Revista Portuguesa de Cardiologia 43 (2024) S3-S71

Revista Portuguesa de Cardiologia
Portuguese Journal of Cardiology
www.revportcardiol.org

COMUNICAÇÕES ORAIS (CO)

Congresso Português de Cardiologia 2024

19-21 de abril de 2024

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00

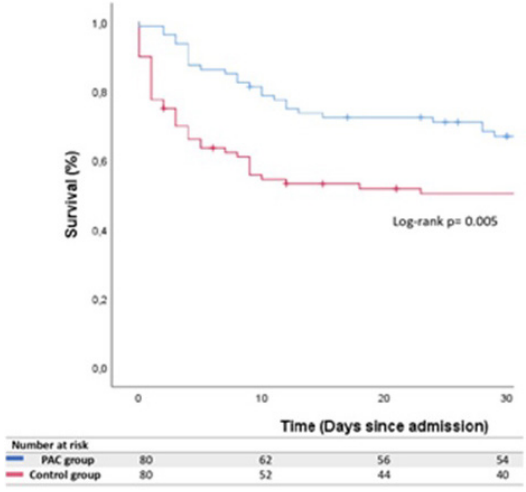
Fenix 1 | Comunicações Orais - Sessão 01 - Choque cardiogénico e transplante cardíaco

CO 1. PULMONARY ARTERY CATHETERIZATION IN CARDIOGENIC SHOCK – A PROPENSITY MATCHED ANALYSIS ON MANAGEMENT AND PROGNOSTIC IMPACT

Ana Rita Bello, Rita Almeida Carvalho, João Presume, Mariana Sousa Paiva, Rita Lima, Rita Sousa Barbosa, Samuel Azevedo, Débora Correia, Catarina Brízido, Christopher Strong, Jorge Ferreira, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Even though previous trials failed to show outcome improvement in cardiogenic shock (CS) patients managed with a pulmonary artery catheter (PAC), recent observational studies suggest that its use may allow tailored treatment decisions and bring prognostic benefits to this population.
Objectives: To analyze PAC-guided patient management trends and identify differences in mortality between CS patients who received a PAC vs. those who did not.
Methods: Retrospective single-center analysis of consecutive CS patients admitted to our cardiac intensive care unit (CICU) between 2017 and 2023. Historically, PAC insertion transitioned from being at the discretion of the attending cardiac intensivist to becoming encouraged for CS from 2021 onwards. Firstly, PAC patients' strategy modification according to the obtained invasive hemodynamic data was analyzed. Secondly, PAC patients were propensity score paired in a 1:1 ratio with a group of non-PAC patients, matched by age, diabetes, chronic kidney disease, CS etiology, SCAI class at admission, maximum lactate and presence of cardiac arrest (mean standardized difference < 10% for matching variables). Matched patients were compared for 30-day all-cause mortality.
Results: From a total of 286 CS patients, 81 (28%) received a PAC. For these patients, invasive hemodynamic phenotyping changed medical approach in 57 (70%) patients: prompting fluid management modification in 46 (80%), initiation of a different inotropic drug in 11 (19%) and a change on vasoactive drug class in 25 patients (44%). Regarding the use of mechanical circulatory support (MCS), PAC was useful: for guiding MCS choice in 4 patients; deciding not to proceed with MCS in 3 patients; helping MCS weaning in 7 patients; and completing heart transplantation or LVAD evaluation in 8 patients. After propensity matching, a total of 160 patients (80 PAC and 80 non-PAC) were included (mean age of 63 ± 17 years, 114 [71%] male). In 52% (n = 83), etiology for CS was acute myocardial infarction. Median lactate and most frequent SCAI class at admission were 3.3 [1.8 – 6.0] mmol/L and C (n = 100; 63%), respectively. Cardiac arrest occurred in 48 (30%) patients. Overall, 30-day mortality was 41% (n = 66). Patients in the PAC group demonstrated decreased mortality at 30-days (33% vs. 50%, p = 0.025). Survival analysis through Kaplan-Meier curves showed improved survival at 30 days in the PAC-guided patient group ([CB1] [AT2] log-rank p = 0.005) (Figure).



Conclusions: PAC had an impact on CS management in 70% of cases and also on 30-day mortality, compared to non-PAC patients. Invasive hemodynamic assessment contributes to more tailored treatment decisions and therefore may have an impact in CS outcomes. Further randomized studies and prospective analysis are necessary to confirm these results.

CO 2. LEFT VENTRICLE UNLOADING TECHNIQUES IN VA-ECMO: A COMPARATIVE ANALYSIS IN CARDIOGENIC SHOCK PATIENTS

Marta Leite, Fábio Nunes, Daniel Caeiro, Marisa Silva, Gustavo Pires-Morais, Mariana Ribeiro Silva, Pedro Gonçalves Teixeira, Marta Ponte, Adelaide Dias, Lino Santos, Pedro Braga, Ricardo Fontes-Carvalho

Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE.

Introduction: Venoarterial Extracorporeal Membrane Oxygenation (VA-ECMO) has significantly advanced the management of patients in

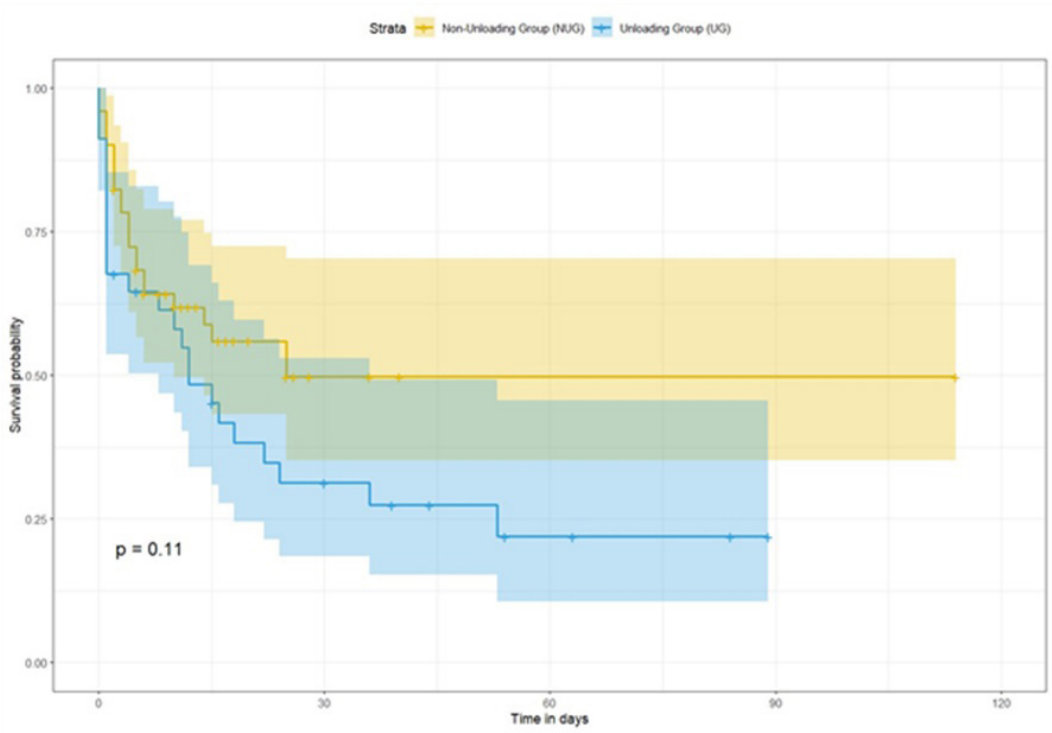


Figure CO2

refractory cardiogenic shock. Nevertheless, the retrograde delivery of oxygenated blood to the aorta via the arterial cannula imposes increased afterload on an already strained left ventricle (LV). Our study aims to compare the clinical outcomes of patients on VA-ECMO with additional invasive techniques to unload the LV against those without unloading strategies.

Methods: Patients admitted to our hospital requiring VA-ECMO were categorized into two groups: the Unloading Group (UG) that received LV unloading interventions and the Non-Unloading Group (Non-UG) without such interventions. We collected comprehensive clinical data, including demographics, baseline characteristics, ECMO-related parameters, in-hospital complications, and patient outcomes. Statistical analyses involved chi-square tests for categorical variables and independent samples t-tests for continuous variables.

Results: In the period between January 2011 and October 2023, our cardiac intensive care unit treated 85 patients with VA-ECMO (mean age 54.5 ± 11.9 years, 61.2% male). Notably, acute coronary syndrome was the primary cause of refractory cardiogenic shock necessitating VA-ECMO (31.4% Non-UG vs. 70.6% UG). Approximately 34 patients received LV unloading support. The choice of unloading device was guided by our centre's expertise and attended physician preference. Intra-Aortic Balloon Pump (IABP) was the most commonly used (64.7%), followed by Impella CP (20.6%). Unloading devices were implemented either concurrently with VA-ECMO cannulation (61.8%) or after its insertion (38.2%). No significant differences were observed in the median duration of VA-ECMO (4 days UG vs. 3 days Non-UG, p = 0.25) or in the median duration of hospitalization (12 days UG vs. 13 days Non-UG, p = 0.619) between the two groups. The UG experienced more thromboembolic events despite not reaching statistical significance (38.2% UG vs. 21.6% Non-UG, p = 0.752). A higher incidence of bleeding events was also reported in the UG, and particularly airway bleeding was significantly more common in the UG (20.6% UG vs. 3.9% Non-UG, p = 0.0369). The 30-day survival rates were 31% (95%CI, 0.19-0.53) in the UG and 50% (95%CI, 0.35-0.70) in the Non-UG, which did not display statistical significance (p = 0.11) (Figure).

Conclusions: In our cohort, incorporating unloading devices alongside VA-ECMO did not yield major differences in survival rates. The precocity of unloading device implantation, either as an initial strategy or to prevent increased afterload in hearts with limited contractile reserve, should be carefully weighed against associated risks and complications.

CO 3. VASODILATORY CARDIOGENIC SHOCK: EPIDEMIOLOGY, INVASIVE PHENOTYPING AND PROGNOSTIC IMPLICATIONS

Rita Almeida Carvalho, Ana Rita Bello, Débora Silva Correia, Rita Barbosa Sousa, Samuel Azevedo, Maria Rita Lima, Mariana Sousa Paiva, João Presume, Catarina Brízido, Christopher Strong, Jorge Ferreira, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Vasoplegia is an increasingly recognized feature of cardiogenic shock (CS). Its significance as either a different subtype of CS or the final stage of CS remains to be clarified. Furthermore, vasodilatory CS prevalence, characteristics, and outcomes remain unknown. The aim of this study was to invasively characterize CS-associated vasoplegia, its non-invasive predictors and its impact on patient prognosis.

Methods: Retrospective single-center study including consecutive patients admitted to our Cardiac Intensive Care Unit (CICU), from January 2017 to October 2023, who underwent pulmonary artery catheter (PAC) insertion. The diagnosis of CS was based on the standard clinical definition. Clinical characteristics, laboratory and echocardiographic features, SCAI stage, and ongoing hemodynamic support were documented at the time of PAC insertion. The PAC was used to obtain a full hemodynamic evaluation, including cardiac output measurements (preferably by thermodilution). Patients were classified based on the calculated systemic vascular resistance (SVR) as having absence of vasoplegia (SVR > 1,200 dynes*s/cm^5), mild vasoplegia (SVR 800-1,200 dynes*s/cm^5), or severe vasoplegia (SVR < 800 dynes*s/cm^5). Population outcomes included CICU length-of-stay and 30-day all-cause mortality.

Results: From a total of 286 patients, 63 (21%) patients with CS and complete hemodynamic evaluation through PAC were included (mean age 61 ± 17 years, 75% male). Among them, 46% presented with AMI-CS, and 75% in CS SCAI C. Vasoplegia was identified in 50% of patients, 21 (34%) were classified as having mild and 10 (26%) as having severe vasoplegia. Clinical, laboratory and baseline echocardiographic features were comparable between groups, although a numerically higher prevalence of AMI-CS (50 vs. 45%) and SCAI D (25 vs. 22%) patients was observed in the vasoplegic population. Vasoactive drug support was similar between both groups

(median VIS 58 vs. 52, p = 0.769). No non-invasive predictors of an invasive vasoplegic profile were identified. Hemodynamic profiling showed vasoplegic patients had lower SVR but higher cardiac index (CI) (median SVR 761 vs. 1,268 dynes*s/cm^5, p < 0.001; CI 2.74 vs. 2.11 L/min/m^2, p = 0.005), as well as lower pulmonary vascular resistance (PVR) and transpulmonary gradient (TPG) (median PVR 0.5 vs. 3.3W, p < 0.001; TPG 3 vs. 11 mmHg, p = 0.011). The presence of vasoplegia did not significantly impact CICU length-of-stay (log rank p = 0.867) or 30-day mortality (log rank p = 0.079), even after adjusting SVR for the intensity of vasoactive drug support.

Figure 1: Example of the invasive hemodynamic assessment of a severe vasoplegic patient using PAC.

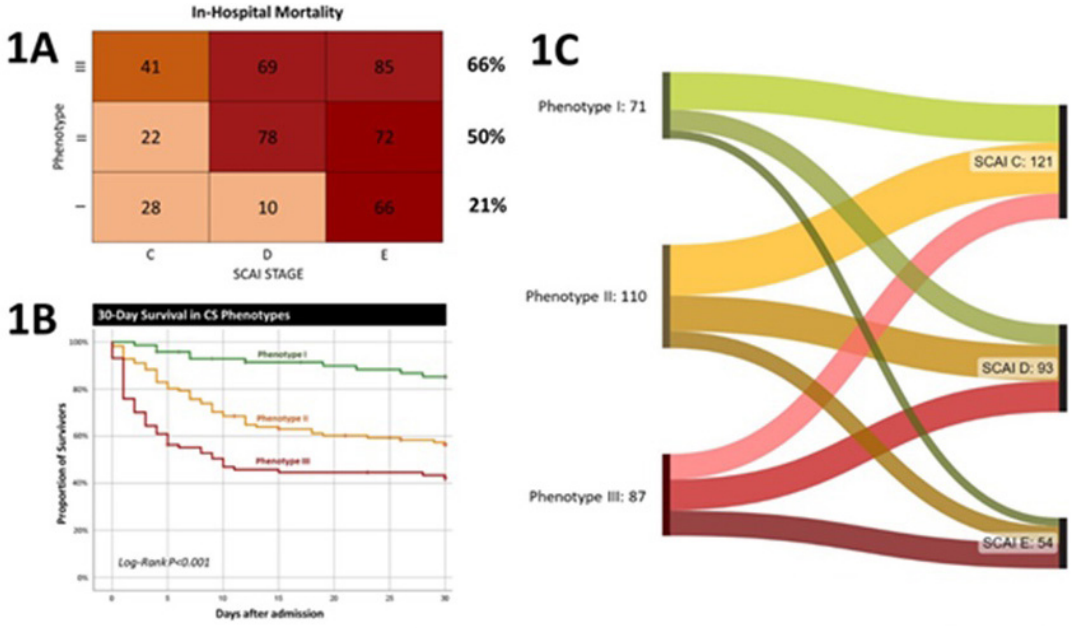
Conclusions: The vasoplegic phenotype of CS was prevalent in our cohort. The invasive hemodynamic profile differs from the classic CS. Its presence did not, however, impact on CICU length-of-stay or 30-day mortality. These results suggest that vasodilatory CS might represent a different, but not necessarily more severe, patient subset.

CO 4. DECODING CARDIOGENIC SHOCK COMPLEXITY: VALIDATION AND PROGNOSTIC SIGNIFICANCE OF MACHINE-LEARNING PHENOTYPES IN A PORTUGUESE PATIENT COHORT

Joana Certo Pereira, Miguel Domingues, João Presume, Rita Carvalho, Rita Bello, Rita Lima, Rita Barbosa, Mariana Paiva, Catarina Brízido, Christopher Strong, Jorge Ferreira, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Accurate characterization of Cardiogenic Shock (CS) is imperative for enhancing our comprehension of this intricate syndrome and tailoring effective therapies. The CS Working Group (CSWG) has delineated three distinct clinical phenotypes—non-congested (I), cardiorenal (II), and cardiometabolic (III)—using machine learning. While these phenotypes may exhibit prognostic implications, their reproducibility necessitates further validation. This study sought to validate the relevance of CS phenotypes in a real-world cohort from Portugal.
Methods: Retrospective, single-center study enrolling consecutive CS patients in a cardiac intensive care unit, from December 2014 to October 2023. Patient phenotyping utilized the CSWG Calculator based on the following specific characteristics: age, serum creatinine, serum bicarbonate, alanine transaminase, lactate, platelet count, and white-cell count. The co-primary outcomes were in-hospital and 30-day mortality.
Results: A total of 269 patients (66% men, mean age 67 ± 16 years) were analyzed. CS etiology included ischemic (45%), chronic heart failure (35%), and secondary causes (20%). Admission SCAI stages were C (67%), D (22%), and E (7%). During hospitalization, progression to SCAI D or E occurred in 58% of cases, of whom 32% required mechanical circulatory support. In-hospital mortality was 48%. Overall, 26% (n = 71) of patients were classified as phenotype I, 41% (n = 111) as phenotype II and 32% (n = 87) as phenotype III. In-hospital mortality rates were 21%, 50%, and 66%, respectively (Figure 1A). Crude odds-ratio for in-hospital mortality were 3.88 (95%CI: 1.95-7.69; p < 0.001) and 6.80 (95%CI: 3.27-14.15; p < 0.001) for phenotypes II and III, when compared to phenotype I. Kaplan-Meier curves for overall 30-day mortality are depicted in Figure 1B. The risk of progressing to stage D or E shock during hospitalization was lowest in phenotype I and highest in phenotype III (Figure 1C). In a bivariate Cox regression model adjusted for SCAI staging, CS phenotyping remained significantly associated with 30-day mortality (OR 1.94 [1.47; 2.54]; p < 0.001).



1A – Sankey graphic depicting shock progression by phenotype; 1B - In hospital mortality stratified by CS phenotype; 1C - 30-day survival among the 3 Phenotypes of CS; SCAI - Society for Cardiovascular Angiography and Interventions Score; CS - Cardiogenic Shock

Figure CO4

Conclusions: This retrospective study validated the CSWG phenotyping categorization in a Portuguese CS cohort, establishing a significant association with in-hospital mortality while adding prognostic information to the SCAI shock classification. Our findings support the applicability of these phenotypes, offering nuanced risk stratification with potential therapeutic implications.

CO 5. PREDICTORS OF ACUTE HEART TRANSPLANT REJECTION

Miguel Abrantes de Figueiredo, Francisco Albuquerque, Ana Raquel Santos, António Valentim Gonçalves, Rita Ilhão Moreira, Tiago Pereira-da-Silva, Rui Soares, Lídia de Sousa, Valdemar Gomes, Pedro Coelho, Rui Cruz Ferreira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: In patients submitted to heart transplant (HT), endomyocardial biopsy (EMB) is considered the most accurate measure for acute cellular rejection (ACR). Invasive hemodynamic parameters obtained during right-heart catheterization are well established predictors of ACR. However, the ability of clinical and non-invasive parameters accurately predict ACR is not yet well defined.
Objectives: To evaluate the accuracy of invasive and non-invasive analytical, electrocardiographic (ECG) and echocardiographic parameters in detecting significant ACR in HT patients.
Methods: Retrospective analysis of 249 consecutive EMB samples of HT patients between February 2016 and November 2023 from one tertiary care center in Portugal. Additionally, data from same-day blood analysis, ECG and the most recent transthoracic echocardiography (TTE) were also collected. Significant ACR was defined as ≥ 2R on EMB (according to the International Society of Heart and Lung Transplantation 2004 grading) or if high-dose immunosuppressants were prescribed. Independent-samples t-test and chi-square were used to identify statistical significance between the invasive and non-invasive parameters and significant ACR. For the statistically significant parameters, receiver operating characteristic (ROC) curves, area under the curve (AUC) and their optimal point were calculated.
Results: Three EMB samples were excluded due to insufficient material for histopathological analysis. Significant ACR was present in 10.6% of cases. Cardiac index, pulmonary capillary wedge pressure, central venous pressure (CVP), cardiac power output, right ventricular (RV) pressures, pulmonary artery pressures and pulmonary artery pressure index are invasive parameters associated with significant ACR (p-value < 0.05). Left ventricular ejection fraction and estimated systolic pulmonary arterial pressure in the TTE, abnormal rhythm and axis in the ECG are non-invasive parameters associated with significant ACR. ROC curve results are portrayed in the Table. Based on the ROC curves, CVP (AUC = 0.855) and RV end-diastolic pressure (AUC = 0.811) are the best predictors of ACR.
Conclusions: Significant ACR was present in 10.6% of cases. Hemodynamic right-heart catheterization parameters were closely correlated with ACR. Moreover, non-invasive analytical, ECG and TTE parameters were also correlated with significant ACR in HT patients, allowing its use as a predictor in clinical practice.

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00

Fenix 2 | Comunicações Orais - Sessão 02 - Doença aórtica

CO 6. SUBENDOCARDIAL "ISCHEMIC-LIKE" STATE IN PATIENTS WITH SEVERE AORTIC STENOSIS: INSIGHTS FROM MYOCARDIAL HISTOPATHOLOGY AND ULTRASTRUCTURE

Rita Reis Santos[1], João Abecasis[1], Sérgio Maltês[1], Pedro Lopes[1], Rita Theias Manso[1], Victor Gil[2], Nuno Cardim[3], Sância Ramos[1], Ana Félix[3]

[1]Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [2]Hospital da Luz Lisboa. [3]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: Myocardial adaptation to severe aortic stenosis (AS) is a complex process that involves myocardial fibrosis (MF) beyond cardiomyocyte hypertrophy. Perfusion impairment is believed to be involved in myocardial remodeling in chronic pressure overload.
Objectives: To describe morphological and ultrastructural myocardial changes at EMB, possibly reflecting subendocardial ischemia, in a group of patients with severe AS referred to surgical aortic valve replacement (AVR), with no previous history of ischemic cardiomyopathy.
Methods: One-hundred-fifty-eight patients (73 [68-77] years, 50% women) referred for surgical AVR because of severe symptomatic AS with pre-operative clinical and imaging study and no previous history of ischemic cardiomyopathy. Intra-operative septal EMB was obtained in 129 patients. Tissue sections were stained with Masson´s Trichrome for MF quantification and periodic acid-Schiff (PAS) staining was performed to assess the presence of intracellular glycogen. Ultrastructure was analyzed through Transmission electron microscopy (TEM).
Results: MF totalized a median fraction of 11.90% [6.54-19.97%] of EMB, with highly prevalent perivascular involvement (95.3%). None of the samples had histological evidence of myocardial infarction. In 58 patients (45%)

Table 1: ROC Curve analysis of the statistically significant hemodynamic and echocardiographic parameters

Category	Parameters	AUC	p-value	95% CI	OP (Sen/Spe)	100% Sen
Hemodynamic	PCWP	0.765	< 0.001	0.673 – 0.857	13.500 (72.5%/66.9%)	< 6.00
	CVP	0.855	< 0.001	0.788 – 0.922	9.500 (65.0%/86.3%)	< 4.00
	RVESP	0.691	0.003	0.594 – 0.788	31.500 (73.9%/58.7%)	< 25.00
	RVEDP	0.811	< 0.001	0.730 – 0.891	5.500 (91.3%/55.4%)	< 4.00
	SPAP	0.742	< 0.001	0.642 – 0.842	31.500 (72.0%/68.3%)	< 21.00
	MPAP	0.767	< 0.001	0.674 – 0.860	20.500 (80.0%/68.6%)	< 13.00
	DPAP	0.738	< 0.001	0.644 – 0.833	13.500 (64%/68.8%)	< 6.00
	PAPI	0.796	< 0.001	0.716 – 0.876	2.740 (76.0%/79.1%)	> 4.92
	CPO	0.689	0.002	0.559 – 0.820	1,036 (62.5%/76.3%)	> 2.22
	CI	0.704	0.001	0.575 – 0.832	2.485 (50.0%/89.1%)	> 7.35
Echocardiographic	LVEF	0.716	< 0.001	0.613 – 0.819	56.600 (69.2%/68.9%)	> 70.00
	SPAP	0.686	0.008	0.568 – 0.805	29.500 (78.9%/58.3%)	< 23.00

AUC (area under the curve); CI (cardiac index); CPO (cardiac power output); central venous pressure (CVP); DPAP (diastolic pulmonary artery pressure); LVEF (left ventricular ejection fraction); MPAP (mean pulmonary artery pressure); OP (optimization point); PAPI (pulmonary artery pressure index); PCWP (pulmonary capillary wedge pressure); ROC (receiver operating characteristic); RVEDP (right ventricular end-diastolic pressure); RVESP (right ventricular end-systolic pressure); Sen (sensitivity); SPAP (systolic pulmonary artery pressure); Spe (specificity).

Figure CO5

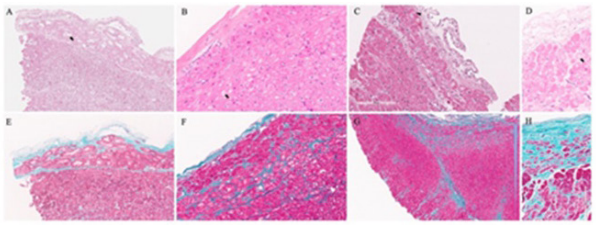


Figure 1A. *A-D) Examples of abnormal subendocardial cardiomyocyte morphology, present in 45% of the EMB samples. At haematoxylin-eosin x100 it is possible to identify cytoplasmatic enlargement, vacuolization (arrow) and myofiber detachment/division (arrowhead). E-F-H) Masson´s Trichrome (x100) from the same corresponding areas as in A-B and D, showing cardiomyocyte entanglement by prominent peri-cellular fibrosis. In G (low magnification of F), such as in H, endo to mid-myocardium gradient of fibrosis becomes clear (blue arrow).*

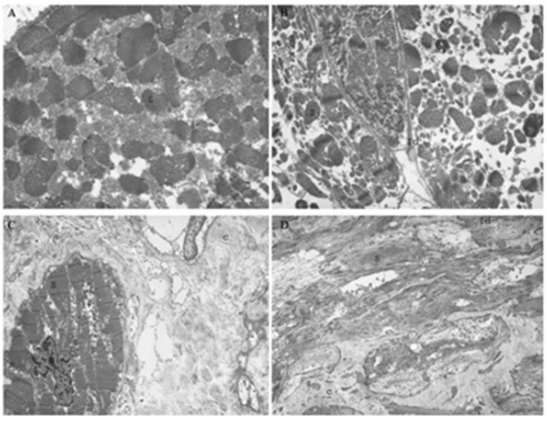


Figure 1B. *Targeted areas of the two selected cases for TEM. In case 1 (A and B x11000) cardiomyocytes still have intact intercalated discs (Id) despite the disruption of the normal disposition of the functional units - sarcomeres (s) and organelles rarefaction. In case 2 (C and D x8000) cardiomyocytes are isolated with thinning of the Id and ECM expansion with collagen (c) deposition. There is nuclear (N) clumping, sarcomeres also have signs of degeneration and mitochondria (m) are both pleomorphic and randomly dispersed. Small electrodense inclusions at the cytoplasm in B are difficult to interpret – possible lysosomes, due to the presence of artifacts, which globally preclude appropriate evaluation of the organelles. There is no intracellular abnormal accumulation.*

Figure CO6

we found subendocardial groups of cardiomyocytes with cytoplasmatic enlargement, vacuolization and myofiber derangement, surrounded by extensive interstitial fibrosis. These cardiomyocytes were PAS positive, PAS-diastase resistant and Alcian Blue/PAS indicative of the presence of neutral intracellular glyco-saccharides. At TEM there were signs of cardiomyocyte degeneration with sarcomere disorganization and reduction, organelle rarefaction but no signs of intracellular specific accumulation.

Conclusions: Almost half of the patients with severe AS referred for surgical AVR have histological and ultrastructural signs of subendocardial cardiomyocyte ischemic insult. It might be inferred that local perfusion imbalance contributes to myocardial remodeling and fibrosis in chronic pressure overload.

CO 7. SEX DIFFERENCES IN AORTIC STENOSIS PROGRESSION AND CARDIAC DAMAGE

Rita Veiga[1], Rafael Silva Teixeira[2], Fábio Sousa Nunes[3], Marta Leite[2], Inês Neves[2], Marta Catarina Almeida[3], André Lobo[2], Mariana Brandão[3], Diogo Santos[3], Francisco Sampaio[2], Ricardo Fontes-Carvalho[3]

[1]Hospital Distrital de Santarém, EPE. [2]Centro Hospitalar de Vila Nova de Gaia/Espinho. [3]Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE.

Introduction: Aortic Stenosis (AS) stands as a major valvular heart disease with increasing burden in developed countries. AS induces increased afterload and left ventricle (LV) remodeling, leading to gradual cardiac damage (CD), which can extend beyond the LV. Different sex-specific patterns of cardiac remodeling and damage have been reported, although prevailing guidelines still advocate identical echo-doppler criteria for diagnosing and grading AS in both women and men. Whether these different patterns are caused by sex-related AS progression rate or myocardial response is still unknown.

Objectives: We aim to compare longitudinal changes in aortic valve and cardiac function between women and men with AS to investigate sex-related differences in AS progression and cardiac remodeling.

Methods: Patients with mild-to-severe AS and LV ejection fraction (LVEF) ≥ 50% at least in 2 echocardiograms (TTE) were retrospectively identified. Prosthetic and bicuspid valves were excluded. Serial TTEs provided a multiparametric framework to compare AS severity, progression rate and induced cardiac alterations between sexes.

Results: 914 patients were included (median follow-up time of 6.8 years) and 52% (473) were female. Both sexes had similar baseline aortic peak velocities (APV) (2.9 ± 0.9 m/s), mean pressure gradient (MPG) (27 ± 13 mmHg) and LVEF (60 ± 5%). Women were older (75 ± 9 vs. 73 ± 8 years; $p < 0.001$), had smaller body surface area (BSA) (1.70 ± 0.15 vs. 1.88 ± 0.16 m^2, $p < 0.001$), proportionally lower stroke volume (SV) (82 ± 19 mL

vs. 91 ± 22 mL, p < 0.001), lower indexed LV mass (iLVM) (118 ± 33 g/m² vs. 125 ± 28 g/m², p < 0.001) and higher indexed left atrium (LA) volume (39 ± 13 vs. 49 ± 20 mL/m², p < 0.001). The average annualized progression rate of APV and MPG was similar for both groups (2 mmHg/year and 0.14 m.s^{-1}. year^{-1}). After multivariate adjustment, women had a higher incidence of severe LV hypertrophy (HR = 1.44, CI = 1.08-1.91, p = 0.01), moderate-to-severe tricuspid regurgitation (TR) and pulmonary hypertension (PHT) (HR = 1.55, CI = 1.06-2.25, p = 0.02) at 5 years. Rapid progressive AS is associated with more CD.

Supplemental Table - Adjusted Cox model for cumulative incidence of AS-CD

	Stage 1 HR (95 % CI) p-value	Stage 2 HR (95 % CI) p-value	Stage 3 HR (95 % CI) p-value
Rapid progression	1.45 (1.08, 1.95) p = 0.01	1.62 (1.27,2.08) p < 0.001	1.48 (1.04, 2.10) p = 0.03
AS grade	1.19 (0.97, 1.45) p = 0.10	0.94 (0.78, 1.12) p = 0.48	1.02 (0.80, 1.31) p = 0.87
Age, per 1 year	1.00 (0.99, 1.02) p = 0.90	1.02 (1.00, 1.03) p = 0.05	1.03 (1.01, 1.06) p < 0.01
Female	1.44 (1.08, 1.91) p = 0.01	1.11 (0.87, 1.41) p = 0.40	1.55 (1.06, 2.25) p = 0.02
CAD	1.06 (0.78, 1.43) p = 0,72	0.77 (0.59, 1.01) p = 0.06	0.89 (0.59, 1.34) p = 0.57
Diabetes	1.11 (0.84, 1.48) p = 0,46	0.91 (0.71, 1.16) p = 0.44	1.00 (0.70, 1.42) p = 0.99
Dyslipidemia	0.90 (0.64, 1.27) p = 0.55	1.00 (0.75, 1.34) p = 0.98	0.85 (0.58, 1.26) p = 0.42
Hypertension	0.69 (0.45, 1.04) p = 0.08	0.93 (0.61, 1.39) p = 0.73	1.11 (0.63, 1.94) p = 0.72
Obesity	1.11 (0.65, 1.88) p = 0.71	1.03 (0.68, 1.56) p = 0.89	1.48 (1.04, 2.10) p = 0.03

HR = Hazard Ratio; CI = Confidence Interval; AS = Aortic Stenosis; CD = Cardiac Damage; CAD = Coronary Artery Disease

Incidence of LV damage- stage 1 **(A);** LA or MV damage- stage 2 **(B);** pulmonary vasculature or TV damage- stage 3 **(C);** RV damage- stage 4 **(D).** LV = Left Ventricle; LA = Left Atrium; MV = Mitral Valve; PHT= Pulmonary Hypertension; TV = Tricuspid Valve; RV= Right Ventricle

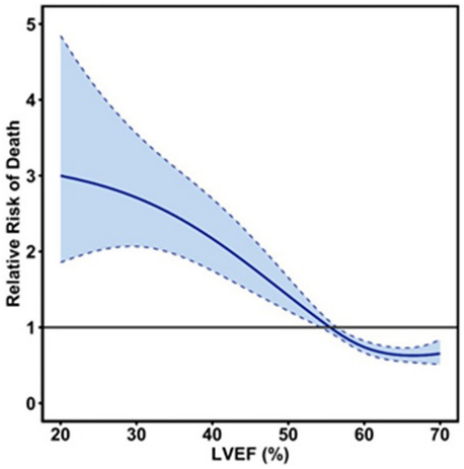
Conclusions: This study suggests that in analogous static and dynamic loading conditions, women will develop severe LV hypertrophy, PHT and significant TR earlier than men. These patterns of CD could reflect sex-specific responses and suggests that the definition of AS severity may benefit from a shift from a valve-focused to a myocardial-integrative approach considering gender.

CO 8. LEFT VENTRICULAR DYSFUNCTION IN PATIENTS WITH AORTIC STENOSIS

Inês Rodrigues, Rafael Teixeira, António Gonçalves, Fábio Nunes, Marta Leite, Inês Neves, Ricardo Fontes Carvalho

Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE.

Introduction: Chronic pressure overload imposed by aortic stenosis (AS) may result in left ventricle (LV) systolic dysfunction. Since reduced LV ejection fraction (LVEF) is associated with poor outcomes in patients with severe AS even after aortic valve replacement (AVR), the ideal time for AVR is before LVEF deterioration. However, the exact moment when LVEF declines and a clear cut-off for an abnormal LVEF in patients with severe AS is not well studied.
Objectives: We aim to compare the longitudinal changes in LVEF and aortic valve area (AVA) in patients with severe AS and their impact on prognosis.
Methods: Patients with AVA ≤ 1 cm², under normal flow conditions, recorded on transthoracic echocardiogram and at least one prior exam performed > 1 year before, were retrospectively identified. Moderate to severe aortic or mitral regurgitation and bicuspid aortic valve were excluded. Characteristics of patients with LVEF < 50% versus ≥ 50% at the moment of the diagnosis of severe AS and 1 year before were compared. A multivariate regression model was used to identify predictors of LVEF deterioration. A Cox model was used to assess the impact of LVEF on overall mortality after adjusting for comorbidities and AVR, as a time dependent covariate.
Results: 645 patients were included (median follow up of 4 years [IQR = 2.3-6.5], 51% female, age 78 years). When severe AS was first identified, 177 (27%) patients had a LVEF < 50% and 468 (73%) had an LVEF ≥ 50%. For patients with LVEF < 50%, LVEF deterioration had begun before AS became severe, whereas LVEF remained > 55% in patients with preserved LVEF at initial diagnosis. LVEF < 55% in the year before predicted LVEF deterioration (adjusted odds ratio = 2.50; 95%CI = 1.81-3.18, p < 0.01). Overall mortality rate was higher in patients with LVEF < 50% (adjusted hazard ratio = 2.88, 95%CI = 2.17-3.70, p < 0.001) even after adjusting for time dependent AVR. The relative risk of death steeply increased when LVEF < 55%.



Conclusions: Our results suggest that LVEF deterioration may begin before AS becomes severe and higher cut-offs (> 55%) may be appropriate to define systolic disfunction in patients with moderate AS. For patients with severe, overall mortality rapidly increases when LVEF < 55%, even after AVR. Further studies are required to establish the benefit of AVR in patients with moderate AS and LVEF < 55%.

CO 9. TWO DECADES OF EFFECTIVE STENT IMPLANTATION IN AORTIC COARCTATION PATIENTS: A SINGLE-CENTER COHORT STUDY OF LONG-TERM HYPERTENSIVE BURDEN

Mariana Sousa Paiva, Isabel Sampaio Graça, Maria Estevens, João Rato, Inês Carmo Mendes, Susana Cordeiro, Mafalda Sequeira, Rui M. Anjos

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Aortic coarctation (AoCo) patients often grapple with persistent hypertension, even after effective interventions. Stent implantation has emerged as a promising solution. Our aim was to describe the burden of hypertension in AoCo patients following stent implantation during long-term follow-up (FUP) and to identify determinants of persistent hypertension.
Methods: Single-center retrospective cohort including AoCo patients who underwent successful stent implantation (persistent residual isthmic Doppler gradient ≤ 20 mmHg) from 1998-2020 and were followed for over 3 years (1,072 patient-years, median FUP 13 years). Data on clinical and echocardiographic assessment, resting blood pressure (BP) measurement, and 24-h ambulatory blood pressure monitoring were collected. Linear regression analyses were performed to explore the association between clinical variables and persistent hypertension at long-term FUP.
Results: We followed 86 patients (mean age 29 ± 15 years at the time of stenting, 61% men, 58 patients (67%) with native coarctation). Before stenting, all patients were on antihypertensive therapy, with 62 (72%) on multiple drugs. Patients with native AoCo were significantly older (32 ± 16 vs. 23 ± 13 yo, p = 0.012) and had an inferior minimal diameter of AoCo (5.3 ± 3.1 vs. 8.3 ± 3.2, p < 0.01). Invasive gradients significantly decreased 42.6 ± 20.8 to 4.8 ± 6.5 mmHg after stenting (p = 0.008). Eighteen patients (21%) underwent a second procedure either for multistage procedure (n = 5), to treat recoil or neointima hyperplasia (n = 5), patient growth (4) or stent fracture. At long-term follow-up, 73 patients (85%) remained hypertensive. However, in 62 (84.9%) of them, it was possible to discontinue at least one

Figure 1A Sankey diagram depicting antihypertensive treatment before stenting, at 1-year follow up and at long-term follow up in aortic coarctation patients

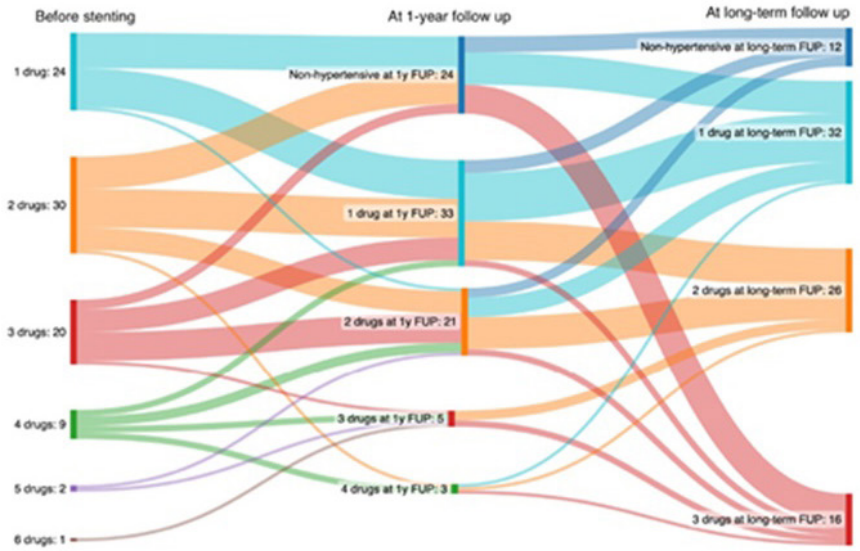


Figure 1B Box plots of age at the time of stenting, echocardiographic and invasive gradients before stenting comparing the long-term non-hypertensive patients and the remainder

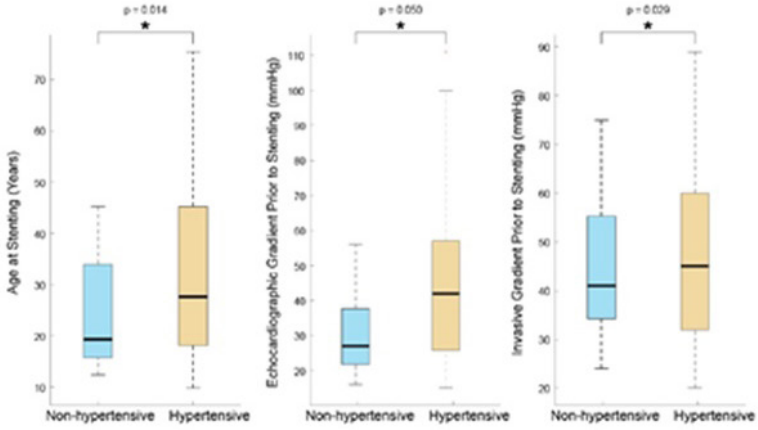


Figure CO9

antihypertensive drug (Figure 1A). Age at the time of stenting was the only predictor of persistent hypertension (β 0.77 95%CI 0.60-0.94, p < 0.001) at this time point. Patients who remained medication free were younger (24.5 ± 12.0 vs. 32.7 ± 16.9 years, p = 0.014), had a lower initial Doppler gradient (35.5 ± 15.6 vs. 48.0 ± 22.8 mmHg, p = 0.050), and lower invasive gradient before intervention (42.6 ± 14.0 vs. 49 ± 16 mmHg, p = 0.029) (Figure 1B). Mean left ventricular mass index (LVMI) significantly reduced over the FUP, from 120.7 g/m² to 107.8 g/m² at 1-year FUP to 98.0 g/m² at long-term FUP (all p < 0.001). Over 20 years, there were 6 deaths (7%), of whom 5 did not reach health adjusted life expectancy.

Conclusions: On long term FUP, while the majority of our cohort remained hypertensive, it was possible to reduce the burden of the disease by discontinuing at least one antihypertensive drug in most of the patients. Age emerged as the sole predictor of persistent hypertension. These findings highlight the importance of pursuing an aggressive screening and treatment of hypertension in these patients even after successful stent implantation.

CO 10. AORTIC DP/DT AS A NEW TOOL FOR PREDICTION OF AORTIC STENOSIS PROGRESSION: A VALIDATION IN A SINGLE-CENTRE COHORT

Ana Rita Bello, Mariana Sousa Paiva, Pedro Freitas, Daniel A. Gomes, Pedro Lopes, Francisco Gama, Sara Guerreiro, António M. Ferreira, João Abecasis, Marisa Trabulo, Maria João Andrade, Regina Ribeiras

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Aortic pressure increase per time unit (dP/dt) has been recently shown to predict the risk of progression of aortic stenosis (AS), with a proposed cut-off of 600 mmHg/s (Panel A). Whether it applies to the Portuguese patients remains to be elucidated.

Methods: In this single-center retrospective study, we included patients with isolated moderate AS who had performed a complete transthoracic

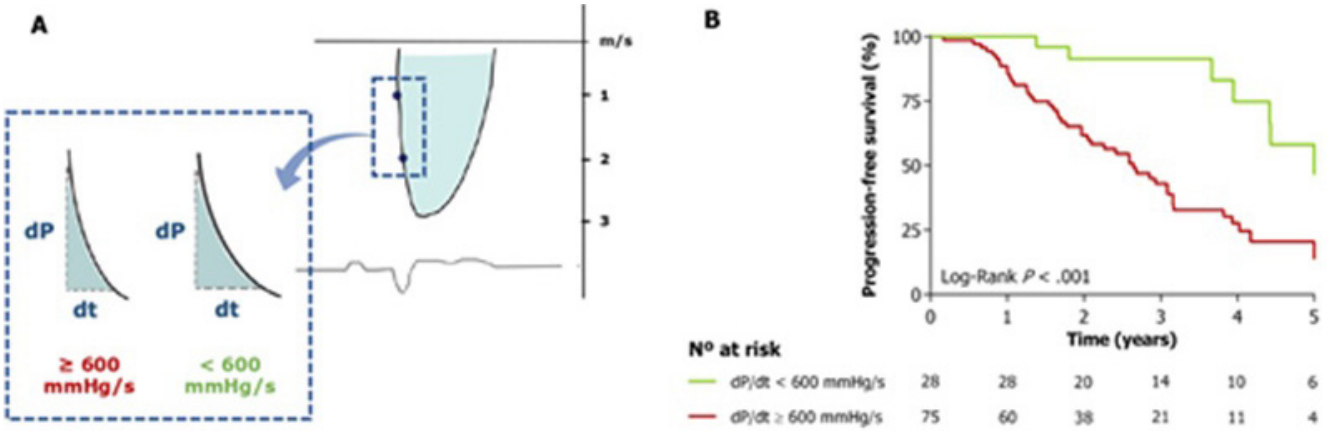


Figure CO10

echocardiography (TTE) assessment in our center between 2014 and 2022. The primary endpoint was progression to severe AS, as documented by follow-up TTE. Uni- and multivariate analysis with Cox regression was used to assess the predictive value of dP/dt.

Results: A total of 103 patients were included, with a median age of 78 years (IQR 71- 83), of which 58 (56%) were male. Median follow-up was 2.2 years (IQR 1.1-3.7) and mean left ventricular ejection fraction (LVEF) was 54 ± 7%. We identified a total of 75 (73%) patients with a dP/dt ≥ 600 mmHg/s; the mean value for dP/dt 737 ± 269 mmHg/s. Aortic dP/dt was independent of flow conditions, showing no correlation with stroke indexed volume (rho = 0.182; p = 0.08; r^2 = 0.02) or LVEF (rho = 0.102; p = 0.31; r^2 = 0.04). After adjustment for aortic maximum velocity (aHR 2.46 [1.08 – 5.5; p = 0.033]) and baseline creatinine (aHR 1.21 [1.06 – 1.37; p = 0.04]), dP/dt remained an independent predictor of progression to severe AS (aHR per 100 mmHg/s: 1.18 [1.03 - 1.34; p = 0.017]). The median time to AS progression was considerably shorter in patients with a dP/dt ≥ 600 mmHg/s when compared with patients with a dP/dt < 600 mmHg/s (2.6 years [95%CI 2.0 – 3.3] vs. 5.3 years [95%CI 4.1 – 6.5]; log-rank p value ≤ 0.001) (Panel B). The dP/dt cut-off of 600 mmHg/s had a sensitivity of 81% (95%CI: 69-90%), a specificity of 44% (95%CI: 30-60), a positive predictive value of 67% (95%CI 60-73%) and a negative predictive value of 63% (95%CI: 48-75%).

Conclusions: Aortic dP/dt was validated in a Portuguese cohort of moderate aortic stenosis patients as an independent predictor of accelerated disease progression. This finding may help tailor individualized follow-up strategies.

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00

Neptuno 1 | Comunicações Orais - Sessão 03 - Válvula aórtica percutânea

CO 11. TAVI FOR TREATING SEVERE AORTIC VALVE DISEASE IN CARDIOGENIC SHOCK – A SINGLE CENTRE EXPERIENCE

Miguel Sobral Domingues, Joana Pereira, João Presume, Catarina Brízido, Christopher Strong, João Brito, Henrique Mesquita-Gabriel, Luís Raposo, Pedro Gonçalves, Manuel Almeida, António Tralhão, Rui Campante Teles

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Recent evidence shows the safety and efficacy of TAVI in patients with aortic valve disease (AVD) presenting in cardiogenic shock (CS). However, there is limited data regarding CS management in the cardiac intensive care unit (CICU) and its outcomes. We aimed to describe the CS features, pre-TAVI management and short-term clinical outcomes of a cohort of CS patients (pts) submitted to TAVI.

Methods: Single-centre retrospective registry of consecutive pts with AVD undergoing TAVI in CS, from January 2020 to October 2023. CS was defined as pre-procedural hypotension/hypoperfusion requiring vasoactive drugs or mechanical circulatory support (MCS) devices. The severity of CS was defined according to the SCAI classification. Procedural related outcomes according to the VARC-3 criteria and 30-day mortality were assessed.

Table 1. Baseline characteristics, CS picture and outcomes in CS patients submitted to TAVI

General clinical characteristics	Total patients (n=16)
Age – years	79±5
Female sex – no. (%)	6 (38)
EuroSCORE II – %	37±15
Cardiogenic shock picture	
SCAI classification, at admission – no. (%)	
- SCAI-C	12 (75)
- SCAI-D	1 (6)
- SCAI-E	3 (19)
Cardiac arrest, at presentation – no. (%)	3 (19)
Mean LVEF – (%)	33±8
Biventricular dysfunction, at admission – no. (%)	10 (62)
Mean aortic valve gradient – (%)	37±15
Peak lactate at 48h (mmol/L)	3.4 [2.1-5.1]
Invasive mechanical ventilation – no. (%)	5 (31)
Renal replacement therapy – no. (%)	5 (31)
Procedural characteristics	
Time since CICU admission to TAVI – days	2.5 [1-7]
Transfemoral access – no. (%)	16 (100)
Balloon-expandable valve – no. (%)	9 (57)
Procedural success – no. (%)	16 (100)
Clinical outcomes	
Access bleeding (BARC 2 or 3a) – no. (%)	2 (12.5)
Permanent pacemaker implantation – no. (%)	2 (12.5)
CICU length of stay – days	6 [5-9]
30-day all-cause mortality – no. (%)	2 (12.5)

Results: A total of 16 pts (1% of our global TAVI cohort, 62% male, mean age 79 ± 5 years) meet the inclusion criteria. The majority (n = 13) presented severe aortic stenosis, two had degenerated aortic bioprosthesis with severe regurgitation and one had native valve severe regurgitation. 6 pts (38%) had isolated left ventricle (LV) dysfunction and 10 (62%) had biventricular dysfunction. The admission LVEF was 33 ± 8% and the mean transaortic gradient for those with aortic stenosis was 46 ± 13 mmHg. The EuroSCORE II estimated for a single non-CABG emergency procedure was 37 ± 15%. All patients were refused for surgical treatment upon Heart Team discussion. At admission, 12 (75%) patients presented in CS SCAI-C, 1 (6%) in SCAI-D and 3 (19%) in SCAI-E. These 3 presented in cardiac arrest upon admission to the CICU (time to ROSC from 2 to 15 minutes). The peak lactate level at 48 hours was 3.4 mmol/L [2.1-5.1] and the highest

Vasoactive-Inotropic Score (VIS) during admission was 21 [11-45]. None of the patients needed MCS pre-TAVI. 5 (31%) patients required invasive mechanical ventilation and 5 (31%) renal replacement therapy. Median time between CICU admission and transfemoral TAVI was 2.5 days [1-7]. Procedural success was 100%, with 57% receiving a balloon-expandable and 43% a self-expandable valve. Post-TAVI CICU length of stay was 6 days [5-9]. Most common procedural complication were the need for permanent pacemaker implantation (n = 2, 12%) and access-related bleeding (n = 2, 12%). Hospital length-of-stay was 20 ± 15 days. Thirty-day mortality was 12% (n = 2).

Conclusions: In this cohort of CS patients selected for TAVI treatment, procedural success was achieved in all cases. While complications were similar to the general TAVI population, in-hospital mortality remained high but very acceptable. These results suggest that, if correctly selected, aortic valve disease patients in CS represent a niche for whom brief stabilization and urgent percutaneous valve treatment might impact their dismal prognosis.

CO 12. CLINICAL OUTCOMES OF NON-SEVERE PARAVALVULAR LEAK AFTER TRANSCATHETER AORTIC VALVE IMPLANTATION

Bárbara Lacerda Teixeira, Ricardo Carvalheiro, Francisco Barbas Albuquerque, Fernando Ferreira, Miguel Figueiredo, André Grazina, Tiago Mendonça, Inês Rodrigues, António Fiarresga, Ruben Ramos, Duarte Cacela, Rui Cruz Ferreira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Paravalvular leak (PVL) after transcatheter aortic valve implantation (TAVI) is common and occurs more frequently than surgical aortic valve replacement (SAVR). Previous studies have shown that severe PVL following TAVI is associated with higher 1 year mortality. Nowadays, with the improvements in the new generation valves and increasing operator's experience, severe PVL is rare. However, the presence of mild and moderate PVL remains frequent. Data regarding the impact of non-severe PVL in short-term clinical outcomes is conflicting and in long-term clinical outcomes is scarce. Since TAVI tends to be expanded to a younger population, it is of utmost importance to evaluate the long-term impact of mild and moderate PVL on clinical outcomes.

Objectives: To assess the prevalence of PVL after TAVI in a large cohort and to determine the long-term mortality impact of non-severe PVL.

Methods: We performed a retrospective analysis in patients (pts) submitted to TAVI in a tertiary center from 2010 to 2022. Pts without echocardiography (TTE) at discharge or with in-hospital mortality were excluded. Pts were divided in two groups according to having any grade of PVL at TTE at discharge. Comparison of groups was made using Chi-square, t-test and Mann-Whitney analysis. Primary endpoint was defined as time to all-cause death over 4 years after TAVI. Kaplan Meier survival curves were used to estimate the risk of events and Cox regression to assess the prognostic relevance of PVL. In pts with assessable TTE at one year, survival analysis was performed again regarding having PVL at one year.

Results: 727 pts (45.8% men, mean age 82) were included. 314 pts (43.2%) had PVL at TTE at discharge: 265 pts (36.5%) mild PVR and 49 pts (6.7%) moderate PVL. No pts showed severe PVL at discharge. Pts with PVL were more likely to be older (p = 0.005), have diabetes (p = 0.005), higher mean aortic valve gradients (p < 0.001) and higher valvular calcium score (p < 0.001). Any grade of PVL was significantly more common in old generation valves than new generation ones (p < 0.001), in self-expanding devices than mechanic or balloon expandable (p < 0.001), and pre-dilation and post-dilation were more frequently performed (p < 0.001). At one year, 25 pts had moderate PVL. Survival analysis revealed that only moderate PVL at 1 year after TAVI had a significantly higher mortality (log-rank p = 0.021), with a HR of 2.26 (95%CI 1.22 – 4.61 p = 0.025) (Figure 2). Any PVL at discharge and mild PVL at one-year had slightly higher mortality rates, but did not met statistically significance (Figure 3).

Conclusions: With the use of the new-generation valves, the number of pts with PVL has reduced but it's still significant. The presence of any grade of PVL at discharge after TAVI is not associated with differences in all-cause mortality at 4 years, but the pts that maintain moderate PVL at one year have twice the risk of overall mortality in the four years after TAVI.

	All (n= 727)	Without PVL (n= 413)	With PVL (n= 314)	p value
Baseline characteristics				
Female - n (%)	394 (54,2)	218 (52,8)	176 (56,1)	0,381
Age in years - mean ± SD	82 ± 6,5	82 ± 6,6	82 ± 6,2	**0,005**
Body mass index in kg/cm2 -	26,6 (6)	26,9 (6)	26,4 (6)	0,162
Euroscore	4,5 (4,5)	4,2 (5,1)	3,9 (4)	0,434
STS Score	4,1 (3,6)	3,9 (3,6)	4,3 (3,5)	0,396
NYHA Class	2,73 ± 0,56	2,75 ± 0,59	2,71 ± 0,53	0,309
Hypertension	626 (86,1)	358 (86,7)	268 (85,4)	0,607
Diabetes mellitus	254 (34,9)	162 (39,2)	92 (29,3)	**0,005**
Dyslipidemia	502 (68,9)	291 (70,5)	210 (66,9)	0,294
Coronary artery disease	301 (41,4)	181 (43,8)	120 (38,2)	0,128
Atrial Fibrillation	234 (32,2)	125 (30,3)	109 (34,7)	0,204
Permanent PM	68 (9,4)	40 (9,7)	28 (8,9)	0,725
Chronic kidney disease	317 (43,7)	181 (43,9)	136 (43,3)	0,867
Chronic kidney disease - hemodialysis	15 (2,1)	12 (2,9)	3 (1,1)	0,080
Left ventricle and aortic valve characteristics				
Mean aortic valve gradient	50 ± 14,9	48 ± 14,2	52 ± 15,6	**< 0,001**
Left ventricle dilatation	56 (17,7)	37 (18,9)	19 (15,7)	0,471
LVEF < 40	77 (10,6)	40 (9,7)	37 (11,8)	0,362
Bicuspid aortic valve	23 (3,4)	12 (3,2)	11 (4,7)	0,691
Valvular calcium score	2451 ± 1472,7	2234 ± 1359,6	2716 ± 1562,8	**< 0,001**
TAVI characteristics				
Old generation valves	383 (52,7)	190 (46,0)	193 (61,5)	**< 0,001**
New generation valves	344 (47,3)	223 (54)	121 (38,5)	**< 0,001**
Balloon-expandable valves	137 (18,8)	121 (29,3)	16 (5,1)	**< 0,001**
Self-expanding valves	575 (79,1)	278 (67,3)	297 (94,6)	**< 0,001**
Mechanically expandable valves	15 (2,1)	14 (3,4)	1 (0,3)	**0,004**
Pre-dilation	352 (55,5)	149 (46,3)	163 (67,9)	**< 0,001**
Post-dilation	237 (33,8)	101 (25,2)	136 (45,3)	**< 0,001**

Figure 1.

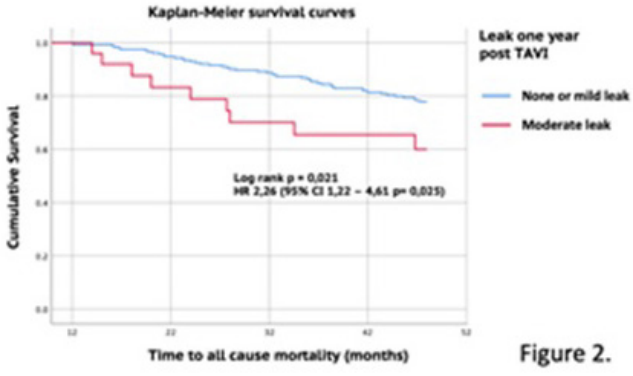


Figure 2.

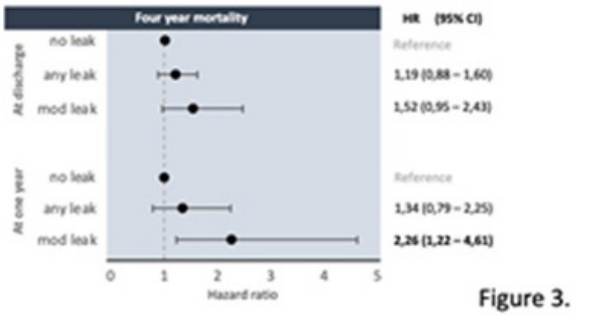


Figure 3.

Figure CO12

CO 13. TAVI VS BALLON AORTIC VALVULOPLASTY IN ACUTE DECOMPENSATED AORTIC STENOSIS

André Lobo, Rafael Teixeira, Marta Catarina Almeida, Fábio Nunes, Marta Leite, Inês Neves, Inês Rodrigues, António Gonçalves, Pedro Braga, Ricardo Fontes-Carvalho

Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE.

Introduction: Transcatheter aortic valve implantation (TAVI) has emerged as a preferred treatment for severe aortic stenosis across a spectrum of surgical risks, potentially diminishing the role of balloon aortic valvuloplasty (BAV) as a transient solution or a bridge to definitive intervention. With advancements in TAVI technology and expertise, patients, even with unstable conditions, are increasingly receiving direct, definitive TAVI instead of undergoing multiple procedures.
Objectives: Assess if immediate TAVI is safer and more effective than BAV followed by elective aortic valve replacement (AVR) in acute decompensated severe aortic stenosis.
Methods: Retrospective single-center cohort analysis of consecutive patients who received either urgent or emergency BAV as a bridge to AVR or direct TAVI to manage acute decompensated severe aortic stenosis from May 2012 to May 2023. The primary outcomes were mortality rates at 30 days and one year.
Results: 258 cases of urgent or emergent percutaneous aortic valvuloplasty were evaluated. BAV was performed in 47 patients, whereas 211 received direct TAVI. A higher proportion of the BAV group (36%) was treated due to cardiogenic shock as the primary indication, compared with 11% in the TAVI group ($p < 0.001$). Demographic parameters and comorbid condition profiles were equivalently balanced across both groups. The median age was 81 years (IQR: 74-85, $p = 0.40$), and males constituted 56% of the patient population ($p = 0.72$). Most patients (65%) presented with left ventricular systolic dysfunction. The reduction in peak aortic valve gradient was significantly more pronounced in the TAVI group (-56 ± 25 mmHg) compared to the BAV group (-27 ± 19 mmHg, $p < 0.001$). TAVI recipients had a higher incidence of VARC-2 minor and major bleeding events (26% versus. 6% for BAV, $p < 0.001$), and a greater occurrence of advanced AV block needing temporary pacing (19% vs. 9% for BAV, $p = 0.02$). Thirty-day survival rates favored the TAVI group (93%) over BAV (86%). This trend persisted at the one-year mark, with survival rates of 84% for TAVI and 70% for BAV. Furthermore, the one-year hazard ratio for mortality among patients undergoing BAV was 2.01 (95% confidence interval: 1.34–3.01, $p < 0.001$).
Conclusions: The data from this retrospective analysis indicate that for patients with decompensated severe aortic stenosis, immediate TAVI may confer a mortality benefit over BAV followed by elective procedures. Despite a higher rate of procedural complications, the direct TAVI approach was associated with better survival rates at both 30 days and one year. These outcomes suggest a potential benefit of the immediate strategy in the general management of acute decompensated severe aortic stenosis. However further prospective analysis is warranted to evaluate the role of BAV in the setting of cardiogenic shock and instability.

CO 14. TIMING OF PCI IN TAVR PATIENTS IMPACT CLINICAL OUTCOMES

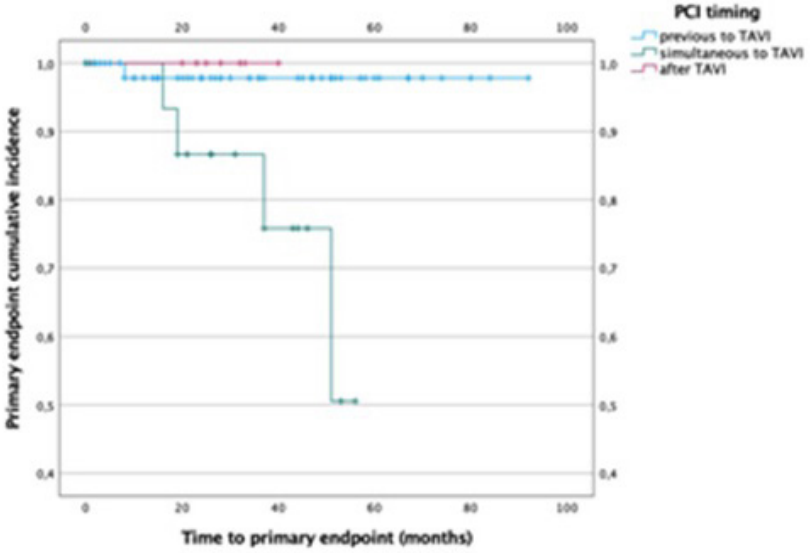
Catarina Simões de Oliveira, Ana Margarida Martins, Ana Beatriz Garcia, Ana Abrantes, João Cravo, Marta Vilela, Cláudia Moreira Jorge, Miguel Nobre Menezes, João Silva Marques, Pedro Carrilho Ferreira, Pedro Pinto Cardoso, Fausto J. Pinto

Department of Cardiology, Centro Hospitalar Universitário de Lisboa Norte, CAML, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Aortic stenosis (AS) and coronary artery disease (CAD) share risk factors and frequently coexist. The optimal timing of percutaneous coronary intervention (PCI) in transaortic valve replacement (TAVR) patients (pts) is a matter of continuing debate.
Objectives: Compare the outcomes of pts with significant CAD submitted to TAVR according to the timing of PCI (preceding, concurrent or following TAVR).
Methods: Single-center study of consecutive pts referred for TAVR who had significant CAD and were submitted to PCI before, during or after TAVR procedure. The primary endpoint was defined as a composite of death from all causes, myocardial infarction (MI), stroke or hospitalization for heart failure (HF) in the follow-up (FUP). Significant CAD was defined as angiographic stenosis ≥ 70% (or ≥ 50% in unprotected left main). Descriptive and comparative statistical analysis were applied.
Results: 146 of the pts that underwent TAVR had severe CAD, of which 75% (n = 107) were submitted to PCI. The median age was 82 years-old, 52.3% were male and the main co-morbidities were hypertension (91.6%), dyslipidemia (80.4%) and diabetes (44.9%). The mean left ventricle ejection fraction was 55%. Balloon-expandable valves were used in 68.2% pts. Considering the PCI timing, 72.9% were performed before, 19.6% during and 7.5% after TAVR. Left main was the target of PCI in 12.1%, a proximal segment in 46.7% and medium or distal segment in 38.3% a (Table). During a mean FUP of 36 months, the incidence of stroke was 3.8%, 15.9% had

PCI before TAVR		PCI during TAVR		PCI after TAVR	
LM	10	LM	3	LM	0
pLAD	24	pLAD	2	pLAD	1
mdLAD	32	mdLAD	8	mdLAD	5
pCx	7	pCx	4	pCx	0
dCx	13	dCx	3	dCx	0
pRCA	18	pRCA	5	pRCA	3
mdRCA	6	mdRCA	3	mdRCA	1

Table 1. Treated coronary lesions by artery. LM left main artery; pLAD proximal left descendent artery; mdLAD medium-distal left descendent artery; pCx proximal circumflex; dCx distal circumflex; pRCA proximal right coronary artery; mdRCA medium-distal right coronary artery



Graphic 1. Time to primary endpoint

Figure CO14

hospital admissions due to HF and 2.8% had MI. The primary endpoint was significantly more frequent in patients undergoing PCI in the same TAVR procedure (p = 0.002). The lowest incidence of the primary endpoint was observed in pts undergoing PCI after TAVR (Figure). The incidence of acute renal lesion was not significantly different across different PCI timings (p = 0.49). In multivariate analysis, concomitant PCI and TAVR was an independent predictor of the primary endpoint (p = 0.049; HR 13, CI 1.016-167).

Conclusions: PCI performed in the same procedure as TAVR was independently associated with higher incidence of death, MI, stroke or HF re-hospitalization in the follow-up. Lowest incidence was observed when PCI was deferred and performed after TAVR. These results build to the growing evidence that simultaneous PCI in TAVR pts should be probably avoided.

CO 15. DIFFERENCES IN OUTCOMES BETWEEN PERCUTANEOUS CORONARY INTERVENTION OF CORONARY LESIONS AND MEDICAL THERAPY IN PATIENTS UNDERGOING TRANSCATHETER AORTIC VALVE IMPLANTATION

Ricardo da Silva Carvalheiro, Bárbara Teixeira, Francisco Albuquerque, Fernando Ferreira, Miguel Figueiredo, André Grazina, Inês Rodrigues, Tiago Mendonça, António Fiarresga, Ruben Ramos, Duarte Cacela

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: For patients with stable coronary artery disease (CAD) and severe aortic stenosis considered suitable for percutaneous treatment, the conventional practice has been to perform percutaneous coronary intervention (PCI) on bystander severe proximal lesions before undergoing transcatheter aortic valve implantation (TAVI) due to concerns regarding coronary access after prosthesis placement, despite the lack of robust evidence regarding reductions in cardiovascular mortality.

Objectives: We sought to compare a strategy of planned periprocedural revascularization of obstructive coronary lesions versus medical therapy in patients undergoing TAVI, regarding major cardiovascular events (MACE), cardiovascular and all cause mortality and unplanned revascularization after TAVI.

Methods: We performed a retrospective analysis of patients with significant coronary artery disease (defined as ≥ 70% obstruction in an epicardial vessel with ≥ 2 mm diameter or ≥ 50% obstruction in the left main coronary artery) submitted to TAVI in a high-volume Portuguese tertiary center from 2009 to 2022. Pts were divided in two groups according to treatment with a previously planned periprocedural (< 6 months before or concomitantly) PCI or medical therapy. Comparison of groups was made using Chi-square, t-test and Mann-Whitney analysis. Primary endpoint was defined as time to cardiovascular death and all-cause mortality of last follow-up over 2 years after TAVI. Kaplan Meier survival curves were used to estimate the risk of events.

Results: A total of 162 pts (48.1% female) were included, with a mean age of 82 ± 5.9 years and a median follow-up of 24 months. 78 pts (48.1%) were submitted to planned periprocedural PCI and 84 pts (51.9%) were treated with medical therapy. Pts submitted to PCI were more likely to have dyslipidaemia (p = 0.038), pulmonary disease (p = 0.018) and angina CCS class ≥ 1 (p = 0.022). There were no differences between the groups regarding number of vessels involved, significant left main disease (p = 0.574) or proximal left anterior descending disease (p = 0.310). There were no statistically significant differences between the groups regarding 30-day MACE (p = 0.673), 30-day CV deaths (log rank p = 0.067) or 30-day all-cause mortality (log rank p = 0.089). Regarding long term follow-up, pts submitted to periprocedural PCI had statistically significant higher CV-death at 48 months (log rank p = 0.034) with a HR of 2.7 (95%CI (1.037 – 6.890), p = 0,042). There were no statistically significant differences regarding unplanned revascularization (p = 0.498) or all-cause mortality at 48 months (log rank p = 0.500).

Conclusions: In our cohort of patients, periprocedural PCI was associated with higher CV death at 48 months after TAVI. There were no statistically significant differences regarding 30-day outcomes, need for unplanned revascularization or all-cause mortality at 48 months.

Characteristics	All (n= 162)	Medical Therapy (n=84)	Periprocedural PCI (n= 78)	p
Age in years - mean ± SD	82 ± 5,9	82 ± 6,3	83 ± 5,5	0,344
Female - n (%)	78(48,1)	39(46,4)	39(50)	0,649
Euroscore II - median (IQR)	4,8(6)	5,6(6,6)	5,5(7,8)	0,563
STS Score Mortality - median (IQR)	4,8(4,9)	5,3(4,8)	5,2(6,6)	0,578
Risk factors				
Hypertension - n (%)	149(92)	80(95,2)	69(88,5)	0,113
Dyslipidemia - n (%)	128(79)	61(72,6)	67(85,9)	**0,038**
Diabetes Mellitus - n (%)	77(47,5)	41(48,8)	36(46,2)	0,735
Peripheral Artery Disease - n (%)	31(19,1)	17(20,2)	14(17,9)	0,711
Cerebrovascular Disease - n (%)	19(11,7)	11(13,1)	8(10,3)	0,571
Pulmonary Disease - n (%)	31(19,1)	22(26,2)	9(11,5)	**0,018**
Chronic Kidney Disease - n (%)	93(57,4)	48(57,1)	45(57,7)	0,944
Chronic Kidney Disease - Hemodialysis - n (%)	5(3,1)	1(1,1)	4(5,4)	0,163
Atrial Fibrillation - n (%)	60(37)	29(34,5)	31(39,7)	0,492
Pacemaker - n (%)	19(11,7)	13(15,5)	6(7,7)	0,124
NYHA Class - mean ± SD	2,87 ± 0,71	2,87 ± 0,58	2,90 ± 0,64	0,766
CCS Class ≥ 1 - n (%)	41(43,6)	15(31,9)	26(55,3)	**0,022**
Coronary Artery Disease				
Number of vessels involved				
1 Vessel Disease - n (%)	80(49,4)	43(51,2)	37(47,4)	0,633
2 Vessel Disease - n (%)	43(26,5)	23(27,4)	20(25,6)	0,802
3 Vessel Disease - n (%)	39(24,1)	18(21,4)	21(26,9)	0,414
Left Main Disease - n (%)	28(17,5)	13(15,9)	15(19,2)	0,574
Proximal LAD - n (%)	34(21)	15(17,9)	19(24,4)	0,310
History of MI - n (%)	45(27,8)	23(27,4)	22(28,2)	0,907
Previous CABG - n (%)	28(17,3)	18(21,4)	10(12,8)	0,148
Previous PCI - n (%)	36(22,2)	21(25,0)	15(19,2)	0,377
Computed tomography				
Aortic valve calcium score - mean ± SD	2197 ± 1287	2334 ± 1598	2049 ± 973	0,230
Left coronary height, mm - mean ± SD	14,6 ± 2,8	14,0 ± 2,8	13,8 ± 3,4	0,684
Right coronary height, mm - mean ± SD	14,0 ± 2,9	14,9 ± 3,0	14,1 ± 3,1	0,114
Echocardiogram				
Mean aortic valve gradient - mean ± SD	44 ± 12,2	43,5 ± 12,2	44,7 ± 14,4	0,584
LV Ejection Fraction < 40% - n (%)	22(13,7)	12(14,3)	10(13)	0,811
Transcatheter heart valve type				
Balloon-expandable - n (%)	41(25,3)	19(22,6)	22(28,2)	0,414
Self-expanding - n (%)	121(74,7)	65(77,4)	56(71,8)	0,414

Table 1 – Baseline characteristics

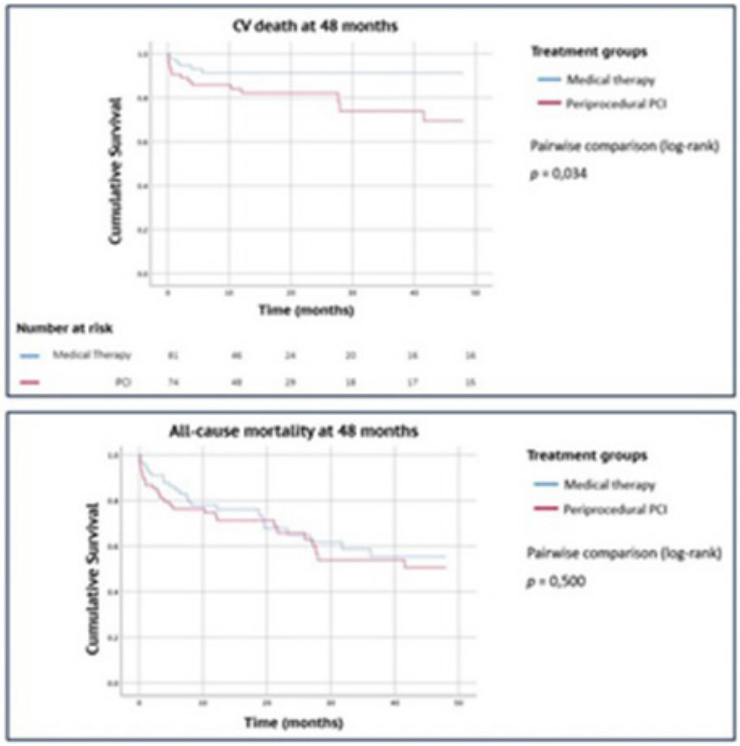


Figure CO15

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00.

Neptuno 2 | Comunicações Orais - Sessão 04 - Reabilitação cardíaca

CO 16. EFFECTIVENESS OF A CARDIAC REHABILITATION PROGRAM IN PATIENTS WITH HEART FAILURE AND SKELETAL MUSCLE WEAKNESS

Mariana Pereira Santos[1], Cristine Schmidt[2], Priscilla Gois Basilio[3], Cláudio Santos[3], Maria Isilda Oliveira[4], Sandra Magalhães[1], Fernando Ribeiro[5], Mário Santos[1]

[1]Centro Hospitalar Universitário do Porto, EPE/Hospital Geral de Santo António. [2]ITR-Laboratory for Integrative and Translational Research in Population Health, Porto; Research Center in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto. [3]Research Center in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport, University of Porto. [4]Department of Immuno-Physiology and Pharmacology, UMIB-Unit for Multidisciplinary Research in Biomedicine, ICBAS - School of Medicine and Biomedical Sciences, University of Porto, Porto; Research Center in Physical Activity, Health and Leisure (CIAFEL), Faculty of Sport. [5]Institute of Biomedicine, School of Health Sciences, University of Aveiro.

Introduction: Cardiac rehabilitation (CR) programs improve functional capacity, symptoms, and quality of life (QoL) in patients with heart failure (HF), however, it is often underutilized in individuals perceived as most fragile. Skeletal muscle weakness is a predictor of adverse outcomes and worse functional status. The effectiveness of CR programs in this subgroup of patients is still unclear.
Objectives: We aimed to evaluate the effects of a CR program on cardiorespiratory fitness, functional capacity, and QoL in patients with HF and muscle weakness.
Methods: We analyzed prospectively collected data on 99 patients with HF referred to our CR program between September 2019 and September 2022. Peak oxygen consumption (VO2 peak, assessed by cardiopulmonary exercise testing), 6-minute walk test (6MWT), and QoL (assessed by the Minnesota Living with Heart Failure Questionnaire, MLHFQ) before and 12-weeks after the CR program were analyzed. Muscle weakness was defined as handgrip strength < 35.5 kg for men and < 20 kg for women. Paired Student t-tests were used to compare values from baseline to the end of the CR program, and a one-way ANCOVA was conducted to determine the effectiveness in different groups controlling for age.
Results: The overall prevalence of muscle weakness was 53.5% (n = 53) and was similar for both sexes (W 50.0% vs. M 55.2%, p = 0.625). Patients with muscle weakness were older [65.6 (± 10.0) vs. 59.1(± 11.0) years, p = 0.003] and had a higher prevalence of HF with preserved ejection fraction (13.2% vs. 0.0%, p = 0.014). As indicated in Table 1, the CR program resulted in increased cardiorespiratory fitness (VO2 peak), functional capacity (6MWT), and quality of life (MLHFQ) in both groups, even though there was no improvement in muscle strength. Also, the magnitude of improvement in all assessed measures was similar for patients with and without muscle weakness when controlling for the effect of age.
Conclusions: Muscle weakness is common in patients with HF. The benefits of CR programs on functional capacity and QoL were consistent across patients with muscle weakness, underscoring the importance of extending the referral to these seemingly fragile patients.

CO 17. MULTIMODAL NUTRITIONAL RISK SCREENING IN HEART FAILURE PATIENTS

Bruno Bragança, Mauro Moreira, Rafaela G. Lopes, Inês G. Campos, Ricardo Barbosa, Patrícia Silva, Sónia Apolinário, Licínia Aguiar, Magda Silva, Aurora Andrade

Centro Hospitalar do Tâmega e Sousa, EPE/Hospital Padre Américo, Vale do Sousa.

Introduction: The heart failure (HF) trajectory evolves with the development of body composition abnormalities and malnutrition. Interventions targeting nutritional disorders may improve the prognosis of HF patients; nonetheless, they remain overlooked due to clinical unawareness and lack of standardized diagnostic tools. Bioimpedance spectroscopy (BIS) through the estimation of body composition has been recognized as a valuable tool in diagnosing nutritional disorders, but more data is needed in the HF population.
Methods: Patients followed in an HF clinic were recruited for body composition evaluation by BIS (InBody BWA 2.0). BIS variables were correlated with other clinical and biochemical parameters. Gender-specific appendicular skeletal muscle index (ASMI) and geriatric nutrition risk index (GRNI) were used to diagnose sarcopenia and malnutrition, respectively. Thirteen healthy subjects were recruited for comparison purposes. Regression models were used to explore associations between baseline characteristics, body composition, and 6-month composite outcome that included all-cause death, hospitalization/unplanned visit, or up-titration of diuretics due to HF.
Results: Fifty-six HF patients under guideline-medical therapy for HF with reduced ejection fraction (HFrEF) were included. Mean age of 65 ± 12 years; 68% males; 52% non-ischemic HFrEF; left ventricular ejection fraction (LVEF) 34 ± 13%; 38% diabetes. Compared with controls, HF patients showed body composition abnormalities: water (52.0 ± 6.6 vs. 61.9 ± 5.5%; p < 0.001), fat mass (29.3 ± 9.0 vs. 15.4 ± 7.5%; p < 0.001); protein (13.7 ± 1.8 vs. 16.5 ± 1.6%; p < 0.001) and minerals (5.1 ± 0.7 vs. 6.1 ± 0.5%; p < 0.001). HF patients had ASMI 7.47 ± 1.3 kg/m^2 (14.3% had sarcopenia); body mass index 26.9 ± 4.1 kg/m^2 (BMI, 25% with obesity); and GNRI score 107 ± 9 (15.8% with malnutrition). NT-proBNP was negatively correlated with ASMI (r = -0.376; p = 0.009) but not with GNRI (r = -0.466; p = 0.051). In contrast to obesity and GNRI-estimated malnutrition, sarcopenia was associated with

Table 1 - Effectiveness of a cardiac rehabilitation program in patients with and without skeletal muscle

	No muscle weakness (n=46)				Muscle Weakness (n=53)				Δ p-value#
	Baseline	3-months	Δ	p-value*	Baseline	3-months	Δ	p-value*	
VO2 (ml/kg/min)	20.2±5.2	21.3±5.8	+1.0±2.7	**0.009**	16.9±4.3	18.1±4.9	+1.1±2.1	**<0.001**	0.560
6MWT (m)	472.6±80.5	510.1±80.2	+39.7±42.8	**<0.001**	459.7±85.0	507.5±81.5	+42.7±34.5	**<0.001**	0.563
Handgrip strength (kg)	34.9±9.7	34.8±8.9	+0.5±3.5	0.096	25.4±7.2	26.7±7.5	+1.0±3.9	0.063	0.367
MLHFQ	28.8±21.2	19.6±18.9	-16.7±17.2	**<0.001**	30.1±21.3	19.4±19.7	-9.5±16.7	**<0.001**	0.844

*Paired Student t-test #One-way ANCOVA (controlling for age)

Figure CO16

the occurrence of the composite outcome (crude HR 17.9 ± 16.0, p = 0.001; adjusted HR 36.5 ± 46.5, p = 0.005).
Conclusions: Malnutrition and body composition abnormalities are prevalent in HF. BIS is a reliable tool in diagnosing sarcopenia that carries an unfavorable prognosis. Further studies are needed to address the impact of diagnostic strategies and specific interventions targeting nutrition disorders in HF patients.

CO 18. WHAT IS THE TRUE NORMAL: COMPARISON OF DIFFERENT EQUATIONS FOR ESTIMATING PEAK OXYGEN UPTAKE FOR OUTCOME PREDICTION IN HEART FAILURE

Rita Amador, Joana Certo Pereira, Sérgio Maltês, Bruno Rocha, Mariana Paiva, Rita Carvalho, Miguel Mendes, Anaí Durazzo, Pedro Adragão, Gonçalo Lopes da Cunha

Hospital de Santa Cruz.

Introduction and objectives: One of the strongest prognostic parameters obtained during Cardiopulmonary exercise testing (CPET) in patients with heart failure (HF) is the peak oxygen uptake (pVO2), as a standalone or as a percentage of the predicted peak oxygen uptake (ppVO2) reached. However, traditional standards by which ppVO2 is calculated have limitations, having been derived from small cohorts, lacking portability and poorly represented by women. Thus, we aim to compare the FRIEND Registry equation to previously used methods of calculating ppVO2 as it relates to prognostic value imparted by the percentage of ppVO2 (%ppVO2) reached during CPET and portability to the Portuguese HF population.
Methods: Single centre retrospective study of patients with HF with LVEF < 50% who underwent CPET between 2015-2021. Patients who did not reach RER ≥ 1.05 were excluded from our analysis. All tests were evaluated and ventilatory thresholds determined by 3 independent, experienced operators. ppVO2 was calculated according to 1) the Wasserman equation; 2) the Wasserman equation using ideal body weight; 3) the Neder equation, 4) the SHIP equation and 5) the FRIEND equation. Our primary endpoint was a composite of CV death, urgent transplant or left ventricular assist device implantation and HF hospitalization.
Results: We included 238 patients (mean age 59 ± 11 years, 83% males). The HF aetiology was mostly ischemic in nature (68%), with LVEF of 34 ± 9% and median NTproBNP of 776 (2,566 – 2,342) pg/mL. Most patients (67%) were in class NYHA I-II and with high prevalence of GDMT (93% ACEi/ARB; 97% beta-blockers and 64% on MRA). Mean BMI in this group was 27.3 ± 4.7 kg/min. Patients performed CPET on a treadmill with a protocol adjusted to their predicted exercise capacity. Mean pVO2 was 18.1 ± 6.2 mL/kg/min, corresponding to a median%ppVO2 that ranges from 51 ± 16% to 71 ± 22%, depending on the equation that is used. Mean VE/VCO2 Slope was 42 ± 13 and 48% (n = 98) of patients showed exercise oscillatory ventilation (EOV). Mean ppVO2 as per the FRIEND and Wasserman equations was 18.9 ± 6.6 and 21.2 ± 4.5 mL/kg/min, with no statistically significant difference between both. %ppVO2 as calculated through all equations was an independent predictor of prognosis on multivariate analysis adjusted for LVEF, NTproBNP and VE/VCO2 Slope (p < 0.001 for values derived from all equations). However, the FRIEND and Wasserman equations showed a slight advantage over the remaining 2 equations, with higher AUC on ROC curve analysis (Figure).
Conclusions: In our population of Portuguese patients with HF, both the FRIEND registry and Wasserman equations for predicting pVO2 yielded strong prognostic power. However, these equations provide different absolute predicted VO2 values for the same patients and thus should not be used interchangeably. Standardisation of the type ppVO2 equation used should be recommended by local scientific societies.

CO 19. EARLY OXYGEN PULSE PLATEAU AS A PROGNOSTIC MARKER IN A POPULATION OF PATIENTS WITH HEART FAILURE: HOW SOON IS TOO SOON?

Catarina Lagoas Pohle[1], Rita Almeida Carvalho[2], Joana Silva Ferreira[1], Rui Antunes Coelho[1], Jéni Quintal[1], Patrícia Bernardes[1], Anaí Durazzo[2], Miguel Mendes[2], Catarina Sá[1], Filipe Seixo[1], Gonçalo Lopes da Cunha[2]

[1]Centro Hospitalar de Setúbal, EPE/Hospital de São Bernardo. [2]Centro Hospitalar de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Oxygen pulse (O2P) is a parameter of Cardiopulmonary Exercise Testing (CPET) often used as an indicator of stroke volume. The occurrence of an O2P plateau corresponds to the inability to increase oxygen uptake with an increase in heart rate (Figure A). The subjective observation of an early plateau is a widespread marker of a worse prognosis. However, the exact definition of early plateau is not yet established.
Objectives: We aimed to establish the prognostic value of the presence and timing of O2P plateau in a population of patients with Heart Failure (HF).
Methods: A retrospective study was conducted with a sample of HF patients with left ventricular ejection fraction (LVEF) < 50% who underwent CPET on a treadmill from 2015-2021. Patients were excluded if they had documented obstructive coronary disease with ischemia. The O2P data was extracted

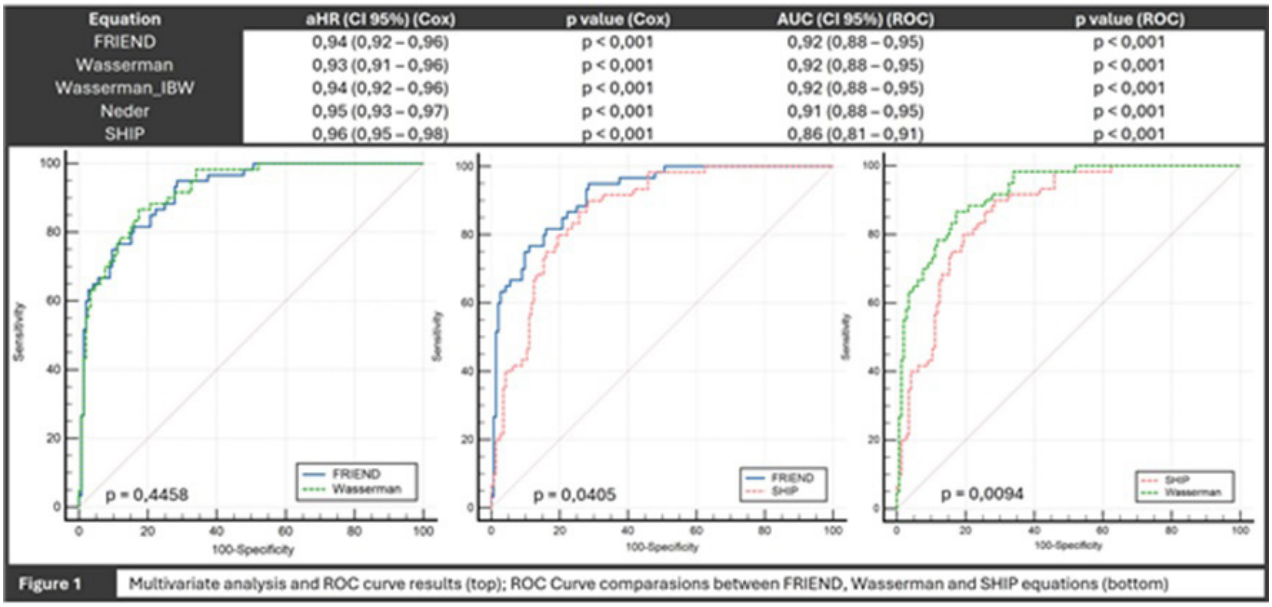


Figure 1 Multivariate analysis and ROC curve results (top); ROC Curve comparasions between FRIEND, Wasserman and SHIP equations (bottom)

Figure CO18

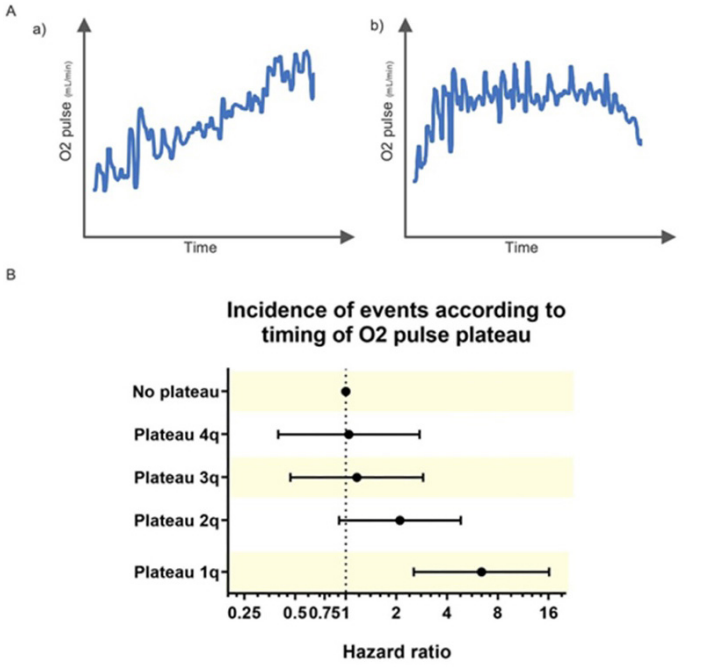


Figure 1-A: a) Normal O2P curve; b) O2P curve with evidence of a plateau. 1-B: Incidence of events according to timing of O2 pulse plateau

Figure CO19

breath by breath and imported to Microsoft Excel. The O2P graph was divided in 4 equal parts and linear regression was fitted to each part to assess the presence of a plateau (defined by a slope less than 0.3 mL/kg/min, according to a previously published work). The primary endpoint was a composite of CV death, HF hospitalization, and urgent heart transplant.

Results: A total of 248 HF patients (66.5% men), with a mean age of 58.3 ± 11.4 years and a mean LVEF of 34 ± 9.5%, were included. The average peak oxygen uptake (pVO2) was 18.4 ± 6.1 mL/min, and the median minute ventilation/carbon dioxide production (VE/VCO2) slope was 38.0 (IQR 32.2 to 46.0). The mean peak O2P value was 12.0 ± 4.0 mL/beat (median of 87.2%, IQR 69.4 to 106.1, of the predicted O2P value). The presence of an O2P plateau was observed in 84.7% (n = 210) of patients, occurring before the 1st quarter of the test in 8.1% (n = 20) of patients, before the 2nd quarter in 40.7% (n = 101), and before the 3rd quarter in 64.9% (n = 161). While the occurrence of O2P plateau, per se, was not associated with the evaluated endpoints, the timing of the plateau was correlated with prognosis. In fact, O2P plateau before the 1st, 2nd and 3rd quarters of CPET was associated with a 4-, 2- and 2- fold increase in the incidence of the primary endpoint, respectively (HR 4.3; 95%CI 2.270 to 8.032, p < 0.001; HR 2.3; 95%CI 1.451 to 3.766, p < 0.001; HR 1.9; 95%CI 1.084 to 3.243, p = 0.025, respectively). (Figure B). The occurrence of a plateau before the 3rd quarter adds prognostic value, even when adjusted for pVO2, LVEF, NT-proBNP and VE/VCO2 slope (HR 2.0; 95%CI 1.087 to 3.752, p = 0.026).

Conclusions: The occurrence of a plateau did not show to have statistically significant prognostic impact in a population of patients with HF. However, the presence of an early O2P plateau (especially in the first three quarters of the test) appears to be associated with a worse CV outcome.

CO 20. CARDIAC REHABILITATION IN YOUNG PATIENTS POST ACUTE CORONARY SYNDROME: THE KEYSTONE IN CARDIOVASCULAR CARE

João Santos Fonseca, Catarina Simões Oliveira, Ana Margarida Martins, Ana Beatriz Garcia, Miguel Azaredo Raposo, Ana Abrantes, Catarina Gregório, Paula Sousa, Nelson Cunha, Inês Aguiar-Ricardo, Fausto J. Pinto, Ana Abreu

Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Cardiac Rehabilitation (CR) programs are recommended as part of the cardiovascular management for patients (pts) following an Acute Coronary Syndrome (ACS). However, despite the well-established benefits, pts are frequently under-referenced.

Objectives: To compare risk factor management and adverse outcomes in young pts with ACS undergoing either a CR program or standard care (SC).

Methods: Single center retrospective study of pts younger than 55 years, with an ACS from January 2017 to May 2023. Following a cardiac event, pts could undergo SC or integrate CR program on top of SC. Adverse outcomes were defined as re-infarction, cardiovascular admissions and death; major cardiovascular events (MACE) was a composite of prior variables. For risk factor management we assessed cLDL, HbA1c, obesity (BMI ≥ 30kg/m2) and smoking status at baseline and during follow-up (FUP). Propensity score matching based on age and sex was used to generate comparable groups. Student T, chi-square and linear regression were used for statistical analysis.

Results: This study included 424 pts, 226 pts were selected based on propensity score matching (1:1), 86% males, mean age 47 ± 6 years, 65% had single vessel disease and 84% underwent complete revascularization. At baseline, 51% of pts had hypertension, 66% dyslipidemia (mean cLDL 99 ± 45 mg/dl), 15% diabetes, 70% smoker, 15% obese; with no differences between groups. During a follow-up period (FUP) of 3.5 ± 2 years, significant cLDL reduction was noted in both groups but CR pts had a 2.4 fold increased odd of meeting cLDL goal (< 55 mg/dl) compared to SC pts (30 vs. 17%, OR 2.4, CI 1.7-4.6). In CR pts, a 12.5-fold lower odds of smoking was noted (OR 0.08, CI 0.03-0.17) and significantly lower obesity rates, with a 30% odd reduction of obesity (OR 0.7, CI 0.6-0.8) when compared to SC. During FUP, SC pts experienced significantly higher incidence of all adverse outcomes except for death (MACE: 33 vs. 4 p = < 0.001; re-infarction: 17 vs. 2 p = < 0.001; CV admission: 27 vs. 2, p = < 0.001; death: 6 vs. 3, p = 0.3). SC was an independent predictor of MACE, re-infarction and CV admission after adjustment for confounders.

Conclusions: These results highlight the pivotal role of CR in, not only achieving optimal risk factor control, but also in substantially reducing adverse outcomes in this young ACS population. Efforts should be intensified to enhance CR referral rates, particularly in the younger population, to optimize cardiovascular management and improve long-term health outcomes.

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00.

Pegasus | Comunicações Orais - Sessão 05 - Arritmologia: da cardioneuroablação até à inteligência artificial

CO 21. THE ROLE OF CARDIONEUROABLATION FOR THE TREATMENT OF HEART RHYTHM DISORDERS

Sofia B. Paula[1], Margarida Figueiredo[1], Helena Fonseca[2], Sara Laginha[2], Sofia Jacinto[2], Ana Raquel Santos[2], Hélder Santos[2], Bruno Valente[2], Ana Lousinha[2], Guilherme Portugal[2], Pedro Silva Cunha[2], Mário Oliveira[2]

[1]Centro Hospitalar Barreiro/Montijo, EPE/Hospital do Montijo. [2]Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: The impact of autonomic modulation of the heart in different pathophysiologic conditions has been the subject of various studies. Cardioneuroablation (CNA) is a novel method of bradyarrhythmia management targeting neuromodulation of the cardiac autonomic nervous system, enabling a sudden postprocedural increase in sinus rhythm, thereby providing an attractive treatment option without the necessity for PM implantation in sinus node dysfunction (SND), atrioventricular blocks (AVB) and vasovagal syncope (VVS).
Methods: Single-center retrospective study evaluating patients who had SDN, AVB and VVS and underwent CNA during a 54-month period.
Results: We screened 9 patients who underwent CNA in a 54-month period. The mean age of patients was 33.9 (± 5.5) years and 55.6% were males. Regarding CV risk factors only one patient had active smoking habits, no other CV risk factors were found. The majority of patients (77.8%) practiced sports; some patients did high-intensity training in various modalities. Symptomatology varied between syncope (55.6%), dizziness (44.4%) and palpitations. We evaluate the mean HR prior and after CNA, the mean HR before CNA was 76.9 (± 7.7) bpm and after was 84.7 (± 8.0) bpm, the difference was statistically significant $p < 0.001$. We also evaluated the occurrence of 1st, 2nd (Mobitz I and II) and high degree AVB, 55.6% vs. 44.4%; 66.7% vs. 11.1% and 44.4% vs. 11.1%; and 22.2% vs. 11.1%, respectively. No 3rd degree AVB was detected and 33.3% of patients had significant sinus pauses (≥ 3s) before CNA that subsided after the CNA. Tilt tests was performed before and after CNA in 66.7% of patients. Before de CNA 2 patients had a negative tilt test, 2 with a response 2B with 19 and 90s of asystole, one with 2A response and one patient with POTS. After CNA all patients except one had negative tilt tests, the patient with previous 2A response after CNA had a type 1 response. The improvement of results in tilt test after CNA was statistically significant $p = 0.005$. Symptoms also improved after CNA, except in 2 patients, one female patient who had high degree AB block before and after CNA and a male patient with POTS who had recurrent previously and after CNA syncope episodes and a dual-chamber pacemaker was implanted afterwards.
Conclusions: CNA is a safe and efficient procedure, allowing a significant increase in heart rate, suppressing AVB and VVS and decreasing the necessity for PM implantation in younger patients.

CO 22. AIMING-PACE: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING-BASED PREDICTION MODEL FOR PACEMAKER IMPLANTATION AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT

Francisco Barbas de Albuquerque[1], Ricardo Carvalheiro[1], Bárbara Lacerda Teixeira[1], André Grazina[1], António Fiarresga[1], Inês Rodrigues[1], Tiago Mendonça[1], Rui Ferreira[1], Tomás Barbas de Albuquerque[2], Mário Oliveira[1], Rúben Ramos[1], Duarte Cacela[1]

[1]Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta. [2]Investigador Independente.

Introduction: Pacemaker (PM) implantation is a common complication after transcatheter aortic valve replacement (TAVR). Accurate identification of factors that contribute to PM implantation is crucial for clinical practice.

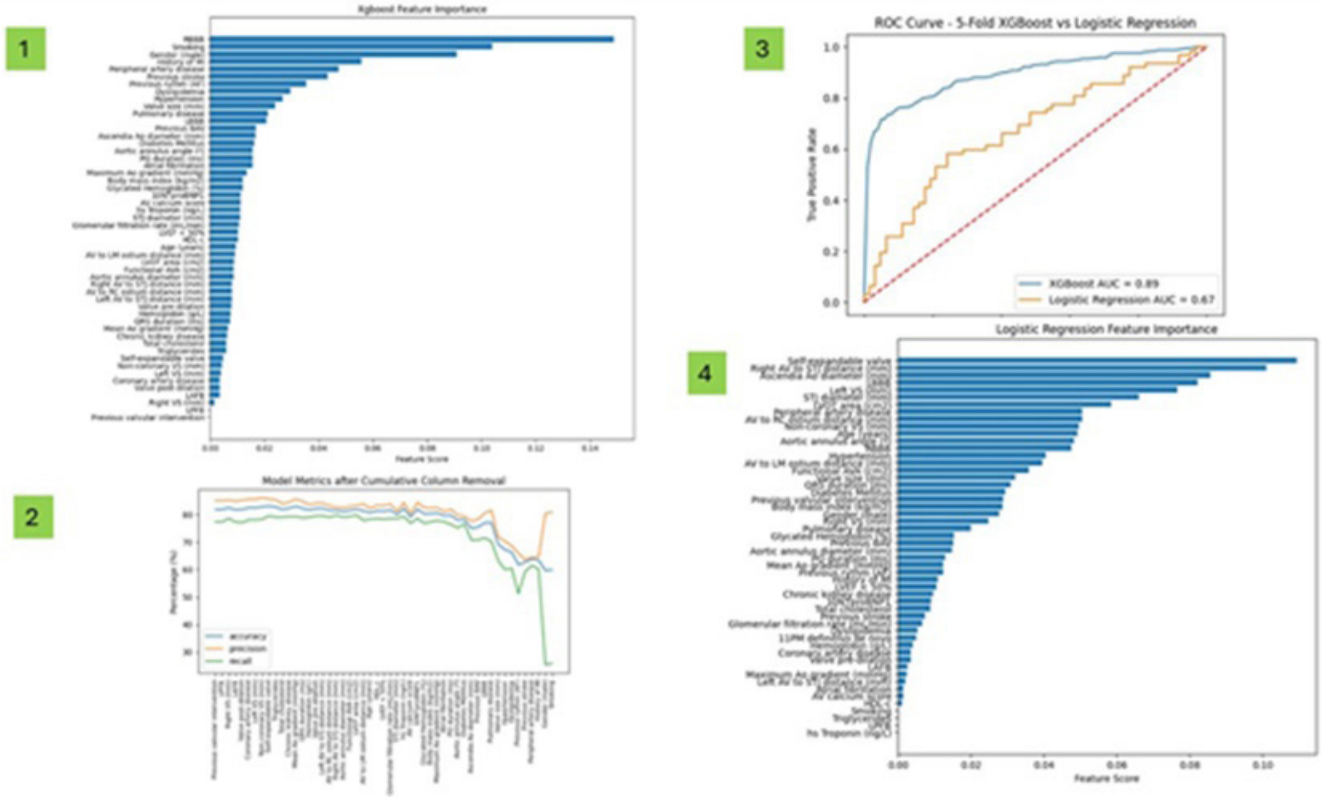


Figure CO22

Artificial intelligence (AI)- and machine-learning (ML) technologies may contribute to developing better prediction models in this clinical context.
Objectives: To develop a ML-based Binary Classification Model for predicting PM implantation after TAVR and to compare it with conventional regression-based models.
Methods: Single-center retrospective study on patients with severe aortic stenosis who underwent TAVR between 2018 and 2022. PM implantation group was considered until the hospital discharge date after TAVR. Both pre- and intra-procedural variables were included in the dataset, after a careful review. We developed a Python script to build the Binary Classification model. For dataset balancing, a SMOTE-based upsampling technique was performed on the minority class. The XGBoost (eXtreme Gradient Boosting) open-source software library and algorithm were used to train the final model. To achieve a better performance, we applied a 5-fold cross-validation. Model performance metrics were computed using the confusion matrix of predictions on the validation set and are as follows: accuracy, precision, and recall. A logistic regression was executed for performance comparison between models. AUC of ROC were computed for each model.
Results: From a total of 673 TAVR procedures, 560 patients entered the analysis. Median age was 83 years and 44% were male. PM implantation occurred in 150 (26.8%) patients after TAVR. The mean time until PM implantation was 4.2 days after the procedure. Using our XGBoost ML algorithm, a scoring model was generated, representing the variables from the highest to the lowest weighted (Figure 1). The highest weighted variables were the presence of right bundle branch block, history of smoking, male sex, history of myocardial infarction and history of peripheral artery disease. ML-model performance metrics were as follows: accuracy 82%, precision 85.1% and recall 77.6%. Figure 2 represents the model metrics after cumulative column removal from the least to the highest weighted variable. The logistic regression performance was: accuracy 63.8%, recall 59.7% and precision 64.9%. Figure 3 represents the relative weight of each variable computed in logistic regression. AUC from ROC curves of ML-model (AUC = 0.89) and logistic regression (AUC = 0.67) model are depicted in Figure 4.
Conclusions: Our ML-based prediction model provides valuable and novel insights regarding the factors contributing PM implantation after TAVR. It outperformed the traditional regression-based models by a great margin. This underscores the move towards a more personalized medicine, where AI enhances clinical decision-making for better patient outcomes.

CO 23. ELECTROCARDIOGRAPHIC IMAGING TO GUIDE ABLATION OF VENTRICULAR ARRHYTHMIAS SHOWS A HIGHER BENEFIT IN PATIENTS WITH LOW INTRAPROCEDURAL BURDEN

Leonor Parreira[1], Pedro Carmo[1], Sílvia Nunes[1], Catalin Marinescu[1], Jeni Quintal[2], Duarte Chambel[2], Lia Marques[2], Pedro Machado[1], Antonio Ferreira[1], Dina Ferreira[2], Filipe Seixo[2], Pedro Adragão[1]

[1]Hospital da Luz Lisboa. [2]Centro Hospitalar de Setúbal, EPE/Hospital de São Bernardo.

Introduction and objectives: Electrocardiographic imaging (ECGI) provides a non-invasive activation map of focal ventricular arrhythmias that has shown good accuracy regardless of the type of cardiac source used. Pre-procedure diagnosis in cases that are expected to be difficult and management of infrequent or poorly tolerated or multiple arrhythmias are some situations that may benefit the most from having an ECGI performed before the procedure. This study aimed to assess the benefit of the ECGI in patients with low intraprocedural burden.
Methods: We performed 81 ECGI procedures in 64 consecutive patients referred for ablation of ventricular arrhythmias (VAs). Ablations were performed with remote magnetic navigation or manually. The localization of the VAs based on the ECGI and invasive electroanatomic mapping was performed using a segmental model of the ventricles. A perfect match (PM) was defined as a predicted location within the same anatomic segment, whereas a near match (NM) was defined as a predicted location within the same segment or a contiguous one. The agreement between

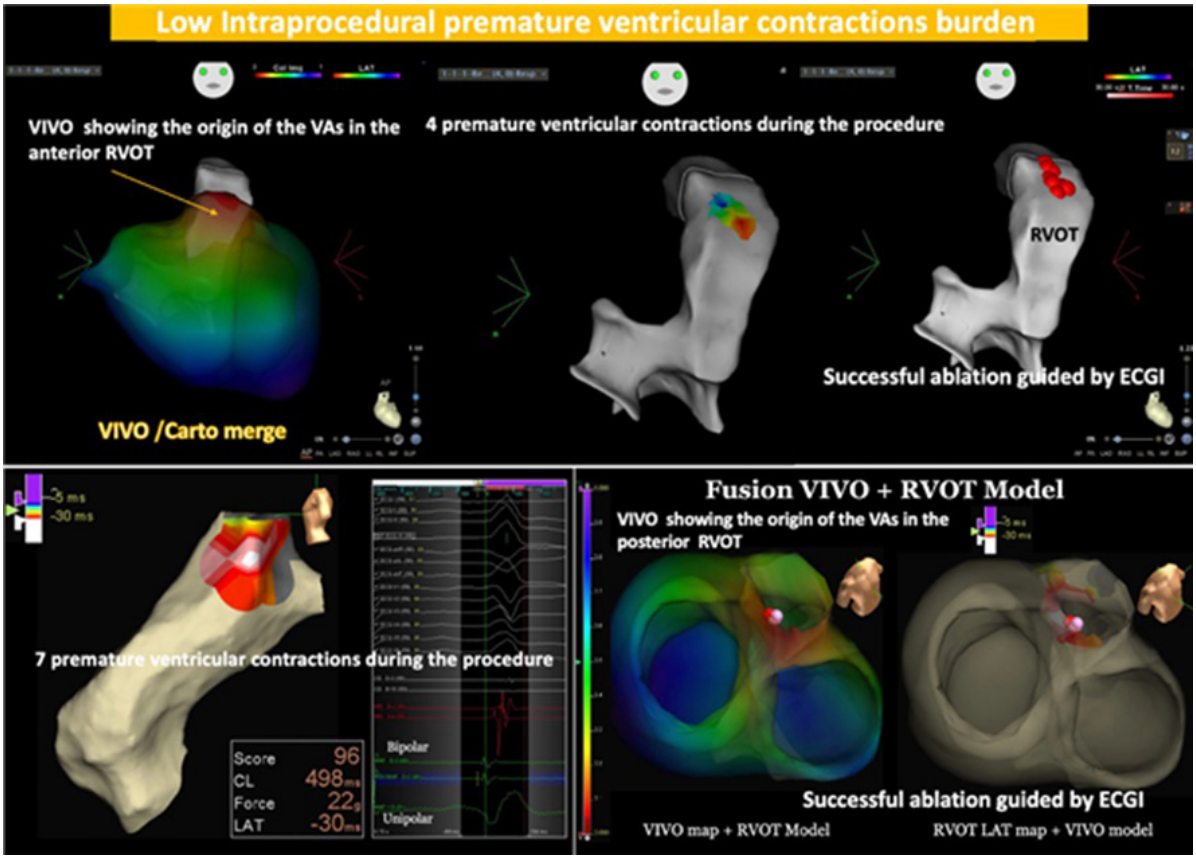


Figure CO23

the ECGI and the invasive map was evaluated. The benefit of the ECGI in the subgroup of patients with intraprocedural infrequent VAs, defined as less than 1 VA complex/min, was assessed in terms of the success of the procedure.
Results: The ECGI was performed with the AMYCARD 01 (EP Solutions SA, Switzerland) only, in 26 patients, with the VIVO (Catheter Precision, NJ USA) only, in 21 patients, and with both systems in 17 patients. Fifty-one patients underwent ablation. 65 ECGI procedures were performed before ablation in those 51 patients, 37 with Amycard with a rate of PM of 79% and NM of 97%, and 28 ECGI procedures with VIVO with 82% of PM and 93% of NM, not significantly different, respectively, p = 0.764 and 0.573. The overall success rate was 80%. The low intraprocedural burden group included 28 patients (2 examples shown in the figure). The success rate was 86%, higher than the overall success rate, and much higher than the previously reported in the literature for this group of patients.
Conclusions: The ECGI was useful in predicting the location of the VA in general but was especially helpful in cases that are usually challenging, like patients with intraprocedural infrequent VAs.

CO 24. NEUROMODULATION IN ELECTRICAL STORM: SAFETY AND EFFICACY OF RENAL DENERVATION

Sofia Jacinto, Ana Rita Teixeira, Guilherme Portugal, Bruno Valente, Ana Lousinha, Pedro Silva Cunha, Duarte Cacela, Luís Almeida Morais, Ana Santana, Eunice Oliveira, Rui Cruz Ferreira, Mário Martins Oliveira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: While catheter ablation (CA) has proven effective in managing ventricular arrhythmias (VA) associated with structural heart disease, a portion of patients continue to experience refractory VA despite medical treatment and multiple CA procedures. In such cases, additional techniques, such as autonomic neuromodulation, have been explored. Renal denervation (RDN), traditionally performed for the treatment of resistant arterial hypertension, inhibits the afferent renal sympathetic pathway, leading to reduced efferent sympathetic overactivation on a systemic level. Due to this mechanism, it has also been studied for the management of arrhythmias, including atrial fibrillation and VA, with favorable results.
Objectives: To assess the effectiveness and safety of RDN for the management of refractory VA storms in high-risk patients.
Methods: A retrospective analysis of RDN procedures for electrical storms, conducted at a tertiary center between February 2020 and September 2023. We analyzed baseline patient characteristics, procedural details, and acute complications. Recurrence of VA after RDN was assessed at one and six months.
Results: A total of 7 patients underwent RDN for the treatment of refractory VA. The mean age was 56 ± 10 years (6 male). The primary diagnosis was ischemic cardiomyopathy (n = 5), with a mean left ventricular ejection fraction (LVEF) of 20 ± 5%, and no history of resistant arterial hypertension. All patients had an implantable cardioverter-defibrillator (ICD) (two with concomitant resynchronization therapy). Five patients had undergone previous endocardial VA ablation. Of the two patients without prior VA ablation, one had a contraindication because of a large left ventricle thrombus, and the other was submitted to an electrophysiological study, but without inducible ventricular tachycardia. In the four weeks before RDN, patients exhibited a mean of 12 ± 18 sustained VA episodes, meeting the criteria for electrical storm (3 ≥ episodes in 24h). During the procedure, there was a mean of 7 ± 8 radiofrequency applications in the right renal artery and 6 ± 10 in the left renal artery. No acute complications were observed. One month after the procedure, VA episodes were reduced to a mean of 0 ± 1, with only two patients experiencing recurrent VA. After six months, the absence of VA recurrence remained consistent, with only one patient experiencing new episodes. There were no deaths during this period.
Conclusions: In our pilot study, RDN appeared to be a safe and effective treatment for the management of VA.

CO 25. CARDIONEUROABLATION USING EXTRACARDIAC VAGAL STIMULATION: A PROMISING ALTERNATIVE TO PACEMAKER THERAPY IN CARDIOINHIBITORY VASOVAGAL SYNCOPE

Rafael Silva Teixeira[1], Marta Catarina Almeida[1], Paulo Fonseca[1], João Almeida[1], Filipa Cardoso[2], Victor Sanfins[2], Helena Gonçalves[1], José Carlos Pachon M.[3], Sérgio Barra[4], José Primo[1], António Lourenço[2], Ricardo Fontes-Carvalho[1]

[1]Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE. [2]Centro Hospitalar do Alto Ave, EPE/Hospital de Guimarães. [3]São Paulo Heart Hospital - HCor, São Paulo, Brazil. [4]Hospital da Luz Arrábida.

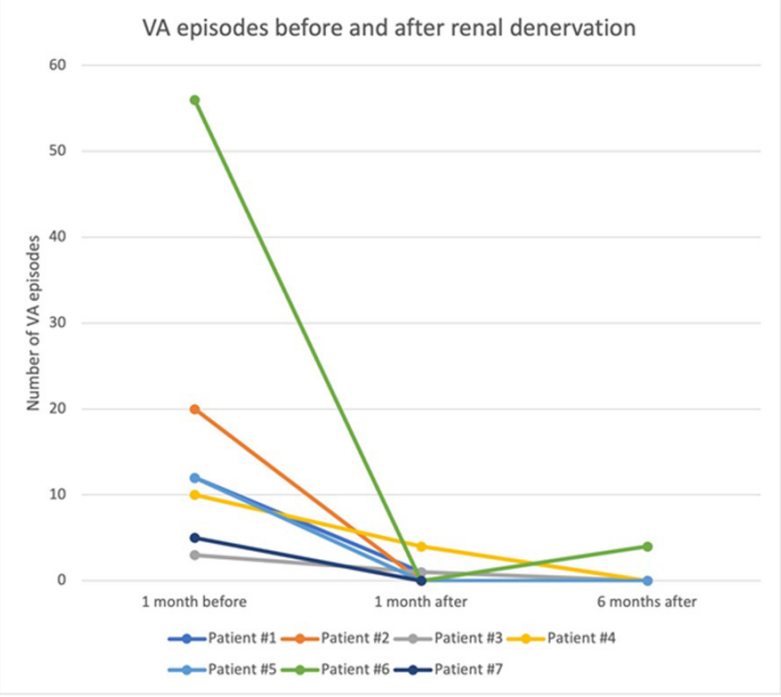


Figure CO24

Introduction: Vasovagal Syncope (VVS) is often linked to abnormal autonomic reflexes, with hypervagotonia identified as a key mechanism, especially in cases with pronounced cardioinhibition. Cardioneuroablation (CNA), which involves radiofrequency ablation of cardiac vagal ganglia, targets parasympathetic hyperactivity, offering a promising treatment for recurrent VVS. This study evaluates the effectiveness and safety of anatomically guided CNA, which may provide an alternative treatment option to pacemaker implantation for younger patients with severe cardioinhibitory VVS.
Methods: Consecutive patients between January 2019 and October 2023 who underwent CNA at two cardiology centers were enrolled. All patients had a history of recurrent syncope, predominantly cardioinhibitory and unresponsive to conventional treatments. Patients showed no signs of conduction system disease, evidenced by normal rate responses in treadmill stress tests and 24-hour Holter monitoring. Extracardiac vagal stimulation (ECVS) through the right internal jugular vein, with or without atrial pacing, was utilized to assess baseline responses of the sinus and atrioventricular (AV) nodes. The ablation strategy was tailored based on rhythm disturbances triggered by ECVS, using sequential and anatomically guided ablation of ganglionated parasympathetic plexuses in left and right atrium. Radiofrequency ablation, conducted with an irrigated catheter, was guided by the ablation index. Acute success was defined as the absence of significant reduction of cardiac parasympathetic response to ECVS, indicated by the elimination of asystole, severe bradycardia, or AV block. The primary endpoint was syncope recurrence during follow-up.
Results: The study included 25 patients (16 males; mean age 36 ± 12 years). All had documented cardioinhibition, identified through ECG monitoring (N = 12), implantable loop recorders (N = 5), or head-up tilt tests (N = 8). The average number of syncopal episodes per patient in the year preceding ablation was 2.7, ranging from 1 to 10. Ablation was acutely successful in all cases. Post-ablation, there were no immediate complications related to the procedure, except for one convulsion deemed unrelated. Over a mean follow-up of 17 ± 14 months, 23 patients remained syncope-free. Two patients experienced syncope recurrence; despite undergoing a repeat ablation, they eventually required pacemaker implantation.
Conclusions: The results of this study suggest that CAN guided by ECVS, may offer a promising treatment for patients with refractory cardioinhibitory VVS. While the procedure showed a high rate of acute success and a notable reduction in syncope recurrence, further research is warranted to fully establish its role as an alternative to pacemaker implantation.

SEXTA-FEIRA, 19 ABRIL de 2024 | 08:00-09:00

Ágora | Comunicações Orais - Sessão 06 - Doença coronária

CO 26. PROCEDURAL AND LONG-TERM PROGNOSIS AFTER SUCCESSFUL CTO RECANALIZATION IN PATIENTS WITH TYPE 2 DIABETES: A UNICENTRIC STUDY

Ana L. Silva, Gonçalo Terleira Batista, Tatiana Pereira dos Santos, Mariana Rodrigues Simões, Ana Luísa Rocha, Tomás Carlos, Mafalda Griné, Bernardo Resende, José Luís Martins, Joana Silva, Marco Costa, Lino Gonçalves

Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Type 2 diabetes (T2D) patients have a high prevalence of chronic total occlusions (CTOs). Despite coronary artery bypass grafting (CABG) being the recommended revascularization approach for T2D with multivessel disease, the ideal strategy for managing CTOs in diabetics with single-vessel disease or those unsuitable for surgery remains sparse.
Methods: Single-center, retrospective study. Patients undergoing CTO percutaneous coronary intervention (PCI) from 2017 to 2023 were included. We aimed to assess the procedural and long-term clinical outcomes following successful CTO-PCI in patients with and without T2D. Statistical analysis was performed using SPSS 28.0.1.1 software.
Results: A total of 118 patients were included (55 with T2D vs. 63 with no T2D). The mean age of the population was 66.1(± 9.9) years, 80.5% men. More females were present in the T2D group (9.5% vs. 30.9%, p = 0.005). The right coronary artery was most affected (44.1%), with 83.3% of CTOs showing Rentrop 3. Single-vessel disease occurred in 40.7%, and 69.5% achieved complete revascularization. The mean follow-up was 47(± 21) months, similar in both groups (p = 0.924). Symptomatic relief (SR) was reported by 66.2% of patients. A significant increase in mean ejection fraction (EF) was observed after CTO recanalization (47.5% vs. 51.5%; p = 0.001), which persisted in the T2D (p = 0.029) and non-T2D (p = 0.009) groups, with no significant difference between them (p = 0.624). The SR group showed an important rise in EF following PCI (p = 0.004), significant across both T2D (p = 0.041) and non-T2D (p = 0.050) groups, which was not observed in the non-SR group (p = 0.175). Also, troponin variation was higher in patients without SR after PCI (p = 0.011). This difference remained significant in the non-T2D group (p = 0.005), but not in the T2D group (p = 0.518). Procedural complications occurred in 5.9% of cases, including distal vessel dissections (n = 4), proximal dissections (n = 2), and one case of acute limb ischemia, showing no significant difference between T2D and non-T2D groups (p = 0.249). No in-hospital deaths were recorded. The all-cause mortality rate during the longest follow-up was similar in T2D (7.3%) and non-T2D (7.9%) groups (p = 1.000). Although the T2D group showed a lower rate of repeated revascularization (4.7%) compared to the non-T2D group (8.5%), this difference was not statistically significant (p = 0.679).
Conclusions: Given that T2D patients with successful CTO revascularization have comparable periprocedural and long-term outcomes to the non-T2D population, our study suggests that PCI of CTOs, performed in highly experienced centers, constitutes a safe and effective treatment option in T2D patients unsuitable for CABG. Also, our findings advocate an improvement in left ventricular function following CTO-PCI, and suggest a potential link between EF gain and symptom relief.

CO 27. ENHANCING PRIMARY PREVENTION: THE INCREMENTAL PREDICTIVE VALUE OF NTPROBNP BEYOND ASCVD RISK ASSESSMENT

Joana Massa Pereira, Sofia Andraz, Lucas Hamann, Hugo Alex Costa, Miguel Espírito Santo, Pedro Azevedo, Daniela Carvalho, Raquel Fernandes, Dina Bento, João Sousa Bispo, Jorge Mimoso

Centro Hospitalar e Universitário do Algarve, EPE/Hospital de Faro.

Introduction: Atherosclerotic cardiovascular disease (ASCVD) is a global health challenge, prompting widespread use of conventional risk assessment tools (SCORE2 in Europe and the ASCVD Risk calculator in the United States) to guide preventive strategies. Emerging evidence indicates that NTproBNP may help refine risk stratification. We investigate whether measuring NTproBNP in primary prevention correlates with mortality and enhances prediction compared to conventional risk score stratification.
Methods: Utilizing National Health and Nutrition Examination Survey (NHANES) data (1999 to 2004) linked to the National Death Index, our cohort included individuals without a history of CVD at baseline and suitable for assessment of the ASCVD ACC/AHA risk score. Individuals were grouped based on computed 10-year risk (low: < 5%; borderline: 5-7.5%; intermediate: 7.5-20%; high: ≥ 20%). NTproBNP levels were measured (Roche assay, cut-off > 125 pg/mL considered as positive). Cox regression estimated the association between ASCVD risk categories, with or without NTproBNP, and all-cause and cardiovascular mortality.
Results: Among 5,257 adults, 47% male, mean age 54 ± 9.1 years, the mean 10-year ASCVD risk was 8.17 ± 8.2%, grouped as: low: 53.3%; borderline: 11.5%; intermediate: 23.9%; and high: 11.3%. NTproBNP > 125 pg/mL was measured in 12.2%, 16%, 23.2% and 48.6% individuals, respectively (p < 0.001). Over 16.2 ± 3.4 years, all-cause and cardiovascular death was 22.3% and 5.6%, respectively. Compared to low-risk, the hazard ratio (HR) for all-cause death increased to 2.85 (2.2-3.7), 5.6 (4.2-7.5), and 15.3 (11.7-

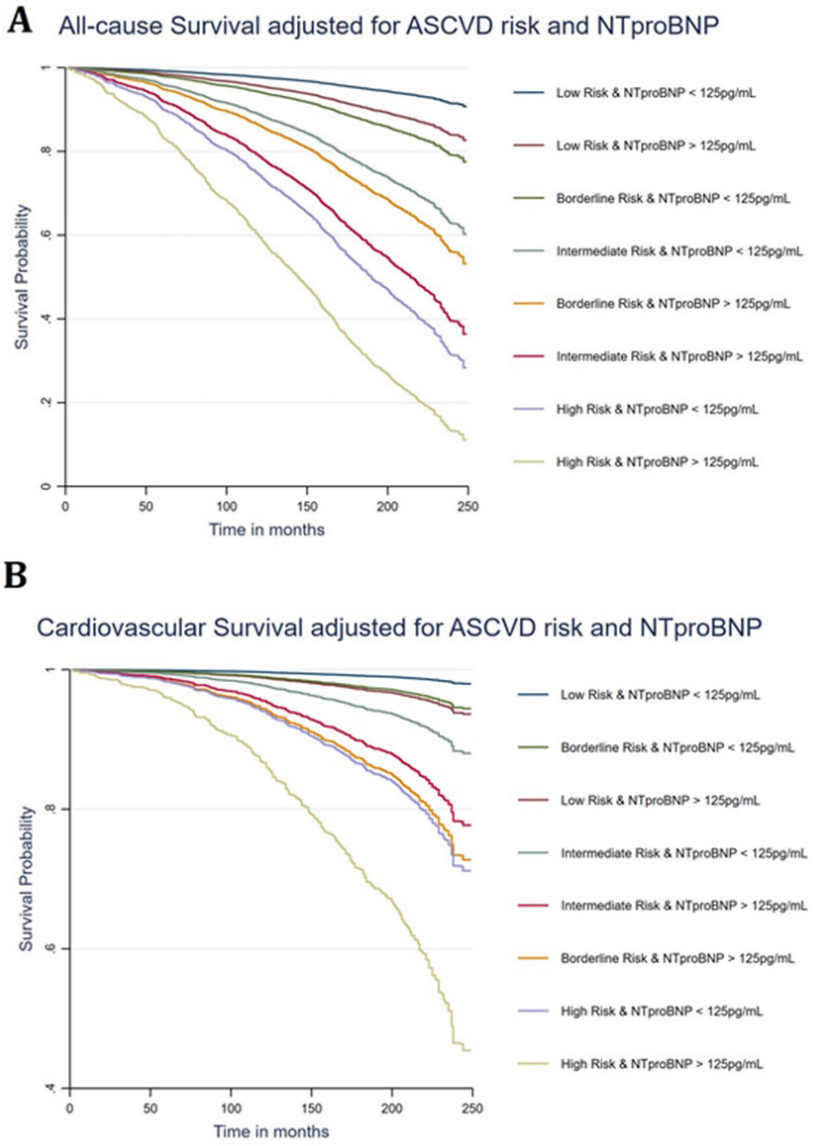


Figure 1 – All-cause (A) and cardiovascular (B) survival curves adjusted for ASCVD risk categories and NT-proBNP above 125 pg/mL. Note, for instance, the increased hazard of all-cause death increased NTproBNP in the same intermediate and high risk category. The hazard ratios (HR) and 95% CI, compared to Low-Risk and hsTnT < P(99), are as follow: **A:** Low Risk & NTproBNP > 125 pg/mL: HR 1.96 (1.3-2.9), p = 0.001; Borderline Risk & NTproBNP < 125 pg/mL: 2.6 (1.9-3.6), p < 0.001; Borderline Risk & NTproBNP > 125 pg/mL: 6.5 (4.2-10.2), p < 0.001; Intermediate Risk & NTproBNP < 125 pg/mL: 5.2 (3.7-7.3), p < 0.001; Intermediate Risk & NTproBNP > 125 pg/mL: 10.4 (7.9-13.6), p < 0.001; High Risk & NTproBNP < 125 pg/mL: 13 (9.8-17.3), p < 0.001; High Risk & NTproBNP > 125 pg/mL: 22.6 (16.9-30.4), p < 0.001; **B:** Low Risk & NTproBNP > 125 pg/mL: HR 3.2 (1.4-7.2), p = 0.001; Borderline Risk & NTproBNP < 125 pg/mL: 2.8 (1.4-5.7), p < 0.001; Borderline Risk & NTproBNP > 125 pg/mL: 15.6 (7.8-31.2), p < 0.001; Intermediate Risk & NTproBNP < 125 pg/mL: 6.3 (3.7-10.6), p < 0.001; Intermediate Risk & NTproBNP > 125 pg/mL: 12.3 (7.6-20), p < 0.001; High Risk & NTproBNP < 125 pg/mL: 16.6 (9.1-30.5), p < 0.001; High Risk & NTproBNP > 125 pg/mL: 38.6 (23.4-63.7), p < 0.001;

Figure CO27

19.9) for borderline, intermediate, and high-risk, respectively. A significant interaction with NTproBNP was observed (low: HR 1.96 (1.33-2.9); borderline: HR 2.5 (1.6-3.9); intermediate: HR 2 (1.6-2.6), high: HR 1.7 (1.4-2.2), p < 0.01 for all interactions, Figure). For cardiovascular death, a significant interaction also occurred across the groups, but of higher magnitude in low and borderline groups (low: HR 3.2 (1.4-7.3); borderline: HR 5.5 (2.5-12.4), p < 0.001 for both).

Conclusions: Our findings suggest that NTproBNP provides incremental predictive value, approximately doubling the hazard of all-cause death across all risk categories, and more than tripling the hazard of CV death in low/borderline risk groups, compared to ASCVD risk alone. The integration of NTproBNP measurements into risk assessment strategies could refine primary prevention approaches.

CO 28. ENHANCING PRIMARY PREVENTION: THE INCREMENTAL PREDICTIVE VALUE OF HSTNT BEYOND ASCVD RISK ASSESSMENT

Sofia Andraz, Joana Massa Pereira, Hugo Costa, Miguel Espírito Santo, Lucas Hamann, Pedro de Azevedo, Jorge Mimoso

Centro Hospitalar e Universitário do Algarve, EPE/Hospital de Faro.

Introduction: Atherosclerotic cardiovascular disease (ASCVD) is a global health challenge, prompting widespread use of conventional risk assessment tools (SCORE2 in Europe and the ASCVD Risk calculator in the United States) to guide preventive strategies. Emerging evidence indicates that high-sensitivity cardiac troponin (hsTn) may refine risk stratification.

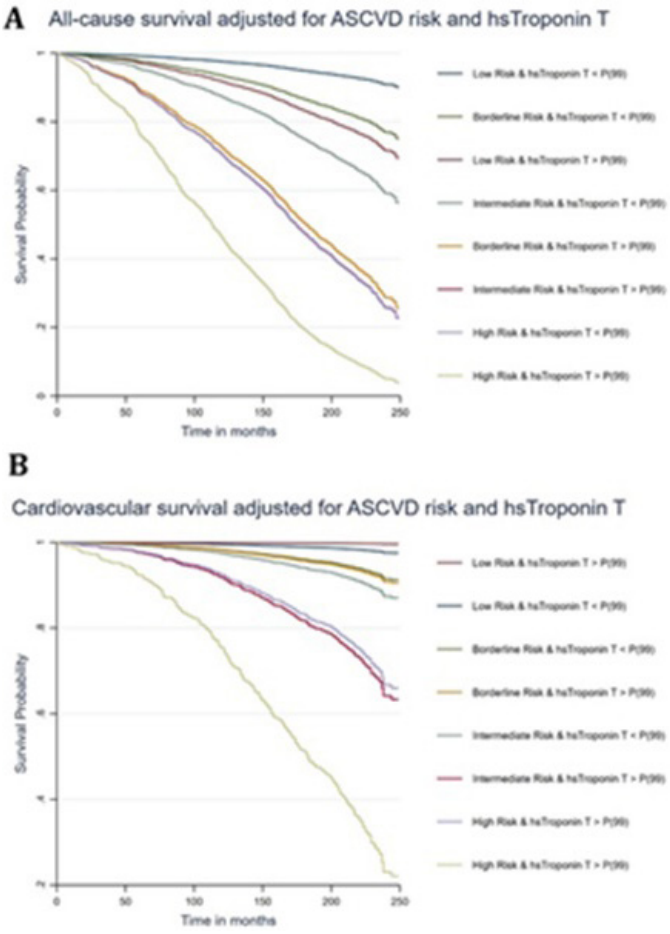


Figure 1 – All-cause (A) and cardiovascular (B) survival curves adjusted for ASCVD risk categories and hsTroponin T above the 99 th percentile (P99). Note, for instance, that increased troponin in borderline risk individuals confers an estimated higher risk of all-cause mortality compared to an intermediate individual with a normal troponin level. The hazard ratios (HR) and 95% CI, compared to Low-Risk and hsTnT < P(99),are as follow: As Low Risk & hsTnT> P(99): HR 3.5 (1.3-9.2), p = 0.01; Borderline Risk& hsTnT < P(99): 2.7 (2.1-3.7), p < 0.001; Borderline Risk & hsTnT > P(99): 13.6-28.2), p < 0.001; Intermediate Risk & hsTnT < P(99): 5.5 (4.1-7.4), p < 0.001; Intermediate Risk & hsTnT > P(99): 14.2 (9.4-21.2), p < 0.001; High Risk & hsTnT < P(99): 14.2 (10.8-18.7), p < 0.001; High Risk & hsTnT > P(99): 31.2 (22.7-43), p < 0.001 . Bt Low Risk & hsTnT > P(99): HR 0.16 (0.02-1.3), p = 0.08; Borderline Risk & hsTnT < P(99):3.6 (2.3-5.8), p < 0.001; Borderline Risk & hsTnT > P(99):3.9 (0.7-21.1), p = 0.1; Intermediate Risk & hsTnT < P(99): 5.5 (3.6-8.4), p < 0.001; Intermediate Risk & hsTnT>P(99): 18.1 (10.1-32.4), p < 0.001; High Risk & hsTnT< P(99): 16.5 (10.5-25.9), p < 0.001; High Risk & hsTnT > P(99) 59.8 (35.6-100.3), p < 0.001

Figure CO28

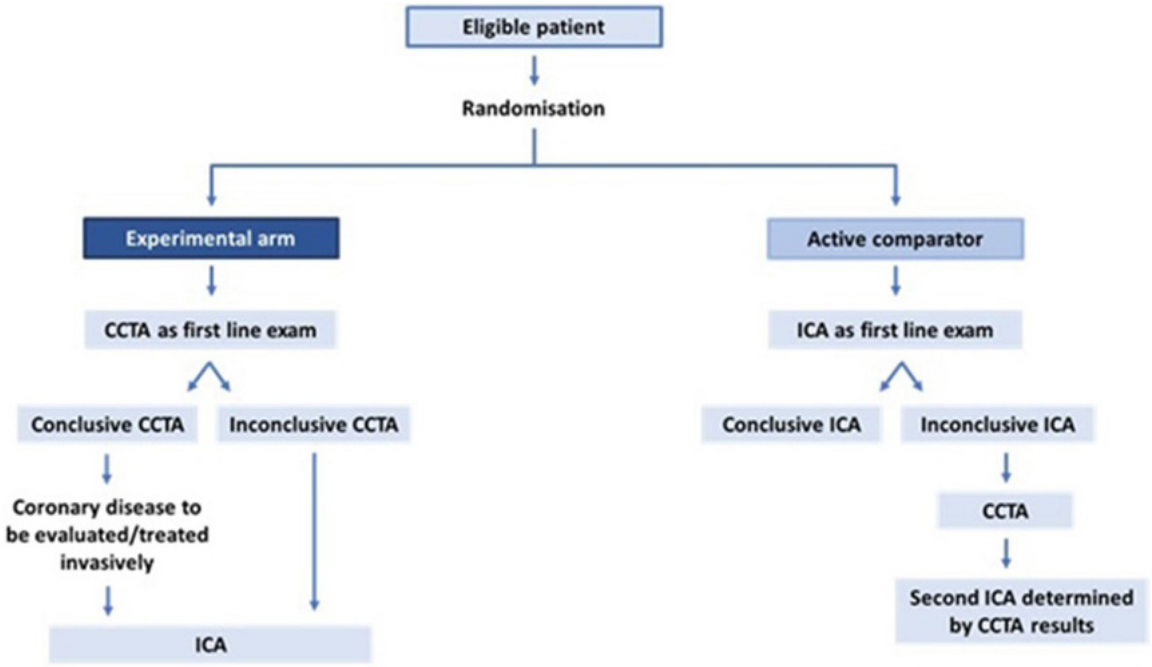
Objectives: We investigate whether measuring hsTn in primary prevention correlates with mortality and enhances prediction compared to conventional risk score stratification.
Methods: Utilizing National Health and Nutrition Examination Survey (NHANES) data (1999 to 2004) linked to the National Death Index, our cohort included individuals without a history of CVD at baseline and suitable for assessment of the ASCVD ACC/AHA risk score. Individuals were grouped based on computed 10-year risk (low: < 5%; borderline: 5-7.5%; intermediate: 7.5-20%; high: ≥ 20%). hsTroponin T levels were measured (Roche assay, 99th percentile 22 ng/L for men and 17ng/L for women). Cox regression estimated association between ASCVD risk categories, with or without hsTnT, and all-cause and cardiovascular mortality.
Results: Among 5,257 adults, 47% male, mean age 54 ± 9.1 years, the mean 10-year ASCVD risk was 8.17 ± 8.2%, grouped as: low: 53.3%; borderline: 11.5%; intermediate: 23.9%; and high: 11.3%. hsTnT above the 99th percentile was measured in 1.1%, 2.7%, 4.9% and 13.4%, respectively (p < 0.001). Over 16.2 ± 3.4 years, all-cause and cardiovascular death was 22.3% and 5.6%, respectively. Compared to low-risk, the hazard ratio (HR) for all-cause death increased to 2.85 (2.2-3.7), 5.6 (4.2-7.5), and 15.3 (11.7-19.9) for borderline, intermediate, and high-risk, respectively. A significant interaction with hsTnT above 99th percentile was observed (low: HR 3.5 (1.3-9.2); borderline: HR 4.75 (2.1-10.8); intermediate: HR 2.6 (1.8-3.7), high: HR 2.2 (1.7-2.9), p < 0.01 for all interactions, Figure). For cardiovascular death, a significant interaction occurred in intermediate (HR 3.3 (2-5.4), p < 0.001) and high-risk (HR 3.6 (2.2-6), p < 0.001) groups.
Conclusions: Our findings suggest that hsTnT provides incremental predictive value, at least doubling the hazard of all-cause death across all risk categories, and tripling the hazard of CV death in intermediate and high-risk groups, compared to ASCVD risk stratification alone. The integration of troponin measurements into risk assessment strategies could refine primary prevention approaches.

CO 29. CORONARY COMPUTED TOMOGRAPHY ANGIOGRAPHY BEFORE INVASIVE CORONARY ANGIOGRAPHY IN CABG PATIENTS

João Baltazar Ferreira, Inês Pereira de Miranda, Cátia Ribeiro, Pedro Magno, José Loureiro, Miguel Santos, Luis Brízida, João Bicho Augusto, Pedro Farto e Abreu, Sérgio Bravo Baptista

Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra.

Introduction: Invasive coronary angiography (ICA) in patients who have coronary artery bypass grafts (CABG) is often a challenging procedure. Problems may include high exposition to elevated radiation doses, elevated iodine contrast doses, complications associated with ICA, and, ultimately, it may lead to an incomplete assessment of the coronary bypasses. Coronary computed tomography angiography (CCTA) may be useful, allowing a better description of bypass grafts' location, type and patency before the invasive procedure.
Objectives: To evaluate the benefits of CCTA before ICA in patients who had previously underwent CABG.
Methods: Single-center prospective randomized trial with an experimental arm with CCTA as first-line exam (where ICA was only performed if CCTA was not conclusive or if it showed disease requiring further assessment



CO29.jpg

and/or treatment) and an active comparator arm with ICA as first-line exam (where CCTA was performed if ICA was considered inconclusive) (see figure). Patients with prior CABG and a clinical indication for ICA between April 2021 and July 2023 were included. Exclusion criteria were glomerular filtration rate < 30 mL/kg/1.73 m^2, CCTA or ICA in the previous 6 months, indication for emergent ICA, previous important adverse reaction to iodine contrast, confirmed or suspected thoracic neoplasia, uncontrolled arrhythmia and pregnancy. Primary endpoint was the total volume of iodinated contrast. Secondary endpoints included (1) total cumulative radiation exposure, (2) total ICA time and radiation exposure, (3) percentage of patients in whom routine CCTA was enough, (4) percentage of patients in whom routine ICA was not enough and (5) change in creatinine at 48h and at 5 days after the last diagnostic procedure.

Results: 46 patients were randomized, 50% to each arm. Mean age was 72 ± 8 years and 80.4% were male. Mean total volume of iodinated contrast was significantly less in the intervention group (181 vs. 268 mL; p = 0.005). Mean total cumulative radiation dose was similar between the two groups (27.3 vs. 36.5 mSv; p = 0.138). Mean total ICA time and mean total radiation dose in ICA were similar between the experimental and comparator arm ([40.8 vs. 40.3 min; p = 0.911] and [35.2 vs. 32.9 mSv; p = 0.702], respectively). CCTA avoided subsequent ICA in 48% of patients in the intervention group and 21.7% of patients in the control group needed additional CCTA. Changes in creatinine at 48h and 5 days after the last diagnostic procedure did not differ significantly between the two groups (+0.08 vs. +0.18 mg/dL; p = 0.172 at 48h and +0.07 vs. +0.33 mg/dL; p = 0.149 after 5 days).

Conclusions: Performing routine CCTA before ICA, as compared to performing routine ICA, in patients with prior CABG, reduces the total volume of iodinated contrast without a significant increase in total radiation exposure. Routine CCTA avoided subsequent ICA in almost half the patients in the intervention group.

CO 30. INTEGRATING DIVERSE REAL WORLD DATA FOR ENHANCED PHENOTYPING OF CARDIOVASCULAR CHRONIC CONDITIONS

Bernardo Neves[1], Mário J. Silva[2], Anabela Raimundo[1], Pedro Sarmento[1], Jorge Cerejo[3], Simão Gonçalves[3], José Maria Moreira[3], Nuno André da Silva[3], Francisca Leite[3]

[1]Hospital da Luz Lisboa. [2]Instituto Superior Técnico. [3]Hospital da Luz Learning Health.

Introduction: Electronic Health Records (EHR) are increasingly leveraged for secondary observational research, clinical trial recruitment and automatic cardiovascular risk assessment. Traditionally, the identification of conditions in EHRs relies heavily on diagnosis codes such as International Classification of Diseases (ICD), however the accuracy of disease phenotyping can vary significantly. In this study we aim to evaluate the additional contribution of drug prescriptions and laboratory measurements in enhancing the phenotyping of some cardiovascular chronic conditions.

Methods: An anonymized dataset from a single hospital's EHR, encompassing 303,807 patients between 2018 and 2022, was analysed. Prevalence of Heart Failure (HF), Diabetes mellitus (DM), Hypertension (HT) and Hypercholesterolemia (HCL) were analyzed trough: 1) ICD9-CM codes assigned by physicians, utilizing the Clinical Classifications Software (CCS) for code aggregation; 2) Drug Prescriptions mapped to conditions trough the previously validated Rx-risk model; 3) Laboratory Measurements of NT-pro-BNP > 125 pg/ml for HF, HbA1c ≥ 6,5% for DM and total cholesterol > 190 mg/dl for HCL.

Results: We found drug prescriptions and laboratory measurements as key enhancers in the identification of chronic conditions, always exceeding ICD9-based identification. Drug prescriptions and NT-pro-BNP measurements found 11.9 and 3.7 times more patients with HF than the 1,760 ones found with ICD-9 codes, respectively. Drug prescriptions led to additional 12,819 patients diagnosed with HT, on top of the 13,683 initially found with ICD9 codes. In diabetes, the supplementary methods revealed 2.4 times more patients than the 5,242 initially identified by ICD9. The impact was even more pronounced for HCL, with the combined approach identifying 52,044 additional patients—9.7 times the 5,812 found via ICD9. While 21.2% of patients with HT could be identified by both ICD9 and drug prescriptions, smaller fractions of patients met all three diagnosis criteria: 13.5% for DM, 5.0% for HF, and 2.1% for HCL.

Conclusions: This study underscores the effectiveness of multimodal phenotyping in EHRs, significantly amplifying patient identification rates for chronic diseases. Drug prescriptions and laboratory data are confirmed as crucial diagnostic resources for these cardiovascular conditions. The low percentage of patients meeting all criteria suggests underdiagnosis when relying on single real world data sources. Future directions include validation to establish the specificity of each phenotyping approach, mining clinical narratives for additional disease mention, and applying these strategies to other conditions to increase clinical data quality. We believe this is an important step towards automatic diagnosis and cardiovascular risk assessment from existing clinical data.

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00

Fenix 1 | Comunicações Orais - Sessão 07 - Genética em Cardiologia

CO 31. DOES THE LPA GENOTYPE HAVE A ROLE IN CORONARY ARTERY DISEASE RISK BEYOND LIPOPROTEIN(A) VALUES?

Ana Débora Câmara de Sá[1], M. I. Mendonça[2], F. Sousa[1], E. Henriques[2], S. Freitas[2], M. Rodrigues[2], S. Borges[2], G. Guerra[2], G. Abreu[1], A. Drumond[1], A. C. Sousa[2], R. Palma dos Reis[3]

[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dra. Maria Isabel Mendonça, SESARAM EPERAM. [3]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: High lipoprotein(a) [Lp(a)] concentrations are one of the most important genetically determined risk factors for coronary artery disease (CAD). Many functional single nucleotide polymorphisms (SNPs) of the LPA gene have pronounced effects on Lp(a) concentrations; studies show that rs3798220 polymorphism is strongly associated with Lp(a) concentration and also with risk of CAD.
Objectives: To evaluate if LPA rs3798220 T > C is associated with CAD beyond its effect on Lp(a) levels.
Methods: We performed a case-control study with 3,157 individuals (1,721 CAD patents and 1,436 controls). The LPA rs3798220 T > C was genotyped with the TaqMan PCR assay (Applied Biosystems 7300 Real-Time). This variant has a minor allele frequency (MAF) < 2%; hence, the risk homozygous CC is a rare genotype, and we used the heterozygous CT in our analysis. Laboratory analysis was performed, and Lp(a) biochemical levels were measured in the cases and controls. Chi-squared tests were used to determine differences by genotype in CAD association (in cases and controls). We also reported a multivariate logistic regression to test if this LPA variant is still independently associated with CAD after adjustment to Lp(a) levels and traditional risk factors for CAD.
Results: Wild-type genotype TT was increased in the group without CAD, whereas the genotype TC was higher in patients with CAD (p < 0.0001). After multivariate logistic regression, adjusted for traditional risk factors, the TC genotype remained in the equation as an independent risk factor for CAD (OR = 2.36; 95%CI: 1.54–3.61; p < 0.0001). When the multivariate regression analysis is adjusted for traditional risk factors plus Lp(a) levels, the TC genotype remains in the equation as independently associated with CAD despite being substantially attenuated (OR = 1.67; 95%CI: 1.07–2.60; p = 0.025).
Conclusions: LPA rs3798220 T > C may be an independent risk factor for CAD beyond the effect of rising Lp(a) levels. Perhaps testing for the genetic determinants of Lp(a) relative to direct measurement of Lp(a) level could provide additional prognostic utility.

CO 32. IS GENETIC INFORMATION HELPFUL IN PREDICTING RECURRENT EVENTS IN YOUNG PATIENTS AFTER ACUTE CORONARY SYNDROME?

Francisco Sousa[1], M.I. Mendonça[2], D. Sá[1], E. Henriques[2], S. Freitas[2], M. Rodrigues[2], S. Borges[2], G. Guerra[2], G. Abreu[1], A. Drumond[1], A. C. Sousa[3], R. Palma dos Reis[4]

[1] Hospital Dr. Nélio Mendonça. [2]Research Centre "Dra Maria Isabel Mendonça", SESARAM EPERAM. [3]Research Centre "Dra Maria Isabel Mendonça", SESARAM EPERAM; Madeira University. [4]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: Coronary Artery Disease (CAD) shares environmental and genetic factors. Young patients with acute coronary syndrome (ACS) carry a poor long-term prognosis. The clinical utility of genetic information in predicting CAD events remains unknown.
Objectives: Evaluate the clinical utility of a multiplicative Genetic Risk Score (mGRS) to predict lifelong residual risk in CAD patients below 55 years with few risk factors.
Methods: 475 non-diabetic patients with LDL cholesterol levels below 100 mg/dL at the first admission who suffered a prior MI at age ≤ 55 years were followed prospectively for a mean of 5.6 ± 5.3 years. A mGRS was performed with nine variants associated with CAD but not with traditional risk factors (TRF): *CDKN2B-AS1* (rs1333049 and rs4977574),

LPA variant associated with CAD (unadjusted and adjusted for Lp(a) levels)

LPA rs3798220	Unadjusted for Lp(a) levels		Adjusted for Lp(a) levels	
	Odds ratio (95% CI)	P value	Odds ratio (95% CI)	P value
TT	Reference	<0.000	Reference	0.025
TC	2.36 (1.54 – 3.61)	1	1.67 (1.07 – 2.60)	

Legend: Covariables included sex, age, dyslipidemia, diabetes, smoking status, hypertension, physical inactivity and obesity.

Figure CO31

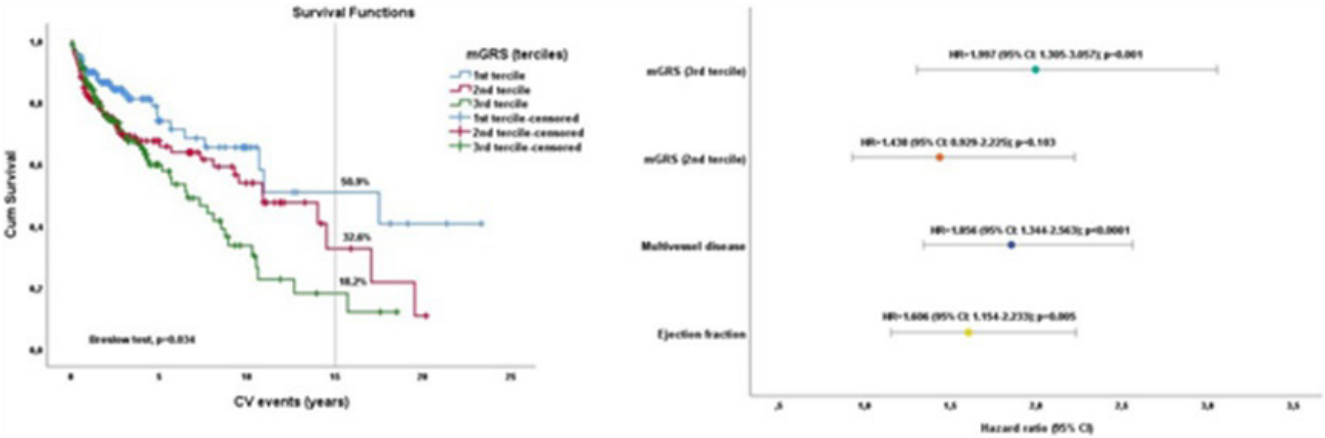


Figure CO32

TCF21 (rs12190287), *PHACTR1* (rs1332844), *MIA3* (rs17465637), *ADAMTS7* (rs3825807), *ZC3HC1* (rs11556924), *SMAD3* (rs17228212) and *GJA4* (rs618675). The mGRS was subdivided into terciles. Using Cox regression analysis, the predictive and discriminative score ability for events was evaluated. C-statistic discriminated cardiovascular events occurrence. Whether mGRS was included in the TRF model, Net Reclassification Improvement (NRI), or Integrated Discrimination Improvement (IDI) reclassified patients. Kaplan-Meier method estimated survival curves.

Results: There were 153 patients with at least one cardiovascular event. The bivariate analysis showed the strongest correlation with second and third mGRS tercile, multivessel disease, left ventricular dysfunction, and inflammation represented by C-reactive protein. Multivariate Cox regression for events adjusted to traditional risk factors displayed an HR = 2.00 (p = 0.001) for the mGRS high-risk tercile together with low ejection fraction HR = 1.61 (p = 0.005) and multivessel disease HR = 1.86 (p < 0.0001). The mGRS inclusion improved C-statistic (C-index = 0.010; p = 0.004), NRI (35.4%; p < 0.0001) and IDI (2.7%; p = 0.0005).

Conclusions: Our 9-SNP mGRS better identified and reclassified younger CAD patients with a high probability of genetic events, improving clinical decision-making and reducing costs for therapeutic strategies.

CO 33. GJA4 GENE INHIBITION MAY REPRESENT A POTENTIAL TARGET FOR NOVEL ANTITHROMBOTIC THERAPIES

Ana Débora Câmara de Sá[1], M. I. Mendonça[2], M. Serrão[1], F. Sousa[1], E. Henriques[2], S. Freitas[2], S. Borges[2], G. Guerra[2], G. Abreu[1], A. Drumond[1], A. C. Sousa[2], R. Palma dos Reis[3]

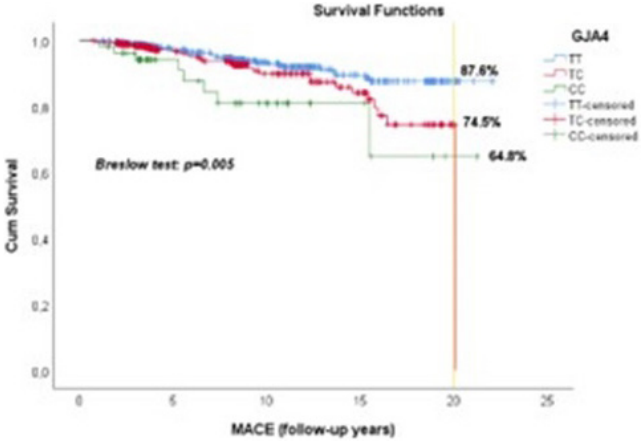
[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dra Maria Isabel Mendonça, SESARAM EPERAM. [3]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: The GJA4 gene encodes a protein called connexin 37, a component of gap junctions in vascular endothelial cells, crucial in regulating endothelial function and influencing inflammation, platelet adhesion and thrombus formation. This gene deletion in mice diminished thrombus formation *in vitro* in human blood. In these circumstances, connexin inhibition with pharmacological agents may represent potential avenues for developing novel antithrombotic agents.

Objectives: To investigate whether the GJA4 rs618675 T>C variant is a risk factor for progressing atherosclerosis and cardiovascular (CV) events in an asymptomatic free of apparent CAD from a Portuguese population.

Methods: A prospective study was performed with 1421 individuals without apparent CV disease (73.6% male, aged 52.2 ± 8.3 years) followed during an extended period of 7.2 ± 5.1 years). GJA4 rs618675 T>C variant was genotyped by TaqMan real-time PCR technique (Applied Biosystems). Conventional, anthropometric, biochemical and clinical risk factors were studied. Bivariate analysis and multivariate Cox regression adjusted for age, gender, traditional risk factors, biochemical markers, and the genotypes under study was performed to determine which variables were, significantly and independently, associated with CV events. Kaplan-Meier estimated the survival curves.

Results: Bivariate analysis showed that 50.6% of wild genotype (TT) carriers had CV events vs. 66.2% without. Of the risk genotype (CC) carriers, 10.1% had CV events, and 3.4% did not. After the Kaplan-Meier analysis, the TT carriers had 90% CV event-free survival time and the CC risk carriers had only 64% of event-free survival. Finally, after adjustment, CC genotype remained in the equation with an HR of 3.1 (p = 0.003) and CT heterozygous with HR of 1.6 (p = 0.043), together with hypertension (HR 3.0; p < 0.0001), smoking habits (HR 2.3; p = 0.001) and diabetes (HR 1.9; p = 0.015).



Conclusions: The CC risk genotype of the GJA4 rs618675 represented an independent risk factor for progressing atherosclerosis and CV events in an asymptomatic population. Thrombus formation often begins with the adhesion of platelets to the endothelium, and connexin 37 may influence this process. The inhibition of connexin 37 emerges as a promising candidate for future cardiovascular prevention as well as for the development of new antithrombotic drugs.

CO 34. THE EFFECT OF THE LPA GENE ON AORTIC VALVE CALCIFICATION IN A PORTUGUESE POPULATION

Francisco Sousa[1], M. I. Mendonça[2], M. Serrão[1], G. Abreu[1], D. Sá[1], S. Freitas[2], M. Rodrigues[2], E. Henriques[2], S. Borges[2], A. Drumond[1], A. C. Sousa[3], R. Palma dos Reis[4]

[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dra Maria Isabel Mendonça, SESARAM EPERAM. [3]Research Centre Dra Maria Isabel Mendonça, SESARAM EPERAM; Madeira University. [4]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: Aortic valve calcium (AVC) deposition is one of the mechanisms behind aortic sclerosis and stenosis. There is a known association between LPA gene rs3798220 T>C polymorphism and the development of severe aortic stenosis. However, it is still unknown if it has been a driving factor since the early stages of the disease.

Objectives: Investigate, in our population, the association between the LPA gene variant rs3798220 T > C and aortic valve calcification.

Methods: AVC was measured in 451 consecutive individuals from the prospective arm of the GENEMACOR study with a mean age of 63.4 ± 9.7, 58.8% male. AVC score was performed by cardiac computed tomography and reported as Agatston units. Results were separated into two groups (Group A: AVC = 0; Group B: AVC > 0). Lp(a) levels were analyzed in the different groups. Each individual was genotyped for LPA rs3798220 T>C. This variant has a minor allele frequency (MAF) < 2%; hence, the risk homozygous CC is a rare genotype, and we used the heterozygous CT in our analysis. The bivariate and multivariate logistic regression analysis evaluated the presence of AVC adjusting to traditional risk factors (TRFs) and the LPA heterozygous genotype (CT).

Results: LP(a) levels were higher in the CT allele versus the homozygous TT, but this difference did not reach a statistical significance. After multivariate analysis, the heterozygous LPA rs3798220 T>C polymorphism remained an independent risk factor for the presence of aortic valve calcification (OR = 12.14,

Variables independently associated with AVC events occurrence

Variables	B	S.E.	Wald	df	OR (95% CI)	p-value
Age	0.121	0.015	63.729	1	1.129 (1.096 – 1.163)	**<0.0001**
AHT	0.672	0.247	7.414	1	1.959 (1.207 – 3.178)	**0.006**
Alcohol	0.900	0.373	5.837	1	2.461 (1.185 – 5.108)	**0.016**
LPA TC	2.497	0.820	9.261	1	12.140 (2.432 – 60.608)	**0.002**

Figure CO34

p = 0.002) together with age (OR = 1.13, p < 0.0001), arterial hypertension (AHT) (OR = 1.96, p = 0.006) and alcohol consumption (OR = 2.46, p = 0.016).
Conclusions: The LPA gene variant rs3798220 T>C is associated with the presence of aortic valve calcification in a Portuguese population. In such an age-dependent disease as aortic stenosis, the inversion in the age pyramid will see a dramatic increase in the prevalence of aortic stenosis. The early identification of high-risk individuals might enable prompt traditional risk factors control and disease prevention. Larger population studies may help to determine if this difference is driven by Lp(a) levels.

CO 35. THE C825T GENETIC VARIANT OF THE G PROTEIN SS3 SUBUNIT IS ASSOCIATED WITH ESSENTIAL HYPERTENSION IN INDIVIDUALS WITH A FAMILY HISTORY OF ESSENTIAL HYPERTENSION

Carolina Isabel Carvalhinha, Ana Célia Sousa, André Ferreira, Carolina Henriques, Francisco Barreto, Rui Fernandes, Mariana Rodrigues, Graça Guerra, Sofia Borges, Maria João Oliveira, Maria Isabel Mendonça, Roberto Palma dos Reis

Hospital Dr. Nélio Mendonça.

Introduction: Essential Hypertension (EH) is a risk factor for cardiovascular disease. Several studies indicate that the presence of a family history of EH leads to a greater risk of developing hypertension. Environmental and genetic factors interfere and increase this risk. However, it is not established which genetic polymorphisms are associated with the development of EH in individuals with familial EH.
Objectives: To study whether the genetic variant of the G Protein C825T Subunit β3 is associated with Essential Hypertension in individuals with a family history of EH.
Methods: With a population of 1,712 individuals: 627 individuals had a family history of hypertension and 1,085 did not. Within the group of individuals with familial EH, a case-control study was carried out depending on whether they had EH (n = 409) or not (n = 218). All collected blood for biochemical analyzes and DNA collection for genetic analysis. We evaluated the frequency of the C825T G Protein Subunit β3 gene in the groups of hypertensive individuals with and without familial history of EH. We calculated the odds ratio (OR) to assess the risk of having EH conferred by the C825T G Protein β3 Subunit gene in individuals with familial history of EH.
Results: Our results indicate that the G Protein C825T Subunit β3 gene, in the dominant model, is associated with EH in individuals with familial history of EH (OR = 1.481; 95%CI: 1.053-2.082; p = 0.024).
Conclusions: In our work, we concluded that individuals with familial history of EH and the CT+TT genotype of the G Protein C825T Subunit β3 have a higher risk of developing EH. These individuals should have greater intervention in controlling environmental risk factors to avoid developing hypertension.

	All (n=289)	Group 1 (n=148)	Group 2 (n=141)	p value
Age - mean±SD	62±11.3	61.6±12.7	62.3±10.4	0.602
Male sex - n (%)	238 (82.4)	119 (80.4)	119 (84.4)	0.347
Heart Failure Etiology				0.591
Ischemic	195 (67.5)	102 (68.9)	93 (66.0)	
Non-Ischemic	94 (32.5)	46 (31.1)	48 (34.0)	
LVEF* - mean±SD	28.1±5.2	28.6±5.0	27.6±5.4	0.093
QRS duration* - median (IQR)	110 (30.0)	105 (26.0)	115 (30.0)	0.008
NYHA class* - n (%)				0.035
I	24 (8.3)	7 (4.7)	17 (12.1)	
II	198 (68.5)	112 (75.7)	86 (61.0)	
III	58 (20.1)	29 (19.6)	29 (20.6)	
Comorbidities - n (%)*				
Hypertension	202 (69.9)	114 (77.0)	88 (62.4)	0.006
Type 2 DM	97 (33.6)	43 (29.1)	52 (38.3)	0.095
Dyslipidemia	204 (70.6)	110 (74.3)	94 (66.7)	0.151
Current alcohol abuse	23 (8.0)	16 (10.8)	7 (5.0)	0.066
Previous alcohol abuse	16 (6.2)	10 (6.8)	8 (5.7)	0.704
Smoker	87 (3.1)	28 (18.9)	41 (29.1)	0.531
Previous smoking	69 (23.9)	47 (31.8)	40 (28.4)	0.042
Current drug abuse	5 (1.0)	4 (2.7)	1 (0.7)	0.194
Previous drug abuse	4 (0.8)	2 (1.4)	2 (1.4)	0.961
Chronic Kidney Disease	61 (21.2)	36 (24.3)	25 (17.7)	0.179
COPD	34 (11.8)	13 (8.8)	21 (14.9)	0.107
Medication* - n (%)				
ACE-I/ARB	189 (65.4)	138 (93.2)	51 (36.2)	<0.001
ARNI	85 (29.4)	1 (0.7)	84 (59.6)	<0.001
Beta-blocker	278 (96.2)	142 (95.9)	136 (96.5)	0.496
Espironolactone	222 (76.8)	107 (72.6)	115 (81.6)	0.115
Dapagliflozin/Empagliflozin	45 (15.6)	3 (2.0)	45 (31.9)	<0.001
Ivabradine	42 (14.5)	20 (13.5)	22 (15.6)	0.666
Loop diuretic	198 (68.5)	101 (68.2)	97 (68.8)	0.875
ICD therapies after one year	24 (8.3)	8 (5.4)	16 (11.3)	0.067

Footnote: IQR - Interquartile Range. SD - Standard deviation. LVEF - Left Ventricular Ejection Fraction. NYHA - New York Heart Association. DM - Diabetes Mellitus. BMI - Body Mass Index. COPD - Chronic Obstructive Pulmonary Disease. ACE-I - angiotensin-converting enzyme inhibitor. ARB - angiotensin II receptor blocker. ARNI - angiotensin receptor-neprilysin inhibitor. ICD - Implantable Cardioverter Defibrillator *4 missing values for LVEF; 120 missing values for QRS duration; 2 missing values for cormobidities; 9 missing values for NYHA class; 3 missing values for medication.

Table 1: Population characteristics and group comparisons

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00

Fenix 2 | Comunicações Orais - Sessão 08 - Insuficiência cardíaca: da clínica aos dispositivos

CO 36. IMPLANTABLE CARDIOVERTER DEFIBRILLATORS IN HEART FAILURE WITH REDUCED EJECTION FRACTION: EVALUATING EFFICACY IN THE ERA OF CONTEMPORARY PHARMACOTHERAPY

Inês Ferreira Neves, Julien Lopes, Guilherme Portugal, Rita Teixeira, Pedro Silva Cunha, Bruno Valente, Ana Lousinha, Paulo Osório, Hélder Santos, André Monteiro, Rui Cruz Ferreira, Mário Martins Oliveira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Among patients with Heart Failure with Reduced Ejection Fraction (HFrEF), a significant proportion of deaths occur due to electrical

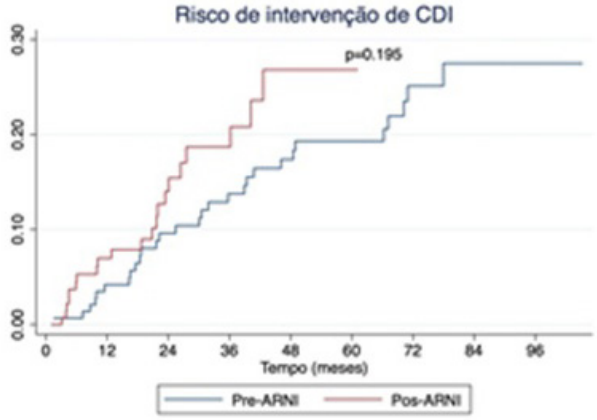


Figure 1: Risk curves of patients implanted with ICD as primary prevention

Figure CO36

disturbances, including ventricular arrhythmias. Implantable cardioverter defibrillators (ICD) are effective in reverting potentially lethal ventricular tachyarrhythmias and are as such recommended in primary prevention. ICD also reduce the risk of sudden death and all-cause mortality in patients with symptomatic heart failure (HF) and a left ventricular ejection fraction (LVEF) ≤ 35%, after at least three months of optimal medical therapy (OMT). However, the ICD trials responsible for the inclusion of these recommendation in the guidelines predate the use of angiotensin receptor-neprilysin inhibitors (ARNIs) and SGLT2 inhibitors. In these patients the benefit of implanting ICDs after OMT with the currently available medication is not known.

Methods: All patients with symptomatic HFrEF, (New York Heart Association [NYHA] class II-III) and with LVEF ≤ 35% after 3 months of OMT who were implanted with ICD for primary prevention at our center between 2015 and 2022 were included. ICD therapies, including Anti Tachycardia Pacing (ATP) and shock were recorded during follow-up. We retrospectively analyzed the time to event (ICD therapy) before (group 1) and after (group 2) the generalization of treatment with ARNI and SGLT2 inhibitors. A cox regression model was used with time to event and Kaplan-Meier survival curve was calculated.

Results: 289 patients (82.4% males, age 62 ± 11.3 [between 50 and 73 years]) were included, 148 (51.2%) included in group 1 (implantation of ICD before the generalization of ARNI and SGLT2 inhibitors) and 141 48.8%) in group 2 (implantation of ICD in the era of contemporary pharmacotherapy). The median follow-up was 4.15 (IQR 3.85) years. There were no relevant statistically significant differences between the two groups. The number of ICD therapies at one year did not significantly differ between the groups (p value = 0.067). In cox regression, contemporary OMT was not associated with a reduced risk of ICD therapy (hazard ratio [HR] 1.47; 95% confidence interval [CI] 0.82-2.70).

Conclusions: The benefit of implanting ICD in patients with HFrEF and LVEF ≤ 35% appears to be maintained in the era of OMT including ARNI and SGLT2i.

CO 37. PROGNOSTIC IMPACT OF RESIDUAL CONGESTION ESTIMATED BY BIOIMPEDANCE IN HEART FAILURE

Bruno Bragança, Inês G. Campos, Rafaela G. Lopes, Mauro Moreira, Ricardo Barbosa, Patrícia Silva, Sónia Apolinário, Licínia Aguiar, Magda Silva, Aurora Andrade

Centro Hospitalar do Tâmega e Sousa, EPE/Hospital Padre Américo, Vale do Sousa.

Introduction: Optimal decongestion is of utmost importance to the hospitalization recovering process from a heart failure (HF) decompensation event. Persistence of residual congestion despite continued therapy builds up relentlessly during the worsening of HF. Clinical examination and biomarkers often miss identifying residual congestion in HF. Thus, we explore the prognosis of residual congestion assessed by bioimpedance spectroscopy (BIS) in HF patients.

Methods: A single-center prospective observational study recruited adult outpatients with ongoing or previous HF with reduced ejection fraction (HFrEF) for characterization of body's composition by multi-frequency BIS (InBody BWA 2.0). Residual congestion was defined as the ratio between extracellular fluid (ECF) and total body water (ECF/TBW) above 38.6% with no evidence of congestion signs by physical examination assessed by cardiologists blinded for BIS data[2]. The primary outcome was a composite of all-cause death, hospitalization or unplanned visit and, up-titration of diuretics due to HF decompensation. Logistic and Cox regression models were used in time-to-event analysis. Data presented as mean ± standard deviation; 95% confidence interval (CI) for hazard ratios (HR) adjusted to potential confounders; $p < 0.05$ was significant.

Results: A total of 56 patients were included in this study with a mean age of 65 ± 12 years; 68% males; 52% non-ischemic HFrEF; 38% diabetes; 57% hypertension; 84% dyslipidemia; 74% chronic kidney disease. The mean ECF/TWB was 39.1 ± 1.7%; 42% patients had residual congestion, while 28% were euvolemic at baseline. During the mean follow-up time of 6 ± 1 months the primary outcome occurred in 34% patients (2 deaths, 10 HF hospitalizations/unplanned visits, and up-titration of diuretics in 13 outpatients). In time-to-event analysis, residual congestion was independently associated with the primary outcome after adjusting for sex, age, and cardiovascular risk factors (HR 6.92; 1.01-47.28; p = 0.048).

Conclusions: BIS is a simple and reliable non-invasive technology that improves detection of residual congestion. Residual congestion estimated by BIS is independently associated with a worse prognosis in HF patients.

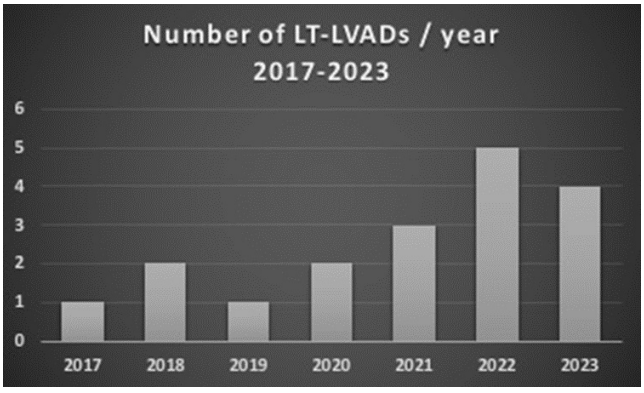
CO 38. HEARTMATE 3™ EXPERIENCE: A SINGLE-CENTER RETROSPECTIVE STUDY

Christopher Strong, Carlos Aguiar, Sérgio Maltês, Bruno Rocha, Catarina Brízido, Márcio Madeira, Tiago Nolasco, Marta Marques, Miguel Sousa Uva, Miguel Abecassis, José Pedro Neves

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction and objectives: The prevalence of advanced heart failure is increasing, thus creating a supply-demand mismatch limiting access to its gold standard therapy - heart transplantation (HT). Long-term left ventricular assist devices (LT-LVAD) – HeartMate 3 (HM3), are nowadays an established therapy to fill the gap left by the shortage of donors. The first HM3 implant in Portugal was in 2017, and since then 34 LT-LVAD surgeries have been performed across the country. We aimed to describe our single-center experience in HM3 implantation.

Results: During the 6-year period (2017-2023), 18 patients underwent HM3 implantation (median days on LT-LVAD support 415 [248-670]), with a progressive annual increase in the number of implantations/year (Figure). 3 additional patients who had the surgery abroad were followed at our center. Mean age 5,512 years, 81% males (n = 21). 10 patients had the device placed as bridge to HT, 7 as bridge to candidacy to HT (most for severe pulmonary hypertension) and 4 as destination therapy. Most patients were on INTERMACS profiles 2 or 3 (n = 14) at the time of LT-LVAD surgery. One patient suffered severe right heart failure early after surgery with need for short-term right VAD. The most frequent complication after HM3 implantation has been VAD-specific infection (percutaneous driveline infections) - 8 episodes with need for hospital admission, followed by gastrointestinal bleeding (4 episodes). Intracranial bleeding occurred in 3 patients, 2 with good functional outcome. There were no thrombotic complications among our cohort. During follow-up, 9 patients subsequently underwent a heart transplant (median 581 [375-712] days after HM3 surgery). 4 patients died while on HM3 support, 2 of them from complications related to VAD-specific infections.



Conclusions: HM3 is increasingly being implanted in Portugal, serving as a potentially life-saving therapy in those that cannot wait or have a reversible contraindication for HT, or that are not eligible for HT. Despite the advances in LT-LVAD technology, the burden of adverse events remains significant, not that different, however, from those experienced after HT. Our results reflect those reported in recent literature.

CO 39. OPTIMAL TIMING OF CRT IMPLANTATION IN HEART FAILURE - A COMPARATIVE ANALYSIS OF LVEF RECOVERY AND DEVICE IMPLANTATION

Catarina Gregório[1], Diogo Ferreira[2], Daniel Cazeiro[2], Ana Beatriz Garcia[1], Fátima Salazar[3], Nuno Lousada[2], Joana Rigueira[1], Rafael Santos[1], Doroteia Silva[1], Fausto J. Pinto[1], Dulce Brito[1], João R. Agostinho[1]

[1]Department of Cardiology, Centro Hospital Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa. [2]Department of Cardiology, Centro Hospital Universitário Lisboa Norte, CAML, Faculdade de Medicina, Universidade de Lisboa. [3]Centro Hospitalar de Lisboa Norte, EPE/Hospital de Santa Maria.

Introduction: Guidelines recommend implanting a cardiac resynchronization device (CRT) in patients with Heart Failure and Reduced Ejection Fraction (HFrEF) with left ventricle ejection fraction (LVEF) ≤ 35% despite optimized medical therapy (OMT) for 3 months and left bundle branch block (LBBB) and QRS duration ≥ 150 ms (Class I) or QRS ≥ 130 ms (Class IIa) or another intraventricular conduction delay and QRS ≥ 150 ms (Class IIa).However, there is growing debate that CRT may be considered before the 3 months threshold overlooking the role of OMT.
Objectives: To compare the LVEF at one year and outcomes of two groups of patients: those with baseline LVEF ≤ 35% and potential Class I or IIa indication for CRT who experienced LVEF improvement to > 35% at the 3-month follow-up and those who maintained LVEF ≤ 35% and had a Class I or IIa indication for CRT and that actually underwent CRT implantation.
Methods: Single-center, observational, retrospective study that included 2 groups of patients with the characteristics described above. T-test was used to compare mean LVEF at baseline and 3 months and 1 year after OMT. Kaplan-Meier survival analysis was conducted to study prognosis impact.
Results: Out of a cohort comprising 154 HFrEF patients, 39 had a baseline LVEF ≤ 35% and a potential Class I or IIa indication for CRT implantation. Twenty-four percent were female with an average age of 64.3 ± 14.2 years. At three-months after OMT, 41.1% of these patients improved to a LVEF > 35%. Mean baseline LVEF in this subgroup was 28.3% and significantly improved to a mean LVEF of 39.5%. At 1-year these patients had a mean LVEF of 38.6% under OMT. The remaining 58.9% of patients maintained a LVEF ≤ 35%. These patients started with a mean baseline LVEF of 25.3% and achieved a mean LVEF of 31.7% at 3-months. All proceeded to CRT implantation. At 1-year this subgroup significantly increased LVEF to a mean of 43.4%. The subgroups had similar age, baseline eGFR, NYHA class and NT-proBNP. There was not a statistically significant difference in LVEF at 1-year after OMT between the two subgroups (p = NS). When comparing a composite outcome of all-cause death and HF-hospitalizations at two years follow-up, patients with CRT had similar results to the patients with OMT alone (p = NS).
Conclusions: Patients with HFrEF with a baseline LVEF ≤ 35% and a potential Class I or IIa indication for CRT benefit from waiting 3 months of OMT before deciding to implant a CRT, sparing a device implantation. As demonstrated, a significant portion of patients improve LVEF after OMT and have similar LVEF and outcomes when compared to patients who actually underwent CRT implantation.

CO 40. HOME INTRAVENOUS DIURETICS: A WAY TO REDUCE HOSPITAL BED USAGE AND URGENT ADMISSIONS

Margarida de Castro, Mariana Tinoco, Filipa Cardoso, Luísa Pinheiro, Tâmara Pereira, Mónica Rebelo, Pedro Gomes, Bebiana Faria, João Português, Filipa Almeida, António Lourenço

Hospital da Senhora da Oliveira, EPE-Guimarães.

Introduction: Heart failure (HF) is often associated with clinical decompensations for volume overload leading to frequent hospitalizations, deterioration of prognosis and high healthcare costs. HF clinics are an effective way for administering IV diuretics in a day-unit setting for ambulatory patients (pts). However, this regimen can be inadequate to advanced end-staged HF pts, dependent on IV diuretics. In our hospital, a program called "home support mobile unit" (HSMU) was implemented to support administration of continuous IV diuretics at the patient´s home, with the assistance of a differentiated nursing team to improve management of fluid retention, pts' quality of life, and reduce readmissions.

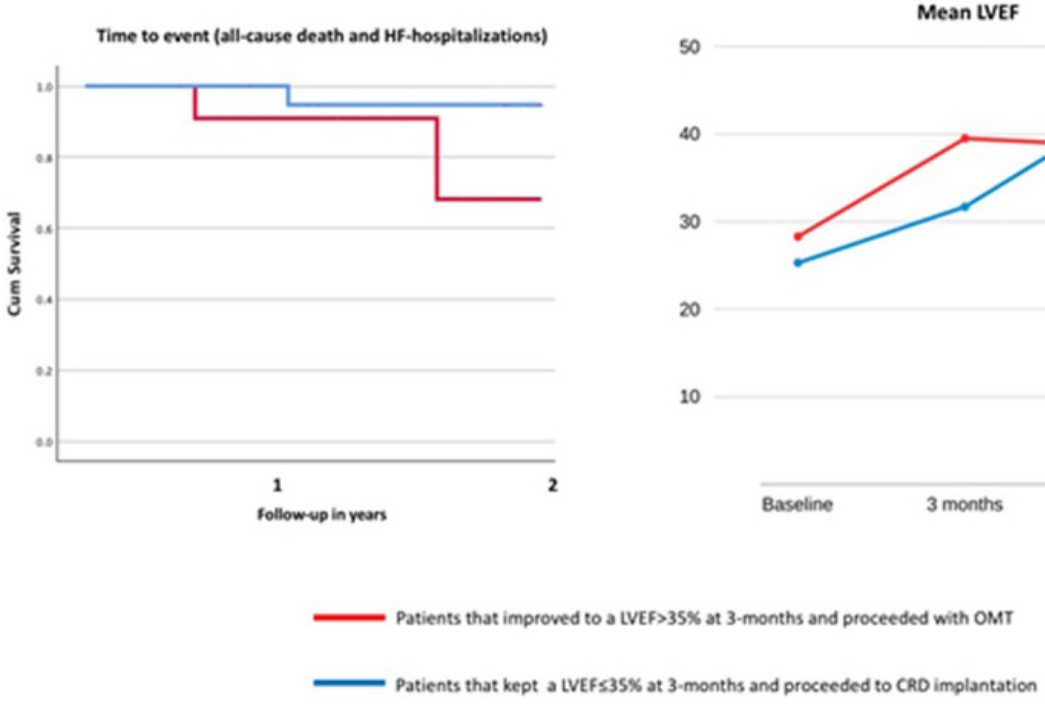


Figure CO39

	% (n)
Mean age	74,9±10,4
Gender	52,4% male
Ejection fraction	34±12
Reduced	66,7 (14)
Preserved	23,8 (5)
Midly reduced	9,5 (2)
Right ventricular dysfunction	52,4 (11)
Pulmonary hypertension	52,4 (11)
HF aetiology	
Ischemic heart disease	38,1 (8)
Previous PCI	14,3 (3)
Previous CABG	14,3 (3)
Mixed heart disease	23,8 (5)
Cardiac amyloidosis	23,8 (5)
Dilated cardiomyopathy	9,5 (2)
Constrictive pericarditis with previous pericardiectomy	9,5 (2)
Valvular heart disease for conservative treatment	4,8 (1)
Predominant right heart failure	4,8 (1)
Cardiac device	47,6 (10)
Dual chamber pacemaker	40 (4)
Cardiac Resynchronization Therapy	30 (3)
Implantable Cardioverter-Defibrillators	30 (3)
Comorbidities	
Chronic kidney disease	90,5 (19)
Class 3	38,9 (7)
Class 4	44,4 (8)
AF	76,2 (16)
Dyslipidaemia	66,7 (14)
Hypertension	61,9 (13)
Diabetes	47,6 (10)
Smoking	33,3 (7)
Obstructive Sleep Apnea Syndrome	28,6 (6)
Chronic Obstructive Pulmonary Disease	23,8 (5)
Obesity	19 (4)
Peripheral artery disease	14,3 (3)
Excessive alcohol intake	9,5 (2)
Neoplasm	9,5 (2)

HF – heart failure; PCI - percutaneous coronary intervention; CABG - coronary artery bypass graft; AF – atrial fibrillation;

Figure CO40

Objectives: To describe our experience with HSMU for IV diuretic administration and to evaluate safety and effectiveness in reducing urgent visits and hospitalizations for decompensated HF (DHF).
Methods: Retrospective study including pts who received IV diuretics at home through HSMU between May 2018 and Nov 2023. Pts were proposed for HSMU by the cardiologist and HF specialist in the presence of recurrent admission due to DHF, dependence of IV diuretics, persistent NYHA class III-IV and not candidate to heart transplant. Continuous diuretic IV infusions were administrated through a long lasting peripheral catheter. At least one weekly visit by a nurse team was performed. Clinical status, vital signs and weight were routinely accessed and communicated to the cardiologist. Medical appointments and blood tests were performed as necessary. All data were collected in pts' electronical records.
Results: We included 21 pts. Data characterizing this population is presented in the Table. The median length of stay at HSMU was 57 (IQR 15-150) days with a median of 19 (IQR 6-70) team visits performed. The majority of pts received IV diuretics through continuous infusion (90.5%; n = 19). Median cumulative IV dose was 190 (IQR 110-230) mg per day. No major complications were reported. A significant reduction in HF hospitalizations was noted after entry into HSMU - 4 (IQR 2-6) in the previous year vs. 1 (IQR 1-2) during program, p < 0.001) as well as urgent HF visits – 4 (IQR3-10) vs. 1 (IQR 1-2), p < 0.001). Median time for first hospitalization after HSMU was 3.5 (IQR 4-9) months and for first HF visit was 2 (IQR 1-9) months. Cardiovascular mortality was 95.2% (n = 20). There were no significant differences in the NYHA class neither in the BNP, sodium and potassium levels during treatment.
Conclusions: This is, to our knowledge, one of the first programs to allow administration of IV diuretic therapy, including by continuous infusion, at home. Despite the challenges encountered and recognizing the relatively small number of pts enrolled, this program has demonstrated that diuretic therapy can be delivered safely and effectively in the home health setting and can improve pts experience outcomes while reducing readmissions.

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00.

Neptuno 1 | Comunicações Orais - Sessão 09 - Síndrome coronária aguda 1

CO 41. PRE-TREATMENT WITH UNFRACTIONATED HEPARIN ALONGSIDE ASPIRIN AND A P2Y12 INHIBITOR IN ST-ELEVATION MYOCARDIAL INFARCTION PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION

Bernardo Lisboa Resende, Gonçalo Ferraz Costa, Rafaela Fernandes, Tomás M. Carlos, Ana Luísa Silva, Luísa Gomes Rocha, Mafalda Griné, Tatiana Santos, Gonçalo Terleira Batista, Mariana Simões, João Gameiro, Lino Gonçalves

Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Acute ST-Elevation Myocardial Infarction (STEMI) is a medical emergency that requires prompt reperfusion therapy. Although percutaneous coronary intervention (PCI) is recognized as the standard treatment, the STEMI periprocedural pharmacological management remains a topic of debate. Upstream pre-treatment with unfractionated heparin (UFH) alongside double antiplatelet therapy (DAPT), especially with aspirin (ASA) and a P2Y12 inhibitor (iP2Y12), in pre-hospital setting is a possible approach, however evidence supporting this option is limited.
Objectives: Conduct a Systematic Review and Meta-Analysis to evaluate the efficacy and safety of triple antithrombotic therapy pre-treatment (UFH + ASA + iP2Y12) versus pre-treatment DAPT (ASA + iP2Y12) followed by periprocedural UFH in STEMI patients undergoing PCI.

Methods: We systematically checked the Cochrane Controlled Register of Trials, EMBASE and PubMed for both interventional and observational studies comparing UFH pre-treatment alongside ASA and iP2Y12 administration versus pre-treatment DAPT with delayed UFH. Primary outcomes were all-cause mortality and major bleeding events. Secondary endpoints were spontaneous reperfusion (pre-PCI TIMI flow 2-3) and in-hospital cardiogenic shock. Our meta-analysis was conducted on a random effects model, considering a 95% confidence interval.

Results: Of the 628 records from our search strategy, 8 studies were included, providing a total of 55,599 patients. Our meta-analysis revealed a lower all-cause mortality within the pre-treatment group (pooled odds ratio (OR) 0.59 [0.45, 0.77], p < 0,01, I^2 = 78%), albeit with heterogeneity. In a subgroup analysis, 30-day and 1-year mortality also showed statistical significance (pooled OR 0.67 [0.47, 0.96], p < 0.01, I^2 = 85% and pooled OR 0.44 [0.35, 0.54], p = 0.86, I^2 = 0%, respectively). There was no statistical significance in in-hospital mortality (pooled OR 0.66 [0.38, 1.16], p = 0.24, I^2 = 30%) and major bleeding (pooled OR 0.92 [0.78, 1.09], p = 0.48, I^2 = 0%), despite a tendency favouring the pre-treatment group in both outcomes. The pre-treatment strategy exhibited a higher rate of spontaneous reperfusion (pooled OR 1.67 [1.43, 1.96], p < 0.01; I^2 = 78%) and significant lower in-hospital cardiogenic shock (pooled OR 0.66 [0.58, 0.76], p < 0.33, I^2 = 13%).

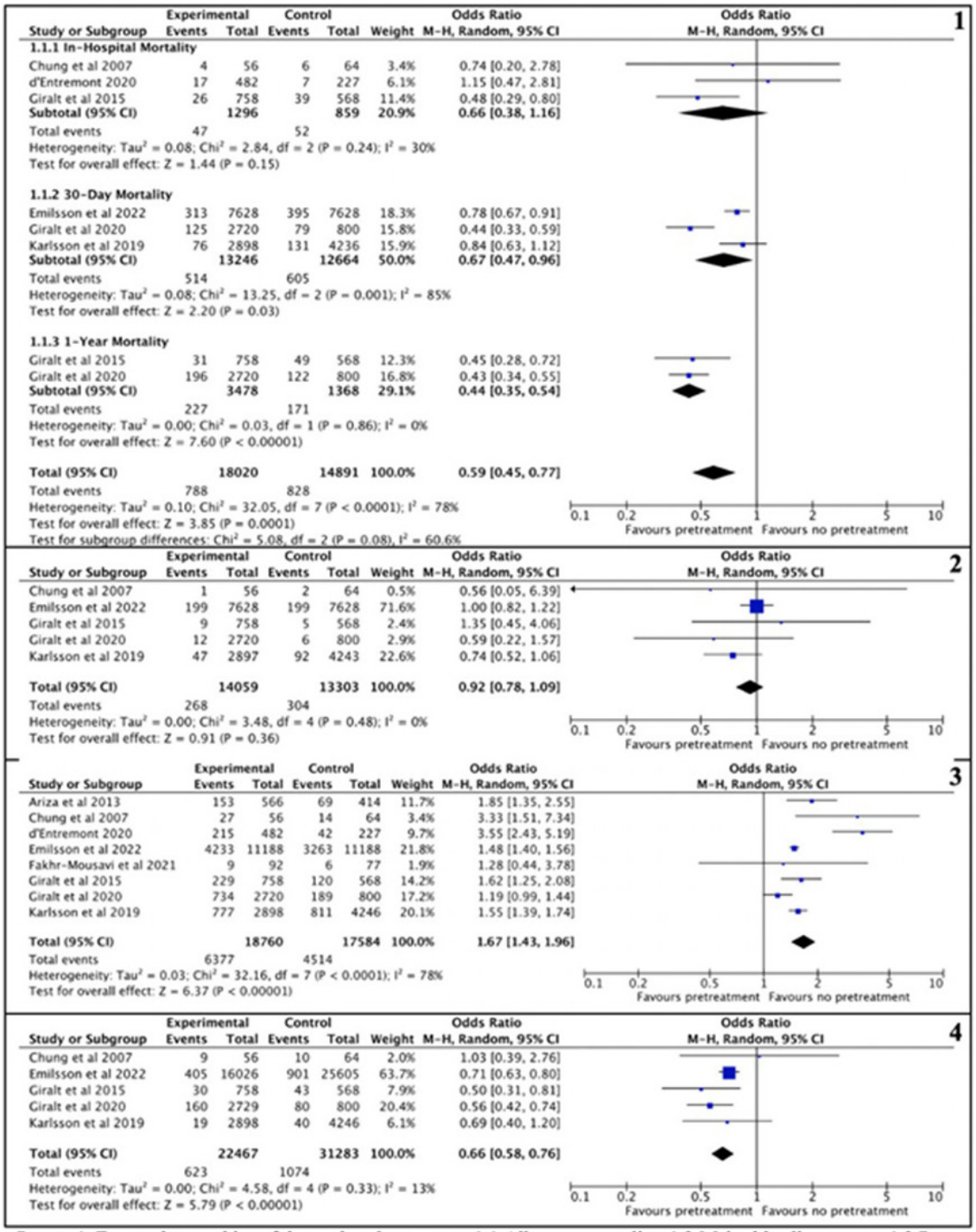


Image 1. Forest plot graphics of the analysed outcomes. 1.1 All-cause mortality; 1.2 Major bleeding events; 1.3 Pre-percutaneous coronary intervention TIMI 2-3; 1.4 In-hospital cardiogenic shock.

Conclusions: Our study suggests the benefit and safety of upstream UFH treatment alongside ASA and iP2Y12 for STEMI patients undergoing primary PCI.

CO 42. SEX DISPARITIES IN MID-TERM OUTCOMES OF ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION ACROSS AGE

Mariana Pereira Santos, David Sá-Couto, André Alexandre, Andreia Campinas, Diana Ribeiro, Raquel Baggen Santos, Bruno Brochado, João Silveira, André Luz, Severo Torres

Centro Hospitalar Universitário do Porto, EPE/Hospital Geral de Santo António.

Introduction: Women with ST-segment elevation myocardial infarction (STEMI) have been reported to have higher short-term mortality than men, especially younger patients. However, data on long-term outcomes did not corroborate this association.
Objectives: We aimed to evaluate if sex was a predictor of major adverse cardio-cerebrovascular events (MACCE) at 1-year follow-up when corrected to other clinical and demographic characteristics. A sub-analysis across different age subgroups was performed.
Methods: We retrospectively studied consecutive STEMI patients treated by primary percutaneous coronary intervention (PCI) from January 2008 to December 2017. Cox proportional hazard models were used to identify predictors of MACCE at 1-year follow-up (death, cerebrovascular accident, new myocardial infarction in any vessel, or target lesion revascularization). Patients were divided into four age groups, according to quartiles, for subgroup analysis (≤ 50, 51-60, 61-70, > 71 years).
Results: Of the 1,131 patients included in the study, 291 (25.7%) were women. Women were older [68.2 (± 14.2) vs. 60.6 (± 12.2) years, p < 0.001], more often non-smokers (21.5% vs. 60.2%, p < 0.001), and had a higher prevalence of diabetes (34,8% vs. 20.9%, p < 0.001) and hypertension (71.6% vs. 50.2%, p < 0.001). They also had lower haemoglobin [12.8 (± 1.6) vs. 14.5 (± 1.7) g/dl, p < 0.001] and lower creatinine clearance at admission [73.8 (± 35.3) vs. 92.6 (± 35.2) ml/min, p < 0.001], as well as longer door-to-balloon times [90(60-166) vs. 75 (50-120) min, p = 0.005]. Total ischemic time was not significantly different between groups [250 (175-480) vs. 224 (150-440) min, p = 0.054]. Overall, women had a higher occurrence of MACCE (22.1% vs. 15.4%; log-rank p = 0.008). On multivariate analysis, sex was not found to be an independent predictor of MACCE (HR 1.12; 95%CI 0.77-1.65; p = 0.547). The risk of unfavourable outcomes was mainly driven by other comorbidities (namely, age, presence of peripheral arterial disease, lower haemoglobin concentration, lower systolic blood pressure on admission, a higher peak CK activity, and the utilization of a femoral approach). When MACCE was stratified for age, sex was not an independent predictor of MACCE in any age group (Figure).
Conclusions: Women with STEMI submitted to PCI had a higher rate of MACCE at 1-year follow-up compared with men, however, sex was not an independent predictor of these events on multivariate analysis, regardless of the age subgroups considered.

CO 43. CLINICAL VERSUS ALGORITHMIC PREDICTION OF OBSTRUCTIVE CORONARY ARTERY DISEASE – THE CASINO STUDY

Mariana Sousa Paiva, Rita A. Carvalho, João Presume, Sérgio Maltês, Catarina Brízido, Liliana Marta, Sérgio Madeira, Daniel Matos, Francisco Moscoso Costa, Marisa Trabulo, Jorge Ferreira, António M. Ferreira

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: The estimation of pretest probability (PTP) is a key step when evaluating patients with suspected coronary artery disease (CAD). Current European guidelines recommend using an algorithm based on age, sex, and symptom typicality. However, many cardiologists do not regularly use this method, relying instead on overall clinical impression. The aim of this study was to compare clinical and algorithmic prediction of obstructive CAD in a set of symptomatic patients with suspected chronic coronary syndrome (CCS).
Methods: In this survey study, 10 cardiologists from a tertiary center were asked to estimate the probability of obstructive CAD (on a scale of 1-99% and without the aid of any score or algorithm) for 100 anonymized clinical vignettes of outpatients who underwent diagnostic workup for suspected CCS. The provided information included age, sex, symptom description, cardiovascular risk factors, known comorbidities, and history of peripheral and/or cerebrovascular disease. Whenever non-invasive tests had been performed, physicians were asked to estimate the probability of obstructive CAD before and after knowing the test results. Obstructive CAD was defined as diameter stenosis ≥ 50% confirmed by invasive coronary angiography.
Results: Among the 100 included patients (52 women, mean age 60 ± 10 years), symptoms consisted of chest pain in 88 and dyspnea in the remainder. After diagnostic workup, the observed prevalence of obstructive CAD was 12% (n = 12). The median PTP of obstructive CAD was 13% (IQR 6-24) according to the ESC algorithm, yielding good calibration (predicted

Figure 1 - Forest plot showing multivariate Cox regression analysis of the effect of sex (female) on MACCE in different age groups.

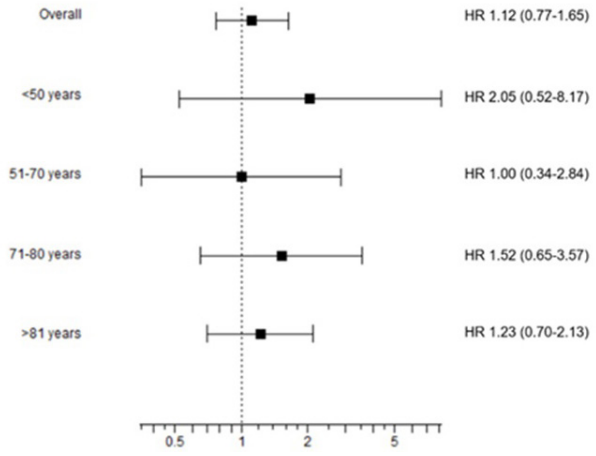


Figure CO42

Figure 1A - Pretest probability according with the ESC algorithm versus the Cardiologists

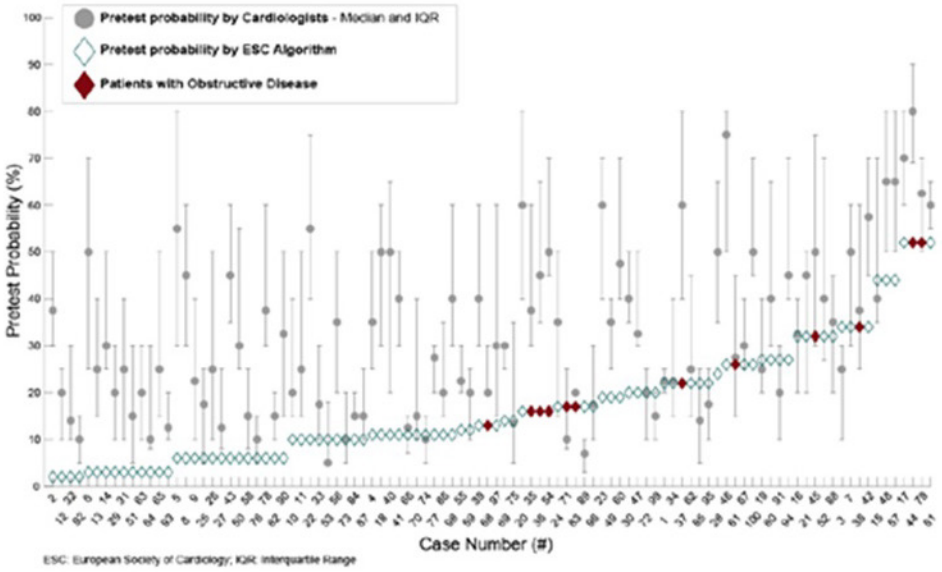


Figure 1B – Receiver operating characteristics curves for the ESC algorithm versus the Cardiologists

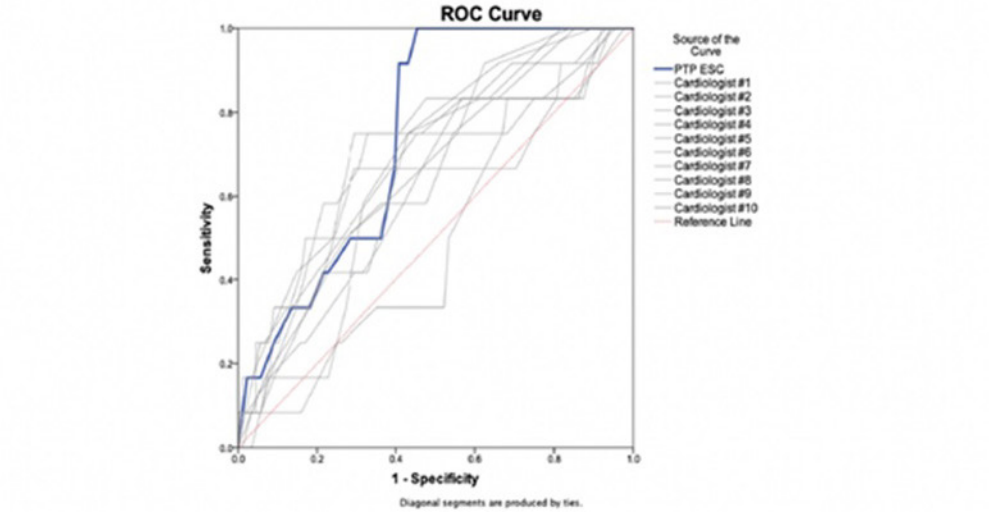


Figure CO43

vs. observed p = 0.766). Clinical estimates of PTP varied widely between cardiologists, were significantly higher than algorithmic likelihoods (median 33%, IQR 23-48%, p < 0.001 for the comparison), and significantly overestimated the presence of obstructive CAD (predicted vs. observed p < 0.001) (Figure 1A). The ESC algorithm showed good discriminative power to identify patients with obstructive CAD (C-statistic 0.74, 95%CI 0.63-0.86, p = 0.006), whereas the C-statistic for clinicians ranged from 0.50 to 0.72 (average 0.65 ± 0.06) (Figure 1B) (p values for individual comparisons 0.045-0.700). In the subset of 58 patients with prior non-invasive tests, clinicians significantly changed their predictions after knowing test results (mean absolute difference 21% ± 5%, p < 0.001), but that change did not improve their discriminative power significantly (mean change in C-statistic of 0.01 ± 0.11, p = 0.810).

Conclusions: Clinicians tend to overestimate the likelihood of obstructive CAD and, despite using more clinical data, they fail to outperform a simple algorithm using only age, sex, and symptom typicality. The systematic use of this tool should be promoted in order to improve disease prediction and guide non-invasive testing.

CO 44. OPTIMIZING COMPLETE REVASCULARIZATION STRATEGY IN STEMI: INSIGHTS FROM A REAL-WORLD SINGLE-CENTER ANALYSIS

Catarina Simões de Oliveira[1], Ana Margarida Martins[1], Ana Beatriz Garcia[1], Miguel Raposo[1], Ana Abrantes[1], Sofia Esteves[1], Inês Araújo[1], Cláudia Jorge[2], Miguel Nobre Menezes[2], João Silva Marques[2], Pedro Pinto Cardoso[2], Fausto J. Pinto[2]

[1]Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, Faculdade de Medicina, Universidade de Lisboa.
[2]Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Complete revascularization in ST-segment elevation myocardial infarction (STEMI) improves outcomes. However, the optimal timing of non-culprit lesions revascularizing remains undefined. The recent MULTISTARS trial

Hypertension	76.8%
Diabetes	29.3%
Dyslipidemia	50.4%
Smoking history	
Former	12.8%
Current	46.1%
Previous PCI	4.9%
MI location	
Anterior	147 (42.6%)
Lateral	21 (6.1%)
Inferior	166 (48.1%)
Posterior	7 (2%)
LVEF	49%

Table I: Patients characteristics.

MI myocardial infarction; **LVEF** left ventricular ejection fraction

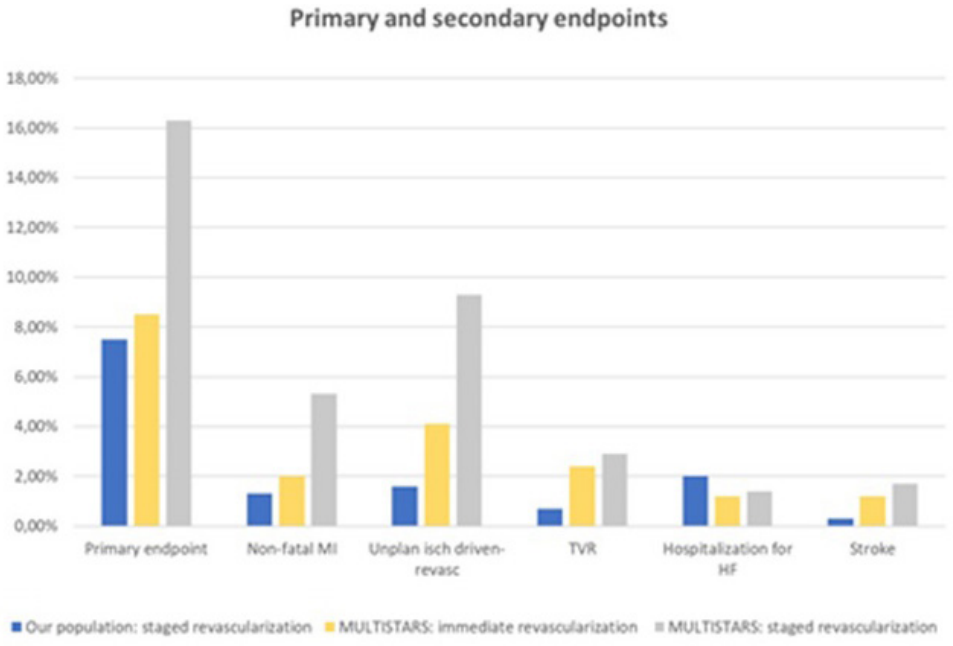


Figure 1: Primary and secondary endpoints.

MI myocardial infarction; **Unplan isch driven-revasc** unplanned ischemia driven-revascularization; **TVR** target vessel revascularization; **HF** heart failure

Figure CO44

reported better outcomes for immediate complete revascularization in the index procedure compared to non-culprit-deferred treatment.
Objectives: As MULTISATRS strategy does not reflect our current practice we sought to describe and compare the results of our early non-culprit deferred revascularization strategy with those reported in the trial.
Methods: Single-center observational study of consecutive patients (pts) with STEMI and multivessel disease in whom a staged procedure aiming complete revascularization was done between 2014 and 2022. Patients presenting in cardiogenic shock and those with non-culprit chronic total occlusions or stent restenosis were excluded. Primary endpoint was defined as a composite of death from any cause, nonfatal MI, unplanned ischemia-driven revascularization, and hospitalization for heart failure (HF) at one year and was prospectively assessed in pts that underwent angioplasty of a non-culprit lesion in the deferred procedure.
Results: A total of 345 pts met inclusion criteria. The characteristics of the pts (Table) did not significantly differ from those included in the MULTISTARS trial. The majority presented with inferior (48%) or anterior (42.6%) STEMI. Almost one third of the patients had more than one non-culprit severe lesions (27.8%). Median time to deferred procedure was 5 days vs. 37 days in the MULTISTARS trial. Most pts (94.2%) received complete revascularization during the index hospitalization (median length of stay 7 days). In the deferred procedure, the non-culprit lesion was not treated in 11% of the pts after angiographic (n = 21) or functional (n = 28) assessment. The primary endpoint occurred in 7.5% of our staged early revascularization group, compared with 8.5% in the MULTISTARS immediate group and 16.3% in the staged group (Figure). Regarding the individual components of the primary endpoint, nonfatal MI in our population (1.3%) was similar to the immediate revascularization group (2%) and inferior to the staged group (5.3%), while unplanned ischemia-driven revascularization was lower compared to the two MULTISTARS groups (immediate 4.1% vs. staged 9.3%).
Conclusions: The results of our staged early revascularization group were comparable to the immediate revascularization arm of the MULTISTARS trial. Until we have randomized data, our results are reassuring that an early staged complete revascularization strategy in STEMI may be safe and effective. Additionally, this strategy may avoid 10% of unnecessary interventions.

CO 45. CORONARY ARTERY ANEURISMS PRESENTING AS ACUTE CORONARY SYNDROME - ANTICOAGULATION THERAPY OR ANTIPLATELET THERAPY ALONE?

Ana Raquel Carvalho Santos, André Ferreira, André Grazina, Tiago Mendonça, Inês Rodrigues, Luís Morais, Tiago Pereira da Silva, Ruben Ramos, Lídia Sousa, António Fiarresga, Duarte Cacela, Rui Ferreira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Optimal treatment for coronary artery aneurisms (CAA) remains debatable. Studies evaluating oral anticoagulation therapy versus antiplatelet therapy (APT) alone have been contradictory, without specific recommendations for the management of these patients (pts).
Objectives: Evaluate differences in outcomes in pts with CAA presenting as acute coronary syndrome (ACS) treated with OAT versus APT alone.
Methods: A retrospective, single centre analysis was made including pts admitted with ACS and CAA in angiography. Data were collected regarding pts evaluation, management and follow-up. Descriptive statistics are presented as absolute frequency (number) and relative frequency (percentage) for categorical variables and as median and interquartile range (IQR) for continuous variables. When testing hypothesis, Chi-squared and Fisher's exact test was performed. A p value of 0.05 was considered statistically significant.
Results: From 2004 to 2023, 5,020 pts were admitted for primary angioplasty, with 0.66% (n = 33) presenting CAA. Of the pts with CAA, 69.7% were male with a median of 66 years old (59-73). Right coronary artery was the main location of CAA (63.7%), followed by anterior descendant artery (30.3%). One vessel disease was present in 45.5% of pts, two vessels in 24.2% and three in 30.3%. The culprit lesion was the aneurismatic vessel in 87.9% of cases. A complete revascularization was possible only in 36.4% of cases, although an adequate revascularization was achieved in 72.7% of cases, with stent implantation in 72.7% of cases. During follow up, 24.2% of pts died in 5 years. A new ACS occurred in 12.2% of pts and 39.4% had at least one hospitalization in 10 years (median 2 years [1-7]). Coronary review was made in 18.2% of pts, 9.1% with a new stent implantation and 3% requiring cardiac surgery. After diagnosis,

30.3% were under OAT with direct anticoagulants. Pts under OAT died less (p = 0.03) than pts under APT alone. In our population there was no significant statistical difference between groups for hospitalization or new ACS.
Conclusions: Knowledge pertaining to the natural history, assessment, and interventional treatment of CAA is essential to achieve optimal results. Due to its low incidence, it is difficult to have evidence-based management strategies to deal with this uncommon but complex condition. In our population of CAA with presentation as ACS, pts treated with OAC versus antiplatelet therapy alone, had less mortality.

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00.

Neptuno 2 | Comunicações Orais - Sessão 10 - Imagem em Cardiologia

CO 46. CLINICAL SIGNIFICANCE OF RIGHT VENTRICULAR PULMONARY ARTERIAL UNCOUPLING IN HYPERTROPHIC CARDIOMYOPATHY

Ana Teresa Timóteo, Sílvia Aguiar Rosa, Luísa Moura Branco, Ana Galrinho, Pedro Rio, Rui Cruz Ferreira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Right ventricular (RV) – pulmonary arterial (PA) coupling represents the relationship between RV function and afterload in the pulmonary vascular system. It is a non-invasive surrogate on how the RV is adapted to an increased afterload in the pulmonary circulation. With exhaustion of compensatory RV remodeling, the ratio decreases and there is RV-PA uncoupling. It is a useful parameter in patients with heart failure, including in preserved ejection fraction. There is no evidence regarding the association between RV-PA coupling and hypertrophic cardiomyopathy (HCM). We aimed to evaluate this parameter in patients with HCM.
Methods: This prospective cohort study enrolled patients with HCM without obstructive epicardial coronary artery disease, that underwent a comprehensive evaluation. Echocardiography was used to assess RV-PA coupling as the ratio of tricuspid annular plane systolic excursion (TAPSE) to pulmonary artery systolic pressure (PASP). In addition, coronary flow reserve in the left anterior descending artery (CFR_LAD) was also evaluated: diastolic coronary flow velocity was measured in basal conditions and in hyperemia and CFR was calculated as the ratio of hyperemic and basal peak diastolic flow velocities. This was used as a surrogate marker of coronary microvascular dysfunction. Functional capacity was evaluated by cardiopulmonary exercise testing (CPET). Cardiac magnetic resonance (CMR) was also performed to evaluate RV function (volumes and ejection fraction), and the extent of late gadolinium enhancement (LGE) in the left ventricle (LV).
Results: We enrolled 62 patients, with a mean age of 55 (15) years, 64% males. In 64% it was an asymmetrical septal hypertrophy phenotype, in 31% an apical hypertrophy, and in 27%, it was an obstructive HCM. Mean TAPSE/PASP was 0.556 (0.23) and median was 0.50. All patients had a normal LV ejection fraction. TAPSE/PASP showed a modest predictive accuracy for peak VO2 < 20 ml/Kg/min, a marker of decreased functional capacity (AUC 0.671, 95%CI 0.535 – 0.807, p = 0.022), with the best cut-off set at 0.60 (sensitivity 85% and specificity 47%). Multivariable linear regression analysis showed that the independent predictors of peakVO2 were male gender (b-estimate: 0.305, p = 0.002), age (b-estimate: - 0.323, p = 0.002), RV indexed end-diastolic volume (b-estimate: 0.200, p = 0.043) and TAPSE/PASP (b-estimate: 0.275, p = 0.005). In addition, independent predictors of TAPSE/PASP were the CFR_LAD (b-estimate: 0.378, p = 0.001) and the extent of LGE in the LV (b-estimate: - 0.357, p = 0.005).
Conclusions: In patients with HCM, RV-PA uncoupling is associated with heart failure symptoms. Furthermore, the presence of coronary microcirculation abnormalities and the extent of LGE in the LV are independent predictors of RV-PA uncoupling. Therefore, it is associated with markers of disease severity (fibrosis and functional capacity).

CO 47. CAN WE BETTER SELECT PATIENTS WITH CRYPTOGENIC STROKE FOR IMPLANTABLE LOOP RECORDERS? - THE IMPORTANCE OF ATRIAL STRAIN AS A PREDICTOR OF SUBCLINICAL ATRIAL FIBRILLATION

Margarida de Castro, Mariana Tinoco, Luísa Pinheiro, Catarina Gonçalves, Joana Gomes, Marina Fernandes, Olga Azevedo, Lucy Calvo, Sílvia Ribeiro, João Português, Victor Sanfins, António Lourenço

Hospital da Senhora da Oliveira, EPE - Guimarães.

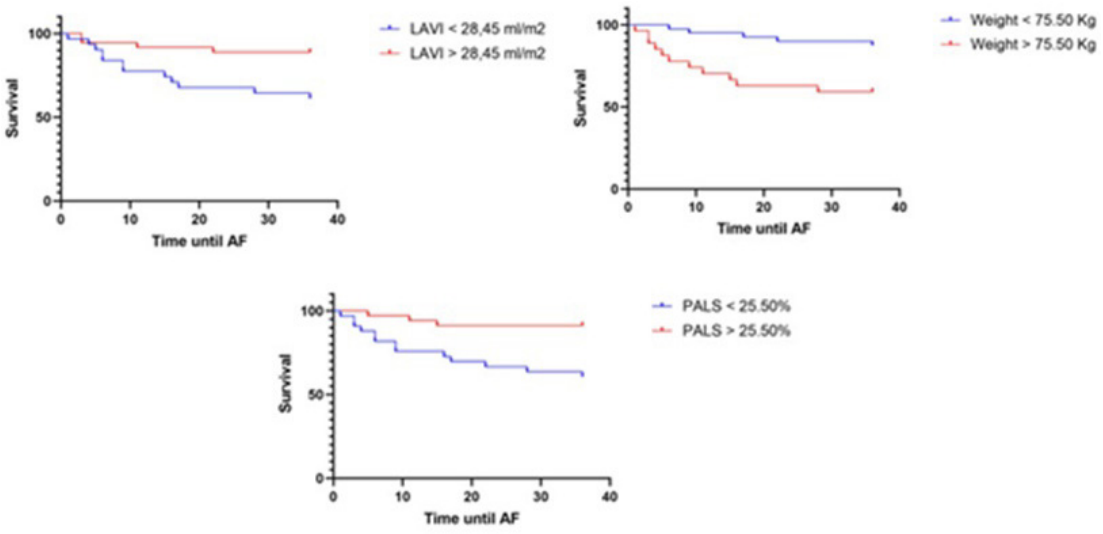


Figure 1 - Kaplan–Meier curves for AF-free survival at 36 months.
Cumulative probability of subclinical AF diagnosis not occurring over time according to Global PALS, LAVI and Weight.
AF = Atrial Fibrillation; PALS = Peak Atrial Longitudinal Strain; LAVI = Left Atrial Volume Index;

Figure CO47

Introduction: Studies using Implantable Loop Recorders (ILR) have reported AF detection rates surpassing 17% in Cryptogenic Stroke (CS). Peak Atrial Longitudinal Strain (PALS), also known as reservoir atrial strain, has emerged as a marker of Left Atrial (LA) fibrosis and proposed as a potential predictor of subclinical AF in patients (pts) with CS. We sought to clarify if PALS was an independent predictor of subclinical AF in pts with CS who implanted ILR.
Methods: Retrospective study including pts with ILR for investigation of CS aetiology. Subclinical AF diagnosis by ILR was reviewed by an experienced arrythmologist and considered related to CS if detected up to 1 year after CS. Pts with and without subclinical AF were compared regarding clinical and echocardiographic parameters at the time of CS. LA PALS was obtained through 2D-speckle tracking echocardiography on apical 4 and 2 chamber views by two independent operators in order to assess reproducibility through Intraclass Correlation Coefficient (ICC). Regression analyses were performed to find independent predictors of subclinical AF.
Results: We included 67 pts (mean age of 64.42 ± 12.01 years; 59.7% males). Subclinical AF was detected in 24% of pts (N = 16) with a median time until diagnosis of 9 months. Both operators obtained excellent intra-rater (ICC.976 and.951) and inter-rater reliability (ICC 0.919 and 0.915) in PALS assessment. A binary logistic regression showed that pts with subclinical AF had higher weight, dyslipidaemia, and lateral E/e', along with lower global PALS. Through ROC-derived cutoffs, pts with global PALS < 25.50% exhibited a higher rate of subclinical AF in Kaplan-Meier survival analysis with a sensitivity of 0.912 and specificity of 0.392 as well as LA volume index (LAVI) < 28.45 ml/m^2, weight > 75.50 kg, and age > 67.50 years. Univariate and multivariate Cox regression showed that global PALS < 25.50% and LAVI < 28.45 ml/m^2 were independent predictors of increased risk of subclinical AF.
Conclusions: Global PALS < 25.50% and LAVI < 28.45 ml/m^2 were independent predictors of subclinical AF detection by ILR in this cohort. Future studies are needed to validate cutoff values of PALS for AF prediction and confirm that therapeutic decisions based on PALS values result in clinical benefit. This study suggests that PALS may allow a premature diagnosis of atrial cardiomyopathy in a subclinical phase and a better selection of candidates for ILR implantation.

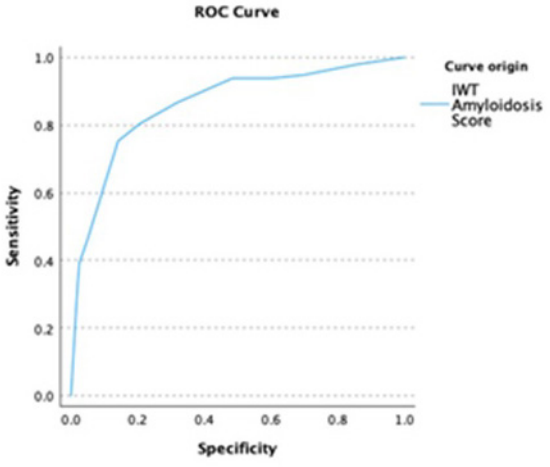
CO 48. ASSESSING THE UTILITY OF THE INCREASED WALL THICKNESS SCORE IN DIAGNOSING ATTR CARDIOMYOPATHY – A VALIDATION STUDY

Miguel Sobral Domingues, Rita Carvalho, Rita Lima, Pedro Freitas, Sérgio Maltez, Tânia Laranjeira, Bruno Rocha, Regina Ribeiras, Carlos Aguiar, António Ferreira

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Cardiac amyloidosis due to transthyretin deposition (ATTR-CM) is often underdiagnosed. An increased left ventricular wall thickness (LVWT) should raise the suspicion for ATTR-CM, but it is a very frequent and non-specific finding. In order to improve diagnostic certainty, an echocardiographic score (Increased Wall Thickness [IWT] score) was recently proposed. The aim of our study was to assess the diagnostic performance of the IWT score in an independent population with increased LVWT.
Methods: We conducted a retrospective analysis of 295 consecutive patients studied at our centre for increased LVWT. All patients with severe aortic stenosis (AS) had ATTR-CM excluded by endomyocardial biopsy (EMB), during aortic valve replacement. ATTR-CM was considered as per the ESC algorithm. To be included, patients with Hypertrophic Cardiomyopathy (HCM) performed cardiac magnetic resonance and required a sarcomeric mutation for definite diagnosis. The echocardiographic IWT score was calculated for all patients, and categorized as certain (IWT ≥ 8), unlikely (IWT ≤ 1) or indeterminate (2 < IWT < 8) for ATTR-CM diagnosis.
Results: A total of 295 patients were included (median age of 75 years [69-81], 61% men). Overall, 230 (70%) patients had hypertension and 164 (56%) chronic kidney disease (CKD). The median LVWT was 16 mm [IQR 15-19] and the median LVEF was 57% [IRQ 50-62%]. After diagnostic workup, 97 patients (33%) had confirmed ATTR-CM, 129 (44%) had isolated severe AS and 71 (24%) had hypertrophic cardiomyopathy (HCM). Fifteen patients had both severe AS and ATTR-CM. The median IWT score was 4 (IQR 2-7), with 21% of patients (n = 64) showing an IWT score ≤ 1, 19% an IWT score ≥ 8, and 60% of patients (n = 176) having an "indeterminate" value between 2 and 7. Despite this, on

Clinical characteristics	Total patients (n=295)
Age – years	75 [69-81]
Female sex – no. (%)	115 (39)
CKD – no. (%)	164 (56)
Hypertension – no. (%)	230 (70)
Diabetes – no. (%)	73 (25)
Main diagnosis	
ATTR-CM – no. (%)	97 (33)
Isolated SAS – no. (%)	128 (43)
HCM – no. (%)	70 (24)
Echocardiography	
LVEF (%)	57 [50-62]
LV wall thickness (mm)	16 [15-19]
IWT score parameters	
- RWT	0.54 [0.45-0.67]
- TAPSE (mm)	20 [16.4-23]
- Lateral E/e'	13.6 [10.1-18.6]
- 4C-Longitudinal Strain	-12.7±4.8
- SAB strain ratio	3.1 [1.9-5.7]



Coordinates of the ROC Curve	Sensitivity	Specificity	+PV	-PV
IWT ≤ 1	95% (95% CI 88-98)	---	---	92% (95% CI 84-97)
IWT ≥ 8	---	96% (95% CI 91-98)	82% (95% CI 72-89)	---
Area Under the Curve (AUC)	0.86 (95% CI [0.82-0.90]), p<0.001			

CKD, Chronic kidney disease; ATTR-CM, cardiac amyloidosis due to transthyretin deposition; SAS, Severe aortic stenosis; HCM, hypertrophic cardiomyopathy; LV, Left ventricle; LVEF, Left ventricle ejection fraction; IWT, Increased wall thickness score; SAB, septal apical/basal; +PV, positive predictive value; -PV, negative predictive value

Figure CO48

a continuous scale, the IWT showed good discriminative value (area under ROC curve 0.86, 95% 0.82-0.90, p < 0.001). The criteria of IWT score ≥ 8 showed a positive predictive value of 82% (95%CI 72-89%), while an IWT score ≤ 1 yielded a negative predictive value of 92% (95%CI 84-97%) (Figure).
Conclusions: Even though the IWT score provides "indeterminate" results in a large proportion of patients, values at the ends of the spectrum showed good negative and predictive values for the diagnosis of ATTR-CM. Our findings provide external validation for this echocardiographic score, and support its use in the diagnostic workup of patients with increased wall thickness and suspected ATTR-CM.

CO 49. RADIOMIC FEATURES OF EPICARDIAL ADIPOSE TISSUE IN AF PROGRESSION

Inês Amorim Cruz[1], Fábio Sousa-Nunes[2], Sílvia O. Diaz[1], João Pedrosa[3], Inês Neves[2], Rafael Teixeira[2], Francisca Saraiva[1], João Almeida[2], João Primo[2], Francisco Sampaio[2], António S. Barros[1], Ricardo Fontes-Carvalho[2]

[1]Faculdade de Medicina da Universidade do Porto. [2]Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE. [3]Universidade do Porto.

Introduction: Obesity is an important risk factor for atrial fibrillation (AF). Improved imaging methods now allow researchers to examine individual adipose tissue storage sites in greater detail. Epicardial adipose tissue (EAT) is a metabolically active tissue unique in its unobstructed proximity to the heart, which could influence the progression of AF. Radiomics is a rapidly developing method of analyzing medical images that allows for noninvasive evaluation of tissue. Our objective was to investigate the radiomic characteristics of EAT that could potentially distinguish between paroxysmal and persistent AF.

Methods: We included all consecutive patients who underwent AF ablation (2017-2021) who performed a CT scan prior to the procedure. The EAT was segmented using a U-Net framework, which is a type of convolutional neural network (CNN) designed specifically for image segmentation. This segmentation was conducted without the use of contrast agents, and a total of 851 radiomic features were extracted using the Pyradiomics software. The radiomic features can be classified into three main categories: shape, first-order (intensity), and texture features. We conducted an exploratory analysis using a univariate logistic regression model, while simultaneously adjusting for age, sex, BMI, hypertension, diabetes, and dilated LA. This analysis used non-transformed radiomic features.
Results: A total of 533 patients were included, 109 (20%) of whom had persistent AF. Compared to patients with paroxysmal AF, those with persistent AF had similar age, sex, diagnostic duration, and comorbidities, except for heart failure. Patients with persistent AF exhibited greater shape-related features, including EAT volume (Mesh Volume, OR 1.38 [95%CI, 1.07-1.79], p = 0.015), maximum 3D diameter (OR 1.32 [95%CI, 1.02-1.72], p = 0.034), and the smallest axis length of EAT (Least Axis Length, OR 1.76 [95%CI, 1.35-2.33], p < 0.001). Additionally, the texture heterogeneity of EAT was found to be higher in patients with persistent AF, characterized by dissimilar intensity gray-level values (Gray-Level Non-Uniformity). On the other hand, the EAT coarseness, which signifies a more uniform texture, was lower in patients with persistent AF (NGTDM-Coarseness, OR 0.60 [95%CI, 0.41-0.84] p = 0.005). In addition, a higher magnitude of attenuation values (First-order-Total Energy, OR 1.31 [95%CI, 1.02-1.68] p = 0.037) was associated with persistent AF.
Conclusions: In this group of patients with atrial fibrillation (AF) who received catheter ablation, it was found that both the volume of epicardial adipose tissue (EAT) and the higher degree of attenuation values within it, as well as the variability in tissue composition of EAT, were related to the persistence of AF.

Characteristic	OR[1]	95% CI[1]	p-value	q-value[2]	*AUC*	*AIC*
Shape – Least Axis Length	1.76	1.35, 2.33	**<0.001**	<0.001	0.723	446
Shape – Maximum 2D Diameter Slice	1.66	1.30, 2.17	**<0.001**	<0.001	0.710	448
Shape - Minor Axis Length	1.55	1.18, 2.05	**0.002**	0.007	0.702	454
GLSZM – Gray-Level Non-Uniformity	1.42	1.12, 1.82	**0.004**	0.014	0.712	455
NGTDM – Coarseness	0.60	0.41, 0.84	**0.005**	0.016	0.705	454
Shape - Flatness	1.45	1.11, 1.91	**0.007**	0.024	0.704	456
GLSZM – Size-Zone Non-Uniformity	1.42	1.10, 1.84	**0.007**	0.025	0.709	457
GLRLM – Gray-Level Non-Uniformity	1.36	1.08, 1.72	**0.010**	0.035	0.708	457
Shape – Voxel Volume	1.40	1.08, 1.83	**0.011**	0.037	0.705	457
GLDM – Gray-Level Non-Uniformity	1.34	1.06, 1.69	**0.013**	0.047	0.706	458
Shape - Mesh Volume	1.38	1.07, 1.79	**0.015**	0.052	0.704	458
Shape – Surface Area	1.38	1.06, 1.80	**0.015**	0.054	0.703	458
GLDM – Dependence Non-Uniformity	1.34	1.06, 1.71	**0.016**	0.057	0.704	458
GLRLM – Run-Length Non-Uniformity	1.32	1.04, 1.67	**0.020**	0.070	0.703	458
Shape – Maximum 3D Diameter	1.32	1.02, 1.72	**0.034**	0.12	0.688	459
First-order – Total Energy	1.31	1.02, 1.68	**0.037**	0.13	0.699	460
Shape - Elongation	1.31	1.01, 1.71	**0.045**	0.13	0.694	460

[1]OR = Odds Ratio, CI = Confidence Interval; [2]False discovery rate correction for multiple testing

N events = 97, due to missing information about covariates

Logistic regression adjusted for age, gender, BMI, hypertension, diabetes and dilated LA

Figure CO49

CO 50. PREDICTORS OF LV REVERSE REMODELING AFTER SAVR: INSIGHTS FROM A PROSPECTIVE TTE AND CMR STUDY IN PATIENTS WITH SEVERE AORTIC STENOSIS

Rita Reis Santos[1], João Abecasis[1], Sérgio Maltês[1], Pedro Lopes[1], Sara Guerreiro[1], Pedro Freitas[1], António Ferreira[1], Regina Ribeiras[1], Victor Gil[2], Nuno Cardim[3], Pedro Adragão[1], José Pedro Neves[1]

[1]Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [2]Hospital da Luz Lisboa. [3]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.

Introduction: Left ventricular (LV) remodeling in patients with severe aortic stenosis (AS) is believed to be reversible after pressure overload relieve, as provided by both surgical (SAVR) or transcatheter aortic valve replacement. However, LV reverse remodeling (RR) is far from uniform in patients with AS and the same clinical indication for treatment.

Objectives: To determine the prevalence and imaging predictors of LV RR after SAVR in patients with severe symptomatic AS.

Methods: single-center, prospective cohort study enrolling 119 patients with severe symptomatic AS (age 71 ± 8y, 49% male; mean transaortic gradient 62 ± 18 mmHg, mean indexed aortic valve area (AVAi) 0.40 ± 0.10 cm^2/m^2, mean LV ejection fraction by TTE 58 ± 9%), with no previous history of ischemic cardiomyopathy, undergoing SAVR between 2019 and 2022. All patients underwent serial imaging assessment beyond clinical characterization (transthoracic echocardiogram – TTE, and 1.5T cardiac magnetic resonance - CMR) prior to surgery and at the 3rd to 6th month post-SAVR. Endomyocardial biopsy (EMB) for myocardial fibrosis quantification (Masson´s Trichrome

Figure 1A

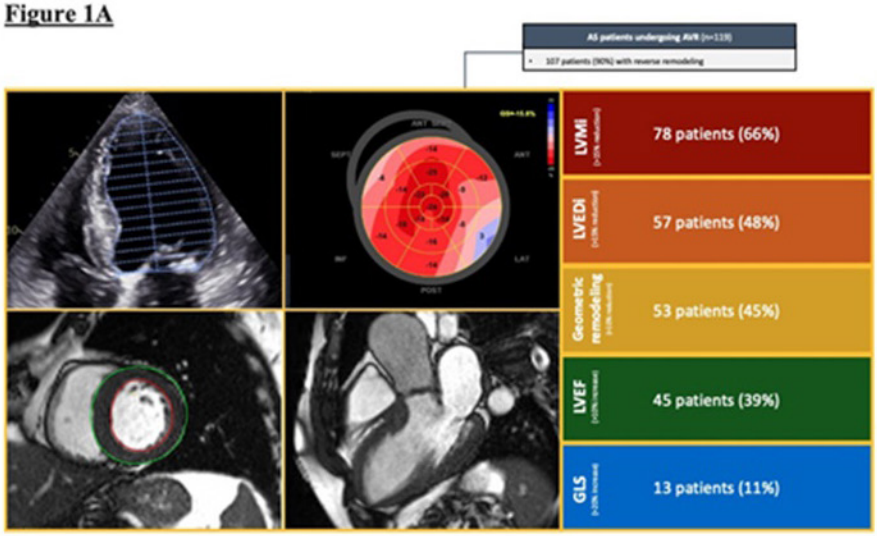


Figure 1B

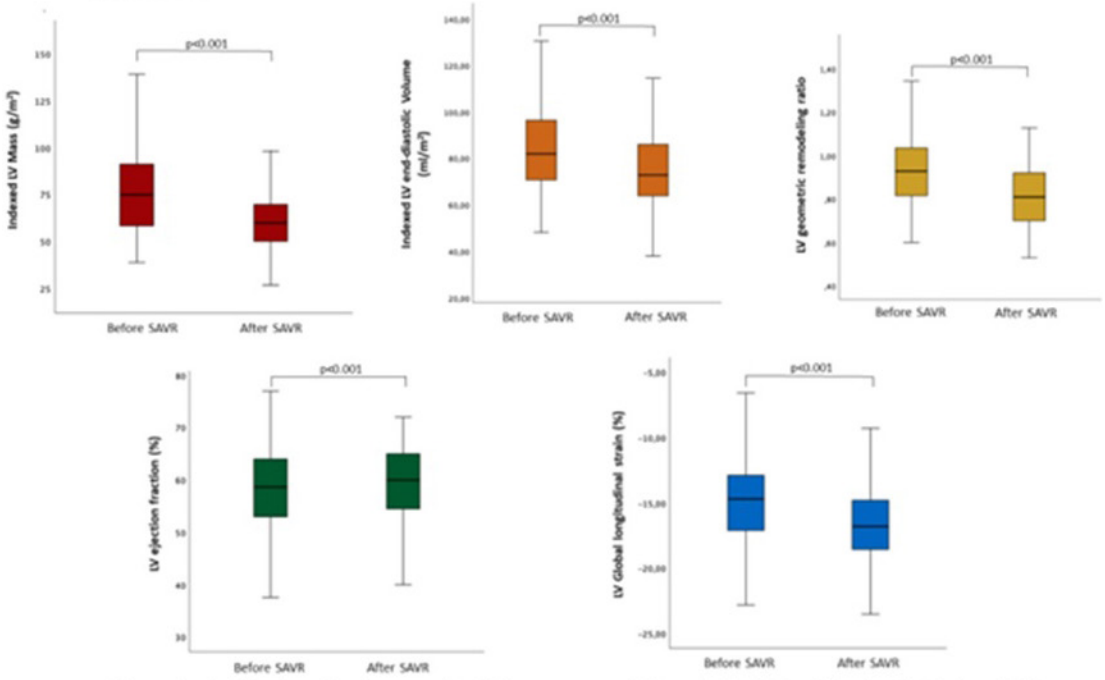


Figure 1: A – Number of patients meeting LV reverse remodeling criteria; **B**: Box Plot showing Indexed LV mass (by CMR), indexed LV end-diastolic volume (by CMR), LV geometric remodeling ratio (by CMR), LV ejection fraction by TTE and global longitudinal strain before and after surgical aortic valve replacement (SAVR).

histochemistry) was performed during SAVR. LV RR was defined when in presence of at least one of the imaging criteria: > 15% reduction in LV end-diastolic indexed volume (LVEDV) by CMR; > 15% reduction in LV indexed mass (LVM) by CMR; > 15% reduction in LV geometric remodeling by CMR; > 10% increase in LV ejection fraction (LVEF) either from TTE or CMR; > 50% increase in global longitudinal strain (GLS) at TTE. Clinical, imaging and histology derived data were compared in patients with post-SAVR LV RR and for each of the defined criteria.

Results: 107 patients (90%) met at least one criteria of LV RR. Morphological criteria were more prevalent than LV functional improvement after SAVR (Figure). In patients who met at least one criteria of LV RR, no differences were found between NT-proBNP, LV tissue characterization (by CMR) or myocardial fibrosis at EMB. Yet, those with LV RR had significantly smaller preoperative AVAi (0.4 ± 0.9 vs. 0.5 ± 0.9 cm^2/m^2, p = 0.007) and higher mean valvular gradients (62 ± 18 vs. 49 ± 12 mmHg, p = 0.017). Considering individual LV RR criteria, patients with higher NT-proBNP levels met LVEF and morphological (LVEDV and LVM) LV RR criteria (p = 0.027, p = 0.016 and p = 0.003, respectively). Patients with higher% of late gadolinium enhancement on pre-operative CMR [7.8 (IQR 2.5-11.3) vs. 1.6 (IQR 0-5.2)%, p = 0.017] had significant GLS improvement after SAVR.

Conclusions: In a cohort of patients with classical severe, symptomatic AS, LV RR is common after SAVR, occurring in almost 9 out of every 10 patients. Both indexes of worse valve narrowing and pre-operative LV adaptation are associated with favorable RR after surgery. This underlines the benefits of a timely intervention even in patients with more advanced disease.

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00

Pegasus | Comunicações Orais - Sessão 11 - Ablação de fibrilhação auricular

CO 51. SAFETY AND EFFECTIVENESS OF PULSED FIELD ABLATION FOR PULMONARY VEIN ISOLATION IN ATRIAL FIBRILLATION PATIENTS: A SINGLE CENTRE EXPERIENCE

Rita Reis Santos, Ana Rita Bello, Pedro G. Santos, Daniel Matos, Gustavo Rodrigues, Mafalda Sousa, Francisco Costa, Pedro Carmo, Francisco Morgado, Diogo Cavaco, Andrea Haas, Pedro Adragão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Atrial Fibrillation (AF) is the most frequent arrhythmia in the world with an exponentially increasing prevalence. Pulmonary veins (PV) are the primary triggering sites for AF and pulmonary veins isolation (PVI) is currently the standard therapy alongside pharmacological treatment and should be considered as first-line treatment. Pulsed-fieldablation (PFA) is

Baseline characteristics	Total population (n=152)
Demographics	
Age (y) (mean ± SD)	63 ± 10
Male gender n (%)	87 (57)
Clinical	
CHA_2DS_2-VASc score (points) (mean ± SD)	2 ± 1
Paroxysmal-AF n (%)	91 (60)
LVEF (%) (median [IQR])	60 [59 - 65]
LAVi (CT scan) (mL/m^2) (median [IQR])	56 [44 – 69]
Redo-ablation n (%)	26 (17)

Procedural characteristics	Total population (n=152)
Posterior Wall ablation n %	63 (41)
Procedure time (median), min	78 [58 - 111]
Fluroscopy time (median), min	12 [8 - 16]
Adverse Events	
Pericardial tamponade n	2
Vascular	
- **Hematoma** n	4
- **Pseudoaneurysm** n	3
- **AV fistula** n	1

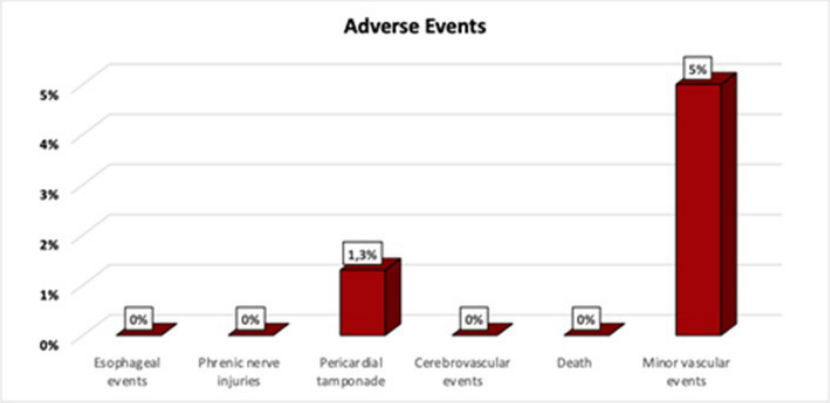


Figure CO51

a novel ablation modality that involves the application of electrical pulses causing cellular death, with preferential tissue specificity.
Objectives: In this study, we evaluated the safety and efficacy of single-shot PFA in AF patients.
Methods: Single-center registry of consecutive patients undergoing PVI using the pentaspline PFA catheter (all with CARTO®3D system v.7 and high-density mapping), between June 2022 and November 2023. Data on demographics, procedural characteristics, and electrocardiographic recurrence (assessed after a 3-month blanking period) were analyzed.
Results: 152 consecutive patients were included (63 ± 10 years, 57% male), with a mean CHA_2DS_2-VASc score of 2 ± 1 points, median LVEF of 60% (IQR 59-65%), and a median CT-scan derived left atrial volume index of 56 mL/m²(IQR 44-69 mL/m²). A total of 40% had non-paroxysmal AF and a redo procedure was performed in 17% of patients. The median procedure time was 78 min (IQR 58-111 min) and fluoroscopy time was 11.6 min (IQR 8.2-15.6 min). Additionally, posterior wall isolation (PWI) was performed in 63 patients (41%). There were no esophageal complications, phrenic nerve injuries, cerebrovascular events, or procedure-related deaths. Two patients (1.3%) experienced acute cardiac tamponade, immediately treated with pericardiocentesis. Other complications were primarily vascular, in 5% of cases (4 femoral hematomas, 3 femoral pseudoaneurysms, 1 arteriovenous fistula). Over 293 (IQR 170 - 394) days of follow-up, considering electrocardiographic recurrence, 12% of patients had AF recurrence (5 with paroxysmal AF and 10 with persistent AF). These patients were older (69 ± 7y vs. 62 ± 11y, p = 0.016), were more likely to undergo a redo procedure (33 vs. 8%, p = 0.004), and had a higher percentage of posterior wall isolation (21 vs. 8%, p = 0.038).
Conclusions: PFA for PVI wall ablation is safe and effective, with 100% intraprocedural technical success, a low rate of complications, and a high percentage of patients free from AF in the short-term.

CO 52. PULSED FIELD ABLATION: A NEW ERA IN ATRIAL FIBRILLATION TREATMENT?

Ana Lobato de Faria Abrantes[1], Ana Margarida Martins[1], Catarina Oliveira[1], Ana Beatriz Garcia[2], Miguel Azaredo Raposo[1], Ana Bernardes[1], Nelson Cunha[2], Afonso Nunes Ferreira[2], Gustavo Lima da Silva[2], Nuno Cortez-Dias[2], Fausto J. Pinto[2], João de Sousa[2]

[1]Cardiology Department, Hospital Universitário de Santa Maria, Faculdade de Medicina, Universidade de Lisboa. [2]Cardiology Department, Hospital Universitário de Santa Maria,CAML, CCUL @RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Pulmonary vein isolation (PVI) is the cornerstone of atrial fibrillation (AF) ablation. Pulsed field ablation (PFA) is a new technology based on the use of high-voltage electrical fields to induce cell death by electroporation. Cardiomyocytes were found highly sensitive to this form of energy, creating the theoretical possibility of a safer, more effective and faster mode of AF ablation.
Objectives: To compare the efficacy, safety and procedural duration of PFA and cryoablation (CA) for PVI.
Methods: Single-center prospective study of AF patients (pts) submitted to PVI with either PFA (Farapulse system) or CA from January to November 2023. Ablation strategy consisted in PVI, complemented with cavotricuspid isthmus (CTI) ablation in pts with concomitant atrial flutter. Propensity score matching based on AF type and CHA2DS2-VASc score was used to generate comparable groups. Acute success was defined by the isolation of all PV. Safety was assessed by the occurrence of major and minor complications. Procedural duration was defined by the skin-to-skin total time. Student T and chi-square tests were used for the comparison of continuous and categorical variables, respectively.
Results: From 152 pts submitted to PVI, 118 pts were selected based on propensity score matching (1:1), 70% males, 66 ± 13 years, CHA2DS2-VASc 2.5 ± 1.2, with paroxysmal, short-duration or long-standing persistent AF in 71%, 17% and 12%, respectively, without differences between groups. Between groups, no differences were found in respect to acute success (PFA: 98.3% vs. CA: 100), major complications (PFA: 3.4% vs. CA: 1.7%) or minor complications (PFA: 1.7% vs. 3.4%) (Table). Procedure time, which included CTI ablation in 22%, was significantly lower in pts submitted to PFA (53 ± 25 vs. 83 ± 31 min, p < 0.001) with similar fluoroscopy times (PFA: 7.7 ± 10.7 vs. CA: 8.1 ± 8.5 p = 0.17). One pt submitted to PFA died 4 days after the procedure due to femoral hemorrhage complicated with hemorrhagic shock.
Conclusions: PFA is a promising new ablation technology, allowing very fast PVI procedures.

CO 53. ANATOMIC-GUIDED ABLATION OF THE RIGHT GANGLIONATED PLEXI VALIDATED BY THE AUTOMATIC FRACTIONATION MAP

Leonor Parreira, Jeni Quintal, Dinis Mesquita, Lia Marques, Rita Marinheiro, José Silva, Duarte Chambel, Cláudia Encarnação, Patrícia Bernardes, Fábio Costa, Pedro Contreiras, Filipe Seixo

Centro Hospitalar de Setúbal, EPE/Hospital de São Bernardo.

Introduction and objectives: Cardiac autonomic modulation through endocardial ablation of atrial ganglionated plexi (GP) is an alternative strategy in selected patients with severe vagal-induced bradyarrhythmias. A strictly anatomical approach targeting the right GPs has demonstrated reasonable success rates but is an empirical approach and has yet to be validated. The presence of fractionated electrograms has been associated with the areas of GPs and can be automatically mapped (fractionation map). This study aimed to compare the empirical ablated area to the automatically assessed sites of GPs based on the presence of fractionated electrograms (FEs).

	Pulsed Field Ablation (N=59)	Cryo-Ablation (N=59)	P-value
Acute sucess: isolation of all the pulmonary veins	58 (98.3%)	59 (100%)	NS
Any major complication			
Hemopericardium	2	0	NS
Stroke	0	1	NS
Retroperitoneal bleeding	0	0	NS
Any minor complication			
Vascular access	1	1	NS
Transient phrenic nerve palsy	0	1	NS
Procedural time (mean±SD)	53±25	83±31	<0.001

Table 1: Comparison of pulsed field ablation to cryoablation regarding acute ablation success, complications and procedural time.

Figure CO52

	Empiric Ablation	FEs Map	P value
Ablated area in the LA in cm^2, median (Q1-Q3)	5.4 (3.3-6)	6.4 (4-8.7)	0.027
Ablated area in RA in cm^2, median (Q1-Q3)	7 (6.2-8)	8 (6.2-9.8)	0.012
Total number of RF applications, median (Q1-Q3)	57 (51-65)	70 (55-75)	0.018
Ablation time on the LA in min, median (Q1-Q3)	30 (19-35)	31 (30-40)	0.027
Ablation time on the RA in min, median (Q1-Q3)	30 (23-33)	33 (26-43)	0.043

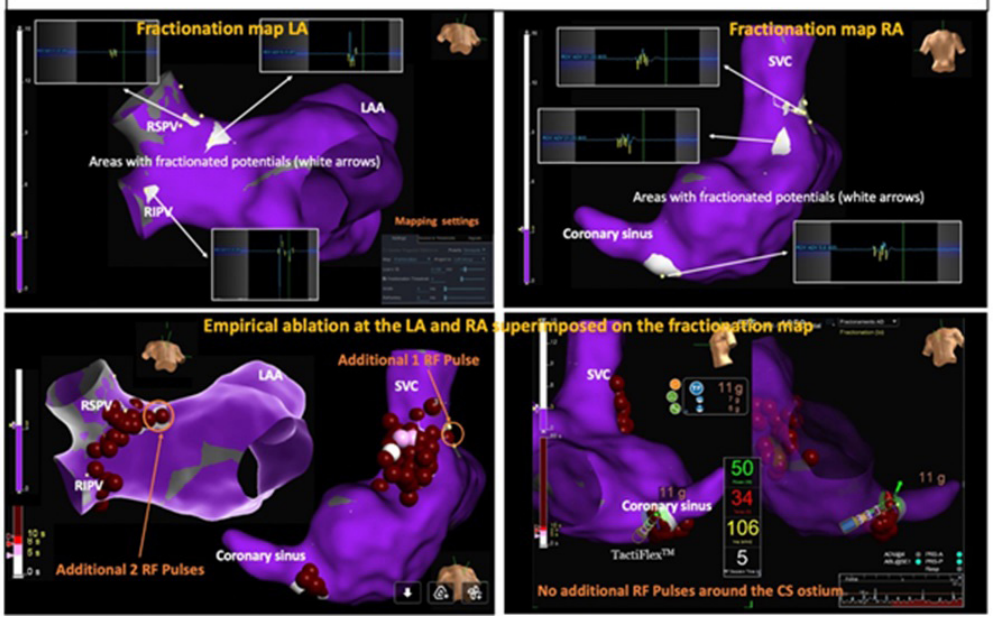


Figure CO53

Methods: We studied eight consecutive patients referred for parasympathetic modulation. A high-density map of the left and right atria (LA, RA) in sinus rhythm was performed. The settings for the automatic map were as follows: bipolar high pass filter of 500 Hz, a fractionation threshold of 4, and a width of 5 ms. The ablation was empirically performed by an operator blinded to the results of the fractionation map, as per site protocol. The ablation was aimed at the anatomic locations of the right GPs in the LA and RA. At the anterior and inferior aspect of the right superior pulmonary vein and bad aspect of the right inferior pulmonary vein on the LA, and posterior RA opposite to the LA RF applications and around the coronary sinus ostium on the RA (Figure). Before ablation, 2 mg of atropine was administered in bolus, and the increase in heart rate was registered and repeated at the end of the procedure. After the operator completed the ablation, access to the fractionation map was available, and additional radiofrequency (RF) applications were applied as needed (Figure). The number of additional RF applications to cover all the areas with FEs was assessed. Success was defined as an absence of response to atropine after the procedure.
Results: Three patients underwent autonomic system modulation only, and five underwent additional pulmonary vein isolation (PVI). The mean age was 66 (50-77) years, five males. The median mapping time of the LA and RA was 11 (17-7) and 14 (9-18) min. All patients underwent successful parasympathetic modulation. The initial median (Q_1-Q_3) increase in heart rate with atropine was 34 (23-39)% versus 0 (0-2)% after ablation, p = 0.012. The differences between empiric and FEs map-guided ablation are depicted in the Figure. The additional number of points was low. However, a median of 9 (5-15) extra points were added.
Conclusions: A purely anatomic-guided procedure directed only at the atrial right GPs is usually enough as a therapeutic approach for cardiac autonomic modulation; however, the fractionation map tool helped validate the method and ensure success on the first pass.

CO 54. MINI-INVASIVE SURGICAL ABLATION AS AN ALTERNATIVE FOR TREATING ATRIAL FIBRILLATION RECURRENCE AFTER CATHETER ABLATION

Margarida G. Figueiredo[1], Rui Cerejo[2], Sofia B. Paula[1], Carolina Rodrigues[2], Manuela Silva[2], Guilherme Portugal[2], Pedro Cunha[2], Hélder Santos[2], Rui Rodrigues[2], Mário Oliveira[2], Pedro Coelho[2]

[1]Centro Hospitalar Barreiro/Montijo, EPE/Hospital Nossa Senhora do Rosário. [2]Centro Hospitalar de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Atrial fibrillation (AF) is the most common clinical arrhythmia, with a currently estimated prevalence of AF in adults between 2% and 4%, and a significant rate of recurrence after conventional AF catheter ablation. Minimally invasive cardiac surgery techniques have emerged to treat selected symptomatic patients (P) with AF refractory to pharmacological and percutaneous ablation. We aim to understand the safety and long-term efficacy of minimally invasive surgical AF ablation in P with AF recurrence after catheter ablation, without concomitant cardiac disease.
Methods: Single-centre retrospective analysis of a cohort of P undergoing solely surgical ablation of AF with a video thoracoscopic (VATS) approach after two unsuccessful AF percutaneous ablations. Safety, intra-hospital complications and length of hospital stay were analysed. Regarding the efficacy of the procedure, patient's rhythm was assessed (ECG, Holter or external loop recorder) in the immediate postoperative period, at discharge, at 1, 6 and 12 months, and in the long-term (beyond 12 months).
Results: We studied 20 P (58.2 ± 10.6 years; 47.4% female). Mean time since the diagnosis of AF was 6.9 ± 3.8 years, 63.2% had paroxysmal AF, while 36.8% were diagnosed with persistent AF. All of them had been submitted to prior catheter ablation (mean of 2 attempts). Mean left ventricular ejection fraction (LVEF) by echocardiogram was 55 ± 7.0% (16% with mildly-

reduced LVEF). Mean volume of the left atrium (LA) was 36.3 ± 10.6 ml/m², with 58% of the P presenting LA enlargement (16% mild, 37% moderate and 5% severe enlargement). The mean volume of the right atrium (RA) was 29.3 ± 9.5 ml/m², with RA enlargement in 26.3% of the cases. Mean systolic pulmonary artery pressure was 29.8 ± 6.4 mmHg (10.5% presenting pulmonary hypertension). Mean hospital stay was 4.7 ± 4.1 days. There were no cases of stroke or mortality during hospitalization; however, one P needed reintervention due to a hemothorax and other one needed permanent pacemaker implantation to treat tachy-brady syndrome. During hospitalization, 17 P (85%) remained in sinus rhythm (SR), while 2 P (10%) presented AF and one (5%) developed atrial flutter. All P were discharged in SR. Mean follow-up was 2.6 ± 1.7 years, with 89.5%, 78.9%, and 73.7% of the P in SR at 1, 6 and 12 months, respectively. In the long-term follow-up (> 12 months), 15 P (75%) remained in SR. Two (10%) cases had AF recurrence and 3 (15%) developed atypical atrial flutter (Figure). One P died in the long-term follow-up, not related to cardiovascular disease. Age, duration of AF before the procedure, type of AF, LVEF, LA/RA enlargement and pulmonary hypertension were not predictors of AF recurrence after surgical ablation.

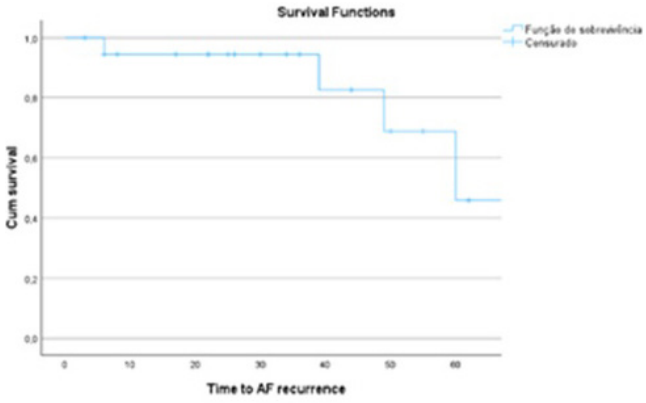


Figure 1 – Long-term follow-up regarding AF recurrence

Conclusions: In P with AF recurrence after multiple percutaneous catheter ablation attempts, minimally invasive surgical approach seems to represent a real benefit in the long term.

CO 55. CATHETER ABLATION FOR ATRIAL FIBRILLATION: UNVEILING KEY PREDICTORS OF LIFE QUALITY ENHANCEMENT

Rafael Silva Teixeira[1], Marta Catarina Almeida[1], João Almeida[1], Paulo Fonseca[1], Francisco Ramires[2], Madalena Plácido[2], Inês Rodrigues[1], Marco Oliveira[1], Helena Gonçalves[1], João Primo[1], Ricardo Fontes-Carvalho[1]

[1]Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE. [2]PROMPTLY Health, Porto.

Introduction: Traditional classification of Atrial Fibrillation (AF) based on temporal patterns doesn't fully encompass the condition's complexity. Unsupervised cluster analyses have been used recently for classifying patients into groups with similar comorbid profiles, abeit inconsistently. Bayesian profile regression, a semi-supervised machine learning technique, may improve the precision of clustering by integrating outcome data, thereby diminishing the variability observed in unsupervised methods. Since quality of life (QoL) primarily drives the indication for AF ablation, we utilized the AFEQT questionnaire to cluster patients.
Objectives: Our aim is to use patient-reported outcome measures to identify clinically relevant phenotypes of AF that benefit the most from catheter ablation.
Methods: We implemented a single center digital follow-up (FUP) program for patients referred for AF ablation since august 2020. FUP included scheduled visits and remote monitoring through a new digital health platform. AFEQT summary score reported by patients was analyzed using a non-linear mixed model and relative change in AFEQT by month 12 was used as outcome. Profile regression mixture modelling guided by QoL improvement was performed to create clinically relevant patient groupings. Penalized multinomial logistic regression model was used for validation.
Results: 354 patients were enrolled until July 2023. 211 patients had FUP > 12 months (age 59 ± 10 years, 31% female, 80% paroxysmal). The overall AFEQT questionnaire completeness rate was 72%. Patients were classified into 3 clusters: 1) patients with long duration AF, left heart cavities enlargement and diastolic dysfunction (n = 57); 2) patients with self-reported anxiety/depression (n = 50); and 3) patients with low rates of comorbidities (n = 104). For clinical application, 8 variables (dyslipidemia, AF type and duration since first diagnosed, mitral E/A ratio following ablation, systolic pulmonary arterial pressure, left ventricle ejection fraction, and PROMIS T-score for anxiety and depression) were sufficient for classifying patients (85% accuracy). Patients with higher depressive and anxiety burden (cluster 2) had worse baseline AFEQT score (median: 46, IQR: 39-60) and derived less benefit (median improvement: 21, IQR: 12-32), while patients with low comorbid burden (cluster 3) displayed higher baseline (median: 58, IQR: 48-62) and final QoL (median improvement: 28, IQR: 21-36, p < 0.01).
Conclusions: Cluster analysis identified 3 reproducible clinically relevant phenotypes of AF using widely available clinical and biological data. These clusters have distinct associations with QoL, underscoring the heterogeneity of AF and importance of comorbidities and substrates. This approach may allow for the prediction of which patients are most likely to benefit from treatment.

SÁBADO, 20 ABRIL de 2024 | 08:00-09:00.

Ágora | Comunicações Orais - Sessão 12 - Hipertensão Pulmonar

CO 56. LONG-TERM EXERCISE TOLERANCE AND QUALITY OF LIFE AFTER BALLOON PULMONARY ANGIOPLASTY (BPA): IS THERE A ROLE FOR RIGHT HEART CATHETERIZATION?

Mariana Martinho, Rita Calé, Filipa Ferreira, Sofia Alegria, Débora Repolho, Bárbara Marques Ferreira, João Mirinha Luz, Sílvia Vitorino, Pedro Santos, Hélder Pereira

Hospital Garcia de Orta, EPE.

Introduction: Resting pulmonary haemodynamics and exercise capacity are good parameters of Balloon Pulmonary Angioplasty (BPA) effectiveness in Chronic Thromboembolic Pulmonary Hypertension (CTEPH) treatment. Increasing evidence regarding resting parameters suggest sustained long-term benefits of BPA. Exercise right heart catheterization (eRHC) might provide additional information on those outcomes.
Objectives: To assess the long-term clinical and haemodynamic effectiveness of BPA, at rest and with exercise, in a Portuguese PH-referral center, and correlate it with the impact in regular daily activities.
Methods: Prospective series of consecutive pts with inoperable or residual CTEPH after surgery, who completed a minimum of 3y follow-up (FUP) after a total of 63 BPA sessions, between 2017 and 2020. Clinical, imaging and haemodynamic data were collected and quality of life (QoL) assessed by the self-reported short form of health-related quality of life scale (SF-36). Long-term rest haemodynamics and eRHC mPAP/CO slope were correlated with clinical parameters of exercise capacity and QoL.
Results: Of 12pts, mean age was 64 ± 12y and 66.7% were females. At baseline, 83.3% of pts were treated with pulmonary vasodilators (3 pts with i.v. prostacyclin analogs) and 3 pts required long-term oxygen therapy. There was a mean of 5.3 ± 1.9 sessions/pt, a mean of 9.8 ± 2.4 targeted segments/session; 1 pt died of cancer during FUP and 2 pts interrupted the program prematurely. The 9 pts that completed 3y-FUP had i.v. vasodilators and oxygen therapy withdrawn, with significant improvement in median

WHO functional class (2.0 vs. 1.0, p = 0.015) and with a reported mean SF-36 physical capacity of 76%. Right ventricle fractional area change improved form 31.1 ± 12.2 to 42.1 ± 5.1% (p = 0.047), resting mPAP reduced from 37.3 ± 13.3 to 29.8 ± 9.7 mmHg (p = 0.166) and PVR from 6.2 ± 3.0 to 3.6 ± 1.4WU (p = 0.066). Resting haemodynamic parameters did not correlate significantly with clinical parameters of exercise capacity. At a mean 43 ± 8 months after the last BPA session, eRHC was performed in 6pts and showed a mean mPAP/CO slope of 7.4 ± 6.0 mmHg/L/min (83.3% with exercise pulmonary hypertension). This slope showed correlation with NT-proBNP and several clinical parameters of physical capacity (table). No complications were reported in eRHC.

Table. Correlation between exercise mPAP/CO slope and clinical parameters/patient reported outcomes in long-term follow-up after BPA.

	Pearson coefficient (r)	p-value
WHO FUNCTIONAL CLASS	0.942	0.005
6MIN WALKING DISTANCE (meters)	-0.997	0.003
NT-PROBNP (pg/mL)	0.959	0.002
SF-36 SELF-REPORTED QUESTINAIRE		
Functional Capacity	-0.852	0.031
Role limitations: physical problems	-0.471	0.346
Pain	-0.575	0.233
General health	-0.717	0.173
Vitality (energy/fatigue)	-0.786	0.064
Social functioning	-0.381	0.527
Role limitations: emotional problems	-0.550	0.259
Mental health	-0.648	0.239

Conclusions: Significant improvements in functional capacity, resting imaging and resting haemodynamic parameters were observed at long-term FUP after BPA. However, a majority of pts maintain worsening of PH with exercise and eRHC appears to confer an added value in assessing clinical outcomes.

CO 57. UNMASKING EXERCISE PULMONARY HYPERTENSION – DOES TIME MATTER?

João Mirinha Luz, Filipa Ferreira, Rita Calé, Sofia Alegria, Ana Cláudia Vieira, Bárbara Ferreira, Débora Repolho, Sílvia Vitorino, Ernesto Pereira, Hélder Pereira

Hospital Garcia de Orta, EPE.

Introduction and objectives: The 2022 ESC/ERS Pulmonary Hypertension guidelines brought us the definition of exercise pulmonary hypertension (E-PH), which is characterized by a mean pulmonary artery pressure to cardiac output ratio (mPAP/CO) slope (between basal and peak exercise) above 3 mmHg/L/min, assessed by exercise right heart catheterization (E-RHC). E-RHC use incremental workloads, but different protocols have been described and the search for the best protocol will be the focus in the coming years. Our goal was to evaluate if increased mPAP/CO slope is time sensitive to the amount of exercise or seen in earlier stages of E-RHC, in patients with confirmed E-PH.
Methods: We performed a observational, cross-sectional and unicentric study that included all patients who underwent E-RHC between April 2022 and November 2023, using a protocol of 15 minutes in total, with increased work thresholds every 3 minutes apart, with workload increases of 10 Watts (W) in every threshold (50W in 15 minutes of exercise). We evaluated mPAP/CO ratio every 3 minutes, and the slope between each stage and basal RHC was assessed.
Results: We included twenty-six (26) patients. Mean age at time of E-RHC was 64.5 years-old. Two-thirds of patients (65,4%) were females. Main diagnosis was chronic thromboembolic disease (CTED), either patients who previously were subjected to pulmonary endarterectomy and had no PH at rest or patients with CTED who had been enrolled in balloon pulmonary angioplasty programme. 70% of patients performed 9 or more minutes of exercise. Sixteen patients had confirmed E-PH, with median mPAP/CO slope in peak exercise of 5.67 mmHg/L/min. In those patients, abnormal mPAP/CO slope was seen already in the first stage (at 3 minutes) and maintained at all intermediate stages until peak exercise. In patients who had E-PH excluded at peak exercise, median mPAP/CO slope was 1.20 mmHg/L/min. In this latter group, mPAP/CO slope at intermediate stages showed variability along each threshold, and only on peak exercise exclusion of E-PH was definitive in these patients (Table). At 3rd minute of exercise, patients with abnormal slope had an odds ratio of 28 (95% confidence interval 1.35-580.59, p = 0.015) for having E-PH, with sensibility of 88% and specificity of 80%, and positive predictive value of 88%.
Conclusions: Our study shows that in patients with confirmed E-PH, significant mPAP/CO slope is evident in early stages of workload during E-RHC, and probably intense protocols are not required. Larger proportion of patients are required to confirm this hypothesis.

CO 58. ENDARTERECTOMY IN CTEPH – HEMODYNAMIC IMPROVEMENT AND RV/PA COUPLING

Miguel Azaredo Raposo[1], Cláudia Jorge[2], Daniel Cazeiro[1], Ana Margarida Martins[1], Catarina Simões de Oliveira[1], Ana Beatriz Garcia[1], Ana Abrantes[1], Tatiana Guimarães[1], Susana Robalo Martins[2], Nuno Lousada[2], Fausto J. Pinto[2], Rui Plácido[2]

[1]Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, Faculdade de Medicina, Universidade de Lisboa. [2]Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Pulmonary thromboendarterectomy (PEA) remains the gold standard in treating chronic thromboembolic pulmonary hypertension (CTEPH). Reducing the thrombotic burden and mechanical obstruction of the pulmonary arteries (PA) leads to significant hemodynamic improvement, allowing for favorable right ventricular (RV) remodeling.
Objectives: To characterize hemodynamic improvement post PEA and predictors of normalization of RV-PA coupling.
Methods: Single center retrospective study, including 30 pts submitted to PEA over a 7-year period. Hemodynamic assessment was performed by right heart catheterization (RHC) before PEA, immediately after and at 6-month follow-up (FUP). Echocardiographic assessment of RV function was acquired at baseline and 6-month FUP. Mean absolute differences were calculated before and after PEA. Differences between groups were assessed with ANOVA analysis and ROC curve analysis allowed us to define a cut-off point in mPAP reduction to predict favorable RV remodeling.
Results: We included 30 pts with a mean age of 57.9 ± 13 years of age and slight predominance of female sex (57%). Regarding risk assessment with the COMPERA 4 strata tool at baseline, 23% of pts were high risk, 20% intermediate high, 27% intermediate low and 6% at low risk. Pulmonary

Stage	E-PH confirmed (n=16) (median; mmHg/L/min)	E-PH excluded (n=10) (median; mmHg/L/min)	P-value
3 minutes (10W)	5.14	2.33	**0.03**
6 minutes (20W)	4.84	4.17	0.268
9 minutes (30W)	4.71	2.47	**0.002**
12 minutes (40W)	4.19	3.22	0.400
Peak	5.66	1.20	**<0.001**

Figure CO57

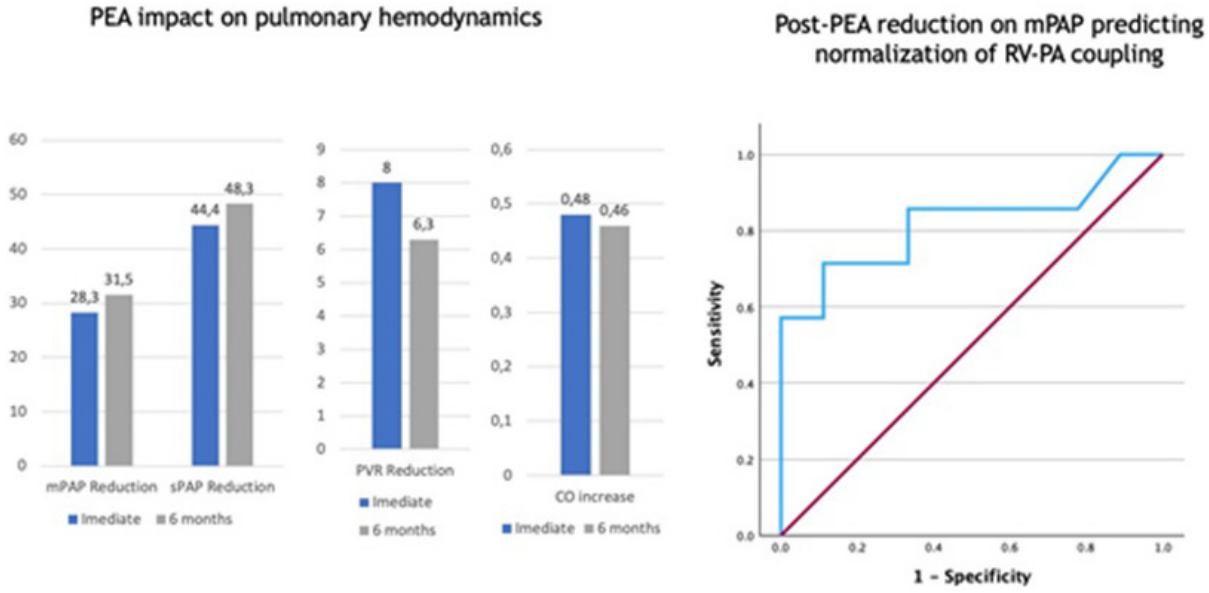


Figure CO58

hemodynamics improved immediately after PEA, as indicated by a mean reduction of 28.3 ± 17 mmHg in mPAP; 44.4 ± 27.6 mmHg in sPAP; 8 ± 3.4 Wu in PVR and an increase in CO of 0.5 ± 1 l/min. This improvement was sustained at 6-month post-PEA assessment, with a mean reduction of 31.5 ± 26.7 mmHg in mPAP; 48.3 ± 41.2 mmHg in sPAP; 6.3 ± 6.2 Wu in PVR and a 0.5 ± 1 L/min increase in CO. Regarding RV remodeling at 6-month post-PEA, an increase of 0.15 ± 0.2 mm/mmHg in TAPSE/PSAP ratio and 3 ± 2.8 cm/s in Tricuspid S' were recorded. RV/PA uncoupling, defined as TAPSE/PSAp < 0.31 mm/mmHg, was evident in 73% of pts at baseline, 25% of which recovered at 6m follow-up. There were no significant differences between groups, according to the 4 strata risk assessment at baseline, regarding pulmonary hemodynamics and RV remodeling. Through ROC curve analysis, we were able to define a cut-off point of 37 mmHg in immediate mPAP post-PEA reduction to predict RV-RA coupling normalization at 6-m FUP (sensitivity 70%, specificity 89%).

Conclusions: PEA is an effective treatment for CTEPH and leads to immediate and sustained improvements in pulmonary hemodynamics. This improvement can be expected regardless of the risk assessment at baseline. Reduction in RV afterload allows for favorable RV remodeling, and an immediate post-PEA mPAP reduction > 37 mmHg may predict the normalization of RV-PA coupling.

CO 59. WHITE SMOKE IN THE INTERMEDIATE RISK PE DEBATE - COULD POPE BE THE SOLUTION?

Ana Margarida Martins, Ana Beatriz Garcia, Catarina Oliveira, Ana Abrantes, Miguel Raposo, João Fonseca, Catarina Gregório, Beatriz Valente Silva, Miguel Nobre de Menezes, Cláudia Jorge, Fausto J. Pinto

Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Despite a multitude of innovative therapeutic strategies emerging in the past decade, acute pulmonary embolism (PE) remains a potentially fatal disease. Mortality varies significantly according to risk stratification, substantiating current recommendations to use reperfusion therapy only in hemodynamically unstable patients (pts). There is an ongoing debate around whether hemodynamically stable pts showing signs of right ventricle dysfunction and myocardial injury (intermediate-high risk PE) may also benefit from reperfusion therapy. While most pts in this category typically improve with anticoagulation alone, up to 10% may experience clinical deterioration.

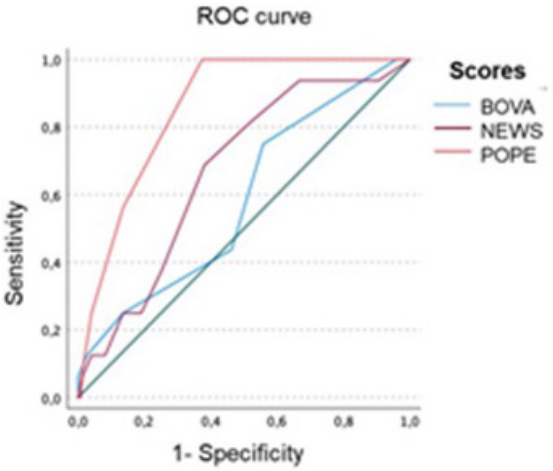


Figure 1 – ROC curve analysis of three different PE scores in predicting unfavorable outcomes in intermediate-high risk patients

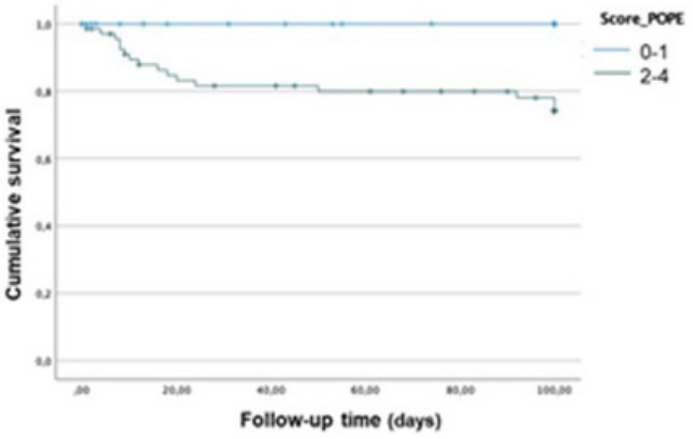


Figure 2 – Kaplan-Meier survival analysis based on POPE score

Figure CO59

Objectives: Characterize the clinical in-hospital progression of patients with intermediate-risk PE and to evaluate the discriminative efficacy of PE scores in anticipating unfavorable clinical outcomes.
Methods: We conducted a retrospective observational study in patients admitted with PE classified as intermediate risk in a tertiary center. Clinical, laboratory and ECG data were obtained. The BOVA score, the News score and the Pope score were evaluated. A composite endpoint of in-hospital mortality and use of reperfusion therapy due to hemodynamic deterioration was defined. Predictive abilities of these three scores were compared using area under the receiver operating characteristics (AUC-ROC) curve.
Results: From January 2019 to December 2020, a total of 166 patients were admitted with acute PE, classified as intermediate-risk. The mean age was 71.9 ± 16.2 years and 57.2% were female. 71.1% of the pts showed bilateral PE in angioCT. The composite endpoint of in-hospital mortality and reperfusion therapy due to hemodynamic deterioration occurred in 9.8% of the pts. The median BOVA score was 3 (2-4), the median POPE score was 1 (0-2) and the median News score was 4 (2-6). The ROC curve analysis showed a significant higher discriminative power of POPE score compared to the other scores (AUC0.856, 95%CI 0.79–0.92, p < 0.001) (Figure 1). Compared to pts with a POPE score 1, the composite endpoint was 4,6 times higher in pts with higher scores (OR 4.6 95%CI 1.63- 6.914, p = 0.029) (Figure 2).
Conclusions: Despite classification as intermediate risk, these patients displayed a non-negligible in-hospital mortality rate. Close clinical monitoring is warranted in this group of pts and there is pressing need for an early identification of those who might benefit from more than just anticoagulation. In our population POPE score showed to be a simple and accurate tool in predicting those with an unfavorable evolution that could have benefitted from more advanced intervention.

CO 60. IDENTIFICATION OF A MULTI-ETIOLOGICAL SIGNATURE OF HEART FAILURE THROUGH MERGING OF MICROARRAY DATA

Sílvia O. Diaz, Sandra Magalhães, Adelino Leite-Moreira, António S. Barros

Universidade do Porto.

Introduction: Microarrays are powerful tools in health research, aiding the understanding of disease mechanisms. One advantage of microarrays is that they allow for the simultaneous analysis of thousands of genes, making them useful in cardiovascular disease (CVD) research. They enable the identification of deregulated genes and provide a global view of molecular processes involved in CVDs, aiding the identification of pathways and mechanisms contributing to disease development. Merging multiple microarrays is advantageous, as it increases sample size and statistical power, improves generalizability of findings, and reduces impact of technical variability and batch effects. This also enables the identification of more reliable gene expression patterns across samples. Heart failure (HF) is a common and life-threatening condition affecting millions worldwide. Over the years, different ways have been explored to improve the understanding of underlying mechanisms of HF and develop effective treatments. When it comes to HF, microarrays can be instrumental in identifying genes/pathways involved in disease's development and progression.
Methods: This work applies multivariate analysis after data-merging and batch correction of six curated microarray datasets of HF to identify its global signature. Gene expression datasets related to HF were retrieved from GEO repository. This included 6 datasets comparing heart tissue of patients with HF and healthy samples, yielding a combined dataset of 108 HF and 47 controls, and 1,019 features. Statistical analysis was performed in R, including batch correction using Combat method to account for non-biological variation resulting from different analytic settings, followed by data normalization. PCA and OPLS-DA were utilized for data exploration to uncover a HF gene expression profile. Discrimination between healthy and HF samples was attained and validated by bootstrapping.
Results: The obtained models exhibited good discriminatory ability, with Q2 = 0.68 and a median bootstrapped Q2 = 0.59. Genes with a median VIP and 95% confidence interval (computed from bootstrapped models) > 1 were considered relevant. Of the 61 genes identified, 24 exhibited gene-disease association score (fetched from DisGenet Database) > 0.1. Of these, 9 genes linked to CVD, 8 with nervous system diseases, 7 with mental disorders, 7 with respiratory tract diseases, 5 with immune system diseases, 5 with digestive diseases, 4 with nutritional/metabolic diseases, and 2 with hemic/lymphatic diseases.
Conclusions: This study identified a global signature for a multi-etiological HF group. Some of the findings indicate the influence of inflammatory/immune systems in HF. This signature may be valuable for molecular HF studies stemming from different conditions. This study also underscored the importance of public repositories in facilitating data-merging studies.

SÁBADO, 20 ABRIL de 2024 | 09:00-10:30

Ágora | Prémio Jovem Investigador (Clínica e Básica)

CO 86. MACHINE-LEARNING BASED RADIOMICS MODEL TO PREDICT VENTRICULAR ARRYTHMIAS IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

Miguel Marques Antunes[1], Inês Pereira de Miranda[2], Vera Ferreira[1], Pedro Garcia Brás[1], José Viegas[1], Isabel Cardoso[1], Boban Thomas[3], Gonçalo Branco[3], Ricardo Pereira[3], Sílvia Aguiar Rosa[1], João Bicho Augusto[2], Rui Cruz Ferreira[1]

[1]Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta. [2]Hospital Fernando Fonseca, EPE. [3]Hospital Cruz Vermelha.

Introduction: Patients with hypertrophic cardiomyopathy (HCM) are at a higher risk of ventricular arrythmias (VA). Late gadolinium enhancement (LGE) imaging from cardiovascular magnetic resonance (CMR) is a well-established risk factor for VAs, but the ability to predict these in various models remains sub-optimal. We hypothesized that deep quantitative phenotyping of high-dimensional data from radiomics could improve risk stratification in HCM.
Objectives: to assess radiomics models based on left ventricular (LV) LGE images to predict the risk of VA.
Methods: Cardiac MRI images from 35 patients obtained during follow-up at a cardiomyopathy clinic were prospectively collected and reviewed. The left ventricular (LV) wall was manually segmented using the 3D Slicer 5.2.2 open access tool. We extracted several features using the PyRadiomics library (v3.1.0), including shape, first order and textural features from the LV wall. We also performed a single staged wavelet decomposition to decompose volumetric images into eight decomposed volumes of images. This led to a total of 851 parameters being extracted per patient. We performed feature relevance analysis, reducing the feature count to 623 features (removing features with a low variance of < 0.01). After adjusting class weights, a Machine Learning Random Forest Classifier (ML-RFC) model was trained to predict arrhythmic events, followed by hyperparameter tuning. We then compared the performance of this model to the prognostic significance of LV LGE amount (using the mean + 5 standard deviations method) and a model that included both.
Results: A total of 35 HCM patients were included (age 54 [45-63] years, 29.4% female). All patients had LV LGE, quantified as a median 16% [8% - 22%] of LV mass. Ventricular arrhythmias were noted in 8 (23.5%) patients. The prediction models are summarized in the Figure. The ML-RFC model had a VA prediction accuracy of 85.7%, with an area under the receiver-operator characteristics curve (AUC-ROC) of 0.833. Of note, HCM patients who experienced a VA event showed features of more LV wall heterogeneity, with increased Zone Entropy (in LLL wavelet, 7.2 [interquartile range 7.0-7.3] vs. 6.8 [6.6-7.0], p = 0.006) and higher values of Long Run High Gray Level Emphasis (in LLH wavelet, 302 [236-337] vs. 167 [88-289], p = 0.040). LV LGE amount was also a predictor of VAs, with an accuracy of 71.4% and AUC-ROC of 0.667. The addition of LGE to the ML-RFC model did not result in a significant improvement of the baseline ML-RFC model (accuracy and AUC-ROC were similar, see Figure).
Conclusions: We show that LV LGE images can conceal complex ultra-structural features, that can be unveiled by radiomics. These features improve prediction of ventricular arrhythmias beyond LV LGE alone, likely reflecting LV wall heterogeneity and susceptibility to arrhythmogenic mechanisms.

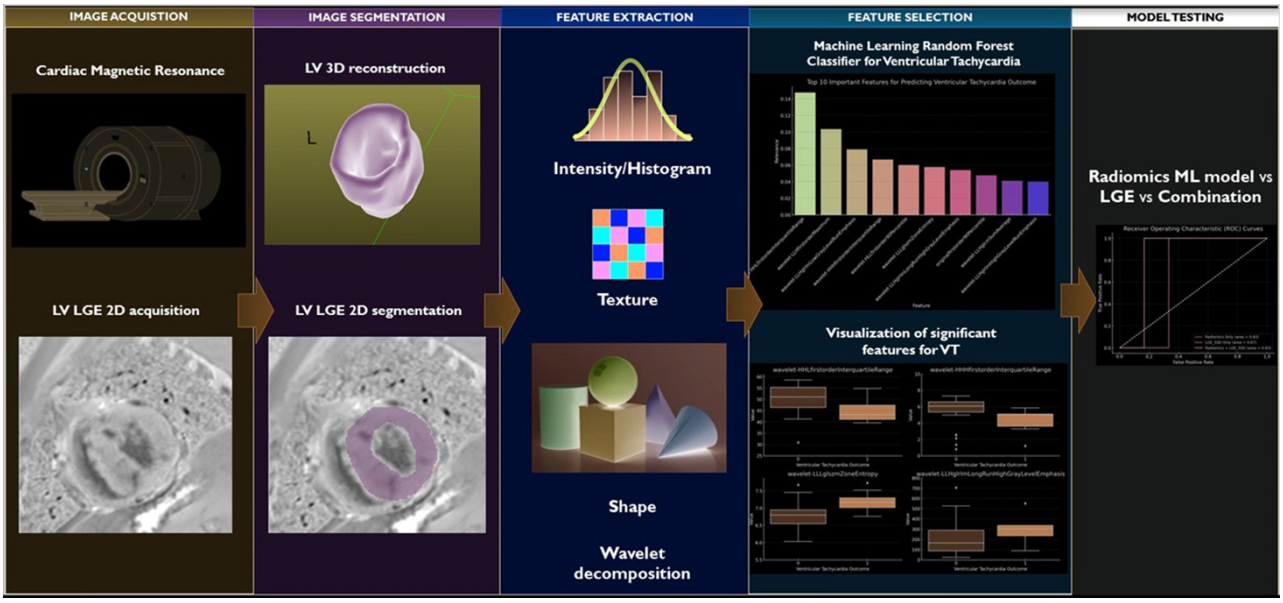


Figure CO86

CO 87. RIGHT VENTRICULAR MYOCARDIAL WORK: PROOF-OF-CONCEPT FOR NON-INVASIVE ASSESSMENT OF RIGHT VENTRICULAR FUNCTION IN PULMONARY HYPERTENSION PATIENTS

Bárbara Lacerda Teixeira, Sofia Jacinto, Ricardo Carvalheiro, Raquel Santos, João Reis, Luís Almeida Morais, Tânia Mano, Pedro Rio, Ana Teresa Timoteo, Ana Galrinho, Rui Cruz Ferreira

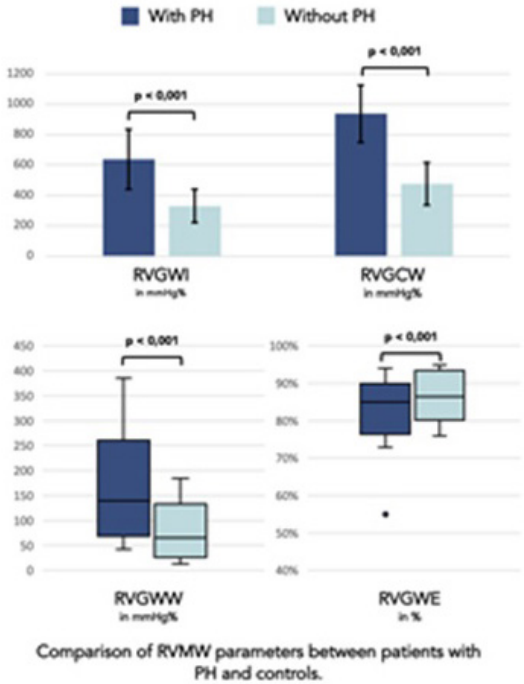
Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Right ventricular myocardial work (RVMW) assessed by transthoracic echocardiography allows to study and analyze the right ventricular (RV) function non-invasively, using RV pressure-strain loops. The association between these novel indexes of RVMW and invasive hemodynamic parameters has not yet been extensively studied, namely in precapillary pulmonary hypertension (PH) population.

Objectives: To evaluate the relationship between RVMW and invasive indices of right heart catheterization (RHC) in a cohort of patients with group I and group IV PH and to compare with a control group without PH.

Methods: A prospective registry of pre-capillary PH patients was used and compared with a control group without PH. In both groups, patients underwent same day RHC and echocardiographic assessment. Dedicated software for left ventricle myocardial work was used for the RV. RV global myocardial work index (RVGWI) was calculated as the area of the RV

Fig 1.



Comparison of RVMW parameters between patients with PH and controls.

Fig 2.

Correlation between RHC and NT-proBNP and RVMW parameters in echocardiography	RVGWI	RVGCW	RVGWW	RVGWE
Mean pulmonary artery pressure in mmHg	x	r = 0,477, p = 0,016	r = 0,732, p < 0,001	r = -0,635, p = 0,001
Pulmonary vascular resistance in WU	x	r = 0,423, p = 0,035	r = 0,748, p < 0,001	r = -0,609, p = 0,001
Right atrium pressure in mmHg	x	x	x	x
Cardiac Output in L/min	r = -0,457, p = 0,022	r = -0,548, p = 0,005	r = -0,436, p = 0,029	x
Cardiac Index in L/min/m2	x	r = -0,412, p = 0,041	r = -0,441, p = 0,027	x
Venous oxygen saturation in %	x	r = -0,480, p = 0,015	r = -0,479, p = 0,016	r = 0,399, p = 0,048
Stroke volume in ml/beat	x	x	r = -0,550, p = 0,004	r = 0,423, p = 0,036
Stroke volume index in ml/beat/m2	x	x	r = -0,544, p = 0,005	r = 0,498, p = 0,011
Right ventricle stroke work in g.m/beat	x	r = 0,566, p = 0,003	r = 0,0440, p = 0,028	x
Right ventricle stroke work index in g.m/beat/m2	r = 0,409, p = 0,042	r = 0,623, p = 0,001	r = 0,439, p = 0,028	x
Pulmonary artery pulsatility index	r = 0,456, p = 0,024	r = 0,513, p = 0,009	x	x
NT-proBNP in pg/ml	x	x	r = 0,535, p = 0,006	r = -0,464, p = 0,019

Fig 3.

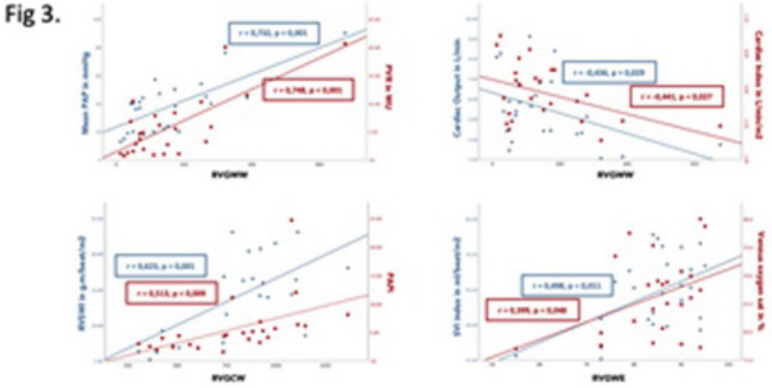


Figure CO87

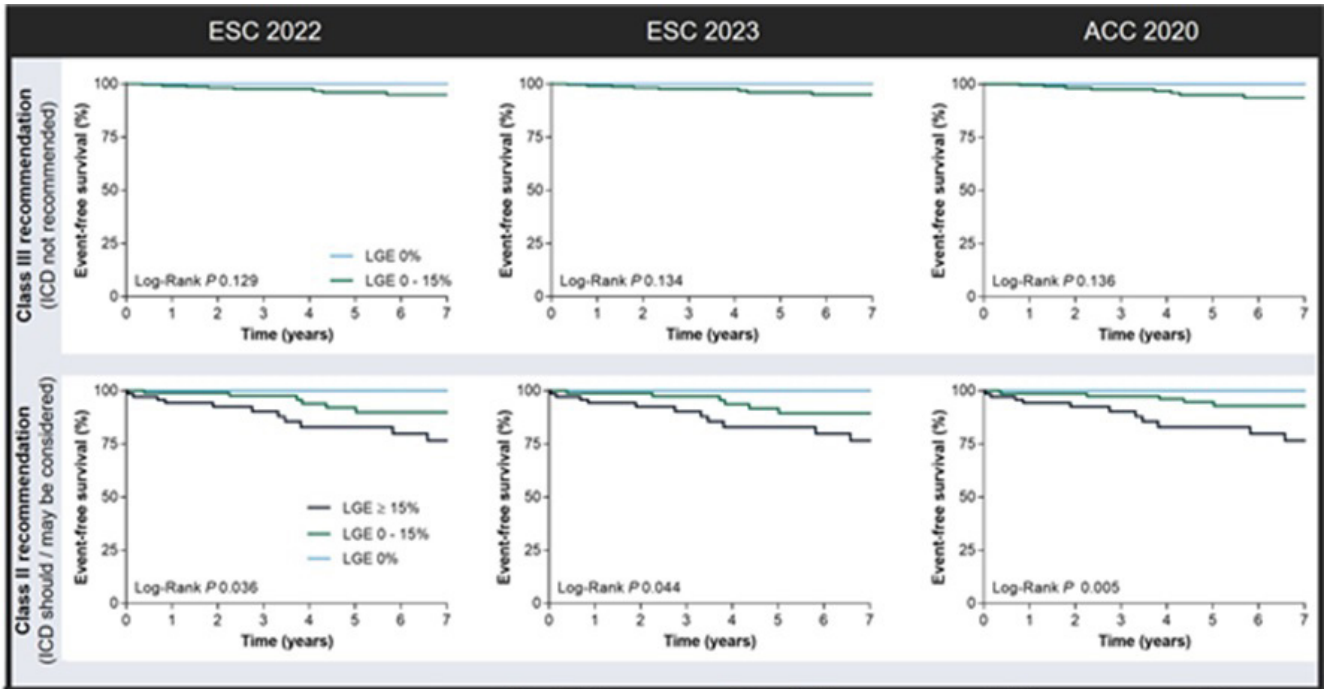
pressure-strain loops. From RVGWI, RV global constructive work (RVGCW), RV global wasted work (RVGWW), and RV global work efficiency (RVGWE) were estimated. Comparison of groups was assessed using Chi-square, t-Test or Mann-Whitney analysis. Pearson's correlation was then applied to assess correlations between continuous variables. Predictive accuracy of RVMW parameters was assessed using a ROC curve analysis.
Results: 25 pts were included: 17 pts with PH (9 pts group I PH and 8 pts group IV PH) were compared with 8 pts without PH. RVGWI, RVGCW and RVGWW were significantly higher in PH patients than in controls ($p < 0.001$), while RVGWE was significantly lower ($p < 0.001$) (Figure 1). Significant correlations (Figures 2 and 3) were found between mean pulmonary artery pressure, pulmonary vascular resistance, venous oxygen saturation and RVGCW, RVGWW and RVGWE; between cardiac output (CO), RV stroke work index and RVGWI, RVGCW and RVGWW; between cardiac index (CI), RV stroke work and RVGCW and RVGWW; between stroke volume (SV), SV index, NT-proBNP and RVGWW and RVGWE; between pulmonary artery pulsatility index and RVGWI and RVGCW. None of the RVMW parameters correlated well with right atrium pressure. According with ROC curve analysis, all RVMW parameters, with the exception of RVGWE ($p = 0.327$), are good predictors of PH. Comparing with the prediction power of RV GLS (AUC 0.906, $p = 0.001$), RVGCW performed better (AUC 0.984, $p < 0.001$), RVGWI performed equal (AUC 0.906, $p = 0.001$) and RVGWW was inferior (AUC 0.777, $p = 0.030$).
Conclusions: Patients with pre-capillary PH present significantly higher RVGWI, RVGCW and RVGWW and lower RVGWE than patients without PH. Echocardiographic RVMW-derived indexes show strong correlation with invasive pulmonary arterial pressure and resistance, CO and CI, venous oxygen saturation, invasive RV function indexes and NT-proBNP. RVGCW seems to be a powerful predictor of PH, comparing with RV GLS and the other RVMW parameters.

CO 88. REVISITING RISK STRATIFICATION IN HYPERTROPHIC CARDIOMYOPATHY AFTER RECENT GUIDELINES - LATE GADOLINIUM ENHANCEMENT REMAINS TOUGH TO BEAT

Rita Amador[1], Joana Certo Pereira[1], Pedro Freitas[1], Maria Rita Lima[1], Mariana Paiva[1], Daniel Gomes[1], Carlos Rochite[2], Edmundo Arteaga[2], Pedro Carmo[1], Diogo Cavaco[1], Pedro Adragão[1], António Ferreira[1]

[1]Hospital de Santa Cruz. [2]InCor Instituto do Coração.

Introduction and objectives: Over the last decades, the recommendation for ICD implantation for the primary prevention of sudden cardiac death (SCD) in hypertrophic cardiomyopathy (HCM) has been evolving. Late gadolinium enhancement (LGE) has recently been incorporated in the guidelines as a risk factor to be considered for ICD implantation. The aims of this study were: 1) assess the evolution of accuracy and discriminative ability of the different guidelines (ESC 2014, ESC 2022, ESC 2023, ACC 2011 and ACC 2020) in predicting SCD; and 2) to understand whether LGE can further help in the risk stratification of SCD.
Methods: We conducted an international multicentric retrospective analysis of HCM patients undergoing cardiac magnetic resonance (CMR) for diagnostic confirmation and/or risk stratification. Eligibility criteria for ICD according to the ESC 2014 (HCM guidelines), ESC 2022 (Ventricular arrhythmias guidelines), ESC 2023 (Cardiomyopathies), ACC 2011 and ACC 2020 (both HCM guidelines) was determined for each patient. Our primary endpoint was a composite of SCD, appropriate ICD discharge and sustained VT.
Results: We included a total of 530 patients (median age was 49 (IQR 35-61), 57% male). Over a median follow-up of 3.8 (IQR 1.6-7.0) years, 27 events occurred (13 SCDs, 8 appropriate ICD discharges and 6 sustained



	Sensitivity	Specificity	PPV	NPV
ESC 2014 HCM guidelines	48%	72%	7,8%	97%
ESC 2022 VAs and SCD guidelines	68%	65%	8,9%	98%
ESC 2023 Cardiomyopathies guidelines	68%	67%	9,2%	98%
ACC 2011 HCM guidelines	60%	59%	6,9%	97%
ACC 2020 HCM guidelines	68%	54%	6,8%	97%
LGE ≥ 7.1% (best cut-off)	78%	73%	13,4%	98%
LGE ≥ 10%	67%	80%	15,1%	98%
LGE ≥ 15 %	40%	88%	13,7%	97%

Figure CO88

VAs). The diagnostic accuracy statistics of the European and the American societies guidelines have evolved similarly over time: sensitivity and PPV increased, NPV remained high and discriminative ability also increased (Figure). However, the concordance in risk assessment is only moderate between the ESC 2022 and ACC 2020 (κ = 0.60 (95%CI: 0.54–0.67); p < 0.001) or the ESC 2023 and ACC 2020 guidelines (κ = 0.56 (95%CI: 0.49–0.62); p < 0.001). LGE was present in 80% of patients. Median LGE% was 3.2% (IQR 0.5 – 8.4%) and remained an independent predictor of arrhythmic events after adjustment to known confounders (aHR of 1.09 per 1% increase in LGE% [95%CI 1.05–1.12; p < 0.001]). The Youden test showed a best cut-off for LGE burden of 7.1%. Further risk stratification could be reached by employing LGE% as an arbiter. Irrespectively of the guideline publisher, in patients with any recommendation for ICD (classes IIa and IIb), the absence of LGE identified patients with no arrhythmic events during follow-up (Figure).

Conclusions: Current guidelines have shown increased sensitivity, PPV and discriminative power when compared with older counterparts. LGE burden remains an independent risk factor for arrhythmic events and although extensive LGE burden has been included in the risk stratification for ICD implantation, further stratification can be accomplished for ICD recommendation, since this seems to be a predictor stronger than clinical parameters.

CO 89. TAFAMIDIS FOR THE TREATMENT OF TRANSTHYRETIN CARDIAC AMYLOIDOSIS (ATTR-CM) - REAL-WORLD DATA FROM A TERTIARY CENTER

Rita Almeida Carvalho, Sérgio Maltês, Gonçalo Cunha, Andreia Marques, Tânia Laranjeira, Catarina Brízido, Pedro Adragão, Miguel Mendes, Carlos Aguiar, Bruno Rocha

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Tafamidis 61 mg was shown to be the first treatment to reduce cardiovascular hospitalizations and to improve survival in patients with Transthyretin Amyloid Cardiomyopathy (ATTR-CM). Real-world data on the efficacy of transthyretin (TTR) stabilizers in patients with Heart Failure (HF) due to ATTR-CM is scare. Thus, we aimed to assess the use of tafamidis in our center, that features a dedicated Cardiomyopathy Clinic.

Methods: We conducted an all-comers single-centre prospective study of consecutive patients with symptomatic HF due to ATTR-CM followed up to November 2023. As per site protocol, the diagnosis was established according to the ESC algorithm and all patients were assessed at least twice yearly. Disease management plans include HF treatment tailored to ATTR-CM (CHAD-STOP) and treatment with disease-modifying tafamidis 61 mg. The latter is considered in patients who meet the local protocol criteria, including key inclusion criteria - NYHA class I-II - and none of the exclusion criteria - e.g. estimated glomerular filtration rate (GFR) < 25mL/min. The primary endpoint was time to cardiovascular hospitalization or all-cause death.

Results: A total 226 ATTR-CM patients were identified, of whom 181 had a follow-up of at least 6 months and were included in the analysis (mean age 84 ± 7 years; 81% males, 16% hATTR-CM). Overall, there were 84 patients treated with tafamidis. Compared to non-treated patients, those receiving tafamidis were younger (mean age 83 vs. 86 years, p = 0.007), more often with a lower NYHA functional class (e.g., NYHA I-II: 92 vs. 62%; p < 0.001), scored higher on performance scales (e.g., Karnovsky > 70: 67 vs. 33%; p < 0.001), and had less comorbidities (e.g., GFR: 40 vs. 30 mL/min; p < 0.001). Over a median follow-up of 16 months, 68 (37.6%) patients met the primary endpoint (49.5% vs. 22.6%, respectively; p < 0.001). In multivariate analysis, treatment with tafamidis was an independent predictor of the primary endpoint (HR 0.24; 95%CI 0.13-0.43; p < 0.001), adjusted for NYHA functional class (HR for NYHA I-II vs. III-IV: 0.54; 95%CI 0.32-0.92; p = 0.023), NT-proBNP (HR 1.83; 95%CI 1.09-3.08; p = 0.023) and high-sensitivity Troponin T (HR per 10 units: 1.01; 95%CI 1.01-1.02; p = 0.024). These findings were consistent in multivariate analysis with any combination of the prior variables with either creatinine, GFR, albumin, or TTR type (wild-type vs. mutated). These results were primarily driven due to association of tafamidis treatment with increased survival.

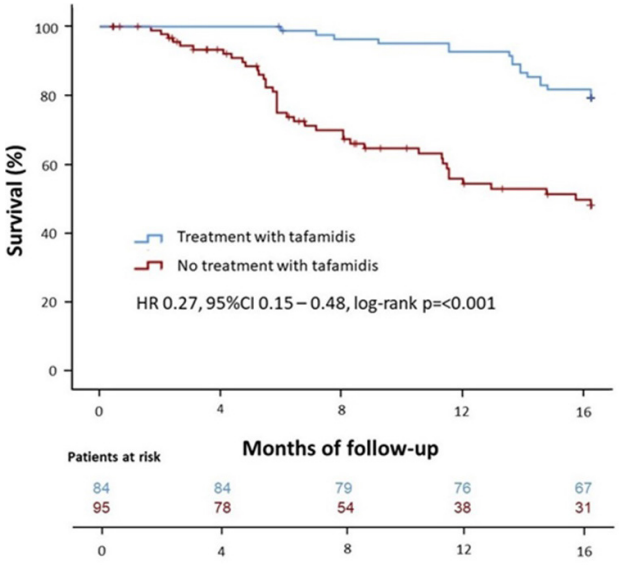


Figure 1: Kaplan-Meier survival curves for patients with ATTR-CM with and without treatment with tafamidis

Conclusions: The use of tafamidis in a cohort of patients with symptomatic HF and ATTR-CM was shown to be independently associated with reduced cardiovascular hospitalization or all-cause death. The effect had a similar magnitude of effect to that of the ATTR-ACT trial, suggesting that our local protocol based on the key criteria from this trial may allow for appropriate patient selection in a real-world setting.

CO 90. THE USE OF LATE GADOLINIUM ENHANCEMENT TO IMPROVE THE YIELD OF GENETIC TESTING IN DILATED CARDIOMYOPATHY

André Paulo Ferreira, Miguel Marques Antunes, Isabel Cardoso, José Viegas, Pedro Brás, Inês Almeida, Vera Ferreira, Diana Antunes, Rui Cruz Ferreira, Sílvia Aguiar Rosa

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Genetic testing has become an important tool in the work-up of dilated cardiomyopathy (DCM), aiding in family screening and providing information about prognosis and arrhythmic risk. Nonetheless, a significant proportion of patients with DCM present negative genetic test results. The "Madrid Score" was created to evaluate the likelihood of positive genetic tests and increase their yield in DCM patients.

Objectives: To determine if late gadolinium enhancement (LGE) assessment can improve the Madrid Score accuracy and increase the yield of genetic tests for DCM.

Methods: A single-centre retrospective study of patients diagnosed with DCM who underwent cardiac magnetic resonance (CMR) and genetic test between January 2017 and October 2023. The CMR imaging included the assessment of LGE. Multivariate logistic regression was performed and the model's change in performance was evaluated when adding LGE.

Results: A total of 90 patients with the diagnosis of DCM underwent CMR and genetic test during the study period. Patient's mean age was 51.0 ± 14.6 years, and 57.1% were male. The genetic test was positive (G+) in 42 (46.7%), and negative (G-) in 48 (53.3%) patients. A variant of uncertain significance was present in 31 (34.4%), and these were included in the

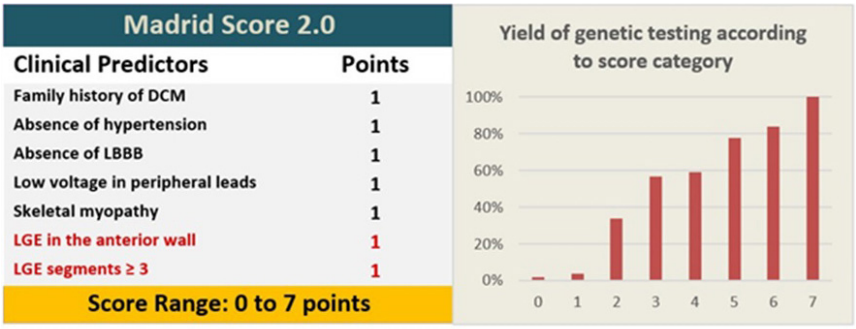


Fig 1 – Test version of the Madrid Score with the inclusion of LGE assessment.

Figure CO90

G- group. Most of the known independent predictors of a G+ given by the Madrid Score were significant in our cohort: Family history of DCM (OR: 4.82; CI: 1.73-11.60; p < 0.001), absence of hypertension (OR: 0.19; CI: 0.06-0.58; p < 0.001), absence of left bundle branch block (OR: 0.22; CI: 0.05-0.98; p = 0.047), and low electrocardiogram voltage in peripheral leads (OR: 3.13; CI: 0.87-11.26; p = 0.081). When analyzing the effect of LGE in the regression model (R^2 = 0.622, p < 0.001), we found that the number of LGE segments (OR: 2.54; CI: 1.10-5.90; p = 0.031), and the presence of LGE in the anterior wall (OR: 3.01; CI: 1.42-12.04; p = 0.041), were associated with a higher rate of positive genetic tests. When comparing both regression models, the incorporation of LGE increased the prediction power of the standard Madrid Score, correctly predicting 82.0% of the tests in our sample, with a probability of a G+ result ranging from 2% when all predictors were absent to 84% when ≥ 6 predictors, including LGE, were present.

Conclusions: Our study suggests that LGE assessment may enhance the Madrid Score performance and consequently improve genetic testing decisions in DCM, potentially leading to better use of the limited resources in our health care system.

SÁBADO, 20 ABRIL de 2024 | 14:30-15:30

Ágora | Prémio Manuel Machado Macedo em Cirurgia Cardíaca

CO 91. TECHNIQUE OF MINISTERNOTOMY IN AORTIC VALVE REPLACEMENT. DOES INTRAOPERATIVE CONVERSION TO FULL STERNOTOMY INCREASE MORBIDITY AND MORTALITY? A SINGLE CENTER ANALYSIS

Hagen Kahlbau, Pedro Félix, Valdemar Marques Gomes, Luís Miranda, Pedro Coelho

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Aortic valve replacement (AVR) through ministernotomy (MS) is considered a safe and reproducible surgical approach to treat aortic

Table 1: Patient characteristics

Male	53,7% (43)
Female	46,3% (37)
Age at surgery	67 (CI: 29; 87)
Hypertension	83,8%
Dislipidemia	67,5%
Smoker	3,75%
Former smoker	15%
Diabetes mellitus	13,75%
Renal insuficiency	3,75%
Chronic obstructive lung disease	7,5%
Cerebrovascular disease	5%
Mean Euro Score 2	1,1%
Mean STS Score Mortality	1,289%
Mean STS Score Morbidity	8,294%
Good preoperative LV function	97,5%

Table 2: Operative characteristics

Ministernotomy through 3rd IC	32,5% (26)
Ministernotomy through 4th IC	67,5% (54)
Bicuspide Valve	36,3% (29/80)
Morrow procedure performed	7,5% (6/80)
Mean time of surgery	178 min
Mean time of CPB	104 min
Mean time of aortic clamp	85 min

Table 3: Postoperative characteristics

Revision of hemostasis	0%
Mean time of ventilation (h)	6,9
Prolonged ventilation (> 24h)	0%
Mean total hemorrage (ml)	540
Blood transfusion (in mean 1 unit)	51,25%
Fresh frozen plasma	22,5%
Transient ischemic cerebral event	3,75%
Renal complications	0%
New onset of atrial fibrillation	3,75%
Wound infection	0%
Permanent Pacemaker	0%
Mean days in ICU (d)	2
Mean days in ward unit (d)	4
Mean hospital stay (d)	6
Readmission due to pleural effusion	2,5%
Mortality at 30 days	0%

Table 4: Patients	Reason for conversion to full sternotomy
1	Right atrial hemorrage
2	Anatomic difficulties (exposition right coronary annulus)
3	Aortic hemorrage
4	Perfuration of right ventricle
5	Anatomic difficulties (exposition right coronary annulus)

Figure CO91

valve diseases. The objective of this study is to analyze the impact of intraoperative conversion to full sternotomy in our case series.
Methods: Patients are selected to different surgical teams within our department. Two senior surgeons perform routinely MS in AVR and train residents and newly specialists. Patients with significant comorbidities such as previous cardiac surgery, dilated left ventricle, severe structural or thoracic alterations, hemodynamic instability or other cardiac diseases with surgical indication are excluded. If a complication occurs during surgery that jeopardizes the procedures' safety, conversion to full sternotomy should be performed. In our series a total of 80 patients were operated through a MS. Pre-operative characteristics are described in the Table 1.
Results: Intra- and post-operative characteristics are shown in Tables 2 and 3. A total of 5 patients (6,25%) needed conversion to full sternotomy. The reasons for conversions are stated in Table 4. Mean age of the converted group was significantly higher (mean age 74 years, CI: 62;87). There were no differences in the preoperative characteristics. Mean procedure time was 180 minutes, cardiopulmonary bypass time was 83 minutes and aortic cross clamp time 63 minutes. Mean ventilation time was significantly increased (mean 12,8 h), however with no prolonged ventilation (> 24 hours). Total hemorrhage was significantly increased (mean of 1,284 ml). All patients needed blood transfusions and/or fresh frozen plasma units. Postoperatively there was no occurrence of renal complications, new onset of atrial fibrillation or wound complications. Mean ICU and hospital stay was identical in the conversion group.
Conclusions: MS can be safely performed without increasing the risk of death or other major complications. In our series 5 patients needed to be converted (6,25%), which is within the range described in the literature. Significant differences were longer ventilation time and significantly increased total hemorrhage with need of blood transfusions and fresh frozen plasma units in all patients. Hospitalization time or major postoperative complications were not increased. Since necessity of conversion has not changed the clinical outcome, we conclude that MS is a strong alternative to full sternotomy.

CO 92. SURGICAL AORTIC VALVE REPLACEMENT FOLLOWING DECLINED TRANSCATHETER AORTIC VALVE IMPLANTATION

Pedro Félix, Inês Rodrigues, Tiago Mendonça, Duarte Cacela, Rui Ferreira, Valdemar Marques Gomes, Pedro Coelho, Hagen Kahlbau

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Aortic stenosis had a paradigm shift in treatment following the advent of transcatheter aortic valve implantation (TAVI). The number of TAVI procedures has been steadily increasing, surpassing in some centers the number of surgical aortic valve replacement (SAVR). The choice of intervention involves in some cases a multidisciplinary approach, with the Heart Team having a central role in this discussion. Patients with high and intermediate surgical risk are considered for TAVI. Those with contraindications to this approach are subsequently discussed for surgery. Outcomes of patients submitted to surgery after being refused for TAVI remain an area of scientific interest. Our goal was to study the subpopulation of patients that underwent SAVR after being refused for TAVI, regarding cause for refusal, surgical risk, complications and outcomes. We studied retrospectively all patients in a single center submitted to surgery after being initially evaluated for TAVI in the outpatient clinic. Data collection was limited to patient records previously documented. Our study period ranges from the beginning of this program in April 2017, to September 2023. A total of 61 patients were initially included. The most common reason to propose to surgery was low frailty (57%), followed by valve anatomy factors that contraindicated TAVI (16%), concurrent cardiac conditions (7%), vascular access contraindications for transfemoral TAVI (5%), and electrocardiographic anomalies (4%). The remaining cases did not have a clearly documented reason for refusal. We performed an analysis of the sub-population of patients with contraindications for TAVI (20/61). We observed a median age of 79 years, median EuroSCORE II of 1,98%, and median waiting time for surgery of 161 days. Surgery had no major complications in the vast majority of cases, with a median cross clamp time of 75 (± 18.5) minutes, and with 10% of cases via upper hemisternotomy. There were no re-interventions during hospital stay. Post-operative complications included 5% stroke, 10% atrial fibrillation, 10% pacemaker implantation, and no in-hospital mortality. Median post-operative hospital stay was 10 days. Median transvalvular mean gradient was 10 (± 7.5) mmHg. There was 1 case of mild and 1 case of moderate periprosthetic leak. We conclude that SAVR may be considered a relatively safe option with good results in high-risk patients previously refused for TAVI, after careful selection in multidisciplinary discussion.

CO 93. LONG-TERM OUTCOME OF ACUTE TYPE A AORTIC DISSECTIONS: A 20-YEAR SINGLE-CENTER CASUISTIC

António Canotilho, André Soeiro, Carlos Branco, Pedro Correia, Gonçalo F. Coutinho, Pedro E. Antunes, David Prieto

Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Acute type A aortic dissection is a life-threatening disease that develops suddenly and requires emergency surgery. However, a number of problems remain during the postoperative course. One problem is the wide age range of the patients.
Objectives: The aim of this study was to evaluate the 20-year results of emergency operations for acute type A aortic dissection of one single center.
Methods: We reviewed 194 patients who underwent surgical aortic repair of an acute type A aortic dissection from January 2000 to December 2020. Two patients were excluded. We analyzed the early and late outcomes, in-hospital death and difficulty of direct discharge to home.
Results: We collected 67% (n = 129) males on our study. Mean age of group was 61.3 ± 12.4 years, 26 of them older than 75 years. The preoperative data showed 80.7% of patients on NYHA III-IV (n = 155), 81.3% with stroke (n = 16), 16.1% with peripheral vascular disease (n = 31), 14.1% with COPD (n = 27), 9.4% on atrial fibrillation (n = 18), 33.9% (n = 65) with severe aortic regurgitation and a mean of LVEF of 52.4 ± 7.6%. Six patients with Marfan Syndrome and 1 patient with Turner Syndrome. Two exploratory sternotomy was performed with no need for ascending Aorta replacement. During surgery, central cannulation was performed in 24% (n = 46), 4 of them in brachiocephalic trunk, and femoral cannulation in 74% (n = 142). Isolated ascending Aorta replacement was performed in 56.8% (n = 109), associated with aortic valve replacement in 16.7% (n = 32), 8 biological and 24 mechanical prosthesis. We performed 14 *Bentall-De Bono* procedures (7.3%) and 16 aortic valve repair (8.3%). Combined with Aorto-coronary bypass 21 patients (10.9%). The mean extra-corporal circulation time was 116.5 ± 48.4 min, aortic cross-clamping time 58.1 ± 21.6 min and Circulatory arrest time 21.4 ± 7.1 min. The mean cooling temperature during extra-corporal circulation was 24.6 ± 2.4 ºC. About postoperative data, inotropic support > 12 hours was needed in 30.7% (n = 59), V-A ECMO in 2.1% (n = 4), ventilation time > 12 hours in 21.9% (n = 42), atrial fibrillation in 24.5% (n = 47), 3rd degree AV block with need of permanent pacemaker implantation in 3.6% (n = 7), pneumoniae in 8.9% (n = 17), acute kidney disease in 36.5% (n = 70) and stroke in 8.3% (n = 16). The mean timing to discharge was 16.2 ± 12.8 days. The 30-day mortality was 7.3% (n = 14): 4 of them during surgery and 4 before discharging. In the late follow-up period, the 5-year, 10-year and 15-year survivals rates were 85.2% ± 2.6%, 74 ± 3.6% and 63.7 ± 4.6%, respectively. The 5-year, 10-year and 15-year survivals rates free of MACCE events were 87.2 ± 2.7%, 83.1 ± 3.2% and 66.6 ± 4.8%, respectively.
Conclusions: From the perspective of saving lives, the results of single centre casuistic emergency surgery were very acceptable and showed the way we should adopt even in selected older patients.

CO 94. LEAD EXTRACTIONS IN A SINGLE CENTER: A RECTROSPECTIVE ANALYSIS OVER THE LAST 26 YEARS

Maria Resende, Márcio Madeira, João Carmo, João Aquino, Inês Alves, Paulo Oliveira, Tiago Nolasco, Marta Marques, Pedro Adragão, Miguel Abecasis, José Pedro Neves, Miguel Sousa-Uva

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: The number of cardiovascular implantable electronic devices has increased over recent years. As a result, more of them will require removal over

Table 1 - Definitions of success	
Procedure (patient)-related:	Lead- related:
Complete procedural success: Removal of all targeted leads.	**Complete removal:** Removal of all targeted leads material.
Clinical procedural success: Retention of a small portion (<4cm) that does not negatively impact the outcome.	**Incomplete removal:** Part of the lead remains in the patient's body. • **Radiological failure**: >4cm of the lead remains in the patient's body.
Procedural failure: Inability to achieve either complete procedural or clinical success.	

Figure CO94

time. Clinical research is essential for understanding efficacy and risks of lead extractions, predictors of procedural failure and other major complications.
Objectives: Analyze lead extractions performed in our medical and surgical center from 1997 to 2022 and comparison between two periods (first and last 13 years).
Methods: Lead explants with < 1 year were excluded. Definitions as in 2018 EHRA expert consensus described in the Table. The primary composite endpoint represents is defined by major procedure-related complications. Secondary endpoints included procedural and clinical success, incomplete removal, and re-infection.
Results: The population included 270 patients (448 leads); [mean age 68 (8–92) years; 77% men]. In the first period the complete procedural success rate was 88%, clinical success rate 95% and procedural failure rate 5%. In the second period the complete procedural success rate was 84%, clinical success rate was 92% and the procedural failure rate was 8%. The primary composite endpoint rate was 12% including a mortality of 2%. The incomplete removal rate was 16%, radiological failure of 8%. On univariate analysis, regarding the second period the independent predictor of primary composite endpoint was leads with a dwell time > 10 years (OR 2.77, 95%CI 1.07-7.14, p = 0.035). Predictors of procedure-related death: incomplete removal (OR 17.64, 95%CI 1.76-176.39, p = 0.015); radiological failure (OR 43.90, 95%CI 4.21-457.72, p = 0.002); COPD (OR 10.78, 95%CI 1.40-82.53, p = 0.022) and re-infection (OR 20.50, 95%.5-164.82, p = 0.005). LASER sheaths were independent predictors of incomplete removal (OR 3.08, 95%CI 1.77-8.07, p = 0.022).Radiological failure and incomplete removal were also predictors of re-infection (OR 6.03, 95%CI 1.36-26.64, p = 0.018) and (OR 6.21, 95%CI 1.66-23.16, p = 0.006) respectively.
Conclusions: Incomplete lead removal and radiological failure were predictors of procedure-related death and re-infection. LASER sheaths were associated with a higher rate of incomplete removal. Leads with a dwell time > 10 years were found significant predictors of the primary composite endpoint. Surgical extractions were not associated with worst outcomes.

SÁBADO, 20 ABRIL de 2024 | 16:30-18:00

Ágora | Sessão Melhores Comunicações Orais

CO 95. CORONARY ATHEROSCLEROTIC BURDEN IN MASTER ATHLETES: RELATIONSHIP WITH CARDIOVASCULAR RISK AND VOLUME OF EXERCISE

Joana Certo Pereira[1], Rita Reis Santos[1], Francisco Moscoso Costa[1], José Monge[1], Pedro de Araújo Gonçalves[1], Hélder Dores[2]

[1]Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [2]Hospital da Luz Lisboa.

Introduction: Although prior studies suggesting an association between coronary artery calcification (CAC) and lifelong exercise, the clinical relevance and mechanisms for this interaction remains unknown. Recent evidence suggests that a significant amount of exercise might not be linked to a more favourable composition of coronary plaques. We aimed to analyse

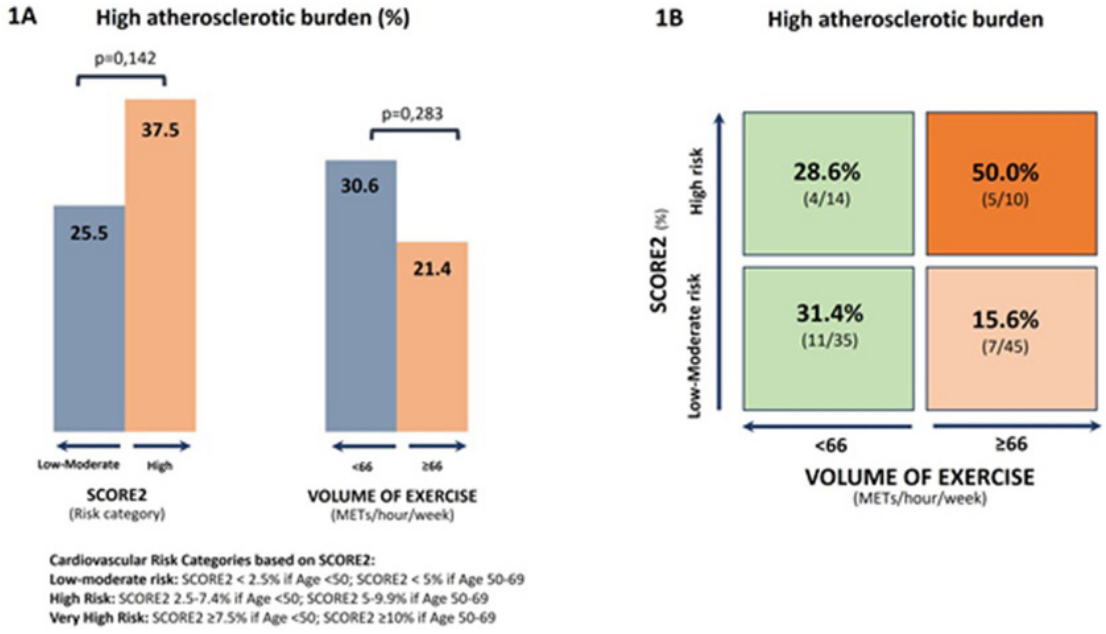


Figure CO95

the prevalence of high coronary atherosclerotic (CAS) burden assessed by coronary CT scan (CCTA) in master athletes, according to cardiovascular (CV) risk and volume of exercise.

Methods: A total of 105 master male athletes (48 ± 5.6 years old), asymptomatic and without known CV disease, were prospectively studied. A high CAS burden was defined as the presence of at least one of the following characteristics in CCTA: CAC score > 100; CAC score > 75th percentile; obstructive plaques; plaques in the left main, three vessels or two vessels including the proximal anterior descending artery; segment Involvement Score (SIS) > 5; CT-adapted Leaman score (CT-LeSc) ≥ 5. This variable was evaluated according to the CV risk, stratified by SCORE2, and volume of exercise, determined by metabolic equivalent task score (MET/hour/week).

Results: Most athletes (n = 88) were engaged in endurance sports, during 17.1 ± 9.8 years, with a median exercise volume of 66 [IQR 44-103] METs/hour/week. The mean SCORE2 was 2.8 ± 1.5%, with 76.9% of athletes classified as having a low to moderate CV risk, and none having very high-risk. A high CAS burden was present in 25.7% of the athletes, without significant differences according to the SCORE2 risk categories [Low-Moderate vs. High Risk: 25.5% vs. 37.5%, respectively; p = 0.142] nor volume of exercise [below vs. above median: 30.6% vs. 21.4%, respectively; p = 0.283)] (Figure 1A). Combining these variables, athletes with high CV risk and a high volume of exercise showed significantly higher occurrence of a high CAS burden compared to those with low-moderate risk and high volume of exercise (50% vs. 15.6%; p = 0.017). Among athletes with low-moderate risk, high volume of exercise trended to be protective (15.6% vs. 31.4%; p = 0,092), while there was a similar rate of high CAS burden in athletes with low volume of exercise, independently of risk class (Figure 1B).

Conclusions: In our cohort of master athletes, one fourth demonstrated a high burden of CAS burden evaluated by CCTA. While a higher volume of exercise combined with high cardiovascular risk showed an association with worse coronary composition it trended to be protective in athletes with lower risk. Integrating clinical and exercise-related data is crucial for evaluating athletes amidst the complex associations between exercise, cardiovascular risk, and CAS burden, necessitating longitudinal studies for comprehensive understanding.

CO 96. NON-INVASIVE DERIVATION OF IFR FROM INVASIVE CORONARY ANGIOGRAPHY USING A NEW DEEP LEARNING AI MODEL AND COMPARISON WITH HUMAN OPERATORS' PERFORMANCE

Catarina Simões de Oliveira[1], Miguel Nobre Menezes[1], João Lourenço Silva[2], João Silva Marques[1], Cláudia Moreira Jorge[1], Ana Rita Francisco[1], Beatriz Silva[1], Marta Vilela[1], Rita Marante de Oliveira[3], Tiago Rodrigues[1], Arlindo L. Oliveira[2], Fausto J. Pinto[1]

[1]Structural and Coronary Heart Disease Unit, Cardiovascular Center of the University of Lisbon (CCUL@RISE), Faculdade de Medicina, Universidade de Lisboa; Serviço de Cardiologia, Departamento de Coração e Vasos, CHULN Hospital de Santa Maria. [2]INESC-ID, Instituto Superior Técnico, Universidade de Lisboa; Neuralshift Inc. [3]Faculdade de Medicina, Universidade de Lisboa.

Introduction: Coronary angiography (CAG) derived physiology methods have been developed to simplify and increase the usage of coronary physiology, by removing or reducing its invasive nature. Almost all studies have focused on FFR (only a single, yet unpublished study, focused on iFR), based mostly on dynamic fluid computational algorithms. We aimed to develop a different approach based solely on artificial intelligence (AI) methods, to fully automatically derive iFR from CAG images alone.

Methods: Consecutive patients undergoing invasive iFR measurements were included. We developed an AI model capable of classifying target lesions as positive (iFR ≤ 0,89) or negative (iFR > 0,89) based solely on standard CAG images. Three Interventional Cardiologists were also asked to classify the target lesions binarily as well. The predictions of both AI and operators were then compared to the true invasive measurements, by calculating accuracy, negative predictive value (NPV), positive predictive value (PPV), sensitivity and specificity, as well as Area Under the Curve (AUC) by ROC curve analysis.

Results: 250 measurements, from 223 patients (age 68 ± 11 years old, 66.37% male), were included (Table 1). iFR was performed predominantly in a chronic setting (66.37%), and in acute coronary syndromes (33.18%) functional assessment was only performed in non-culprit vessels ≥ 48h after the index event. Left descending coronary artery (LAD) was the most evaluated vessel (51.6%), followed by right coronary artery (RCA) and circumflex (Cx) (Table 2). For AI, the accuracy, NPV, PPV, sensitivity and specificity were 72%, 90%%, 48%,

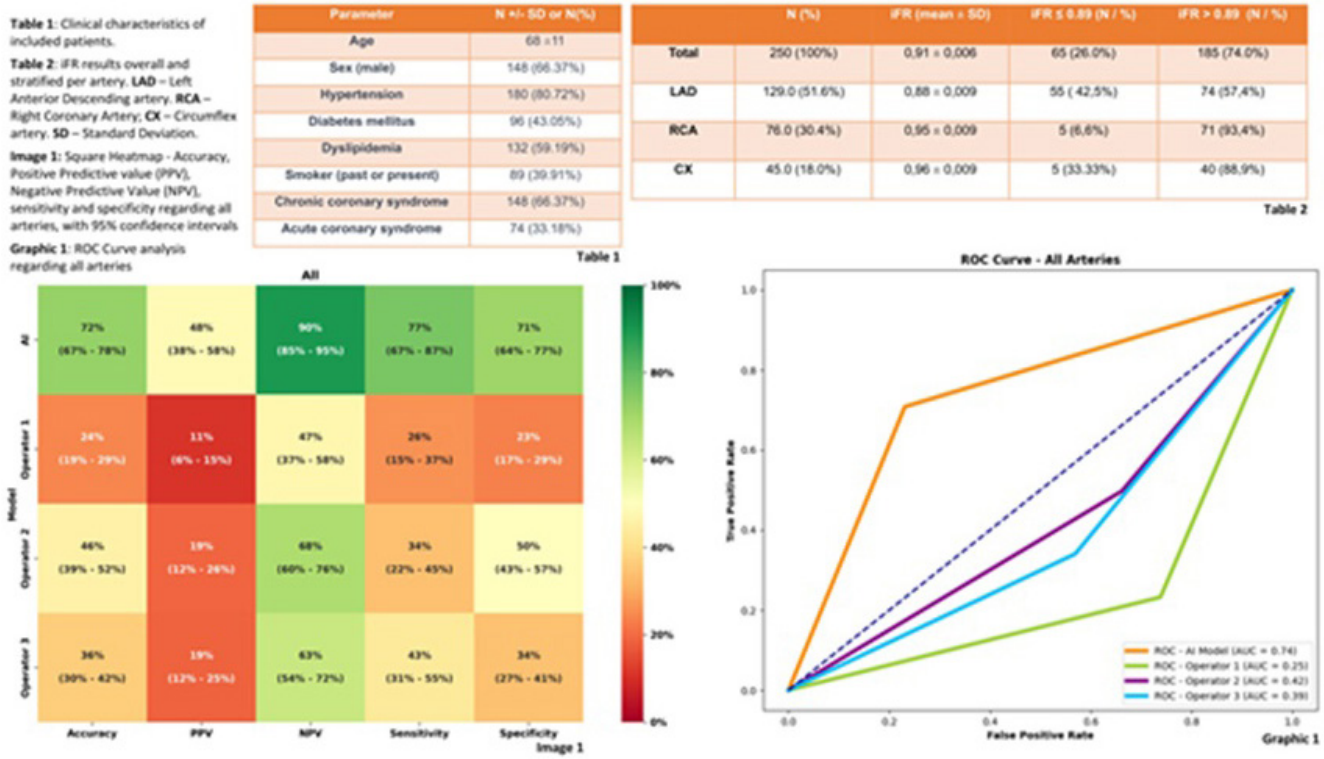


Figure CO96

77% and 71%, respectively. All three operators had an inferior performance to AI, with an accuracy ranging from 24 to 46%, NPV 47 to 68%, PPV 11 to 19%, sensitivity 26 to 43% and specificity 23 to 50% (Image and Graphic). Performance differed per target vessel, but the superiority of AI persisted when individual vessels were considered. The best performance of AI was for the RCA (accuracy 86%, NPV 97%), followed by Cx (accuracy 69%, NPV 96%) and LAD (accuracy 66%, NPV 78%). For operators, the best performance was for the LAD (accuracy ranging from 33 to 50%), RCA (accuracy ranging from 17 to 50%) and Cx (accuracy ranging from 9 to 27%).
Conclusions: We developed an AI model capable of binary iFR estimation from CAG images, with superior performance to human operators' predictive capability for all metrics. Despite modest accuracy, the consistently high NPV is of potential clinical significance, as it would enable avoiding further invasive manoeuvres after CAG. This is especially relevant because most iFR measurements in this dataset were negative (> 0,89), as in previously published iFR studies.

CO 97. LONG TERM PROGNOSIS OF IDIOPATHIC VENTRICULAR ARRHYTHMIAS: AN EIGHTEEN-YEAR EXPERIENCE FROM A TERTIARY CENTER

Cátia Oliveira[1], Ana Pinho[1], Luís Santos[1], Ricardo Pinto[1], Sílvia Oliveira[2], Helena Moreira[1], Miguel Rocha[1], Pedro Palma[1], Gonçalo Pestana[1], Marta Madeira[1], Ana Lebreiro[1], Luís Adão[1]

[1]Centro Hospitalar Universitário de S. João, EPE. [2]Unidade Local de Saúde de Matosinhos, EPE/Hospital Pedro Hispano.

Introduction: Idiopathic ventricular arrhythmia (IVA) is diagnosed in patients (pts) who survived sudden cardiac death (SCD) due to ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) without any identifiable structural or electrical cause after extensive investigation. The exact incidence of IVA is unknown but is declining with the advance of diagnostic testing and identification of primary arrhythmic syndromes, but current evidence still provides limited guidance on the diagnosis and follow-up of these pts. Our aim was to assess the clinical outcomes of survivors of an aborted SCD attributed to IVA.
Methods: We retrospectively collected clinical and technical data of a sample of pts who survived IVA and implanted a cardiac defibrillator (ICD) between 2005 and 2023. Median follow-up time was 5 years.

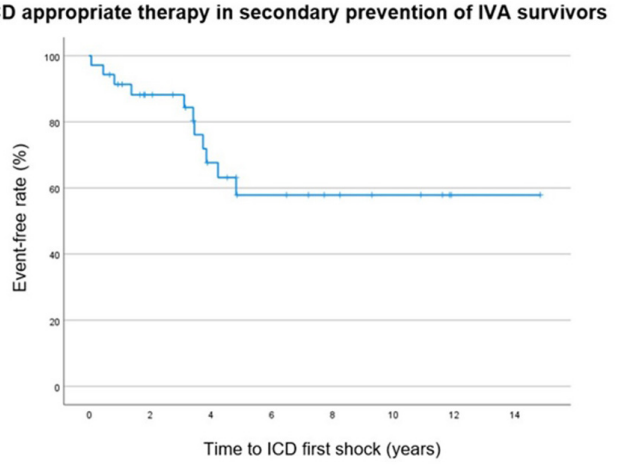


Figure 1. Representation of time to ICD therapy in patients with idiopathic ventricular arrhythmias. Most of the patients had ICD therapies in the first 5 years after implantation. Almost 60% of the cohort remained event-free during follow-up.

Results: A total of 38 pts, 36.8% female, with a mean age of 44 ± 14 years-old at the time of aborted SCD were included. The type of ICD implanted was: 64.9% transvenous single chamber, 21.6% dual chamber and 13.5% subcutaneous. Upon medical arrival, the initial rhythm was VF in 73.7% and pVT in 26.3%. SCD occurred during daily life activities in 52.9%, 17.6% at rest, 11.8% during emotional stress, 11.8% during exercise and 5.9% while asleep. Of note, 13.9% of pts had a previous history of syncope and 15.8% had family history of SCD. Normal ECG was present in 72.2% of pts. All pts underwent a comprehensive diagnostic evaluation, including invasive/noninvasive coronary angiogram and echocardiogram (all pts), cardiac magnetic resonance (78.6%), genetic testing (37.2%), electrophysiology study (18.4%), pharmacological provocative test (13.5%) and endomyocardial biopsy (2.6%). During long-term follow-up, a diagnosis was established in 34.2% of pts. Specifically, 3 events were attributed to coronary vasospasm, 3 to short coupled polymorphic VT, 3 to long QT syndrome, 2 with Brugada syndrome, 1 to arrhythmogenic cardiomyopathy, and in 1 patient an ANK2 mutation was identified. Genetic testing improved the diagnosis and allowed identification of a clinical entity in 47.1% of pts (p = 0.04, OR = 4.7). Concerning clinical outcomes, 5.3% pts died (all due to non-arrhythmic causes) and 36.4% received appropriate therapies (Figure) with a median time to first shock of 33 (IQR 11.4-43.2) months. Also, 13,9% experienced inappropriate shocks (60% sinus tachycardia and 40% supraventricular tachycardias).
Conclusions: Etiological diagnosis and recurrence prediction in pts with IVA poses considerable challenges, even with extensive diagnostic evaluation and long-term follow-up. Our study reveals that genetic testing played a crucial role in enhancing the diagnostic yield. Consistent with previous findings, our cohort experienced a notable arrhythmic recurrence in about one-third of pts, with no cardiac deaths. These results underline the pivotal role of ICD implantation in these pts.

CO 98. COMPUTED TOMOGRAPHY-DERIVED MYOCARDIAL EXTRACELLULAR VOLUME AS A PROGNOSIS PREDICTOR IN PATIENTS WITH SEVERE AORTIC STENOSIS

Rita Reis Santos, Rita Carvalho, Pedro M. Lopes, Francisco Gama, Pedro Freitas, Sara Guerreiro, João Abecasis, Carla Saraiva, Rui Campante Teles, Manuel de Sousa Almeida, Pedro Adragão, António M. Ferreira

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Patients with severe aortic stenosis (AS) face a higher risk of mortality, but prognosis is still heterogeneous and tools for prioritizing intervention are needed. Myocardial extracellular volume (ECV), measured non-invasively in pre-TAVR computed tomography (CT), is a marker of fibrosis that may reflect the degree of irreversible damage. The aim of this study was to assess the prognostic value of CT-derived ECV (ECV_{CT}) in patients with severe AS referred for TAVR-planning CT.
Methods: Consecutive patients with severe symptomatic AS undergoing TAVR-planning CT between April and December 2022 at single centre were prospectively included. CT was performed on a 192-slice dual-source 3rd generation scanner. ECV_{CT} was acquired during TAVR-planning using an additional post-contrast low-radiation-dose prospective acquisition. ECV_{CT} was calculated as the ratio of change in CT attenuation (Hounsfield units [HU]) of the septal myocardium and the left ventricle (LV) blood pool before and after contrast administration, according to the equation: ECV_{CT} = (1 – hematocrit) × (DHU_{myo}/DHU_{blood}) (Figure A). The primary endpoint was all-cause mortality. The secondary endpoint was a composite endpoint including all-cause mortality and heart failure hospitalization.
Results: A total of 138 patients were included (mean age 81 ± 7 years; 46% male; mean transaortic gradient 51 ± 15 mmHg; mean aortic valve area 0.75 ± 0.19 cm^2; mean LV ejection fraction (EF) by 2D echocardiogram 57 ± 11%). No patient had a clinical diagnosis of cardiac amyloidosis. Mean ECV_{CT} was 33.9 ± 8.0%. During a median follow-up period of 386 days (IQR 332 – 464), there were 18 deaths (13%), 13 before intervention and 5 after intervention; the secondary endpoint occurred in 26 patients (19%), 17 of which before intervention and 9 after. Patients who attained the primary endpoint were significantly older [81 ± 7 vs. 85 ± 7 years, p = 0.011], had lower left ventricular ejection fraction [51 ± 11 vs. 58 ± 11%, p = 0.015], higher NTproBNP levels [4,739 (IQR 2,003 – 9,970) vs. 751 (IQR 314 – 2,541), p < 0.001] and higher ECV values (39.9 ± 7.4% vs. 33.0 ± 7.7%, p < 0.001). After adjustment for age, LVEF and NTproBNP levels, ECV_{CT} remained an independent predictor of all-cause mortality (adjusted HR 1.09 per 1% ECV increase, 95%CI 1.02 – 1.17, p = 0.005 – Figure B) and also the secondary endpoint (adjusted HR 1.07 per 1% ECV increase, 95%CI 1.01 – 1.13, p = 0.002).

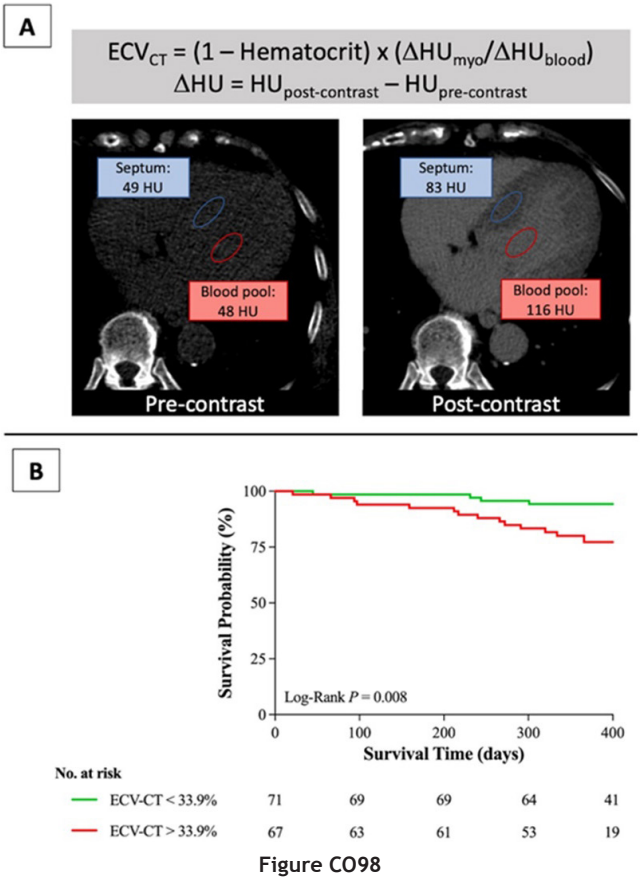


Figure CO98

Conclusions: In this prospective observational cohort study, interstitial fibrosis assessed by CT-derived ECV was associated with poor outcomes in patients with severe AS. ECV_{CT} values may be useful to identify a subgroup of patients with higher risk who may benefit from earlier intervention.

CO 99. LONG-TERM OUTCOMES OF VENTRICULAR TACHYCARDIA ABLATION IN PATIENTS WITH ISCHEMIC AND NON-ISCHEMIC CARDIOMYOPATHY: A PROPENSITY-SCORE MATCHED ANALYSIS

Daniel A. Gomes, Mariana Sousa Paiva, Daniel Nascimento Matos, Ana Rita Bello, Gustavo Rodrigues, João Carmo, Francisco Moscoso Costa, Pedro Galvão Santos, Pedro Carmo, Diogo Cavaco, Francisco Bello Morgado, Pedro Adragão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Catheter ablation (CA) has been shown to be effective in the treatment of ventricular tachycardia (VT). Although some observational data suggest patients with non-ischemic cardiomyopathy (NICM) have less favorable clinical outcomes when compared to those with an ischemic etiology (ICM), direct comparisons are scarcely reported. We aimed to compare the outcomes of VT ablation in a propensity score-matched population of ICM or NICM patients.
Methods: Single-center observational registry including 246 consecutive patients with ischemic (ICM, N = 166) and non-ischemic cardiomyopathy (NICM, N = 80) who underwent drug-resistant VT ablation from 2012 to 2023. A propensity score (PS) was used to match patients in a 1:1 fashion according to the following variables: age, sex, left ventricular ejection fraction (LVEF), NYHA class, electrical storm (ES) at presentation, and previous endocardial VT ablation. The outcomes of interest were VT recurrence and all-cause mortality.
Results: The PS yielded two groups of 71 patients each (mean age 63 ± 10 years, 92.3% male, mean LVEF 35 ± 10%, 35.9% with ES at presentation,

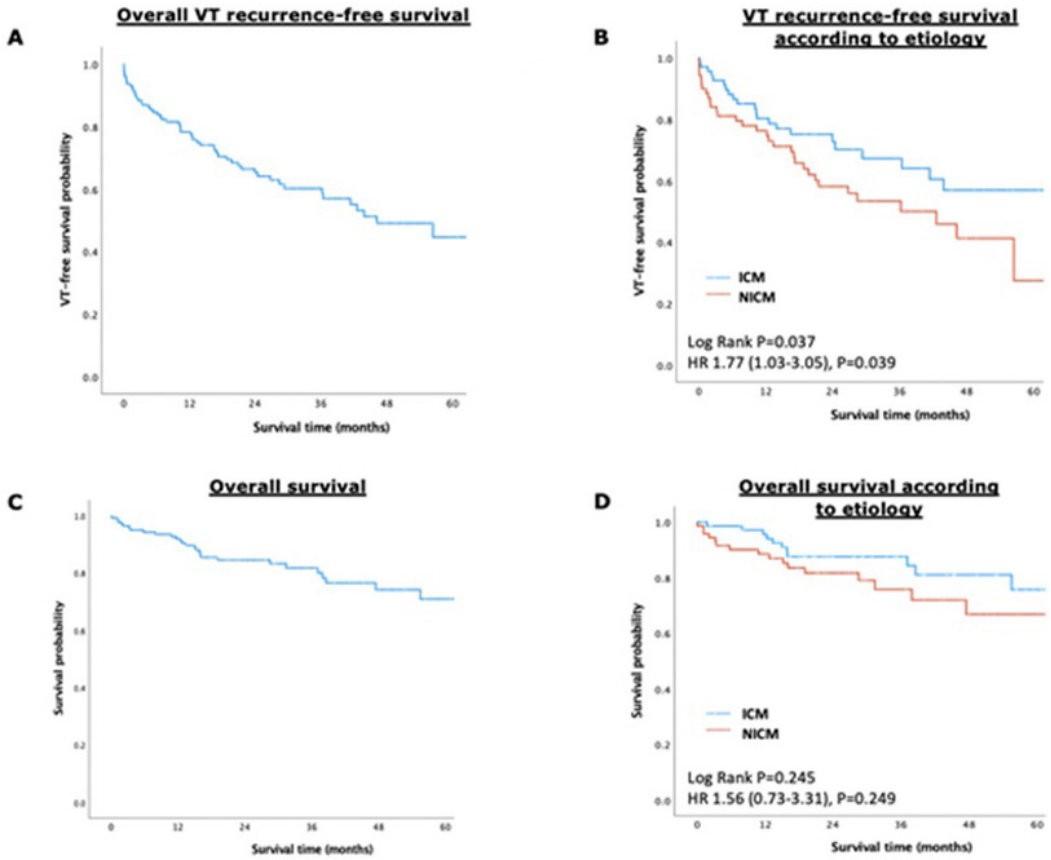


Figure CO99

and 23.2% with previous ablation), well matched for baseline characteristics. Those with NICM were more likely to undergo epicardial or combined VT ablation (43.7% vs. 9.9%, p < 0.001). The procedural complication rate was low (4.9%, N = 7) and similar between groups (P > 0.05). During a median follow-up of 27 (IQR 15–45) months, patients with NICM had a significantly higher rate of VT recurrence (46.5% vs. 31.0%, log-rank p = 0.037), although there were no differences regarding all-cause mortality (22.5% vs. 16.9%, log-rank p = 0.245) (Figure). Multivariate analysis identified NICM (HR 2.34 [95%CI 1.32–4.14], p = 0.004), NYHA class III/ IV (HR 2.11 [95%CI 1.11–4.04], p = 0.024), and chronic kidney disease (HR 2.23 [95%CI 1.25–3.96], p = 0.006), as independent predictors of VT recurrence. Non-inducibility of any VT immediately after ablation was associated with significantly lower rates of VT recurrence during follow-up (22.8%/ year vs. 42.4%/ year, log-rank p = 0.03).

Conclusions: NCIM patients are at increased risk of VT recurrence after ablation, although long-term mortality is similar to ICM in a propensity-matched cohort. Non-inducibility of any VT after CA is associated with better outcomes.

DOMINGO, 21 ABRIL de 2024 | 08:30-09:30

Fenix 2 | Comunicações Orais - Sessão 13 - Miocardiopatias

CO 61. UNRAVELING THE COMPLEXITY OF HYPERTROPHIC CARDIOMYOPATHY: A MACHINE LEARNING-BASED RADIOMICS MODEL TO PREDICT PHENOTYPE AND CARDIOVASCULAR EVENTS

Inês Pereira de Miranda[1], Miguel Marques Antunes[2], Vera Ferreira[2], Mara Sarmento[1], Filipa Gerardo[1], Mariana Passos[1], Carolina Pereira Mateus[1], Joana Lima Lopes[1], Sílvia Aguiar Rosa[2], João Bicho Augusto[1]

[1]Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra.
[2]Hospital Santa Marta.

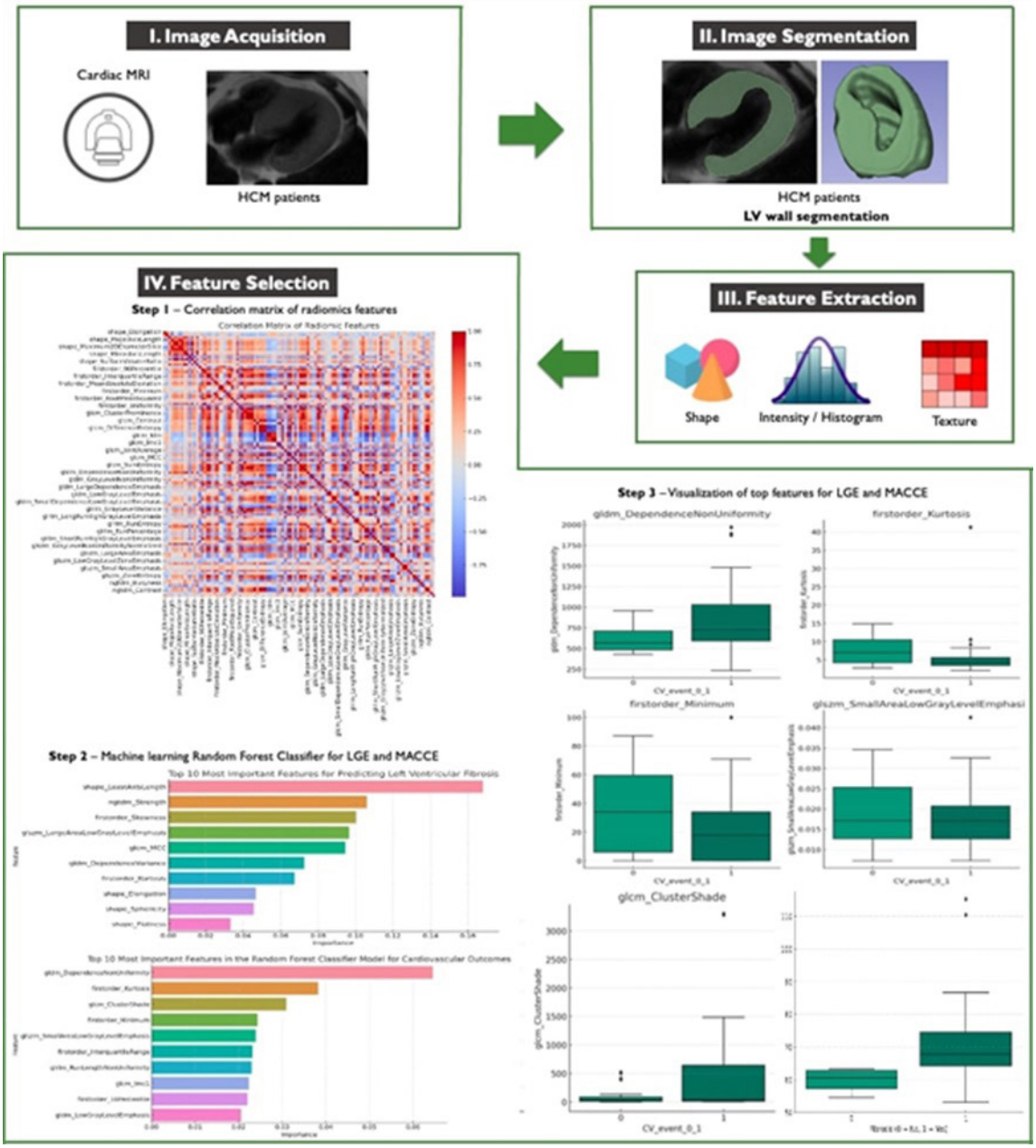


Figure CO61

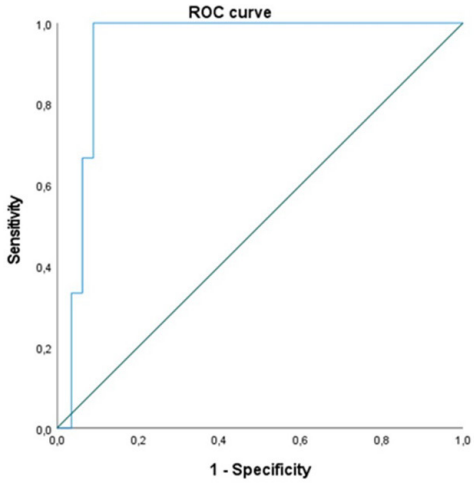
Introduction: Late gadolinium enhancement (LGE) imaging from cardiovascular magnetic resonance (CMR) plays a crucial role in the diagnosis and risk stratification of patients with hypertrophic cardiomyopathy (HCM). However, acquisition time can be long and some patients have contraindication to paramagnetic contrast. Simple, fast and widely available non-contrast single-shot fast spin echo black-blood (SS-FSE-BB) sequences can provide insights into the ultrastructure of the myocardium in HCM.
Objectives: To assess radiomic models based on left ventricle (LV) images from SS-FSE-BB sequences and (1) compare with other imaging characteristics of HCM, particularly LGE, and (2) predict the risk of cardiovascular events in HCM patients.
Methods: We conducted a single-center study on 52 HCM patients who underwent CMR. SS-FSE-BB is widely used and acquired as a transaxial stack in beginning of the scan (without contrast), with < 60 s acquisition time. We excluded patients with poor imaging quality or missing this CMR sequence. The LV was segmented using a semi-automated tool with minimal input from the user. A total of 107 radiomics features were extracted using the PyRadiomics v3.1.0 library which included first-order, textural, shape and size. The primary endpoint was a composite of major adverse cardiac and cerebrovascular events (MACCE) defined as all-cause death, admission for acute/decompensated heart failure, malignant arrhythmia, cardiac syncope, myocardial infarction, ischemic stroke and/or complete heart block. We first conducted correlation analyses with visualization of matrix, to exclude redundant/correlated features. Then we implemented a Machine Learning Random Forest Classifier (ML-RFC) model to explore the HCM phenotype and cardiovascular events.
Results: A total of 46 CMR scans were suitable for analysis (age 60 ± 15years, 43.5% female). 56.5% of patients had septal HCM, 15.2% had apical HCM and 8.7% had mixed disease. LV obstruction at rest was present in 14 (30.4%) patients, 40 (87%) had LGE, and MACCE occurred in 31 (67.4%) patients. The ML-RFC models for both LGE and MACCE are presented in the Figure. Longer LV least axis length (a shape feature that reflects the smallest axis length) was the only radiomics feature significantly associated with LGE (higher in patients with LGE, median 67.9 [IQR 57.8-67.9] vs. 60.5 [57.7-63.2], p = 0.0106). Patients who experienced MACCE displayed myocardial LV texture features of heterogeneity, with higher Dependence Non-Uniformity (728 [590-1,029] vs. 566 [482-711], p = 0.0191]) than patients without MACCE; other factors were not significant.
Conclusions: Radiomic features in simple, fast and widely available SS-FSE-BB sequences provide relevant information in HCM patients in less than a minute of CMR scan, without the need for paramagnetic contrast. This tool could simplify current CMR protocols and improve risk stratification in HCM.

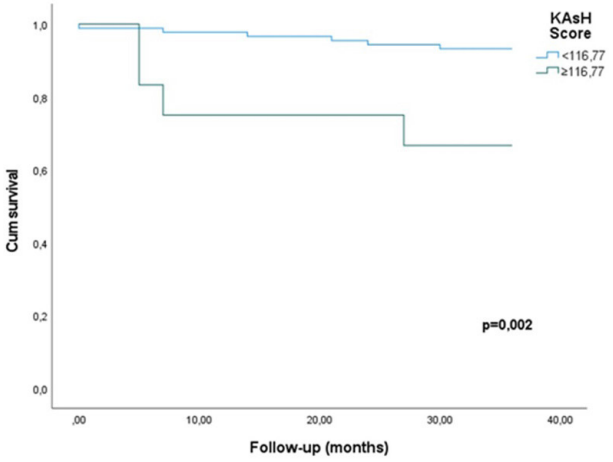
CO 62. KASH SCORE – A CLINICAL SCORE TO PREDICT IN-HOSPITAL MORTALITY IN TAKOTSUBO SYNDROME

Isabel Martins Moreira, Catarina Ribeiro Carvalho, Marta Catarina Bernardo, Luís Sousa Azevedo, Pedro Rocha Carvalho, Catarina Ferreira, Pedro Magalhães, Inês Silveira, Ilídio Moreira

Centro Hospitalar de Trás-os-Montes e Alto Douro, EPE/Hospital de Vila Real.

Introduction: Medical scoring systems are practical tools for decision making and prognostic assessment. Recent evidence suggests comparable in-hospital and long-term outcomes between takotsubo syndrome (TTS) and acute coronary syndrome. However, there is paucity of specific scoring systems for risk stratification in TTS patients.
Objectives: KAsH score is a simple score designed to predict in-hospital mortality in myocardial infarction patients at first medical contact, with easily obtainable parameters of daily clinical practice. The present study aimed to test the applicability of KAsH score in predicting in-hospital mortality in TTS.
Methods: We performed a retrospective analysis of patients admitted with TTS in our centre over the last 15 years. Patients' baseline characteristics, clinical management and outcome data were collected. KAsH score at hospital admission was calculated using the following formula: KAsH = (Killip class × Age × Heart rate)/Systolic blood pressure (SBP). The score's capacity to predict in-hospital mortality was analysed using ROC curves and their respective area under the curve (AUC). The optimal KAsH score cut-off for our population was determined through ROC curve analysis.
Results: A total of 121 patients were included, with a mean age of 71 ± 12 years, mostly female (86%). Mean heart rate at admission was 82 ± 18/min and mean SBP was 130 ± 27 mmHg. Most patients were at Killip class I at admission (62%), followed by class II (37.2%). In-hospital mortality was 3.3%, with a median hospital stay of 5 ± 4 days. In ROC curve analysis, KAsH score displayed excellent predictive power for in-hospital mortality in TTS population (AUC: 0.937, p = 0.010 and 95%CI 0.889-0.986). The optimal KAsH score cut-off was 116.77 (100% sensitivity and 91% specificity). The adjusted probability of in-hospital mortality for patients with KAsH score ≥ 116.77 was 22.2%. At 3-year follow-up, using a Kaplan-Meyer survival analysis, mortality was significantly higher in patients with KAsH score ≥ 116.77 (log-rank p = 0.002).





Conclusions: KAsH score exhibited excellent predictive power for in-hospital mortality in TTS patients in our study. It is an easily applicable score that could serve as a valuable clinical tool to identify higher-risk patients. Nevertheless, external validation in a larger population is still needed.

CO 63. INVASIVE QUANTITATIVE ASSESSMENT OF CORONARY MICROVASCULAR DYSFUNCTION IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

Miguel Marques Antunes, Francisco Barbas Albuquerque, Duarte Cacela, Rúben Ramos, Tiago Mendonça, Pedro Garcia Brás, Isabel Cardoso, Eunice Oliveira, Ana Santana, Rui Cruz Ferreira, Sílvia Aguiar Rosa, António Fiarresga

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Patients (P) with hypertrophic cardiomyopathy (HCM) commonly suffer from coronary microvascular dysfunction (CMD) - the affection of function/structure of the coronary microvasculature. Invasive assessment of CMD through thermodilution methods allows for the calculation of coronary flow reserve (CFR) and index of microvascular resistance (IMR). These methods, while extensively studied in the context

Table 1 – General patient characteristics

Baseline characteristics	n = 25
Age - yr	63±10
Female sex - n (%)	14 (56%)
Hypertension - n (%)	13 (52%)
Dyslipidemia - n (%)	5 (20%)
Active smoker - n (%)	3 (12%)
Angina – n (%)	12 (48%)
CCS class – [IQR]	1 [0-2]
NYHA class [IQR]	2 [1-3]
Obstructive MCH phenotype – n (%)	20 (80%)
Drugs	
Beta-Blocker - n (%)	20 (80%)
Calcium channel blockers – n (%)	8 (32%)
ACEi/ARAII - n (%)	7 (28%)
Transthoracic Echocardiography	
Maximal wall thickness – mm ± SD	19 ±3
Left ventricular ejection fraction - % ± SD	67±7
Left atrium diameter – mm [IQR]	73 [48-80]
Resting left ventricular outflow tract gradient - mmHg [IQR]	50 [11-69]
Provoked left ventricular outflow tract gradient - mmHg [IQR]	107 [53-138]

Table 2 – Invasive hemodynamic assessment

Invasive assessment	n = 25
Distal coronary pressure (Pd) - [IQR]	70 [63-77]
Resting mean transit time (TmnRest) [IQR]	0.61 [0.45-0.79]
Hyperemic mean transit time (TmnHyper) [IQR]	0.28 [0.22-0.31]
Coronary Flow Reserve (CFR) , [IQR]	2.5 [1.5-3]
Index of Myocardial Resistance (IMR) , [IQR]	19 [14-22]
CRF < 2 – n (%)	13 (44%)
IMR > 22 – n (%)	5 (20%)
Structural CMD pattern - CFR < 2 and IMR > 22, n (%)	2 (8%)
Functional CMD pattern - CFR < 2 and IMR < 22, n (%)	10 (40%)
IMR/CFR pair within normal range – n (%)	12 (48%)
IMR/CFR concordance – n (%)	14 (56%)

Table 3 – Linear regression model of clinical predictors of IMR/CFR variation

Independent Variable	IMR	Linear regression	p-value
Patients with angina	21	5.3 (95%CI -0.05 – 11)	0.052
CCS =0	12	-	-
CCS =1	20	7 (95%CI 0.68 – 14)	0.033
CCS=2	21	9 (95%CI 4 – 14)	0.002
CCS=3	23	10 (95%CI 2 – 18)	0.011
Independent variable	**CFR**	**Linear regression**	**p-value**
Patients with angina	2.1	-0.74 (95%CI -2.1 – 0.67)	0.29
CCS =0	3.9	-	-
CCS =1	2.7	- 1.17 (95% CI -3.78 – 1.42)	0.35
CCS=2	1.89	- 2.0 (95% CI -4.03 – -0.03)	0.05
CCS=3	2.0	- 1.87 (95% CI -4.89 – 1.51)	0.20

Figure CO63

of non-obstructive coronary artery disease and myocardial infarction, have not been thoroughly validated in HCM P.

Objectives: To invasively assess the presence of CMD in P with HCM and to determine clinical predictors of invasively assessed CMD.

Methods: In a prospective single-centre study, we opportunistically recruited consecutive adult P with an established diagnosis of HCM with or without LVOTO that had an indication to pursue elective coronarography – such as pre-procedural evaluation for alcoholic septal ablation (ASA) or exclusion of epicardial coronary artery disease. P characteristics and coronary hemodynamic invasive assessment data were extracted. CFR was calculated as the ratio between resting and hyperemia mean transit times (TmnRest;TmnHyper). IMR was calculated as the ratio between distal coronary pressure (Pd) and the inverse of TmnHyper (IMR = Pd/TmnHyper^{-1}). A cutoff of ≤ 22.0 in IMR, and ≥ 2 in CFR was used. We excluded P with end-stage HCM (LVEF < 50% and/or or left ventricular wall thinning), or with epicardial coronary artery disease. Continuous variables were reported as mean ± SD or median and IQR depending on data distribution pattern and categorical data as frequencies and percentages. A linear regression model was used to test predictors of IMR and CFR involvement.

Results: 25 HCM P with a mean age of 63 ± 10 years were included, 14 (56%) were female. In 20 (80%) of the P the cause for coronary angiography was ASA. All P referred for ASA had LVOTO and were on beta-blocker therapy (Table 1). Median CFR was 2.5 [1.5-3] and median IMR was 19 [14-22], both within normal range. A total of 13 (44%) P had a reduced CFR and 5 (20%) of P had an increased IMR. 14 P (56%) had an altered CFR or IMR value, with the presence of a functional CMD phenotype in 10 P (40%) (Table 2). Angina was associated with a higher IMR (5.3, 95%CI -0.05-10, p = 0.053) and for each +1 increase in CCS a larger increase in the likelihood of a higher IMR was observed (CCS 1, +7 (95%CI 0.68 – 14); CCS 2, +9 (95%CI 4 – 14); CCS 3, 10 (95%CI 2 – 18)). A similar but non significant trend was observed for higher CCS correlating with lower CFR (Table 3).

Conclusions: In a prospective cohort of HCM P submited to invasive angiographic evaluation 56% had at least one invasive measure compatible with CMD. Angina, and a higher degree of anginal symptoms correlated positively with the presence of higher IMR and therefore with a higher level of CMD. In the future, we intend to correlate these findings with multimodality imaging/clinical outcomes.

CO 64. LEFT VENTRICULAR TRANSRADIAL ENDOMYOCARDIAL BIOPSY IN VAL30MET PATIENTS AND NEGATIVE BONE SCINTIGRAPHY: CHANGING DIAGNOSTIC PARADIGM

Catarina Gregório[1], Marta Vilela[2], Ana Beatriz Garcia[1], Catarina Simões de Oliveira[2], Ana Abrantes[2], Ana Margarida Martins[2], Miguel Nobre Menezes[1], Isabel Conceição[3], Conceição Coutinho[1], Fausto J. Pinto[1], João R. Agostinho[1]

[1]Department of Cardiology, Centro Hospital Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa. [2]Department of Cardiology, Centro Hospital Universitário Lisboa Norte, CAML, Faculdade de Medicina, Universidade de Lisboa. [3]Neurology Department, Centro Hospitalar Universitário Lisboa Norte, EPE/Hospital de Santa Maria.

Introduction: Transthyretin cardiac amyloidosis (ATTR-CM) diagnosis can be established in most cases by bone scintigraphy (BS). However, Val30Met (V30M) mutation is associated with lower sensibility of BS, mainly in patients (pts) with early onset phenotype. When ATTR-CM is suspected and BS Perugini score (PGs) is 0 or 1, endomyocardial biopsy (EMB) may be considered.

Objectives: To describe a population of pts with V30M mutation with non-diagnostic BS submitted to left ventricular (LV) transradial EMB.

Methods: Single-center prospective case-series of pts with V30M mutation submitted to EMB, due to suspicion of cardiac involvement despite non-diagnostic BS. Demographics, clinical and echocardiographic data was analyzed. Hypertension control was assessed by 24h blood pressure monitoring.

Results: Six pts underwent LV EMB, a mean of 6.5 fragments were obtained with no complications reported. In 4, EBM confirmed the diagnosis of ATTR-CM and it was negative in 2. In pts with ATTR-CM confirmed by EMB, tafamidis (TF) 61 mg was initiated. Pt 1: Male, 45 years-old, with no neurological involvement, NYHA I. EBM was required due to left ventricular hypertrophy (LVH) with interventricular septum (IVS) and posterior wall (PW) thickness of 14 mm and 12 mm, respectively, and E/e´ratio was 9.5. BS PGs was 0. BEM was positive for ATTR-CM. Pt 2: Female, 41 years-old, with grade 1 neuropathy under TF 20 mg, NYHA I. Pacemaker was implanted due to Mobitz 1 AV block (AVB). EBM was required due to LVH (IVS: 12 mm; PW: 12 mm) and LV strain of -13.5%, and was positive for ATTR-CM. BS PGs was 0. Pt 3: Female,

73 years-old, with grade 3 neuropathy under TF 20 mg, NYHA II. Renal and gastrointestinal involvement was present with positivity for amyloid on rectal biopsy. She had atrial fibrillation, controlled hypertension and a PMK due to Mobitz 2 AVB. EMB was required due to E/E´ ratio of 18 and left atrial enlargement (55 ml/m²) despite no LVH being present. BS PGs of 0. BEM was positive for ATTR-CM. Pt 4: Female, 80 years-old, with grade 2 neuropathy under TF 20 mg, NYHA II. She had controlled hypertension and a PMK due to 1st degree AVB and left bundle branch block. BS PGs was 1. LVH (IVS: 13 mm) and left atrial enlargement (41 ml/m²) led to EMB that was positive for ATTR-CM. Pt 5: Female, 75 years-old, no neurological involvement, NYHA I, with controlled hypertension and diabetes. BS PGs was 0. LVH with a IVS thickness of 12 mm and a E/E´ratio of 20 led to EMB, which was negative for ATTR. Pt 6: Female, 60 years-old, with grade 2 neuropathy under TF 20 mg, NHYA I and controlled hypertension. BS PGs was 0. EMB was performed due to LVH with IVS of 12 mm with a E/E´ratio of 12.5 and was negative for ATTR. **Conclusions:** In pts with Val30Met mutation and slight suspicion of cardiac involvement, LV EMB should be performed despite negative bone scintigraphy in order to establish the diagnosis and guide therapy, given its safety profile and high diagnostic yield.

CO 65. REFINING THE DIAGNOSIS OF HYPERTROPHIC CARDIOMYOPATHY WITH A MACHINE LEARNING-BASED RADIOMICS MODEL: A CARDIOVASCULAR MAGNETIC RESONANCE STUDY

Inês Pereira de Miranda[1], Miguel Marques Antunes[2], Vera Ferreira[2], Mara Sarmento[1], Filipa Gerardo[1], Mariana Passos[1], Carolina Pereira Mateus[1], Joana Lima Lopes[1], Silvia Aguiar Rosa[2], João Bicho Augusto[1]

[1]*Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra.* [2]*Hospital Santa Marta.*

Introduction: Cardiovascular magnetic resonance (CMR) plays a crucial role in the diagnosis of hypertrophic cardiomyopathy (HCM), but acquisition

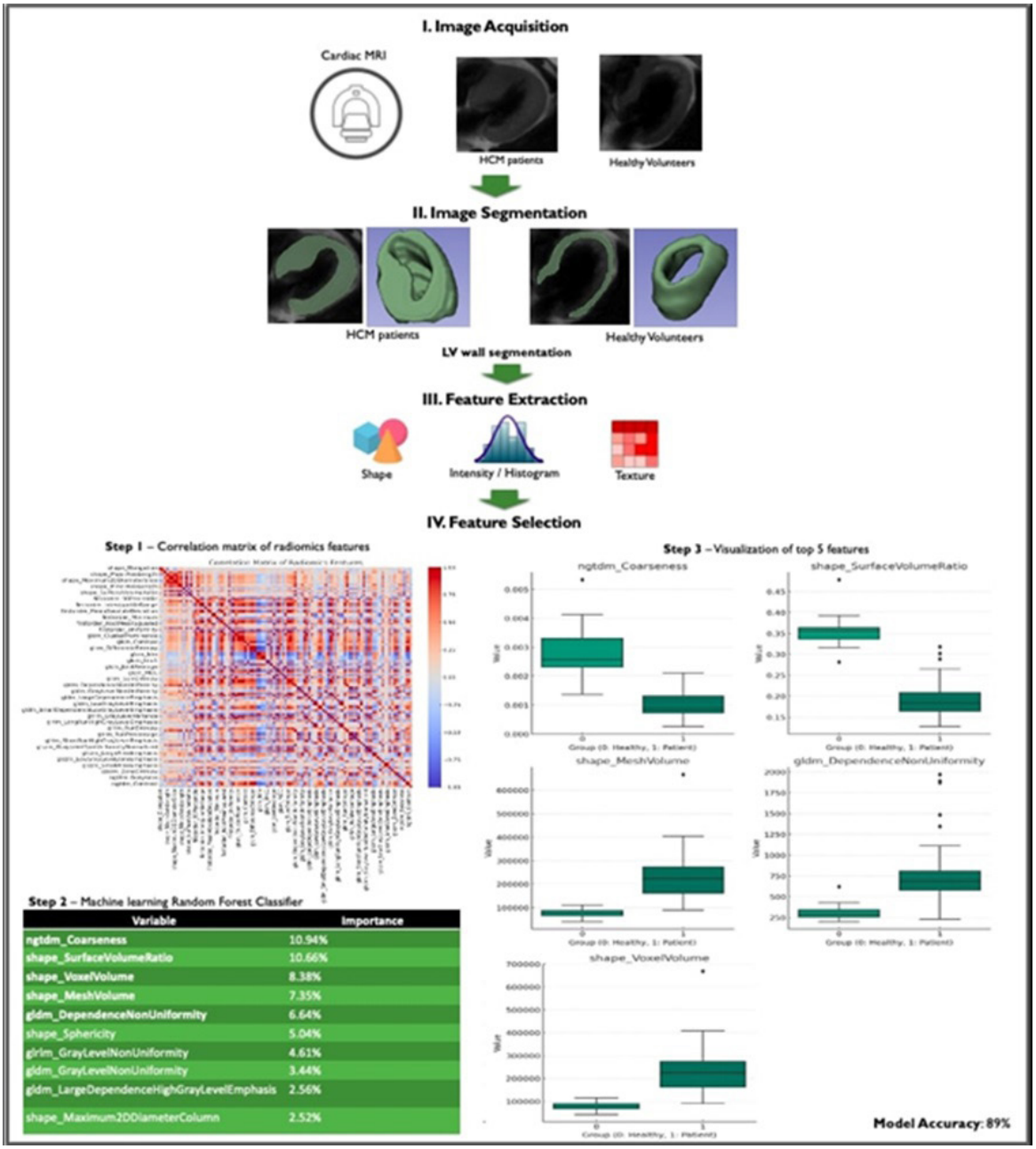


Figure CO65

time can be long and some patients have contraindication to paramagnetic contrast, limiting the use of late gadolinium enhancement imaging. Simple, fast non-contrast single-shot fast spin echo black-blood (SS-FSE-BB) sequences can provide insights into the ultrastructure of the myocardium in HCM.

Objectives: We aimed to analyze radiomics features in SS-FSE-BB sequences to identify ultrastructural characteristics of the myocardium to distinguish HCM patients from healthy controls.

Methods: We conducted a single-center study on 52 HCM patients who underwent CMR. SS-FSE-BB is widely used across MRI scanner vendors and acquired as a transaxial stack at the beginning of the scan (without contrast) with a < 60 s acquisition time. We excluded patients with poor imaging quality or missing the designated CMR sequence. The left ventricle (LV) was segmented using a semi-automated tool with minimal input from the user. A total of 107 radiomics features were extracted using the PyRadiomics v3.1.0 library which included first-order, textural, shape and size features. The same was done for 17 CMR scans from healthy volunteers (HVs). We first conducted correlation analyses with visualization of matrix, to exclude redundant/correlated features. Then we implemented a Machine Learning Random Forest Classifier (ML-RFC) model to provide insights into which features are most relevant in HCM versus HVs.

Results: A total of 46 HCM (60 ± 15 years, 43.5% female) and 17 HVs (53 ± 18 years, 58.8% female) scans were suitable for analysis. 56.5% of patients had septal HCM, 15.2% had apical HCM and 8.7% had mixed disease. The ML-RFC model showed a very high accuracy of 89% (summarized in the Figure). HCM patients showed abnormal myocardial texture compared to HVs, with lower values of LV Coarseness (a lower value indicates a less uniform texture, median 0.0009 [IQR 0.0007-0.0013] vs. 0.0026 [IQR 0.0023-0.0033], p < 0.000001) and higher values of Dependence Non-uniformity (687 [578-810] vs. 293 [257-343], p < 0.000001). HCM patients presented LV shape features suggesting higher myocardial volume: higher voxel volume (225,052 [162,458-274,457] vs. 78131 [67,597-89,987], p < 0.000001) and mesh volume (223,912 [161,483-273,571] vs. 76,738 [65,254-87,213], p < 0.000001), and lower surface area-volume ratio (0.183 [0.164-0.208] vs. 0.355 [0.336-0.364], p < 0.000001).

Conclusions: The complex structure of the LV wall through CMR radiomics conveys information far beyond conventional "human eye" imaging. Distinct features of myocardial heterogeneity can be found in HCM using routine sequences, acquired in the first minutes of the scan, without any contrast. These findings could enhance diagnostic and prognostic models in HCM, but require larger datasets and advanced modeling for validation.

Domingo, 21 Abril de 2024 | 08:30-09:30

Neptuno 1 | Comunicações Orais - Sessão 14 - Choque cardiogénico e suporte circulatório mecânico

CO 66. CARDIOGENIC SHOCK MANAGEMENT WITH VENOARTERIAL EXTRACORPOREAL MEMBRANE OXYGENATION: A SINGLE-CENTER ANALYSIS

Marta Leite, Mariana Brandão, Daniel Caeiro, Fábio Nunes, Marisa Silva, Pedro Gonçalves Teixeira, Gustavo Pires-Morais, Marta Ponte, Adelaide Dias, Alberto Rodrigues, Pedro Braga, Ricardo Fontes-Carvalho

Centro Hospitalar de Vila Nova de Gaia/Espinho, EPE.

Introduction: Venoarterial Extracorporeal Membrane Oxygenation (VA-ECMO) has emerged as a crucial therapy in managing refractory cardiogenic shock, offering both circulatory and oxygenation as bridge to recovery, bridge to transplant, or bridge to decision. It is a salvage intervention in patients with cardiogenic shock despite high rates of complications and mortality. This study aimed to assess the demographics, clinical characteristics, and outcomes of VA-ECMO patients with cardiogenic shock in a tertiary centre.

Methods: We conducted a retrospective observational study, encompassing patients admitted with cardiogenic shock and treated with VA-ECMO from 2011 to 2023. Key patient data, including demographics, comorbidities, clinical presentation, ECMO-related complications, and outcomes, were extracted from medical records. Summary statistics were employed for data analysis.

Results: From January 2011 to October 2023 our cardiac intensive care unit treated a total of 85 patients in VA-ECMO [Table]. The mean age was 54.5 ± 11.9 years-old with male predominance (61.2%). Approximately half of the patients (54.1%) were submitted to VA-ECMO implantation after cardiac arrest and most of them were admitted from the emergency room. Acute coronary syndrome accounted for 47.1% of cardiogenic shock cases, followed by acute decompensated heart failure (12.9%), electrical storm (10.6%), and myocarditis (7.1%). The median hospital stay was 11.0 days (range: 0 to 114), with a median of 3.0 days on ECMO support (range: 0 to 52). All VA-ECMO reported in this cohort were percutaneous, with 40% requiring left ventricular unloading techniques. In terms of VA-ECMO-related complications, hematological complications, including anemia and thrombocytopenia necessitating transfusion, were observed in 51.8% of patients, and thromboembolic complications, such as acute limb ischemia, affected 28.2% of patients. Bleeding complications were also notable, with 14.1% experiencing significant vascular access-site bleeding, 17.6% gastrointestinal bleeding, 10.6% airway bleeding, and 2.4% intracerebral hemorrhage. The 5-day survival rate stood at 67% (95%CI, 0.57-0.78), declining to 41% at 30 days (95%CI, 0.30-0.55). Of the 85 patients, 32 (37.6%) died while on VA-ECMO, and 36 patients (42.4%) were either discharged or underwent heart transplantation.

Table 1. VA-ECMO (n=85)

Gender, n (%)	Female	33 (38.8)
	Male	52 (61.2)
Age, mean (SD)		54.5 (11.9)
Origin, n (%)	Ambulatory	4 (4.7)
	Emergency Room	52 (61.2)
	Other Department	7 (8.2)
	Other Hospital	22 (25.9)
Cardiac Arrest Before ECMO, n (%)	Yes	46 (54.1)
	No	39 (45.9)
ECPR, n (%)	Yes	28 (32.9)
	No	57 (67.1)
Diagnostic, n(%)	Acute Coronary Syndrome	40 (47.1)
	Acute Heart Failure	11 (12.9)
	Acute Valvular Disease	2 (2.4)
	Aortic Dissection	1 (1.2)
	Electrical Storm	9 (10.6)
	Myocarditis	6 (7.1)
	Pulmonary Embolism	3 (3.5)
	Takotsubo Cardiomyopathy	3 (3.5)
	Unknown	6 (7.1)
	Septic Shock	4 (4.7)
Bridge to Transplant, n(%)	Yes	12 (14.1)
	No	73 (85.9)
LV Unloading Device, n(%)	Yes	34 (40)
	No	51 (60)
ECMO Related Complications, n (%)	Access Bleeding	12 (14.1)
	Airway Bleeding	9 (10.6)
	Canulation Complications	19 (22.4)
	Gastrointestinal Hemorrhage	15 (17.6)
	Hematological Complications	44 (51.8)
	Intracerebral Hemorrhage	2 (2.4)
	Liver Failure	30 (35.3)
	Septic Complications	23 (27.1)
	Thromboembolic Complications	24 (28.2)
Renal Replacement Therapy, n (%)	Yes	27 (31.8)
	No	57 (67.1)
Days in ECMO, median [min, max]		3.0 [0, 52.0]
Days of Hospitalization, median [min, max]		11.0 [0, 114]
Alive to Discharge or Transplant, n (%)	Yes	36 (42.4)
	No	49 (57.6)
Death in ECMO, n (%)	Yes	32 (37.6)
	No	53 (62.4)

ECMO, Extracorporeal Membrane Oxygenation; ECPR, Extracorporeal cardiopulmonary resuscitation; LV, Left Ventricle; min, minimum; max, maximum; Post-Op, Postoperative.

Conclusions: Our single-center experience encompassing over a decade illustrates VA-ECMO's predominant use in younger patients following acute coronary syndrome or acute heart failure. Despite associated complications, our observed mortality rate, while significant, supports the use of VA-ECMO to rescue patients in such ill-fated clinical conditions. This analysis provides a foundational understanding of cohort characteristics and sets the stage for future comparative studies.

CO 67. INTRA-AORTIC BALLOON PUMP PLACEMENT AT THE BEDSIDE: A SINGLE-CENTER EXPERIENCE OF CICU VERSUS CATHLAB INSERTION, MANAGEMENT, AND REMOVAL.

Rita Almeida Carvalho, Mariana Sousa Paiva, Débora Correia, Rita Barbosa Sousa, Samuel Azevedo, Joana Certo Pereira, Miguel Domingues, Ana Rita Bello, João Presume, Catarina Brízido, Christopher Strong, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: The intra-aortic balloon pump (IABP) is frequently used to support patients with hemodynamic instability in the Cardiac Intensive Care Unit (CICU). Despite being classically implanted at the catheterization laboratory (CathLab) under fluoroscopic guidance, its easy implantation technique may allow rapid deployment at the bedside.
Objectives: The aim of this study was to assess the feasibility and safety of bedside IABP insertion in the CICU using a standardized technique based on anatomic landmarks, as compared to the fluoroscopic-guided IABP insertion at the CathLab.
Methods: Retrospective single-center study of consecutive patients with cardiogenic shock (CS) admitted to a CICU between January 2019 and October 2023, who received transfemoral IABP for hemodynamic support or left ventricular unloading. The overall study cohort was divided according to the IABP implantation strategy into CICU and CathLab groups. The chosen approach, timing and removal strategy were at the discretion of the treating physician. IABP insertion in the CICU was performed using echo-guided arterial puncture, subsequent device deployment according to anatomic landmarks, and final position confirmation by chest x-ray. The efficacy endpoint was successful IABP deployment according to the first chosen approach, while safety endpoints were short-term IABP-related vascular complications.
Results: A total of 53 patients were included (mean age 64 ± 14 years; 70% males; 74% acute myocardial infarction (AMI); 93% SCAI C). Seventeen (32%) patients received an IABP at the bedside in the CICU, and all were deployed effectively with no need for CathLab transfer. The CICU cohort featured a lower proportion of AMI-CS patients (47% vs. 86%; p = 0.003), but a higher proportion of concomitant mechanical circulatory support with VA-ECMO (65% vs. 22%; p = 0.003). Duration of IABP support was longer in the CICU group (6.9 ± 4.3 vs. 3.6 ± 3.4 days; p = 0.004). IABP removal was mostly done by manual compression (91%) followed by the use of a vascular closure device (6%), with no differences between groups. Bedside IABP implantation did not significantly impact on the number of short-term vascular complications, namely IABP-site-related or other major (BARC 3 to 5) bleeding (4 vs. 2; p = 0.127) or ischemic events (5 vs. 7; p = 0.211), such as IABP limb ischemia, stroke or intestinal ischemia. Although vascular complications in both groups were more common in patients simultaneously on VA-ECMO, the frequency of IABP limb-related events was not different between implantation strategies. No pseudo-aneurysms, fistulas or arterial dissections were identified in both groups.
Conclusions: Bedside IABP insertion using anatomic landmarks is a feasible and safe approach in patients in CS requiring IABP support. These CICU skills improve CS management, particularly in non-AMI-CS and very unstable patients, avoiding the need for CathLab transfer.

CO 68. DIASTOLIC SHOCK INDEX: A NOVEL PROGNOSTIC PARAMETER UNVEILING INSIGHTS INTO VASODILATORY CARDIOGENIC SHOCK

Mariana Sousa Paiva, Rita A. Carvalho, Catarina Brízido, Ana Rita Bello, Maria Rita Lima, Miguel Domingues, Joana Certo Pereira, Samuel Azevedo, João Presume, Christopher Strong, Jorge Ferreira, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Systemic vasodilation is an increasingly acknowledged feature in cardiogenic shock (CS), defining a subset of patients with low systemic vascular resistances and higher vasopressor requirements. While a diastolic shock index (DSI) above 2.0 predicts vasoplegia and mortality in septic shock, its cut-off and prognostic significance in CS remain unclear. Our study aimed to characterize vasoplegia in CS using the DSI and assess its impact on prognosis.
Methods: Single-center retrospective cohort study on Cardiac Intensive Care Unit (CICU) admissions for CS from January 2017 to October 2023. Data included patient variables, CS features, vasoactive drugs, mechanical circulatory support, and 30-day mortality. DSI (heart rate (HR) to invasive diastolic blood pressure (DBP) ratio) impact on 30-day all-cause mortality was assessed with univariate Cox regression. Optimal DSI cut-off for adverse outcomes was determined through ROC curve analysis, and survival based on this cut-off was analyzed using Kaplan-Meier curves.
Results: 185 patients (mean age 59 ± 12 years, 63% male) were included. Acute myocardial infarction-related CS (47%) and heart failure-related CS (29%) were predominant. According to SCAI classification, 86% were class C, 22% class D, and 4% class E, with 26% experiencing previous cardiac arrest. Median Vasoactive-Inotropic Score (VIS) was 48 (IQR 21-85), and 25% used mechanical circulatory support. At admission, median HR was 105 bpm (IQR 90-125), DBP was 60 mmHg (IQR 55-65), and DSI was 1.71 (IQR 1.31-2.18). Thirty-day all-cause mortality was 36% (n = 67), with median time to death of 4 days (IQR 1-10). DSI at 30 days predicted mortality (OR 1.42, 95%CI 1.06-1.91, p = 0.020). DSI showed fair discriminative power for 30-day mortality (C-Statistic 0.60, 95%CI 0.51-0.68, p = 0.031) with a cut-off of 2.2. Patients with DSI > 2.2 exhibited heightened likelihood of prior cardiac arrest (38% vs. 20%, p = 0.032), and higher serum lactate (5.5 vs. 3.9 mmol/L, p = 0.008), and serum creatinine (2.64 vs. 1.88 mg/dL, p = 0.003) at admission. Despite higher VIS at 48 hours (120 ± 136 vs. 65 ± 93.9, p = 0.04), MCS need did not significantly differ. This group had superior 30-day mortality risk (log-rank p = 0.011).

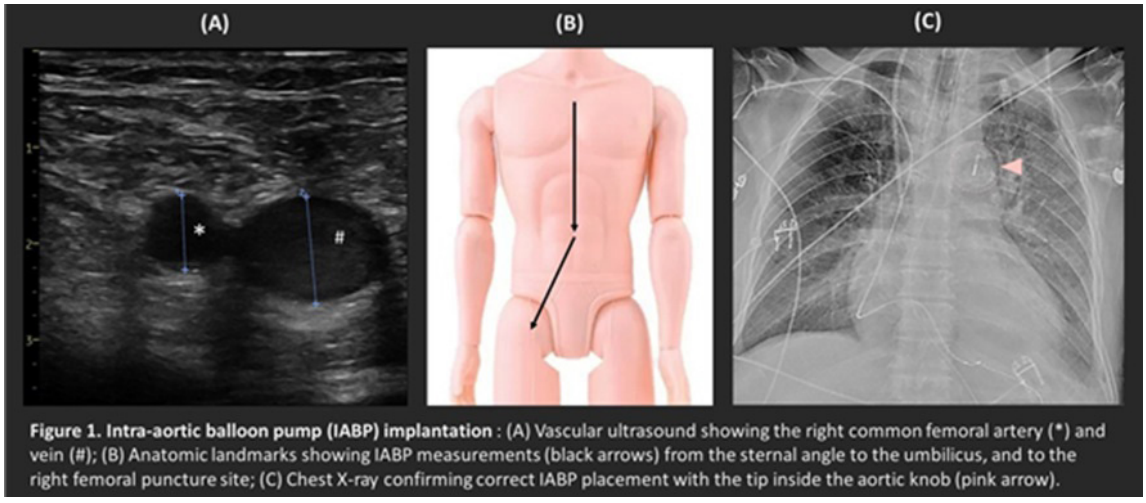


Figure 1. Intra-aortic balloon pump (IABP) implantation : (A) Vascular ultrasound showing the right common femoral artery (*) and vein (#); (B) Anatomic landmarks showing IABP measurements (black arrows) from the sternal angle to the umbilicus, and to the right femoral puncture site; (C) Chest X-ray confirming correct IABP placement with the tip inside the aortic knob (pink arrow).

Figure CO67

Figure 1A - Receiver operating curve for Diastolic Shock Index

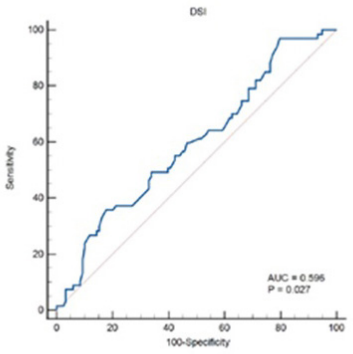
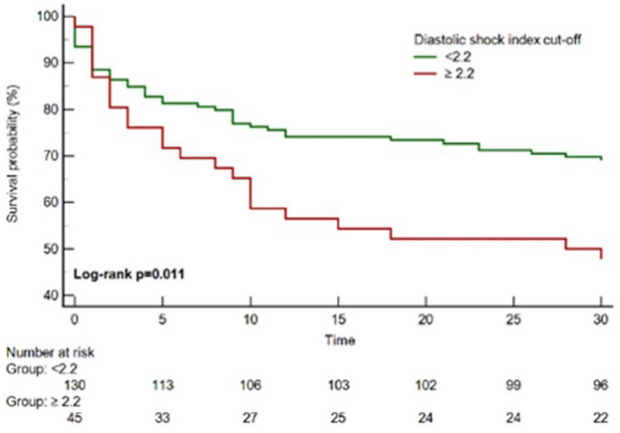


Figure 1B - Kaplan-Meier curves for 30-day all-cause mortality by a Diastolic Shock Index cut-off of 2.2



Conclusions: In our cohort, the admission Diastolic Shock Index (DSI) emerged as a promising identifier for CS vasoplegic patients and was a predictor of a higher risk for mortality. A DSI above 2.2 identified a subset of patients with previous cardiac arrest and higher lactate levels, enlightening possible risk factors associated with vasoplegia. Further studies are warranted to establish the robustness of this novel prognostic parameter in CS patients and its therapeutic implications.

CO 69. VENOARTERIAL EXTRACORPOREAL MEMBRANE OXIGENATION FOR INFARCT RELATED CARDIOGENIC SHOCK: A REAL-WORLD COMPARISON OF PATIENT CANDIDATES, PRACTICES AND OUTCOMES

Ana Rita Bello, Rita Lima, Mariana Sousa Paiva, Joana Certo Pereira, Samuel Azevedo, Rita Sousa Barbosa, Débora Correia, João Presume, Catarina Brízido, Christopher Strong, Jorge Ferreira, António Tralhão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: The recently published ECLS-SHOCK trial showed no benefit of venoarterial extracorporeal membrane oxygenation (VA-ECMO) for acute myocardial infarction related cardiogenic shock (AMI-CS). However, regional reproducibility patterns and each center's weighing of candidate selection variables are known to differ from clinical trials. Additionally, the prognostic impact of initiating VA-ECMO in a potentially significant proportion of trial-ineligible patients remains largely elusive.
Objectives: To assess the eligibility of a real-world cohort of AMI-CS patients based on the inclusion and exclusion criteria of ECLS-SHOCK and compare current VA-ECMO practices with a trial-based implantation strategy.
Methods: Retrospective single-center study of AMI-CS patients with ages between 18 and 80 years, admitted between January 2017 and October 2023. Baseline characteristics, patient severity and type of organ support were compared. We applied ECLS-SHOCK selection criteria and then assessed the primary outcome of 30-day mortality stratified in 4 groups by the presence of VA-ECMO: (1) eligible and cannulated, (2) eligible and not cannulated, (3) ineligible and cannulated and (4) ineligible and not cannulated. We further evaluated the persistence of hypotension/catecholamines and signs of hypoperfusion/hyperlactatemia at 24 and 48 hours post-AMICS-CS recognition.
Results: A total of 103 patients with AMI-CS were included (mean age 63 ± 15 years, 70% male), 44% (n = 45) in SCAI D or E, mean serum lactate 4.9 ± 4.2 mmol/L and 28% (n = 29) with out of hospital cardiac arrest. Applying the ECLS-SHOCK study's criteria, 56% (n = 58) of patients would have been eligible for VA-ECMO. The most frequent reason for exclusion in our practice

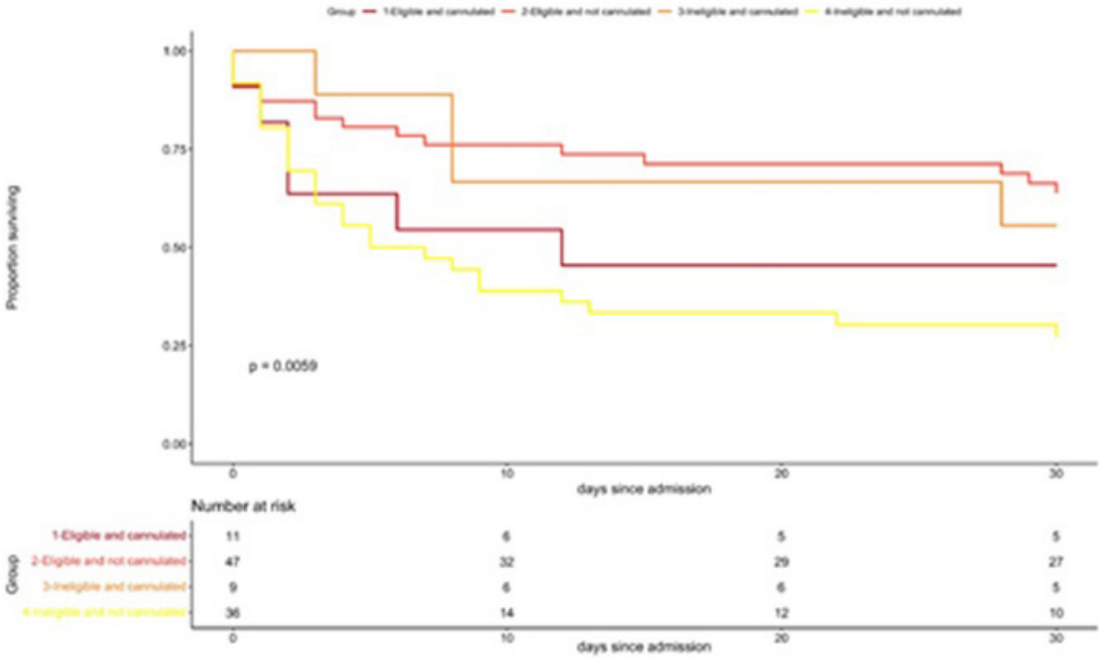


Figure CO69

was the presence of severe peripheral arterial disease (12%, n = 11). In eligible patients, 19% (n = 11) were cannulated, whereas in ineligible patients 20% (n = 9) were cannulated. Only 55% of the cannulated patients fulfilled the study's criteria. 30-day mortality according to the defined groups was 55% (1), 43% (2), 44% (3) and 72% (4), p = 0.006 (Figure). After adjusting for patient severity with the CardShock score, the presence of VA-ECMO was not associated with a lower mortality [HR 1.101 (CI95% 0.525-2.307), p = 0.799]. In 16% (n = 9) of all initially eligible patients who were not cannulated, hypotension/cathecolamines and hypoperfusion/hyperlactatemia did not persist at 48h from AMI-CS diagnosis - signaling shock resolution. None of these patients died.
Conclusions: In our real-world cohort, roughly half of all AMIC-CS patients would have been eligible for VA-ECMO. Our selection practices, however, markedly differed from the ECLS-SHOCK trial. 30-day mortality adjusted for clinical severity was similar between VA-ECMO support and usual treatment. Optimized selection strategies including better prediction of shock trajectories are warranted.

CO 70. EVALUATING THE OUTCOMES OF BEDSIDE PERCUTANEOUS PERIPHERAL VA-ECMO DECANNULATION USING A PERCLOSE PROGLIDE SUTURE-MEDIATED POST-CLOSURE PROCEDURE IN A HIGH-VOLUME ECMO CENTRE

Diana Martins Fernandes, Rita Ferreira, Hélio Martins, João Neves, Sérgio Gaião, José Artur Paiva

Centro Hospitalar Universitário de S. João, EPE.

Introduction: Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) offers mechanical circulatory support for cardiac arrest and cardiogenic shock with potentially reversible causes. Despite its expanding role, decannulation carries high risk of vascular complications and the available guidance is scarce. While the Perclose ProGlide technique is safe and efficacious for endovascular surgery and cardiac catheterization, its role in VA-ECMO decannulation remains controversial.
Methods: Single-centre retrospective cohort study assessing ProGlide-based post-closure decannulation from VA-ECMO compared with conventional strategies, including manual compression or surgical repair. Eligible patients included adults, decannulated from VA-ECMO, at a Portuguese ELSO Centre, from January 2017 to August 2023. Depending on physician skill, ProGlide technique is preferred in the absence of bleeding history and coagulopathy, with shorter VA-ECMO lifespan. Primary outcome was decannulation-related complications. Secondary outcomes were hospital and intensive care unit (ICU) length of stay, procedural success, need of surgical repair and 30-day post-ICU mortality.
Results: During the study period 120 patients met the inclusion criteria. The ProGlide group comprised 59 patients (49%) and the conventional group 61 (51%). Baseline characteristics were similar between groups. VA-ECMO was mainly used for post-acute myocardial infarction cardiogenic shock (22.5%) and most cannulations occurred in the ICU setting (41.7%) and emergency department (30.8%). Median VA-ECMO duration was 14.8 (IQR 13.6) days, with the ProGlide group spending less time on ECMO (p = 0.014, modified T test). Most patients were decannulated after cardiac function recovery (85%) and 12.5% after cardiac transplantation. 48 complications were documented, mainly pseudoaneurysm (19.2%) and limb ischaemia (10%). Decannulation using ProGlide technique resulted in fewer complications compared to conventional approaches (p = 0.001, Pearson Chi-Square Test) and a lower risk of vascular complications (OR 0.606). Emergency VA-ECMO canulation correlates with more decannulation complications (p = 0.03, Pearson Chi-Square Test). ProGlides were efficient in 93.2% of cases, with a mean of 3 (SD ± 1) ProGlide devices for procedural success. Despite not reaching statistical significance, the ProGlide approach was associated with shorter ICU and hospital length of stay, both overall and after decannulation. No differences between groups were found in terms of mortality and need for surgical repair of complications.
Conclusions: The results showed the ProGlide-based post-closure technique for VA-ECMO decannulation is feasible, safe, and effective, with high technical success rate and fewer procedure-related adverse events. Furthermore, a trend towards reduced ICU and hospital length of stay was observed.

Domingo, 21 Abril de 2024 | 08:30-09:30

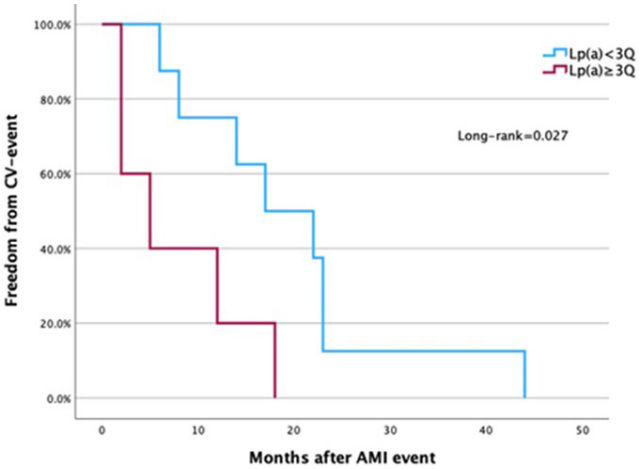
Neptuno 2 | Comunicações Orais - Sessão 15 - Síndrome coronária aguda 2

CO 71. LIPOPROTEIN (A) AS A RISK MARKER FOR WORSE OUTCOMES IN ACUTE MYOCARDIAL INFARCTION PATIENTS

Catarina Amaral Marques, André Cabrita, Luís Santos, Ana Isabel Pinho, Cátia Oliveira, Pedro Palma, Miguel Rocha, Helena Santos Moreira, Paulo Maia Araújo, Cristina Cruz, Rui André Rodrigues

Centro Hospitalar Universitário de S. João, EPE.

Introduction: Lipoprotein(a) [Lp(a)] is an increasingly acknowledged modulator/contributor to cardiovascular (CV) risk. However, its impact on acute or follow-up (FU) outcomes in patients (pts) admitted with acute myocardial infarction (AMI) is still poorly understood. Our aim was to evaluate Lp(a) relation with CV outcomes in pts admitted with AMI.
Methods: Tertiary care centre retrospective study of pts admitted with type one AMI between 2020 and 2023, in whom Lp(a) assessment was performed at admission (n = 162). Data was based on pts' medical records review. A focused analysis was then performed on pts presenting higher Lp(a) values (defined as Lp(a) ≥ than the 3rd quartile (3Q) cut-off value identified in our cohort).
Results: A total of 162 pts were included: 19% were female; median age at AMI was 54 years old; 95% presented ≥ 1 CV risk factor (CVRF). Non-ST/ST segment elevation AMI frequency was 46% and 54%, respectively. Median FU time was 24 months. Median Lp(a) value was 35.5 mg/dL, and the 3Q cut-off was 81.6 mg/dL. Focusing pts with Lp(a) ≥ 3Q (n = 40), no differences were found regarding baseline characterization (vs Lp(a) < 3Q), namely in CVRF (p = 0.12), sex (p = 0.25), age (p = 0.7), or frequency of previous CV events (p = 0.6). Lipid panel at admission, namely low-density lipoprotein (LDL) cholesterol (p = 0.5), was not significantly different between groups. However, Lp(a) ≥ 3Q presented more frequently on pre-AMI antidyslipidemic drug treatment (p = 0.02), as well as on higher-intensity drug regimens (p = 0.02). Regarding in-hospital management and outcomes, both groups were globally comparable, namely in terms of access to coronariography (p = 0.6), revascularization (p = 0.08), Killip classification (p = 0.8), left ventricular dysfunction (p = 0.6) or post-AMI complications (p = 0.2). Concerning FU outcomes, time-to-CV-event analysis was performed and showed significant differences between groups (Log-rank = 0.027; Figure 1). Mean time-to-first CV-event was 8 ± 7 months(m) in the Lp(a) ≥ 3Q group versus 20 ± 12m in Lp(a) < 3Q. Overall, 8% of all pts presented a CV event on FU, namely a new AMI episode in 6% and heart failure hospitalization in 2%. One CV death was observed during the FU.



Conclusions: Although baseline characteristics were comparable, particularly concerning the lipid panel at admission, pts with higher Lp(a) values presented worse CV outcomes on FU, with significant differences on survival analysis. Our work raises awareness for this especially high-risk subgroup of AMI pts. Further studies are urgently needed to better characterize these pts' risk and address optimal management strategies, aiming to minimize their CV burden.

CO 72. ACUTE CORONARY SYNDROMES: DISPARITIES IN THE INITIAL APPROACH FOR MEN AND WOMEN

Carolina Pereira Mateus, Mariana Passos, Filipa Gerardo, Inês Miranda, Mara Sarmento, Joana Lima Lopes, Inês Fialho, David Roque, em nome dos Investigadores do Registo Nacional de Síndromes Coronárias Agudas

Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra.

Introduction: Cardiovascular disease, particularly coronary artery disease, has emerged as the primary cause of mortality in women across Europe, as highlighted by the Organization for Economic Co-Operation and Development (OECD). While preventive measures are crucial, understanding gender-based differences in treatment approaches could further enhance efforts to reduce mortality.
Objectives: This study aims to investigate gender disparities in the initial approach to acute coronary syndromes (ACS).
Methods: We performed an observational study with retrospective analysis of all patients included between 2002 and 2019 in the Portuguese Registry of Acute Coronary Syndromes (ProACS), a voluntary, observational, prospective, continuous registry of the Portuguese Society of Cardiology and the National Center for Data Collection in Cardiology.
Results: A total of 49,113 patients (34,936 men and 14,177 women) were included. Women with ACS were significantly older than men (72 ± 12 years vs. 64 ± 13years, p < 0.001). While chest pain is the predominant symptom in both genders, there was a significantly difference between men and women experiencing this symptom (96.8% vs. 94.7%, p < 0.001). Women more frequently presented with equivalent symptoms: dyspnea, fatigue, syncope, and other symptoms (Table). When calling 112, women were more frequently than men transported in an ambulance only with paramedics (31.8% vs. 26.5%, p < 0.01), and less likely to be transported to the hospital with *Viatura Médica de Emergência e Reanimação* (VMER).Women experienced a longer duration of symptoms until their first medical contact (FMC), and a greater time delay from FMC until needle, balloon or reperfusion (p < 0.001) (Table).
Conclusions: Women more frequently present with equivalent symptoms than men, despite chest pain being the same predominant symptom. This gender-specific clinical presentation affects the timely identification of ischemic symptoms, compromises the fast and safe emergency transport, resulting in an extended time until FMC and significant delays in revascularization for female patients. This delay may consequently elevate the risk of mortality in women. To address this, increased awareness of ACS and its presentation in women is essential, not only among the general population but also among triage teams (both pre-hospital and in-hospital) and all health-care providers in the emergency department. These efforts can help reduce the extra time until treatment seen in female patients.

CO 73. GENDER DISPARITIES IN ACUTE CORONARY SYNDROMES: A COMPREHENSIVE ANALYSIS OF MANAGEMENT, TREATMENT, AND PROGNOSIS

António Maria Rocha de Almeida, Miguel Carias de Sousa, Marta Paralta Figueiredo, Rafael Viana, Kisa Congo, David Neves, Renato Fernandes, Manuel Trinca, Lino Patrício

Hospital do Espírito Santo, EPE, Évora.

Introduction: Sex disparity in access to healthcare and management of cardiovascular disease (CVD) is still significant, leading to suboptimal treatment of acute coronary syndromes (ACS). This study aims to evaluate differences in accessibility, management and its prognosis between women and men with ACS.
Methods: Multicenter retrospective cohort of 6,000 patients with ACS was divided according to patient's sex. CV risk factors, time to first medical care (FMC), to ECG, coronary angiography (CAG) and percutaneous coronary intervention (PCI) were evaluated. The outcomes assessed were major adverse cardiac events (MACE), in hospital and follow-up death, reference to cardiac rehabilitation and hospital readmission.
Results: From the 6,000 patients, 30% (n = 1,784) were female, with mean age of 73 ± 13 years. 70% (n = 4,216) of the patients were male, with mean

	Men	Women	p-value	OR
Predominant symptom at presentation				
Chest pain	96.8%	94.7%	<0.001	0.59
Dyspnea	1.4%	2.5%	<0.001	1.79
Fatigue / Tiredness	0.2%	0.4%	0.007	1.62
Syncope	0.6%	1.0%	<0.001	1.63
Cardiac arrest	0.2%	0.2%	0.616	0.9
Other	0.7%	1.2%	<0.001	1.71
Diagnosis at admission				
STEMI	44.4%	37.5%	<0.001	0.75
NSTEMI	43.0%	47.5%	<0.001	1.20
Unstable angina	9.7%	10.1%	0.191	1.04
Transport to hospital				
Ambulance without a doctor, %	26.5%	31.8%	<0.001	1.29
VMER, %	19.8%	17.4%	<0.001	0.85
Arrival in the hospital by own means, %	47.1%	45.5%	0.054	0.94
Time				
Average and median time from symptoms until FMC, minutes	347; 150 [79; 320]	412; 179 [90; 381]	<0.001	
Average and median time from FMC until reperfusion, minutes	110; 71 [30; 135]	131; 85 [38; 155]	<0.001	
Average and median time from FMC until needle, minutes	75; 39 [17; 80]	89; 48 [20; 97]	<0.001	
Average time from FMC until balloon, minutes	127; 90 [45; 153]	151; 105 [57; 178]	<0.001	

Table 1. Gender differences in symptoms, diagnosis, transport to hospital and time to treatment in patients with Acute Coronary Syndromes. FMC: First Medical Contact; NSTEMI: Non-ST-Elevation Myocardial Infarction; STEMI: ST-Elevation Myocardial Infarction.

Figure CO72

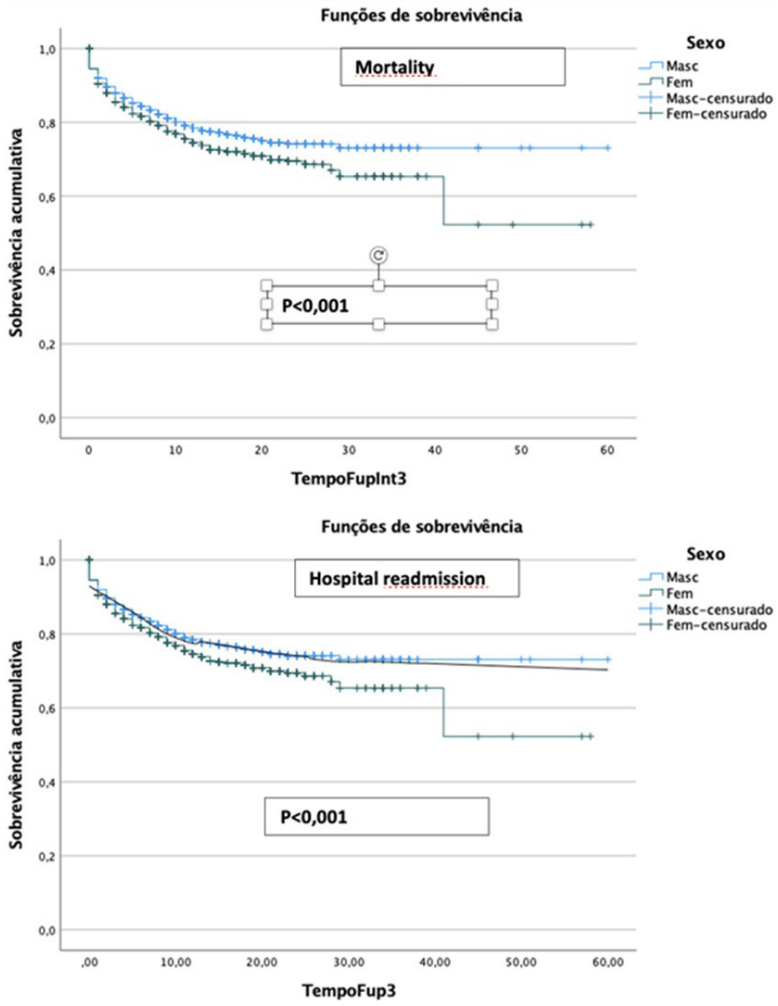


Figure CO73

age of 65 ± 13 years. Women were significantly older (p < 0.001). Despite the significantly higher prevalence of CV risk factors in women, namely hypertension (81% vs. 69%, p < 0.001), diabetes (38% vs. 31%, p < 0.001) and dyslipidemia (60% vs. 57%, p = 0.02), the time to FMC is statistically significantly longer in women (10.6 hours vs. 9.5 hours, p < 0.001), and the median time to ECG was similar (101 min vs. 110 min, p = 0.9). Non-ST segment elevation ACS (NSTE-ACS) was higher in women (65% vs. 61% p < 0.001 OR 1.2 [1.1-1.4]) Female patients were significantly less likely to undergo CAG, (68% vs. 79% p < 0.001 OR 0.6 [0.5-0.7]), and to be done less PCI than men (82% vs. 86% p < 0.001 OR 0.7 [0.6-0.8]). Still, there were no statistically significant differences in terms of unfavorable anatomy (63% vs. 66%, p = 0.5), and women had less multivessel disease (12% vs. 18% p < 0.001). Successful PCI was similar among groups (95% p = 0.9). About outcomes, women's in-hospital death and MACE were higher than men's (12% vs. 7% p < 0.001 HR 1.8 [1.5-2.2] and 7% vs. 5% p = 0.005, HR 1.5 [1.1-2]). Women had more heart failure (28% vs. 19%, p < 0.01 HR 1.7 [1.5-1.9]), cardiogenic shock (8% vs. 5%, p < 0.001 HR 1.6 [1.3-2]), and mechanical complications (2% vs. 1% p < 0.01 HR 2.5 [1.6-3.8]). There were no differences in myocardial infarction (1% vs. 1%, p = 0.6). Women were less likely to be referenced to cardiac rehabilitation (33% vs. 38% p < 0.001 OR 0.8 [0.7-0.9]). Mean follow-up was 16 ± 7 months. Women had a statistically higher mortality during follow-up (15% vs. 11% p < 0.001 HR 1.5 [1.2-1.7]). The median survival time was statistically inferior in women (48 months vs. 54 months p < 0.001). Also women had significantly more hospital readmissions (28% vs. 24%, p = 0.004, OR 1.2 [1.1-1.4]). The median time of hospital admission was statistically inferior in women (39 months vs. 46 months p < 0.001).

Conclusions: Despite the awareness, CVD in women remains underestimated. Women take longer to seek medical care and are less likely to undergo to CAG and PCI. This ends in worse early and long-term prognosis, with higher mortality and MACE on follow-up.

CO 74. EVALUATING ECONOMIC IMPACT OF GENERIC PRASUGREL WIDESPREAD ADOPTION

Ana Filipa Mesquita Gerardo, Miguel Santos, Daniel Faria, Maura Nédio, Célia Monteiro, Sérgio Baptista, Carolina Mateus, Mariana Passos, Inês Miranda, Joana Lima Lopes, Pedro Farto e Abreu, Carlos Morais

Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra.

Introduction: The 2023 European Acute Coronary Syndrome (ACS) guidelines state that prasugrel (PRG) should be considered in preference to ticagrelor (TCG) in patients (pts) who proceed to percutaneous coronary angioplasty (PCI). In Portugal, PRG is less available due to earlier evidence considering pretreatment and contraindications for each drug. PRG (10mg) is currently a generic drug, while TCG is not. We aimed to evaluate the proportion of pts that could be switched from TCG to PRG, and the economic impact of a widespread national adoption.

Methods: To determine eligibility for generic PRG 10mg, we examined a single center prospective database of consecutive ACS pts undergoing PCI in a full year. Eligibility for TCG and PRG was based on drug specific contraindications, previous stroke for PRG and chronic liver disease (CLD) for TCG, and indication for PRG dose reduction (≤ 60 kg and ≥ 75 years). To estimate hospital costs we used the price per pill indicated by the pharmacy (0.98 € TCG, 0.67 € PRG). To obtain post-discharge and NHS savings we used

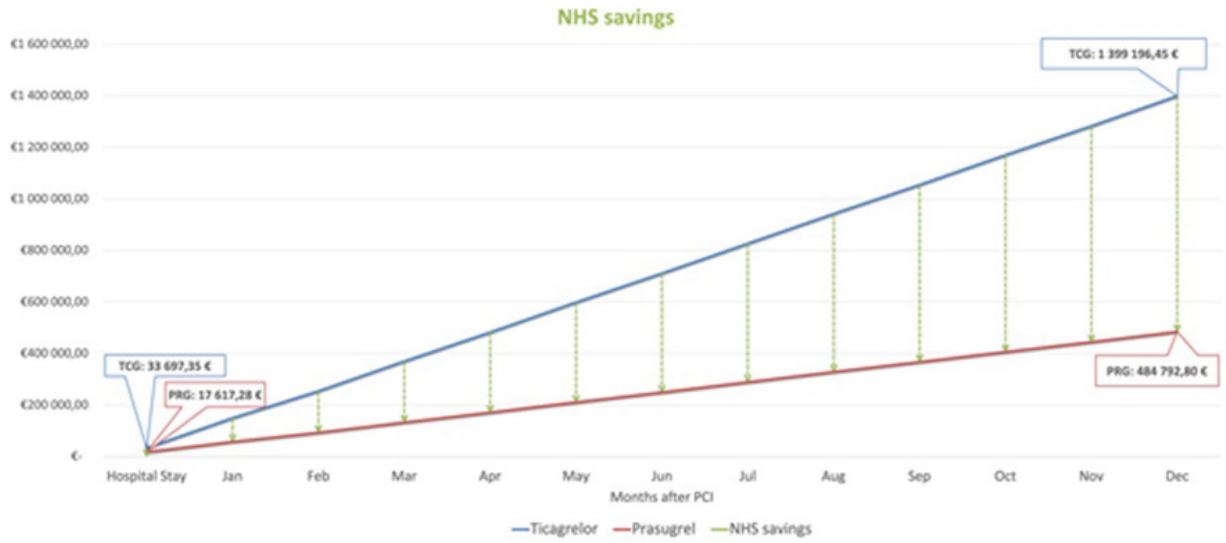


Figure CO74

the INFARMED public information. We estimated 3,500 PCIs per year on a national level, based on published data.
Results: A total of 780 pts were included, median age 68 ± 10.4 years, 523 (67.1%) were male, 51.9% (n = 406) had non-ST elevation ACS. Mean admission time was 8.36 days. Considering PRG and TCG contraindications, 157 pts (20.3%) had a previous history of stroke and 20 pts (2.6%) had CLD. 150 pts (19.2%) had PRG dose reduction criteria. Eligible for PRG 10 mg and TCG 90 mg were 434 pts (57.8% of total PCI pts). Cost per admission would be 33,697.35 € for TCG and 17,617.28 € for PRG. At a national level, hospital costs can be reduced by 16,080.07 €. Considering the 1-year outpatient setting and a widespread generic PRG 10 mg adoption, NHS savings are estimated in 898,323.59 €, and patient savings in 401,248.25 € (198.38 € per patient).
Conclusions: ACS pts in real-world scenarios exhibit both eligibility for PRG and TCG. Considering the lower cost, the NHS can potentially save 914,403.66 € (Figure) annually through the widespread adoption of generic PRG 10 mg.

CO 75. DAPAGLIFLOZIN'S INFLUENCE ON CARDIAC REMODELING IN CHRONIC HEART FAILURE PATIENTS

Ana Rita Teixeira, André Paulo Ferreira, João Ferreira Reis, António Valentim Gonçalves, Rita Ilhão Moreira, Tiago Pereira-da-Silva, Ana Teresa Timóteo, João Alves, Sofia Barquinha, Rui Cruz Ferreira

Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta.

Introduction: Dapagliflozin improves the prognosis of patients (Ps) with heart failure (HF). Adverse myocardial remodeling affecting the left ventricle (LV) is a key factor in HF progression. Our aim was to investigate the impact of dapagliflozin on cardiac remodeling parameters in HF Ps in a real-world setting.
Methods: This single-centre prospective study involved adult HF Ps randomized 1:1 to receive dapagliflozin 10 mg or a placebo. All Ps had a LV ejection fraction (LVEF) < 50%, were in NYHA class II-III and had been on guideline-recommended OMT for the previous 3 months, including a BB, ARNI/ACEi and MRA. Exclusion criteria included a history of diabetes mellitus or a GFR ≤ 30 ml/min/1.73 m^2. Baseline and 6-month post-treatment measurements of echocardiographic parameters were evaluated.
Results: Forty Ps were included (82.5% male, mean age 61 ± 13 years, mean LVEF 34 ± 5%, 70% with ischemic etiology). In the 20 Ps randomized to dapagliflozin, no major safety events were recorded, and the reported compliance was 100%. There were no significant differences between groups regarding baseline clinical and demographic characteristics. During follow-up, Ps under dapagliflozin showed significant remodeling with a decrease in the LV end-diastolic diameter (LVEDD), from 67.2 to 63.0 mm vs. from 65.1 to 65.8 mm in the control group (p = 0.010), while there was no significant difference in the LV end-systolic diameter (LVESD) variation (p = 0.460). The dapagliflozin group also demonstrated a significant improvement in global longitudinal strain from -8.2 ± 3.2 to −10.4 ± 2.3 vs. −8.4 ± 2.8 to −6.8 ± 2.8, p < 0.001, while no significant difference was observed in LVEF (p = 0.512), or right ventricular systolic function assessed by TAPSE (p = 0.376). Furthermore, there was also a significant improvement in LV-filling pressures parameters as evidenced by a reduction in left atrium (LA) indexed volume (p < 0.001) and an improvement in E/e' ratio (p = 0.026). Ps under dapagliflozin also showed a statistically significant reduction in pulmonary artery systolic pressure (p < 0.001).
Conclusions: In our population, dapagliflozin resulted in favorable remodeling of the LV and LA, with improved longitudinal strain and reduced diastolic dysfunction, along with decreased estimated filling pressures and atrial volume. This suggests a potential for dapagliflozin to reverse cardiac remodeling, offering benefits to HF pts.

Domingo, 21 Abril de 2024 | 08:30-09:30

Pegasus | Comunicações Orais - Sessão 16 - *Pacing* cardíaco

CO 76. LEFT BUNDLE BRANCH AREA PACING: THE INITIAL EXPERIENCE AT A PORTUGUESE TERTIARY CENTER

Daniel A. Gomes, Mariana Sousa Paiva, Joana Certo Pereira, Francisco Moscoso Costa, Eduardo Varandas, Daniel Nascimento Matos, Gustavo Rodrigues, Pedro Galvão Santos, Pedro Carmo, Diogo Cavaco, Francisco Bello Morgado, Pedro Adragão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Left bundle branch area pacing (LBBAP) has gained significant recognition as an attractive alternative by preventing the deleterious effects of chronic right ventricular (RV) pacing, including desynchrony and LV dysfunction. Despite encouraging short-term results, reports of lead stability and outcomes on longer follow-ups are still scarce. We aimed to describe the procedure-related characteristics of LBBAP implantation, as well as the stability and electrical synchrony in the mid-term follow-up.

Methods: Single-center registry of patients undergoing LBBAP implantation since November 2021. The pacing lead was implanted deep on the interventricular septum, aiming for a right bundle branch pacing pattern and LV activation time (LVAT) < 90ms. Procedure-related characteristics as well as acute complications were assessed. Lead parameters and paced QRS duration (surrogate of electrical synchrony) were collected immediately after implantation and during follow-up.
Results: A total of 109 patients were included (mean age 77 ± 10 years, 66% male, 29% with LV ejection fraction [LVEF] < 50%). The most common indications for ventricular pacing were high-degree atrioventricular block (n = 61, 56%) and biventricular CRT (BiV-CRT) bailout (n = 19, 17%). The mean implantation time was 63 (IQR 50-81) minutes, and fluoroscopy duration was 4 (IQR 3-7) minutes. LBBAP resulted in a median LV activation time (LVAT) of 87 (IQR 80-96) ms, and in all cases, an RBBB pattern in V1 was achieved. Final paced-QRS was significantly wider among those in whom LBBAP indication was CRT-bailout (130 [120-135] vs. 115 [IQR 106-123], p < 0.001). This subgroup of patients had a higher incidence of LV dysfunction (LVEF 35 ± 10% vs. 57 ± 9%, p < 0.001) and worse functional status (NYHA III/IV 42% vs. 16%, p = 0.009). The last follow-up appointment was a median of 7 (IQR 2-10) months after implantation. Overall, QRS duration (124 [IQR 104-131] vs. 128 [IQR 120-140], Wilcoxon p = 0.111) as well as lead parameters, including R-wave amplitude (12 [IQR 7-18] mV), pacing threshold (0.5 [0.5-0.75] V) and impedance (586 [IQR 475-700] Ohm), did not vary significantly. No cases of lead dislodgment, perforation, or significant pacing threshold rise leading to re-intervention were reported.

Clinical and procedural characteristics (n = 109)	
Age, years	77 ± 10
Male sex	72 (66.1%)
LV ejection < 50%	31 (28.4%)
Pacing indication	
Sinus node disease	17 (15.6%)
AV block	61 (56.0%)
Atrial fibrillation with bradycardia	7 (6.4%)
Refractory AF prior to AV node ablation	5 (4.6%)
Bailout BiV-CRT	19 (17.4%)
Baseline QRS	
Narrow	21 (19.3%)
LBBB	30 (27.5%)
RBBB	16 (14.7%)
Asystole/ escape/ paced	32 (29.4%)
Procedural characteristics	
Implantation duration, min	63 (50-81)
Fluoroscopy duration, min	4 (3-7)
Paced QRS durations, ms	122 (105-130)
R-wave amplitude, mV	12 (7-18)
Bipolar threshold at 0.4ms, V	0.50 (0.50-0.75)
Impedance, Ohm	586 (475-700)
At 1 year of follow-up (N = 24)	
Paced QRS durations, ms	127 (120-140)
R-wave amplitude, mV	15 (11-20)
Bipolar threshold at 0.4ms, V	0.65 (0.50-0.85)
Impedance, Ohm	414 (380-494)

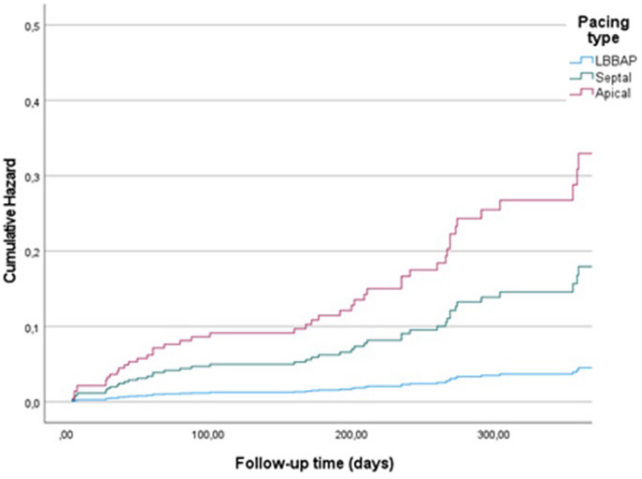
Conclusions: In our cohort, LBBAP implantation was feasible and safe, with favorable pacing parameters and lead stability during the mid-term follow-up. Even in CRT-bailout, LBBAP achieved relatively narrow QRS, supporting its role in this subset of patients.

CO 77. FROM RIGHT TO LEFT: LEFT BUNDLE BRANCH AREA PACING VS CONVENTIONAL RIGHT VENTRICULAR PACING

Diogo de Almeida Fernandes, João André Ferreira, Patrícia Alves, Carolina Saleiro, Natália António, Luís Elvas, Lino Gonçalves

Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Right ventricular pacing (RVp) is the most used pacing technique worldwide. Nevertheless, high pacing percentages may lead to pacing induced cardiomyopathy (PICM). Due to its more physiologic profile, left bundle branch area pacing (LBBAP) has arisen as an alternative that may improve clinical outcomes. Our aim was to compare procedural and clinical outcomes of RVp and LBBAP.
Methods: Single-center cohort study including consecutive patients who underwent LBBAP or RVp from Jan to Dec 2023. LBBAP was performed by implanting the ventricular pacing lead using the tricuspid summit technique aided by pace mapping aiming for an LV activation time (LVAT) < 80 ms and/or V6-V1 inter-peak interval > 40 ms. Regarding RVp, both apical and septal implanted leads were included. Primary outcome was a composite of heart failure (HF) emergency department (ER) admission, HF hospitalization and all-cause mortality. Patients were considered at risk for PICM if pacing percentage was > 20%.
Results: 139 patients underwent LBBAP and 586 RVp (58.5% septal and 41.5% apical). There were no differences on baseline regarding comorbidities. Complete atrioventricular (AV) block was the most frequent indication in all groups (42.4% LBBAP vs. 45.7% septal vs. 35.8% apical). LBBAP patients had lower LVEF (51% vs. 57% in both methods of RVp, p < 0.001) and wider basal QRS (140 ± 33 ms vs. 129 ± 27 septal vs. 123 ± 28 ms apical, p < 0.001). Average LVAT was 77 ± 8 ms. Paced QRS was shorter in LBBAP (115 ± 15 ms vs. septal 150 ± 17 ms vs. apical 163 ± 19 ms, p < 0.001). Procedural duration was higher in LBBAP (82 vs. 60 min, p < 0.001) as well as fluoroscopy time (13.8 vs. 6.4 septal vs. 3.8 apical min, p < 0.001). Acute R-wave amplitude was higher in LBBAP (p < 0.001) and pacing thresholds were similar (p 0.899). After a median follow-up time of 7.8 months, LVEF increased by 7 ± 8% in LBBAP (vs -4 ± 7% septal and -5 ± 10% apical, p < 0.001). Primary outcome occurred in 5.1% of patients with LBBAP vs. 16.0% septal and 24.3% apical (p < 0.001). After adjusting for differences at baseline, patients with pacing percentage > 20% had a higher risk of fulfilling the primary endpoint, particularly patients with apical pacing (HR 7.3, 95%CI 2.04-26.01, vs. septal pacing HR 3.96, 95%CI 1.14-13.83, p 0.031).



Conclusions: LBBAP is a feasible pacing technique which leads to shorter paced QRS and improved LV function. Our data suggests improved short and medium term outcomes in this subset of patients.

CO 78. LEADLESS PACING SYSTEM: REAL-WORD COMPARISON BETWEEN TWO SYSTEM DEVICES

Pedro Lopes do Carmo[1], Joana Brito[2], Catarina Oliveira[2], Rita Amador[1], Beatriz Garcia[2], Francisco Costa[1], Margarida Martins[2], Pedro Galvão Santos[1], Sérgio Fartoso[1], João de Sousa[2], Pedro Adragão[1], Pedro Marques[2]

[1]Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [2]Centro Hospitalar Universitário de Lisboa Norte, EPE/Hospital de Santa Maria.

Introduction: Leadless pacing was developed as an alternative to transvenous pacing systems aiming to reduce pocket and lead related

complications. Micra transcatheter pacing systems (Medtronic) have been implanted since 2016 and real-world results present high rates of successful and safe implantations. Nevertheless, important limitations persist, halting their generalization. The most concerning is battery depletion and the need for replacement. Since September 2023 an alternative device from Abbott Medical (Aveir) became available in two centers in Portugal. Test results have shown longer longevity and possibility of device extraction.

Objectives: To describe the pivotal results of the first Aveir implantation in two centers in Portugal and to compare with the corresponding Micra implantations.

	Micra N = 10	Aveir N = 11	p
Pacing indication			**0.288**
AV node disease	7 (70%)	10 (90.9%)	
Sinus node disease	2 (20%)	1 (9.1%)	
Syncope and bifascicular block	1 (10%)	0	
Reasons for leadless choice			**0.261**
Permanent AF and AV node disease	3 (30)	5 (50)	
Device extraction	4 (40)		
Epicardial system pacing dysfunction	-	1 (10)	
Severe tricuspid regurgitation / prior tricuspid annuloplasty	2 (20)	2 (20)	
Chronic kidney disease with hemodialysis	1 (10)	1 (10)	
No venous access	0	1 (10)	
Low expected percentage of pacing	0	1 (10)	
Procedure related complications	**0**	**1**	**0.283**
Device parameters			
Sensing (V)	9.36 ± 3.45	11.95 ± 2.60	0.089
Threshold (V)	0.67 ± 0.24	0.5 ± 0.24	0.143
Impedance (Ω)	677 ± 234	717 ± 221	0.850
Longevity (years)	9.6 ± 2.2	13.8 ± 4.3	0.011

Methods: Case series of the first patients submitted to the Aveir implantation in two tertiary centers in Portugal. Clinical and procedure data were collected, and devices were interrogated immediately after implantation. Data from the initial corresponding Micra implantations were retrospectively gathered from each center. Statistical analysis was performed with SPSS.

Results: A total of 21 patients (mean age 76 ± 13, 70% male) were included. Procedures were successful in 20/21 patients (95.2%) - one procedure was complicated with a cardiac tamponade after Aveir repositioning. Two patients performed AV nodal ablation simultaneously with leadless implantation. Indications and procedure related data is presented in table 1. The primary pacing indication was AV nodal disease (N = 18, 85,7%) in the majority of patients and similar between systems. In 11 patients a leadless system was preferred due to prior complications with pacing systems, chronic kidney failure in hemodialysis, absence of venous accesses or severe tricuspid regurgitation. The remainder presented permanent atrial fibrillation (N = 8, 28%) and in 1 a low percentage of pacing was expected. Comparison of device interrogation data reveals that all parameters presented similar values with the exception for longevity which was significantly higher with Aveir devices (p = 0.011).

Conclusions: We present the first comparison between the two available leadless system devices regarding procedure success, complications and device parameters. One major complication was observed after one Aveir implantation. A significantly higher longevity is expected with Aveir system device in comparison to Micra transcatheter pacing system.

CO 79. META-ANALYSIS COMPARING CARDIAC RESYNCHRONIZATION THERAPY WITH OR WITHOUT DEFIBRILLATION IN PATIENTS WITH NON-ISCHEMIC CARDIOMYOPATHY

Vanda Devesa Neto[1], Gonçalo Costa[2], Luís Ferreira Santos[1], António Costa[1], Rogério Teixeira[2], Lino Gonçalves[2]

[1]Centro Hospitalar Tondela-Viseu, EPE/Hospital de São Teotónio. [2]Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Cardiac resynchronization therapy (CRT) stands as a notable medical breakthrough for individuals with heart failure and electrical desynchrony. This intervention aims to alleviate symptoms, diminish hospitalization rates, and enhance overall survival, both in conjunction with

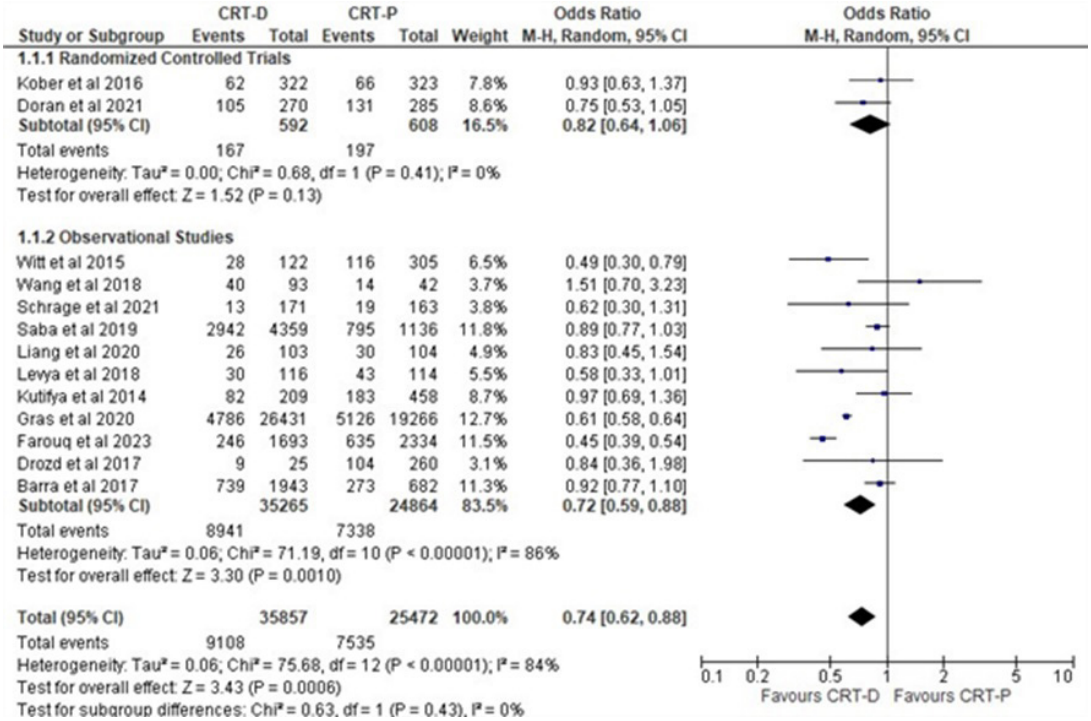


Figure CO79

and without implantable cardioverter-defibrillator (ICD) therapy. Despite these advancements, the role of defibrillator therapy in conjunction with CRT for patients with non-ischemic cardiomyopathy (NICM) remains a topic of debate.
Objectives: To assess and compare the outcomes of individuals diagnosed with NICM who have underwent CRT with implantable cardioverter-defibrillator (CRT-D) against those who received CRT with a pacemaker only (CRT-P).
Methods: We conducted a systematic searched of PubMed, Embase and Cochrane database during August 2023 for studies comparing CRT-P and CRT-D in patients with nonischemic cardiomyopathy.
Results: Thirteen studies, including two randomized clinical trials, were incorporated, with a total of 61,326 patients providing 16,446 pooled death events (9,108 in CRT-D and 7,338 in CRT-P). The meta-analysis revealed that CRT-D was associated with a significantly lower risk of all-cause mortality compared to CRT-P (pooled HR 0.74, 95%CI: 0.62-0.88; I^2 = 84%), resulting in a 26% reduction in mortality risk. Subgroup analysis focusing on propensity score-matched studies yielded consistent findings (pooled HR 0.82; 95%CI: 0.77-0.87; I^2 = 0%). However, subgroup analysis for patients older than 75 years suggested no statistically significant difference in mortality risk within this specific age group (pooled HR 0.96; 95%CI: 0.811-1.15; I^2 = 39%). Regarding the secondary endpoint of cardiovascular mortality, no significant risk reduction with CRT-D was observed (pooled HR 0.70; 95%CI: 0.49-1.01; I^2 = 92%).
Conclusions: Our meta-analysis indicates that the addition of defibrillator therapy significantly reduces all-cause mortality in CRT-eligible patients with NICM, although results were not consistent for patients older than 75 years.

CO 80. INITIAL EXPERIENCE AND MEDIUM-TERM RESULTS OF LEFT BUNDLE BRANCH AREA PACING

Diogo de Almeida Fernandes, João André Ferreira, Patrícia Alves, Carolina Saleiro, Natália António, Luís Elvas, Lino Gonçalves

Centro Hospitalar e Universitário de Coimbra, EPE/Hospitais da Universidade de Coimbra.

Introduction: Right ventricular pacing (RV) and cardiac resynchronization therapy (CRT) have been the mainstay of pacing techniques for years. Left bundle branch area pacing (LBBAP) has arisen as an alternative, by maintaining left ventricular (LV) synchrony and potentially improving outcomes. Our aim was to describe LBBAP short and medium term results.
Methods: Single-center cohort study including consecutive patients who underwent LBBAP pacemaker implantation from Jan 2023 to Dec 2023. LBBAP ventricular lead was implanted using the tricuspid summit technique aided by pace mapping aiming for an LV activation time (LVAT) < 80 ms and/or V6-V1 inter-peak interval > 40 ms. Procedural data, outcomes and lead parameters were recorded at 1 and 6 months follow-up.
Results: A total of 139 patients underwent LBBAP, of which 85.6% with a stylet-driven lead. Mean age was 75.1 ± 10.1 years-old and 71.2% of patients

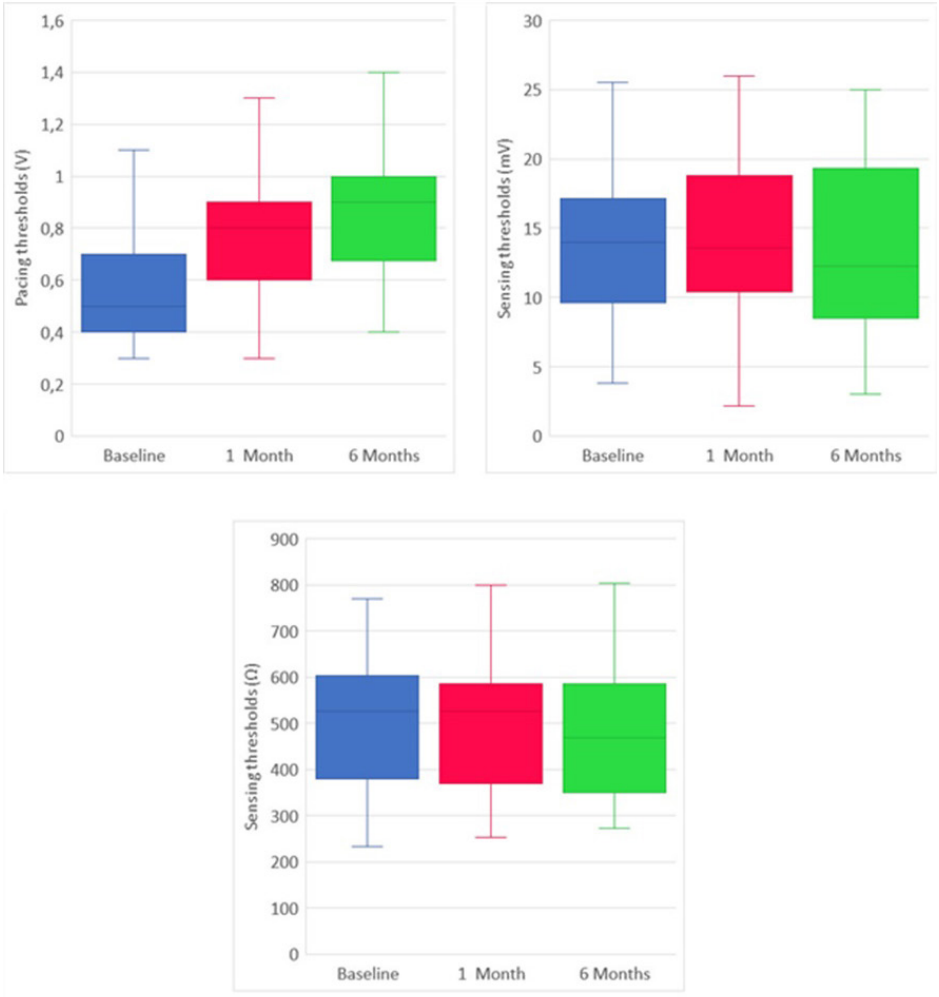


Figure 1. Lead parameters at baseline and during follow-up

Figure CO80

were male. Most patients had sinus rhythm at implantation (72.7%) and 68.3% had a QRS greater than 120ms with an average length (± standard deviation) of 140 ± 34 ms. Complete atrioventricular (AV) block was the most common indication for pacemaker (42.4%) followed by 2nd degree AV block (24.5%) and heart failure with reduced LV ejection fraction (14.4%). 24.3% of patients had complete left bundle branch block. Mean procedural duration was 80 ± 23 min and mean fluoroscopy time was 13 ± 7 min. Average LVAT was 77 ± 8 ms and paced QRS of 113 ± 15 ms, resulting in a final QRS 27ms shorter than baseline. Acute R-wave amplitude was 12.3 mV (interquartile range [IQR] 7.2), pacing threshold was 0.5 V (IQR 0.2) and impedance 526 (IQR 219). No relevant per-operative complications occurred. After 1 month follow-up, median pacing threshold had significantly increased to 0.7 V (IQR 0.3; p < 0.001) while R-wave amplitude and impedance remained unchanged (p 0.609 and p 0.294 respectively). At 6 months of follow-up there were no changes on the evaluated parameters. During follow-up, loss of left bundle branch capture occurred in 10 patients (7.1%) and macro-dislodgement in 2 (1.4%).

Conclusions: LBBAP is a feasible and safe pacing technique which reduces QRS duration and improves LV synchrony. Furthermore, pacing parameters were stable after 6 months of follow-up and number of complications was low.

Domingo, 21 Abril de 2024 | 08:30-09:30

Ágora | Comunicações Orais - Sessão 17 - Miscelânea

CO 81. TRICUSPID TRANSCATHETER EDGE-TO-EDGE REPAIR (TEER): RIGHT VENTRICLE (RV) FUNCTION AND RV-PULMONARY ARTERY (RV-PA) COUPLING CHARACTERIZATION IN A REAL-WORLD SETTING

Rita Amador, Mariana Sousa Paiva, Rui Campante Teles, Marisa Trabulo, Sérgio Maltês, Regina Ribeiras, Pedro Gonçalves, Pedro Freitas, Afonso Félix Oliveira, Sara Guerreiro, João Brito, Manuel Almeida

Hospital de Santa Cruz.

Introduction: Triscuspid Transcatheter Edge-to-Edge Repair (TEER) is a treatment option for high risk patients with tricuspid regurgitation (TR). Nonetheless, right ventricular (RV) dysfunction remains a critical prognosis predictor even in those ultimately undergoing TEER. The RV – Pulmonary Artery (RV-PA) coupling (TAPSE/PSAP on transthoracic echocardiogram) has been shown to independently predict mortality. However, both TAPSE and PSAP have limited value in patients with severe TR. Our aim was to characterize RV function and RV-PA before and after treatment in those undergoing TEER.

Methods: Retrospective, single centre study, including 14 consecutive patients (median age 79 (IQR 77 – 82) years, 14% male) who underwent TEER between May 2021 and October 2023. A total of 6 patients had undergone previous surgical valvular repair (5 aortic prosthesis and 1 mitral annuloplasty), and 6 patients underwent right heart catheterization prior to TEER. We evaluated symptoms, diuretics dose and multiparametric RV function pre- and post-TEER, including RV-PA coupling as calculated by different methods (TAPSE/PSAP; RVS/PSAP and FAC/PSAP).

Results: In the group that underwent right heart catheterization, mean PMAP, PASP and Cardiac Index were 31 ± 12 mmHg, 48 ± 16 mmHg and 2.0 ± 0.5 L/min/m² respectively. There was high concordance between invasive and echocardiographic measurements of PASP (ρ = 0.926; 95%CI 0.460 – 0.992). Median Pulmonary Artery Pulsatility index (PAPi) was 3.3 (IQR 1.7 – 4.1). In 14 TEER procedures, median procedure time was 124 (IQR 92 – 203) minutes and median radiation dose was 244 (152 – 793) mGy. Most patients (79%) implanted 2 devices (6 Clip Mitral XT, XTw, NT, NTW and 8 Pascal P10, PAScal ACE). No procedural complications occurred. TR was reduced to mild-to-moderate in all but 1 patient. We observed a statistically significant reduction in both NYHA class (median 3 to 2 p < 0.05) and furosemide dose (median 70 (IQR 75 – 120) mg vs. 40 (IQR 0 – 120 mg), p < 0.05) after the procedure (see figure). There was no significant difference in RV function parameters or RV-PA coupling measures pre- and post-TEER (see figure). At a median follow-up (FUP) of 28 (IQR 5 – 49) weeks, 2 deaths occurred (1 due to heart failure in a patient with no procedural success and 1 due to fatal ischemic stroke 2 days after the procedure) and 4 patients had heart failure re-admissions.

Conclusions: Early experience indicates that TEER is a feasible and safe procedure, resulting in a significant improvement in tricuspid regurgitation grade and symptomatic relief. A multiparametric evaluation of RV function in patients undergoing tricuspid TEER is warranted to optimize patient selection and outcomes.

	Pre-TEER	Post-TEER	p-value
RV basal diameter (mm) [mean ± sd]	47 ± 6	44 ± 5	0,196
TAPSE (mm) [median (IQR)]	17 (13 – 22)	18 (14 – 20)	0,677
RV S' (cm/s) [median (IQR)]	10 (9 – 14)	11 (9 – 12)	0,719
RV FWS (%) [mean ± sd]	20.9 ± 3.7	18.0 ±4.8	0,212
FAC (%) [mean ± sd]	35 ± 12	35 ± 9	0,994
PASP (mmHg) [mean ± sd]	45 ± 10	38 ± 9	0,099
RV-PA coupling (TAPSE / PASP) [median (IQR)]	0,38 (0,26 – 0,51)	0,47 (0,35 – 0,70)	0,155
RV-PA coupling (RVS / PASp) [median (IQR)]	0,62 (0,50 – 0,71)	0,25 (0,23 – 0,43)	0,074
RV-PA coupling (FAC / PASP) [median (IQR)]	0,72 (0,57 – 1,15)	0,81 (0,70 – 1,18)	0,753

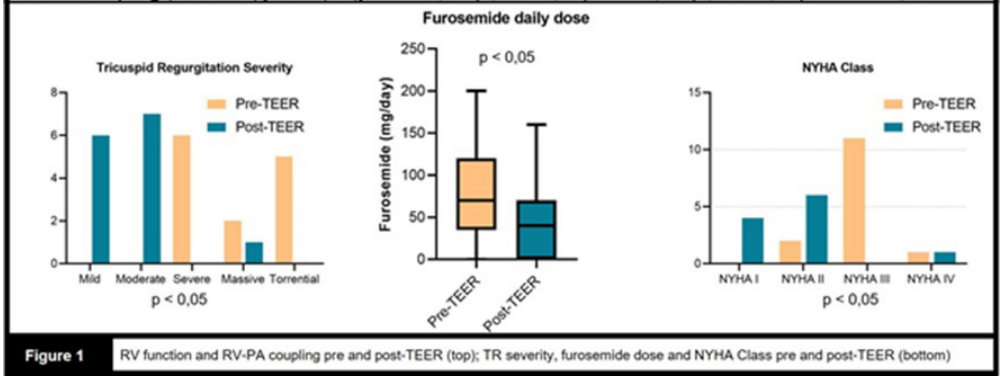


Figure 1 RV function and RV-PA coupling pre and post-TEER (top); TR severity, furosemide dose and NYHA Class pre and post-TEER (bottom)

Figure CO81

CO 82. LEFT ATRIAL STIFFNESS AS A PREDICTOR OF SUBCLINICAL ATRIAL FIBRILLATION AND A MARKER OF STROKE RECURRENCE IN A COHORT OF PATIENTS WITH CRYPTOGENIC STROKE

Margarida de Castro, Mariana Tinoco, Luísa Pinheiro, Catarina Gonçalves, Marina Fernandes, Olga Azevedo, Joana Gomes, Lucy Calvo, Sílvia Ribeiro, João Português, Victor Sanfins, António Lourenço

Hospital da Senhora da Oliveira, EPE-Guimarães.

Introduction: Recent studies based on implantable Loop Recorders (ILR) have reported an AF detection rate over 17% in patients (pts) with Cryptogenic Stroke (CS). Left atrial (LA) remodelling with diffuse and focal fibrosis has been associated with atrial fibrillation (AF). Therefore, we hypothesized that LA stiffness index (LASI) may be associated with AF and stroke recurrence in pts with CS.
Methods: Retrospective study including pts with imaging-proven CS, who performed transthoracic echocardiogram and implanted ILR within 6 months of the event. Subclinical AF diagnosis by ILR was reviewed by an experienced arrythmologist and considered related to the CS if detected up to 1 year after CS. Pts with and without subclinical AF and patients with and without stroke recurrence were compared regarding clinical and echocardiographic parameters at the time of CS. LA reservoir strain (LASr) was measured twice by two independent operators through 2D-speckle tracking echocardiography on apical 4 and 2 chamber views. LA stiffness index (LASI) was derived from: the ratio between the mitral peak E-wave velocity and the mitral annular e' velocity (E/e´) divided by the LASr (*E/e' |LASr)*. Regression analyses was performed to find independent predictors.
Results: We included 67 pts with CS (mean age 64 ± 12 years, 60% men). Subclinical AF was detected in 24% (n = 16) of pts after a median ILR follow-up of 9 months. A total of 21 pts (31.3%) experienced recurrent stroke in the following year. Both operators obtained excellent intra-rater (ICC 0.976 and 0.951) and inter-rater reliability (ICC.919 and.915) in LASr assessment. LASI was significatively higher in pts with subclinical AF (0.42 ± 0.18 vs. 0.31 ± 0.15, p = 0.033) and in pts with recurrent stroke (0.44 ± 0.13 vs. 0.30 ± 0.17, p = 0.028). Through ROC-derived cutoffs, pts with LASI > 0.35 (sensitivity of 0.67 and specificity of 0.65) exhibited a higher rate of AF in Kaplan-Meier survival analysis. Univariate and multivariate Cox regression showed that LASI was an independent predictor of subclinical AF (p = 0.016; HR 26.86).
Conclusions: The LASI showed to be an independent predictor of subclinical AF in patients with CS and it was also associated with stroke recurrence. Future studies are needed to validate this cutoff value and its usefulness in the better selection of patients for ILR implantation in the context of CS.

CO 83. UROCORTIN-2 AS A NOVEL BIOMARKER OF CLINICAL DETERIORATION IN HFPEF: A PROSPECTIVE COHORT STUDY

Inês Vasconcelos, Rui Adão, Francisco Vasques-Nóvoa, Adelino Leite-Moreira, António S. Barros, Carmen Brás-Silva

Faculdade de Medicina da Universidade do Porto.

Introduction: With an increased understanding of the pathophysiology of heart failure (HF), many molecules have emerged as possible diagnostic and prognostic biomarkers. Although circulating urocortin levels in healthy humans are low, serum Urocortin-2 (Ucn2) levels have been found to be elevated in HF patients with reduced ejection fraction and in patients with hypertension and have been positively correlated with left ventricular hypertrophy. These findings suggest a potential value of serum Ucn2 concentration in HF with preserved ejection fraction (HFpEF).
Objectives: The study aims to explore the possibility that circulating levels of Ucn2 may serve as indicators of the severity and prognosis of HFpEF.
Methods: Urocortin-2 serum levels were measured in 101 serum samples from patients with chronic HFpEF in a prospective cohort study (NETDiamond). Clinical, imaging, and analytical data were compared for a cutoff value of 1,203 pg/mL. The primary outcome was a composite of the time to cardiovascular death or HF hospitalization. A univariable Cox regression model was utilized to explore the relationship between urocortin-2 and various clinical characteristics.
Results: Higher Ucn2 levels were associated with an increased risk of primary outcomes. Echocardiographic parameters such as left atrial diameter and e/e' ratio were positively associated with Ucn2 serum levels (HR = 1.10, 95%CI 1.01-1.19, p = 0.024 and HR = 1.36, 95%CI 1.14-1.64, p < 0.001, respectively). Additionally, Ucn2 concentration was positively associated with clinical congestive signs, such as bibasilar pulmonary congestion (HR = 3.59, 95%CI 1.2-10.7, p = 0.022), peripheral edema, particularly if present above the knee (HR = 30.3, 95%CI 1.89-486, p = 0.016), and increased jugular venous pressure (HR = 4.74, 95%CI 1.11-20.3, p = 0.036).

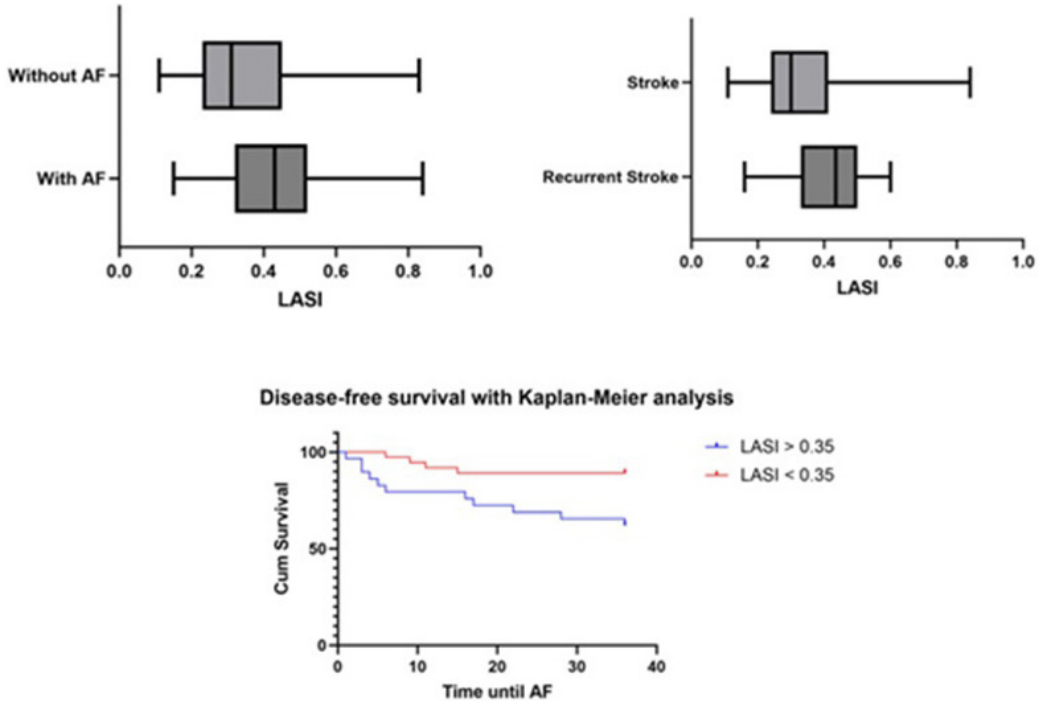


Figure CO82

Conclusions: In patients with HFpEF, it was observed that serum Ucn2 levels were correlated with left chamber remodeling and adverse prognosis, particularly with clinical signs of congestion. These findings provide evidence for the potential pathophysiological role of this peptide and suggest its usefulness as a circulating biomarker for HFpEF.

CO 84. CAPL-SCORE: ANTICIPATING FUTILITY IN TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI)

Mariana Martinho, Rita Calé, Ana Marques, Pedro Santos, Ana Rita Pereira, Bárbara Marques Ferreira, Diogo Santos Cunha, Cristina Martins, Inês Cruz, Paula Fazendas, Isabel João, Hélder Pereira

Hospital Garcia de Orta, EPE.

Introduction: Futility in Transcatheter Aortic Valve Implantation (TAVI), acknowledged by the latest guidelines as an expected survival of less than 1 year, results in an unnecessary exposure of risk for patients (pts) and an inefficient use of healthcare resources. Considering that advanced age alone does not preclude pt referral, alternative parameters and scores (such as Charlson comorbidity index and Euroscore-II) have been proposed to predict futility of the procedure for aortic stenosis (AS) treatment. However, current practice still relies on subjective referral.
Objectives: To identify independent predictors of 1-year mortality in a Portuguese population undergoing TAVI implantation and the development of a risk stratification scoring system, comparing it to other existing models.
Methods: Retrospective single center study including consecutive pts accepted for TAVI, between 2015 and 2022. Clinical, echocardiographic and follow-up data were evaluated. Independent predictors for 1y-mortality were identified using Cox regression analysis, and since adjustment had little effect on the coefficient, the proposed score was developed from using the unadjusted Cox proportional hazards model. The Charlson comorbidity index (CCI) and the Euroscore-II were applied to each case. Receiver operating characteristic (ROC) curves and area under curve (AUC) were calculated for these scores and used for comparison.
Results: A total of 75pts were included (mean age 82 ± 6y; 56.0% females). Classical AS was predominant (90.7%), followed by 6.7% low-flow-low-gradient (LFLG) AS, and 2.7% paradoxical LFLG AS. One-year mortality rate was 17.3% (n = 13). Although neither age, nor CCI were predictors of 1y-mortality, when the CCI resulting from subtracting the points assigned to age was > 5 points, it was an independent predictor of the outcome (4.43, 95%CI 0.96-20.51, p = 0.057). After multivariate analysis, other predictors of 1y-mortality were pulmonary hypertension given by an estimated pulmonary systolic artery pressure (PSAP) ≥ 35 mmHg (HR 4.63, 95%CI 0.77-27.80, p = 0.094), and left ventricle dilation with an indexed LV end-diastolic volume ≥ 75 mL/m² (HR 5.51, 95%CI 1.01-30.01, p = 0.048). For the 50 pts that had all CAPL-score parameters available, AUC was 0.806 (95%CI 0.671-0.942, p =.003), which performed better than the previously proposed scores, such as Euroscore-II. In this population, a CAPL-score of 0 points, 3-5 points, 6-8 points, and > 9 points predicted a 1y-mortality of 0%, 26.3%, 37.5% and 100% respectively.
Conclusions: In this population, there was a significant rate of 1y-mortality that was independent of advanced age. Upon comparison with alternative scoring systems, the suggested model exhibited superior accuracy in stratifying pt risk, indicating it as a potential tool to prevent futility. Nevertheless, validation with a larger population is necessary.

CO 85. LEFT ATRIAL WALL THICKNESS MEASURED BY A MACHINE LEARNING METHOD PREDICTS AF RECURRENCE AFTER PULMONARY VEIN ISOLATION

Daniel A. Gomes, Ana Rita Bello, Pedro Freitas, Joana Certo Pereira, Daniel Nascimento Matos, Sara Guerreiro, Pedro Carmo, João Abecasis, Diogo Cavaco, Francisco Bello Morgado, António M. Ferreira, Pedro Adragão

Centro Hospitalar Universitário de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Left atrial (LA) remodeling plays a significant role in the progression of atrial fibrillation (AF). Although LA wall thickness (LAWT) has emerged as an indicator of structural remodeling, its impact on AF outcomes remains unclear. We aimed to determine the association between LAWT and AF recurrence after pulmonary vein isolation (PVI).
Methods: Single-center registry of patients enrolled for radiofrequency PVI from 2016 to 2018. In all cases, a pre-ablation CT scan was performed within less than 48 hours. Mean LAWT was retrospectively measured by a semi-automated machine learning method (ADAS 3D®) with minimal human intervention. Additionally, regional tissue thickness was assessed in four different locations: roof, inferior, posterior, and anterior walls. In a subgroup of patients, a pre-ablation cardiac magnetic resonance (CMR) was also performed within the same week. LA functional parameters and fibrosis, using 3D delayed gadolinium enhancement, were analyzed. The primary endpoint was AF recurrence after a 3-month blanking period.
Results: A total of 439 patients (mean age 61 ± 12 years, 62% male, 78% with paroxysmal AF) were included. The mean LAWT was 1.4 ± 0.2 mm (from 0.9 to 1.9 mm). Software processing duration was 8.2 ± 0.4 min, and the mean human input time was 1.3 ± 0.1 min. There was no correlation between LAWT and CT-derived LA volume index (LAVI; Spearman R -0.01,

CAPL-score	
Charlson comorbidity index score	
– **A**ge	
≤ 5 points	0 points
> 5 points	4 points
Pulmonary hypertension	
PSAP < 35mmHg	0 points
PSAP ≥ 35mmHg	5 points
LV end-diastolic volume (indexed)	
< 75mL/m²	0 points
≥ 75mL/m²	3 points

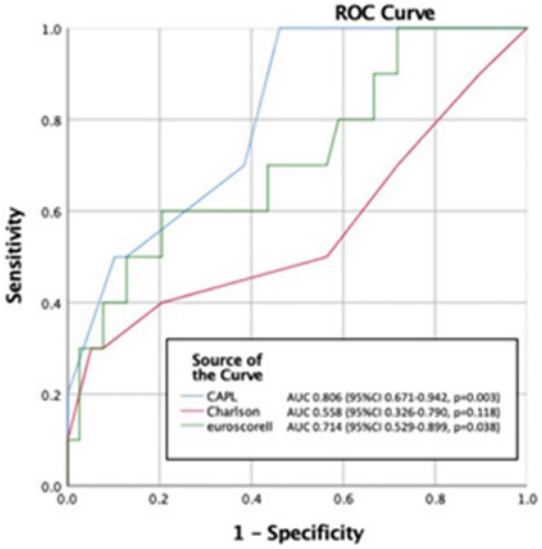


Figure CO84

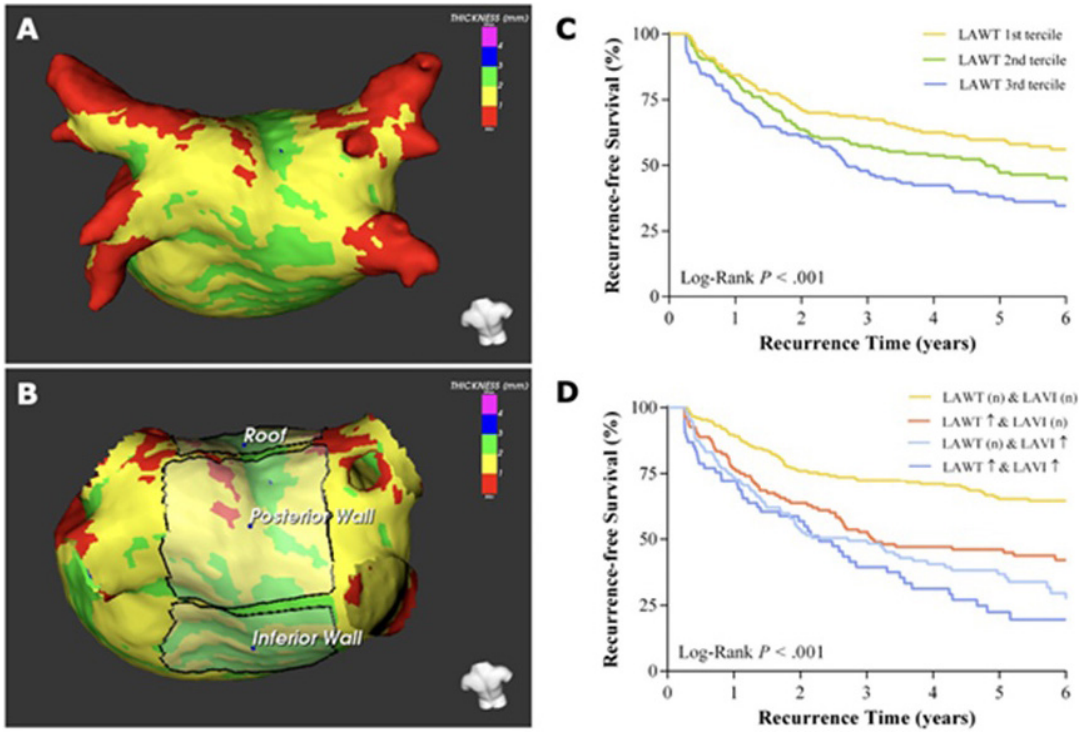


Figure CO85

p = 0.845). During a median follow-up of 5.8 (IQR 4.9–6.6) years, 238 patients (54%) had an AF relapse. After adjusting for known confounders including age, non-paroxysmal AF, LAVI, and chronic kidney disease, LAWT remained an independent predictor of time-to-recurrence (adjusted HR 6.49 [95%CI 2.70-15.49], p < 0.001). AF recurrence rates were 11%, 15%, and 21%/ year across terciles of increasing LAWT (log-rank p < 0.001) (Figure panel C). Additionally, annual recurrence rate progressively increased across the spectrum of LA structural remodeling, ranging from 8% (normal LAWT and LAVI) to 30%/ year (LAWT and LAVI both increased) (see also Figure panel D). The posterior LAWT revealed the strongest association with the study endpoint (HR 2.02 [95%CI 1.29-3.16], p = 0.003). In the cohort of 62 patients with both pre-ablation CT and CMR, LAWT showed weak correlations with LA ejection fraction and LA coupling index (Spearman R < 0.25; p = 0.054 and p = 0.093, respectively), and a moderate correlation with LA fibrosis (Spearman R 0.468; p < 0.001).

Conclusions: Mean LAWT, easily assessed by a commercially available machine learning software, is an independent predictor of AF recurrence after PVI in the long term. This association is mainly driven by the posterior LAWT. Whether patients with increased LAWT should receive tailored therapies deserves further investigation.