procedure coronariche percutanee eseguite presso il nostro Centro per infarto miocardico acuto negli ultimi sette anni.

Metodi. Abbiamo analizzato retrospettivamente il database del nostro Centro fra gennaio 2015 e gennaio 2022 selezionando tutti i pazienti sottoposti a studio coronarografico per infarto miocardico acuto (IMA) sia STEMI che NSTEMI. I pazienti sono stati suddivisi in due gruppi: italiani e stranieri. Successivamente abbiamo escluso dall'analisi i pazienti europei di nazionalità non italiana.

Risultati. Tra gennaio 2015 e gennaio 2022 sono stati studiati nel nostro Centro 2573 pazienti con IMA. Dopo aver escluso i soggetti nati in Europa ma non in Italia abbiamo ottenuto una popolazione complessiva di 2512 pazienti: 2406 italiani e 106 stranieri extraeuropei (SE). Tra gli SE la nazionalità d'origine prevalente era il Bangladesh (n 28). Non sono state osservate differenze significative nel rapporto STEMI/NSTEMI tra italiani e SE (p=0.294). I due gruppi risultavano omogenei per altezza, peso e BMI. Gli SE erano significativamente più giovani, con un'età di presentazione in media di ben 15 anni inferiore rispetto agli italiani (53.03 vs 68.5, p<0,001). La popolazione femminile era meno rappresentata nel gruppo SE (15% vs 31%, p<0.001). Nonostante l'età molto più giovane,

né l'estensione della coronaropatia né il numero di stent coronarici impiantati mostravano differenze statisticamente significative tra italiani e SE (n vasi malati: 1.65 vs 1.49, p= 0,10; tot stent impiantati: 1.56 vs 1.64, p=0,60). Fattori di rischio quali il diabete e la dislipidemia erano significativamente più frequenti negli SE (39% vs 20%, p<0,001 e 36% vs 26%, p= 0,032) mentre l'ipertensione arteriosa (68% vs 56%, p=0,01), un pregresso IMA (28% vs 14%, p=0,001) e una pregressa angioplastica coronarica (28% vs 4%, p=0,0001) si riscontravano più spesso tra gli italiani.
Conclusioni. L'analisi dei nostri dati ha evidenziato che la popolazione di stranieri extraeuropei con IMA è caratterizzata da un'età di presentazione significativamente inferiore rispetto a quella italiana. Sebbene più giovani, gli SE presentano un'estensione di coronaropatia paragonabile a quella di una popolazione italiana 15 anni più anziana. Ciò potrebbe essere legato ad una elevata incidenza precoce di fattori di rischio quali il diabete e la dislipidemia.

P10

EXTENSION OF CORONARY ARTERY ECTASIA IN DIFFERENT CLINICAL SCENARIO AND ITS CORRELATION WITH MYOCARDIAL INFARCTION WITH NON-OBSTRUCTIVE CORONARY ARTERIES

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Introduction. Several causes have been reported for coronary artery ectasia (CAE), mostly atherosclerosis and tunica media abnormalities. The main aim of the present study was to investigate if CAE extension differs in distinct clinical settings.
Methods. Three-hundred forty-one patients with diagnosis of CAE were identified among 9659 coronary angiographies and divided into 4 groups according to patient's admission diagnosis: stable or unstable angina (S-UA), myocardial infarction (MI), aortic disease (AD), aortic valvular disease (AVD). S-UA and MI were sub-grouped according to the presence of obstructive coronary artery disease (OCAD). Multivariable logistic regression was used to investigate the relationship between clinical diagnosis and CAE extension as expressed by Markis classification and number of coronary vessels affected by CAE.
Results. No significant differences in CAE extension were found among the four groups, in terms of vessels affected by CAE (p=0.37) or Markis class (p=0.33). CAE was not related to the extension of OCAD as assessed by the Gensini score, that was higher in MI and S-UA groups (p<0.01). However, when ischemic patients were sub-divided on the basis of the presence of OCAD, myocardial infarction without obstructive coronary artery disease (MINOCA) was associated with a higher extension of CAE in terms of Markis class 1 (OR 5.08, 95% CI: 1.61-16.04; p<0.01).
Conclusions. The extension of CAE is comparable in patients referred to coronary angiography for different clinical scenarios, including S-UA, MI, AD and AVD; however, patients with MINOCA was associated with a higher extension of CAE.

P11

IMPACT OF CONTRAST-INDUCED ACUTE KIDNEY INJURY ON LONG-TERM OUTCOMES IN OLDEST OLD STEMI PATIENTS: A MULTICENTER REGISTRY

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Introduction. Contrast-induced acute kidney injury (CI-AKI) is a well-known complication of ST-elevation acute myocardial infarction (STEMI) with an adverse impact on prognosis. Elderly patients are at higher risk for cardiovascular events. Moreover, renal function decreases with age. We sought to evaluate the incidence of CI-AKI in very elderly STEMI patients undergoing primary PCI (pPCI) and its impact upon outcomes in these patients.
Methods. We retrospectively evaluated all very elderly patients (i.e. age above 85 years) treated with pPCI for STEMI in two hub-centers between January 2010 and June 2021. We defined CI-AKI as a rise in serum creatinine of ≥0.30 mg/dL over baseline during the first 48h from procedure. Follow-up data were determined from local clinical records during a twelve-months period.
Results. Among 451 patients referred for STEMI at our institutions, 404 patients underwent pPCI. Overall, the incidence of CI-AKI was 16.3%. There was no significant age difference between CI-AKI and non CI-AKI groups (89.3 ± 2.9 vs 88.6 ± 2.7, p=0.11). Baseline features were similar except for higher prevalence of diabetes mellitus (31.1% vs 18.7%, p=0.03) and chronic kidney disease (CKD) (77% vs 25.7%, p<0.01) in CI-AKI vs non CI-AKI group. CKD appeared to be strongly associated to higher risk of CI-AKI (OR 9.69, 95% CI: 5.0-18.5; p<0.01). Time-to-first composite MACE (all cause death, stroke, heart failure hospitalization) tended to be shorter without a significant difference between CI-AKI vs non CI-AKI group (252.3 vs 296.2 days, p=0.06) at one year follow-up.
Conclusions. Underlying CKD is strongly associated with CI-AKI in oldest-old STEMI patients. CI-AKI group had a nonsignificant trend toward a reduction in time-to-first MACE.

P12

NEUTROPHIL TO LYMPHOCYTE RATIO AND ITS POSSIBLE ROLE FOR IN-HOSPITAL OUTCOMES IN OLDEST OLD STEMI PATIENTS

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Introduction. The neutrophil to lymphocyte ratio (NLR) is an indicator of systemic inflammation and has been emerged as a prognostic marker in patients undergoing percutaneous coronary intervention (PCI). We aimed to assess the prognostic value for in-hospital clinical outcomes in patients with STEMI undergoing primary PCI.
Methods. We enrolled every oldest old patient admitted in two Hub hospitals with a diagnosis of STEMI who underwent an invasive strategy (coronary angiography ± percutaneous coronary intervention) between January 2010 and June 2021. Blood samples were performed at the first medical contact (in the emergency room or in the cath-lab according to presentation). In-hospital MACCE was defined as a composite of death, heart failure, recidive of AMI and stroke during in-hospital stay.
Results. Four hundred fifty-eight patients accessed the Hub hospitals for STEMI during the selected period. Among them, 351 patients were eligible for this analysis. One hundred thirty patients (37%) experienced an in-hospital MACCE. Patients with in-hospital MACCE had a significantly higher NLR at baseline (10,1±7,6 vs 7,1±4,6 p<0,001), this was also true when in-hospital mortality was considered per se (11,1±8,3 vs 8,0±5,8 p=0,002).
Conclusions. In our multicenter registry of oldest old STEMI patients, NLR has demonstrated to be an affordable and accessible tool able to help the identification of patients at risk for in-hospital MACCE and in-hospital mortality.

P13

EFFECTS OF THE SARS-COV-2 PANDEMIC ON ISCHEMIA TIME AND OUTCOMES OF PATIENTS WITH ACUTE CORONARY SYNDROMES: THE MYOCARDIAL INFARCTION NETWORK

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Background. During the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, hospital admissions for acute coronary syndromes (ACS) dramatically declined worldwide, mostly because of patients' perception of hospitals as dangerous places regarding the infection risk. Accordingly, patients with acute myocardial infarction (AMI) displayed a significantly higher in-hospital mortality compared to those admitted before SARS-CoV-2, potentially due to the delayed activation of emergency medical systems and late arrival to the catheterization laboratories (CathLabs).
Purpose. We aimed at assessing the differences in time from chest pain onset (OP) to first medical contact (FMC), time from FMC to arrival at CathLab, and number of in-hospital cardiovascular (CV) deaths between patients admitted during a period of high incidence of SARS-CoV-2 infection (November-December 2020) and those admitted in a period of relative low incidence of infection (July 2020).
Methods. We retrospectively enrolled 259 patients with ACS including ST-elevation myocardial infarction (STEMI), myocardial infarction without ST-elevation (NSTEMI) and unstable angina (UA), admitted to five CathLabs. All patients underwent a coronary angiography with or without primary percutaneous coronary intervention (PCI). We divided our population into two groups according to the period of admission to the CathLab: November-December 2020 (185 patients) and July 2020 (74 patients).
Results. We observed no differences in age [November – December 2020: 66.5 years old (IQR: 59.0 – 78.0), July 2020: 68.0 years old (IQR: 57.0 – 81.0), p-value: 0.55] and prevalence of males [November – December 202: 146 (78.9%), July 2020: 50 (67.5%), p-value: 0.11], main CV risk factors, and previous AMI [November – December 2020: 27 (14.6%), July 2020 11 (14.8%), p-value: 0.96] (Table). Patients admitted

in November-December 2020 displayed similar time from OP to FMC [November – December 2020: 105.0 minutes (IQR: 50.0 – 182.3); July 2020: 77.0 minutes (IQR: 30.0 – 355.2), p-value: 0.38] and time from FMC to CathLab [November – December 2020: 72.0 minutes (IQR: 57.0 – 107.0); July 2020: 81.0 minutes (IQR: 53.8 – 136.0), p-value: 0.26] compared to those admitted in July 2020 (Table). Furthermore, in our population 17 in-hospital CV deaths occurred without significant differences in the number of events between the two groups [n. events November – December 2020: 10/185, n. events July 2020: 7/74, p-value: 0.25].

Conclusion. Although SARS-CoV-2 infection represents a challenge for healthcare systems worldwide, in our population patients with ACS admitted to CathLab in a period with high incidence of infection did not display differences in time from OP to FMC, time from FMC to CathLab and numbers of in-hospital CV deaths compared to those admitted in a period with relative low incidence of infection.

Table. Overall population characteristics and differences between patients admitted during November-December 2020 and those admitted in July 2020.

Variables	Overall population (n=259)	November – December 2020 (n=185)	July 2020 (n=74)	p-value
Age (years old)	67.0 (IQR: 58.7 – 79.0)	66.5 (IQR: 59.0 – 78.0)	68.0 (IQR: 57.0 – 81.0)	0.55
Males (%)	196 (75.6)	146 (78.9)	50 (67.5)	0.11
Smokers (%)	54 (20.8)	37 (20.0)	17 (22.9)	0.68
Diabetes Mellitus (%)	129 (49.8)	87 (47.0)	42 (56.7)	0.23
Hypertension (%)	64 (24.7)	46 (24.8)	18 (24.3)	0.39
Previous AMI (%)	38 (14.6)	27 (14.6)	11 (14.8)	0.96
Sars-Cov 2 infection (%)	64 (24.7)	40 (21.6)	24 (32.4)	0.08
STEMI (%)	121 (46.7)	87 (47.0)	34 (45.9)	0.71
Time from OP to FMC (minutes)	100.0 (40.0 – 213.0)	105.0 (IQR: 50.0 – 182.3)	77.0 (IQR: 30.0 – 355.2)	0.38
Time from FMC to CathLab (minutes)	74.0 (56.0 – 115.0)	72.0 (IQR: 57.0 – 107.0)	81.0 (IQR: 53.8 – 136.0)	0.26
n. In-hospital CV deaths	17	10	7	0.25

Data are presented as median and interquartile range (IQR). Test U-Mann-Whitney was used to assess diff between the two groups. Abbreviations: AMI, acute myocardial infarction; STEMI: ST-elevation myocardial inf OP: onset of pain; FMC: first medical contact; CathLab, catheterization laboratory; n. number.

Coronary: Acute coronary syndrome, PCI

P14

PRIOR MYOCARDIAL INFARCTION AND TREATMENT EFFECT OF TICAGRELOR VERSUS PRASUGREL IN PATIENTS WITH ACUTE CORONARY SYNDROMES – A SUBGROUP ANALYSIS OF THE ISAR-REACT 5 TRIAL

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Objectives. To assess the treatment effect of ticagrelor versus prasugrel according to prior myocardial infarction (MI) in patients with acute coronary syndrome (ACS).

Background. The efficacy and safety of ticagrelor versus prasugrel in patients with ACS and prior MI remain unstudied.

Methods. Patients with ACS planned for an invasive strategy and randomized to ticagrelor or prasugrel in the ISAR-REACT 5 trial were included. The primary endpoint was the composite of one-year all-cause death, myocardial infarction, or stroke; the secondary endpoint was one-year incidence of Bleeding Academic Research Consortium (BARC) type 3 to 5 bleeding.

Results. The study included 4,015 patients (prior MI=631 patients; no prior MI=3,384 patients). As compared with patients without prior MI, the primary endpoint occurred more frequently in patients with prior MI (12.6% vs.7.2%; hazard ratio [HR]=1.78, 95% confidence interval [CI] 1.38-2.29); the secondary endpoint appears to differ little between patients with and without prior MI (5.8% vs. 5.7%; HR=1.02 [0.71-1.45]). With regard to the primary endpoint, ticagrelor vs prasugrel was associated with an HR of 1.62 (95% CI, 1.03-2.55) in patients with prior MI and an HR of 1.28 (95% CI, 0.99-1.65) in patients without prior MI (P_{int}= 0.37). With regard to the secondary safety endpoint, ticagrelor vs prasugrel was associated with an HR of 1.28 (95% CI, 0.56-2.91) in patients with prior MI and an HR of 1.13 (95% CI, 0.82-1.55) in patients without prior MI (P_{int}=0.79).

Conclusions. Patients with ACS and prior MI are at higher risk for recurrent ischemic but not bleeding events. Prior MI does not statistically significantly affect the relative efficacy and safety of ticagrelor versus prasugrel in patients with ACS.

P15

ONE-YEAR OUTCOMES OF IMPELLA-SUPPORTED PCI IN ACUTE CORONARY SYNDROMES: A SINGLE-CENTER EXPERIENCE

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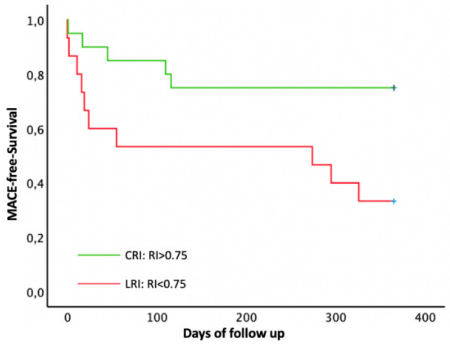
Background. The use of mechanical circulatory support in high-risk percutaneous coronary intervention (HRPCI) has grown over the past decade. We aimed to evaluate the impact of coronary revascularization extent on one-year outcomes of Impella-supported HRPCI in the setting of acute coronary syndrome (ACS).

Methods. We performed a single-center retrospective study including all patients who underwent coronary angiography supported by Impella at our institution. Patients undergoing HRPCI in the setting of ACS with Impella-assistance were identified for the analysis. Revascularization extent was assessed using the British Cardiovascular Intervention Society (BCIS) jeopardy score revascularization index (RI). Patients were classified into two groups according to the completeness of revascularization in high RI (RI >0.75) and low RI (RI <0.75). The primary study endpoint was survival free from major adverse cardiac and cerebrovascular events (MACCE: all-cause death, myocardial infarction, stroke, heart failure hospitalization) at one-year follow-up.

Results. Among fifty patients enrolled in the study, forty ACS patients (mean age 69.2±9 years) were identified for the analysis. At coronary angiography, 76.3% had multivessel disease, and the mean BCIS-$JS_{PRE-PCI}$ score was 10.2±2.1. After Impella-supported PCI, BCIS-$JS_{POST-PCI}$ score was 2.1±2.0 (p<0.01) and RI>0.75 was reached in 89.2% of cases (mean RI 0.8±0.2). In-hospital mortality was 20.5% without a statistical difference between high and low RI (p=0.1). Within 12 months, time-to-MACCE was statistically higher in patients with high RI as compared to low RI (288.2 vs. 189.8 days, p<0.05) (Figure).

Conclusions. Our single-center experience suggests a more extensive revascularization, aiming for a positive impact on outcomes, when a Impella-protected strategy is performed in the setting of acute coronary syndromes.



P16

TRENDS NELLA PRESENTAZIONE E GESTIONE DELLO STEMI NELL'ESPERIENZA DI UN CENTRO HUB COVID

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Introduzione. L'Organizzazione Mondiale della Sanità (OMS) ha dichiarato l'infezione pandemica da SARS 2-COVID 19 l'11 marzo 2020; molti paesi hanno adottato un blocco rigoroso, come ha fatto l'Italia. Durante la prima e la seconda epidemia di COVID-19 (03.2020-02.2021), il numero totale dei ricoveri ospedalieri è diminuito per malattie non correlate al COVID-19 con un conseguente aumento del rischio di diagnosi e cure mancate o ritardate, come dimostrato dalla letteratura soprattutto per pazienti cardiologici. È interessante notare che le persone con rischio cardiovascolare, (fattori/malattie) sono a maggior rischio di sviluppare sintomi pericolosi di COVID-19 e di conseguenza un esito peggiore. Dal gennaio 2021 è iniziata la somministrazione del vaccino alla popolazione, determinando successivamente un graduale ritorno al normale accesso al pronto soccorso.
Metodi. L'Ospedale "Antonio Cardarelli" di Napoli possiede il pronto soccorso più grande del Sud Italia ed è stato identificato dalle Autorità sanitarie della Regione Campania come HUB per l'infarto ST-elevato del miocardio (STEMI)-COVID-19 HUB per l'area metropolitana di Napoli (circa 4 milioni di abitanti): per tale motivo è stata allestita all'interno del padiglione COVID una sala con angiografo polivalente, dedicata alle urgenze per la cardiologia interventistica e radiologia vascolare, con turni specifici e personale dedicato. Il database per l'anno 2019-2021 è stato esplorato per studiare l'impatto della pandemia COVID-19 sull'incidenza, sui tassi e sui risultati dell'intervento coronarico percutaneo (PCI) nel setting dello STEMI prima e dopo la disponibilità del vaccino mRNA. I dati sono stati ricavati negli anni 2019-2021 per studiare le differenze nei ricoveri ospedalieri dei pazienti STEMI-PCI, le caratteristiche demografiche [sesso, età e indice di massa corporea (BMI)], la mortalità intraospedaliera e i valori di laboratorio.
Risultati. La riduzione della mortalità è stata osservata da maggio 2021 a maggio 2022, così come anche un aumento del ritardo dall'inizio dei sintomi al primo contatto medico durante la prima e la seconda fase, probabilmente a causa della paura delle persone dell'infezione da COVID negli ospedali. La disponibilità della vaccinazione ha ridotto la gravità della presentazione clinica, con un minore coinvolgimento polmonare; questo può spiegare gli effetti benefici del vaccino. Il numero di failure delle angioplastiche primarie superiore alla media potrebbe essere correlato alla presentazione tardiva di diverse ore ed, in alcuni casi, anche di giorni.
Conclusioni. L'impatto del COVID sulla gestione dello STEMI e sui risultati della PCI nello STEMI è stato nettamente correlato alla presentazione tardiva ed alla presenza di quadri clinici nettamente peggiori nella prima e nella seconda ondata della pandemia. La creazione di un HUB COVID ha permesso di mettere a punto protocolli di trattamento e di sviluppare un expertise notevole dell'equipe medico-infermieristica dedicata.

Coronary: Acute coronary syndrome, pharmacology

P17

ANTIOXIDANT TREATMENT WITH GLUTATHIONE SODIUM SALT IMMEDIATELY BEFORE AND AFTER PRIMARY PCI FAVORABLY INFLUENCES THE LENGTH OF HOSPITAL STAY: INSIGHTS FROM OF THE GSH2014 TRIAL

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Introduction. Developing strategies aimed to shorten the length of stay (LOS) in patients with STEMI undergoing primary-PCI is a healthcare goal to be pursued. We carried out a sub-analysis of the GSH 2014 trial to assess the potentiality of glutathione sodium salt infusion to impact on LOS.
Methods. 100 consecutive patients with STEMI, aged more than 18 years and referred to the three enrolling centers for primary angioplasty (p-PCI), were asked to participate to the GSH 2014 trial. Fifty patients were randomized to treatment group and fifty to placebo; treatment consisted into an intravenous infusion of glutathione sodium salt over 10 min before p-PCI; after interventions, glutathione was infused at the same doses at 24, 48 and 72 h elapsing time. A stepwise linear multivariate model was built in order to assess independent predictors of LOS.
Results. Subjects receiving infusion of glutathione sodium salt had a significantly lower LOS than subjects receiving placebo (8.6±3 vs 10.8±4 days, p=0.006). At multivariate analysis, the randomization to GSH group was negatively associated with length of stay (β±SEβ -1.64±0.74, cumulative R2 0.43, p=0.03) independently from age, sex, cardiovascular risk factors, number of treated vessels, infarct-related coronary artery (left anterior descending artery as reference) and enrolment hospital.
Conclusions. Results from this sub-analysis support the hypothesis that an early and prolonged glutathione sodium salt administration, as antioxidant therapy to patients with STEMI, may favorably impact on LOS. Further studies with larger sample size are necessary to confirm these data.

P18

ANTITHROMBOTIC THERAPY IN NEW ONSET ATRIAL FIBRILLATION IN OLDEST OLD STEMI PATIENTS

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Introduction. Management of antithrombotic therapy (ATT) in oldest old STEMI patients undergoing percutaneous coronary intervention (PCI) with new onset atrial fibrillation (NOAF) is a clinical conundrum given the gamut of possible ATT strategies and the lack of studies in this population. We sought to evaluate ATT patterns at discharge and 1-year outcomes in our center.
Methods. A retrospective cohort study of all consecutive oldest old (i.e. over 85 years) STEMI patients undergoing primary PCI (pPCI) was performed at our institution. NOAF was defined according to its documentation within 48 hours of STEMI diagnosis. Primary outcomes were 1-year major adverse cardiac or cerebrovascular events (MACCE: composite of death, myocardial infarction, stroke, heart failure hospitalization) and major bleeding events (Bleeding Academic Research Consortium 3 or 5).
Results. Among the 248 patients studied, NOAF was detected in 25.4% of patients (mean patient age 88.9±2.4 years, 56.5% females). At logistic regression analysis, baseline chronic kidney disease (eGFR<60 ml/min) was associated to nAF (OR: 2.38, 95% CI: 1.3 to 4.2; p<0.05).The development of heart failure during hospitalization was statistically higher in patients with nAF compared to patients without nAF (p=0.05). At discharge, triple therapy (TT: 1 anticoagulant and 2 antiplatelet agents) was prescribed in 11.5%, dual antiplatelet therapy (DAPT) in 77% and dual therapy (1 anticoagulant plus 1 antiplatelet agent) in 11.5% of patients. No group differences by ATT strategy were observed in 1-year MACCE (TT 32% vs dual therapy 27.2% vs DAPT 25.7%; p=0.81), or BARC 3,5 (TT 8% vs dual therapy 12.8% vs DAPT 9%; p=0.74).
Conclusions. The high incidence of NOAF in oldest old STEMI patients highlights the need of an adequate calibration between ischaemic and bleeding risk. Despite differences in the choice of ATT strategy, there were no significant differences in clinical outcomes up to 1 year.

P19

REAL-WORLD USE OF CANGRELOR IN CLINICAL PRACTICE: INSIGHTS FROM THE M.O.CA REGISTRY

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Introduction. Dual antiplatelet therapy (DAPT), consisting of the association of acetylsalicylic acid and an inhibitor of the P2Y12 receptor (P2Y12-I), is the cornerstone of the pharmacological treatment of acute coronary syndromes (ACS) and of chronic coronary syndromes (CCS) undergoing percutaneous coronary intervention (PCI). In 2017 the European Medicines Agency approved the use of cangrelor, the first intravenous P2Y12-I. While cangrelor registration trials were conducted in rigid and standardized settings, real-world data are still lacking. We sought to investigate the outcome of patients treated with cangrelor and included in the multicenter observational M.O.Ca Registry.
Methods. We enrolled 241 consecutive patients (196 ACS, 45 CCS) treated with cangrelor during PCI. Drug administration modalities and in-hospital clinical outcomes were evaluated. To generate outcome data comparable with the registration trials, a subpopulation of patients satisfying the CHAMPION Phoenix trial inclusion/exclusion criteria (CHAMPION-like subpopulation) was also created and analyzed.
Results. Cangrelor was administered only in P2Y12-I naïve patients and preferentially in ACS setting, high-risk clinical conditions at presentation, and high bleeding risk patients. Switch to clopidogrel was always done at the end of cangrelor infusion, while ticagrelor or prasugrel were

prevalently given 30 minutes before. In-hospital mortality and GUSTO moderate/severe bleeding were 10% and 2.5% respectively. In the CHAMPION-like subpopulation the occurrence of bleeding and stent thrombosis showed nevertheless to be in line with those of the registration trials (0.6%).
Conclusions. Cangrelor was predominantly used in ACS patients with modalities substantially in accord with the label indications. Poor clinical outcomes were only apparently disappointing because of the prevalent use of the drug in highly challenging clinical settings; nevertheless the rate of bleeding and stent thrombosis were consistent with the randomized trials if analyzed in a subpopulation of comparable risk profile.

P20

INCIDENCE AND CLINICAL IMPACT OF BLEEDING EVENTS IN A MULTICENTER COHORT OF HIGH BLEEDING RISK OLDEST OLD STEMI PATIENTS

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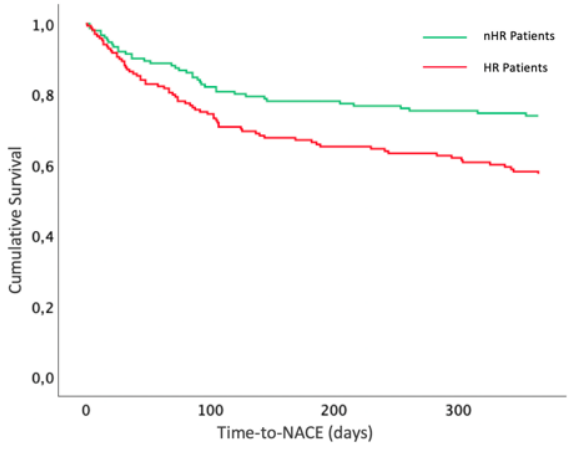
Introduction. The balance between thrombotic and bleeding events after myocardial revascularization is of paramount importance. Patients with higher bleeding risk are at high risk for complications. Age and frailty are also major risk factors for complications. We sought to evaluate the incidence of major bleeding events (BE) and their impact on prognosis in a real life oldest old (i.e. >85 years) ST elevation myocardial infarction (STEMI) patients population.
Methods. We evaluated all consecutive oldest old STEMI patients hospitalized in two hub-centers between January 2010 and June 2021. Patients were stratified according to Academic Research Consortium for High Bleeding Risk (ARC-HBR) in high bleeding risk (HR) and non-HR (nHR) patients. BE were defined according to the Bleeding Academic Research Consortium (BARC) criteria, BARC 3 or 5. Patients were also divided in groups according to anti-thrombotic therapy (AT) regimens at discharge: single antiplatelet therapy (SAPT), dual antiplatelet therapy (DAPT) or triple therapy (DAPT plus oral anticoagulation) (TT). Net adverse clinical event (NACE) was defined as a composite of all-cause mortality, myocardial infarction, stroke, or major bleeding. Follow-up data were determined from local clinical records during a twelve-months period.
Results. 340 oldest old (mean age 88.6 ± 2.9 years, 52.6% female) STEMI patients were eligible for the analysis. 161 patients (47.4%) were categorized as nHR and 179 patients (52.6%) as HR. AT regimens at discharge were: 28 patients with SAPT (8.2%), 276 with DAPT (81.2%) and 36 with TT (10.6%). The overall incidence of BE was 4.6% within 12 months, without difference between nHR and HR patients (3.0% vs 5.9%, p=0.16). No BE were found in the SAPT group while the incidence of BE in the HR group was not statistically different between the DAPT and TT regimens (11.2% vs 9.5%; p=0.8). The incidence of NACE was statistically higher in HR than nHR patients (40.9% vs 25.5%, p<0.01) at 1-year. In addition, time-to-NACE was statistically inferior in HR group than nHR group (256.2 days vs 294.2 days, p<0.01) (Figure).
Conclusions. Our oldest old STEMI population was characterized by a large proportion of HR patients according to ARC-HBR criteria. This population experienced a higher rate of NACE in a shorter time when compared to nHR patients in the same age group.



P21

DUAL ANTIPLATELET THERAPY IN ELDERLY PATIENTS WITH STEMI OR VERY HIGH RISK NSTEMI: A RETROSPECTIVE STUDY COMPARING TICAGRELOR VS CLOPIDOGREL

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Introduction. Elderly patients with acute coronary syndrome represent a growing population. The major problem in this population is the balancing of ischemic and bleeding risk. There are poor data from randomized clinical trials on the treatment of acute coronary syndrome in this population. We aim to analyze the best therapeutic strategy in this population.
Methods. We performed retrospective study at the Cardiology Department, San Carlo Hospital, Potenza. 181 patients with an age ≥75 years with STEMI (ST-elevation myocardial infarction) or very high risk NSTEMI (non ST-elevation myocardial infarction) were selected from 1 January 2018 to 31 December 2019. Exclusion criteria were anticoagulants therapy, end stage renal disease, cancer in progress and cardiogenic shock at clinical presentation. 43 patients had starter dual antiplatelet therapy with acetylsalicylic acid and clopidogrel and 76 with acetylsalicylic acid and ticagrelor. We aimed to evaluate at 12-month follow-up the composite endpoints of ischemic stroke and reinfarction, stroke, bleeding events and death.
Results. At 12-month follow-up, 15 patients died (all-cause mortality of 12.6%). There were 5 strokes (4% of population), 3 in the Clopidogrel group (6.9%) and 2 in the Ticagrelor group (2.6%) without a statistically significant difference (p=0.7463). The composite endpoint of ischemic events, stroke and reinfarction occurred in 12 patients, 6 in each group, (13.9% in the Clopidogrel group and 7.9% in the Ticagrelor group) but this difference, although indicative, is not statistically significant (p=0.2956). The only statistically significant difference occurred for BARC (Bleeding Academic Research Consortium) 2, 3 or 5 bleeding events with a significantly less events in the Clopidogrel group (4.6%) than in the Ticagrelor group (18.4%) (p=0.0345).
Conclusions. Elderly patients with STEMI or high-risk NSTEMI represent a group of patients with high ischemic risk but also high bleeding risk. The use of clopidogrel in combination with acetylsalicylic acid should be considered to reduce bleeding events without increasing ischemic events.

Table. 12-month follow-up events in two study groups.

Variable	Clopidogrel (n=43)		Ticagrelor (n=76)		p-value
	n	%	n	%	
Stroke	3	6.9	2	2.6	0.7463
Ischemic stroke and myocardial reinfarction	6	13.9	6	7.9	0.2956
Bleeding events	2	4.6	14	18.4	0.0345
Death	4	9.3	11	14.5	0.4185

P22

ADENOSINE AS ADJUNCTIVE THERAPY IN PATIENTS WITH ACUTE CORONARY SYNDROME: WHEN LESS IS MORE. UPDATED META-ANALYSIS OF 26 RANDOMIZED CONTROLLED TRIALS

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Background. A considerable number of patients do not achieve complete myocardial reperfusion despite successful angioplasty in the context of acute coronary syndrome (ACS). Adenosine is one of the therapeutic options taken into account in several randomized controlled trials (RCTs) to minimize reperfusion injury, with conflicting results. Aim of the present study was to evaluate all RCTs, comparing intracoronary or intravenous adenosine versus placebo, as adjunctive therapy in patients with ACS undergoing percutaneous coronary intervention (PCI) or thrombolysis.
Methods. PubMed and Scopus electronic databases were scanned for eligible studies up to June 5th 2022. The meta-analysis included 26 randomized controlled trials (RCTs) with a total of 5843 patients involved. Primary outcomes consisted in the rate of clinical events and comprehended the following: major adverse cardiovascular outcomes (MACE), heart failure (HF), all-cause-death and non-fatal myocardial infarction (MI). The rate of advanced atrioventricular blocks, ventricular fibrillation /sustained ventricular tachycardia, hypotension and bradycardia were considered as safety endpoints. Several sensitivity analysis and meta regressions were conducted to evaluate the role of different procedural and non procedural factors eventually affecting the results, as mean ischemic time, adenosine administration route, dosage or timing and follow up. Finally, a sub-analysis was conducted only including RCTs analyzing patients with ST-segment elevation myocardial infarction (STEMI).

Results. On pooled analysis, adenosine did not confer any significant clinical benefits in terms of reduction of MACE (RR 0.91, CI 0.80-1.04, p 0.16), all-cause-death (RR 0.90, CI0.74-1.09, p=0.28), re-MI (RR 0.70, CI 0.60-1.2, p=0.44) and HF (RR 0.94 CI 0.77-1.16, p=0.59). Adenosine compared to placebo was associated with a significant reduction of post-procedural no-reflow parameters such a,s Myocardial Blush Grade (MBG) 0-1 (RR 0.69, CI 0.53-0.90, p=0.01) and Thrombolysis In Myocardial Infarction (TIMI) flow grade 0-2 (RR 0.67, CI 0.53-0.85, p=0.00). However, adenosine did not increase EF (ES 0.22, CI -0.04, 0.47; p=0.10) or decrease infarct size (ES -0.09, CI -0.35, 0.18; p=0.53). Sub-analyses of STEMI patients showed similar results for both primary and secondary outcomes. Sensitivity analysis did not show any benefit of adenosine in any primary outcome. Furthermore, adenosine therapy was associated with a higher rate of adverse events, including advanced atrioventricular blocks (RR 2.76, CI 1.58-4.82, p=0.00), and bradycardia (RR 1.7, CI 1.14-2.62, p=0.00). In studies with mean ischemic time >3 hours, higher rate of ventricular fibrillation/sustained ventricular tachycardia was observed (RR 1.66, CI 1.14-2.42).

Conclusion. This is the most up-to-date meta-analysis summarizing the available evidence on adenosine safety and efficacy in the context of ACS. Adenosine does not provide any clinical improvement and, despite increasing procedural surrogate parameters of myocardial perfusion as TIMI flow and MBG, the rate of adverse events is not negligible. One interesting original finding of the present study is that higher ischemic time-to-perfusion seems to increase the rate adenosine-triggered ventricular arrhythmias, suggesting that higher myocardial ischemic damage may represent a substrate for adenosine arrhythmogenic effects.

P23

INTRAVENOUS ANTIPLATELET THERAPY WITH CANGRELOR VS. TIROFIBAN IN PATIENTS WITH ST-ELEVATION MYOCARDIAL INFARCTION UNDERGOING PRIMARY PERCUTANEOUS CORONARY INTERVENTION

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Background. Intravenous antiplatelet drugs provide rapid and sustained inhibition of platelet aggregation and can mitigate the ischemic risk of patients with ST-elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (pPCI). However, there are few real-world studies comparing cangrelor to tirofiban as an adjunctive antiplatelet therapy in this patient population. The aim of this study was to evaluate the effectiveness and the safety of cangrelor compared to tirofiban in a real-world population of STEMI patients undergoing pPCI.

Methods. This was a prospective, multicenter, observational study including consecutive STEMI patients who received either cangrelor or tirofiban during pPCI. The study was conducted in six Italian high-volume pPCI centers from January 2020 to January 2022. The study population was divided into two groups according the antiplatelet treatment received (cangrelor or tirofiban). The primary study outcome was impaired myocardial revascularization assessed by post-procedural Thrombolysis in Myocardial Infarction (TIMI) flow grade <3. The secondary outcome measures were major bleeding, defined as Bleeding Academic Research Consortium (BARC) type 3 or 5, and all-cause mortality during the hospitalization. The propensity score technique was used to account for potential selection bias in treatment assignment.

Results. A total of 478 STEMI patients received intravenous antiplatelet therapy during pPCI. Of them, 16 patients were excluded since they received both cangrelor and tirofiban as bailout strategy. Thus, the final study population included 462 patients (mean age 63.9±11.8 years; 79.7% males): 223 patients received cangrelor (48.3%), and 239 tirofiban (51.7%). Patients treated with tirofiban had higher prevalence of prior myocardial infarction (p=0.016) and prior PCI (p=0.048) than patients receiving cangrelor (Table 1); also, they showed higher SYNTAX score (p=0.038) than patients receiving cangrelor, and a higher proportion of stent thrombosis as culprit lesion (p=0.047). Conversely, patients treated with cangrelor had worse clinical status at admission according to the Killip class (p<0.001), and underwent more frequently pPCI via femoral access. Post-procedural TIMI flow <3 was reported in 114 (24.7%) patients. At propensity score adjusted regression analysis, the use of cangrelor was associated with a lower probability of post-procedural TIMI flow <3 (adjusted OR: 0.530; 95% CI 0.313-0.900; p=0.019) than tirofiban. Major bleeding and all-cause death occurred in 28 (6.1%) and 19 (4.1%) patients. There was no difference in the risk of major bleeding (adjusted OR: 1.626; 95% CI 0.618-4.279; p=0.324) and death (adjusted OR: 2.724; 95% CI 0.719-10.318; p=0.140) between groups.

Conclusions. In this real-world population of STEMI patients undergoing pPCI, periprocedural use of cangrelor was associated with improved myocardial reperfusion compared to tirofiban, but with no differences in terms of major bleeding or death during the hospitalization. Large randomized studies are needed to confirm our preliminary observational finding.

Table 1.

		Cangrelor (N=223)	Tirofiban (N=239)	p
Age, years		64.2±12.1	63.7±11.6	0.449
Male sex, N(%)		180 (8.7)	188 (78.7)	0.583
Diabetes, N(%)		45 (20.2)	51 (21.3)	0.759
Hypertension, N(%)		131 (58.7)	154 (64.4%)	0.209
Dyslipidemia, N(%)		103 (46.2)	132 (55.2)	0.052
Obesity, N (%)		49 (22.0)	53 (22.2)	0.958
Prior MI, N(%)		19 (8.5)	38 (15.9)	**0.016**
Prior PCI, N(%)		24 (10.8)	41 (17.2)	**0.048**
Prior CABG, N (%)		5 (2.2)	4 (1.7)	0.744
Active malignancy, N (%)		4 (1.8)	3 (1.3)	0.660
eGFR, mL/min		82.2±20.1	79.9±22.0	0.348
LVEF at admission, %		47.7±10.2	47.7±8.5	0.087
Haemoglobin, g/dL		14.4±1.7	14.5±1.8	0.807
Killip class, N (%)	I	174 (78.0)	175 (73.2)	**<0.001**
	II	11 (4.9)	37 (15.5)	
	III	19 (8.5)	13 (5.4)	
	IV	19 (8.5)	14 (5.9)	
Procedural characteristics				
Arterial access, N (%)	Radial	180 (8.7)	212 (88.7)	**0.017**
	Femoral	43 (19.3)	27 (11.3)	
Treated vessel, N (%)	LAD	125 (56.1)	120 (50.2)	0.208
	LCx	31 (13.9)	42 (17.6)	0.280
	RCA	89 (39.9)	98 (41.0)	0.811
	LM	15 (6.7)	8 (3.3)	0.095
	Graft	5 (2.2)	4 (1.7)	0.659
Number of diseased vessels		1.6±0.8	1.7±0.8	0.494
SYNTAX score		14.1±8.5	16.1±9.2	**0.038**
TIMI flow before PCI, N (%)	0	138 (61.9)	163 (68.2)	0.132
	1	41 (18.4)	28 (11.7)	
	2	31 (13.9)	39 (16.3)	
	3	13 (5.8)	9 (3.8)	
Minimum stent diameter, mm		3.1±0.6	3.0±0.5	0.063
Total stent length, mm		39.8±23.6	37.9±23.4	0.608
No. of stents/procedure		1.5±0.8	1.4±1.0	0.711
PCI of bifurcation, N(%)		44 (19.9)	43 (18.0)	0.600
PCI of restenotic lesion, N(%)		4 (1.8)	3 (1.3)	0.627
PCI of stent thrombosis, (%)		12 (5.4)	25 (10.5)	**0.047**
TIMI flow after PCI, N (%)	0	5 (2.2)	6 (2.5)	**<0.001**
	1	4 (1.8)	13 (5.4)	
	2	26 (11.7)	60 (25.1)	
	3	188 (84.3)	160 (66.9)	

CABG, coronary artery bypass graft; eGFR, estimated glomerular filtration rate; LAD, left anterior descending; LCx, left circumflex; LM, left main; LVEF, left ventricular ejection fraction; MI, myocardial infarction; PCI, percutaneous coronary intervention; RCA, right coronary artery; TIMI; Thrombolysis in Myocardial Infarction.

Coronary: Chronic coronary syndrome, general

P24

MICROVASCULAR COMPLICATIONS PREDICT GOOD CORONARY COLLATERALIZATION IN TYPE 2 DIABETES MELLITUS PATIENTS WITH CORONARY ARTERY CHRONIC TOTAL OCCLUSION

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Introduction. Coronary collateral (CC) vessel development appears be protective with regard to ventricular function, adverse cardiovascular events and survival in patients with coronary chronic total occlusion (CTO). The influence of type 2 diabetes mellitus (T2DM) on CC growth has been controversial. In particular, the specific role of diabetic microvascular complications (DMC) in determining CC maturation has not been elucidated. The aim of the study was to investigate whether patients with DMC (DMC+) presented differences in the angiographically visible CC vessels presence and grading compared to those without DMC (DMC-).

Methods. We prospectively enrolled consecutive T2DM patients without previous CV history, undergoing a clinically indicated coronary angiography for chronic coronary syndrome (CCS) and angiographic evidence of at least one CTO. Patients were subdivided into two study groups: DMC+ vs DMC- subjects. The presence and the grading of angiographically visible CC development from the patent vessels to the

occluded artery was evaluated using the classification developed by Rentrop et al.
Results. We enrolled in total 157 T2DM patients (mean age 68.6±9.8 years; 120 [76.4%] men). DMC+ patients (75 [47.8%]) had a higher prevalence of CC (69 [92.0%] vs. 62 [75.6%], p=0.06) and well-developed CC vessels (55 (73.3%) vs. 39 (47.6%), p=0.001] compared to those without. Furthermore, the presence of at least one DMC was an independent predictor of both angiographic visible CC and well-developed CC vessels.
Conclusions. Among T2DM patients hospitalized for CCS and with angiographic evidence of at least one coronary CTO, the presence of DMC predicts higher CC vessel development, thus helping to stratify diabetic patients and moving towards tailored therapy.

Coronary: chronic coronary syndrome, PCI

P25

EFFICACIA E SICUREZZA DELLA LITOTRISSIA CORONARICA NEL MONDO REALE: REGISTRO RETROSPETTIVO ROLLING STONE

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Introduzione e obiettivi. La litotrissia intracoronarica (IVL, Shockwave) è una tecnica utilizzata per la frattura del calcio coronarico profondo mediante dilatazione di uno specifico pallone in associazione all'emissione di energia meccanica pulsatile nel sito di lesione.
La sicurezza dello Shockwave nel mondo reale rimane tuttavia ancora incerta e gli effetti della combinazione con altri device sono sconosciuti, specialmente in contesti ad alto rischio (sindromi coronariche acute).
Metodi. Abbiamo eseguito pertanto uno studio multicentrico retrospettivo che ha arruolato pazienti sottoposti a litotrissia coronarica. L'endpoint primario era rappresentato da un efficace espansione dello stent con una percentuale di stenosi residua <20%; endpoint secondari erano le complicanze angiografiche maggiori e i MACE durante l'ospedalizzazione, a 30 giorni e a 6 mesi. L'intera coorte di pazienti è stata analizzata considerando le tempistiche di utilizzo della IVL: prima dell'impianto dello stent (Gruppo 1), come strategia di salvataggio negli stent sottoespansi (Gruppo 2), nelle restenosi intrastent (Gruppo 3).
Risultati. Questo registro multicentrico retrospettivo comprende 431 pazienti e 475 lesioni trattate con IVL, tra Gennaio 2019 e Novembre 2021, in 21 laboratori di emodinamica ad alto volume di Italia e Spagna. L'età media della popolazione era di 73 ± 9 anni, il 77% uomini, ipertesi (81%), con diabete mellito (43,4%), dislipidemia (69%), con storia di pregresso infarto miocardico (34,5%). Tra i pazienti, 162 (36.8%) presentavano stenosi critiche in corrispondenza di una biforcazione coronarica, 229 (53%) si sono presentati con una sindrome coronarica acuta di cui 27 con infarto del miocardio con sopraslivellamento del tratto ST (STEMI). Si è ricorso ad un approccio ibrido IVL e aterectomia rotazionale (Rotatripsy) in 40 pazienti (9%). Lo shockwave è stato pianificato prima dell'impianto degli stent (Gruppo 1) in 370 pazienti (78%), come strategia di salvataggio (Gruppo 2) in 62 pazienti (13%) e come trattamento delle stenosi intrastent (Gruppo 3) in 43 pazienti (9%). L'endopoint primario di stenosi residua <20% è stato raggiunto nel 92% dei pazienti, rispettivamente 93.7% vs 86,1% vs 95.6% per Gruppo 1 vs Gruppo 2 vs Gruppo 3. Abbiamo inoltre rilevato una maggiore percentuale di complicanze angiografiche maggiori nel gruppo 3 (12.5%), rispetto al gruppo 1 (5%) e al gruppo 2 (2%). Tra gli endpoint secondari i MACE intraricovero, a 30 giorni e a 6 mesi sono stati rispettivamente 1.1%, 1.6% e 6,1%. Nel sottogruppo dei pazienti con STEMI, l'endpoint primario di stenosi <20% è stato raggiunto in 23 pazienti (85%); si è verificata una sola dissezione coronarica di tipo A e non sono stati registrati eventi MACE intraricovero e al follow-up a 30 giorni e sei mesi.
Conclusioni. La litotrissia intravascolare è una tecnica efficace e sicura per il trattamento di lesioni coronariche calcifiche in pazienti complessi nel mondo reale. È associata inoltre a un basso rischio di complicanze intraprocedurali e MACE durante l'angioplastica primaria in corso di infarto del miocardio con sopraslivellamento del tratto ST (STEMI).

P26

RELATIONSHIP BETWEEN THE COMPLETENESS OF REVASCULARIZATION AND MYOCARDIAL INJURY IN PATIENTS TREATED WITH PERCUTANEOUS CORONARY INTERVENTION

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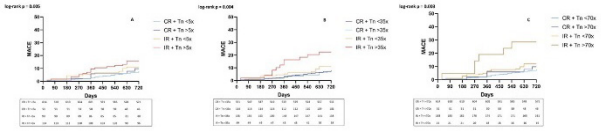
Background. Clinical outcomes of patients suffering periprocedural myocardial injury and undergoing incomplete revascularization (IR) following percutaneous coronary intervention (PCI) has never been investigated.
Objective. To investigate the relationship between different thresholds of post-PCI cardiac troponin (cTn) elevation and revascularization completeness in determining long-term clinical outcomes.
Methods. Patients were stratified in tertiles according to preprocedural SYNTAX score (SS) (low: 0-6; medium: >6-11; high: >11) and residual SS (low: 0-4; medium: >4-8; high: >8). IR was defined by a rSS value >4. Three thresholds of myocardial injury were pre-specified: 5×, 35× and 70× 99th percentile upper reference limit (URL) increase of baseline cTn. Primary outcome was a composite of major adverse cardiac events (MACE) at two years of follow-up.
Results. 1061 patients undergoing PCI for stable coronary artery disease were enrolled. IR occurred in 249 (23.4%) and major myocardial injury in 540 (50.9%). Patients belonging to the highest tertile of SS showed an increased risk of experiencing IR and periprocedural myocardial injury. Two-year follow-up was available in 869. At multi-variate Cox's regression analysis, patients undergoing IR + cTn >35×URL and IR + cTn >70×URL showed an increased risk of MACE [HR 2.40; 95% CI (1.10-5.21) and HR 3.14; 95% CI (1.25-7.89), respectively].



	Univariate HR-95% CI	p-value	Mulvariate HR-95% CI; p-value*	Mulvariate HR-95% CI; p-value**	Mulvariate HR-95% CI; p-value***
Age, years	**1.03 (1.00-1.05)**	**0.013**	**1.02 (1.00-1.05); 0.023**	**1.02 (1.00-1.05); 0.037**	**1.02 (1.00-1.05); 0.033**
Male sex	1.22 (0.73-2.05)	0.435			
Hypertension	1.42 (0.68-2.95)	0.342			
Hypercholesterolemia	1.63 (0.65-3.55)	0.213			
Diabetes	1.46 (0.94-2.28)	0.091			
Insulin-dependence	1.74 (0.92-3.29)	0.087			
Current smoking	0.58 (0.30-1.12)	0.109			
CKD	1.52 (0.85-2.71)	0.151			
Previous PCI	1.09 (0.70-1.70)	0.672			
Previous MI	0.87 (0.52-1.44)	0.604			
Previous CABG	1.30 (0.67-2.52)	0.436			
Previous PMK	1.73 (0.75-3.99)	0.192			
LVEF	0.99 (0.97-1.01)	0.630			
LM disease	**3.23 (1.61-6.40)**	**0.001**	2.10 (0.99-4.45); 0.052	**2.33 (1.09-4.95); 0.028**	**2.18 (1.03-4.63); 0.041**
Three vessels disease	**1.75 (1.13-2.72)**	**0.011**	**2.12 (1.11-4.02); 0.021**	**2.12 (1.12-4.02); 0.020**	**2.20 (1.15-4.19); 0.016**
Median SS	**1.03 (1.01-1.05)**	**0.003**	0.97 (0.93-1.01); 0.217	0.97 (0.93-1.01);0.182	0.97 (0.93-1.01); 0.240
SS low (0-6)	**0.54 (0.33-0.89)**	**0.016**	0.69 (0.38-1.26); 0.230/	0.69 (0.38-1.26); 0.226	0.69 (0.38-1.25); 0.299
SS medium (>6-11)	0.93 (0.57-1.50)	0.770			
SS high (>11)	**1.87 (1.21-2.90)**	**0.005**	0.96 (0.49-1.89); 0.918	0.91 (0.46-1.82); 0.803	0.93 (0.47-1.85); 0.853
Failed revascularization	**1.28 (1.08-1.51)**	**0.004**	**1.20 (1.00-1.45); 0.042**	**1.21 (1.01-1.45); 0.036**	**1.20 (1.00-1.44); 0.048**
Total DES diameter	0.97 (0.89-1.05)	0.486			
Total DES length	0.99 (0.98-1.00)	0.613			
CR	**0.55 (0.35-0.87)**	**0.012**	1.23 (0.54-2.81); 0.612	1.17 (0.57-2.38); 0.654	1.08 (0.55-2.12); 0.816
cTn >5×URL	1.32 (0.85-2.05)	0.210			
cTn >35×URL	1.45 (0.87-2.40)	0.148			
cTn >70×URL	1.82 (0.96-3.43)	0.065			
Type 4a MI	1.74 (0.92-3.29)	0.087			
IR + type 4a MI	1.83 (0.58-5.82)	0.301			
IR + cTn >5×URL*	**1.72 (1.07-2.78)**	**0.025**	1.64 (0.75-3.58); 0.212		
IR + cTn >35×URL**	**2.93 (1.54-5.52)**	**0.001**		**2.40 (1.10-5.21); 0.026**	
IR + cTn >70×URL***	**3.80 (1.65-8.73)**	**0.002**			**3.14 (1.25-7.89); 0.015**

Conclusions. Periprocedural myocardial injury is critically associated with MACE at two-year follow-up in patient treated with PCI who achieve IR. Despite conflicting evidence exists regarding the influence of periprocedural myocardial injury on clinical outcomes, patients undergoing IR seem to represent a high-risk subgroup.

P27

INTRAVASCULAR LITHOTRIPSY FOR THE TREATMENT OF UNDEREXPANDED STENTS: A META-ANALYSIS

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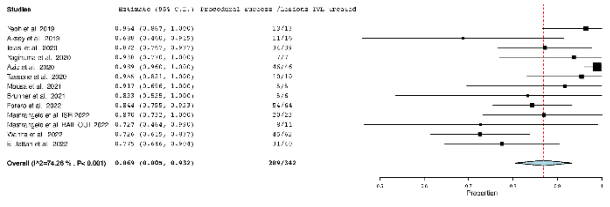
Introduction. Calcified coronary plaque (CCP) represents a challenging scenario for interventional cardiologist. Stent underexpansion (SU), often associated with CCP, can predispose to stent thrombosis and in-stent restenosis. To date, SU with heavily CCP can be addressed by means of scoring/cutting balloons, very-high/high pressure non-compliant balloons, off-label rotational/orbital atherectomy and intravascular lithotripsy (IVL). In this meta-analysis we investigate the success rate of IVL for the treatment of SU due to CCP.

Methods. Studies and case-based experiences reporting on the use of IVL strategy for treatment of SU were included. The primary outcome was IVL strategy success, defined as adequate expansion of the underexpanded stent. Metanalysis was performed for the main focuses to calculate proportions of procedural success rates with corresponding 95% confidence intervals (CI). Random effects models weighted by inverse variance were used because of clinical heterogeneity.

Results. Our study included 13 studies with 354 patients. Mean age was 71.27 years (95% CI: 64.97-73.06) and 74% were male. The mean follow-up time was 2.56 months (95% CI: 1–15.3). Strategy success was seen in 86.90% patients (95% CI: 80.5–93.2) (Figure 3). The mean Minimal Stent Area (MSA) was reported in 6 studies, pre-IVL value was 3.42 mm2 (95% CI: 3.02–3.81) and post-IVL value was 6.93 mm^2 (95% CI: 6.45–7.40). The mean diameter stenosis (%) was reported in 7 studies, pre-IVL value was 69.44% (95% CI: 60.66–78.22) and post-IVL value was 14.55% (95% CI: 11.11–17.99). The rate of intraprocedural complications was 1.6% (95% CI: 0.3-2.9).

Conclusions. The “stent-through” IVL plaque modification technique is a safe tool to treat SU due to CCP, with high success rate and very low incidence of complications.



Coronary: Chronic coronary syndrome, pharmacology

P28

PREVENTION OF CONTRAST-INDUCED NEPHROPATHY IN DIABETIC PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION: ROLE OF NEW ANTIDIABETIC DRUGS

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Background. Contrast-induced acute kidney injury (CI-AKI) is a complication associated with high morbidity and mortality after percutaneous coronary intervention (PCI). Its incidence is highest in patients with type II diabetes mellitus (DM), particularly those with poor glycemic control and pre-existing chronic kidney disease (CKD). To date, the only strategy for preventing CI-AKI is hydration with crystalloid solutions and high-dose statins. Several randomized controlled trials have shown a clear benefit of new antidiabetic drugs such as GLP-1 analogues, DPP-4 inhibitors, and SGLT-2 inhibitors in reducing chronic kidney damage. However, no study has evaluated their potential role in the prevention of CI-AKI in the PCI setting. This study aims to evaluate the role of new antidiabetic drugs in developing CI-AKI in a cohort of patients with type II diabetes mellitus undergoing PCI.

Methods. The study enrolled 408 patients undergoing PCI and divided them into three groups: 136 with type 2 DM treated with new-antidiabetic drugs, 136 with type 2 DM treated with standard antidiabetic therapy, and 136 non-diabetic patients. Patients were evaluated for serum creatinine (measured at the time of hospitalization, 24- and 48-hour post-PCI), glomerular filtration rate (eGFR) estimated using the Cockcroft-Gault equation before and after the procedure, and markers of myocardial damage at the admission and 24 hours after PCI. CI-AKI was defined as an increase in serum creatinine levels ≥ 0.3 mg/dL (26.5 µmol/L) or greater than 25% of the base value, which occurred 24-48 hours after administration of the contrast medium.

Results. It was observed a significant increase in delta creatinine between pre and post PCI in the group treated with standard antidiabetic therapy (0.91±0.22 mg/dL vs 0.94 ± 0.23 mg/dL, p= 0.008), but not in the group treated with new-antidiabetic drugs (1.01 ± 0.33 mg/dL vs 1.01 ± 0.35 mg/dL, p=0.945), which showed similar results compared with non-diabetic patients (1.01 ± 0.30 mg/dL vs 0.99 ± 0.31 mg/dL, p=0.020). The patients receiving SGLT-2 inhibitors presented pre-PCI mean creatinine levels significantly lower (0.83 ± 0.16 mg/dL) than those treated with DPP-4 inhibitors (1.04 ± 0.34 mg/dL) and GLP-1 analogues (1.05 ± 0.39 mg/dL) (p for trend = 0.009). However, the delta creatinine (pre and post PCI) between the three pharmacological classes was similar (p=0.881). The incidence of CI-AKI, defined as an increase >25% of serum creatinine 24-48 hours after contrast medium administration, was 9.6% in patients treated with standard antidiabetic therapy, 4.4% in patients treated with new-antidiabetic drugs and 3.7% in non-diabetic patients (p for trend = 0.080). The incidence of CI-AKI, defined as an increase of serum creatinine 24-48 hours after contrast medium administration ≥0.3 mg/dL, was 5.1% in the standard antidiabetic therapy group, 3.8% in the new antidiabetic drugs group and 2.9% in the non-diabetic patients (p for trend = 0.911).

Conclusions. The study demonstrated a lower CI-AKI incidence in diabetic patients undergoing PCI with new antidiabetic drugs (GLP-1 analogues, DPP-4 inhibitors, SGLT-2 inhibitors) than those receiving standard antidiabetic drugs (metformin, sulfonylureas, thiazolidinediones, insulin). Given the prognostic value of CI-AKI and the current lack of effective treatments, the results of this study underline a possible protective role of new antidiabetic drugs and a new potential opportunity for the prevention of this complication. Further studies are needed to confirm these preliminary results.

P29

CIRCADIAN VARIATIONS OF PLATELET REACTIVITY ON CLOPIDOGREL IN PATIENTS TREATED WITH ELECTIVE PERCUTANEOUS CORONARY INTERVENTION

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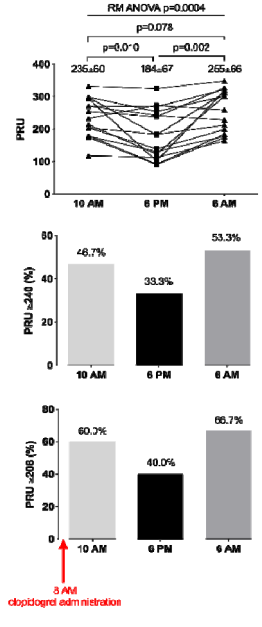
Background. The potential diurnal variations of platelet reactivity in patients on clopidogrel treated with elective percutaneous coronary intervention (PCI) for stable coronary artery disease (CAD) are currently unknown.

Methods. We prospectively enrolled 15 patients with stable CAD treated PCI and on clopidogrel therapy for at least eight days. All patients received their maintenance 75-mg clopidogrel dose at 8AM. Platelet reactivity was assessed with the Verifynow P2Y12 assay at three different time points (10 AM, 6 PM and 6 AM). Platelet reactivity is expressed as P2Y12 reaction units (PRU) and PRU thresholds ≥208 and ≥240 were used to define high platelet reactivity (HPR).

Results. A significant heterogeneity in diurnal levels of platelet reactivity was found (p=0.0004), with a peak occurring at the 6 AM assessment. In addition, at the 6 AM evaluation patients showed the highest prevalence of HPR (53.3% of patients with PRU ≥240, 66.7% of patients with PRU ≥208).



Conclusions. Platelet reactivity in patients with stable CAD treated with PCI and taking clopidogrel in the morning follows a circadian rhythm, thus suggesting that platelet inhibition may not be constant and sufficient throughout the day. Whether an evening or a *bis in die* administration of clopidogrel may result in a constant and more reliable antiplatelet inhibition, should be investigated in dedicated studies.

Coronary: DEB

P30

IMPACT OF DIABETES MELLITUS ON THE PROCEDURAL AND CLINICAL OUTCOMES AMONG PATIENTS TREATED WITH DRUG-COATED BALLOONS: A REAL-WORLD MULTICENTER REGISTRY

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Background. Diabetes mellitus (DM) has been associated with a higher rate of PCI failure, even with newer generation drug eluting stents (DES), due to more complex coronary lesions and more aggressive in-stent restenosis. Drug coated balloons (DCB) have emerged for the management of in-stent restenosis and particular anatomical subsets, as small vessels, providing the advantage of preserving coronary physiology and avoiding the release of "pro-inflammatory" material, with potential greater advantages among patients with diabetes. However, few studies have evaluated so far the procedural and clinical outcomes of DCBs in the settings of DM.

Aims. To provide a real-world analysis of the impact of DM among patients treated with DCB for any type of lesion and included in a comprehensive multicenter registry.

Methods. We retrospectively included consecutive patients undergoing coronary angiography and PCI with DCB for in-stent restenosis or de novo lesions in 3 centers. Quantitative parameters for coronary lesions were calculated by an automatic edge-detection system. The primary study endpoint was the occurrence of major cardiovascular events (MACE, a composite of all-cause death, Myocardial Infarction and target vessel revascularization) at the longest available follow-up. Secondary endpoints were the individual components of the primary endpoint, target lesion failure (TLF, defined as any evidence of significant stenosis of the target lesion, treated with or without revascularization) or all-cause death.

Results. Out of 352 patients treated with DCB, 138 (39.2%) were diabetic and 69.9% were treated for in-stent restenosis. Median follow-up was 511 days. Diabetic patients displayed higher rates of hypertension, (p=0.03), renal failure (p=0.04), higher use of statins (p=0.02) and diuretics (p<0.001) and lower ejection fraction, hemoglobin (p=0.001 respectively) and HDL cholesterol (p=0.02). LDL cholesterol was comparable. No angiographic or procedural difference was observed, but for a higher prevalence of 3-vessel disease among diabetics (p=0.05). Acute procedural success was achieved in 94.9% of patients with DM vs 99.1% of patients without DM (p=0.03). Among the 330 patients (93.8%) with follow-up available, MACE occurred in 22.4% of the patients with no difference according to diabetic status (21.4% vs 23.1%, adjusted HR[95%CI]=0.80[0.47-1.36], p=0.40). Similar outcomes were observed also in terms of TLF (20.6% vs 19.3%, adjusted HR[95%CI]=1.07[0.62-1.83], p=0.81), with no difference for both restenotic or de-novo lesions. On the contrary, lower mortality was observed among diabetics (2.3% vs 6.1%; adjusted HR[95%CI]=0.24 [0.06-0.90], p=0.03) with no difference in cardiovascular mortality.

Conclusion. The present registry shows that, among patients undergoing PCI for in-stent restenosis or de novo lesions in a real-world large-scale registry, diabetes mellitus is associated with a more complex cardiovascular risk profile and lower acute procedural success. However, at long-term follow-up, DM was associated with similar clinical outcomes and even reduced mortality.

P31

PROCEDURAL AND 1-YEAR OUTCOMES FOLLOWING DRUG-ELUTING STENT AND DRUG-COATED BALLOON COMBINATION FOR THE TREATMENT OF DE NOVO DIFFUSE CORONARY ARTERY DISEASE: THE HYPER STUDY

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Introduction. De novo diffuse coronary artery disease (CAD) is a challenging scenario in interventional cardiology. At present, there are limited treatment option, beside stent implantation. In this context, a hybrid approach, combining drug-coated balloon (DCB) and drug-eluting stent (DES) might be an interesting, alternative strategy. Aim of the study was to evaluate the safety and efficacy of a hybrid approach in addressing percutaneous treatment of de novo diffuse CAD.

Methods. This was a prospective, multicenter registry including patients affected by diffuse de novo CAD and treated with a hybrid approach from April 2019 to December 2020. Angiographic and clinical data were collected. The primary endpoint was the 1-year device-oriented composite endpoint. Procedural success was included among secondary endpoints.

Results. One hundred six patients were included, mean age was 68.2±10.2 years and 78.3%. were male. Diffuse de novo CAD consisted of 52.8% long lesions and 47.2% (true) bifurcation lesions. Significant increase in the final minimal lumen diameters and significant decrease in the final diameter stenosis were observed when compared to the baseline values in both DES- and DCB-target segments. Device success was 96.2%, 1-year DOCE was 3.7%, with all the adverse events characterized by ischemia-driven target lesion revascularization.

Conclusions. Combination of DES and DCB could be a safe and effective treatment option in de novo diffuse CAD. (NCT03939468)

Coronary: DES

P32

INCIDENCE AND PREDICTORS OF TARGET LESION FAILURE AFTER PERCUTANEOUS CORONARY INTERVENTION WITH ULTRATHIN DRUG ELUTING STENTS FOR LEFT MAIN DISEASE, CORONARY BIFURCATIONS, OR CHRONIC TOTAL OCCLUSIONS: INSIGHTS FROM THE ULTRA REGISTRY

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Background. Data about the performance of new-generation ultrathin drug eluting stents (DES) for challenging coronary lesions such as left main disease, coronary bifurcation lesions and chronic total occlusion (CTO), are scant.

Methods. ULTRA is a multicenter, retrospective, observational registry including consecutive patients treated with ultrathin DES (strut thickness <70μm) for LM disease, CTO, coronary bifurcations and in stent restenosis (ISR) from September 2016 to August 2021. Patients treated for ISR were not considered in the present analysis. The incidence of Target Lesion failure (TLF) (a composite of cardiac death, target lesion revascularization (TLR), target-vessel myocardial infarction (TVMI) and definite stent thrombosis (ST)) was the primary endpoint. Secondary endpoints included all-cause death, any acute myocardial infarction (AMI), target vessel revascularization along with single components of the primary endpoint. Predictors of TLF were assessed by means of Cox multivariable analysis.

Results. 1801 patients (mean age 66.6 years old) were included. After a median FU of 3.1 ± 1.4 years, the incidence of TLF was 9.4% (LM 13.5%, CTO 9.9%, bifurcation 8.9%). 160 patients died (8.9%) of whom 74 (4.1%) from cardiac death. The incidences of AMI and TVMI were respectively 6% and 3.2%. 11 patients (1.1%) experienced definite ST while 77 (4.3%) underwent TLR. Cox multivariable analysis identified several clinical predictors of TLF (namely age, STEMI and cardiogenic shock on admission, left ventricular ejection fraction, diabetes, renal function). Among procedural variables total stent length entailed a significant increased risk of TLF (HR 1.01, 95%CI 1-1.02 per mm increase), while intracoronary imaging was associated with a substantial risk reduction (HR 0.35, 95%CI 0.12-0.82).

Conclusions. Ultrathin DES show a satisfactory safety/effectiveness profile even in the context of complex coronary lesions. The association of established clinical and procedural features with impaired outcomes is confirmed in this high-risk population although treated with gold-standard devices for PCI.

Coronary: Imaging

P33

ANOMALOUS LEFT MAIN ARISING FROM THE RIGHT AORTIC SINUS AND CORONARY ARTERY WITH AN INDEPENDENT ACCESSORY BRANCH: A VERY RARE CASE-IMAGE

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A 51-year-old man with hypertension and obesity presented to our Hospital complaining of dyspnea and tipical chest pain. An echocardiography showed a normal left ventricle function with infero-lateral hypokinesia. Coronary angiography revealed no significant atherosclerotic lesions in the major epicardial coronary arteries, a stenosis 40-50% in the poster-lateral branch of right coronary artery, an anomalous origin of the left main from the right Valsalva sinus and a accessory branch of Right Coronary Artery (RCA), arising independently of the RCA. A multi-detector row computed angio-tomography (MDCT) confirmed the condition. The patient was treated by conservative strategy because the negativity of a provocative test.

Anomalous coronary vessels (ACV) are relatively rare congenital defects. The incidence of such anomalies has been reported in the Medical Literature to range from 0.3% to 0.9% [1]. The anomalous origin from the opposite sinus is the most clinically relevant, whereas the origin of an artery from the noncoronary sinus represents an unusual finding [2].

ACV are often discovered as an incidental finding during the diagnostic workup for ischemic heart disease. Normally, there are 3 main epicardial coronary arteries: the right coronary artery, emerging from the right sinus of Valsalva, and the left anterior descending (ADA) and left circumflex coronary (LCx) arteries, characterized by an initial common tract (the Left Main coronary artery) that arises from the left sinus of Valsalva. The clinical correlates and prognostic implication of ACV remain poorly understood: the guideline-recommended therapeutic choices are supported by a low level of scientific evidence [3].

The course of ACV is of clinical relevant especially when dealing with anomalous origin from the opposite sinus: an interarterial course is considered malignant and is often associated with other high-risk anatomic features. From a pathophysiological standpoint, the possible compression of the anomalous coronary between the great vessel was first proposed as a causative mechanism of myocardial ischemia [4].

In our case, the Left Main is originated from the right aortic sinus, near but independently from the ostium of the RCA. The accessory branch of RCA is the third vessel arising from right Valsalva sinus, non sharing the ostium with RCA. The course of the Left Main was devoid of intramural tract and no clearly compression was found with MDCT. The ADA, the LCx and a large Intermediate Ramus (RI) emerged from the Left Main: this anatomy from a right sinus of Valsalva is very rare and was not found in the Medical Literature with the presence of accessory branch. MDCT showed a subpulmonic and retroaortic course of the Left Main. With medical therapy your patient remains asymptomatic during follow-up. Conservative medical management has also been described for this anomaly, especially when risk of surgery was deemed to outweigh benefits [5].

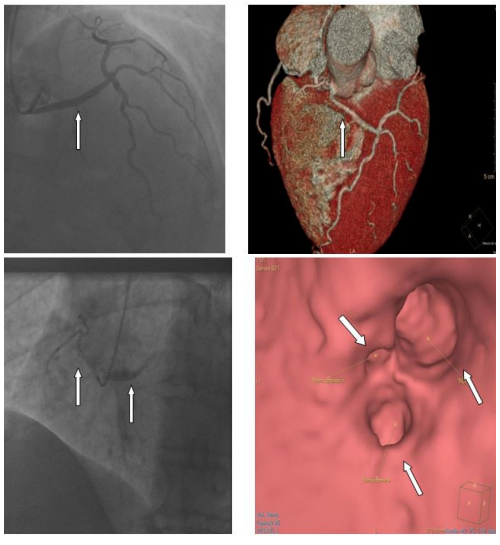

Figure 1. (*A*) Selective left coronary angiography in RAO-30° view and MDCT shows: Left Main from right Valsalva sinus, ADA, LCx and RCA (white arrows). (*B*) Selective angiogram showing anomalous accessory branch of right coronary artery and MDCT showing the origin of all branches from right Valsalva sinus.

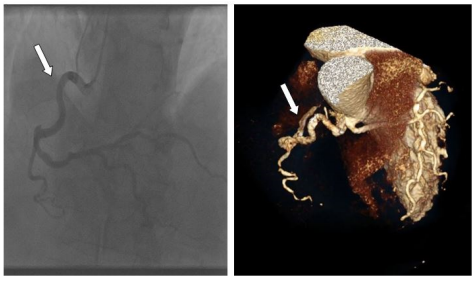

Figure 2. Selective right coronary angiography and 3D reconstruction of MDCT images showing the right coronary artery from right Valsalva sinus. MDCT showing also the accessory branch and left main with ADA and LCx.

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MAGNETIC RESONANCE IMAGING DIAGNOSIS OF A LEFT VENTRICULAR LIPOMA IN A PATIENT WITH Q INFERIOR WAVES ON ECG

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Background. Primary cardiac tumors are rare, accounting for less than 5% of all cardiac tumors. Benign tumors comprise more than 75% of primary cardiac tumors, with myxomas being the most common, followed by papillary fibroelastomas and lipomas. Cardiac lipomas are very rare. They constitute 2-8% of all benign cardiac tumor. Most lipomas are asymptomatic and portend a favorable prognosis, but some are large enough to cause obstruction and resultant symptoms of dizziness, dyspnea and syncope. Conduction abnormalities and sudden cardiac death can also occur, but the true incidence is unknown. We present the case of a left ventricular lipoma in an asymptomatic patient, which was diagnosed on routine screening electrocardiogram.

Patient presentation. A 46-year-old male patient current smoker (10 cigarettes/die), with family history of CAD and new onset hyperlipidemia and hypertension, underwent routine screening ECG for recent single episode of urent/burning chest pain resolved with oral gastroprotector. He did not alert any other cardiovascular symptoms.

Initial workup. His electrocardiogram (ECG) showed sinus rhythm with Q waves in inferior leads (Fig. 1). The laboratory analyses did not reveal any anomalies. His transthoracic echocardiogram showed a highly-mobile pedunculated lobular mass of 30x18 mm (Fig. 2), attached to the apical anterior wall of the left ventricle; left ventricular (LV) wall motion and systolic function were normal. For the presence of cardiovascular risk factor, the patient underwent diagnostic coronary angiography which showed normal coronary artery.

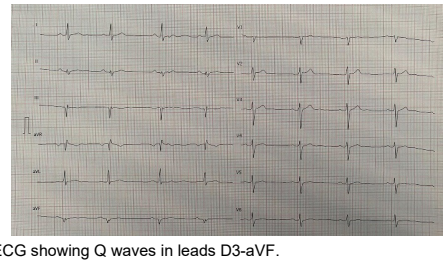

Figure 1. ECG showing Q waves in leads D3-aVF.

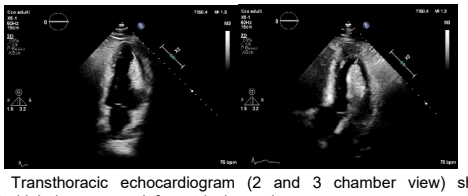

Figure 2. Transthoracic echocardiogram (2 and 3 chamber view) showing a pedunculated lobular mass on left ventricular cavity.

Diagnosis and management. The differential diagnoses that were entertained were isolated hypertrophy of papillary muscle and LV mass. Cardiac magnetic resonance was performed for further tissue characterization. CMR demonstrated a pedunculated mobile non-enhancing 30x18mm mass within the LV anterior apex that in the systolic phase contracts close relationships with the antero-lateral papillary muscle which appears dislocated (Fig. 3). This encapsulated formation is responsible for a partial systolic obliteration of the left ventricular cavity at the mid-apical portion. T1 imaging with and without suppression of adipose tissue, are compatible with cardiac intraventricular lipoma. The case and images were discussed in a multi-disciplinary heart team meeting, and the final consensus was to repeat echocardiography 6 months and CMR after 1 year.

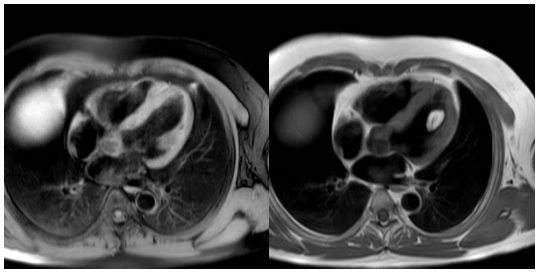

Figure 3. CMR T1 imaging with and without suppression of adipose tissue.

Follow-up. The echocardiographic control at 6 months showed no change in the size or characteristics of the LV abnormality. After another multi-disciplinary heart team meeting we refer the patient on surgical consultation that recommended clinical and instrumental follow-up.
Conclusion. The early diagnosis of LV lipoma is essential, and the treatment strategy should be individualized.

P35

ADDITIONAL ROLE OF CORONARY MICROVASCULAR ASSESSMENT IN PATIENTS WITH CHEST PAIN: A SINGLE-CENTER EXPERIENCE

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Introduction. Coronary microvascular disfunction is responsible for chest pain in a substantial proportion of patients, with or without concomitant disease of epicardial vessels. Recently, functional assessment of microcirculation is emerging as an additional diagnostic tool in the routine practice of cath-labs. We present the initial experience of a single high-volume center by reporting a case series of consecutive patients assessed with this technology and its observed advantages.
Methods. All patients undergoing microvascular assessment in our cath-lab were included in the case series. Measurements included coronary flow reserve (CFR) and index of microvascular resistance (iMR), and concomitant fractional flow reserve/resting full-cycle ratio (FFR/RFR). The assessment was performed with the Coroventis Coroflow Cardiovascular System (Abbott Vascular, Santa Monica, CA).
Results. Out of 147 patients who underwent coronary angiography in our cath-lab after the introduction of Coroventis Coroflow (April 2022), 6 patients without significant epicardial disease (diameter stenosis <50%) were deemed eligible to microvascular assessment. Four were females presenting as chronic coronary syndrome and two were males with unstable angina. Mean age was 65. All the patients had an intermediate pre-test probability of coronary artery disease. In all patients, the absence of obstructive epicardial disease was confirmed by functional criteria (FFR >0.80). Microvascular dysfunction was confirmed in the majority of patients (4 out of 6). However, discordance between iMR/CFR values was present in three of these patients (pathological iMR with concomitant normal CFR). No complication of microvascular assessment were observed.
Conclusions. Within a guideline-directed approach to chest pain, performing microvascular functional assessment in selected patients has the potential to increase the diagnostic accuracy in routine practice of cath-labs. In our experience, microvascular assessment is a safe and valuable tool to unravel challenging clinical scenarios. Further studies will assess the role of different functional phenotypes (i.e. concordant/discordant iMR and CFR values).

P36

RUOLO DELL'OCT NELL'INDIVIDUAZIONE DELLA NEO-ANGIOGENESI NEI PAZIENTI CON STENOSI CORONARICA ANGIOGRAFICAMENTE INTERMEDIA

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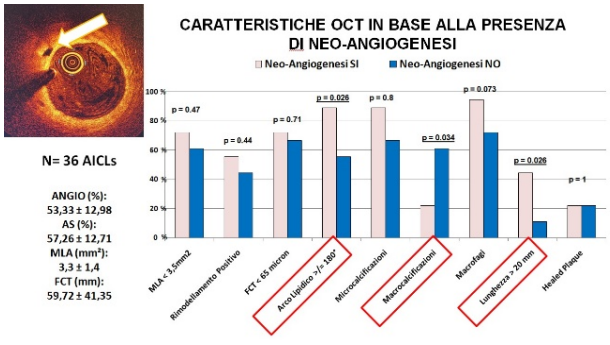
Introduzione. Nell'ambito dello studio mediante OCT delle placche coronariche angiograficamente intermedie finalizzato all'identificazione di quelle vulnerabili, vi sono iniziali evidenze che la presenza di neo-angiogenesi medio-intimale definita come la presenza di lacune con scarso segnale nettamente delineati in almeno due frame adiacenti (1) sia statisticamente più frequente nelle placche che abbiano altri criteri di vulnerabilità associati quali Arco Lipidico maggiore, TCFA, infiltrazione macrofagica, micro-noduli calcifici, MLA minore, Area Stenosi maggiore. Obiettivo della nostra analisi è quella di identificare le caratteristiche delle placche vulnerabili identificate mediante OCT e la loro associazione con la neo-angiogenesi.
Metodi. Tra dicembre 2019 e aprile 2021 sono stati eseguiti 36 studi OCT di placche coronariche angiograficamente intermedie alla ricerca di quelle vulnerabili. Le caratteristiche dei 34 pazienti erano le seguenti: età media 64,5 ± 10,1 anni, sesso maschile 78%, ipertensione nell'89%, dislipidemia nel 78%, pregressa PCI nel 58%, pregresso IMA nel 44%, tabagismo nel 30,5% e FA nell'11%. 17 pazienti presentavano Angina Instabile, 6 pazienti SCA-NSTEMI, e 13 pazienti CAD cronica di cui il 38% era un completamento dopo STEMI ed il 31% presentava una Cardio-TC positiva per stenosi ≥50%.
Risultati. Le lesioni studiate interessavano per il 67% l'IVA, per il 22% la CDx, per l'8% la Cx e per il 3% il TC. Il 33% erano lesioni del tratto prossimale ed il 66% lesioni al tratto medio. La stenosi angiografica media era del 53,33 ± 12,98%. All'OCT l'AS media era 57,26 ± 12,71%, l'FCT 59,72 ± 41,35µm e MLA 3,3 ± 1,4mm². La neo-angiogenesi era presente nel 50% delle lesioni. Le lesioni con neo-angiogenesi rispetto alle lesioni senza avevano una maggior prevalenza di arco lipidico ≥ a 180° (89% vs. 56%; p=0.026), una maggior prevalenza di lesioni >a 20mm (44% vs. 11%; p=0.034), una minor prevalenza di macrocalcificazioni (22% vs. 61%;p=0.026). Figura 1.
Conclusioni. Nell'ambito delle placche coronariche angiograficamente intermedie la presenza di neo-angiogenesi all'OCT, un criterio semplice e di rapido riconoscimento, è associato a placche a maggiore vulnerabilità.



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IMPACT OF ACUTE AND PERSISTENT STENT MALAPPOSITION AFTER PERCUTANEOUS CORONARY INTERVENTION ON ADVERSE CARDIOVASCULAR OUTCOMES

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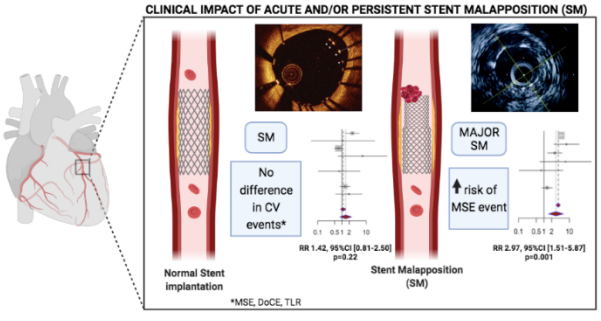
Background. The association of coronary stent malapposition (SM) and adverse clinical outcomes after percutaneous coronary intervention (PCI) remains unclear. We aimed to perform a systematic review and meta-analysis of randomized and observational studies to assess the

association between acute and persistent SM detected using intravascular ultrasound (IVUS) or optical coherence tomography (OCT) and adverse cardiovascular outcomes.
Methods. Available studies were identified through a systematic search of PubMed, reference lists of relevant articles, and Medline. Main efficacy outcomes of interest were: device-oriented composite endpoint [DoCE, including cardiac death, myocardial infarction (MI), target lesion revascularization (TLR), and stent thrombosis (ST)], major safety events (MSE, including cardiac death, MI and ST), and TLR. A sensitivity analysis regarding the impact of major malapposition was also performed.
Results. A total of 9 studies (6497 patients) were included in the meta-analysis. After a mean follow up of 24±14 months, SM was not significantly associated with the occurrence of all the outcomes of interest, including DoCE [risk ratio (RR) 1.00, 95% confidence interval (CI) [0.79-1.26], p=0.99), MSE (RR 1.42, 95%CI [0.81-2.50], p=0.22), and TLR (RR 0.84, 95%CI [0.59-1.19], p=0.33). In the sensitivity analysis, we found a significant increase of MSE in patients with major malapposition (RR 2.97, 95%CI [1.51-5.87], p=0.001).
Conclusions. Acute and persistent SM were not associated with adverse cardiovascular clinical outcomes at follow-up. However, major malapposition was associated with an increased risk of major safety events, including cardiac death, MI and ST. These findings should be taken into account during stent implantation and PCI optimization.



P38

CLINICAL IMPACT OF HEALED CORONARY PLAQUES: AN OPTICAL COHERENCE TOMOGRAPHY STUDY

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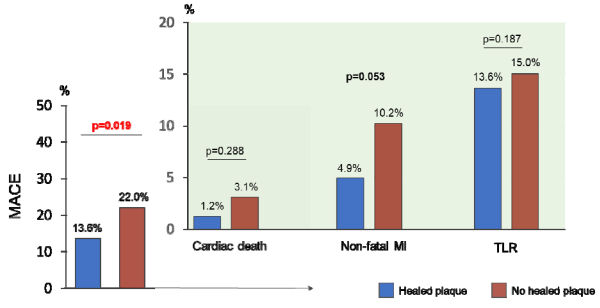
Introduction. Pathological studies have shown that many atherosclerotic plaques destabilize without resulting in a clinical manifestation. Recent *in vivo* studies showed that healed plaques are more common in patients with chronic coronary syndrome (CCS) than in those with acute coronary syndrome (ACS), suggesting that they might be a marker of clinical stability. The aim of the present study was to evaluate the clinical impact of healed coronary plaques detected by optical coherence tomography (OCT) imaging.
Methods. A total of 208 patients with CCS or ACS who underwent OCT imaging of non-target/non-culprit vessels were enrolled. Only non-culprit segments were analyzed. Patients were divided into two groups according to the presence or absence of healed plaques detected by OCT. The incidence of major adverse cardiac events (MACE) at follow-up was assessed, defined as the composite of cardiac death, non-fatal myocardial infarction, and target vessel revascularization (TVR).



Results. Healed coronary plaques were observed in 39.7% of patients, and the prevalence was higher in those presenting with chronic coronary syndrome. Median follow-up time was 4 years, and was not different between the two groups. Patients with healed plaques had a significantly lower incidence of MACE at follow-up (13.6% vs 22%, p=0.019), mainly driven by a lower rate of non-fatal myocardial infarctions (4.9% vs 10.2%, p=0.05). The incidence of cardiac death and TVR was not significantly different between the two groups (1.2% vs. 3.1%, p=0.288; and 13.6% vs. 15.0%, p= 0.187, respectively). At multivariate Cox regression analysis, the presence of plaque disruption was an independent predictor of MACE (odds ratio [OR] 3.33, 95% confidence interval [CI] 1.39-7.98, p=0.007), while the presence of healed plaque was an independent protective factor (OR 0.44, 95% CI 0.22-0.89, p=0.022).
Conclusions. Healed coronary plaques detected by OCT imaging are associated with a favorable clinical outcome at long-term follow-up.

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MORPHOLOGICAL AND CLINICAL PREDICTORS OF CORONARY PLAQUE HEALING: AN IN VIVO OPTICAL COHERENCE TOMOGRAPHY IMAGING STUDY

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Background. Atherosclerotic plaque healing may develop after one or more cycles of plaque disruption, aiming to prevent lasting occlusive thrombus formation, promoting plaque repair and restoring vessel integrity. The evolution of coronary artery disease appears to be more stable in patients with healed coronary plaques (HCPs). The aim of this study was to identify *in vivo* morphological and clinical predictors of coronary plaque healing.
Methods. In this single-center observational cohort study, patients who underwent optical coherence tomography (OCT) imaging of non-culprit coronary segments at Fondazione Policlinico A. Gemelli–IRCCS, Rome, from January 2013 to November 2021 were included. Patients were divided into 2 groups according to the presence of HCPs, and predictors were identified using logistic regression analyses.
Results. A total of 239 patients were included (95 patients with HCPs, 144 without HCPs), with a total of 1858 segments analyzed. Lesions with HCP showed a significantly higher prevalence of lipid-rich plaques (51.7% vs. 31.4%), thin-cap fibroatheromas (13.4% vs. 4.9%), macrophages (54.4% vs. 10.5%), cholesterol crystals (16.8% vs. 3.5%), neovascularization (46.3% vs. 19.1%), plaque disruption (13.4% vs. 2.4%) and thrombus (7.4% vs. 1.7%) than those without HCP (all p<0.001). At the multivariate logistic regression analysis, neovascularization (odds ratio (OR) 2.16, 95% confidence interval (CI) [1.19-3.92], p=0.01) and lipid-rich plaque phenotype (OR 4.49, 95%CI [2.51-8.04], p<0.001) were independent morphological predictors of healing capacity. A presentation with chronic coronary syndrome was the only independent clinical predictor of HCP (OR 2.06, 95%CI [1.15-3.68], p=0.015).
Conclusion. Patients with HCP have a distinct atherosclerotic phenotype compared with those without. The presentation with chronic coronary syndrome, and the presence of neovascularization and lipid-rich plaque phenotype at OCT are independent predictors of plaque healing.

P40

ANALISI DEI MECCANISMI DI RESTENOSI INTRA-STENT MEDIANTE OPTICAL COHERENCE TOMOGRAPHY: EVIDENZE DALLA NOSTRA CASISTICA

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Introduzione. La re-stenosi intra-stent (ISR) è un fenomeno frequente che riguarda ad oggi circa il 10% di tutte le procedure di angioplastica coronarica. I motivi sono complessi e molteplici; per primo, sebbene gli stent a rilascio di farmaco (DES), in confronto agli stent metallici (BMS), riescano a ridurre la formazione di neo-intima, l'infiammazione locale e l'ipersensibilità a polimeri e farmaci rimangono tutt'ora i maggiori contribuenti alla formazione della neo-intima; secondo, l'aumento dell'incidenza di neo-aterosclerosi dovuto al lungo tempo oramai intercorso dall'impianto dei primi BMS/DES; in ultimo, il non ancora sufficiente ed adeguato utilizzo su ampia scala delle tecniche di debulking del calcio, che predispone a sotto-espansione dello stent. L'obiettivo dello studio è stato quello di eseguire un'analisi dettagliata della nostra casistica di ISR mediante optical coherence tomography (OCT), al fine di studiarne i meccanismi sottostanti, confrontarli con la letteratura e mettere in luce punti forti e criticità, volti al miglioramento del trattamento delle ISR e della prevenzione.
Metodi. È stato condotto uno studio osservazionale retrospettivo multicentrico, in cui sono stati arruolati 58 pazienti ricoverati dal 01/2017 al 12/2021 con diagnosi di sindrome coronarica cronica (SCC), sindrome coronarica acuta (SCA), infarto acuto del miocardio ST (STEMI), per i quali è stata eseguita intra-ricovero una coronarografia con evidenza di ISR angiograficamente significativa (riduzione del lume >50% entro i 5 mm dell'edge prossimale/distale dello stent) e valutata mediante OCT.

Per l'analisi OCT, sono stata utilizzate misure istantanee altamente riproducibili sulla severità e sulla lunghezza della lesione (area minima luminale [MLA]). All'OCT la re-stenosi significativa è determinata da una MLA<5 mm2 per il tronco comune e <4 mm2 nei tratti prossimali e medi. La caratterizzazione del meccanismo alla base della ISR ha permesso la suddivisione delle cause secondo la classificazione di Waksman. La sotto-espansione dello stent è stata considerata come una espansione minima dello stent (MSA) <90% dell'area di riferimento distale o <80% del valore medio dell'area di riferimento prossimale e distale.
Risultati. L'età media dei pazienti era di 65 aa, la mediana di 70 aa. L'83% dei pazienti era di sesso maschile. Il 10% non presentavano fattori di rischio (FR), il 90% due, tre o quattro FR. Nel 38% dei casi i pazienti erano affetti da ipercolesterolemia, che era presente nell'83% dei pazienti con ISR da neo-aterosclerosi; il 30% da ipertensione arteriosa, il 21% erano fumatori e solo l'11% erano diabetici. Il 60% dei pazienti esordiva con sindrome coronarica cronica, il 30% con SCA, e solo il 5% con STEMI. Per quanto concerne le cause di IRS, nel 22% dei casi la causa era meccanica mentre nel 78% dei casi era biologica; in particolare, l'OCT mostrava nel 39% dei casi un quadro di iperplasia omogenea, nel 38% dei casi iperplasia eterogenea (classificata come neo-aterosclerosi), nel 21% sotto-espansione dello stent e nel 2% frattura di stent. Nei casi di ISR dovuti a causa meccanica, nel 77% dei casi la sotto-espansione dello stent era dovuta a severa coronaropatia calcifica sottostante; nel restante 23% dei casi la sotto-espansione era in realtà un sotto-dimensionamento dello stent precedentemente impiantato in corso di STEMI, con evidenza all'OCT di trombosi acuta, e determinante un nuovo quadro di STEMI nelle 24 ore successive all'impianto. Pertanto nel 23% dei casi la manifestazione clinica avveniva entro le 24 h, nel 23% dei casi entro un anno e nel 53% dei casi oltre un anno; il 62% degli stent colpiti erano DES, nell'8% BMS, e nel 30% doppia maglia (BMS + DES). Per quanto concerne le cause biologiche, l'iperplasia omogenea colpiva prevalentemente l'arteria discendente anteriore, stent con diametro medio di 3 mm e lunghezza di 20 mm. Nel 57% dei casi gli stent colpiti erano DES, nel 27% BVS, nell'8% dei casi BMS e nell'8% doppia maglia. L'incidenza massima di ISR da iperplasia omogenea si aveva a due anni dall'impianto dello stent. Anche per la neo-aterosclerosi il vaso più colpito era l'arteria discendente anteriore (68%), il diametro medio dello stent era di 3.2 mm con lunghezza media di 20 mm, ed il tipo di stent maggiormente interessato era il BMS (50%). La massima incidenza di neo-aterosclerosi si aveva a quindici anni dall'impianto dello stent.
Conclusioni. Il genere maschile è significativamente più soggetto a sviluppare ISR da ogni causa ed il FR con più alta prevalenza è l'ipercolesterolemia, con una forte correlazione con il quadro OCT di neo-aterosclerosi. La manifestazione clinica più frequente di ISR è la sindrome coronarica cronica, non correlata con uno specifico pattern OCT. D'altro canto, una forte correlazione sembra esserci tra pazienti con ISR che esordiscono con STEMI e causa meccanica, ovvero un sotto-dimensionamento dello stent, posizionato a sua volta per STEMI entro le 24 ore precedenti, determinante trombosi acuta intra-stent. Per le cause meccaniche di ISR, la sotto-espansione dello stent è quasi esclusivamente attribuibile alla presenza di placche fibro-calcifiche non adeguatamente trattate nella sede di impianto dello stent. Per le cause biologiche di ISR, non vi è netta prevalenza tra il quadro OCT di iperplasia omogena o di neo-aterosclerosi, la sede più frequente è l'arteria discendente anteriore e sono maggiormente colpiti vasi di medio calibro (3 mm) e con lunghezza >20 mm. L'iperplasia mio-intimale è più frequente nei DES e la massima incidenza è nel secondo anno dall'impianto dello stent. La neo-aterosclerosi è più frequente nei BMS e la massima incidenza è nel quindicesimo anno successivo dall'impianto dello stent.

P41

SEX-BASED DIFFERENCES IN CORONARY PLAQUE PHENOTYPE AND HEALING AT OPTICAL COHERENCE TOMOGRAPHY (OCT) ANALYSIS

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Introduction. Atherosclerotic plaque healing is a dynamic process that promotes plaque repair after destabilization. Previous studies showed that healed plaques are more common in patients with chronic coronary syndrome than in those with acute coronary syndrome, suggesting that they might be a marker of clinical stability. The mechanisms underlying plaque healing are not completely understood. The aim of the present study was to evaluate sex-based differences in plaque phenotype and healing of non-culprit coronary lesions by optical coherence tomography.
Methods. In this observational, single-center cohort study, we enrolled patients from the OCT Registry of the Fondazione Policlinico A Gemelli IRCCS. A total of 205 patients with both acute coronary syndromes or chronic coronary syndromes undergoing coronary angiography and intravascular OCT imaging of non-culprit vessels were included in the analysis and divided into two groups according to gender.
Results. Of 205 patients, 153 were male (75%) and 52 (25%) female. Compared with male patients, female patients had lower prevalence of lipid-rich plaque (40.4% vs. 57.7%; p=0.030), plaque rupture (7.7% vs. 21.2%; p=0.028) and cholesterol crystal (13.5% vs. 29.5%; p=0.022). Mean lipid arc and calcium depht were significantly lower in female patients than in male ones (118.0° ± 79.9° vs. 135.5° ± 77.9°; p=0.011; and 52.7 µm ± 79.2 µm vs. 72.3 µm ± 93.5 µm; p=0.007) while fibrous cap tended to be thicker (108.2 µm ± 70.4 µm vs. 96.2 µm ± 72.9 µm; p=0.055). Healed plaques were significantly more frequent in female patients than in male patients (51.9% vs 34.6%; p=0.027). The prevalence of fibrous plaque, thrombi, neovascularization, diffuse calcifications and spotty calcification was not different between the two groups.
Conclusion. Females have a distinct atherosclerotic phenotype and healing capacity compared with male patients, including lower prevalence of lipid-rich plaque, cholesterol crystals and plaque ruptures and higher prevalence of healed plaques in non-culprit coronary lesions.

P42

INTERMEDIATE CORONARY LESIONS IN THE SETTING OF ACUTE CORONARY SYNDROME: PHYSIOLOGY OR MORPHOLOGY, THIS IS THE PROBLEM

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Rationale. The key-role of fractional flow reserve (FFR) to guide coronary revascularization in intermediate coronary non-culprit lesions is well established; on the other side, the CLIMA study showed the ability of Optical Coherence Tomography (OCT) in identifying high-risk plaque features that were associated with major coronary events. These methods can be useful in the setting of acute coronary syndrome (ACS) with ambiguous coronary lesions. We present a case of a 77 years-old woman affected by arterial hypertension, who arrived in our Emergency Department with epigastric pain and sweating. Electrocardiogram showed sinus tachycardia with ST-elevation in V1-V4 and she had high cardiac biomarkers levels; the echocardiogram revealed akinesia of left ventricle anterior wall and apex, with Left Ventricle Ejection Fraction of 40%.
Technical resolution. Left heart catheterization showed Left Ventricle End-diastolic Pressure of 20 mmHg; the coronary angiography revealed intermediate coronary stenosis of mid Left Anterior Descending (LAD) and no more stenosis in the other vessels. We performed a functional assessment at maximal hyperaemia with the Pressure Wire X (Abbott, Chicago - Illinois) guidewire with FFR value of 0.81. The intravascular imaging with a Dragonfly OpStar catheter (Abbott, Chicago - Illinois) showed diffuse disease of mid LAD, with thick cap lipidic plaque, lipid arc >180°, macrophage infiltration and MLA of 2,77 mm² (Figure 1). Therefore, we decided to perform percutaneous coronary intervention (PCI): the lesion was pre-dilatated with a 2.5x30 mm Euphora (Medtronic, Minneapolis, MN) semi-compliant balloon; then a drug-eluting stent Resolute Onyx (Medtronic, Minneapolis, MN) 3.0x34 mm was implanted and post-dilatated with a 3.5x12 mm Emerge (Boston Scientific, Paris, FA) Non-Compliant balloon, with optimal angiographic and intravascular imaging result (Figure 2).

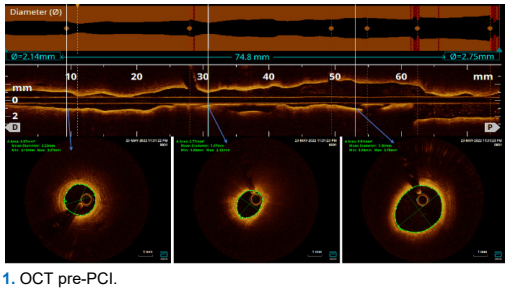

Figure 1. OCT pre-PCI.

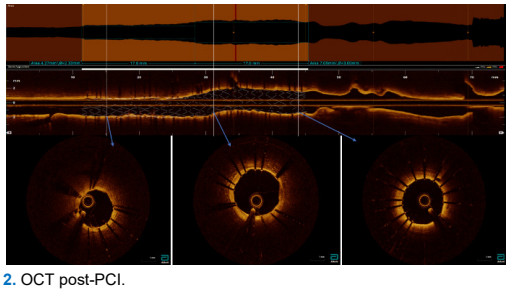

Figure 2. OCT post-PCI.

Clinical Implications. FFR and OCT assess different but complementary features of coronary artery lesions: FFR evaluates the haemodynamic significance of the stenosis, OCT gives important information about plaque composition. In the setting of ACS without a clear significant stenosis many factors related to the acute situation can influence the functional assessment, therefore intravascular imaging can be useful to investigate the morphology of equivocal lesions, guiding treatment strategy.
Perspectives. The decision of whether to perform PCI in this ambiguous setting is a clinical challenge. Further studies to investigate the role of functional and morphologic assessment in intermediate lesions in the context of ACS and their prognostic value are needed.

Coronary: PCI lesion/patient subsets

P43

OUTCOMES A LUNGO TERMINE DEI PAZIENTI SOTTOPOSTI AD ANGIOPLASTICA CORONARICA AD ALTO RISCHIO CON SUPPORTO CIRCOLATORIO MECCANICO IMPELLA CP

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Introduzione ed obiettivo dello studio. L'utilizzo dell'Impella per interventi di angioplastica percutanea (PCI) ad alto rischio (HR-PCI) sta subendo un notevole incremento nel mondo. L'obiettivo di questo studio è valutare gli outcomes intra-ospedalieri ed a lungo termine dei pazienti sottoposti a HR-PCI con l'utilizzo del device di supporto circolatorio meccanico Impella CP.
Metodi. Lo studio è basato sul registro singolo centro che arruolava tutti i pazienti consecutivi sottoposti a procedura di HR-PCI con utilizzo di Impella CP presso l'Ospedale Cannizzaro di Catania. I dati relativi a pazienti, procedure, e follow-up sono stati inseriti in un database dedicato.
Risultati. Da Gennaio 2019 a Dicembre 2021, sono stati arruolati 16 pazienti di cui il 75% maschi. La presentazione clinica all'ingresso era una sindrome coronarica acuta nell'87.5% dei casi (infarto miocardico in 13 pazienti, angina instabile in 1 soggetto). La frazione di eiezione media del ventricolo sinistro era 35 ± 7.6%. Dieci soggetti (62.5%) erano diabetici in terapia ipoglicemizzante con insulina nel 90% dei casi. Il Syntax score era 29 ± 12.3 e lo score di mortalità STS era 8.1 ± 10.4. Il tronco comune era coinvolto da ateromasia critica in 8 pazienti (50%) mentre una patologia trivasale era presente nel 56% dei casi. Nella maggior parte dei casi -14 (87.5%) pazienti- l'Impella CP era stato introdotto attraverso l'arteria femorale mediante accesso percutaneo, mentre solo in 2 (12.5%) soggetti si era reso necessario un accesso chirurgico. È stata effettuata una rivascolarizzazione coronarica completa in 7 (43.8%) pazienti. Per un totale di 2 ± 1 vasi trattati per paziente e 3 ± 1.3 lesioni sottoposte a PCI, sono stati impiantati 3 ± 1.8 stent con una lunghezza totale media degli stent di 81 ± 44.3 mm. In tutti i casi, il device Impella CP era stato posizionato nel ventricolo sinistro prima dell'effettuazione della PCI e rimosso pochi minuti dopo la procedura con una durata media di supporto circolatorio di 2.7 ± 0.8 h. Solo 1 (6.2%) paziente è deceduto in ospedale, a causa di una sepsi, mentre si è verificato un sanguinamento clinicamente evidente in 5 (31.3%) soggetti, 4 dei quali era sanguinamenti correlati all'accesso; 4 (25%) pazienti sono stati sottoposti a trasfusione di emazie; non si sono verificate ischemie acute degli arti né danni all'aorta o al ventricolo sinistro. Entro un follow-up medio di 13 mesi dalla data della procedura, in 2 pazienti (12.5%) si è praticata una rivascolarizzazione miocardica, di cui 1 (6.2%) riguardava un vaso target (target-vessel revascularization). Sono deceduti 4 (25%) pazienti ma solo 1 (6.2%) dovuto a cause cardiache: 2 soggetti sono morti a seguito di complicanze da sepsi secondaria a polmonite ed 1 da sepsi complicante una gangrena.
Conclusioni. Il nostro studio dimostra la fattibilità e l'efficacia della HR-PCI protetta da Impella CP, mostrando accettabili outcomes a lungo termine in una coorte di pazienti a rischio molto elevato.

P44

LEFT MAIN PCI IN AN ALL-COMERS POPULATION: TEMPORAL TRENDS AND OUTCOMES OF A SINGLE CENTER EXPERIENCE

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Background. Percutaneous treatment of Left Main (LM) coronary artery disease has expanded rapidly in the past decade together with evolution of techniques and technologies. We aimed to describe temporal trends in indications, practice and outcomes of LM PCI at our institution.
Methods. A total of 354 consecutive patients that underwent left main percutaneous coronary interventions (PCI) between January 2018 and December 2021 at our institution, were retrospectively analyzed. From the total pool of the procedures, 266 (75%) were undertaken in unprotected left main disease (ULMD). The annual number of LM-PCI in ULMD progressively grew during these years: 40 in 2018, 60 in 2019, 68 in 2020, 98 in 2021. The main indication for the procedure was chronic angina (156/266 pts, 58.6%) while 33% of the patients (89/266 pts) were admitted for acute coronary syndrome (ACS), principally with NSTEMI presentation (NSTEMI 55/89 pts, 62%; STEMI 10/89 pts, 11%; unstable angina 24/89 pts, 27%). Most of the procedures were conducted via radial access (77%) irrespective of elective or urgent indication (73/89 in acute setting, 82%; 132/178 74% in elective admission; p-value = 0.11). Along with increase in procedural volumes, a statistically significant increase in adoption of Intravascular Ultrasound (IVUS) guidance was shown (p-value=0.02): 1/40 (2.5%) in 2018, 13/60 (22%) in 2019, 14/68 (21%) in 2020, 25/98 (26%) in 2021. At angiographic baseline analysis, in most of the cases (218/266, 82%) distal LAD-CX bifurcation was involved and provisional stenting was the main strategy applied (194/218, 88.9%). Upfront plaque modification devices were applied in 13% of cases (35/266): NC-balloon at high pressures in 26 cases, rotational atherectomy in 6 cases and intravascular lithotripsy in 3 cases. Mechanical circulatory support due to unstable hemodynamics was necessary in 10 cases. MACCEs rate (composite of all-cause death, spontaneous MI, Stroke and any repeated revascularization) at 30 days, 1 year and at last follow-up available (mean follow-up of 864±255 days) was 4.9%, 14.2% and 22.1%, respectively. After stratification by year of the procedure, no significant difference in MACCEs was found at 30-days, (p=0.3) while a trend towards statistical significance was found at 1-year follow-up (p-value=0.07) that became significant at longest follow-up available (p<0.01). In the final multivariate logistic model, including the variables statistically significant at binomial regression, year of the procedure (year 2018 OR 12.5, 95% CI 4.5-35.3; year 2019 OR 4, 95% CI 1.5-11.1; year 2020 OR 2.4, 95% CI 0.8-6.7), multivessel revascularization (OR 4.2, 95% CI 2.1-8.5) and urgency indication for the PCI (OR 2.1, 95% CI 1-4.2) were the main variables independently associated to increased risk of MACCEs at last follow up.
Conclusions. in our single-center analysis a progressive rise in volume in LM percutaneous revascularization procedures was evidenced with concomitant improvement in clinical practices and more favorable outcomes.

P45

PROCEDURAL AND IN-HOSPITAL OUTCOME OF PERCUTANEOUS CORONARY INTERVENTION USING LASER CORONARY ATHERECTOMY FOR COMPLEX CORONARY LESIONS: A SINGLE CENTER REAL WORLD-REGISTRY

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Introduction. Laser Coronary Atherectomy (ELCA) is an emerging therapy for the treatment of a wide spectrum of complex coronary lesions, such as thrombotic lesions, severe calcific lesions, non-crossable or non-expandable lesions, chronic occlusions, stent under-expansion and stent restenosis.
Aims and methods. The aim of this study was to examine the early outcome of this approach on a consecutive cohort of patients treated with ELCA for complex coronary lesions. This is a prospectical single center observational study.
Results. From July 2018 to June 2022 a total of consecutive 68 patients (age 71 ± 9 years) with 102 lesions treated with ELCA were enrolled in the study. Notably, the clinical presentation at the time of index procedure was an acute coronary syndrome in 42.6% of the cases. The mean of left ventricular ejection fraction was 43 ± 9%. The population was at high coronary anatomy complexity and a high risk of cardiovascular events (Syntax score, STS score and EuroSCORE II respectively >25 and >15). The left anterior descending was treated in 45.1% of cases, left main in 12.8%, left Circumflex in 20.6%, right coronary artery in 20.6% and in only one case (0.9%) a saphenous vein graft was the artery treated. A total of 1.8 ± 1.4 stents were implanted for an average of 40.6 ± 32.1mm. Procedural and fluoroscopy time were 66.5 ± 42.6min and 26.3 ± 16.4min respectively. Angiographic success was achieved in 95% of cases (two patient had no reflow phenomenon after stent implantation while in other two cases there were a residual stenosis >30% after ELCA use and balloon inflation for undilatable stent restenosis. Complete revascularization was obtained in 62%. One patient died for an acute stent thrombosis 2 hours after procedure. No other events happened in hospital and at 30-days of clinical follow-up.
Conclusion. This study showed that ELCA is able to provide high rate of angiographic and clinical success in a real-world cohort of complex patients.

P46

FUNCTIONAL ASSESSMENT OF INTERMEDIATE CORONARY ARTERY STENOSIS: A COMPARISON BETWEEN ADDED INDEX AND QUANTITATIVE FLOW RATIO

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Background. FFR represents the gold standard to functionally assess the ischemic potential of intermediate coronary artery stenoses particularly in patients presenting with multivessel disease. However, it is still underused in the current practice. Less invasive techniques have been identified for the evaluation of intermediate stenosis. The Quantitative flow ratio (QFR), based on the angiography with 3D-reconstruction of the coronary artery and computational fluid dynamics, has been showed to well correlate with the FFR. The Angiography-DeriveD hEmoDynamic index (ADDED Index) has also been validated to assess the ischemic potential of intermediate coronary stenosis and was also found to well correlate with FFR. It considers the jeopardized subtended myocardium and the minimal lumen diameter calculated at the angiography. This study aimed to compare the ADDED Index with QFR in terms of diagnostic accuracy.

Methods. A retrospective observational study was conducted. We included all patients presenting with an intermediate stenosis assessed with QFR. Both QFR and ADDED Index were calculated. Correlation was studied using Pearson's r test and linear regression. Receiver operator characteristics curve analysis was also performed.

Results. A total of 54 patients presenting with either stable angina or acute coronary syndromes were enrolled and finally 62 intermediate stenoses were included. A significant correlation between the ADDED Index and QFR was found (r^2=0,32, p<0.001) (Figure 1). At ROC analysis, and with the QFR as reference, the ADDED Index showed a significant and very high area under the curve (0.99 (0.99-1.00), p<0.001), Figure 2) suggesting the high accuracy for the assessment of the ischemic potential of intermediate coronary artery stenoses.

Conclusion. ADDED Index was found similar to the QFR in terms of accuracy for the functional assessment of intermediate coronary artery stenoses.

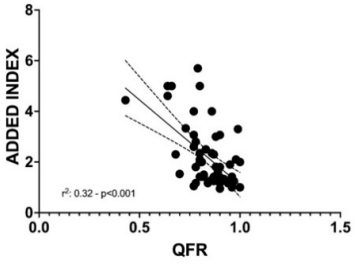

Figure 1

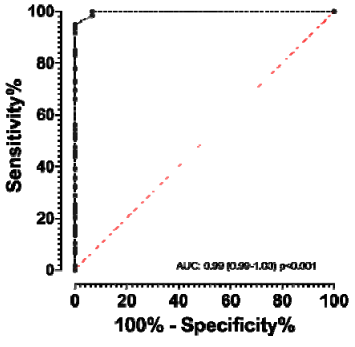

Figure 2

P47

PARTICULAR MISDIAGNOSED ACS-NSTEMI IN A YOUNG ADULT WITH A HISTORY OF HODGKIN'S LYMPHOMA IN THE ERA OF FREQUENT SARS-COV-2 RELATED MYOCARDITIS: NOTHING SHOULD EVER BE LEFT TO CHANCE

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Rationale. Radiotherapy plays a key role in the multimodality treatment of thoracic tumors. Radiotherapy-induced heart disease (RIHD) has become an increasingly recognized adverse reaction contributing to major radiation-associated toxicities, including nonmalignant death. Especially patients with diseases with excellent prognosis, such as breast cancer or Hodgkin's lymphoma, may suffer from delayed side effects 2-6 including RIHD in a dose-dependent manner. The pathological spectrum of RIHD includes conduction abnormalities, valvular disease, coronary artery disease, pericarditis and pericardial constriction or effusion, cardiomyopathy, and myocardial fibrosis. Here we describe the case of a young man cured of Hodgkin's lymphoma who presented to our laboratory with the diagnosis of suspected myocarditis in the Sars-COV 2 era, but the presenting clinical picture confused the clinicians and complex coronary artery disease was behind it.

Technical resolution. A young 33-year-old man presented to the emergency room with typical exertional chest pain. Clinical history: smoker patient who denied familiarity for cardiovascular diseases, dyslipidemic, 10 years previously underwent chemotherapy and radiotherapy for Hodgkin's Lymphoma in complete remission. A nasopharyngeal molecular swab for Sars-COV 2 was performed, which was negative. The presentation electrocardiogram (EKG) documented nonspecific repolarization abnormalities; the myocardionecrosis enzyme curve performed at three times was frankly positive (0.034 ng/ml ->0.576 ng/ml ->4.098 ng/ml) with elevated PCR values (102 pg/ml). Color Doppler echocardiography documented a left ventricular ejection fraction at the lower limits of normal, hypokinesia of the mid-basal segments of the infero-posterolateral wall with moderate mitral valve regurgitation. On suspicion of acute myocarditis, the patient was transferred to the Coronary Care Unit and, during admission, underwent MRI, which showed a slightly enlarged left ventricle (DTD 58 mm, EDV 147 ml), slightly depressed systolic function (LVEF 46%), accentuation of intramyocardial trabeculation, and akinesia of the proximal lateral and mid-proximal wall. In delayed enhancement sequences late persistence of gadolinium in the endomesocardium (60%), proximal lateral and mid-proximal wall with involvement of areas adjacent to the base of implantation of both papillary muscles and late persistence of gadolinium in the proximal antero-septal endocardium, moderate to severe functional mitral insufficiency. The initial therapy administered consisted of: High-dose Acetylsalicylic acid (1 g x 3/day), Metoprolol 100 mg 1/2 cp b.i.d., Furosemide 20 mg, Spironolactone 200 mg 1/2 i.v., Atorvastatin 40 mg. In light of the instrumental picture, the patient underwent coronarography, which showed an unexpected nightmare picture, given his young age. Circumflex branch (lcx-lesion culprit) suboccluded to the middle segment with TIMI I downstream flow at the bifurcation with a prominent obtuse marginal branch (OM) with a delayed reperfusion (Medina 1,1,1) (Figure 1 a-b); diffusely atheromatous left anterior descending artery (LAD), showing 70% complex critical disease in the proximal segment at the bifurcation with a first diagonal branch of good caliber and good distribution area (Medina 1,1,1) (Figure 2). Therefore, in a patient with misdiagnosed ACS-NSTEMI, two complex coronary angioplasties were performed through left radial access with Slender 7 in 6 introducer at one time. The following drugs were administered in the cath-lab: Cangrelor bolus/kg followed by continuous infusion for 2 hours and Prasugrel 60 mg, initially UFH 5000 IU and anticoagulation control according to ACT during the procedure. The left main was engaged with an EBU 3.5 6F guide catheter and the PTCA of the LCx-OM bifurcation was performed through the T and inverse protrusion technique (i-TAP). The subocclusive stenosis was crossed with a BMW 0.014 " in the LCx branch and a second BMW wire was positioned in the MO branch with recanalization of the downstream vessel and TIMI II flow. OM ostium-proximal stenosis branch was dilated by means of a 2.0 x 15 mm semi-compliant balloon at 12 ATM and then a Resolute Onyx 2.75 x 23 mm expanded drug stent (DES) was positioned at 14 ATM. POT was performed with a 3.0 x 10 mm "non compliant" balloon at 16 ATM, then a re-wire OM-LCx was performed and the stent meshes widened using 1.5 x 12 mm and 2.0 x 15 mm semi-compliant balloon at 12 ATM. A DES Resolute Onyx 2.5 x 28 mm was placed in LCx branch, expanded at 14 ATM. The 3.0 x 20 mm non-compliant balloon was positioned in OM and, using the DES balloon in LCx, the final Kissing Balloon was performed with an excellent final angiographic result and TIMI III flow ensured (Figure 3). At the same time, the second LAD-DI bifurcation disease was treated by repeating the TAP technique, which is simple, quick and guaranteed a good result. The complex proximal LAD stenosis was crossed using the Whisper and BMW wires were used and the last one was positioned in the diagonal branch. LAD stenosis was dilated using a non-compliant balloon 2.5 x 15 mm at 14 ATM and was implanted a DES Xience Sierra 3.0 x 23 mm, released at 12 ATM. After the POT in LAD, upstream of the bifurcation, using a 3.5 x 10 mm "non compliant" balloon at 14 ATM, the stent struts were rewired by positioning a third BMW wire in DI, removing the previous one. The struts of DES vs DI were enlarged with a 2.0 x 12 mm semi-compliant balloon at 12 ATM. After placing a 3.25 x 20 mm semi-compliant balloon in LAD downstream of the bifurcation, a DES Resolute Onyx 2.5 x 15 mm was implanted at 12 ATM in DI and final Kissing balloon and final POT in LAD were performed (Figure 4). The procedure ended with complete revascularization and asymptomatic patient. During the following days of hospitalization, no late electrical or mechanical complications occurred. On echocardiography prior to discharge, the same segmental kinetics changes persisted and were associated with posterior mitral leaflet retraction and asymmetric tethering, resulting in moderate to severe mitral

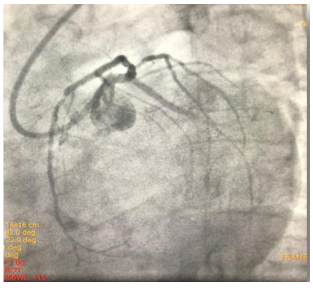

Figure 1. Spider view: CLx-OM.

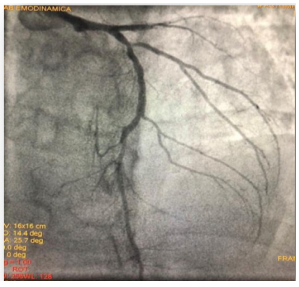

Figure 2. Cranial view: LAD.

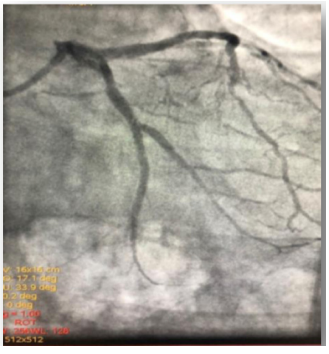

Figure 3. PTCA bifurcation CLx-OM through iTAP technique, final result.

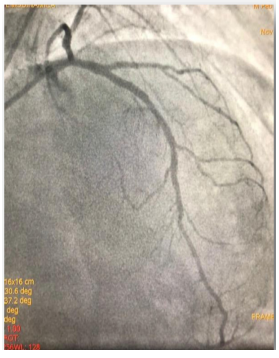

Figure 4. PTCA bifurcation LAD-DI through TAP technique, final results.

regurgitation. The recommended therapy at discharge was as follows: Acetylsalicylic acid 100 mg per os, Prasugrel 10 mg per os, Rosuvastatin/ezetimibe 20/10 mg per os, Furosemide 25 mg 1 cp b.i.d., Telmisartan 20 mg per os, Metoprolol 100 mg 1/2 cp b.i.d. at the one-month follow-up, the patient was asymptomatic and resumed the normal daily activity of his life. Blood chemistry tests were normal with LDL-Cholesterol values in the range for the risk category. An echocardiographic control was scheduled at three months from the start of therapy based on ACE-inhibitors analogues and diuretics for the possible improvement of functional mitral valve disease.

Clinical Implications. The one just described represents a complex and unexpected scenario for a young adult. The literature available has analyzed the pathophysiology of myocardial damage resulting from exposure to high amounts of radiation in patients undergoing curative radiotherapy for Hodgkin's lymphoma. It is now generally accepted that the most common clinical syndromes after irradiation are pericarditis in acute and chronic forms, cardiomyopathy, valvular disease, and, to a lesser extent, complete atrioventricular block. However, coronary vessel lesions have been considered exceptionally rare, so the true pathophysiological triggering mechanism is still poorly understood. The most widely accepted hypothesis on the onset of RICHD is a dual pathway of vascular damage ("two-hit combined hypothesis"). Radiation induces endothelial damage, characterized by chronic inflammation, oxidative stress, and fibrosis, which causes thickening of the tunica intima (first hit) and acceleration of the atherosclerotic process (second hit). The coronary segments most frequently involved in RICHD are the proximal ones, due to exposure to higher doses of radiation. Angiographically, the lesions are long, smooth, concentric, and tubular. The most frequent clinical presentation of RICHD is typical angina in young patients, average age 30-35 years, without cardiovascular risk factors, with angiographic evidence of severe coronary artery disease involving the ostium-proximal segments. Less frequently, RICHD may present with acute myocardial infarction and sudden cardiac death. This disease is very insidious and occurs in patients without cardiovascular risk factors, at least 10 years after radiation therapy. The most important preventive measure regarding RICHD is dose minimization. From a cardio-oncology perspective, however, prevention should be initiated before the start of radiotherapy and continued indefinitely with serial clinical assessments, imaging, and aggressive modification of risk factors. The presence of at least one classic risk factor at the time of irradiation increases the relative risk of ischemic heart disease. For the purpose of risk stratification physicians should consider a history of chest wall irradiation as an independent risk factor for ischemic events. Few data are available in the literature on outcomes according to the revascularization strategy adopted in patients with RICHD (PCI vs. CABG), although there is a tendency to refer low-risk patients to cardiac revascularization, especially in the case of concomitant valvulopathy. In addition, the frequent involvement of ostium-proximal coronary segments, which makes the interventional procedure more complex, and the duration of stents are reasons that discourage percutaneous intervention. However, some observational studies have shown that there are no significant differences in mortality among patients treated with PCI compared with those treated with CABG.

Perspectives. Morbidity and mortality from post-radiotherapy cardiovascular complications in patients with Hodgkin's lymphoma must be reduced through close cardiological surveillance in primary prevention and a close collaboration between oncologists and cardiologists in order to minimize any deleterious complications, especially in the young. A close echocardiographic follow-up of patients is essential in association with the use of ACE inhibitors and statins, associated with the reduction of radiation exposure doses through the intensity-modulated RT, limiting the involved thoracic fields. Further research is needed to elucidate profibrotic mechanisms, identify promising therapies that can be implemented early during the course of treatment and to compare revascularization strategies with longer-term mortality in such patients, in order to guide the physicians in the decision-making. The creation of a close and valid cardio-oncology network for early detection, risk factor modification and treatment represents the best hope for reducing morbidity and mortality associated with coronary artery disease in patients exposed to radiotherapy.

P48

TRATTAMENTO DELLE LESIONI CALCIFICHE CON ATERECTOMIA ROTAZIONALE MEDIANTE ACCESSO TRANSRADIALE ED UTILIZZO DI CATETERE GUIDA SHEATHLESS

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Introduzione. L'accesso radiale è diventato il "gold standard" nelle procedure interventistiche coronariche (PCI), perché associato in modo significativo con la riduzione delle complicanze vascolari e della mortalità a breve e lungo termine. Esso tuttavia presenta delle limitazioni, rappresentate soprattutto dal piccolo calibro dell'arteria radiale, dalla sua tendenza allo spasmo e dalla presenza di tortuosità dell'arteria succlavia, che possono rendere difficoltose procedure complesse, come l'utilizzo dell'aterectomia rotazionale (RA), che richiedono spesso un aumento delle dimensioni del catetere guida ed un elevato supporto. Da alcuni anni è disponibile un catetere guida "sheathless" (Eucath, Asahi, Giappone) dotato di un basso profilo e di un rivestimento idrofilico e che non richiede l'utilizzo di un introduttore. Pertanto, esso può essere avanzato anche in anatomie complesse riducendo il trauma per l'arteria radiale. Questa analisi ha lo scopo di valutare la nostra esperienza nell'utilizzo di questo catetere guida in procedure complesse di RA.

Metodi. Abbiamo valutato retrospettivamente le caratteristiche cliniche e procedurali e gli eventi intraospedalieri di pazienti sottoposti a procedure di RA eseguite nel nostro laboratorio utilizzando un catetere sheathless Eucath.

Risultati. Dal maggio 2011 ad aprile 2022, 103 pazienti sono stati sottoposti a procedura di RA; 41 pazienti ovvero il 40% da via arteriosa femorale e 62 pazienti ovvero il 60% tramite l'accesso radiale. In 28 di questi (45%) è stato utilizzato un catetere sheathless Eucath 7,5 Fr, che ha un calibro di un introduttore 5Fr. L'età media di questi 28 pazienti era di 75±8 anni, 10 pazienti (36%) erano di sesso femminile, 8 (28%) diabetici, 3 (3.5%) con insufficienza renale severa (GFR <30 ml/min), 10 (36%) con arteriopatia periferica. La presentazione clinica è stata di infarto miocardico sopraslivellato (STEMI) in 1 caso (3.5%), infarto miocardico senza sopraslivellamento ST (NSTEMI) in 12 (43%) e di sindrome coronarica cronica nei rimanenti. Un paziente (3.5%) erano in shock cardiogeno. Nella maggioranza dei casi (24, 85.5%) il vaso trattato è stata la discendente anteriore, mentre il tronco comune è stato trattato in 3 pazienti (11%) e la coronaria destra in un paziente (3.5%). Le frese utilizzate sono state da 1.5 mm. Il successo procedurale, definito come stenosi residua <30% con un flusso TIMI 3, è stato ottenuto in 27 pazienti (96%). In un caso non è stato possibile avanzare la fresa a valle della stenosi ed in paziente è stato pertanto sottoposto a rivascolarizzazione chirurgica. La mortalità intraospedaliera si è verificata in un caso (3.5%) in paziente già in shock prima della procedura. Non si sono verificate complicanze vascolari.

Conclusioni. Nella nostra esperienza la procedura di aterectomia rotazionale mediante accesso radiale ed utilizzo di catetere guida "sheathless" è risultata efficace e sicura in una popolazione di pazienti ad alto rischio clinico e procedurale.

P49

THE ROLE OF INFLAMMATORY TIME-BASED TRAJECTORIES IN STEMI PATIENTS UNDERGOING PRIMARY PCI

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Introduction. Despite the key pathophysiological role of inflammation in the development and progression of coronary artery disease, the

evaluation of inflammatory status has not been clearly established in patients presenting with acute coronary syndrome. The aim of this study is to evaluate the prevalence of different inflammatory patterns in patients referred for primary PCI (pPCI) and to determinate their relationship with adverse clinical outcomes.
Methods. We carried out a single-centre, cross-sectional study consecutively enrolling all patients presenting at our large-volume PCI hub between January 2006 and December 2018 with a diagnosis of STE-ACS and treated with pPCI. Systemic Immune-Inflammatory Index (SII: total peripheral platelets count × neutrophil-to-lymphocyte ratio) was calculated at admission and discharge. High and low values were referred to the study median SII value. According to different SII trajectories patients were divided into four patterns: the "low-low" pattern [persistently low SII], the "high-low" pattern [first high-, then low SII], the low-high pattern [first low-, then high SII] or the "high-high" pattern [persistently high SII]. The primary endpoint was a composite of all-cause of death and myocardial infarction (MI) at one-year follow-up.
Results. A total of 2353 subjects treated with pPCI have been enrolled in the study and about one half of them presented with elevated SII Index at admission (51%). Considering different inflammatory patterns, 44% patients belonged to the "low-low" patterns, 31% to the "high-low", 4% to the "low-high" and 21% to the "high-high" pattern. The primary endpoint was observed in 8% of patients with a "low-low", 12% with a "high-low", 27% with a "low-high", and 25% with a high-high pattern, p=0.001. After multivariate analysis, "low-high" [OR: 3.2 (1.59-3.93); p=0.001] and "high-high" [OR: 4.1 (3.03-4.65); p=0.001] patterns emerged as the only independent predictors of the primary outcome.
Conclusion. Among different inflammatory patterns, "high-high" and "low-high" patterns are frequently observed in patients undergoing pPCI and they appear associated with an increased risk of all-cause mortality and MI at 1 year follow-up. Inflammatory patterns in STEMI patients undergoing pPCI constitute a valid prognostic tool and a potential therapeutic target.

P50

ABLUMINUS DES+ LONG-TERM OUTCOMES: REGISTRO PROSPETTICO MONOCENTRICO

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Introduzione. La nuova generazione di stent a rilascio di farmaco con matrice di polimeri biodegradabili, ha cercato di migliorare la loro efficacia e sicurezza. Il registro prospettico monocentrico Abluminus-DES+ Long-term Outcomes ha lo scopo di valutare, in un follow-up di 2 anni, il profilo di efficienza/sicurezza nel real world.
Metodi. Da Ottobre 2019 a Marzo 2020 e con un follow-up di 2 anni, sono stati arruolati consecutivamente 167 pazienti (Tab. 1) sottoposti a coronarografia in elezione e contestualmente ad angioplastica coronarica con impianto di stent medicato Abluminus-DES+ (Concept Medical; Tampa, FL; USA). Endpoint primari: morte cardiovascolare, infarto miocardico correlato al vaso trattato (TV-MI), rivascolarizzazione della lesione bersaglio (TLR)/rivascolarizzazione del vaso bersaglio (TVR) e la trombosi dello stent (ST). Criteri di esclusione: SCA (STEMI e NSTEMI) ed allergia ad ASA. Terapia farmacologica intraoperatoria: Eparina 70-100 UI/kg; ASA 500 mg; Clopidogrel: 600 mg. Terapia farmacologica alla dimissione era: ASA 100 mg e Clopidogrel 75 mg per 12 mesi e poi solo ASA 100 mg. Follow-up: A) visita cardiologica: 1, 6, 12, 18 e 24 mesi; B) ECG da sforzo: 3, 6, 12, 18 e 24 mesi; C) ecocardiogramma color-Doppler: 6, 12 e 18 mesi.
Risultati. Nei 167 pazienti arruolati sono stata osservati: una trombosi dello stent (ST: 0,59%) a circa 2 mesi dall'angioplastica e una restenosi (TLR: 0,59%) a 15 mesi dall'angioplastica.
Conclusioni. Nel registro prospettico monocentrico Abluminus-DES+ Longo-term Outcomes, lo stent Abluminus-DES+ ha mostrato un ottimo profilo di sicurezza ed efficacia a 2 anni.

Tabella 1. Caratteristiche della popolazione.

Età	48-83 anni
Uomini	53%
Ipertensione arteriosa sistemica	61%
Ipercolesterolemia	54%
Diabete mellito NID	38%
BMI >25	67%
Fumo	68%

Tabella 2. Caratteristiche lesioni e stent utilizzati.

Lunghezza (μ)	18,2 mm
Diametro (μ)	2,9 mm
Biforcazione	58%
Calcificazioni	43%
Diametro (μ)	2,9 mm
Lunghezza (μ)	18,2 mm

P51

5-YEAR FINAL RESULTS OF THE BVS STEMI STRATEGY-IT (NCT02601781)

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Introduction. Data on Absorb bioresorbable vascular scaffold (BVS) use in patients presenting with ST-segment elevation myocardial infarction (STEMI) are limited. Furthermore, Absorb studies including STEMI patients lacked a prespecified implantation technique to optimize BVS deployment. We aimed to the final 5-year clinical outcomes STEMI patients undergoing primary percutaneous coronary intervention (pPCI) with a pre-specified BVS implantation strategy.
Methods. BVS STEMI STRATEGY-IT (NCT02601781) included 505 STEMI patients undergoing pPCI with BVS following a dedicated implantation protocol. Device-oriented composite endpoint [(DOCE) cardiac death, ischemia-driven target lesion revascularization (ID-TLR) and target vessel myocardial infarction (TV-MI)] and scaffold thrombosis (ScT) at 5-year were evaluated. A subgroup analysis was performed on patients in whom dual antiplatelet therapy (DAPT) was continued 36 months after pPCI ("longer-term DAPT"), and outcomes of this cohort compared to the remaining population ("shorter-term DAPT": <36 months) are also reported.
Results. Five-year DOCE and ScT rates were low (2.4% and 1.0%, respectively). In 319 (63.2%) patients DAPT was continued 36 months after pPCI. DOCE rate was significantly lower in the longer- compared to shorter-DAPT group (HR:0.29;95%CI: 0.1-0.9;p=0.03), driven by a lower rate of TV-MI (0% vs. 2.2%, p=0.018). Significantly lower rate of ScT was observed in longer-DAPT group (0% vs 2.7%, p=0.007). No DOCE or ScT occurred between 3- and 5-year follow-up.
Conclusions. Five years after Absorb implantation in selected STEMI patients, following a prespecified implantation strategy, the rates of DOCE and ScT were low. The addition of adequate longer-term DAPT continuation to proper implantation technique further improves the outcomes in these patients. No DOCE or ScT occurred between three and five years. Whether these results can be extended to newer generation devices needs further investigation.

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FRA ANGIOGRAFIA CORONARICA E STRAIN IMAGING NELLA SINDROME CORONARICA ACUTA

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Introduzione. Una percentuale consistente di pazienti affetti da sindrome coronarica acuta nell'espressione clinica dell'AI, della SCA-NSTE e, in percentuale meno consistente, della SCA-STE, è sottoposta ad imaging ecocardiografico, sia nel dipartimento di emergenza urgenza che all'ingresso in UTIC sia per la conferma diagnostica sia per definizione di sede e di estensione dell'ischemia miocardica acuta. Il cardiologo interventista si avvale volentieri delle informazioni provenienti dall'imaging per la programmazione di modalità, timing e stratificazione del rischio di procedura, quando disponibili. Il 2DS longitudinale è una metodica già ampiamente validata per la valutazione sensibile ed oggettiva della contrattilità miocardica con scarsa variabilità intra ed interosservatore e scarso time consuming. Lo scopo del nostro studio osservazionale è stato il confronto, nell'attività della nostra UTIC, con il gold standard dell'angiografia coronarica in pazienti monovasali con sindrome coronarica acuta di nuova insorgenza valutati entro le 24 ore dall'insorgenza della sintomi-segni di ischemia miocardica acuta.
Metodi. *Arruolamento allo studio*: Abbiamo reclutato 100 pazienti consecutivi, ricoverati nella nostra terapia intensiva per sindrome coronarica acuta (SCA). I criteri di esclusione erano: pazienti con una storia di precedente infarto del miocardio (n=15) o rivascolarizzazione dell'arteria coronaria (n=20); quelli con frazione di eiezione (EF) <30% valutata con il metodo di Simpson del biplano modificato (n=3) e/o precedente cardiomiopatia dilatativa (n=2), malattia valvolare moderata o grave (n=5), severa ipertrofia miocardica (n=1), malattia coronarica multivasale (n=18), QRS >0,12" su ECG (n=2). Pertanto, il numero finale di partecipanti arruolati è stato 62.
Case definition: La definizione di angina instabile si è basata sui criteri di Braunwald come nuova insorgenza (<2 mesi) di angina severa, angina ingravescente o angina a riposo. L'infarto miocardico è stato definito richiedendo almeno 2 dei seguenti criteri: 1) dolore toracico tipico della durata di almeno 30 minuti, 2) segni elettrocardiografici di ischemia, 3) l'elevazione degli enzimi cardiaci a più del doppio del limite superiore del nostro range di riferimento ottenuto prima del cateterismo.
Analisi WMS e 2DS longitudinale: Il ventricolo sinistro è stato diviso in 16

segmenti secondo le raccomandazioni dell'American Society of Echocardiography, 6 segmenti basali, 6 segmenti della cavità media e 4 segmenti apicali sia per la valutazione del WMS che del "DS longitudinale. Le correlazioni tra i segmenti miocardici del ventricolo sinistro e i letti coronarici principali sono state assegnate tenendo presente la dominanza coronarica osservata sulla coronarografia, infatti in caso di dominanza coronarica sinistra e/o ipoplasia coronarica destra, i segmenti 3, 9 sono stati assegnati all'arteria circonflessa (Fig. 1a). Il Wall Motion Score era basato su 4 valori funzionali (1= contrazione normale; 2= ipocinesia; 3= acinesia; 4= discinesia). Per correlare il letto arterioso coronarico e segmenti definiti ecocardiograficamente è stata utilizzata una mappa bull's eye del ventricolo sinistro, secondo la convenzione generale.

Imaging ecocardiografico. Le immagini ecocardiografiche sono state ottenute nella posizione di decubito laterale sinistro utilizzando una piattaforma ecografica GE VIVID 7 (General Electrics Vingmed Ultrasound AS, Horten, Norvegia). Abbiamo utilizzato un trasduttore da 3,5 MHz e registrato tre proiezioni apicali (4 camere, 3 camere e 2 camere), ciascuna composta da almeno tre cicli cardiaci, con frame rate >60 fpm. Le immagini sono state acquisite in cicli cinematografici attivati nel complesso QRS. I Raw Data sono stati archiviati su supporto magneto-ottico e quindi rivisti off-line utilizzando il pacchetto software Echopack BT04 (BE Vingmed Ultrasound AS).

Misure 2DS longitudinali. 2DS è stato misurato con una procedura automatica (AFI). Identificato l'anello della valvola mitrale e l'apice ventricolare sinistro nel frame telesistolico delle immagini 2-D, il software ha proceduto automaticamente a delineare i bordi endocardici, creando 6 regioni di interesse in ciascuna immagine ed eseguendo l'analisi del tracciamento delle macchie in scala di grigi in tutto l'intero ciclo cardiaco. Ciechi per i dati elettrocardiografici e coronarografici, gli operatori hanno verificato l'accuratezza del tracciamento e apportato le modifiche eventualmente necessarie. Quindi, dopo la convalida del tracciamento, il sistema ha generato una rappresentazione grafica a occhio di bue del picco di deformazione sistolica longitudinale di ciascun segmento. I valori limite di deformazione sono stati definiti in base alla letteratura.

Angiografia selettiva coronarica. Il cateterismo cardiaco è stato eseguito entro 24 ore dall'arrivo in terapia intensiva coronarica con un angiografo Siemens Artis Zee floor ed i relativi filmati delle angiografie coronariche archiviati con software Carestream Vue Motion Il pattern dell'arteria coronaria è stato definito come dominanza destra, quando l'arteria interventricolare posteriore (IP) era, come tipicamente, un ramo dell'arteria coronaria destra (CDX). o dominante sinistra, se IP era un ramo dell'arteria coronaria circonflessa (CX) e/o RCA (Fig. 1B). La lesione colpevole è stata identificata sulla base dell'angiografia coronarica (arteria occlusa, stenosi critica), e/o con delle caratteristiche della placca (ulcerata, apposizione di trombi, dissezione spontanea) e della sede delle alterazioni dell'ECG.

Analisi statistica. Le variabili continue sono state espresse come mediana + deviazione standard. La capacità di WMS e 2DS di identificare il sito di una lesione osservata all'angiografia è stata confrontata attraverso un'analisi della curva caratteristica operativa del ricevitore (curva ROC). Inoltre, abbiamo confrontato sensibilità, specificità e valori predittivi positivi e negativi delle due tecniche (WMS e 2DS) utilizzando le informazioni coronarografiche.

Risultati. Sono stati inclusi 62 pazienti, 49 maschi (79,1%) e 13 femmine (20,9%), età media 60,3±13,3 anni. Trentadue pazienti (51,6%) avevano una diagnosi clinica di SCA-STE, ventuno (33,9%) SCA-NSTE e nove (14,5%) AI. La frazione di eiezione media è stata del 57,64±11,29%, con valori compresi tra il 35% e l'80%. Il volume medio del ventricolo sinistro telediastolico (LVEDV) era 108,19±25,26 ml. Nove pazienti (14,51%) hanno mostrato predominanza coronarica sinistra e/o ipoplasia dell'arteria coronaria destra. Un'angiografia coronarica selettiva ha evidenziato stenosi critica anatomica o funzionale (Riserva di flusso frazionario <80%) in un singolo vaso coronarico principale: arteria discendente anteriore sinistra (IVA), arteria circonflessa (CX) o arteria coronaria destra (CDX), in tutti i pazienti osservati; trentotto pazienti (61,3%) presentavano stenosi critica e/o occlusione dell'IVA, tredici della CDX (21%) e undici (17,7%) della CX. Tutti i pazienti erano stati sottoposti con successo a rivascolarizzazione dell'arteria colpevole. Un totale di 992 segmenti miocardici ecocardiografici del ventricolo sinistro sono stati valutati per determinare sia il di 2DS che WMS. L'accuratezza dell'analisi 2DS longitudinale appariva elevata e superiore a quella ottenuta con WMS come confermato dall'AUC della curva ROC (Fig. 2). I risultati di TPR, TNR, PPV e NPV dell'intera popolazione arruolata sono riassunti nella Tabella 1 e nella Figura 3 che sottolineano un aumento significativo di TPR e NPV con il metodo 2DS. Visual WMS conserva TNR e PPP più elevati rispetto all'analisi 2DS longitudinale (rispettivamente 95% vs 85% e 88% vs 69%). Abbiamo inoltre identificato i sottogruppi in base all'arteria colpevole (IVA, CX o CDX) e alla diagnosi clinica (SCA-STE, SCA-NSTE, AI). Il miglior risultato in TPR è stato osservato nel gruppo SCA-STE (65%) e particolarmente nel sottogruppo SCA-STE anteriore (68%). Un'elevata sensibilità è stata riscontrata nei pazienti con SCA e stenosi critica/occlusione de ramo IVA (54,9%). Questi risultati ei relativi valori di p ottenuti sono illustrati nella Tabella 2. La Figura 4 mostra il sottogruppo dello SCA-STE anteriore che evidenzia una ROC curve ed il suo interessante AUC (0,90). NPV sembrava essere elevato nel sottogruppo STEMI (75%). In particolare, era maggiore nell'infarto miocardico della parete inferiore (83%), nella stenosi RCA, nella stenosi CXA e nell'N-STEMI posteriore-laterale (82%).

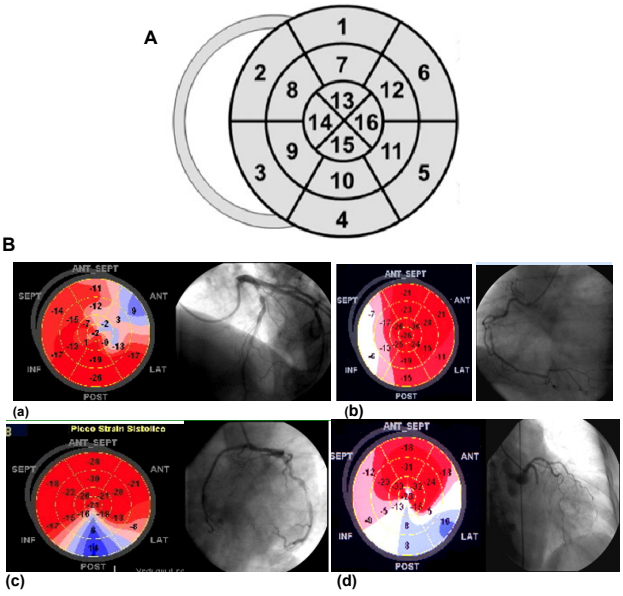

Figura 1. (*A*) Bull's eye. (*B*) 2DS bull's eyes esemplari nella sindrome coronarica acuta derivanti da: (*a*) stenosi critica/occlusione prossimale del ramo IVA, (*b*) stenosi critica/occlusione della coronaria destra dominante al segmento medio, (*c*) stenosi critica/occlusione del ramo circonflesso al segmento medio e (*d*) stenosi critica/occlusione del ramo CX iper-dominante.

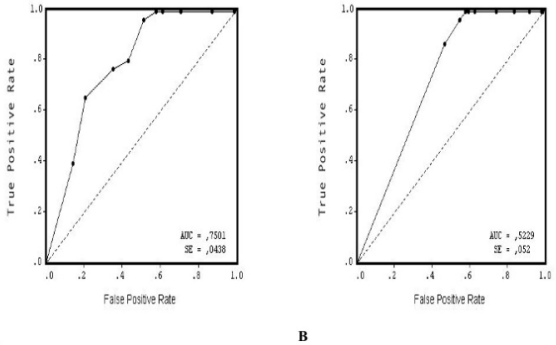

Figura 2. (*A*) ROC curve ottenuta con 2DS longitudinale ottenuta confrontando l'area ischemica con il riscontro angiografico della lesione colpevole attesa con il 2DS longitudinale e con il WMS in 62 pazienti con SCA.
AUC, area under the curve; SE, errore standard.

Tabella 1. TPR, TNR, PPV e NPV per il 2DS longitudinale ed il WMS of 62 pazienti con SCA.

62 pazienti con sindrome coronarica acuta		
Metodica	2DS longitudinale	WMS
Sensibilità (TPR)	0,522	0,328
Specificità (TNR)	0,8523	0,9575
Valore predittivo positivo (PPV)	0,6966	0,8882
Valore predittivo negativo (NPV)	0,6921	0,6474
p	<0,00005	<0,00005

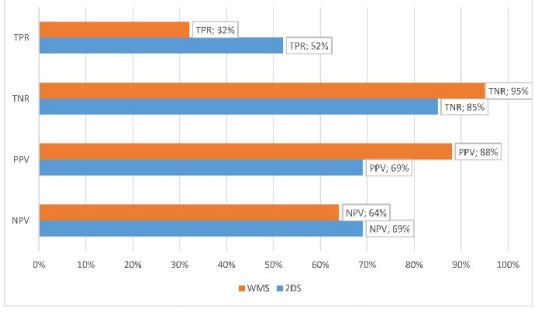

Figura 3. Sensibilità (TPR), specificità (TNR), valore predittivo positivo (PPV) e valore predittivo negativo (NPV) per il WMS e 2DS di 62 pazienti con SCA.

Tabella 2. Risultati e dati statistici nei sottogruppi identificati.

Sottogruppi	Metodo	AUC	TPR	TNR	PPV	NPV	p
IVA (n.38)	2DS	**0,7801**	0,5497	0,7857	0,7673	0,5758	<0,00005
	WMS	0,6887	0,3772	0,9662	0,9348	05468	<0,00005
CX (n.11)	2DS	0,8017	0,5	0,7955	0,449	0,8268	<0,0002
	WMS	0,3595	0,1429	0,9528	0,5385	0,7423	<0,03
CDX (n.13)	2DS	0,5917	0,2857	0,9467	0,6	0,8256	0,00005
	WMS	0,2308	0,1556	0,9816	0,7	0,8081	0,0001
SCA STE	2DS	**0,8228**	0,6545	0,8014	0,7129	0,7548	<0,00005
(n.32)	WMS	0,6216	0,4682	0,9452	0,8555	0,7023	<0,00005
SCA NSTE	2DS	0,7528	0,449	0,8413	0,6875	0,6625	<0,00005
(n.21)	WMS	0,4728	0,2168	0,9482	0,7561	0,6203	<0,00005
AI (n.9)	2DS	0,4506	0,1406	0,8625	0,45	0,5565	0,957 (n.s.)
	WMS	0,2099	0,0357	0,8977	0,1818	0,594	0,1427 (n.s.)
SCA STE ant.	2DS	0,9025	0,6833	0,7857	0,8039	0,6587	<0,00005
(n.20)	WMS	0,7425	0,5167	0,95	0,93	0,6045	<0,00005
SCA STE inf.	2DS	0,6550	0,4211	0,8852	0,5333	0,8308	<0,00005
(n.9)	WMS	0,4000	0,2538	0,959	0,6429	0,8014	<0,0002
SCA STE post-	2DS	0,9167	0,5455	0,6216	0,3	0,8214	<0,3 (n.s.)
lat (n.3)	WMS	0,2728	0,0909	0,8219	0,2	0,7674	0,8 (n.s.)
SCA NSTE	2DS	0,7639	0,4907	0,7857	0,7465	0,5455	<0,0005
anteriore (n.12)	WMS	0,6563	0,25	0,9881	0,9643	0,5061	<0,00005
SCA NSTE	2DS	0,6667	0,1333	1	1	0,7174	<0,0321
inferiore (n.3)	WMS	0,0000	0	1	0	0,5875	<0,99 (n.s.)
SCA NSTE	2DS	0,8889	0,4583	0,8333	0,4783	0,8219	<0,04
post-lat (n.6)	WMS	0,3333	0,1379	1	1	0,7283	<0,002

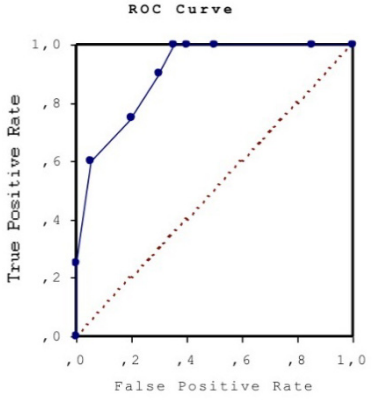

Figura 4. ROC curve nel sottogruppo SCA STE anteriore, ottenuta con 2DS longitudinale (AUC: 0,9025).

Discussione. In questo studio, l'analisi del è stata spesso eseguita poco dopo il primo contatto medico del paziente e sempre entro 24 ore dall'insorgenza dei sintomi, successivamente si sono confrontati i dati ecocardiografici con i risultati dell'esame angiografico. I risultati hanno mostrato che il 2DS eseguita in ambiente acuto garantisce una migliore sensibilità e un valore predittivo negativo rispetto al WMS e ai suoi risultati TPR sostanzialmente equivalenti all'imaging miocardico perfusionale. Da notare, il 2DS può essere facilmente eseguito al letto del paziente, ha costi contenuti, è facilmente ripetibile, non è invasivo e, con software recenti, non richiede tempo. Un'accurata diagnosi di ischemia miocardica è fondamentale per un adeguato trattamento farmacologico e/o interventistico e per definire la stratificazione del rischio dei pazienti con SCA. È stato dimostrato che l'analisi della deformazione valuta in modo affidabile la funzione sistolica e diastolica del ventricolo sinistro. Studi sperimentali su modelli animali hanno dimostrato che Strain è in grado di identificare alterazioni della deformazione miocardica entro pochi secondi dall'occlusione dell'arteria coronaria. Nell'uomo, lo sforzo può distinguere il miocardio normalmente perfuso dal miocardio stordito o necrotico, con un buon valore predittivo per la transmuralità dell'infarto. Tuttavia, i tempi di post-elaborazione prolungati hanno limitato l'uso di questa procedura in ICCU. Di recente, l'analisi semiautomatica del rilevamento delle macchie e il software aggiornato hanno ridotto il dispendio di tempo consentendo una rapida implementazione della procedura, anche al letto del paziente. Limitazioni Il valore di 2DS dipende dalla qualità delle immagini bidimensionali, e quindi la fattibilità di questa procedura dipende dalla qualità della finestra ecocardiografica. Dal nostro studio sono stati esclusi i pazienti con uno o più segmenti ventricolari sinistri non valutabili. La variabilità inter- e intra-osservatore dell'analisi 2DS semiautomatica si è stabilizzata a meno del 5% per entrambe le variabili, e comunque inferiore a quella riportata per WMS. Il tempo medio di elaborazione dei dati è risultato essere di 3±1 minuti, dipendente principalmente dalla qualità della finestra ecocardiografica. In ogni caso, questo intervallo è apparso sufficiente per completare l'esame, ma sicuro per il paziente nonostante le condizioni critiche.

Conclusioni. Conclusioni: il 2DS longitudinale, in questo piccolo studio osservazionale ha dimostrato con soddisfacente accuratezza nella individuazione dell'arteria colpevole confrontato con il gold standard dell'angiografia coronarica. La sensibilità ed il valore predittivo negativo sono più elevati, e con significatività statistica, nei pazienti con infarto miocardico anteriore acuto con sopraslivellamento del tratto ST persistente (68%).

Coronary: Physiology

P53

ACETYLCHOLINE USE IN MODERN CARDIAC CATHETERIZATION LABORATORIES: A SYSTEMATIC REVIEW

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Introduction. The use of acetylcholine for the diagnosis of vasospastic angina is recommended by international guidelines. However, its intracoronary use is still off-label due to the absence of safety studies. We aimed to perform a systematic review of the literature to identify adverse events related to the intracoronary administration of acetylcholine for vasoreactivity testing to fill this gap.

Methods. We conducted a systematic review of observational studies and randomized controlled trials dealing with the intracoronary administration of acetylcholine. Articles were searched in MEDLINE (PubMed) using the MeSH strategy. Three independent reviewers determined whether the studies met the inclusion and exclusion criteria.

Results. A total of 434 articles were selected. Data concerning clinical characteristics, study population, acetylcholine dosage, and adverse effects were retrieved from the articles. Overall, 71,566 patients were included, of which only 382 (0.5%) developed one adverse event, and there were no fatal events reported (0%).

Conclusions. Intracoronary administration of acetylcholine in the setting of coronary spasm provocation testing is safe and plays a central role in the evaluation of coronary vasomotion disorders, making it worthy of becoming a part of clinical practice in all cardiac catheterization laboratories.

P54

CORONARY MICROVASCULAR DYSFUNCTION: IT COULD BE (ALSO) A MAN'S WORLD!

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Introduction. Coronary microvascular dysfunction (CMD) is considered an aetiology for ischaemic heart disease with signs and symptoms of myocardial ischaemia, but no obstructive coronary artery disease (CAD). CMD is defined as impaired coronary flow reserve owing to functional and/or structural abnormalities of the microcirculation and is associated with an adverse cardiovascular prognosis. Women are known to be more likely than men to have angina in the absence of obstructive CAD and CMD has been proposed as one of the major reasons for this presentation. However, also in men, CMD should be recognized, in order to give the best treatment to relieve symptoms and improve patient prognosis. Index of microvascular resistance (IMR) and coronary flow reserve (CFR) are needed to diagnose CMD and are now easily obtained with pressure wires measurement.

Methods. Since the adoption in our Cath Lab of the PressureWire™ X Guidewire with the Coroventis CoroFlow Cardiovascular System (Abbott) we started to study IMR and CFR in patients with no obstructive CAD and typical angina. No acute coronary syndromes have been studied in our Cath Lab so far. In this brief study we report a descriptive analysis of the first patients studied and of the first period of follow-up, focusing on men.

Results. From January 2022 (date when we received the new software) to April 2022 we studied 24 patients and 8 (33%) were men. Among men, mean age was 58±5 yo and two have been already treated with PCI during the previous 6 months. Mean ejection fraction was 57±2% and mean GFR was 76±20 ml/min/mq. 7 out of 8 patients were affected by dyslipidemia, 5 were smoker, 50% were affected by arterial hypertension and only 1 by diabetes. Mean RFR and FFR in left anterior descending artery were 0.92±0.02 and 0.92±0.03, respectively. In 6/8 (75%) patients IMR derived was >25 and, among them 4 (66%) had CFR<2. After coronary study we tried to optimize medical therapy in all these patients, adding or changing to Zofenopril previous ACE inhibitor therapy, adding or titrating Ranolazine and adding or titrating negative chronotropic therapy (beta blockers or calcium channel blockers). After therapy optimization none of the patients had resumption of symptoms (follow-up from 1 to 5 months).

Conclusions. Even if historically considered a women's disease, we should remember that CMD also affects men. New widespread technologies should be used systematically to rule out CMD and to define patients' symptoms mechanisms. This would lead to targeted therapy that could improve patient's lives.

P55

EVALUATION OF ECHOCARDIOGRAPHIC PARAMETERS IN PATIENTS WITH MICROVASCULAR DYSFUNCTION: A PROSPECTIVE STUDY

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Introduction. The prevalence of microvascular angina is underestimated in the general population because it is often difficult to detect. Microvascular dysfunction is defined by parameters of reduced coronary flow reserve (CFR <2) without epicardial stenosis and/or increased index of microvascular resistance (IMR >25). The aim of this study was to evaluate the echocardiographic parameters in patients with symptoms of myocardial ischemia without evident coronary epicardial obstruction. Primary endpoint was to analyze the global longitudinal strain of the left ventricle and the left atria strain in patients with microvascular angina. Secondary endpoint was to analyze echocardiographic parameters to evaluate the diastolic function of the left ventricle, the prevalence of cardiovascular risk factors and the blood tests values.

Methods. Between 1st February 2019 and 1st May 2022, subjects with angina and not functionally significant epicardial stenosis (Resting Full-cycle Ratio >0.91, Fractional flow reserve >0.80), underwent assessment of microvascular function and were divided into 2 cohorts. All patients had sinus rhythm, preserved left ventricular ejection fraction (LVEF >55%), no severe left ventricular hypertrophy (interventricular septum <13 mm) or structural heart disease. For each patient we analyzed the left ventricular global longitudinal strain in the three apical views (4 chamber, 2 chamber and 3 chamber) and the left atria strain, PALS (peak atrial longitudinal strain) and PACS (peak atrial contraction strain), in two apical views (4 chamber and 2 chamber). We also measured the diastolic function indices (E/e', isovolumic relaxation time, deceleration time), the left atrial area and pulmonary artery systolic pressure (PASP) evaluated on echocardiography.

Results. A total of 132 patients were enrolled. Of those, 47 had evidence of microvascular dysfunction and 85 had normal CFR/IMR. *Primary endpoint*: patients with microvascular dysfunction had reduced values of left ventricular global longitudinal strain and reduced values of left atrial strain compared to controls. *Secondary endpoint*: a higher prevalence of diabetic and obese women was associated with microvascular dysfunction. However, there were no significant differences in age, prevalence of hypertension, dyslipidemia, smoking and dysthyroidism. Numerically higher values of NT-pro-B-type natriuretic peptide (NT-proBNP) and C-reactive protein were seen in patients with microvascular dysfunction, while there were no significant differences in hemoglobin, white bold cells, platelets, cholesterol, creatinine and troponin values. Left ventricular isovolumic relaxation time, left atrium area, and pulmonary artery systolic pressure as well as E/e' values were significantly increased in patients with microvascular dysfunction. Furthermore, there was a significant reduction in deceleration time values.

Conclusion. Patient with microvascular dysfunction are frequently diabetic and obese women. Echocardiographic parameters show left ventricular diastolic dysfunction and possibly subsequent left atrial remodeling. Furthermore, the analysis of the global longitudinal strain of the left ventricle could reveal alterations in cardiac contractile mechanics that are difficult to identify with conventional echocardiography. NT-proBNP values were not significantly higher, demonstrating that patients with microvascular dysfunction have an early diastolic dysfunction that is not clinically evident.

Baseline and procedural patients characteristics	**Cohort A** (Patients with microvascular dysfunction) (n=47)	**Cohort B** (Patients without microvascular dysfunction) (n=85)	**p** (p value) **ns** (not significant)
Female sex	30 (64,0%)	28 (32,9%)	p<0,01
Diabetes	9 (19,5%)	9 (10,6%)	p<0,05
Obesity (BMI >25)	36 (78%)	50 (58%)	p<0,01
Left Atrium Area (cm^2) (Average)	22,1 ± 1,4	17,7 ± 0,6	p<0,01
E/e'	10,4 ± 0,8	8,3 ± 0,3	p<0,05
Isovolumic Relaxation Time (ms)	122,3 ± 6,5	99,0 ± 6,0	p<0,05
% Left Ventricular Global Longitudinal Strain (average between 4ch, 2ch, 3ch)	-17,4 ± 2,8	-20,7 ± 3,7	p<0,0001
% Atrial strain (average PALS)	25,9 ± 1,3	34,4 ± 1,2	p<0,0001
% Atrial strain (average PACS)	12,4 ± 0,8	16,5 ± 0,7	p=0,0002
PASP (mmHg)	31,9 ± 1,5	27,2 ± 1,1	p<0,05
BNP (pg/ml)	66,1 ± 11,5	45,6 ± 9,2	p=0,0516
C-reactive protein (mg/dl)	2,26 ± 0,8	1,36 ± 0,3	p=0,0512

P56

INDEX OF MICROCIRCULATORY RESISTANCE AND CHRONIC KIDNEY DISEASE: A PROOF-OF-CONCEPT STUDY

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Introduction. In modern cath-lab the Index of Microcirculatory Resistance (IMR) is the gold standard for evaluation of coronary microcirculation with a well known prognostic value. The presence of coronary microvascular dysfunction (IMR >25) is known to alter the functional assessment of coronary stenosis. This study aimed to establish if the presence of chronic kidney disease (CKD) influences IMR value.

Methods. We used data from a monocentric prospective registry enrolling 200 patients (342 vessels) undergoing a full physiological assessment of epicardial and microvascular function with Fractional Flow Reserve (FFR), Resting Full-cycle Ratio (RFR), Coronary Flow Reserve (CFR), Resistive Reserve Ratio (RRR) and IMR. We assessed the relationship between clinical, angiographic and functional variables and IMR measurement. CKD was defined as CrCl value <60 ml/min.

Results. IMR measurement was >25 in 174 (51%) vessels. Of the 342 vessels evaluated, 60 (19.4%) were from patients with CKD. Patients with CKD are more likely to have an IMR value >25 than patients with IMR<25 (29.3% vs 10.0% p<0.001). After multivariable analysis, CKD (OR 5.97 1.71-20.81 p=0.005) emerged as the only independent predictors of IMR >25.

Conclusions. CKD affects IMR assessment, leading to a higher incidence of coronary microvascular diseases (CMD).

P57

ACCURACY OF THE FFR_{CT} PLANNER IN CALCIFIC CORONARY LESIONS

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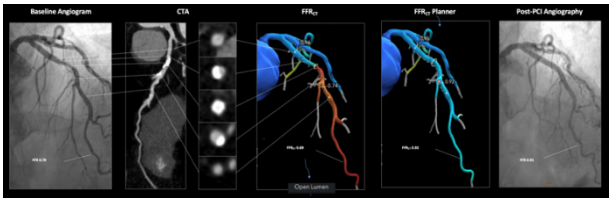
Introduction. Calcific plaques hamper the evaluation of coronary computed tomography angiography (CCTA). FFR_{CT} improves the diagnostic accuracy compared with CCTA to detect significant lesions. The FFR_{CT} Planner has been shown to be accurate and precise to predict fractional flow reserve (FFR) after percutaneous coronary intervention (PCI). The accuracy of the FFR_{CT} Planner in calcified coronary lesions remains to be determined. The primary objective was to assess the accuracy of the FFR_{CT} Planner in vessels with calcified lesions.

Methods. This is a sub-analysis of the Precise PCI Plan (P3) study. In this multicenter, investigator-initiated, prospective study, we recruited patients with stable coronary artery disease (CAD) and significant lesions based on invasive FFR ≤0.80. All patients had CCTA performed in the context of standard of care. CCTA images were processed for FFR_{CT} and FFR_{CT} Planner. Calcium was quantified using seven metrics derived from CCTA analysis: (1) maximal calcium thickness; (2) maximal calcium arc; (3) calcium length; (4) per-patient Agatston calcium score; (5) per-vessel Agatston calcium score; (6) presence of calcium; (7) calcium burden. The median value of each parameter was used to defined high and low calcium content.

Results. Overall, 120 patients and 123 vessels were included. Mean age was 64±9 years, and 23% were diabetics. Measured FFR post-PCI was 0.88±0.06 and Planner FFR_{CT} was 0.86±0.07 (mean difference 0.02 FFR units, LLA -0.12, ULA 0.15). When stratified by different calcium assessments there were no difference in accuracy of the FFR_{CT} Planner (Table).

Conclusion. The FFR_{CT} Planner is accurate to predict post-PCI FFR regardless of the extent and severity of coronary calcifications.

Metrics	**Mean difference**		**p-value**
	Low	**High**	
Calcium thickness	0.03 (-0.12;0.19)	0.01 (-0.13;0.15)	0.090
Calcium arc	0.02 (-0.12;0.16)	0.02 (-0.14;0.18)	0.975
Calcium length	0.03 (-0.12;0.18)	0.01 (-0.13;0.15)	0.104
Calcium burden	0.03 (-0.1;0.15)	0.01 (-0.15;0.18)	0.416
Total Calcium Score	0.02 (-0.13;0.17)	0.01 (-0.11;0.12)	0.372
Per-vessel Calcium Score	0.02 (-0.1;0.14)	0.01 (-0.13;0.16)	0.744
Presence of Calcium	0.02 (-0.08;0.07)	0.01 (-0.12;0.15)	0.783



P58

FEASIBILITY AND EFFICACY OF "PHYSIOLOGY-GUIDED PCI" USING PRESSURE CATHETER IN COMPARISON TO CONVENTIONAL PRESSURE WIRES

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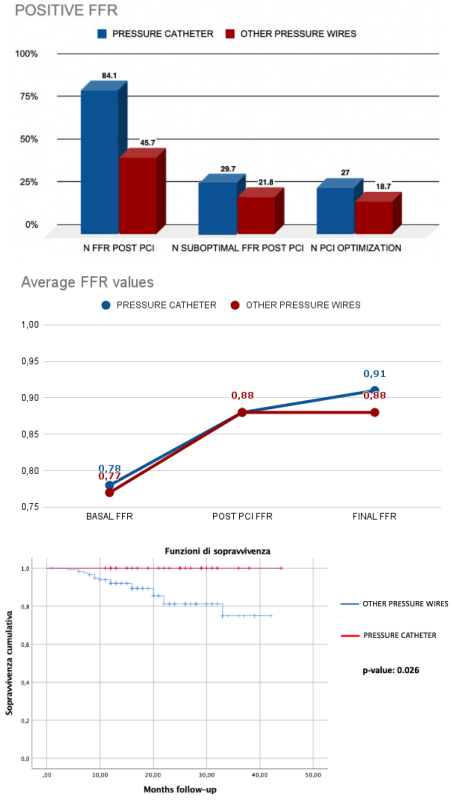
Introduction. Physiological assessment of intermediate coronary stenosis plays a key role for the selection of lesions susceptible to PCI. On the contrary the role of invasive physiological assessment in evaluating the immediate result of PCI, to optimize it and predict prognosis is less established. This also depends on the complexity of handling pressure wires, especially during the rewiring phase of the treated vessel. The monorail Navvus pressure catheter (Acist, USA), represents a valid alternative to this limitation because it works with a workhorse wire used for PCI.

Methods. From the PROPHET-FFR ambispective study (NCT05056662), we compared patients undergoing PCI following an ischemic FFR (or NHPR) value obtained using the Navvus pressure catheter and with a similar population of patients in which the functional evaluation was performed using standard pressure wires.

Results. We enrolled 184 patients undergoing PCI after the evidence of at least one hemodynamically significant stenosis. 44 patients assessed using pressure catheter and 140 patients assessed using conventional pressure wires. After the achievement of a satisfactory angiographic result, post-PCI FFR assessment was performed in 37 cases (84.1%) using pressure catheter vs 64 cases (45.7%) using a traditional pressure wire, without a significant difference in the post PCI FFR value (0.88 vs 0.88, p>0.05). A suboptimal post-PCI FFR value (or NHPR or cFFR) was observed in 11 cases (29.7%) of the pressure catheter group vs 15 cases (21.8%) of traditional pressure wire group. An optimization was done with post-dilatation or further stenting in 10 cases (27%) of pressure catheter group vs 12 cases (18.7%) of traditional pressure wire group. This resulted in a significantly higher post PCI final FFR value in the pressure catheter group than in the pressure wire group (0.91 vs 0.88, p=0.015). A preliminary follow up analysis showed 16 MACE (composite endpoints of CV death, myocardial infarction, TVF and TVR) in "other pressure wires" group; no MACE occurred in "pressure catheter" group. This resulted in a significantly different survival curves and better prognosis for pressure catheter group (p=0.026, average follow-up=28 months).

Conclusions. The use of the Acist Navvus monorail catheter, using common workhorse wires, leads to greater procedural easiness and consequently more post-PCI functional re-evaluations, physiology guided optimizations and so higher final FFR values than traditional pressure wires. This is associated with a better prognosis in pressure catheter group.



P59

CORONARY MICROVASCULAR FUNCTION AND MEASURES OF CARDIAC PERFORMANCE IN PATIENTS WITH LOW FLOW LOW GRADIENT AORTIC STENOSIS

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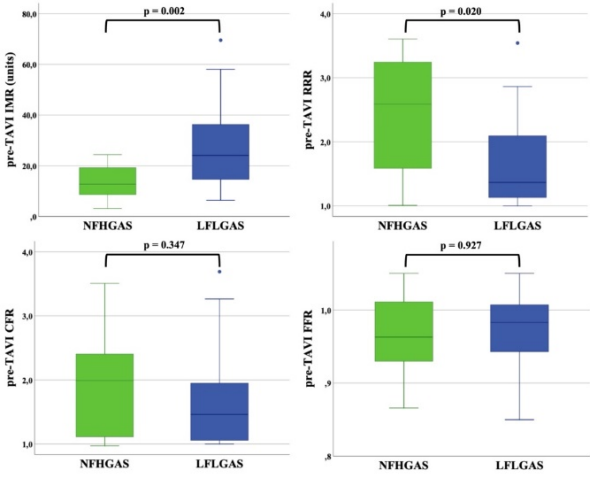
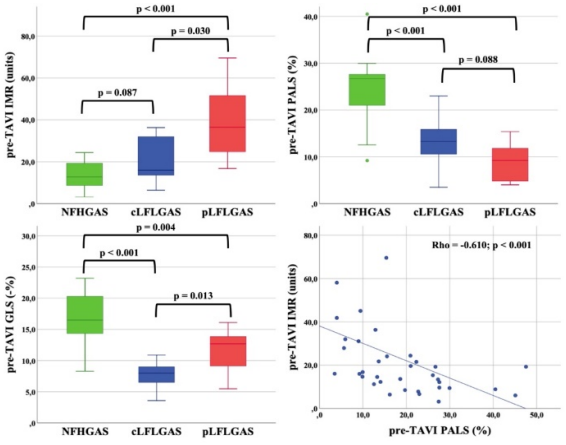
Introduction. Aortic stenosis (AS) is the most common primary valve disease requiring surgery or transcatheter intervention in Western Counties. Based on the transvalvular gradient and forward stroke volume, two broad categories of severe AS can be distinguished: normal-flow high-gradient aortic stenosis (NFHGAS) and low-flow low-gradient aortic stenosis (LFLGAS). Coronary flow reserve (CFR) is reduced in patients with AS, even in the absence of obstructive epicardial coronary artery disease (CAD). Coronary microvascular dysfunction (CMD) was observed in NFHGAS using both invasive and non-invasive coronary physiology assessments. Conversely, little is known about coronary microcirculation in patients with LFLGAS. The pathophysiology of LFLGAS and, especially, the mechanisms of left ventricular (LV) dysfunction are not clearly explained yet. Compared to NFHGAS, patients presenting with LFLGAS show higher grade and more extensive myocardial fibrosis at the cardiac magnetic resonance in both classical (cLFLGAS) and paradoxical LFLGAS (pLFLGAS). Myocardial fibrosis, among others (i.e., valve stenosis and LV hypertrophy), represents a key determinant of impaired perfusion reserve in AS. Based on these data, we hypothesized that CMD might be more prominent in patients with LFLGAS compared with NFHGAS. In this study, we sought to perform a prospective invasive assessment of coronary microcirculation in a consecutive cohort of patients with LFLGAS undergoing transcatheter aortic valve implantation (TAVI) and to compare it with patients with NFHGAS. Moreover, we aimed to assess the possible acute impact of TAVI on coronary microvascular function in the two groups and the interactions between abnormalities in microvascular function and measures of cardiac performance at speckle tracking echocardiography (STE).

Methods. An invasive thermodilution-based assessment was systematically performed in 41 consecutive patients with isolated severe AS with angiographic unobstructed coronary arteries undergoing TAVI. The index of microcirculatory resistance (IMR), resistive reserve ratio (RRR), and CFR were derived to assess coronary microcirculatory function before and after TAVI. Advanced echocardiographic imaging, including STE, was performed to assess cardiac function.

Results. IMR was significantly higher in patients with LFLGAS compared with patients with NFHGAS (24.1 [14.6-39.1] vs. 12.8 [8.6-19.2] p=0.002). Similarly, RRR was significantly lower in LFLGAS compared with NFHGAS (1.4 [1.1-2.1] vs 2.6 [1.5-3.3] p=0.020). No significant differences were observed in CFR between the two groups. High IMR was associated with low stroke volume index (rho=-0.427, p=0.005), low cardiac output (rho=-0.517, p=0.001) and reduced peak atrial longitudinal strain (PALS) (rho=-0.610, p=<0.001). Conversely, IMR was only modestly associated with the mean pressure aortic valve gradient (rho=-0.304, p=0.054). Notably, the mean gradient was significantly associated with IMR in the NFHGAS group (rho=0.632, p=0.003) but not in the LFLGAS (rho=-0.222, p=0.333). Similarly, high IMR was associated with the AVA in the NFHGAS group (rho=-0.50, p=0.025) but not in patients with LFLGAS (rho=0.157, p=0.497). Paradoxical LFLGAS emerged as a phenotype associated with CMD, poor left ventricular longitudinal systolic function and left atrial dysfunction. TAVI determined no significant variation in microvascular function (IMR: 16.0 [10.4-26.1] vs 16.6 [10.2-25.6], p=0.403) and in PALS (15.9 [9.9-26.5] vs 20.1 [12.3-26.7], p=0.222). Conversely, left ventricular global longitudinal strain increased overall after TAVI (-13.2 [8.4-16.6] vs -15.1 [9.4-17.8], p=0.047).





Conclusions. LFLGAS is associated with impaired coronary microvascular function compared with NFHGAS. Combined invasive assessment of microvascular function and advanced non-invasive imaging contributed to defining different AS phenotypes. CMD was associated with a low-flow state, left atrial dysfunction, and reduced cardiac efficiency in patients with AS.

P60

AGE AND VASODILATOR RESPONSE TO DIFFERENT HYPEREMIC AGENTS: ADENOSINE VERSUS CONTRAST MEDIUM

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Introduction. Functional evaluation is the gold standard for the assessment of intermediate coronary lesions, and the most adopted and recommended by societal guidelines to manage percutaneous coronary interventions (PCI) are fractional flow reserve (FFR) and instantaneous ware-free ratio (iFR). Aging is a well-known risk factor for microvascular disfunction and the influence of a pathological microvascular remodeling on FFR, has already been addressed. However, there is another validated hyperemic index, contrast fractional flow reserve (cFFR) which relies on a milder hyperemia than the one achieved by adenosine and for which the relationship with ageing and impaired microcirculation is unknown. The purpose of our study was to investigate the impact of aging on the vasodilatory response to different hyperemic agents (adenosine vs contrast-medium). At the same time, we focused–on the relationship between ageing and both hyperemic (FFR, cFFR) and non- hyperemic (iFR) pressure-derived coronary physiology indices.

Methods. We extrapolated data of physiological indexes from previous studies held at our center during the last ten years. A total of 1533 patients from the NASCI, RINASCI and PROPHET-FFR database were enrolled, accounting for 1874 pressure recordings available for analysis. The cohort was stratified into three age terciles. Age-dependent correlations with FFR, cFFR and iFR were calculated and adjusted for stenosis severity. The vasodilatory response was calculated in 765 lesions (lesions with both FFR and cFFR) as the difference between resting and hyperemic pressure ratios.

Results. Age was positively correlated to FFR (r=0.07, 95% CI: 0.017 to 0.122, p=0.009) (Figure 1), but not with cFFR (r= 0.05, 95% CI: –0.052 to 0.062, p=0.859) (Figure 2) and iFR (r= 0.02, 95% CI: –0.068 to 0.134, p=0.680) (Figure 3). The impact of aging on FFR was independent from acute presentation, presence of diabetes mellitus, angiographic lesion severity and location–(LAD). A significant increase in FFR values was noted in older patients (0.84±0.07 1st tercile, 0.84±0.07 2nd tercile, 3rd tercile 0.85±.060, p=0.019), in particular over 74 years **(**0.84±0.07 1st tercile vs 0.84±0.07 2nd tercile, p=0.758; 0.84±0.07 1st tercile vs 0.85±0.06 3rd tercile, p=0.010; 0.84±0.07 2nd tercile vs 0.85±0.06 3rd tercile, p=0.004). This was not the case for cFFR and iFR that did not differ significantly between age terciles. The hyperemic response to adenosine showed a significant negative correlation with age (r-0.07, CI: -0.144 to -0.003, p=0.039) (Figure 2A). This was not the case for contrast medium hyperemia (r= -0.017, 95% CI: -0.088 to 0.054, p=0.639) (Figure 2B,C). This relationship was independent from angiographic lesion severity, clinical presentations, lesion location on left anterior descending (LAD) artery and other possible confounder factors as shown in the multivariate analysis A decreased and significant value of PdPa-FFR along the age spectrum was noted (0.090±0.050 vs 0.089±0.048 vs 0.079± 0.042 for the 1st, 2nd and 3rd terciles, respectively p=0.002), while PdPa -cFFR value remained pretty similar irrespective of the age terciles.

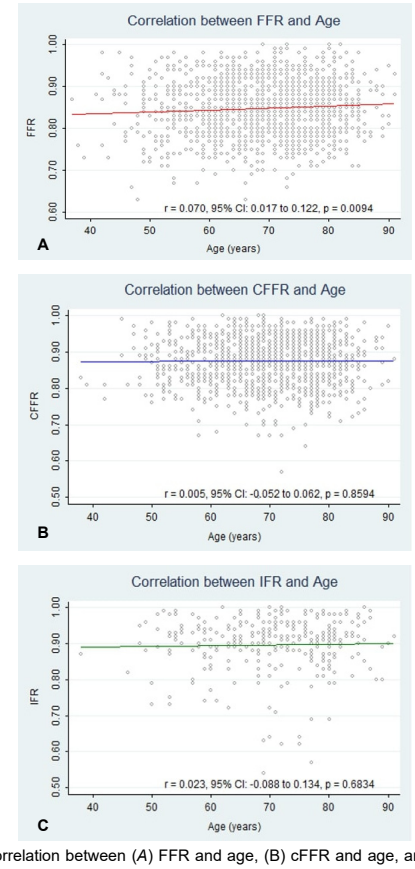

Figure 1. Correlation between (*A*) FFR and age, (B) cFFR and age, and (C) iFR and age.

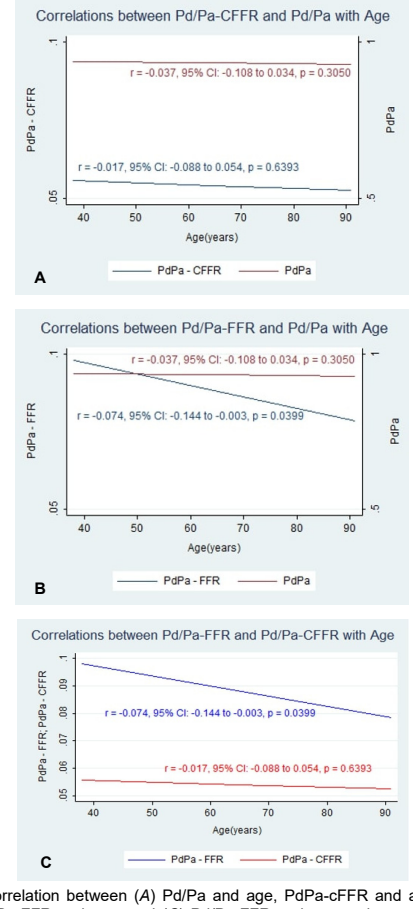

Figure 2. Correlation between (*A*) Pd/Pa and age, PdPa-cFFR and age, (*B*) Pd/Pa and age, PdPa-FFR and age, and (*C*) Pd/Pa-FFR and age and correlation between Pd/Pa-cFFR and age.

Conclusions. The hyperemic response to adenosine shows strict negative correlation with age while contrast induced hyperemia behaves similarly in all the three age terciles. Consequently, FFR value increases in older patients, while cFFR and iFR values are not affected by aging. Among hyperemic indices, cFFR appeared to be less affected by age related microvascular dysfunction and may be considered a more reliable and reproducible tool to assess epicardial stenosis compared to FFR.

P61

UNMASKING OF A SIGNIFICANT LEFT MAIN STENOSIS IN A PATIENT WITH HIGH LEFT VENTRICULAR PRESSURES

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Rationale. A precise characterization of left main (LM) stenoses has prognostic and therapeutic relevance. Beyond coronary angiography, in patients with intermediate LM stenosis Guidelines suggest to collect a more detailed anatomical information by intravascular ultrasound (IVUS) or to perform a physiologic measurement to guide the treatment. This "physiologic approach" includes the evaluation of fractional flow reserve (FFR). Notably, FFR use has been validated in populations with normal or slightly elevated left ventricular (LV) filling pressures. Thus, a cautious interpretation of FFR values is required in patients with LV dysfunction, where increased filling pressures might affect FFR measurements. Previous data demonstrated that LV end-diastolic pressure (LVEDP) was positively associated with FFR measures; this association was greater for FFR values <0.80 and at lower Pa. To date, evidence on intra-individual variations of FFR measures based on changes of LV filling pressures is scant.

Technical resolution. We here describe changes of LV, aortic, and coronary pressures and their effects on FFR measurement during the use of Impella CP device in a patient with LM stenosis and severe LV dysfunction. A 78 years old woman, with hypertension and diabetes mellitus, was admitted for chronic coronary syndrome and severe LV dysfunction. LV ejection fraction at echocardiography was 20% and invasive LVEDP was 25 mmHg. Coronary angiography showed an intermediate LM stenosis with a FFR index of 0.83 (Pd = 67 mmHg, Pa = 81 mmHg) (Figure 1B). Conversely, IVUS imaging showed a significant LM plaque with a minimal luminal area of 4.7 mm2 and 180° angle of a calcified arch. Due to anatomical features of the lesion and concomitant LV dysfunction, we planned a percutaneous coronary intervention (PCI) assisted by Impella CP support. With Impella CP at maximal power (P8) we repeated LVEDP and FFR measurements, being 15 mmHg and 0.65 (Pd=60 mmHg, Pa = 92 mmHg), respectively. Then, we successfully performed coronary intravascular lithotripsy and stent implantation on LM stem.

Clinical Implications. This case demonstrates that an increased LVEDP underestimates the physiological assessment of LM coronary stenosis severity. This can be related to severe diastolic dysfunction resulting in impaired coronary flow. A physiological coronary flow peak has been described in diastole, due to the dominance of a "suction wave" generated by coronary microcirculatory decompression. This wave is significantly reduced in patients with diastolic dysfunction. Furthermore, the vasodilatory capacity of coronary arterioles in patients with increased LVEDP, in our case being related to persisting, large myocardial ischemia and LV dysfunction, is reduced or exhausted at rest; thus, the vasodilatory effect of adenosine on microcirculatory resistance is limited. A similar condition has been described in patients with severe aortic stenosis, where LVEDP reduction by transcatheter aortic valve replacement leads to immediate recovery of coronary microcirculatory resistance and increased hyperemic flow velocity. In our patient, LV unloading and LVEDP decreasing by Impella, coupled with the device-related increase of aortic pressures and reduction of coronary pressures, restored the coronary autoregulation pathways, in particular improving the physiological diastolic "suction wave" and increasing coronary flow. This "unmasked" the functional severity of LM stenosis.

Perspectives. In patients with LM stenosis and high LV pressures, the discrepancy between anatomic and functional measurement may be a sign of coronary autoregulation dysfunction and therefore could help to identify high-risk patients in whom the use of a mechanical support device is more beneficial during percutaneous revascularization.

Peripheral: Aorta

P62

ACCESS-RELATED COMPLICATIONS IN PATIENTS UNDERGOING TOTALLY PERCUTANEOUS ABDOMINAL AND THORACIC ENDOVASCULAR ANEURYSM REPAIR

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Introduction. Endovascular repair of the abdominal (EVAR) and thoracic (TEVAR) aorta are major advance in the treatment of aortic aneurysms. Moreover, these procedures are now frequently handled directly by interventional cardiologists. While the experience in EVAR is well solid, for TEVAR limited evidence is available regarding the advantages of full endovascular versus over open surgical access in terms short-term complications.

Methods. In this cross-sectional study, we retrospectively assessed the short-term outcome and complications of full percutaneous EVAR and TEVAR among 210 patients referred to our center for aneurysm repair over the last decade. Of note, our center is lead only by Interventional Cardiologists with no vascular surgeons on-site.

Results. In EVAR group, we found a lower rate of access-site complication compared to TEVAR (4.0 vs 9.6%) even if this difference did not reach the statistical significance (p=0.09). Moreover, we found no significantly difference in the rate of access complication related to common vascular closure devices between the two groups. Among short term complication, we found more frequently post-operative ischemic complication and anemia associated to TEVAR. At multivariate analysis diabetes was the main determinant for access complication risk. Interestingly, an increased EuroSCORE value in EVAR group was significantly associated to access complication, post-operative renal failure, anemia, stroke, ischemic complication and the presence on endoleak as complication.

Conclusions. In our experience, TEVAR and EVAR are procedures with a high procedural success –leading in most of cases to the definitive treatment of the aortic pathology- with a low incidence of serious adverse events, as shown by the low incidence of access-related complications. Ultimately, full percutaneous approach of aortic pathology represents a valuable therapeutic option, especially in centers with proven experience.

Data Study Population	EVAR (n=127)	TEVAR (n=83)	p value
Age (mean±SD)	72.6±7.9	69.3±11.0	**0.01**
Male (%)	113(89)	63 (76)	**0.01**
Female (%)	14 (11)	20 (24)	**0.01**
Diabetes (%)	30(24)	16 (19)	0.4
Hypertension (%)	119 (93)	76 (91)	0.5
Smoke(%)	60 (47)	36 (43)	0.6
Dyslipidemia (%)	110 (86)	58 (70)	**0.003**
CABG pre (%)	19(15)	4 (5)	**0.02**
Pre-lower limb ischemia	39(31)	29(35)	0.5
Pre-cerebrovascular disease	3(2)	6(7)	0.08
Pre-PCI	42(33)	10(12)	**0.0006**
Pre valvular surgery (%)	10 (8)	19(23)	**0.002**
Prostar (PS) (%)	76(59)	60(72)	0.06
Proglide (PG) (%)	51(40)	23(28)	0.06
Preoperative creatinine value	1.1 ± 0.6	1.3±1.4	0.1
Preoperative Hemoglobin value	13.3±1.8	12.2±1.9	**0.0001**
EuroSCORE	6.6± 6	8.5±7.1	**0.04**
Median sheath size	18.6F ±3.4	22.4±3.2	**<0.0001**
Anticoagulant therapy			
None	112(88)	66(80)	0.1
Coumadin	11(9)	15(18)	
NOAC	4(3)	2(2)	
Left ventricular ejection fraction	55.2±8	56.6±6.7	0.1
Major complications non access-related			
Ischemic complication (%)	2(1.5)	7(8)	**0.01**
Post-operative renal failure (%)	9(7)	10(12)	0.2
Anemia (%)	7(5)	14(17)	**0.007**
TIA (%)	0 (0)	1 (1)	0.2
Stroke (%)	1(0.8)	3 (2)	0.3
Paraplegia (%)	0(0)	1(1)	0.2
Endoleak (%)	10(8)	3 (4)	0.2
Exitus (%)	0 (0)	2 (0)	0.1
Short term complication access related			
Access Complication (%)	5(4)	8 (9.6)	0.09
Access Complication PS (%)	4(5)	6 (10)	0.3
Access Complication PG (%)	1(2)	2(8)	0.1

NOAC, new oral anticoagulant; percutaneous abdominal endovascular aneurysmal repair (EVAR); percutaneous thoracic endovascular aneurysmal repair (TEVAR); percutaneous revascularization (PCI); by-pass surgery (CABP); Proglide (PG); Prostar XL (PS).

Peripheral: Carotid

P63

THE USE OF QUANTITATIVE FLOW RATIO (QFR) FOR THE FUNCTIONAL ASSESSMENT OF EXTRACRANIAL INTERNAL CAROTID ARTERY STENOSIS

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Background. In asymptomatic patients with haemodynamically significant internal carotid artery stenosis, if endarterectomy cannot be considered, a selective invasive angiography is indicated before deciding for percutaneous revascularization. Sometimes, the angiographic assessment of the stenosis might be discordant with the non-invasive assessment, usually performed with Doppler. Therefore, the use of an angiography-based method that allows a functional assessment of the stenosis could be useful to help the diagnostic-therapeutic process. The aim of this study was to evaluate the diagnostic accuracy of Quantitative Flow Ratio (QFR) in the assessment of extracranial internal carotid artery stenosis.

Materials and methods: This registry prospectively enrolled asymptomatic patients with an indication to perform a selective angiography of the supra-aortic trunks. The systolic peak velocity obtained by colour Doppler ultrasound was used to determine the hemodynamic significance of the carotid stenosis (PSV >120 cm/sec), whereas it was defined angiographically significant a stenosis with a %DS >60%, according to NASCET criteria (%DS_{NASCET}). After three-dimensional reconstruction of the angiographic data, QFR, Area Stenosis (AS%) and the minimum luminal area (MLA, mm^2) were obtained.

Results. 30 consecutive patients were enrolled, and 60 carotid arteries analysed, 8 of which were excluded because of previous percutaneous (n = 3) or surgical (n = 5) revascularization. On linear regression analysis, an inverse linear correlation was observed between QFR and PSV values (r^2 = 0.71, p<0.001) and% DS_{NASCET} (r^2 = 0.79, p<0.001) (Figure 1). Similarly, the MLA values showed a significant correlation with both PSV and% DS_{NASCET} (respectively, r^2 = 0.67 and r^2 = 0.75, p<0.001), as well as AS values, which also showed a significant correlation with both PSV and% DS_{NASCET} (respectively, r^2 = 0.68 and r^2 = 0.88, p<0.001). The QFR and the% DS_{NASCET} showed a comparable and high diagnostic accuracy (AUC = 0.99, p<0.001) using PSV as a reference, with a cut-off value of 0.95 for the QFR (Figure 2). However, considering the% DS_{NASCET} cut-off values, the QFR showed higher diagnostic accuracy, sensitivity and negative predictive value as compared with % DS_{NASCET}.

Conclusions. This study showed the feasibility of QFR for the assessment of extracranial internal carotid artery stenosis. It was effective indeed for predicting the functional significance of the stenosis considering the Doppler as standard of reference. However, whether revascularization of the carotid stenosis should be guided by QFR rather than the angiography alone has still to be evaluated.

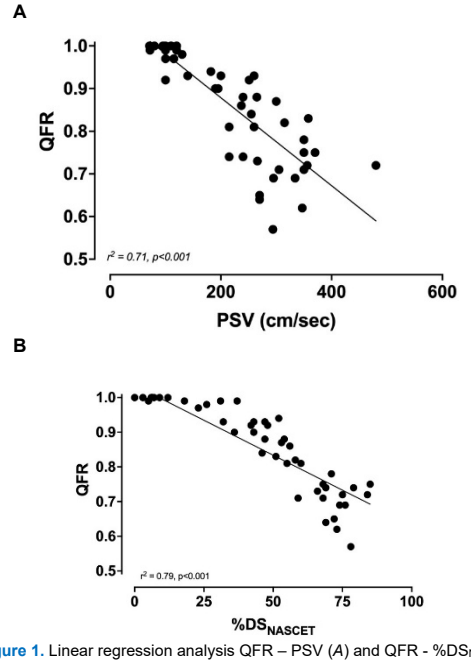

Figure 1. Linear regression analysis QFR – PSV (*A*) and QFR - %DS_{NASCET} (*B*).

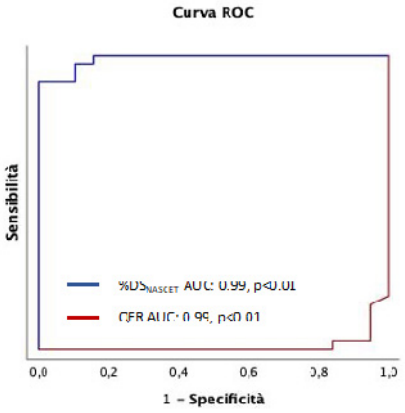

Figure 2. QFR e %DS_{NASCET} - ROC analysis.

Peripheral: Renal denervation

P64

QUANDO LA TERAPIA FARMACOLOGICA NON È PIÙ SUFFICIENTE NEL CONTROLLO DELL'IPERTENSIONE ARTERIOSA: UN CASO DI DENERVAZIONE RENALE

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Razionale. L'ipertensione arteriosa è ancora una delle maggiori cause di morbilità e mortalità nel mondo. Rappresenta il più importante fattore di rischio per malattie cardiovascolari causando la morte di circa 7.6 milioni di pazienti all'anno nel mondo. La maggior parte delle volte si riesce con i farmaci comuni a ottenere valori pressori accettabili. Una delle maggiori cause di insuccesso della terapia farmacologica è la scarsa compliance del paziente che ha una non corretta percezione delle conseguenze correlate ad un cattivo controllo dei valori pressori. Da recenti studi si è osservato che la denervazione renale può giocare un ruolo nell'ottimizzazione dei valori pressori in quei pazienti già in trattamento con almeno tre farmaci antipertensivi e non in controllo ottimale.

Risoluzione tecnica. Il caso che andiamo a presentare è un paziente di 72 anni con storia di cardiopatia ischemica cronica già rivascolarizzata alcuni anni fa, con insufficienza renale cronica lieve (creatininemia 1.3mg/dl e VGFR 54.5 ml/min) in terapia con Aldactone 50 mg, Zanedip 10 mg x2/die, Vytorin 40/10 mg, Cardura 4 mg, Plavix 75 mg, ed in attuale non controllo farmacologico. Dopo aver eseguito uno screening per le cause secondarie di ipertensione abbiamo riscontrato una ipertrofia surrenalica bilaterale causa di un iperaldosteronismo, veniva proposto al paziente un cateterismo delle vene surrenaliche per ricerca di catecolamine, cercando di capire quale dei due surreni fosse maggiormente produttore di catecolamine ed eventualmente rimuoverlo chirurgicamente, ma il paziente ha rifiutato di sottoporsi a tale procedura perché anche se la ricerca delle catecolamine avesse dato risultato positivo non si sarebbe voluto sottoporre ad intervento chirurgico, quindi abbiamo valutato nuove strategie. Il paziente è risultato elegibile a procedura di simpatectomia renale bilaterale.

Implicazioni cliniche. La procedura eseguita in sedazione per via femorale sinistra, dopo cannulazione e angiografia renale si procedeva a 34 ablazioni 16 a sinistra e 18 a destra delle arterie renali e sue ramificazioni extraparenchimali (Fig. 1). Non si sono avute complicanze peri-procedurali. Il paziente dimesso il giorno successivo all'intervento veniva ricontattato per un prelievo ematico di controllo ed una visita cardiologica ad un mese da intervento, dove si notava un trend di miglioramento su valori di pressione non ancora ottimali e valori di creatininemia sovrapponibili a quelli precedenti la procedura.

Prospettive. Questo tipo di procedura è rivolta ad un setting di pazienti in cui le convenzionali armi farmacologiche sono terminate e di fatto questa procedura rappresenta l'unica vera alternativa. Inoltre spesso i pazienti a cui può essere rivolta sono soprattutto under 60 anni in prevenzione secondaria in cui il beneficio del controllo ottimale della pressione arteriosa (intesa come fattore di rischio cardiovascolare) a lungo termine è maggiore. L'intervento percutaneo si è rilevato di breve durata in anestesia locale e senza gradi difficoltà tecniche, il nuovo device ha semplificato decisamente la procedura rendendola più standardizzata e in attesa di ulteriori studi riteniamo che nei prossimi anni aumenteranno il numero di pazienti sottoposti a questo tipo di intervento.

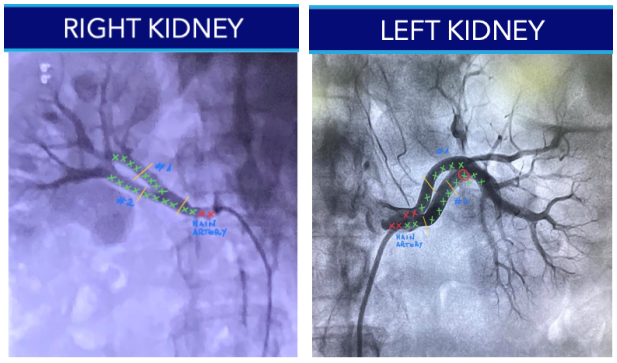

Figura 1

Structural heart disease: LAAO

P65

SAFETY AND FEASIBILITY OF SINGLE VERSUS DUAL ANTIPLATELET THERAPY AFTER LEFT ATRIAL APPENDAGE OCCLUSION IN PATIENTS WITH HIGH BLEEDING RISK AND ABSOLUTE CONTRAINDICATION TO ANTICOAGULANT THERAPY

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Introduction. Percutaneous left atrial appendage occlusion (LAAO) is a well-established procedure for stroke prevention in patients with atrial fibrillation (AF). The management of antithrombotic therapy after LAAO is still under debate and data from clinical trials are lacking, in particular in patients with high bleeding risk and absolute contraindication to oral anticoagulant therapy (OAC). The purpose of this study is to evaluate the feasibility and safety of a single antiplatelet therapy (SAPT) versus a dual antiplatelet therapy (DAPT) for at least 1 month or for at least 3 months after LAAO, in patients with high bleeding risk (HAS-BLED score ≥3) and absolute contraindication to OAC.

Methods. We conducted a retrospective observational real-world study enrolling consecutive patients electively admitted to our department to undergo LAAO. The population was categorized into three groups according to antithrombotic treatment at discharge after LAAO: SAPT, DAPT for a period of at least 1 month (DAPT-1M) or at least 3 months (DAPT-3M). Clinical events were recorded at follow up. The primary ischemic endpoint was defined as a composite of stroke/transient ischemic attack, systemic embolism, nonfatal myocardial infarction, cardiovascular death, and device thrombosis. The primary bleeding endpoint was defined as a composite of major or minor bleedings established according to the GUSTO criteria. Total events were defined as a composite of the primary ischemic and bleeding endpoints, and death from all causes. The primary ischemic and bleeding endpoints, and total events were compared between SAPT and DAPT-1M groups, and SAPT and DAPT-3M groups.

Results. In 77 (98,7%) out of 78 patients, a LAAO device was successfully implanted. One patient died during the procedure cause of LAA perforation. Among 77 patients (67,5% males, mean age 77,0±6,9 years), 21 were discharged in SAPT and 56 in DAPT, the latter carried on for at least 1 month (DAPT-1M) in 56 patients and at least 3 months (DAPT-3M) in 49 patients. Clinical features were similar between SAPT and DAPT groups, except for a higher body mass index and a lower prevalence of previous percutaneous intervention in SAPT patients. Follow up was available in 74 patients (median time: 14,0 months, interquartile range: 6,0-18,0 months). The primary ischemic endpoint occurred in 7 (9,6%) patients. No differences were found in the primary ischemic endpoint between SAPT vs. DAPT-1M groups (4,8% vs. 11,5%, p=0,384) and SAPT vs. DAPT-3M groups (4,8% vs 12,8%, p=0,327). The primary bleeding endpoint occurred in 16 (21,9%) patients. A statistically non-significant trend toward a lower prevalence of the primary bleeding endpoint was found in the SAPT group compared to both DAPT-1M (9,5% vs. 26,9%, p=0,114) and DAPT-3M groups (9,5% vs. 27,7%, p=0,104). Finally, a statistically non-significant trend toward a lower rate of total events were found in SAPT group compared to DAPT-1M (14,3% vs. 38,5%, p=0,055) and DAPT-3M groups (14,3% vs. 38,3%, p=0,058).

Conclusions. In patients with AF, high bleeding risk and absolute contraindication to OAC undergoing LAAO, SAPT is feasible and is not associated with an increase in ischemic events compared to DAPT for at least 1 or 3 months, showing instead a trend toward fewer bleeding events and an increased net clinical benefit.

P66

SINGLE VERSUS DUAL ANTIPLATELET THERAPY FOLLOWING PERCUTANEOUS LEFT ATRIAL APPENDAGE CLOSURE – A SYSTEMATIC REVIEW AND META-ANALYSIS

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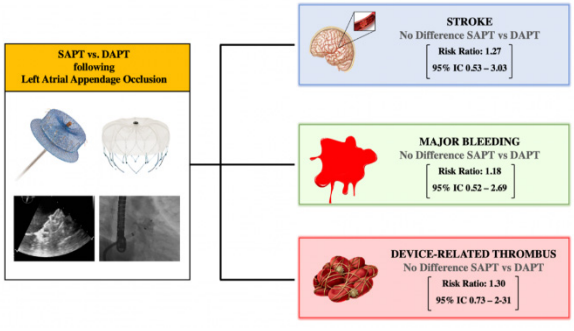
Background. Atrial fibrillation (AF) is the most important cause of cardioembolic stroke worldwide and most of stroke-causing clot derives from the left atrial appendage (LAA). In the last few years, transcatheter LAA occlusion (LAAO) has become a plausible alternative to oral anticoagulation therapy (OAT) for AF patients with absolute contraindications to anticoagulation therapy. Although post-procedure antiplatelet therapy represents the only possible strategy in this subset, few data are currently available about the best antiplatelet regimen. The aim of this study was to assess clinical outcomes among patients treated with single antiplatelet therapy (SAPT) and dual antiplatelet therapy (DAPT) after LAAO.

Methods. Published studies comparing single versus dual antiplatelet regimens following LAAO were systematically searched and screened. The outcomes of interest were ischemic stroke, major bleeding and device-related thrombus (DRT). Random-effect meta-analysis was performed comparing outcomes in both groups. The moderator effect of baseline characteristics on outcomes were evaluated by univariate meta-regression analysis.

Results. A total of 14 observational studies with 2931 patients treated with antiplatelet therapy (SAPT, n = 961; DAPT, n = 1970) after LAAO were included. The main indication to perform LAAO in the overall population was previous bleeding during anticoagulation. In the overall cohort, mean age was 74.4 ± 8.6 years, while mean CHA_2DS_2-VASC and HAS-BLED scores were 4.3 ± 1.5 and 3.0 ± 1.1, respectively. At a weighted mean follow-up of 10.3 ± 9.2 months, there were no significative difference in the occurrence of stroke (RR 1.27; 95% CI 0.53 to 2.03; p=0.60), major bleeding (RR 1.18; 95% CI 0.52 to 2.69; p=0.70) and DRT (RR 1.30; 95% CI 0.73 to 2.31; p=0.38) comparing SAPT versus DAPT after LAAO. The occurrence of the composite outcome was also similar between groups (7.5% vs. 7.1%, respectively; RR 1.16; 95% CI 0.50 to 2.71; p=0.73).

Conclusions. In patients treated with SAPT or DAPT after percutaneous LAAO there were no differences with regards to stroke, major bleeding, and DRT.



P67

LOOKING FOR OPTIMAL ANTITHROMBOTIC STRATEGY AFTER TRANSCATHETER LEFT ATRIAL APPENDAGE OCCLUSION: A REAL-WORLD COMPARISON OF DIFFERENT ANTIPLATELET REGIMENS

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Introduction. Transcatheter left atrial appendage occlusion (LAAO) has emerged as an effective procedure for the prevention of thromboembolic events in non-valvular atrial fibrillation (AF) and with contraindications to oral anticoagulation (OAC). After the procedure, different antithrombotic regimens (either antiplatelet or anticoagulation drugs) have been used, in order to prevent device-related thrombus (DRT) trying to minimize at the same time bleeding risk. The search for the optimal post-procedural antithrombotic strategy is still ongoing due to lack of randomized data.

Thus, we conducted a single-center real-world based on different antiplatelet therapy (APT) regimens after LAAO assessing both efficacy and safety.
Methods. We enrolled consecutive non-valvular AF patients who underwent LAAO at the University Hospital of Parma between October 2010 and June 2021. For each patient baseline clinical characteristics and procedure-related features were collected. Three study groups were identified according to post-procedural APT strategy: long (>1, ≤12 months)-dual APT (DAPT) group, short (≤ 1 month)-DAPT group, single APT (SAPT) group. The choice of the APT was left to multidisciplinary team evaluation, based on ischemic and bleeding risk assessment. The incidence of the primary outcome, a composite of any ischemic or hemorrhagic event, was assessed at follow-up.
Results. We enrolled a total of 130 patients with median age 77.0 [72.7; 81.0] years, predominantly men [78, 60.0%], characterized by both high ischemic (mean CHA_2DS_2-VASc-score 4.46) and bleeding risk (mean HAS-BLED score 3.23). The main indication for LAAO was previous hemorrhagic stroke [74 (56.9%)]. Technical procedure success was achieved in 123 (94.6%) patients. After LAAO, 39 [31.7%] patients were discharged on short (≤ 1 month)-DAPT, 35 [28.5%] on long (1-12 months)-DAPT and 49 [39.8%] on SAPT. After a median follow-up of 32 [18; 42] months, short-DAPT group had a significantly lower occurrence of the primary outcome (3 [7.7%] vs. 7 [20.0%] in long-DAPT vs. 14 [28.6%] in SAPT, p=0.049], mainly driven by a significantly lower occurrence of bleeding events (0 vs. 4 [11.4%] in long-DAPT vs. 9 [18.4%] in SAPT, p=0.020). Finally, comparison of the Kaplan-Meier curves by log-rank test showed that short-DAPT group had also a higher primary endpoint-free survival [p= 0.015] and hemorrhagic endpoint-free survival [p= 0.006] compared to the other groups.
Conclusions. In our cohort of non-valvular AF patients with contraindications to OAC who underwent LAAO, post-procedural short-DAPT strategy is associated with better outcomes, mainly driven by reduction of major bleedings. Conversely, SAPT usually reserved for patient at very high risk bleeding is still associated with a higher rate of hemorrhagic events rate.

P68

LEFT ATRIAL THROMBOSIS ASPIRATION DURING PERCUTANEOUS APPENDAGE OCCLUSION: A SINGLE CASE REPORT

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Rationale. A 83-year-old woman with FAC was referred for insertion of LAA occlusion device on a background of increasing risk of intracranial spontaneously hemorrhages due to a pituitary macroadenomas. Before release, a large thrombus was noted within the left atrium, attached to the left atrial appendage occluder delivery system.
Technical resolution. After 4,000 IU E.P.B.M. administration thrombus was aspirated into the delivery sheath applying continuous negative pressure without evidence of cerebral or peripheral embolism.
Clinical implications. A possible cause of delivery system thrombosis may have been a long and difficult attempt to correct device placement.
Perspectives. Prospective, controlled studies are required to determine the clinical benefits of cerebral protection.

Structural heart disease: Mitral interventions

P69

FIRST ITALIAN EXPERIENCE OF MITRAL TRANSCATHETER EDGE-TO-EDGE REPAIR WITH MITRACLIP IN CARDIOLOGY DEPARTMENTS WITHOUT ON-SITE CARDIOSURGERY

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Introduction. Mitral transcatheter edge-to-edge repair (TEER) is the treatment of choice for symptomatic patients with significant Mitral Regurgitation (MR), with high risk for surgery or surgery contraindications. Clinical trials and real-world registries show a good safety profile of the procedure; the risk of urgent post-operative mitral valve surgery is negligible. In addition, post-procedural mortality appears to be related to the multiple and concomitant patients' comorbidities, rather than to the procedure itself.
Methods. We collected procedural and intra-hospitalization data from patients undergoing mitral TEER with MitraClip, in the 5 Italian Cardiology Departments that currently perform these interventions in the absence of on-site Cardiosurgery. Under different administrative agreements, procedures were performed with territorial cardiac surgery teams ready on standby.
Results. From May 2018 to date, 104 patients have been treated (59 males, 77±7 years old), 51 with ischemic cardiomyopathy, mainly in NYHA functional class III (73.1%) and IV (22.1%), despite optimal medical therapy. MR was moderate-to-severe (3+, 18.3%) or severe (4+, 79.8%) and more frequently functional (65.4% of patients). Main echocardiographic findings were: Left Ventricular End-Diastolic Diameter (LV-EDD) of 57±9 mm; LV ejection fraction of 39±14%; Pulmonary Artery systolic Pressure (PAPs) of 53±16 mmHg; Tricuspid Annular Plane Excursion (TAPSE) of 19.7±4.5 mm. All the procedures were conducted according to standard steps; ultrasound-guided femoral venous puncture was performed in 39% of cases. Technical success was achieved in 99% of patients; in one case, after multiple positioning attempts, MitraClip device was not released due to an excessive increase in transvalvular gradient, despite an initial mitral valve area greater than 4 cm^2. At the end of the procedure, 101 patients (97%) had a reduction in MR to 2+ or lower. No patient had major intra-procedural or intra-hospitalization complications. Complications related to the access site were observed in 6 patients (1 arteriovenous fistula, 2 vascular pseudo-aneurysm, 3 hematoma requiring transfusions); none of them underwent ultrasound-guided venipuncture and all of them had non-surgical resolution during hospitalization. 1 patient presented partial detachment of the second MitraClip implanted, without consequences. 1 patient had anaesthetic complication (massive hematoma of the neck) with need for prolonged oro-tracheal intubation. All patients left the hospital after 8±8 days.
Conclusions. The described experience of TEER with MitraClip in Cardiology Departments without on-site Cardiosurgery Unit, confirms the safety profile of the procedure and shows results comparable to those reported in literature. Mitral TEER interventions are normally handled with confidence by the team of cardiologists and cardiac anesthesiologists. We believe that additional factors for the improvement of procedural outcomes should consider the implementation of strategies to reduce vascular complications (for example, ultrasound-guided venous puncture), the opportunity of sharing cases and experiences between the executing Centers and the presence of a general data collection system related to procedures and patient follow-up.

P70

THE IMPACT OF TRANSCATHETER EDGE-TO-EDGE REPAIR ON RIGHT VENTRICLE-PULMONARY ARTERY COUPLING IN PATIENTS WITH FUNCTIONAL MITRAL REGURGITATION AND PULMONARY HYPERTENSION

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Background. Baseline tricuspid annular plane systolic (TAPSE)/ pulmonary artery systolic pressure (PASP) ratio as non-invasive surrogate of right ventricular to pulmonary arterial coupling has demonstrated to improve prognostic stratification in patients with heart failure (HF). Transcatheter edge-to-edge repair (TEER) can be followed by RV reverse remodelling in patients with severe mitral regurgitation (MR). However, there are no data on the effects of TEER on TAPSE/PASP ratio. This study aimed to assess the impact of TEER with MitraClip on TAPSE/PASP ratio in patients affected by heart failure with reduced ejection fraction (HFrEF) and functional MR (FMR).
Methods. Fifty-two patients affected by HFrEF and moderate-to-severe or severe FMR undergoing MitraClip at two Italian centres were included in the study. One-hundred-and-two echocardiographic evaluations were performed: TAPSE and TAPSE/PASP ratio were collected at baseline and at discharge as indexes of RV function and RV-PA coupling respectively.
Results. Compared to baseline pre-discharge echocardiography showed an improvement in TAPSE/PASP (0.49±0.16 vs 0.42±0.27 mm/mmHg, p<0.001). Both TAPSE and PASP significantly improved after the procedure (respectively p=0.009 and p<0.001).
Conclusion. In a cohort of patients with HFrEF and FMR, TEER resulted in acute improvement of TAPSE/PASP ratio.

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RITIRATO

P72

PROGNOSTIC RELEVANCE OF RIGHT VENTRICULAR-TO-PULMONARY ARTERY COUPLING IN PATIENTS WITH SECONDARY MITRAL REGURGITATION UNDERGOING MITRACLIP PROCEDURE: RESULTS FROM THE MULTICENTER ITALIAN GIOTTO AND MIZÜBR REGISTRIES

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Introduction. Conflicting data exist regarding the benefit of transcatheter mitral valve repair (TMVR) in severe secondary mitral regurgitation (SMR). The impact on outcomes of right ventricular function has not been thoroughly characterized yet. We sought to evaluate the prognostic relevance of right ventricular function as defined by right ventricular-to-pulmonary artery (RV-PA) coupling on outcome after edge-to-edge TMVR for severe SMR.

Methods. The study population consisted of 564 patients with significant SMR from the multicenter Italian GIOTTO and MiZüBr registries. RV-PA coupling was assessed by tricuspid annular plane systolic excursion-to-systolic pulmonary artery pressure (TAPSE/sPAP) ratio. Primary endpoint was a composite of overall death and first re-hospitalization for heart failure (HF), secondary endpoints were overall death, cardiac death and first re-hospitalization for HF considered singularly. The derivation cohort included 401 patients from the GIOTTO registry. A receiver operating characteristic curve (ROC) was used to identify a cut-off value for TAPSE/sPAP ratio associated with primary endpoint. The predictive performance of the identified cut-off was then validated in 163 patients from the MiZuBr registry.

Results. In the derivation cohort, ROC curve identified a cut-off value for TAPSE/sPAP ratio of 0.30 mm/mmHg [Area Under Curve (AUC) 0.593; 95% CI: 0.532-0.655; p=0.003] associated with primary endpoint with a sensitivity and specificity of 78 and 40%, respectively. RV-PA coupling (TAPSE/sPAP ratio >0.30 mm/mmHg) was present in about 70% of patients. At 2-year Kaplan Meier analysis, primary endpoint occurred in 20% of RV-PA coupled patients, compared to 32% cases in RV-PA uncoupled patients (p=0.048). RV-PA coupled patients presented a lower rate of both overall death and re-hospitalization for HF, whereas similar cardiac death rate was observed between the two groups. After adjustment, RV-PA coupling was an independent predictor of the primary endpoint (HR: 0.524; 95% CI: 0.277-0.993; P=0.048)

Conclusion. Impairment of RV-PA coupling is a major predictor of adverse outcome in patients undergoing TMVR for severe SMR.

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PROGNOSTIC IMPACT OF COAPT-LIKE PROFILE AND GUIDELINE-DIRECTED MEDICAL THERAPY IN PATIENTS WITH HEART FAILURE AND SECONDARY MITRAL REGURGITATION UNDERGOING MITRACLIP TREATMENT: RESULTS FROM THE MULTICENTER ITALIAN GIOTTO AND MIZÜBR REGISTRIES

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Introduction. Guideline-directed medical therapy (GDMT) is a cornerstone of treatment of patients with heart failure (HF), even in the presence of secondary mitral regurgitation (SMR). Recently published COAPT trial identified clinical and echocardiographic criteria to predict prognosis in patients with SMR treated with MitraClip. Limited data are available regarding the independent prognostic role of COAPT-like profile according to baseline medical therapy. The aim of this study was to investigate the impact of COAPT-like profile on outcomes in a large real-word population of patients with SMR undergoing MitraClip treatment, dicothomized according to discharge medical therapy.

Methods. The study population consisted of 1409 patients with significant SMR from the multicenter Italian GIOTTO and MiZüBr registries. GDMT was defined as the use of appropriate classes of neurohormonal antagonists for heart failure (HF). The presence of at least one COAPT exclusion criterion was used to define a COAPT-like$^-$ profile. Both GDMT$^+$ (n = 398) and GDMT$^-$ (n = 1011) groups were further divided into two cohorts based on the presence of a COAPT-like profile. Primary endpoint was a composite of cardiac death and first re-hospitalization for HF, secondary endpoints were overall death, cardiac death and first re-hospitalization for HF considered singularly.

Results. COAPT-like profile was present in 67% of GDMT$^+$ (n = 270) and 62% of GDMT$^-$ (n = 630). In GDMT$^+$ patients, at 2-year Kaplan Meier analysis, primary clinical endpoint occurred in 29% of COAPT-like$^+$ cohort, compared to 43% cases in COAPT-like$^-$ (p=0.020). COAPT-like$^+$ presented a lower rate of re-hospitalization for HF, whereas similar overall and cardiac death rate was observed between the two cohorts. Multivariate Cox-regression analysis identified COAPT-like$^+$ as an independent predictor of favorable outcome in terms of primary endpoint (HR 0.600, 95% CI 0.363-0.989; p=0.045), mainly driven by absence of right ventricular impairment (HR 1.702, 95% CI 1.003-2.906; p=0.049). Similarly, in GDMT$^-$ patients primary clinical endpoint occurred in 33% of COAPT-like$^+$ cohort, compared to 42% cases in COAPT-like$^-$ (p=0.042). COAPT-like$^+$ showed fewer events in terms of cardiac death, meanwhile overall death and re-hospitalization for HF rates were similar between the two cohorts. Multivariate Cox-regression analysis identified COAPT-like$^+$ as an independent predictor of favorable outcome in terms of primary endpoint (HR 0.827, 95% CI 0.648-0.997; p=0.049), mainly driven by absence of left ventricular impairment (HR 1.424, 95% CI 1.000-2.027; p=0.050) and hemodynamic instability (HR 1.584, 95% CI 1.046-2.398; p=0.030).

Conclusion. COAPT-like profile was common and it was an independent predictor of mid-term positive outcome in both GDMT$^+$ patients, because of the absence of right ventricular impairment, and GDMT$^-$ ones, given the absence of left ventricular impairment and hemodynamic instability.

Structural heart disease: PFO closure

P74

LONG-TERM FOLLOW-UP WITH BRAIN MRI IN PATIENTS WITH CRYPTOGENETIC STROKE TREATED WITH SUTURE-MEDIATED PFO CLOSURE. SINGLE-CENTER EXPERIENCE

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Introduction. The percutaneous suture-mediated PFO closure through the Noblestitch device has been recently proposed as an effective alternative to umbrella-like double disk device placement. Data about its long-term efficacy are, to date, relatively scarce and limited to recurrences of clinically relevant neurological events. We reported initial results, from a single-center experience, of a cohort of individuals treated with Noblestitch undergoing brain MRI-follow for the detection of novel ischemic lesions.

Methods. 23 patients (mean age 56±8 years, men 56%) previously treated with Noblestitch based on clinical indications, were evaluated. Brain MRI at follow-up was compared with baseline for the quantitative and qualitative assessment of novel lesions of potential ischemic origin. All patients repeated contrast echocardiography for detection of post-procedural residual shunt.

Results. The median follow-up duration was 16 months (IQR 10-28 months). None of the patients reported new onset neurological signs or symptoms, none showed novel ischemic lesion at brain MRI. Three patients (13%) had post-procedural residual shunt at follow-up contrast echocardiography. These patients showed significantly greater PFO dimensions at baseline.
Conclusions. in this preliminary study based on the experience of a single center, none of the patients treated with Noblestitch device, for percutaneous PFO closure, showed novel clinically-relevant neurological events or new-onset novel ischemic lesions at brain MRI follow-up. The rate of long-term persistence of residual shunt (13%) confirms the overall long-term good efficacy of the procedure. Our data demonstrate that characteristics of PFO at baseline are useful to predict the long-term persistence of residual interatrial shunt.

Structural heart disease: Pharmacology

P75

PROGNOSTIC IMPACT OF RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM INHIBITION IN HYPERTENSIVE PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE IMPLANTATION

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Introduction. Aortic Stenosis (AS) is is the most common valvular heart disease and the third most common cardiovascular disease after hypertension and coronary artery disease in the western world, with a prevalence that is increasing due to aging of population. Tissue renin-angiotensin-aldosterone system (RAAS) activation participates to fibrosis and worse clinical outcomes. We determine the impact of pre-procedural treatment with RAAS inhibitors (RAASi) on all-cause mortality in a series of patients with severe AS who underwent transcatheter aortic valve implantation (TAVI).
Methods. We retrospectively examined 373 patients with AS who had undergone TAVI. Analyses were undertaken in the subgroup of hypertensive individuals (n=327) with 2-year follow-up. Univariable and multivariable Cox regression models were built according to baseline RAASi therapy status [RAASi (n=222) vs non-RAASi (n=151)]. A second analysis was undertaken by categorizing patients in angiotensin II receptor blockers (ARBs) (n=110) vs non-ARBs (n=217) or angiotensin-converting enzyme inhibitors (ACEi) (n=112) vs non-ACEi (n=215) recipients.
Results. Among hypertensive TAVI patients, RAASi administration at baseline was significantly related to female gender (56.8%), heart failure (25.7%), chronic kidney disease (25.7%), atrial fibrillation (19.4%), use of calcium-channel blocker (26.6%) or anti-platelet therapy (68.5%) (all p<0,05). All-cause mortality occurred in 23 (10.4%) patients on RAASi (9 on ARBs and 14 on ACEi), and in 21 of 151 patients not taking RAASi (13.9%). In univariable COX regression model, overall, treatment with RAASi was associated with 54% reduction in 2-year all-cause mortality (HR=0.46, 95% CI 0.25-0.84 p=0.011). After multivariable control for significant confounders, this association was not statistically significant (95% CI 0.31-1.11 p 0.1). Analyzing pre-procedural ACEi and ARBs separately vs non RAASi recipients, ARB therapy was associated with 58% reduction in all-cause mortality (95% CI 0.18-0.95 p=0.038) (Figure) that was confirmed in multivariate analysis whereas no impact of baseline ACEi was observed (Table). Heart failure (HR=2.87, p<0.001), atrial fibrillation (HR=2.39, p<0.005) and chronic kidney disease (HR=2.08, p 0.02) were all related with increased 2-year all-cause mortality. In multivariable Cox regression, most relevant predictor was heart failure, with less impact for atrial fibrillation, CKD and female sex (Table).
Conclusion. ARBs, but not ACEi, are independently associated with decreased risk of 2-year all-cause mortality in a series of hypertensive patients with severe AS, who underwent TAVI.

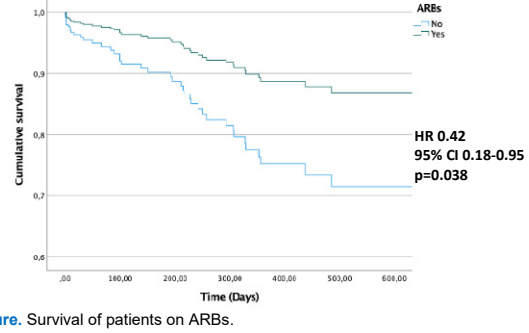

Figure. Survival of patients on ARBs.

Table. Multivariate Cox regression model.

	HR	95% CI	p-value
Angiotensin II receptor blockers (n/y)	**0.416**	**0.182-0.952**	**0.038**
ACE-inhibitor (n/y)	0.775	0.372-1.614	0.495
Calcium channel blocker (n/y)	1.13	0.544-2.347	0.744
Anti-platelet therapy (n/y)	0.813	0.408-1.622	0.557
Sex female	1.645	0.825-3.28	0.157
Age (years)	0.995	0.952-1.040	0.840
Systolic blood pressure (mmHg)	0.996	0.98-1.012	0.617
Heart failure (n/y)	**2.462**	**1.318-4.602**	**0.005**
Atrial fibrillation (n/y)	1.87	0.941-3.714	0.074
Chronic kidney disease (n/y)	1.645	0.871-3.107	0.125

Structural heart disease: TAVI

P76

PERCUTANEOUS TREATMENT OF ABDOMINAL ANEURYSM AND VALVE AORTIC STENOSIS WITH 'STAGED' EVAR & TAVR

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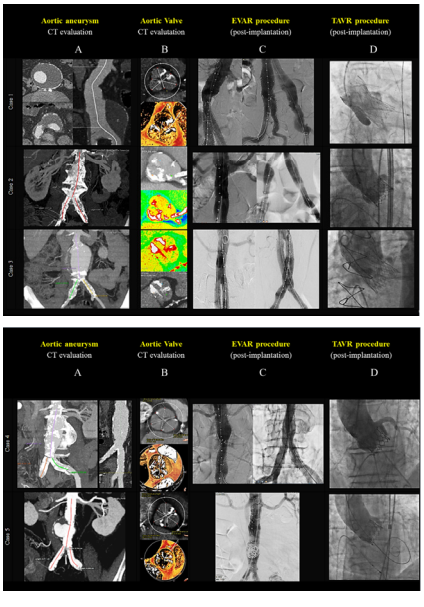
Background. Symptomatic severe aortic valve stenosis (AS) and Abdominal Aortic Aneurysm (AAA) are critical clinical conditions. It is not yet clarified the incidence of AAA and its impact on procedural and clinical outcomes among patients undergoing transcatheter aortic valve replacement (TAVR). The purpose of this report is to describe the anatomical details and technical and procedural considerations when proposing totally endovascular strategies dedicated to the treatment of patients with AS and AAA.
Methods. Starting from July 2015 and up to July 2021, we treated 533 consecutive patients with a TAVR procedure. We analyzed the demographic, clinical and procedural data of the patients suffering from significant AAA with major diameter ≥40 mm.
Results. We describe the experience of n=5 consecutive patients presenting association of AS and AAA treated with percutaneous procedures: Endovascular aortic aneurysm repair (EVAR) and subsequently TAVR. The mean age was 76.6 years. GORE Excluder prosthesis were used in n=4 and a GORE TAG Conformable Thoracic Stent Graft in n= 1 EVAR procedures. Two 'self-expanding' and three 'balloon-expanding' valves were used for the TAVR procedures. A major vascular complication occurred in one patient and a permanent pace-maker implantation was required in one patients. No cases of periprocedural stroke, coronary occlusion or myocardial infarction were described. There was no 30-day mortality.
Conclusions. The combined 'staged' EVAR and TAVR, in patients with severe AS and a large AAA, is feasible, safe and effective with acceptable risks, especially in regards to the vascular complications and acute kidney injury.



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MANTA IMAGING DETERMINES EVENTS: THE MANTIDE STUDY

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Background. Preprocedural planning is essential for the success of trans-femoral TAVI, but the correct choice and implementation of vascular closure device (VCD) plays an important part also. The aim of this study was to evaluate access site-related complications in patients undergoing transfemoral TAVI and vascular closure with the plug-based device MANTA (Teleflex, Wayne, Pennsylvania).

Methods. All patients undergoing transfemoral TAVI and closure with MANTA between October 2020 and 2021 were prospectively included. Technical success was defined as the achievement of vascular closure with MANTA without the use of unplanned stenting or surgical intervention. Adverse events were defined according to the VARC-3 classification

Results. We included 114 patients (mean STS score 2.8±1.7). The mean sheath size was 14.8±1.1 Fr. Concomitant PCI was performed in 9 patients, permanent pacemaker implantation (PPMI) was needed in 15 (13.2%). Technical as well as procedural success was obtained in 108 (94.7%). Complications and management are listed in Table 1. MANTA success was not achieved in 6 patients: 3 pseudoaneurysm treated with covered stent (CS), 2 dissection requiring surgery, one dissection treated with CS. Anchor misalignment occurred in 5 cases and it was solved in 4 (80%) with prolonged balloon inflation. Targeted puncture area (TPA) calculated as a cylindric area ($2\pi r^2$*h, where h was the CT length between the femoral bifurcation and the femoral head) independently predicted MANTA success with an OR of 1.009 (IC 1.002-1.017) for each mm2 of TPA increase (p=0.01).

Conclusion. MANTA VCD is associated with a very high technical success. The probability of MANTA success increases with the increase of the CT calculated TPA. This finding may guide the appropriate implementation of this device.

	n (%)
TAVI access complications	14 (12.28)
Major	6 (5.3)
Minor	8 (7)
Dissection	4 (3.5)
Pseudoaneurysm	3 (2.6)
Stenosis	3 (2.6)
Groin haematoma	2 (1.7)
Retroperitoneal haematoma	1 (0.9)
Missed haemostasis	1 (0.9)
Anchor misalignment	5 (4.4)
Management	
Covered stent	4 (3.5)
Vascular surgery	2 (1.7)
Prolonged balloon inflation	4 (3.5)
Prolonged manual compression	2 (1.7)
Watchful waiting	1 (0.9)

P78

OUTCOMES DELLE PROCEDURE TAVI A CONFRONTO TRA I DUE SESSI: ESPERIENZA DEL NOSTRO CENTRO

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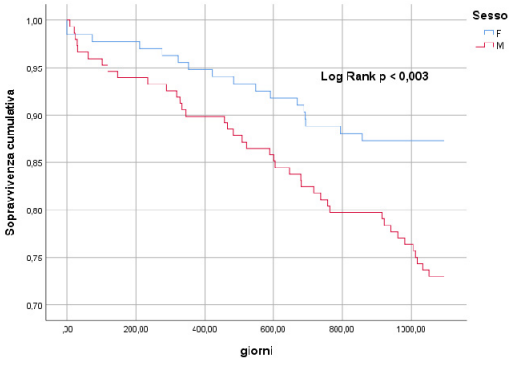
Introduzione. Scopo di questo lavoro è quello di valutare l'impatto della differenza di genere sugli outcomes nei pazienti sottoposti a procedura TAVI (transcatheter aortic valve implantation).

Metodi. I dati sono stati estratti dal nostro database locale, utilizzando come criterio la disponibilità di follow-up a 3 anni post TAVI. Le caratteristiche basali e gli outcomes procedurali sono state confrontati utilizzando il test del Chi-quadro per i dati categorici e il test T di Student per le variabili continue; per valutare l'impatto delle caratteristiche basali sulla sopravvivenza, è stata eseguita una analisi time to event mediante una regressione multivariata di Cox con approccio stepwise (p di inclusione <0.1).

Risultati. Dei 282 selezionati per questa analisi, 134 (47,5%) erano donne. I pazienti di sesso femminile avevano una età media di 80,6 anni vs 79,3 (p=n.s.); la prevalenza di cardiopatia ischemia (30,1% vs 57,2%), pregressa rivascolarizzazione percutanea (24,1% vs 40%), o pregressa cardiochirurgia (12% vs 32,4%) è risultata significativamente minore nelle donne rispetto agli uomini. La prevalenza di malattia vascolare periferica allo stesso modo è risultata minore nelle donne (9% vs 23,4%); lo score STS della coorte femminile e maschile è risultato simile (6,5 + 4,8 vs 6,9 + 7, p=n.s.), così come le restanti caratteristiche basali. L'analisi della sopravvivenza ha mostrato un chiaro beneficio per le donne con una mortalità a 3 anni del 12,7% vs 27% della coorte maschile (log rank p<0,003). L'analisi multivariata dei predittori di mortalità ha permesso di costruire un modello in cui la presenza di diabete e di vasculopatia periferica appaiono predittori indipendenti di prognosi avversa, mentre il sesso femminile è risultato predittore indipendente di migliore sopravvivenza (HR 0,44 I.C. 95% 0, 25 – 0,78; p=0,004).

Conclusioni. i pazienti sottoposti a procedura TAVI hanno una prognosi sostanzialmente diversa in base al sesso, con una minore mortalità per tutte le cause a 3 anni nel sesso femminile. Questo sembra confermare alcune evidenze presenti in letteratura ed è indipendente dal grado di comorbilità e dalle caratteristiche basali.



P79

IMPACT OF CORONARY ARTERY DISEASE ON TRANSCATHETER AORTIC VALVE IMPLANTATION WITH SECOND GENERATION DEVICES: REAL-WORLD DATA FROM THE OBSERVANT 2 STUDY

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Background. Coronary artery disease (CAD) has been reported in up to two-thirds of aortic stenosis (AS) cases, being an independent predictor of outcome. International guidelines recommend concomitant coronary revascularization in patients with significant CAD undergoing surgical aortic valve replacement, on the other hand limited evidence is available regarding the role of coronary revascularization in patients undergoing transcatheter aortic valve implantation. How to evaluate CAD severity in patients with AS, whether percutaneous coronary intervention need to be performed and what is the fitting timing for revascularization to minimize procedural risks, remains matters of debate.

Methods. The aim of the present post-hoc analysis of the OBSERVANT 2 multicentre registry was to evaluate the impact of CAD and of percutaneous revascularization on mortality and on rate of heart failure (HF) hospitalization within the first year after transcatheter aortic valve implantation (TAVI). 1877 patients had no significant CAD, 488 (18.1%) patients had significant CAD but were not candidate to pre-TAVI PCI, 334 (12.4%) patients underwent either staged or concomitant percutaneous revascularization.

Results. All-cause death at 30-days from TAVI was not significantly different between the 3 groups (2.1% vs 3.3% vs 1.5%, p=0.19). At one year follow-up, the observed all-cause mortality was not different among the groups (10.6% vs 11.7% vs 11.1% p=0.76) while the rate of HF hospitalizations was higher in patients affected by CAD and not undergoing revascularization compared to the other 2 groups (p=0.02).

Conclusions. Among a large real-world cohort of patients, the presence of CAD did not affect rates of mortality at one year after TAVI. Patients suffering from significant CAD and receiving percutaneous revascularization experienced an inferior rate of heart failure hospitalization at one year as compared to those not being revascularized.

P80

BETTER IS THE ENEMY OF GOOD… TAVI MIGRATION AND SUCCESSFUL VALVE-IN-VALVE

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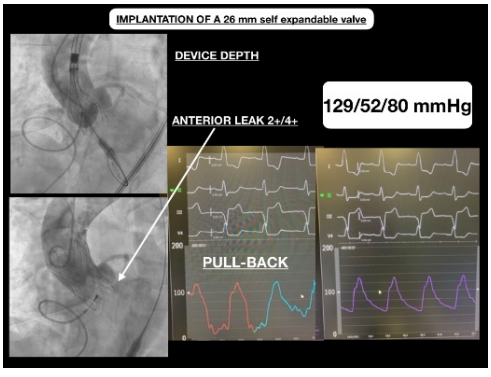
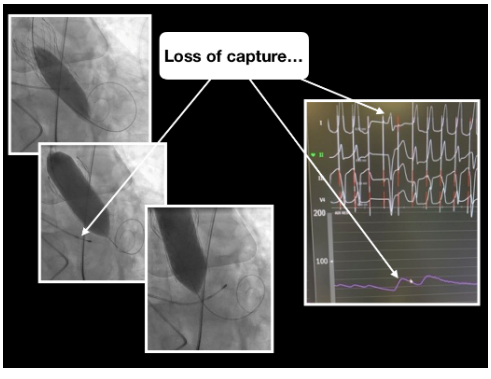
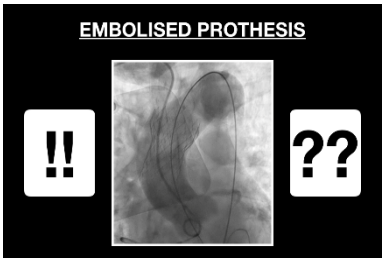
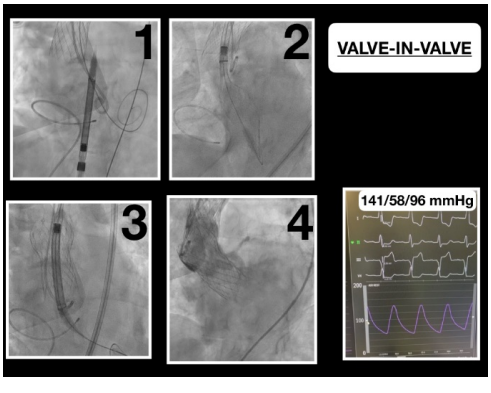
Rationale. An 82-year-old lady underwent TAVI with self expandable 26 mm device. Hemodynamic parameters post implantation were satisfying but control angiography suggested moderate regurgitation by anterior leak. Postdilatation was performed complicated by accidental removal of the prosthesis from annular position caused by inefficient rapid pacing with loss of capture and balloon anchoring to the stent waist.

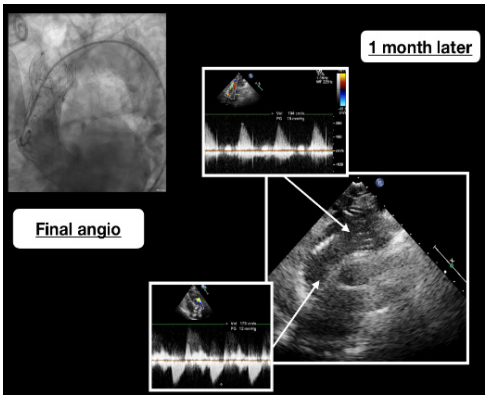
Technical resolution. Preformed stiff wire was maintained inside left ventricle while a new aortic prosthesis of equal type and size was prepared and then advanced across the first one. A pigtail from right radial artery was used to pull the embolized prosthesis cranially with free flow segment in front of brachiocephalic trunk. The angiographic catheter was removed before expansion of the new valve to avoid double entrapment between the two overlapping devices. Final result was good with no significant gradient and mild anterior leak. Echocardiography at one month post procedure confirmed good hemodynamics and clinical stability.
Clinical implications. Postdilatation after TAVI implantation is a potentially hazardous procedure that should always be performed with optimal pacing to mitigate the risk of dislocation. If this circumstance occurs every attention should be paid to stabilize the embolised valve while implanting a new prothesis to assure adequate hemodynamics.
Perspectives. Paravalvular leak should be maximally avoided with optimal planning and accurate valve implantation. In the post implantation phase several parameters including aortic diastolic pressure and diastolic gradient and not only angiographic grade should be taken into account before decision upon balloon postdilatation.











P81

CONDUCTION DISORDERS AFTER TRANSCATHETER AORTIC VALVE IMPLANTATION: A COMPARISON BETWEEN SAPIEN 3 AND SAPIEN 3 ULTRA BALLOON-EXPANDABLE VALVES

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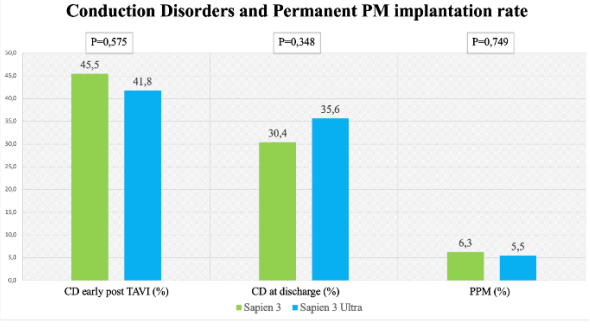
Introduction. Conduction disorders (CD) are the most common complications after transcatheter aortic valve implantation (TAVI). The last generation of Edwards balloon expandable valves, the SAPIEN 3 Ultra (S3U), is provided with an external sealing skirt that aims to further reduce paravalvular leakage (PVL) compared to SAPIEN 3 (S3) and could potentially lead to higher CD rate. We sought to investigate the rate of new-onset CD in patients undergoing TAVI with the S3 or S3U valve.
Methods. We included 582 consecutive patients undergoing TAVI in a single high-volume Center. Patients with previously implanted pacemaker and Valve in valve procedures were excluded. CD rate was evaluated early after implantation and at discharge.
Results. No significant difference in the overall CD rate was found between S3 and S3U patients both immediately after the procedure (S3 45.5% vs. S3U 41.8%, p=0.575) and at discharge (S3 30.4% vs. S3U 35.6%, p=0.348) with low rate of permanent pacemaker implantation (S3 6.3% vs. S3U 5.5%, p=0.749). No significant differences were found also in patients with pre-existing atrial fibrillation (S3 8.2% vs. S3U 5%, p=0.648). A significantly lower rate of PVL was found with S3U compared to S3 (S3 42% vs. S3U 26%, p=0.007). As suggested by the company we confirmed that S3U were implanted in a significantly higher position compared to S3U (S3 4.89 ± 1.57 mm vs. S3U 4.47 ± 1.36 mm, p=0.001).
Conclusions. No significant difference in the rate of CD was found in patients undergoing TAVI with the S3 compared to S3U. Moreover, S3U further reduced the PVL rate without increasing CD or the need of PPM implantation.



P82

PREVALENCE AND RENAL IMPACT OF CT-DEFINED SARCOPENIA IN PATIENTS UNDERGOING TAVI

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Introduction. Sarcopaenia, the age-associated decline in skeletal muscle and function, increases the risk of procedure-related complications and mortality in patients undergoing transcatheter aortic valve implantation (TAVI). We sought to investigate whether CT-determined sarcopenia

impacts on in-hospital renal function and on midterm outcomes following TAVI.
Methods. This was a retrospective cohort study including patients who underwent TAVI. Sarcopaenia was CT-defined as skeletal muscle mass index <55.4 cm^2/m^2 in males and <38.9 cm^2/m^2 in females at the level of L3 vertebra. Acute kidney injury (AKI) was defined as an increase in creatinine concentration of at least 0.3 mg/dL within 48 hours of TAVI according to Valve Academic Research Consortium-3 Criteria. Acute kidney recovery (AKR) was determined as an increase of 25% in eGFR within 48 hours following TAVI. The primary endpoint was freedom from major adverse cardiac and cerebrovascular events (MACCE; composite of any cause of death, any coronary revascularization, stroke and heart failure hospitalization) at the 1-year follow up in sarcopaenic and non-sarcopaenic patients.
Results. A total of 113 patients (mean age 82.2 ± 4.03 years, 52.2% female) were followed for a median of 1.1 year. Sarcopenia was found in the 59% of the TAVI population, more frequently among males (72.2% versus 33.8%, p<0.01). The incidence of AKI was 8.0% and AKR was 6.9% without differences between sarcopaenic and non-sarcopaenic patients (9.4% versus 6.5%, p=0.59 and 11.6% versus 2.2%, p=0.08). The freedom from MACCE at 1 year follow up was 74.5% for sarcopaenic and 70.3% for non-sarcopaenic patients (p= 0.6). In sarcopaenic patients, the incidence of AKI and AKR had no significant impact on the freedom from MACCE at 1 year (p=0.58 and p=0.87).
Conclusions. Sarcopaenic patients had similar out of hospital incidence of adverse events to non-sarcopaenic patients following TAVI confirming the safety of this procedure in sarcopaenic patients.

P83

RIGHT VENTRICLE/PULMONARY ARTERY COUPLING RATIO AS PROGNOSTIC FACTOR IN PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE IMPLANTATION

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Introduction. Right ventricle/pulmonary artery (RV/PA) coupling has recently emerged as a relevant prognostic factor in patients undergoing transcatheter valvular interventions. The aim of this study is to assess the interaction between RV/PA coupling ratio and the incidence of acute kidney injury (AKI) following TAVI in patients with severe aortic stenosis. Furthermore we investigated the interaction between this novel ratio and adverse events at 24 months follow-up.
Methods. A population of 283 patients was selected from the Verona Valvular Registry (CESC n =1918). RV/PA coupling was estimated as the ratio of tricuspid annular plane systolic excursion (TAPSE) to pulmonary artery systolic pressure (PAPs) obtained through transthoracic echocardiograms. AKI was defined as an increase in serum creatinine (sCr) of at least 0.3 mg/dL up to 48 hours following TAVI. Major adverse cardiovascular events (MACEs) were defined as the composite occurrence of cardiac death, re-hospitalization for congestive heart failure and stroke.
Results. Mean age was 83.4 ± 5.36 years and 41.3% of patients were female. The median value of TAPSE/PAPs ratio was 0.5667 mm/mmHg and was used as a cut-off. A TAPSE/PASP ratio <0.5667 was found to be associated with a higher incidence of MACE at Kaplan Meyer analysis at 24 months (10.4% vs 3.5%, log p=0.050) and higher occurrence of AKI (17.0% vs. 7.7%; p=0.027). Notably TAPSE/PAPs interquartile comparison showed higher incidence for AKI in patients in the lowest quartile compared to higher ones (24.2% vs. 8.5%; p=0.001). Following Cox multivariate analysis, TAPSE/PAPs ratio and diabetes mellitus were found to be independent predictors of AKI. Furthermore, risk for 24 months MACEs was higher in the population with lower TAPSE/PAPs ratio (HR 2.672; CI 95% [1.195-5.974]; p=0.017).
Conclusions. RV/PA coupling, as characterized by TAPSE/PAPs ratio, is a promising independent predictor of AKI, also associated with higher risk of major adverse cardiac events at follow-up in subjects undergoing TAVI. These data suggest a possible role for this novel index in risk stratification, assessment of the prognosis, and decision-making in these patients.

P84

TRANSCATHETER AORTIC VALVE REPLACEMENT WITH OR WITHOUT ANESTHESIOLOGIST: RESULTS FROM A HIGH-VOLUME SINGLE CENTER

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Introduction. Local instead of general anesthesia has been became the standard approach in many centers for transfemoral transcatheter aortic valve replacement (TAVR). New generation devices and increase in skill's operators had led to a drastic reduction of periprocedural complications, bring to an adoption of a minimalist approach. In our study, we aimed to compare patients treated with TAVR under local anesthesia with or without the presence of anesthesiologist on site.
Methods. We compare procedural aspects and results of patients treated with TAVR with anesthesiologist on site (AIS) against patients treated with TAVR with anesthesiologist on call (AOC). From January 2019 to December 2020, all consecutive patients undergoing transfemoral TAVR with either the self-expandable Evolut™ (Medtronic, MN, USA) or balloon-expandable SAPIEN 3™ (Edwards Lifesciences, CA, USA) were collected.
Results. Of 332 patients collected, 96 (29%) were treated with TAVR with AIS, while 236 (71%) were treated with TAVR with AOC. No differences in procedural time, fluoroscopy time and amount of contrast medium were observed. No procedural death and conversion to open-chest surgery were reported. The rate of stroke/transient ischemic attacks (TIA) and major vascular complications was similar in the two groups. No patients in both groups required conversion to general anesthesia. Two patients (0.8%) in the AOC group required urgent intervention of the anesthesiologist. In the AOC group, there was a greater use of morphine (55.9% vs 33.3%, p=0.008), but with a lower dose for each patient (2.0 vs 2.8 mg, p=0.006). On the other hand, there was a lower use of other painkiller drugs (3.4% vs 20.8%, p=0.001). No difference in inotropic drugs use was observed
Conclusions. In patients at low or intermediate risk undergoing transfemoral TAVR, a safe procedure can be performed under local anesthesia without the presence of anesthesiologist in the catheterization laboratory.

P85

TYPE OF DEVICE AND PRE-EXISTING BUNDLE BRANCH BLOCK CORRELATION WITH PERMANENT PACEMAKER IMPLANTATION IN TRANSCATHETER AORTIC VALVE IMPLANTATION PATIENTS: TO EACH HIS OWN

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Introduction. Transcatheter aortic valve implantation (TAVI) is spreading to low-risk patients in whom safety and rate of complication are even more relevant. Pre-existing right bundle branch block and type of device are known to be predictors of permanent pacemaker implantation (PPI). The aim of our study is to evaluate the role of the pre-existing branch block and type of valve have on incidence of PPI after TAVI.
Methods. This is an observational, retrospective multicenter study involving 1278 patients who underwent TAVI for Aortic valve stenosis in the North Area of Emilia Romagna (AVEN). Patients with prior pacemaker implantation were excluded. The population with pre-existing right bundle branch block (RBBB) (n° 99 - 7.7%) and left bundle branch block (LBBB) (n° 98 - 7.6%) was divided into four groups based on type of valve implanted (balloon expandable+ RBBBpre 74% vs self expandable + RBBBpre 26%) and (balloon expandable + LBBBpre 72% vs self expandable + LBBBpre 28%). The relations between the type of valve + RBBBpre or LBBBpre and the implantation of permanent pacemaker after TAVI was documented through Chi square test.
Results. The median age of 1278 patients treated with TAVI was 82y ± 6 s.d. Patients had a low-to medium risk score (STS risk score 3.8 ± 2.5 s.d.). In the group of patients with RBBBpre the type of valve implanted was divided as follows (Sapien 3 Ultra 72%, CoreValve Evolut 16%, Navitor 10%, MyVal 2%), while in the LBBBpre group (Sapien 3 Ultra 72%, CoreValve Evolut 21%, Navitor 5%, MyVal 2%). Excluding patients with pacemaker implantation prior to the procedure and after adjustment by pre-TAVI factors (age and sex), we found that patients with self expandable valve + RBBBpre presented an increased risk of developing advanced block and pacemaker implantation compared to patients with balloon expandable valve + RBBBpre (53.8% vs 17.8%, p<0.001). The same correlation was not demonstrated in patients with self expandable valve + LBBBpre vs balloon expandable valve + LBBBpre (11.1% vs 8.5%, p=0.68).
Conclusions. This multicenter observational study showed that self expandable + RBBB are independently factors that increase the incidence of pacemaker implantation in TAVI population. On the other hand, left bundle branch block and balloon expandable valve not appear to be related to an increased incidence of pacemaker implantation.

P86

AORTIC VALVE CALCIFICATION PATTERNS ON CT SCAN AND HEMODYNAMIC PERFORMANCE OF THE SELF-EXPANDING INTRA-ANNULAR TRANSCATHETER PORTICO PROSTHESIS VALVE

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Campus Bio-Medico, Roma

Introduction. The burden of native aortic valve calcification (AVC) represents a negative prognostic factor in patients undergoing transcatheter aortic valve implantation (TAVI). Recent randomized clinical trials comparing commercially available self-expanding (SE) supra-annular and balloon-expandable (BE) devices with second-generation SE intra-annular devices demonstrated the clinical non-inferiority of the latter in terms of procedural success. However, no current data are available in vivo regarding the potential impact of the above-mentioned calcification patterns on SE intra-annular device performance and clinical outcomes.

Purpose. To evaluate the potential impact of different AVC patterns on SE intra-annular device performance in a consecutive cohort of patients undergoing TAVI.

Methods. This is an observational, non-randomized, prospective, single-center study preliminarily enrolling 53 consecutive patients who underwent TAVI with a SE intra-annular device (Portico - Abbott Structural Heart, St Paul, MN, USA) between 2019 and 2022 at our department. All patients underwent transthoracic echocardiography, contrast-enhanced multidetector row computed tomography (MDCT) with volumetric calcium score and coronary angiography before TAVI. Patients with bicuspid aortic valve and previous surgical aortic valve replacement eligible for valve-in-valve TAVI were excluded. AVC and left ventricle outflow tract (LVOT) calcification (up to 15 mm below the basal annular plane) were quantified in the contrast images by using a Hounsfield unit threshold of 850.

Results. Patients undergoing pacemaker implantation post-TAVI (19% of the overall study population) because of the occurrence of third degree atrio-ventricular block or advanced atrio-ventricular block (implantation depth described as ventricular/aortic stent extension ratio: 27.77±6.9%) had higher calcification extension on all aortic cusps compared with those that did not show this complication (overall AVA calcium score 270.6±409.6 vs 158.1±137.1, p=0.146; p significance of 0.048, 0.181 and 0.346 for left cusp- LCC, right cusp – RCC- and non-coronary cusp-NCC, respectively). Severe LVOT calcification was also associated with a higher incidence of AV conduction abnormalities (37.9±44.5 vs 13.4±39.0 of patients without AV defects, p=0.045). Moreover, post-procedural moderate/severe aortic regurgitation occurred more frequently in patients with LCC calcification (183.7±87.0 vs 64.2±99.6, p=0.018) and RCC calcification (188.7±149.5 vs 58.7±120.8, p=0.019) rather than those with NCC or LVOT calcification.

Conclusions. Preliminary results of our observational registry highlight the potential impact of AVC patterns on the occurrence of aortic regurgitation and pacemaker implantation after a SE intra-annular device implantation. A larger sample size is needed to better understand the impact of calcium patterns on each single outcome in order to identify patients at higher risk and to early manage these complications, improving long-term outcomes.

P87

MEASURED VS. PREDICTED EFFECTIVE ORIFICE AREA-DERIVED PROSTHESIS-PATIENT MISMATCH AND CLINICAL OUTCOMES IN SMALL AORTIC ANNULI

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Introduction. To estimate incidence of prosthesis-patient mismatch (PPM), prediction of effective orifice area from size of the implanted valve (EOA_{Pvs}) or of the annulus (EOA_{Pann}) have been suggested as alternative to its measurement via echocardiography (EOA_M). No validation in patients with small aortic annuli is available as of today. Aim of this study was to assess incidence and clinical outcomes according to different definitions of PPM in patients with small aortic annuli undergoing transcatheter aortic valve replacement (TAVR).

Methods. TAVI-SMALL 2 international retrospective registry included 1,378 patients with severe aortic stenosis and small annuli (annular perimeter <72 mm or area <400 mm^2) treated with transfemoral TAVR at 16 high-volume centers between 2011 and 2020. Patients implanted with valves for which either EOA_{Pvs} or EOA_{Pann} are available (Evolut R/PRO [n = 750], Portico [n = 172] and Sapien 3 [n = 286]) were included (n =1,208). Primary endpoint was incidence of body mass index (BMI)-adjusted severe PPM via EOA_M, EOA_{Pvs} and EOA_{Pann}. Incidence of all-cause mortality according to presence of severe PPM defined via EOA_M, EOA_{Pvs} and EOA_{Pann} was also investigated.

Results. In the overall population, incidence of severe PPM derived from EOA_M was 6.32%, and was higher than that derived from EOA_{Pann} and EOA_{Pvs} (0 and 1.65%, respectively, p<0.001). While use of EOA_M yielded lower incidence of severe PPM with Evolut R/PRO (3.6 vs. 9.0 Portico vs. 8.7% Sapien 3, p=0.042), the only cases of severe PPM when using EOA_{Pvs} were observed in the Evolut R/PRO cohort (2.28%). No cases of severe PPM derived from EOA_{Pann} were observed. At a median follow-up of 385 days, all-cause mortality was higher in patients with severe PPM derived from EOA_M than in those without (20.0 vs. 8.62%, p=0.025). No difference in all-cause mortality was evident when comparing patients with and without severe PPM derived from EOA_{Pvs} (10.7 vs. 10.3%, p=1.000).

Conclusion. Incidence of severe PPM in patients with small annuli undergoing TAVR is lower when estimated via EOA_{Pann} or EOA_{Pvs} than via EOA_M. Only patients with severe PPM derived from EOA_M appear to have an increased risk of mortality at a median follow-up of 1 year.

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TAVI IN MODALITÀ SERVICE: I PRIMI 300 CASI DEL PROGRAMMA ROMAGNA TAVI

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Introduzione. L'impianto transcatetere di protesi valvolare artica (TAVI) è diventato negli ultimi anni un importante terapia per il trattamento della stenosi valvolare aortica dell'anziano. La popolazione candidabile a questa tecnica è in forte incremento, considerate le indicazioni delle più recenti linee guida. In Romagna, con una popolazione di 1.126.000 abitanti, di cui 95.000 ultraottantenni, il trattamento transcatetere della stenosi valvolare artica è una priorità, da qui l'importanza dell'introduzione delle procedure in modalità Service per i centri senza cardiochirurgia on-site.

Metodi. Dal 2019 è stato promosso un programma di sviluppo del percorso TAVI che coinvolge tutte le U.O. di Cardiologia appartenenti all'unica AUSL del territorio. Le procedure vengono effettuate da un team di operatori appartenenti all'AUSL Romagna, in modalità Service, presso le sale ibride di Maria Cecilia Hospital di Cotignola, riferimento territoriale per la cardiochirurgia. I pazienti afferiscono dalle varie U.O. di Cardiologia del territorio, vengono sottoposti a TAVI nella stessa giornata, con rientro al reparto di provenienza il giorno successivo. Dal 9 Luglio 2019 al 07 Gennaio 2022, con una sospensione delle attività causa COVID dal 11 marzo al 6 luglio 2020, sono state effettuate 300 procedure di TAVI con modello Service.

Risultati. L'età mediana dei pazienti è stata di 84 anni (range 50-93), con un rapporto maschi:femmine di 1:1. Nel 23% dei casi era stata precedentemente effettuata una valvuloplastica aortica presso la Cardiologia della Romagna di riferimento. Nel 92% dei casi l'accesso vascolare è stato femorale percutaneo, nell'8% chirurgico: trans-succlavio (15 casi), femorale (7 casi) e trans-aortico (3 casi). Il 10% delle procedure sono statie di valve-in-valve. Il successo procedurale è stato del 95% con impianto di 188 valvole balloon-expandable e 111 valvole self-expandable. La conversione ad intervento cardiochirurgico è stata dello 0.7% (2 casi), e nel 2% dei casi si è reso necessario un intervento di chirurgica vascolare. L'incidenza di ictus periprocedurali è stata dell'1.3%. Il 10% dei pazienti ha necessitato un impianto di pacemaker definitivo post-procedura. Complicanze vascolari maggiori (secondo la definizione VARC 3) si sono verificate nel 5.3% dei casi. La mortalità a 30 giorni è stata del 2.3%, e la mortalità cardiovascolare ad 1 anno del 6.1%. La

mediana della degenza post TAVI è stata di 4 giorni. Solo 2 pazienti hanno avuto necessità di prolungare la degenza presso il centro cardiochirurgico oltre la prima notte.
Conclusioni. La nostra esperienza dimostra che le procedure di TAVI possono essere effettuate con un programma Service in modo sicuro ed efficace rappresentando un possibile modello per i centri sprovvisti di cardiochirurgia on-site.

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PROSTHESIS-PATIENT MISMATCH AFTER TRANSCATHETER IMPLANTATION OF CONTEMPORARY BALLOON-EXPANDABLE AND SELF-EXPANDABLE VALVES IN SMALL AORTIC ANNULI

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Introduction. Evidence of clinical impact of prosthesis-patient mismatch (PPM) after transcatheter aortic valve replacement (TAVR) is conflicting, and might vary according to the type of valve implanted. The aim of this study is to assess clinical impact of PPM after TAVR with balloon-expandable valves (BEV) and self-expandable valves (SEV) in patients with small annuli.
Methods. Six-hundred and twenty-eight patients were enrolled from TAVI-SMALL 2 international retrospective registry, which included patients with severe aortic stenosis and small annuli (annular perimeter <72 mm or area <400 mm2) treated with transfemoral TAVR at 16 high-volume centers between 2011 and 2020. Analyses were performed comparing patients with less than moderate (n =452), moderate (n =138) and severe PPM (n =38). Primary endpoint was incidence of all-cause mortality. Predictors of all-cause mortality and PPM were investigated.
Results. At a median follow-up of 380 days (interquartile range 210-709 days), patients with severe PPM, but not moderate PPM, had an increased risk of all-cause mortality when compared with less than moderate PPM (log-rank p=0.046). Severe PPM predicted all-cause mortality in patients with BEV (hazard ratio [HR] 5.20, 95% confidence interval [CI] 1.27-21.2) and IAV (HR 4.23, 95% CI 1.28-14.02), and it did so with borderline significance in the overall population (HR 2.89, 95% CI 0.95-8.79). Supra-annular valve implantation was the only predictor of severe PPM (odds ratio 0.33, 95% CI 0.13-0.83).
Conclusion. Patients with small aortic annuli and severe PPM after TAVR have an increased risk of all-cause mortality at medium-term follow-up, especially after IAV or BEV implantation. TAVR with SAV protected from severe PPM.

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SHORT-TERM OUTCOME OF SELF-EXPANDING ALLEGRA VALVE IMPLANTATION IN PATIENTS AFFECTED BY SEVERE AORTIC STENOSIS: A SINGLE CENTER EXPERIENCE

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Introduction. Allegra (New Valve Technology, NVT) transcatheter heart valve (THV) is a novel self-expanding THV with supra-annular bovine leaflets. The aim of the study is to evaluate the procedural and early clinical outcome of Allegra THV at our center.
Methods. Consecutive patients with symptomatic severe aortic stenosis undergoing transcatheter aortic valve implantation with Allegra THV were enrolled from January 2022 to July 2022. Procedural and clinical success were assessed according to the Valve Academic Research Consortium-3 (VARC-3) consensus criteria.
Results. A total of 12 patients were enrolled in the study. Mean age was 83±5 years, mean Society of Thoracic Surgeons score (n=2 high, n=4 intermediate, n=5 low). At CT scan, mean derived valve area was 23,6±1.9 mm^2 and valve eccentricity index 0,21±0,05. Pre-dilatation was performed in all pts and post-dilatation in five patients. Device time was 5±1,2 min and total fluoroscopy time 27±9,3 min. VARC-3 criteria were met in all patients. Echocardiographic assessment after implantation confirmed a good hemodynamic response by a reduction of mean transvalvular aortic gradient from 57±20 mmHg to 9±1 mmHg. Mild-moderate paravalvular regurgitation was recorded in two patients and in one required plug closure. Femoral pseudoaneurysm occurred in one patient while complete atrio-ventricular block resulting in permanent pacemaker implantation was needed in three patients during hospitalization. Acute kidney injury occurred in one patient who was affected by chronic renal failure.
Conclusions. Our experience with the novel NVT Allegra THV demonstrates that this new valve is a safe and effective THV for treatment of patients affected by severe aortic stenosis.

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PREDICTORS OF MID-VENTRICULAR AND LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT: HIGH VOLUME SINGLE CENTRE EXPERIENCE

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Introduction. Mid ventricular (MVO) and left ventricular outflow tract obstruction (LVOTO) after transcatheter aortic valve implantation (TAVI) have been previously described and are associated with adverse outcome. Pre-procedural identification of patient at risk of MVO and LVOTO after TAVI may help pre-operative risk stratification and patient selection and facilitate intra-operative management, finally improving clinical outcomes. This study aims to identify CT-scan and echocardiographic predictors of left ventricular obstruction (LVO), defined as the composite of MVO and LVOTO.
Methods. We retrospectively reviewed pre-operative CT scans and transthoracic echocardiography of 349 patients treated with TAVI at our Centre between January 2019 and December 2021. Correlations between post-operative development of MVO and LVOTO and pre-operative Echocardiographic and CT scan measurements were tested.
Results. LVO occurred in 16.3% of patients after TAVI. At univariate analysis clinical factors associated to LVO were female gender (OR=2.2, p=0.006) and body surface area (OR=0.19, p=0.006); pre-procedural echocardiographic parameters identified were end-diastolic-diameter (OR=0.89, p<0.001) and left ventricular ejections fraction (OR=1.09, p<0.001), whereas pre-procedural CT scan measurements associated to LVO were intraventricular septum to leaflet coaptation length (SLCL; OR=0.87, p<0.001) and left ventricular systolic area (OR=0.9, p<0.001). After multivariate analysis, only left ventricular ejection fraction (OR=1.1, p<0.001) and the CT scan derived parameters SLCL (OR=0.9, p<0.001) and left ventricular area (OR=0.9; p<0.001) were able to predict LVO after TAVI.
Conclusions. Left ventricle obstruction (LVOTO + MVO) after TAVI can be predicted by CT scan derived parameters. Pre-procedural identification of patients at risk may help intraprocedural and postprocedural management, thus improving clinical outcomes.

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CLINICAL OUTCOMES IN WOMEN AND MEN WITH SMALL AORTIC ANNULI UNDERGOING TRANSCATHETER AORTIC VALVE REPLACEMENT - A MULTICENTER, RETROSPECTIVE, PROPENSITY-MATCHED COMPARISON

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Introduction. Gender-specific characteristics in patients with aortic stenosis and small annuli undergoing transcatheter aortic valve replacement (TAVR) might affect clinical outcomes and hemodynamics. The aim of this study was to assess clinical outcomes and trans-valvular hemodynamics in women and men with small aortic annuli undergoing TAVR.

Methods. TAVI-SMALL 2 international retrospective registry included 1,378 patients with severe aortic stenosis and small annuli (annular perimeter <72 mm or area <400 mm2) treated with transfemoral TAVR at 16 high-volume centers between 2011 and 2020. Women (n = 1,233) were compared with men (n = 145). One-to-one propensity score (PS) matching resulted in 99 pairs. Primary endpoint was incidence of all-cause mortality. Incidence of pre-discharge severe prosthesis-patient mismatch (PPM) and its association with all-cause mortality were investigated. Binary logistic and Cox regression were performed to adjust the treatment effect for PS quintiles.

Results. Incidence of all-cause mortality at a median follow-up of 377 days did not differ between genders in the overall (10.3 vs. 9.8%, p=0.842) and PS-matched (8.5 vs. 10.9%, p=0.586) populations. After PS matching, pre-discharge severe PPM was numerically higher in women vs. men (10.2 vs. 4.3%, p=0.275). Within the overall population, women with severe PPM suffered a higher incidence of all-cause mortality when compared to those with less than moderate PPM (log-rank p=0.024) and less than severe PPM (p=0.027).

Conclusion. No difference in all-cause mortality at medium-term follow-up was observed between women and men with aortic stenosis and small annuli undergoing TAVR. Incidence of pre-discharge severe PPM was numerically higher in women than men, and it was associated with increased all-cause mortality in women.

Other

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COST-EFFECTIVENESS OF PRESSURED-CONTROLLED INTERMITTENT CORONARY SINUS OCCLUSION IN PRIMARY PERCUTANEOUS CORONARY INTERVENTION: A THRESHOLD ANALYSIS ON THE COST OF THE DEVICE

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Introduction. Percutaneous coronary intervention (PPCI) represents the standard technique for ST-elevated myocardial infarction (STEMI). Despite improvements in treatments, 1-year mortality is 14% and heart failure occurs in up to 28% of patients within the first 90 days. Preliminary data suggest that pressure-controlled intermittent coronary sinus occlusion (PiCSO) might reduce the infarct size in these patients leading to a 34% reduction in hospitalizations for heart attack at one year with a 25% reduction in associated mortality. The PiCSO is an innovative medical technology intended to reduce infarct size by intermittently occluding the coronary sinus outflow in patients undergoing PPCI. Treatment with the PiCSO Impulse System enhances redistribution of venous blood-flow towards the peri-infarct area, clearing microvascular obstruction and potentially leading to myocardial protection.

Objectives. As in Italy PiCSO is not used yet in the clinical practice, we evaluated the cost-effectiveness of PPCI+PiCSO compared to PPCI alone for the treatment of patients with STEMI from the National Healthcare Service (NHS) perspective in Italy.

Methodology. A Markov model was developed to estimate quality-adjusted life years (QALYs) and costs associated with PPCI+PiCSO and PPCI alone in an adult population with STEMI. In this model, adult patients with STEMI undergoing PPCI, with or without PiCSO, enter in the "post-MI" health state; they may remain in the "post-MI" state or experiment subsequent events such as heart failure, reinfarction, stroke or death. Transition probabilities and costs for the management of events were derived from published literature. A discount rate of 3% was considered for both costs and QALYs, and the cycle length was established to be one month. A lifetime horizon was applied for the baseline analysis. As in Italy the cost of PiCSO technology is not currently covered by DRGs, one-way sensitivity analyses were performed on the cost of the medical device according to different willingness-to-pay (WTP) thresholds: 50'000€, 30'000€ and 15'000€.

Conclusion. Over a lifetime horizon, PPCI+PiCSO may lead to 15.87 life years and 12.16 QALYs, compared to values that were 15.37 and 11.74 for PCI alone, respectively. Considering a WTP threshold of 50,000€, PPCI+PiCSO showed to be a cost-effective strategy compared to PCI alone when assigning a cost lower than 21'700€ to the medical device; assuming WTP thresholds of 30'000€ and 15'000€, PPCI+PiCSO appeared to be a cost-effective option versus PCI alone considering a cost for the medical device lower than 13'400€ and 7'100€, respectively. The present analysis suggests that a cost lower than 21,700€ may be good value for money for PiCSO, a technology that may avoid cardiac events and improve patients' life expectancy and quality of life.

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DESIGNING A QUESTIONNAIRE TO PERFORM A MICROCOSTING ANALYSIS OF THE PiCSO DEVICE

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Introduction. Acute myocardial infarction is one of the leading causes of mortality in Italy. Timely restoration of epicardial blood flow through primary percutaneous coronary intervention (PPCI) is the gold standard in the treatment of ST-segment elevation myocardial infarction (STEMI). However, despite optimized stenting techniques and improvements in imaging and in adjuvant pharmacological therapies, the one-year mortality rate after STEMI has plateaued at 14% and heart failure occurs in approximately 13% of patients at 30 days and 20–30% at 1 year after discharge. The PiCSO (Pressure-controlled Intermittent Coronary Sinus Occlusion) Impulse System is an innovative medical technology intended to reduce infarct size by intermittently occluding the coronary sinus outflow in patients undergoing PPCI. Treatment with the PiCSO Impulse System enhances redistribution of venous blood-flow towards the peri-infarct area, clearing microvascular obstruction and potentially leading to myocardial protection. Clinical data from non-randomized, matched pair control studies, suggests that the use of PiCSO may be associated with reductions of up to 34% in hospitalization for heart failure and a 25% reduction in mortality in the first year after the PPCI procedure. As PiCSO is not yet used routinely in Italian clinical practice, evidence on its clinical and economic value may be useful to policymakers to support the assessment and appraisal activities on the device. In order to depict the economic value of PiCSO there is the need to assess the actual cost of the entire procedure involving the device in order to generate an as accurate as possible number to input into further cost-effectiveness analyses to compare PPCI+PiCSO with PPCI alone.

Objectives. The aim of the study was to design a questionnaire following the micro-costing approach for the determination of the total cost of the PiCSO procedure from the hospital perspective. The questionnaire needed to consider all the phases of the PiCSO procedure in order to fathom the overall cost.

Methodology. The questionnaire has been designed for a target population of STEMI patients undergoing PPCI+PiCSO. The questionnaire has been divided into two main sections: on one hand, the PiCSO treatment, as an adjunct to PPCI, and, on the other hand, the management of complications directly attributable to the PPCI+PiCSO procedure. In each section, all the required steps have been enumerated and, for each step, all the necessary resources have been listed. In this way, hospital costs can be assigned to each healthcare resource used during the index hospital stay, considering both the main procedure and the management of complications, while healthcare professionals' time will be monetized based on their wages. The questionnaire has been validated by an expert interventional cardiologist (RS), who provided guidance in the identification of the appropriate phases of the procedure and of the relevant complications, whose management requires consumption of additional healthcare resources. The recipients of the questionnaire are key opinion leaders in the field of interventional cardiology, with experience in the use of the PiCSO device.

Results. The questionnaire included the following sections: (i) introduction describing the patients' characteristics and the procedure; (ii) relevant visits and examinations, laboratory tests, drugs, and surgical materials related to PPCI+PiCSO procedure, as well as personnel time for the different professionals involved in the healthcare services and in the surgical activity; (iii) management of possible main complications: vascular complications of the access site (non-severe bleeding), coronary complications caused by PPCI alone (perforation, occlusion, dissection of arteries or branches of arteries); coronary sinus complications caused by PiCSO device insertion and activation procedure (perforation, occlusion, dissection) and acute kidney damage from contrast medium. The resources listed in the questionnaire have been divided into disposable

resources (e.g. catheters) and permanent resources (e.g.PiCSO Console). For each item, responders have to indicate the percentage of patients involved, followed by the average number of items used per patient and the hospital unit cost. Concerning drugs, responders are requested to indicate active ingredient and dosage per patient. The ad-hoc developed questionnaire is a tool that allows to gather data on the healthcare resource consumption, including personnel, and corresponding costs involved in a PPCI+PiCSO procedure and may be a useful instrument in order to carry out future cost-effectiveness analyses.

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L'UTILIZZO DI UNA BASSA DOSE DI RADIAZIONI DURANTE PROCEDURE DI DIAGNOSTICA E INTERVENTISTICA CORONARICA È SICURA E PROTETTIVA PER IL PAZIENTE E L'OPERATORE

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Introduzione. L'esposizione a radiazioni ionizzanti durante procedure di interventistica coronarica è potenzialmente dannosa per i pazienti e gli operatori. Abbiamo valutato la fattibilità e l'efficacia di un protocollo di bassa dose (BD) in una serie caso-controllo di pazienti consecutivi trattati da due operatori del nostro centro confrontati ad una serie precedente trattata dagli stessi operatori.
Metodi. Dal 1/1/21 al 30/4/21 abbiamo raccolto i dati di 231 procedure con protocollo di dose normale (DN: 15 f/s per scopia e grafia). Dal 1/7/21 al 30/10/21 abbiamo raccolto i dati di 230 procedure con protocollo di BD (7 f/s per scopia e grafia) per un tot di 443 pazienti.
Risultati. Le caratteristiche cliniche dei pazienti sono sovrapponibili in termini di età e BMI. Maggior percentuale di uomini e diabetici nel gruppo bassa dose e maggior percentuale di sindromi coronariche. Le caratteristiche procedurali sono sovrapponibili in termini di numero di angioplastiche (PCI), n di vasi trattati, complessità della procedura. Tutte le procedure nel gruppo dose normale e tutte meno una nel gruppo bassa dose sono state effettuate tramite l'accesso radiale. La durata della procedura e i min di scopia sono leggermente inferiori nel gruppo bassa dose, ma con un chiaro dimezzamento della DAP. Non vi è stato un aumento dei tempi procedurali né di utilizzo di mezzo di contrasto con il dimezzamento dei frame/s. Per quanto riguarda il follow up sono stati persi 10 pazienti in quanto stranieri non raggiungibili telefonicamente. Il follow up medio è stato di 8 mesi. Il numero di morti totali e cardiovascolari non differisce in modo statisticamente significativo tra i gruppi, così come la TVF. Si sono registrati solo 2 casi di trombosi di stent certa nel gruppo DN.
Conclusioni. L'utilizzo di una bassa dose di radiazioni durante procedure di interventistica coronarica si è dimostrata non inferiore in termini di successo della procedura e di eventi al follow up rispetto alla dose normale, permettendo di risparmiare la metà della dose somministrata ai pazienti e agli operatori e quindi riducendo il rischio di eventuali danni correlati.

	DN	%	BD	%
n	231		230	
Età, aa	70		68	
Sesso, m	151	65	169	73
Ipertensione	173	75	149	65
Diabete	35	15	48	21
BMI	27		28	
Patologia				
Cardiopatia ischemica	174	75	191	83
SCA	93	53	125	65
Valvolari	34		17	
CMP dilatativa	18		11	
Altro	4		12	

SCA, sindrome coronarica acuta; CMP, cardiomiopatia dilatativa.

	DN	%	BD	%
n	231		230	
n PCI	96	41	95	41
n vasi trattati				
1	92		90	
2	4		5	
3	0		0	
n stent				
1	69		60	
2	21		19	
3	5		6	
4	1		2	
Accesso radiale	231	100	229	99
Successo procedurale	231	100	230	100
Durata procedura, min	41		38	
Tot scopia, min	10		8	
DAP	164		84	
Contrasto (Iomeron)	131		120	

DAP, prodotto dose area.

Follow-up	DN	%	BD	%
Morti	8	0,03	9	0,04
Morte cardiaca	7		6	
TVF	3	0,01	1	<0,01
Trombosi tardiva	2		0	

TVF, nuova rivascolarizzazione del vaso target.

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L'HEART TEAM NELLA NOSTRA PRATICA CLINICA QUOTIDIANA: RISULTATI DA UNA SURVEY DI CARDIOLOGI INTERVENTISTI

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Introduzione. L'Heart Team (HT) ha inciso pesantemente sulle indicazioni al trattamento percutaneo della coronaropatia, dapprima, e delle valvulopatie successivamente. Ci siamo chiesti come operi tale team multidisciplinare nella nostra realtà regionale.
Metodi. Abbiamo intervistato oltre 100 cardiologi interventisti della nostra regione, la Sicilia, afferenti alla società scientifica GISE.
Risultati. Molti cardiologi interventisti siciliani non impiegano adeguatamente l'HT per via di difficoltà logistiche e relazionali con gli altri componenti del team. Vedasi figure a corredo.
Conclusioni. Occorrono protocolli scritti e ben codificati riguardanti le indicazioni per l'attivazione dell'HT e le patologie che ne richiedono la valutazione. Gli stessi protocolli devono essere condivisi con i cardiochirurghi e non demandati al solo "buon senso" dell'emodinamista. Ad oggi, nella nostra realtà regionale, il concetto di HT non è applicato nella pratica clinica quotidiana in accordo con la Letteratura scientifica.