COMUNICAÇÕES ORAIS (CO)

Congresso Português de Cardiologia 2025
11 a 13 de abril de 2025

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Espaço Ágora | Sessão de Comunicações Orais 01 – Dos lípidos aos genes - Fatores de risco e biologia molecular na aterosclerose e saúde cardiovascular

CO 1. UNDERSTANDING THE UNDERPINNING OF HYPERTRIGLYCERIDEMIA AS A RISK FACTOR FOR ATHEROSCLEROSIS

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Introduction: Hypertriglyceridemia (HTG) is considered a risk factor for atherosclerosis and may sometimes be a monogenic condition. However, in most patients, this is due to the cumulative effect of multiple genetic risk variants along with lifestyle factors, medications, and disease conditions. Understanding the genetic and environmental basis of HTG could open new translational opportunities in clinical decisions that are not always consensual.

Objectives: Investigate the main risk factors, lifestyle and genetics, for hypertriglyceridemia during an extensive follow-up in a Portuguese population.

Methods: A prospective study was conducted on 3,157 enrolled participants from our Research Center dataset, and they were grouped into two categories based on the triglyceride levels, below or above 150 mg/dl in admission. An additive genetic risk score (GRS) was constructed using the variants from the lipidic axis and stratified into terciles. A non-parametric Spearman test evaluated the correlation between triglycerides and continuous GRS. The Kruskal-Wallis test investigated triglycerides median differences in the GRS terciles. Multivariate logistic regression entering GRS and adjusted to all confounders (CAD family history, sedentary lifestyle, alcohol abuse, smoking, type 2 diabetes, hypertension and body mass index BMI ≥ 30 kg/m²) investigated variables independently associated with high triglyceride levels.

Results: A Spearman correlation between triglycerides levels and continuous GRS was positive and highly significant (p < 0.0001). Median triglycerides levels of 126 mg/dL, 132 mg/dL and 133 mg/dL were obtained for the GRS 1st, 2nd and 3rd terciles, respectively (p < 0.0001). After multivariate regression, entering additive GRS adjusted for all confounder variables, the 2nd tercile of GRS presented an OR of high triglycerides of 1.29 (p = 0.005) and 3rd tercile an OR of 1.23 (p = 0.028), as well as sedentary lifestyle (p = 0.001), alcohol abuse (p = 0.005), smoking (p < 0.0001), diabetes (p < 0.0001), hypertension (p < 0.0001) and BMI ≥ 30 (p = 0.020).
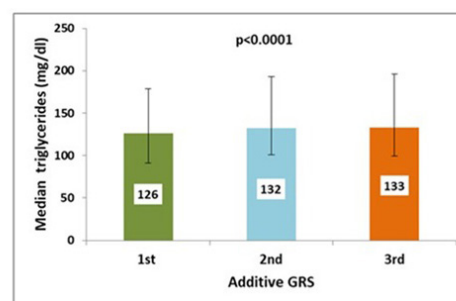
Triglycerides levels distribution (median) in the lipidic additive genetic score terciles

Variables independently associated with higher triglycerides levels

Variables	B	S.E.	Wald	df	Odds ratio (95% CI)	P value
Sedentary lifestyle	.252	.077	10.640	1	1.287 (1.106-1.497)	0.001
Diabetes	.585	.086	46.308	1	1.795 (1.516-2.124)	<0.0001
Hypertension	.301	.083	13.272	1	1.351 (1.149-1.588)	<0.0001
BMI≥30	.192	.082	5.427	1	1.211 (1.031-1.424)	0.020
Alcohol abuse	.288	.104	7.714	1	1.333 (1.088-1.634)	0.005
Smoking	.349	.079	19.801	1	1.418 (1.216-1.654)	<0.0001
Additive GRS			9.787	2		
2nd tercile	.256	.092	7.819	1	1.292 (1.080-1.546)	0.005
3rd tercile	.209	.095	4.810	1	1.232 (1.022-1.485)	0.028

Variables that didn't remain in the equation: CAD family history.

Conclusions: In our population, genetic loci identified in GWAS and gathered in a lipidic GRS influenced the high triglyceride levels as well as some clinical conditions (diabetes, hypertension and obesity) and lifestyle as sedentarism, alcohol abuse, and smoking. A healthy lifestyle, with weight loss without smoking and alcohol and appropriate medication, could protect against genetic susceptibility in reducing triglyceride levels.

CO 2. THE ROLE OF AGE ON LIPID-LOWERING THERAPY PRESCRIPTIONS AND ON LOW-DENSITY LIPOPROTEIN CHOLESTEROL (LDL-C) CONTROL: A SUBANALYSIS OF THE PORTRAIT-DYS STUDY

Cristina Gavina[1], Daniel Seabra[1], Sílvia Oliveira[1], Carla Teixeira[2], Jorge A. Ruivo[2], Nuno Lourenço-Silva[3], Rita Luz[4], Cristina Jácome[4], Francisco Araújo[5]

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Lifelong exposure to high cholesterol levels represents a risk factor for atherosclerotic cardiovascular disease (ASCVD). We characterized lipid-lowering therapies (LLT) prescription patterns among middle-aged and older adults with high and very-high ASCVD risk and estimated the effect of age in achieving LDL-C control. This retrospective cohort study used electronic health records of a Portuguese healthcare institution from Jan 1, 2012 to Dec 31, 2022. Patients aged 40-85 yrs and with high and very-high ASCVD risk were analysed. Exposure consisted of any time a LLT was prescribed (regardless of duration). Two age cohorts were defined (middle-aged 40-69 yrs; older 70-85 yrs), along with six LLT prescription patterns based on statin intensity (high, moderate, low) and the addition of ezetimibe to each intensity group. A patient could be eligible for multiple cohorts as they could have multiple LLT prescription episodes. The likelihood of reaching the LDL-C goal between 150-360 days of follow-up according to ESC/EAS guidelines was modelled using multivariate Cox regression adjusted at baseline for age group, sex, comorbidities and LLT intensity. A total of 31 755 patients with 408 219 episodes of LLT prescription were identified (Table 1). Most LLT prescriptions were from the middle-aged cohort (229 602, 56.2%). In both cohorts, statins in monotherapy (moderate 78.4%, high 10.3%, low 6.9% intensity) were more commonly prescribed than statin-ezetimibe combinations (moderate 2.6%, high 1.6%, low 0.2% intensity). The use of moderate intensity statin in monotherapy was similar across cohorts (middle-aged 77.7%, older 79.3%), but patients in the middle-aged cohort were more frequently prescribed high intensity (11.8 vs. older 8.5%), while older were more frequently prescribed low intensity (8.4 vs. middle-aged 5.7%). The prescription of statin-ezetimibe combinations was similar across cohorts. At 150 days of follow up, only 4 301 (1.2%) episodes reached LDL-C goal, which increased to 20 909 (5.9%) episodes at 360 days. The older cohort had 18% higher likelihood of reaching the LDL-C goal at 150 days (HR = 1.18, 95%CI 1.09-1.28) and 14% higher likelihood at 360 days (HR = 1.14, 95%CI 1.08-1.20) compared to the middle-aged cohort. LDL-C control in high and very-high risk patients remains suboptimal, with particularly low rates in middle-aged adults, despite receiving more frequent high-intensity LLT. This underscores the importance of combined therapies and age-specific strategies in managing dyslipidaemia to decrease lifelong high LDL-C exposure.

Table 1

Baseline lipid-lowering therapies prescription patterns for the total cohort and stratified by age.

| | Total cohort | Age cohorts n (%) | |
| | n = 408 219 | 40-69 years | 70-85 years |
		n = 229 602	n = 178 617
Low intensity statin, n(%)	28 085 (6.9%)	13 003 (5.7%)	15 082 (8.4%)
Moderate intensity statin, n(%)	320 179 (78.4%)	178 460 (77.7%)	141 719 (79.3%)
High intensity statin, n(%)	42 275 (10.3%)	27 139 (11.8%)	15 136 (8.5%)
Low intensity statin + Ezetimibe, n(%)	727 (0.2%)	369 (0.2%)	358 (0.2%)
Moderate intensity statin + Ezetimibe, n(%)	10 537 (2.6%)	6 320 (2.7%)	4 217 (2.4%)
High intensity statin + Ezetimibe, n(%)	6 416 (1.6%)	4 311 (1.9%)	2 105 (1.2%)

CO 3. THE ROLE OF THE PHACTR1 GENE IN CORONARY ARTERIAL DISEASE IN SMOKERS WITH FEW OTHER CARDIOVASCULAR RISK FACTORS

Francisco Sousa[1], Maria Isabel Mendonça[2], João Adriano Sousa[1], Débora Sá[1], Matilde Ferreira[1], Gonçalo Abreu[1], Sónia Freitas[2], Mariana Rodrigues[2], Graça Guerra[1], António Drumond[1], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

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Introduction: Coronary arterial disease (CAD) poses a significant public health challenge, with tobacco recognized as the most predominant modifiable risk factor in young individuals. Despite a strong correlation between tobacco use and cardiovascular (CV) events, many smokers remain event-free. This raises questions about the complex interplay of environmental, epigenetic, and genetic factors contributing to CAD.
Objectives: To identify genetic polymorphisms potentially responsible for CAD in smokers without other cardiovascular risk factors.

Methods: A case-control study involved individuals with low-density lipoprotein (LDL) levels < 100 mg/dL, who were non-diabetic and non-hypertensive. A total of 134 individuals (83% men; Age 48.9 ± 8.4) were enrolled, comprising 97 CAD patients (defined as having at least 70% stenosis in one major coronary artery) and 37 controls without CAD. Eight polymorphisms previously associated with CAD but not with traditional risk factors (TRFs) were genotyped using TaqMan real-time PCR: CDKN2B-AS1 (rs1333049/rs4977574), TCF21 (rs12190287), PHACTR1 (rs1332844), MIA3 (rs17465637), ADAMTS7 (rs3825807), ZC3HC1 (rs11556924), SMAD3 (rs17228212), and GJA4 (rs618675). Bivariate and multivariate analyses compared genotypic proportions between CAD and non-CAD groups.
Results: The PHACTR1 polymorphism (rs1332844 TT/TC) was significantly more prevalent in the CAD cohort, with 86.6% of CAD patients exhibiting this genotype compared to 70.3% of controls (p = 0.028). After multivariate analysis of the 8 polymorphisms, the PHACTR1 variant remained associated with CAD (OR 2.7; p = 0.031). No other genetic variant examined was associated with CAD in this population.
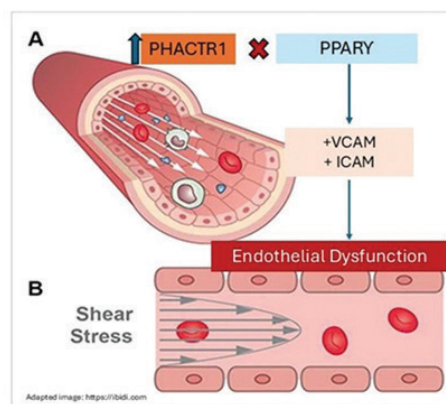
Variables independently associated with CAD

Variable	B	S.E.	Wald	df	Odds ratio (CI 95%)	P value
PHACTR1 (TT/TC)	1.006	0.467	4.635	1	2.734 (1.094 - 6.829)	0.031
Constant	0.167	0.410	0.166	1	1.182	0.683

Variables excluded from the equation: age; gender; MIA3; TCF21; ZC3HC1; CDKN2B-AS1;ADAMTS7; GJA4 and SMAD3.

Conclusions: The PHACTR1 variant is linked to an increased risk of CAD in smokers without other main CV risk factors. This gene encodes a phosphatase and actin regulator protein involved in endothelial cell stabilization, suggesting a synergistic effect of smoking and the PHACTR1 (rs1332844 TT/TC) variant on endothelial dysfunction. PHACTR1 overexpression has been linked to Peroxisome proliferator-activated receptor gamma suppression, a mechanism involved in endothelial dysfunction. GLP-1 analogs have shown promise in increasing PPARγ activity and may be a potential therapy for this population.

CO 4. FIBRINOGEN IS CORRELATED TO INCREASED ARTERIAL STIFFNESS ON HYPERTENSIVE INDIVIDUALS

Cláudia C. Sousa[1], Ana Célia Sousa[1], Patrícia Nunes[1], João Gouveia[1], Mónica Jardim[1], Sara Gomes[1], Sofia Borges[1], Maria João Oliveira[1], Mariana Rodrigues[1], Eva Henriques[1], Maria Isabel Mendonça[1], Roberto Palma dos Reis[2]

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Introduction: Arterial hypertension is the main risk factor for the development of arterial stiffness. Arterial elastic properties are important for cardiovascular function and predictors of cardiovascular risk. Fibrinogen is an inflammatory marker that stimulates endothelial dysfunction, leading to an increase in arterial stiffness. However, these mechanisms of subclinical inflammation, triggered at the level of the vascular wall, remain unknown.
Objectives: Evaluate whether serum fibrinogen is associated with increased arterial stiffness in a Portuguese hypertensive population.
Methods: A study was performed in a Portuguese population of 860 hypertensive individuals (aged 52.0 ± 8.0 years; 53.3% male). Pulse wave

velocity (PWV) was determined using the Complior method, which is an arterial distensibility index. A case-control study was performed depending on whether they had high PWV (≥ 10 m/s) or not (< 10 m/s). Serum fibrinogen levels were determined in both groups. Subsequently, a multivariate analysis was performed with other conventional risk factors for cardiovascular disease, namely: diabetes, dyslipidemia, alcohol consumption and smoking to estimate which variables were significantly and independently associated with increased PWV.

Results: Cases group (PWV ≥ 10 m/s) consisted of 130 individuals and the control group (PWV ?10 m/s) consisted of 730 individuals. In a hypertensive population, individuals with higher PWV have increased serum fibrinogen levels than those with lower PWV (402.77 ± 93.10 mg/dL versus 380.28 ± 80.75 mg/dL; p = 0.004). A positive Pearson correlation was found between fibrinogen and PWV (p < 0.0001). After logistic regression analysis, the risk factors that remained in the equation as significantly and independently associated with PWV increase were: diabetes OR = 2.138 (95%CI 1.400-3.264; p < 0.0001), alcohol abuse OR = 1.511 (95%CI 1.027-2.224; p = 0.036) and fibrinogen OR = 1.003 (95%CI 1.001-1.005; p = 0.006).

Table – Variables independently associated with high PWV (≥10 m/s).

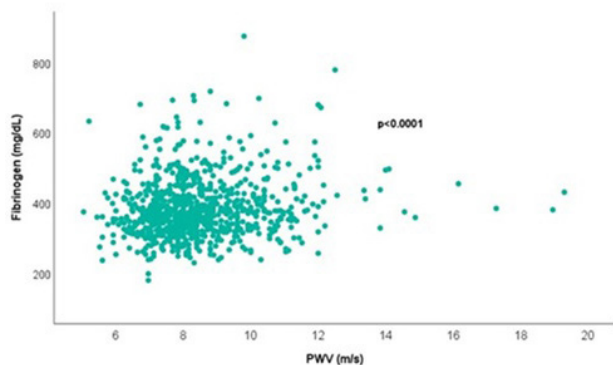| Variables	OR (95% CI)	p-value
Diabetes	2.138 (1.400-3.264)	<0.0001
Alcohol	1.511 (1.027-2.224)	0.036
Fibrinogen	1.003 (1.001-1.005)	0.006

Figure - Pearson Correlation between Fibrinogen and PWV values.

Conclusions: The findings demonstrate a significant and independent association between serum fibrinogen levels and increased arterial stiffness in patients with hypertension. This underscores fibrinogen's crucial role as a marker of arterial wall injury and reinforces its involvement in the pathophysiology of arterial stiffness. To mitigate cardiovascular risks, it is essential to implement control measures in hypertensive individuals aimed at reducing both arterial stiffness and fibrinogen levels.

CO 5. INVESTIGATING THE EFFECTS OF β-ESTRADIOL ON HUMAN MICROVASCULAR ENDOTHELIAL CELLS: A FOCUS ON SEX DIFFERENCES IN CARDIAC HEALTH

Ivo Fonseca[1], Cristiana Fernandes[1], Ana Grego[1], Rita Ferreira[2], Adelino Leite-Moreira[1], Marina Dias-Neto[1], Sandra Marisa Oliveira[1], Rita Nogueira-Ferreira[1]

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Endothelial dysfunction plays a key role in the pathogenesis of various conditions, including heart failure with preserved ejection fraction (HFpEF). It has been proposed that coronary microvascular endothelial dysfunction is a central factor driving the structural and functional changes in the heart associated with this syndrome. HFpEF primarily affects post-menopausal women, yet the potential influence of estrogen on its pathophysiology remains poorly understood. We began investigating the effects of β-estradiol (E2) on human microvascular endothelial cardiac cells (HMVECs) from both sexes, focusing on cell proliferation (assessed via the BrdU assay) and the

nitric oxide (NO) signaling pathway. HMVECs obtained from commercial sources were exposed to various E2 concentrations (0, 0.01, 0.1, 1, and 10 nM). The results indicated that E2 enhanced proliferation in male HMVECs (p < 0.05 for 1 nM E2 compared to 0 nM), while it inhibited proliferation in female cells (p < 0.05 for 0.01 nM E2 compared to 0 nM). Nitrite levels in the culture medium appeared to rise in male HMVECs, suggesting that E2 stimulated NO production in these cells. Additionally, E2 treatment seemed to increase the p-eNOS/eNOS ratio in female HMVECs compared to their male counterparts. The levels of estrogen receptor-α did not significantly differ between sexes with E2 treatment, suggesting that this receptor may not play a role in the observed effects. E2 treatment did not affect NOX4 levels, but GPx1 levels appeared consistently higher in male HMVECs across all E2 concentrations. These findings suggest that the impact of E2 on HMVECs can vary in a sex-dependent manner. Future research into the roles of other estrogen receptors and the effects of serum from HFpEF patients on HMVECs may contribute to our understanding of cardiac microvascular endothelial dysfunction in HFpEF.

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Sala Arquivo | Sessão de Comunicações Orais 02 – Hipertensão pulmonar: desenvolvimentos na estratificação de risco, diagnóstico e tratamento

CO 6. PULMONARY ARTERY PULSE PRESSURE AS A PREDICTOR OF PULMONARY HYPERTENSION IN PATIENTS WITH INTERMEDIATE-HIGH RISK PULMONARY EMBOLISM

Julien Lopes, Mariana Caetano Coelho, Bárbara Lacerda Teixeira, André Grazina, João Reis, Ana Galrinho, Duarte Cacela, Rúben Ramos, Melanie Ferreira, Rui Cruz Ferreira, Luís Almeida Morais

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

Introduction: Pulmonary hypertension (PH) is a recognized long-term complication that can arise after pulmonary embolism (PE), due to persistent obstruction of pulmonary arteries by organized thrombi and secondary remodeling. Higher systolic pulmonary artery pressure (sPAP) at presentation during the acute PE event as already been stablished as a predictor of pulmonary hypertension at long-term. Also, diastolic pressure has been discussed as a marker for chronic setting. This study aimed to evaluate the predictive power of pulmonary artery pulse pressure (PAPP) for the development of PH and compare it to sPAP.

Methods: Patients with intermediate-high risk PE submitted to catheter-directed therapy in a tertiary centre were scheduled for follow-up to screen for PH after 3-6 month of anticoagulation with RHC. PPAP values from RHC during the acute PE episode were collected and analysed to assess their potential as predictive markers for the development of pre-capillary PH (mPAP > 20 mmHg, PVR > 2 WU and PCWp < 15 mmHg in RHC). A logistic regression was used to assess the predictive value of PAPP for PH development and then a ROC curve analysis to determine the optimal cut-off threshold for PAPP as a predictor.

Results: 48 patients (median age 63 years [IQR 24]; 56% female) were included. At baseline, the mean sPAP was 52.7 ± 14.8 mmHg and the mean dPAP was 19.33 ± 6.3 mmHg. The mean PPAP was 33.4 ± 11.58 mmHg. 23 patients (47.9%) were diagnosed with pulmonary hypertension at 3-6 month follow-up. The logistic regression model showed that PPAP was a significant predictor of PH (p = 0.017) and the ROC curve analysis demonstrated a superior discriminative power compared to sPAP (p = 0.004; AUC = 0.716 vs. p = 0.013; AUC = 0.690) with an optimal cut-off of 33.5 mmHg

(Sensibility 65.2%; Specificity 80%). When employing this threshold, individuals exhibiting elevated PPAP levels (> 33.5 mmHg) demonstrated a 7.5-fold increased likelihood of developing PH (OR = 7.5; p = 0.002). They were also more likely to have saddle/central PE at admission (p = 0.03) and seemed to have higher values of mMiller index (p = 0.09; 95%CI 0.98-1.35).

Conclusions: In our study, PPAP at admission demonstrated a higher discriminative power in predicting the development of PH at 3-6 month follow-up when compared to sPAP suggesting that it may serve as a more reliable predictor for identifying patients at risk of PH. This finding is of utmost importance in an era of advanced percutaneous technologies for PE treatment.

CO 7. IMPROVING RISK PREDICTION IN PULMONARY HYPERTENSION: THE ROLE OF PULMONARY ARTERIAL COMPLIANCE

Daniel Inácio Cazeiro, Miguel Azaredo Raposo, Catarina Gregório, Ana Abrantes, Diogo Ferreira, Marta Vilela, João Cravo, Tatiana Guimarães, Susana Robalo Martins, Nuno Lousada, Fausto J. Pinto, Rui Plácido

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Pulmonary arterial compliance (PAC) is an early marker of vascular disease in patients (pts) with pulmonary hypertension (PH), decreasing when pulmonary pressures and vascular resistance are still normal. Emerging evidence suggests that PAC may outperform traditional hemodynamic parameters as a predictor of outcomes in PH, potentially enhancing risk stratification in this population.

Objectives: To evaluate the potential of PAC in predicting adverse outcomes in pts with PH, as an adjunct to conventional risk stratification models.

Methods: Single-center, retrospective study of pts with precapillary PH (groups I and IV) followed at a tertiary hospital. Risk stratification was initially performed using the COMPERA 2.0 four-strata risk stratification score. Time-to-event analysis for a composite endpoint of all-cause death or hospitalization was conducted using Kaplan-Meier survival curves and Cox proportional hazards regression. A modified 4-strata risk score was developed to incorporate PAC. Pts with PAC values below the median advanced to the next risk category, except those at high risk, whose classification remained unchanged. The diagnostic performance of the traditional and modified models was compared using receiver operating characteristic (ROC) analysis.

Results: Seventy-one pts were included (mean age 58 years; 61% female; 55% with group I PH). In the conventional 4-strata score, 27%, 39%, 26% and 8% were at low, intermediate-low, intermediate-high and high risk, respectively. Median PAC was 1.30 mL/mmHg. Pts with PAC below this value had a shorter time to the composite endpoint (hazard ratio [HR]: 4.317, 95% confidence interval [CI]:1.423-13.095, p = 0.01). Over a median follow-up time of 818 days, 17 combined events occurred. The COMPERA risk score demonstrated moderate predictive accuracy for events, with an area under the curve (AUC) of 69% (p = 0.02); however, event rates were similar between intermediate-high and high-risk pts. According to the modified 4-strata score, a significant shift of risk category was noted, especially in low (27 > 15%) and high risk (8 > 27%) categories. Pts who were at low risk did not experience any events, and a higher number of events occurred in pts at high risk. The accuracy of the modified score for predicting events was higher than the COMPERA risk score, with an AUC of 73% (p = 0.005).

Conclusions: In PH pts with a more adverse hemodynamic profile (defined as PAC < 1.30 mL/mmHg), there was a higher risk to a combined endpoint of all-cause death or hospitalization. PAC may be used as a risk modifier in the conventional 4-strata risk score, providing a better accuracy for prediction of events. While our results provide new insight into risk stratification of PH pts, larger, prospective studies are needed to validate this hypothesis.

CO 8. PERSUING VENTRICULAR-ARTERIAL COUPLING: PROPOSING A NEW CUT-OFF OF TAPSE/SPAP TO IDENTIFY PATIENTS WITH PULMONARY HYPERTENSION AFTER INTERMEDIATE-HIGH RISK PULMONARY EMBOLISM

Julien Lopes, Mariana Caetano Coelho, Bárbara Lacerda Teixeira, André Grazina, João Reis, Ana Galrinho, Duarte Cacela, Rúben Ramos, Melanie Ferreira, Rui Cruz Ferreira, Luís Almeida Morais

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

Introduction: Pulmonary hypertension (PH) remains a potential long-term complication following pulmonary embolism (PE). Right heart catheterization (RHC) is the gold-standard for the diagnosis while echocardiography is often used as a non-invasive screening tool. The ventricular-arterial coupling
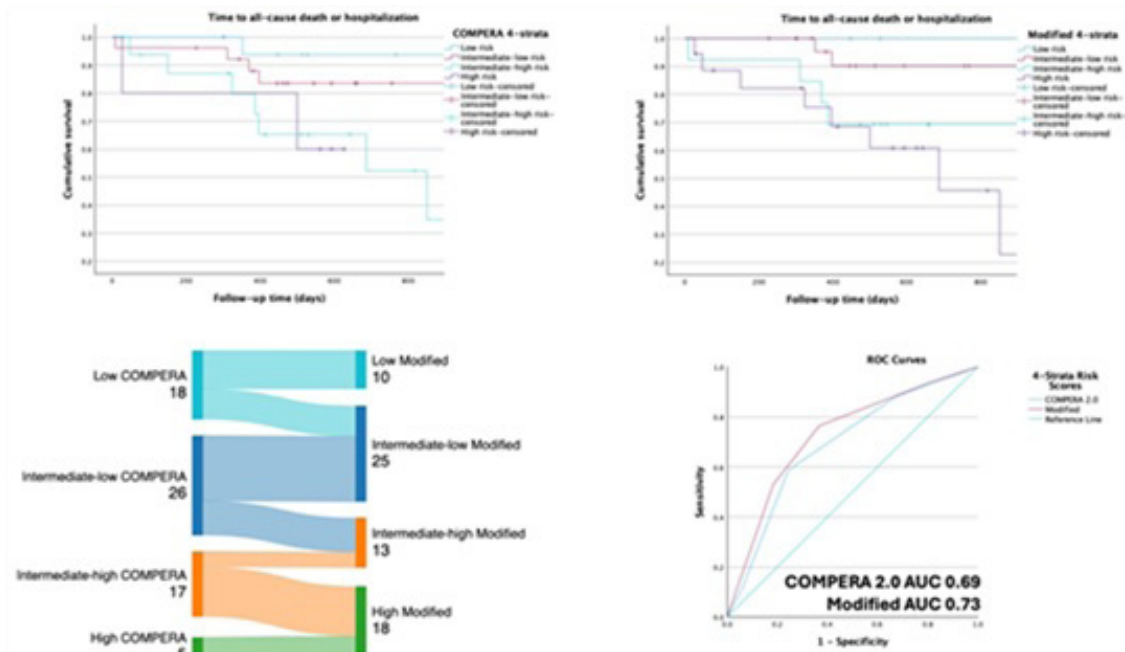

Figure CO 7

accessed by echocardiography in the form of TAPSE/sPAP ratio is increasingly used as an add-on to other echocardiography parameters to better predict the probability of PH. This study aimed to evaluate the predictive power of echocardiographic parameters to detect PH in patients with intermediate-high risk PE submitted to catheter-directed therapy (CDT).

Methods: Patients with intermediate-high risk PE submitted to catheter-directed therapy in a tertiary centre are submitted to a multimodality evaluation at 3 to 6-month follow-up to screen for PH. Patients were divided in two groups according to the presence of pre-capillary PH (mPAP > 20 mmHg, PVR > 2 WU and PCWp < 15 mmHg in RHC) and echocardiographic parameters were analysed to assess their power to predict PH.

Results: From the 78 patients, 42 completed the follow-up and were included in the analysis (median age 59 years [IQR 47-73 years], 57.1% female). 20 patients (47.6%) were diagnosed with PH by RHC at 3-6 month follow-up. Echocardiographic parameters of the right heart that were significantly different between the two groups were the presence of tricuspid regurgitation (p = 0.01) and the TAPSE/sPAP ratio (p = 0.03). Peak tricuspid regurgitation velocity (p = 0.169) and RVOT acceleration time (p = 0.520) showed no statistically significant differences between the two groups. The ROC curve analysis of TAPSE/sPAP showed the best cut-off value of 0.64 (p = 0.001, AUC 0.752, Sensibility 53%, Specificity 93%) when comparing with the guideline recommended cut-off of 0.55 (p = 0.389, AUC 0.577, Sensibility 20%, Specificity 95%). A logistic regression model showed a OR 2.15 (p = 0.017) in predicting PH for each increase of 0.1 in TAPSE/sPAP ratio.
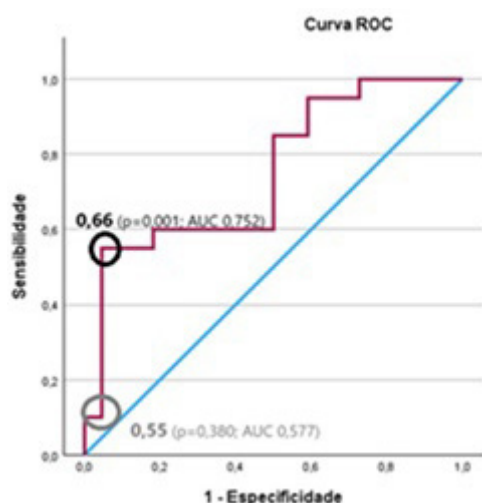
Conclusions: In our study, for patients after intermediate-high risk PE, the ventricular-arterial coupling accessed by echocardiogram (TAPSE/sPAP) showed to be most valuable echocardiographic parameter to predict the presence of PH 3 to 6 months of effective anticoagulation. However, the optimal cut-off may be outdated taking into account the most recent hemodynamic threshold for the diagnosis of PH. In our cohort, a higher value of TAPSE/sPAP ratio seems to be a better predictor of PH.

CO 9. PULMONARY ENDARTERECTOMY AND BALLOON PULMONARY ANGIOPLASTY IN CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION: COMPARISON OF LONG-TERM HEMODYNAMIC RESPONSES TO EXERCISE

Rita Calé, Mariana Martinho, Filipa Ferreira, Sofia Alegria, Débora Repolho, João Luz, Ana Rita Pereira, Patrícia Araújo, Sílvia Vitorino, Hélder Pereira, Daniel Caldeira

Hospital Garcia de Orta.

Introduction: This study evaluates the long-term hemodynamic outcomes of right heart catheterization (RHC) at rest and during exercise in chronic thromboembolic pulmonary hypertension (CTEPH) patients treated with balloon pulmonary angioplasty and pulmonary endarterectomy. The objective was to evaluate whether disease resolution, particularly under exercise conditions, is consistently achieved in both treatment groups.

Methods: This was a prospective single-center registry of a Portuguese Pulmonary Hypertension referral center. Between 2017 and 2020, a total of 13 consecutive patients with CTEPH who underwent pulmonary endarterectomy (PEA Group) and 12 patients who completed a balloon pulmonary angioplasty program (BPA Group) were prospectively evaluated, with all patients having follow-up periods of over one year. The selection for PEA or BPA was conducted by a specialized CTEPH expert team. RHC at rest and during exercise was performed both prior to the procedure and after an average follow-up period of 45 ± 15 months. Long term rest hemodynamics and exercise mean pulmonary artery pressure/cardiac output (mPAP/CO) slope were compared between groups.

Results: Demographics were similar between groups. At baseline, a higher proportion of patients in the BPA group were receiving pulmonary vasodilator therapy compared to the PEA group (91.7 vs. 38.5%, p = 0.008). One patient in the BPA group died because of cancer after 28 months of follow-up. Both PEA and BPA significantly reduced mPAP (from 42.7 ± 13.9 mmHg at baseline to 23.1 ± 5.6 mmHg at follow-up; p < 0.001 and from 47.7 ± 9.3 mmHg at baseline to 29.8 ± 8.8 mmHg; p < 0.001) and pulmonary vascular resistance (from 9.9 ± 5.4 WU at baseline to 3.2 ± 1.9 WU at follow-up; p < 0.001 and from 11.2 ± 3.9 WU at baseline to 3.8 ± 1.3 WU; p < 0.001). At follow-up, the PEA group demonstrated better resting hemodynamics, with lower mPAP (p = 0.038) and a greater proportion of patients achieving normal hemodynamics at rest (mPAp < 20 mmHg in 17.4 vs. 0%, p = 0.093). However, in the long term, exercise hemodynamics remain impaired in both groups (mPAP/CO slope in both PEA and BPA groups was 4.5 ± 2.2 mmHg/L/min and 7.3 ± 5.5 mmHg/l/min, respectively; p = 0.154; figure). An abnormal slope (> 3.0 mmHg/L/min) was observed in 70.0% of patients in the PEA group compared to 85.7% in the BPA group (p = 0.603).

Conclusions: The analysis demonstrates that both BPA and PEA improve resting hemodynamics. While PEA showed lower mPAP values at long-term follow-up, many patients exhibit persistent abnormal hemodynamic responses to exercise over time, as reflected in the mPAP/CO slopes, regardless of treatment modality. These results highlight the importance of comprehensive patient evaluation, including exercise testing, in the long-term follow-up of CTEPH patients, and suggests the need for further studies to address exercise-induced pulmonary hypertension in these patients.
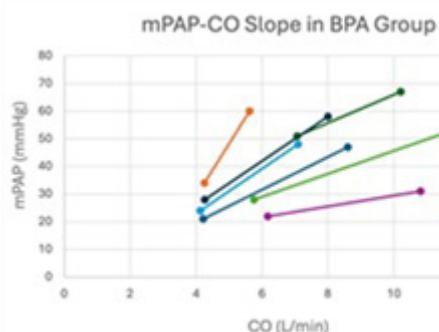

Figure CO 9

CO 10. TAPSE/PASP RATIO: UNVEILING A KEY PREDICTOR OF PULMONARY HYPERTENSION IN ACUTE PULMONARY EMBOLISM

Sofia Esteves, Miguel Azaredo Raposo, Ana Abantes, Daniel Inácio Cazeiro, Diogo Rosa Ferreira, João Mendes Cravo, Nuno Lousada, Susana Gonçalves, Sara Lopes, Catarina Sousa, Fausto J. Pinto, Rui Plácido

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Pulmonary hypertension (PH) is a serious complication of pulmonary embolism (PE), arising from persistent vessel obstruction. Early diagnosis and intervention can help reduce the risk of PH, but clinical predictors remain limited. The TAPSE/PASP ratio correlates with right ventricle-pulmonary artery (RV-PA) coupling. A low TAPSE/PASP ratio, indicating RV-PA uncoupling, has been linked to a poor prognosis in patients with acute PE.
Objectives: To evaluate the TAPSE/PASP ratio in patients with acute PE and assess its correlation with prognosis, namely with the development of PH.
Methods: Observational, single-center study conducted on intermediate-risk acute PE patients. Clinical and echocardiographic data were prospectively collected from hospital records between 2019 and 2021. To assess the diagnostic performance of the TAPSE/PASP ratio in predicting PH development, a ROC curve was generated, and the area under the curve (AUC) was calculated.
Results: A total of 166 patients were included, (46.4% male, median age of 76 years). The most common comorbidities were hypertension (66.9%), dyslipidemia (47.6%), and active cancer (26.5%), table. The in-hospital mortality rate was 7.4%. Echocardiographic data showed a median TAPSE of 20 mm and a median PASP of 37 mmHg, with a mean TAPSE/PASP ratio of 0.53. 44.2% of patients had a ratio > 0.55, and 55.8% had a ratio ≤ 0.55. During a median follow-up (FUP) of 43.5 months, 50% of patients died, with 29.6% of these deaths attributed to cardiovascular causes. 9.9% of patients developed PH. A TAPSE/PASP ratio < 0.44 showed a sensitivity of 80.3% and a specificity of 72.7% for predicting PH development during FUP (AUC: 0.758) (Figure 1). TAPSE/PASP was found to be an independent predictor of development of PH during FUP (OR 9.91, 95%CI: 2.318-42.319, p value = 0.002). However, when analyzing the subgroup of patients with PASp < 60 mmHg, the effect was more modest, not meeting statistical significance (p value = 0.09).
Conclusions: A TAPSE/PASP ratio < 0.44 was associated with the diagnosis of PH during FUP, but this effect was attenuated after excluding patients with PASP > 60. A low TAPSE/PASP ratio should prompt clinicians to provide both comprehensive diagnostic investigation and close FUP of these patients, as they present a higher risk of having either preexisting PH or developing it in the future.

Table 1: Baseline characteristics of population.

Figure CO 10

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Sala Arrábida | Sessão de Comunicações Orais 03 – Epidemiologia e organização de cuidados de saúde

CO 11. MAPPING HEART FAILURE CARE IN PORTUGAL: ACCESS, RESOURCES, AND REGIONAL INEQUITIES

Diogo Rosa Ferreira[1], João Agostinho[2], Filipa Almeida[3], Elisabete Martins[4]

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Introduction: Heart failure (HF) presents a significant public health challenge in Portugal as the prevalence reported in the PORTHOS study is overwhelming. Managing HF requires specialized resources, including dedicated outpatient clinics and trained healthcare professionals. To better understand the current landscape of HF care across the country, a survey was conducted to gather insights into the availability of HF specific services, the distribution of healthcare resources and the challenges faced by medical teams in providing optimal care for HF patients.
Methods: A questionnaire was distributed to key medical leaders across all 41 Local Health Units (ULS) of mainland Portugal, as well as to the two autonomous regions. The recipients were either the Head of the HF Clinic, the Cardiology Department Head or the Head of Internal Medicine at each institution. Each center was classified according to the ICARe-HF accreditation program categories.
Results: A total of 42 responses were received from the 43 questionnaires sent. There are 8 advanced centers, including 4 Type A and 4 Type B centers, 22 specialized centers, 4 community centers and 8 centers with limited or no cardiology support to HF patients. Among the ULS, 22 have dedicated HF outpatient clinics, 10 manage HF patients through general outpatient clinics and 10 do not have any outpatient clinic. Additionally, 25 centers administer
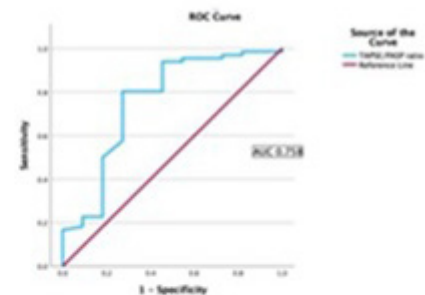

Figure 1: ROC Curve for assessing the performance of the TAPSE/PASP ratio in predicting PH during FUP.
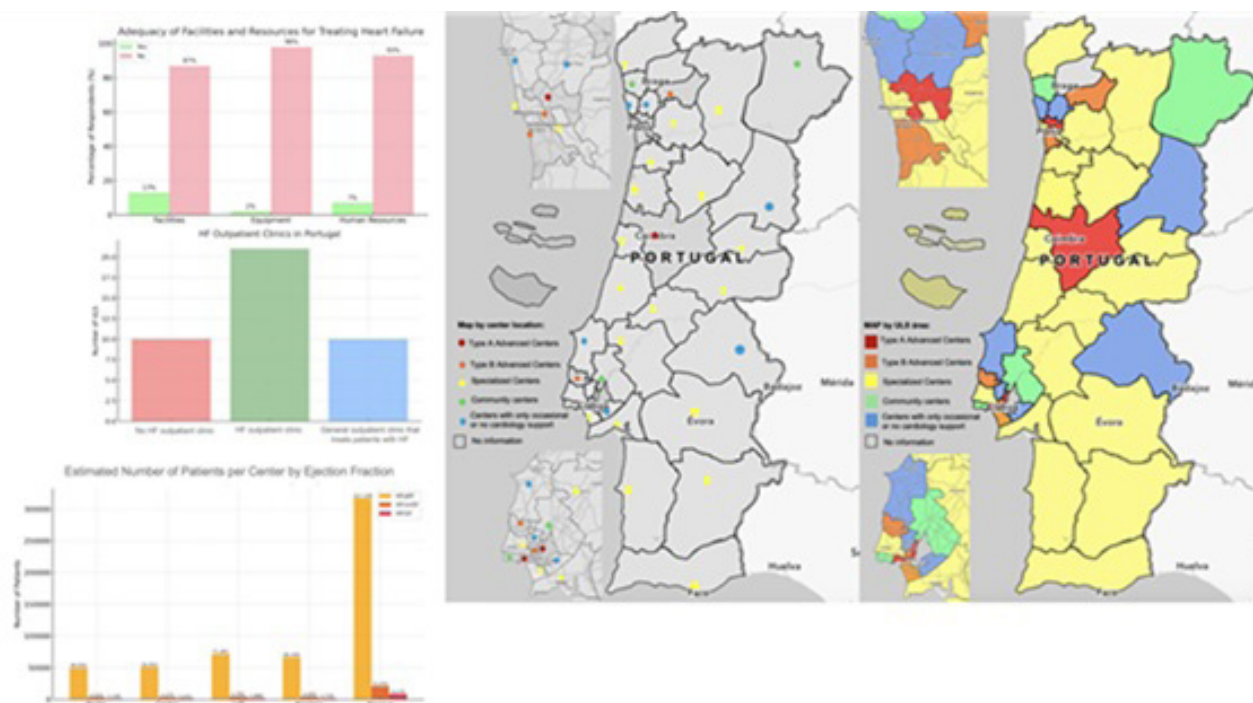
Figure CO 11

ambulatory IV diuretics or IV iron, while 20 centers offer intermittent levosimendan. Of the 35 centers offering HF-specific appointments, 27 are conducted by cardiologists (9 in ARS Norte, 6 in ARS Centro, 9 in ARS LVT, 2 in ARS Alentejo, and 1 in ARS Algarve). On average, each of these centers has 3 cardiologists dedicated to HF care, along with 2 dedicated nurses. By analyzing patient numbers in each ARS and using data from the PORTHOS study, we calculated the average number of patients served by each center with HF-specific appointments. The data reveals that the number of patients per center increases from the North to the South of Portugal. Sixty-three percent of the ULS have their own HF-specific protocols. When asked if the available facilities for treating HF patients were sufficient, 87% of respondents answered "no". Similarly, 93% indicated that human resources were inadequate, with the primary shortage being in doctors, followed by a lack of nurses.

Conclusions: The survey results reveal disparities in the availability of HF-specific care across Portugal's regions. While some areas are well-equipped with specialized centers and dedicated outpatient clinics, others face substantial challenges due to a lack of resources and specialized personnel. These findings emphasize the importance of addressing regional inequalities to ensure that HF patients receive the necessary care. Further investments in both healthcare facilities and human resources are essential to address the burden of HF in Portugal.

CO 12. SOCIOECONOMIC AND ETHNIC FACTORS AFFECTING HEART FAILURE TREATMENT AND PROGNOSIS: EXPLORING DISPARITIES IN CLINICAL OUTCOMES

Ana Rita M. Figueiredo[1], Ana Abrantes[1], João Fernandes Pedro[1], Fátima Salazar[2], Ana Francês[2], Rafael Santos[1], Joana Rigueira[1], Doroteia Silva[3], Nuno Lousada[1], Fausto J. Pinto[1], Dulce Brito[1], João R. Agostinho[1]

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Introduction: Heart failure (HF) with reduced ejection fraction (rEF) is a prevalent and burdensome condition, with treatment shaped by social determinants such as ethnicity, migration status, and socioeconomic factors. However, little is known about disparities in treatment access between Portuguese and non-Portuguese patients and their impact on disease outcomes.

Objectives: This study aims to explore potential differences in the management of heart failure with reduced ejection fraction, including access to medication and survival outcomes between Portuguese and non-Portuguese patients.

Methods: A prospective, single-center study was conducted involving HFrEF patients treated in a HF Clinic with a protocol-based follow-up program. The sample was divided into two groups: Portuguese and non-Portuguese, based on their ethnic origin. Treatment strategies, including the use of guideline-directed medical therapies (GDMT) and HF-related events were analyzed and compared. T-test for independent samples and Kaplan-Meier analysis were used.

Results: A total of 181 Portuguese patients were included [mean age: 66 ± 13 years; baseline left ventricle ejection fraction (LVEF): 29 ± 8%; follow-up LVEF: 44 ± 11%; ischemic heart disease: 50%] and 38 patients of African/Asian origin (age: 57 ± 16 years; baseline LVEF: 26 ± 8%; follow-up LVEF: 41 ± 13%; ischemic heart disease: 31%). The mean follow up was 2.4 years. No significant differences were found between the two groups in clinical, epidemiological or treatment characteristics, except for the use of sacubitril-valsartan (ARNI), which was significantly higher in Portuguese patients (p = 0.033). Among the African/Asian group, 17 (44.7%) were not treated with ARNI, mainly due to an inability to afford the drug (11 patients; 28.9%). In the Portuguese group, 28 patients (15.5%) were not under ARNI and no one stated inability to afford the drug. Prognostic analysis, adjusted for age, LVEF and NYHA class revealed that African/Asian patients had a significantly higher risk of HF events (cardiovascular death or HF-related hospitalization) compared to Portuguese patients, with a hazard ratio of 3.53 (95%CI 1.53-8.14; p = 0.003) (Figure 1).

Conclusions: This study reveals disparities in HFrEF management between Portuguese and non-Portuguese patients, particularly in ARNI use, with financial barriers affecting access in the African/Asian group. Despite similar clinical profiles, non-Portuguese patients had a higher risk of heart failure events, highlighting the impact of ethnic and socioeconomic factors on treatment and outcomes.
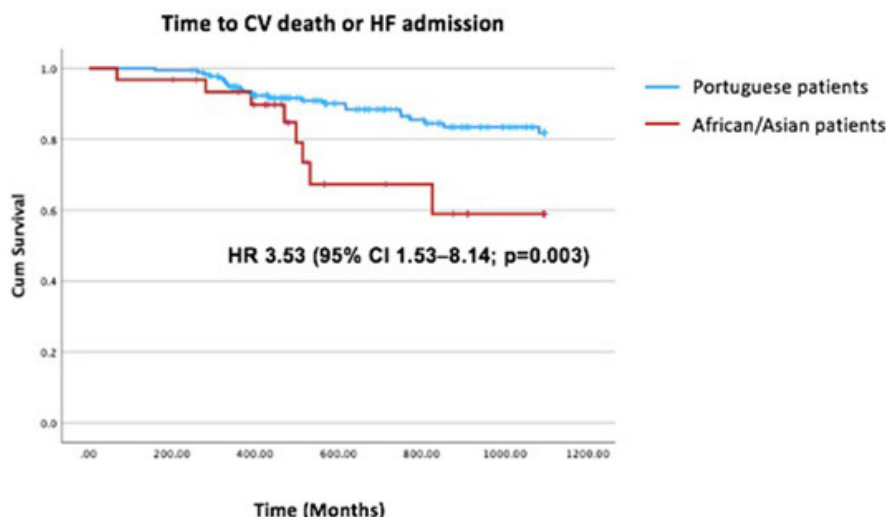
Time to CV death or HF admission

HR 3.53 (95% CI 1.53–8.14; p=0.003)

Figure CO 12

CO 13. THE EXPERIENCE OF 253 EARLY POST DISCHARGE HEART FAILURE APPOINTMENTS: WHAT WE HAVE LEARNED

Ana Filipa Mesquita Gerardo, Inês Miranda, Mariana Passos, Inês Fialho, Célia Henriques, Ana Oliveira Soares, Carolina Mateus, Mara Sarmento, Rodrigo Brandão, David Roque

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

Introduction: Heart Failure (HF) guidelines recommend a follow-up visit within 7 to 14 days post-hospitalization to facilitate a high-quality transition to outpatient care. This provides an excellent opportunity to monitor signs and symptoms of HF, assess potential treatment side effects and titrate medication accordingly. This strategy has been associated with lower 30-day readmission rates in retrospective studies.
Objectives: To describe the role of HF early post discharge appointment (EPDA) in the management of HF patients and the outcomes of these patients immediately after hospitalization.
Methods: Prospective registry of consecutive patients who underwent an EPDA between March 2021 and September 2023. Demographics, blood test results, treatment decisions, and HF-related readmissions and all-cause death at 90 days were recorded.
Results: A total of 253 patients were included, with 35.2% females (n = 89) and a median age of 68 [56-76] years. *De novo* HF was present in 48.2% (n = 122) patients; 77.9% (n = 197) had reduced left ventricle ejection fraction, and its etiology was still under investigation at the time of EPDA in 43.1% (n = 109) patients. Among patients with a known etiology, the majority (54.9%; n = 79) had ischemic heart disease. The median time between hospital discharge and EPDA was 13 [10-16] days. Just 2 weeks after discharge, there was already an increase in NYHA class in 10.3% (n = 26) of patients, and 18.2% (n = 46) already showed signs and symptoms of hypervolemia, requiring diuretic treatment intensification. Guideline medical directed treatment (GMDT) adjustments at EPDA are presented in Graph 1. At EPDA, 17.4% (n = 44) of patients experienced drug adverse effects: 4.3% (n = 11) hyperkalemia, 5.5% (n = 14) hypotension and 9.5% (n = 24) acute kidney injury; no one had bradycardia. At discharge 52.6% (n = 133) of patients were on the 4 pharmacologic pillars, and this rate increased only to 56.5% (143) at the EPDA, with the mineralocorticoid receptor antagonists being the least prescribed class. Serum creatinine level (1.1 vs. 1.3 mg/dL, p = 0.001), serum C cystatin level (1.5 vs. 1.9 mg/dL, p = 0.006), serum urea level (50.3 vs. 57.8 mg/dL, p = 0.005), serum NTproBNP level (1,847 vs. 4,877 mg/dL, p < 0.001) and furosemide dosage (42 vs. 56 mg, p = 0.01) at EPDA were associated with HF-related readmissions and all-cause death at 90 days. Logistic regression analysis revealed that only NTproBNP level at EPDA remained independently associated with adverse events (p = 0.031).

GMDT adjustments at EPDA
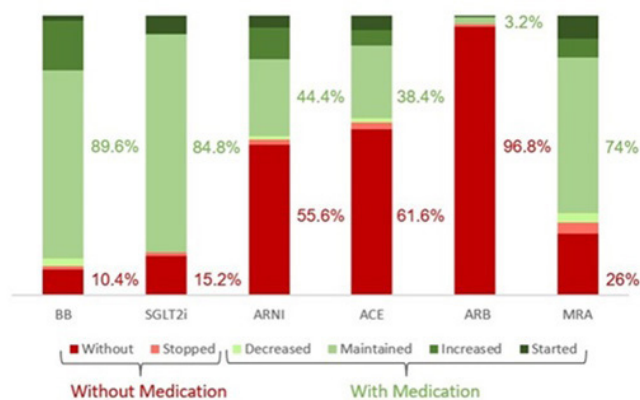
Conclusions: Early evaluation of HF patients after discharge allows congestion reassessment, GMDT titration, and detection of drug adverse effects. NTproBNP and kidney function measured around 2 weeks after discharge following an acute HF episode are strong predictors of HF-related readmissions and all-cause death at 90 days, allowing identification of high-risk patients that should be reassessed earlier.

CO 14. TRENDS IN CARDIOVASCULAR HOSPITAL ADMISSIONS OVER THE LAST 15 YEARS: IS IT TIME TO RETHINK HEALTHCARE POLICIES?

Helena Sofia Santos Moreira, Miguel Rocha, Pedro Mangas Palma, Ana Isabel Pinho, Cátia Oliveira, Luís Santos, Emanuel Oliveira, Joana Gonçalves, Bernardo Cruz, Rui André Rodrigues, Ana Lebreiro

Centro Hospitalar Universitário de S. João, EPE.

Introduction: The field of cardiovascular (CV) diseases has witnessed significant changes in recent years, marked by cutting-edge scientific advancements with novel diagnostic approaches and clinical entities. Understanding trends in CV hospital admissions is essential to improve healthcare policies, as it remains the leading cause of morbidity and mortality worldwide.
Objectives: To analyse the 15-year trends in the CV profile of patients (pts) admitted to the cardiology department of a tertiary center.

Methods: A retrospective analysis was conducted on pts admitted to the cardiology ward of our centre between 2008 and 2023. Data on baseline characteristics and index events were collected through medical records review. Linear regression was performed to evaluate time trends.

Figure 1. Linear regression illustrating the trends in admissions over the 15-year period.
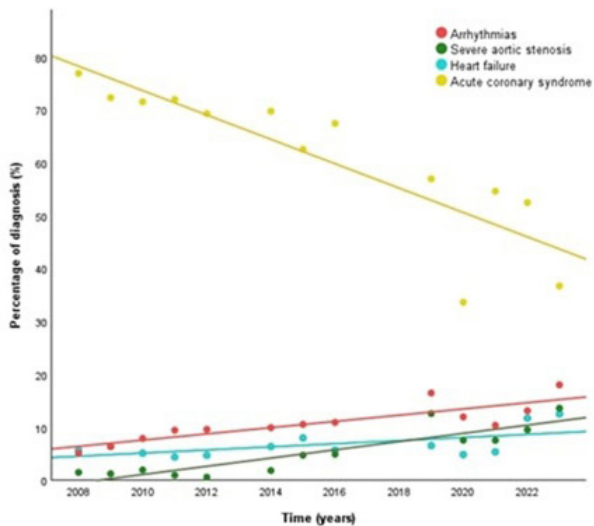
Results: A total of 14,304 pts were included, with 80.2% (n = 11,470) representing urgent admissions. Bed capacity increased significantly over the study period, resulting in an annual mean rise of 75 admissions ($R^2 = 0.77$; p < 0.001), doubling from 849 in 2008 to 1713 in 2023. Focusing on urgent admissions, 68% were male (n = 7825), though the proportion of females increased annually by 0.48% ($R^2 = 0.54$; p < 0.004), comprising 39% of the pts in 2023. Mean age rose by 0.26 years annually ($R^2 = 0.68$; p < 0.001), with pts having 65 ± 15 years in 2023. Arterial hypertension (62.6%) and dyslipidemia (61.3%) were the most common CV risk factors, with no substantial variation over time. Acute coronary syndrome (ACS) was the most frequent diagnosis (n = 6684, 58.3%), though its proportion declined 2.3% annually ($R^2 = 0.76$; p < 0.001), reflecting the emergence of other diagnosis (Figure 1). Urgent admissions due to rhythm disturbances increased significantly, with a 0.58% annual rise ($R^2 = 0.72$; p = 0.001), particularly over the past 10 years (2014: 9.99 vs. 2023: 18.08%). Also, admissions for heart failure nearly doubled since the beginning of the decade (2010: 4.9 vs. 2023: 8.6%), with overall a yearly increase of 0.29% ($R^2 = 0.35$; p = 0.033). Hospitalizations due to severe aortic stenosis are currently nine times more prevalent (2008: 1.5 vs. 2023: 13.7%), with a 0.78% annual rise ($R^2 = 0.80$; p < 0.001), largely driven by elective admissions for transcatheter aortic valve implantation (TAVI). The median duration of hospitalizations was 6 (IQR 5) days, with a non-significant trend towards shorter stays (p = 0.11) over the years.

Conclusions: Our study highlights the dynamic nature of CV health, including an aging population, an increasing proportion of female pts and rising admissions for arrhythmias, heart failure and severe aortic stenosis. These findings underscore the need for tailored strategies and resource adaptation to address the growing burden of CV diseases. Further research is required to guide institutional and national healthcare policies in response to these trends.

CO 15. MORTALITY AND HOSPITALIZATION COSTS DUE TO HEART FAILURE ASSOCIATED WITH SYSTEMIC ARTERIAL HYPERTENSION IN BRAZIL FROM 2010 TO 2019

Matheus de Oliveira Dutra[1], Estefanny Maria de Souza Schuck[2], Fátima Carolina Lopes Simões da Silva[1], Maria Lima de Sá[1], Louisie Marie Ferreira Lima[3], Hiochelson Najibe Dos Santos Ibiapina[4], Erian de Almeida Santos[5], Aristóteles Comte de Alencar Neto[4], Mônica Regina Hosannah da Silva e Silva[1], Bernardo Medeiros Carvalho[6]

[1]Centro Universitário Fametro. [2]Universidade Nilton Lins. [3]Hospital Beneficente Português do Amazonas. [4]Universidade do Estado do Amazonas (UEA). [5]Fundação de Vigilância em Saúde. [6]Universidade do Porto.

Introduction: Systemic arterial hypertension (SAH) represents one of the main risk factors for other cardiovascular diseases, such as heart failure (HF). In Brazil, it is estimated that more than 30% of the adult population is hypertensive and that over 2 million individuals present with HF, which is associated with a significant utilization of public health resources.

Objectives: To describe the magnitude of mortality and hospitalizations due to heart failure (HF) associated with systemic arterial hypertension (SAH) and to evaluate the trends in expenditures related to hospital admissions for this condition across the different geographic regions of Brazil from 2010 to 2019.

Methods: This is an ecological study on hospital admissions and mortality due to HF associated with SAH in Brazil between 2010 and 2019, using secondary data from the Hospital Information System (SIH/DATASUS) and the Mortality Information System (SIM/DATASUS), respectively. Data were filtered by category of the International Classification of Diseases (ICD-10) and analyzed in absolute
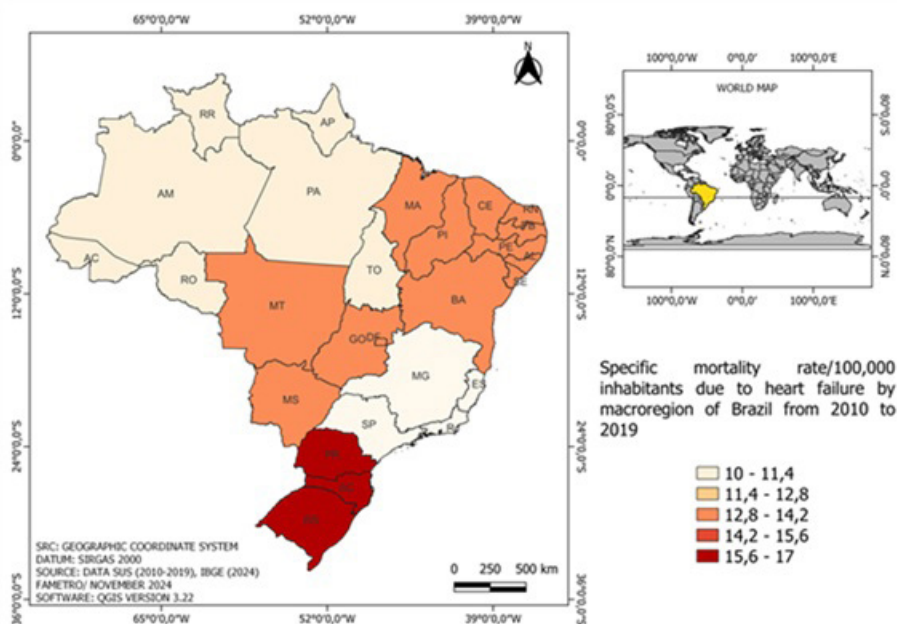

Figure CO 15

and relative frequencies. The specific mortality rate was calculated per 100.000 inhabitants, based on population data from the Brazilian Institute of Geography and Statistics. Expenditures related to hospitalizations were extracted (SIH/DATASUS) and adjusted for inflation during the study period.

Results: Between 2010 and 2019, there were 842,995 deaths due to HF, of which 35,123 (4.2%) were associated with SAH. A continuous increase in these deaths was observed during the study period, with the number of HF deaths associated with SAH rising from 2,829 in the first year to 4,327 in the last year of the time series, representing a 53.0% increase. Of the total deaths, 18,574 (52.9%) occurred in the Southeast and 7,913 (22.5%) in the Northeast. The specific mortality rate for HF associated with SAH per 100,000 inhabitants for the national territory and Brazilian regions was, respectively: Brazil (15.2), North (10.26), Northeast (14.22), Southeast (21.78), South (16.79), and Midwest (13.04). During the same period, 2,274,501 hospitalizations for HF were recorded, primarily concentrated in the Southeast, with 947,875 (41.7%). Expenditures on hospitalizations for HF totaled approximately 1.69 billion dollars, or around 742.8 dollars per admission.

Conclusions: The increase in hospitalisations and deaths due to heart failure associated with systemic arterial hypertension in Brazil, as well as the substantial expenditures resulting from this condition, underscores the importance of prevention and control strategies to reduce fatal outcomes.

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Sala D. Luís | Sessão de Comunicações Orais 04 – Inovação em cuidados intensivos: novas intervenções em choque cardiogénico e SCA

CO 16. OUTCOMES AND PROCEDURAL BURDEN OF CULPRIT-ONLY VS. MULTIVESSEL PERCUTANEOUS CORONARY INTERVENTION IN CARDIOGENIC SHOCK: A RETROSPECTIVE ANALYSIS OF REAL-WORLD DATA

Ana Raquel Carvalho Santos, Francisco Albuquerque, André Grazina, Pedro Brás, Tiago Mendonça, Luís Morais, Ruben Ramos, António Fiarresga, Lídia Sousa, Inês Rodrigues, Duarte Cacela, Rui Ferreira

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

The optimal revascularization strategy for ST-segment elevation myocardial infarction complicated by cardiogenic shock remains controversial. While randomized trials, such as CULPRIT-SHOCK, demonstrated benefits of percutaneous coronary intervention (PCI) limited to the culprit vessel, real-world data remain limited. This retrospective study analyzed 84 patients with cardiogenic shock undergoing primary PCI. Of these, 53 patients with multivessel coronary artery disease were divided into culprit-only PCI (n = 38) and multivessel PCI (n = 15) groups. The mean age was significantly higher in the culprit-only group (72.3 ± 11.3 years) than in the multivessel group (58.5 ± 13.8 years, p = 0.0006). Primary outcomes included mortality and procedural complications; secondary endpoints included stent use, angiographic complications, bifurcation lesions, and clinical variables such as cardiopulmonary resuscitation (CPR) and mechanical circulatory support. Short-term mortality was similar between groups (p = 0.4218), with procedural death occurring in 15.8% of culprit-only PCI patients and 26.7% of multivessel PCI patients. Procedural burden was higher in multivessel PCI, requiring 3 or more stents in 40% of patients compared to 18% in culprit-only PCI. Angiographic complications occurred significantly more frequently in the multivessel PCI group (86.7 vs. 39.5%, p = 0.0009), including coronary dissection and no-reflow phenomenon. Culprit-only PCI predominantly targeted the proximal left anterior descending artery (39.5%), proximal right coronary artery (28.9%), and left main coronary artery (7.9%). Multivessel PCI addressed bifurcation lesions in 26.7% of culprit-treated vessels and 6.7% of second-treated vessels. Clinical outcomes, including CPR (36.8% in culprit-

only vs. 20% in multivessel PCI) and ventricular arrhythmias, showed no significant differences. Intra-aortic balloon pump use was more common in multivessel PCI (66.7 vs. 34.2%), while Impella and extracorporeal membrane oxygenation (ECMO) use remained low overall. In conclusion, among 53 patients with multivessel disease and cardiogenic shock, culprit-only PCI was associated with fewer complications (39.5 vs. 86.7%, p = 0.0009) and reduced procedural burden compared to multivessel PCI. Despite addressing bifurcation and complex lesions, multivessel PCI did not improve short-term mortality. These findings align with prior randomized data and highlight the procedural safety of culprit-only PCI in this critically ill population.

	Culprit-Only PCI	Multivessel PCI	p-value	Odds Ratio (95% CI)
Age (mean, standard deviation)	72.3 ± 11.3	58.5 ± 13.8	0.0006[1]	
Mortality during procedure (%)	15.8	26.7	0.756[2]	
Angiographic complications (%)	39.5	86.7	0.0009[2]	
Procedural burden (stents) (%)	18	40	0.116[3]	
Cardiopulmonary resuscitation (%)	36.8	20		1.7 (1.12.5)[4]

PCI - Percutaneous coronary intervention

1 – Independent T-Test; 2 – Fisher's Exact Test; 3 – Chi Squared Test; 4 – Logistic Regression (adjusted for age)

CO 17. FULMINANT ACUTE MYOCARDITIS IN THE CARDIAC INTENSIVE CARE UNIT – A LONG BUT SUCCESSFUL ROAD TO RECOVERY

Rita Amador, Ana Rita Bello, Rita Lima, Rita Carvalho, Joana Certo Pereira, Rita Barbosa, Débora Correia, João Presume, Jorge Ferreira, Christopher Strong, Catarina Brízido, António Tralhão

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

Introduction and objectives: Fulminant myocarditis leading to cardiogenic shock (CS) is a life-threatening condition arising from various inflammatory etiologies. This study aims to describe the clinical characteristics, management strategies, and outcomes of patients with myocarditis-related CS treated at a tertiary center with mechanical circulatory support (MCS) capabilities.

Methods: We conducted a retrospective, observational single-center study of consecutive patients (pts) admitted to our Cardiac Intensive Care Unit for CS-related myocarditis, between 2018 and 2024. Diagnostic confirmation was made through cardiac magnetic resonance imaging (CMR) or endomyocardial biopsy (EMB), while a presumed diagnosis was considered based on clinical, laboratorial and TTE features in the absence of coronary artery disease.

Results: Fourteen pts (mean age 45 ± 14 years, 64% male) were included. The majority (93%, n = 13) experienced their first myocarditis episode. The most common symptom at admission was chest pain (57%, n = 8), while 29% (n = 4) immediately presented in CS. The median time from initial symptom onset to CS was 5 days (IQR 4-6). Median LVEF at admission was 25 (IQR 20-34)%, and biventricular dysfunction was present in 57% (n = 8). Diagnosis was confirmed by EMB (diagnostic yield 80%) or CMR in 13 pts, while 1 was diagnosed presumptively. SCAI class at admission was C in 9 pts (64%), D in 4 (29%) and E in1 pt (7%), with 5 pts deteriorating over the first 24 hours. All pts required vasoactive pharmacological support, and 71% (n = 10) required MCS, mostly VA-ECMO (n = 9). Other interventions included non-invasive and invasive mechanical ventilation (71%, n = 10) and renal replacement therapy (21%, n = 3). Complete AV block occurred in 14% (n = 2) of patients, 21% (n = 3) had ventricular arrythmias and 1 patient (7%) had cardiac tamponade requiring pericardiocentesis. The ICU length-of-stay was 12 days (IQR 7-21), and total hospital admission was 32 days (IQR 20-47). In-hospital mortality was 14% (n = 2): one due to refractory shock and another for surgical LVAD-related complications. One patient underwent transplantation for unrecovered biventricular failure. Among survivors (n = 11), LVEF improvement was observed at discharge (51 (IQR 41-56)%; p < 0.001), with 64% (n = 7) normalizing LVEF (> 50%). During a median follow-up of 20 months (IQR 5-35), one patient died of non-cardiovascular causes, and another underwent transplantation for persistent heart failure. The remaining patients (n = 8) were in NYHA class I or II, and all maintaining LVEF > 50%.
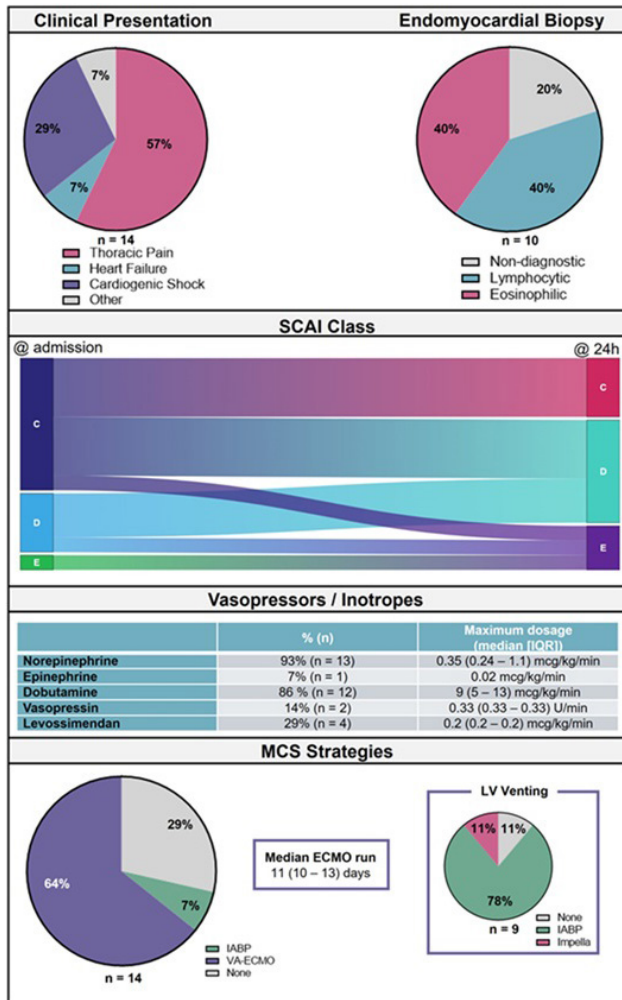
Conclusions: Fulminant myocarditis carries significant acute morbidity and mortality and often requires MCS as a bridge-to-recovery. However, survivors demonstrate favorable long-term outcomes, including functional recovery and LVEF normalization. Further studies are needed to optimize support strategies and improve outcomes in this high-risk population.

CO 18. IMPACT OF DANGER SHOCK ELIGIBILITY CRITERIA ON SURVIVAL IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION-RELATED CARDIOGENIC SHOCK: IT IS ALL ABOUT IMPELLA?

Débora Sá[1], Joana Certo Pereira[2], Ana Rita Bello[2], Rita Carvalho[2], Débora Correia[2], Samuel Azevedo[2], Rita Barbosa[2], Christopher Strong[2], Jorge Ferreira[2], João Presume[2], António Tralhão[2], Catarina Brízido[2]

[1]Hospital Dr. Nélio Mendonça. [2]Hospital de Santa Cruz.

Introduction: The recently published DanGer Shock trial demonstrated that incorporating a microaxial flow pump (Impella) alongside standard care significantly reduced all-cause mortality at 180 days in patients with STEMI-related cardiogenic shock (CS) compared to standard care alone. As patient selection criteria across centers can challenge the applicability of trial findings to the real-world setting, we aimed to apply the study's eligibility criteria in an acute myocardial infarction (AMI) related CS population in Portugal, evaluating differences in clinical management and all-cause mortality in eligible and ineligible groups.

Methods: Retrospective single-center study of AMI-CS patients admitted to a cardiac intensive care unit (CICU) between January 2017 and October 2024. After applying eligibility criteria, eligible and ineligible groups were compared regarding baseline characteristics, CS severity, types of mechanical circulatory support (MCS) used and in-hospital complications. Mortality at 180 days was compared using Kaplan-Meier survival curves and predictors of survival obtained through bivariate logistic regression analysis.

Results: Our cohort included 181 patients with AMI-CS, of whom 85 (47%) met eligibility criteria for the DanGer shock trial (see flow-chat). Eligible patients were younger (64 ± 14 vs. 71 ± 14 years, p = 0.001), all underwent coronary angiography and were more frequently submitted to culprit vessel PCI (88 vs. 63%, p < 0.001). Despite similar SCAI severity at admission, eligible patients had lower LV ejection fraction and received more MCS (53

Figure CO 18

vs. 32%, p = 0.005), with numerically higher device-related complications. The type of MCS used was similar in both groups (Table 1). Mortality at 30 and 180 days was significantly lower in the eligible group (46 vs. 71%, and 55 vs. 78%, p < 0.001), regardless of the type of MCS used. The predictors of survival in this population included being eligible for DanGer Shock trial (OR 0.35 95%CI: 0.18 – 0.67; p 0.002), being submitted to PCI, younger age, higher blood pressure upon admission and the absence of mechanical ventilation (Table 2).

Conclusions: Less than half of all AMI-CS patients would be eligible for the DanGer Shock trial in a real-world CICU Portuguese population. These patients represented a subset with higher chances of survival, regardless of the type of MCS implanted. For ineligible patients, MCS should be carefully used, taking into consideration known predictors of survival to avoid futility.

CO 19. EXPLORING THE SAFETY AND EFFICACY OF RENAL DENERVATION IN ELECTRICAL STORM MANAGEMENT

Mariana Caetano Coelho, Sofia Jacinto, Ana Rita Teixeira, Inês Ferreira Neves, Guilherme Portugal, Bruno Valente, Ana Lousinha, Pedro Silva Cunha, Hélder Santos, Paulo Osório, Rui Cruz Ferreira, Mário Martins Oliveira

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

Catheter ablation (CA) has shown efficacy in managing ventricular arrhythmias (VA) associated with structural heart disease. However, some patients continue to experience refractory VA despite pharmacological therapy and multiple CA attempts. In such cases, additional interventions, including autonomic neuromodulation, have been investigated. Renal denervation (RDN), a technique originally developed to treat resistant arterial hypertension, works by inhibiting the afferent renal sympathetic pathways, thereby reducing systemic sympathetic overactivity. Given this mechanism, RDN has been studied as a therapeutic option for arrhythmias, including atrial fibrillation and VA, with promising outcomes. This study aims to evaluate both the effectiveness and safety profile of renal denervation as a therapeutic strategy for managing refractory ventricular arrhythmia storms in patients classified as high-risk. A retrospective analysis was conducted on renal denervation procedures performed to manage electrical storms at a tertiary center from February 2020 to October 2024. Baseline patient characteristics, procedural details, and acute complications were recorded. Recurrence of ventricular arrhythmia post-RDN was evaluated at one month and six months to assess the intervention's impact on arrhythmia control. A total of 11 patients underwent RDN for the treatment of refractory VA. The cohort had a mean age of 63 ± 10 years, with 9 males. The primary diagnosis in most patients was ischemic cardiomyopathy (n = 7), characterized by a mean left ventricular ejection fraction of 25 ± 8%. All patients had implantable cardioverter-defibrillators (ICDs), and two of these devices included concomitant cardiac resynchronization therapy. Nine patients had previously undergone endocardial VA ablation. Among the two patients without prior ablation, one was contraindicated due to a large left ventricular thrombus, while the other underwent an electrophysiological study without inducible ventricular tachycardia. In the four weeks preceding RDN, patients experienced an average of 18 ± 20 sustained VA episodes, meeting the criteria for an electrical storm (≥ 3 episodes within 24 hours). During RDN, a mean of 15 ± 9 radiofrequency applications were delivered to the right renal artery and 12 ± 9 to the left renal artery. No acute procedural complications were observed. One month post-RDN, VA episodes were reduced to a mean of 0 ± 1, with only two patients experiencing recurrent VA. At the six-month follow-up, VA recurrence remained low (mean 1 ± 2 episodes), and at one year, there was an increase in mean episodes (29 ± 50), with only one patient experiencing new episodes. There were four deaths during the follow-up period, three of which were attributable to heart failure. In our pilot study, RDN appeared to be a safe and effective treatment for the management of VA.

CO 20. CHANGING THE PARADIGM IN ACUTE CORONARY SYNDROMES: FROM STEMI VS. NSTEMI TO OMI VS. NON-OMI

André Lobo, Francisco Sousa, Francisca Nunes, Marta Catarina Almeida, Fábio Nunes, Marta Leite, Inês Neves, Inês Rodrigues, António Gonçalves, Ricardo Fontes-Carvalho

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

Introduction: Occlusion Myocardial Infarction (OMI) is an emerging classification in acute coronary syndromes (ACS) that challenges the traditional STEMI. OMI emphasizes the identification of coronary occlusion
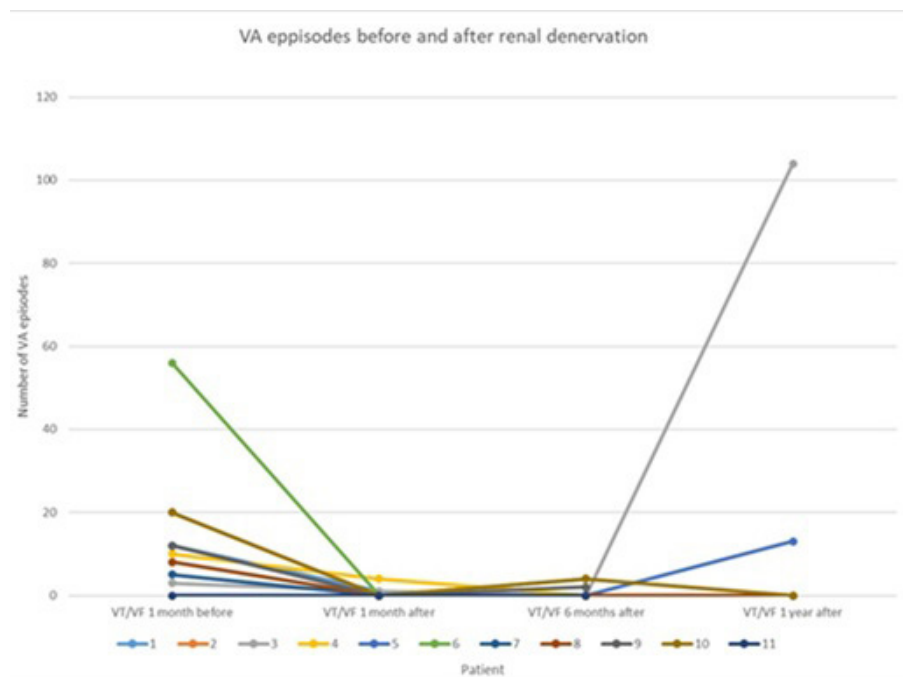

Figure CO19

through more subtle ECG changes. Advocates argue that this could improve the identification of patients who need urgent revascularization. OMI is defined by the presence of TIMI flow ≤ 2 and/or significantly elevated troponin levels (Troponin T > 1,000 ng/L or Troponin I > 5,000 ng/L) with regional wall motion abnormalities. In this study, we reclassified ACS patients using the OMI paradigm and analyzed their clinical characteristics and outcomes to explore the potential impact of this classification.

Methods: We conducted a retrospective one-year analysis of ACS patients. We analyzed clinical, angiographic, and imaging data, stratifying patients into STEMI, NSTEMI-OMI, and NSTEMI-NON OMI groups.

Results: We analyzed 336 ACS patients, including 196 STEMI and 134 NSTEMI/UA cases. Among NSTEMI/UA patients, 38.8% were classified as OMI, with 25% presenting TIMI flow ≤ 2. The median time to angiography was 1 hour in STEMI patients, significantly shorter than the 10.5 hours in NSTEMI-OMI patients (p < 0.001), and 12 hours in NSTEMI-NON OMI patients. Median Left ventricular ejection fraction (LVEF) at discharge was lower in NSTEMI-OMI patients (51%) compared to NSTEMI-NON-OMI (57%) (p < 0.001). This difference persisted at 12 months (p = 0.002). Median peak troponin T levels were higher in NSTEMI-OMI patients (1777 ng/L) compared to NSTEMI-NON OMI patients (217 ng/L) (p < 0.001). STEMI patients showed trends toward higher troponin levels and lower LVEF than NSTEMI-OMI, but these differences were not statistically significant. Clinical event rates at 12 months were low across all groups, with no significant differences.

Conclusions: Our findings show that NSTEMI-OMI patients resemble STEMI patients, suggesting they may benefit from an approach similar to STEMI care. NSTEMI-OMI patients faced longer delays to angiography, though times in this cohort were still shorter than usual benchmarks, which could underestimate the potential impact of reclassification. While the OMI paradigm is promising, it faces challenges in application. Unlike STEMI, it lacks randomized validation, and ECG criteria are not fully standardized. The troponin thresholds used to define OMI may contribute to overclassification, as seen in our cohort with a significant percentage of patients classified as OMI despite normal TIMI flow. AI-driven tools capable of detecting subtle ECG changes could complement this paradigm, improving early diagnosis and intervention. The OMI paradigm highlights critical gaps in ACS management and has the potential to improve risk stratification. Further validation is essential to refine its application and maximize its clinical impact.

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Sala D. Maria | Sessão de Comunicações Orais 05 – Avanços na gestão do ritmo cardíaco: um olhar sobre as inovações e os resultados do *pacing*

CO 21. LEFT BUNDLE BRANCH PACING AND MECHANICAL DESYNCHRONY: A REAL-WORLD PERSPECTIVE

Margarida de Castro, Luísa Pinheiro, Mariana Tinoco, Emídio Mata, Lucy Calvo, Cláudia Mendes, Assunção Alves, Sílvia Ribeiro, Olga Azevedo, Victor Sanfins, João Português, António Lourenço

Unidade Local de Saúde do Alto Ave.

Introduction: Left Bundle Branch (LBB) Area Pacing (LBBAP) is a pacing technique designed to mitigate the adverse effects of right ventricular pacing. It is believed to preserve inter- and intraventricular synchrony and reduce QRS duration (QRSd).

Objectives: To evaluate the performance and success rate of LBBAP in a real-world population. To compare the results of LBBAP under unipolar and bipolar configuration. To assess the effect of LBBAP on mechanical dyssynchrony (MD) in the subset of patients (pts) with intraventricular conduction disturbances (IVCD).

Methods: Retrospective study of pts undergoing LBBAP (intention-to-treat) for bradycardia indication. Performance, success rate and complications are described. In pts with baseline QRS > 110 ms, QRSd after LBBAP was measured and compared under unipolar and bipolar configuration. In the subset of pts with IVCD, echocardiographic (echo) evaluation of MD was performed offline by 2 independent observers in 3 scenarios: baseline rhythm and under unipolar and bipolar configuration. MD was defined using septal flash (SF) and interventricular mechanical delay (IVMD) > 40 ms.

Results: Of the 68 pts enrolled, LBBAP was successfully performed in 86.8% (n = 59). Median left ventricular activation time (LVAT) was 72.05 ± 1.65 ms. One septal lead displacement and 2 cases of loss of LBB capture criteria occurred during a mean follow-up (FU) of 11.85 ± 0.86 months. Ventricular threshold showed stability over time. Ventricular lead impedance decreased significantly (p < 0.001) while R wave amplitude increased (p < 0.001). Pts with a baseline QRS > 110 ms (n = 31) exhibited a significant reduction in QRSd (134 ± 28 vs. 120 ± 4; p = 0.002), particularly those with LBB block (LBBB). No significant difference was observed between bipolar and unipolar (p = 1.000). A subset of 14 pts with IVCD (3 with right bundle branch block (RBBB) and 11 with LBBB) underwent echo analysis of MD. At baseline, QRSd was 155.50 ms (IQR 24.25) and left ventricular ejection fraction (LVEF) was 56.7% ± 2.19. With LBBAP, LVEF remained stable. Regarding interventricular desynchrony, a significant reduction in IVMD was shown (p =.003) with both polarities (42 ± 52 ms vs. 18 ± 31ms in unipolar; vs. 10 ± 15 ms in bipolar) with a greater number of pts losing MD criteria with bipolar configuration (p =.004). SF resolved significantly with LBBAP (p = 0.030) on both polarities, especially under unipolar (p = 0.028).

Conclusions: LBBAP demonstrated high success rates and reduced QRSd, with minimal complications. Polarity configuration showed no significant impact on MD. Given that the unipolar configuration leads to greater battery drain, the polarity must be defined case by case in order to guarantee greater optimization of MD. MD improved in pts with IVCD, so LBBAP may be preferable to minimize the risk of LV dysfunction mediated by dyssynchrony in these pts. More research with larger samples is needed for robust conclusions.

CO 22. LEFT BUNDLE BRANCH AREA PACING: LONGITUDINAL DATA ON PACING EFFICACY

Joana Certo Pereira, Rita Barbosa Sousa, Daniel A. Gomes, Francisco Moscoso Costa, Gustavo Rodrigues, Daniel Matos, João Carmo, Pedro Galvão Santos, Pedro Carmo, Diogo Cavaco, Francisco Belo Morgado, Pedro Adragão

ULS Lisboa Ocidental, Santa Cruz.

Introduction: Left bundle branch area pacing (LBBAP) has gained recognition as a technique for physiological ventricular pacing that maintains left ventricular (LV) synchrony. Although procedural characteristics are increasingly documented, information on longer terms lead stability remains scarce. We aimed to evaluate the procedural features and the stability of pacing parameters over a mid-term follow-up.

Methods: Single centre prospective study including consecutive patients undergoing LBBAP from 2021 to 2024. Data on procedural characteristics, lead parameters, and final QRS duration were gathered immediately post-implantation and throughout follow-up. Criteria for confirming conduction system capture with LBBAP was defined according to current recommendations. Patients with > 1 year of follow-up were invited to undergo an echocardiogram to assess follow-up left ventricular ejection fraction (LVEF).

Results: Overall, 205 consecutive patients were included (mean age 77 ± 12 years and 64% male). Procedural duration was 63 min (IQR 51-80) and fluoroscopy time was 4.9 min (IQR 2.9-7.8). Median LVAT was 86 ms (IQR 78-96), paced QRS immediately after implantation was 112 ms (IQR 104-120) and interpeak V1-V6 was 38 ms (30-44). Acute R-wave amplitude and pacing threshold were 11.4 mV (IQR 6.9-15.7) and 0.5 mV (IQR 0.5-0.7), respectively. One case of in-hospital ischemic stroke associated with withholding anticoagulation in a patient with atrial fibrillation was reported at discharge. No other major complications were reported. Over a median follow-up of 7.9 months (IQR 2.3-15.3), both the pacing threshold (0.6 mV [IQR 0.5-0.75]) and R-wave amplitude [12.3 mV (IQR 9.0-19.3)] remained stable. QRS duration, a surrogate of LV synchrony, remained narrow: 120 ms [IQR 110-122]. In the

Figure 1. Lead parameters, final QRS complex duration and left ventricular ejection fraction collected immediately after implantation and during follow-up.
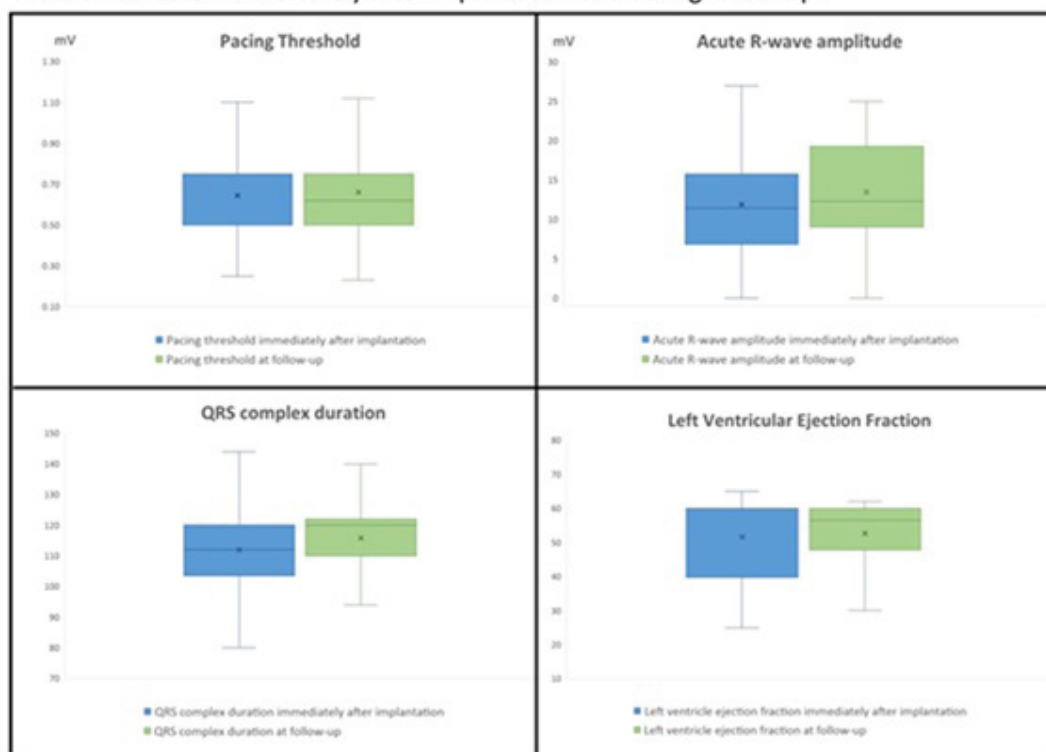
Figure CO22

subgroup with > 1 year of follow-up, 42 patients underwent LVEF assessment [median follow-up of 18 months (IQR 11-27)]. LVEF did not differ significantly from baseline (60% [IQR 40-60%] vs. 57% [IQR 48-60%], p = 0.861). Ventricular pacing dependency was 60% (IQR 8-98). Notably, 6 out of 10 patients (60%) with reduced baseline LVEF showed improvement, achieving an LVEF of > 40% at follow-up (mean LVEF improved from 33 ± 5% to 50 ± 6%, p < 0.001).

Conclusions: In this cohort, LBBAP proved feasible, demonstrating excellent pacing parameters that remained stable throughout the mid-term follow-up. QRS duration did not differ during follow up and LVEF did not change significantly after 1 year of implantation, with most patients with reduced baseline LVEF showing improved ventricular function.

CO 23. ADOPTION OF AN ECHO-GUIDED AXILLARY PUNCTURE WORKFLOW IS ASSOCIATED WITH FASTER PROCEDURAL DURATION IN TRANSVENOUS PACEMAKER IMPLANTATION

Guilherme Portugal, Francisco Barbas Albuquerque, Cátia Guerra, Rita Contins, Manuel Brás, Ana Sofia Delgado, Margarida Paulo, Sofia Jacinto, Pedro Silva Cunha, Rui Cruz Ferreira, Mario Martins Oliveira

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

Introduction: Echo-guided venous access for the implantation of transvenous leads in cardiac device recipients is a class I recommendation in the current EHRA guidelines. However, many centers are still performing conventional anatomical or fluoro-guided venous puncture due to barriers related to equipment availability, operator learning curve and subjective perception of a longer procedural time. Our aim was to analyze the impact of the systematic adoption of an echo-guided workflow on transvenous pacemaker (PM) implantation.

Methods: We retrospectively analyzed a cohort of patients (P) submitted to transvenous PM lead implantation employing an axillary echo-guided puncture. An historical cohort from 2019 to 2021 was employed as a control group. Baseline characteristics, procedural data and outcomes were reviewed. Multivariate linear regression analysis was employed to determine baseline predictors of procedural duration.

Results: A total of 530 PM implantations were included, of which 59% were dual-chamber (DDD) corresponding to 841 implanted leads. The mean age was 79.4 ± 10.4 years and 41.1% were male. The indication for pacing was atrioventricular block in 67.2%, sinus node disease in 20.5% and binodal disease in the remaining 12.2%. There were 392 patients in the conventional group and 138 in the echo-guided group. No significant differences were observed between groups regarding baseline characteristics (p = ns for all). Axillary access was successful in 137 patients (99.2%), with one bailout to a cephalic cutdown technique. Two pneumothoraxes were observed in the conventional group and one pneumothorax in the echo-guided group (p = NS), while using the short-axis technique in the initial 30 patients. No other complications were observed after switching the echo-guided approach to a long-axis technique. Mean procedural duration for all P was 47.9 ± 22.7 minutes, which was 6.3 minutes lower in the echo-guided group (43.1 ± 21.4 vs. 49.5 ± 22.9; p = 0.004). After multivariate linear regression analysis, DDD PM (7.9 ± 2.0 mins, p < 0.001) and echo-guided puncture (-5.9 ± 2.2 mins, p = 0.007) were the only significant predictors of procedural duration.

Conclusions: The adoption of an echo-guided workflow for the implantation of transvenous leads has a high success rate and is associated with a decrease in procedural duration, even when considering the initial learning curve.

CO 24. PREDICTORS AND PROGNOSIS OF LEAD RELATED TRICUSPID REGURGITATION

Marta Miguez Vilela, Catarina Gregório, Joana Rigueira, João Cravo, Daniel Cazeiro, Pedro Alves Silva, Daniel Caldeira, Rui Plácido, João Agostinho, Fausto Pinto, Catarina Sousa

Department of Cardiology, Centro Hospitalar Universitário Lisboa Norte, CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.
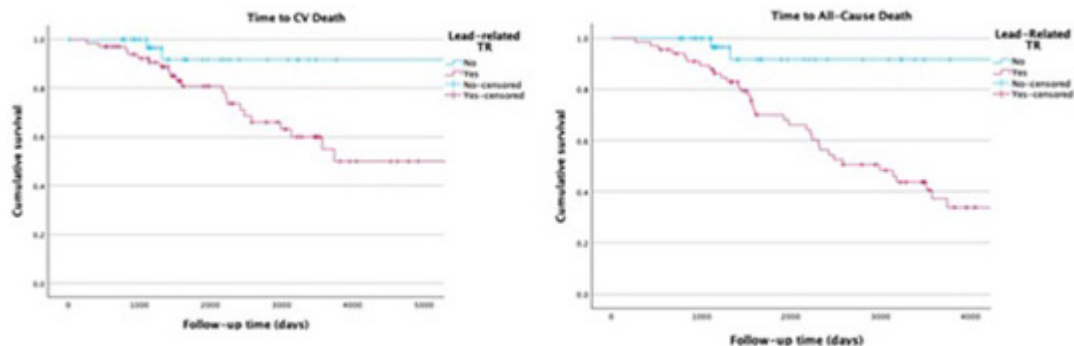
Figure 1 – Survival Analysis: Impact of Lead-Related TR on CV and All-Cause Death

Figure CO24

Introduction: Tricuspid regurgitation (TR) is a known post procedure complication of cardiac implantable electronic device (CIED) implantation, with reported prevalences up to 45%. Limited data that predicts which patients will develop this complication exists. Lead related TR is an independent predictor of poor prognosis, associated with higher rates of heart failure (HF) hospitalizations and mortality. Our study aimed to identify predictors of increased risk of lead related TR and its impact on cardiovascular outcomes during follow-up.

Methods: Single center, retrospective study of patients with device implantation between 2010 and 2024 with a pre and post procedure transthoracic echocardiogram (TTE). The population was divided in 2 groups: Group 1 with lead related TR according to established criteria. The control group consistent of patients with mild TR before and after CIED implantation. Patients with at least moderate TR before CIED implantation were excluded. Time to first urgent care visit/admission for HF and death (all-cause and cardiovascular) were evaluated with the use of Kaplan-Meier estimates and Cox proportional-hazards models.

Results: A total of 108 pts (68 in Group 1) were included, 63% male with a mean age of 73 ± 12 years. Median follow-up time was 5.9 years. The most common implantable devices were conventional single and dual-lead pacemakers (45%), followed by CRT-D (30%). Variables such as age (OR 1.109, atrial fibrillation (AF) (OR 23.033) and a QRS interval ≥ 150 ms (OR 5.631) post CIED implantation were independent predictors for development of lead-related TR. Regarding outcomes, in univariate analysis, patients with lead-related TR had an increased risk for cardiovascular death (23 pts (34%) in group 1 vs. 2 pts (5%) in the control group [HR 4.794, CI 1.121-20-502]). There were no statistically significant differences regarding urgent care visit/hospitalization for HF in these 2 groups. Finally, the presence of CIED related TR was independently associated with shorter CV survival, when adjusting for: age, gender, RV/LV function, AF and device type (HR 5.083, 95% [CI],1.091-23.678, p = 0.038).

Conclusions: Our study showed that CIED-related TR was an independent risk factor for CV mortality. Key predictors include advanced age, AF, and a post-implant QRS interval ≥ 150 ms, suggesting the means for an early identification of patients at risk to further optimize care.

CO 25. VENTRICULAR PACING RATE AND VENTRICULAR PACING DEPENDENCY IN PATIENTS REQUIRING PERMANENT PACEMAKER IMPLANTATION AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT

Miguel Abrantes de Figueiredo, Inês Rodrigues, Fernando Ferreira, Mariana Coelho, Francisco Albuquerque, André Grazina, Tiago Mendonça, António Fiarresga, Rúben Ramos, Mário Oliveira, Rui Cruz Ferreira, Duarte Cacela

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

Introduction: Conduction disturbances requiring permanent pacemaker implantation (PPI) are a common complication of Transcatheter Aortic Valve Replacement (TAVR). Recently, it has been suggested that pacing dependency may decrease over time.

Objectives: To evaluate the dynamic evolution and predictors of adequacy of PPI after TAVR through an analysis of the ventricular pacing rate (VPR) and pacemaker dependency (PD) during the first year after PPI.

Methods: A retrospective analysis of all patients who underwent TAVR until November 2023 in one high-volume tertiary care center in Portugal was conducted. The VPR of the patients that were submitted to PPI after TAVR was analyzed at 3 distinct moments; during hospitalization, 1 month and 1 year after PPI. PMD was defined using a VPR cut-off of 80%. Patients with previous PPI, indication for PPI pre-TAVR and indication for cardiac resynchronization therapy were excluded.

Results: Of the 971 patients included, *de novo* PPI was conducted in 199 cases (implantation rate - 22.2%), on average 4 days after TAVR. VPR analysis showed a bimodal distribution, with rates predominantly over 80% and below 20%, with a reduction in VPR over time (Figure 1). During hospitalization, 57.7% of patients had a VPR over 80% and 17.6% had a VPR of less than 20% (median VPR of 99%). At 1 month, 46.7% had a VPR over 80% and 24.7% had a VPR of less than 20% (median VPR of 80%). Finally, at 1 year, only 33% had a VPR over 80% and 27.5% had a VPR of less than 20% (median VPR of 55%). Approximately 30% of the cases were "pacemaker dependent" in all the
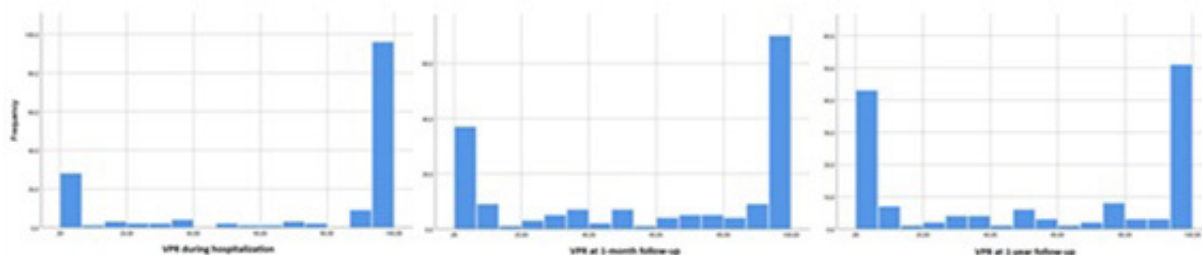

Figure 1: Evolution of VPR over the 1-year follow-up after PPI for conduction disturbances after TAVR. PPI (permanent pacemaker implantation); TAVR (transcatheter aortic valve replacement); VPR (ventricular pacing rate)

Figure CO25

evaluations and 20% were "never dependent". Previous complete right bundle branch block, occurrence of complete AV block and earlier PPI (especially within the first 24 hours) were significantly correlated with PMD across all VPR evaluations, with complete AV block during TAVR procedure being the sole independent predictive factor (OR 3.638 [95%CI: 1.388-9.533]; p = 0.009).

Conclusions: In a large cohort of P receiving PPI after TAVR, VPR and PD diminished over time during the first year of follow-up. Complete AV block during TAVR was the most powerful predictor of long-term PD.

Sexta-feira, 11 Abril de 2025 | 08:00-09:00

Sala Infante | Sessão de Comunicações Orais 06 – Explorando a amiloidose cardíaca: inovações no diagnóstico, prognóstico e tratamento

CO 26. DIFFERENTIATING TRANSTHYRETIN CARDIAC AMYLOIDOSIS AMONG LEFT VENTRICULAR HYPERTROPHY PHENOTYPES: THE ROLE OF RIGHT AND LEFT VENTRICULAR GLOBAL LONGITUDINAL STRAIN

André Manuel Faustino Martins, Adriana Vazão, Joana Pereira, Mónica Amado, Carolina Gonçalves, Mariana Carvalho, Margarida Cabral, Célia Domingues, Catarina Ruivo, Hélia Martins

ULSR Leiria.

Introduction: Left ventricular hypertrophy (LVH) may result from various cardiomyopathies, complicating the differentiation of transthyretin cardiac amyloidosis (ATTR-CA) from other LVH phenotypes. The overlap in echocardiographic features can hinder timely diagnosis and limit access to targeted therapeutic interventions.

Objectives: Assess the diagnostic accuracy of right ventricular (RV) and left ventricular (LV) global longitudinal strain (GLS) to discriminate ATTR-CA in patients (pts) evaluated for suspected CA at a Cardiomyopathy Clinic in a regional hospital in Portugal.

Methods: Retrospective single-center study of 96 adult pts followed from 2018 to 2024. Inclusion criteria: pts aged ≥ 60 years with LV wall thickness ≥ 12 mm and at least one cardiac/extracardiac red flag for CA. Baseline clinical data were collected, and speckle tracking echocardiography was used to analyze RV and LV GLS at the time of diagnosis. Pts were classified in the ATTR-CA group (group 1) and the non-ATTR-CA group (group 2) according to the ESC algorithm for the diagnosis of ATTR-CA. Group comparisons were performed.

Results: 96 pts were included (median age 79 [IQR 10] yrs, 77% male). Following the diagnostic workup, 52 pts (54%) were assigned to group 1, and 44 pts (46%) to group 2, which included 19 with hypertrophic cardiomyopathy, 13 with hypertensive heart disease, 3 with valvular heart disease, and 9 with multifactorial heart disease. Group 1 pts were older (81 [IQR 8] vs. 78 [IQR 10] yrs, p = 0.006) and more frequently had overweight (58 vs. 32%, p = 0.011) and chronic kidney disease (62 vs. 39%, p = 0.025). Regarding heart failure characterization, the majority of pts had a LV ejection fraction > 50% (67 vs. 84%, p = 0.06). Pts with CA had greater interventricular septum thickness (18.5 ± 3.2 vs. 15.7 ± 2.8 mm, p < 0.001), lower RV GLS (-11.2 ± 4.1 vs. -15.0 ± 4.1%, p < 0.001) and lower LV GLS (-9.8 ± 2.9 vs. -13.4 ± 4.1%, p < 0.001). LV and RV GLS showed adequate diagnostic accuracy (AUC 0.743 vs. 0.770, respectively; p < 0.001), with LV GLS ≥ -11.7 yielding 81% sensitivity and 66% specificity, and RV GLS ≥ -15.5 yielding 92% sensitivity and 48% specificity for identifying ATTR-CA. Multivariate logistic regression identified lower LV and RV GLS as independent predictors of ATTR-CA (Table 1B).

Conclusions: In this population, pts with ATTR-CA had notably lower RV and LV GLS values compared to non-ATTR-CA pts, with both parameters showing comparable diagnostic accuracy for identifying the disease.

CO 27. ECHOCARDIOGRAPHIC PREDICTORS OF DEATH IN WILD-TYPE TRANSTHYRETIN AMYLOID CARDIOMYOPATHY

Luísa Pinheiro, Margarida de Castro, Emídio Mata, Bárbara Lage Garcia, Tamara Pereira, Filipa Cordeiro, Olga Azevedo, António Lourenço

Hospital da Senhora da Oliveira, EPE-Guimarães.

Introduction: Wild-type transthyretin amyloid cardiomyopathy (wtATTR-CM) is associated with high mortality. Although staging systems using biomarkers like NT-pro-B-type natriuretic peptide (NTproBNP) and estimated glomerular filtration rate (eGFR) have been used to assess disease severity, accurately predicting the prognosis in wtATTR-CM remains a challenge. Echocardiographic parameters, however, offer valuable insights into the prognosis of these patients.

Objectives: This study aimed to assess the impact of echocardiographic parameters on the prognosis of wtATTR-CM patients.

Methods: Retrospective, single-center study of patients with diagnosis of wtATTR-CM between 2014 and 2024. The primary endpoint was the death from any cause. Baseline echocardiographic parameters were compared between patients who reached the primary endpoint and those who did not. ProBNP and eGFR values were also assessed. Regression analyses were performed to identify independent predictors of death.

Results: A total of 111 patients were included in the study (74% males; mean age 81 ± 5 years). Median follow-up was 31 [IQR 16-39] months. In this study, forty-six patients (41%) achieved the primary endpoint. Patients who achieved the primary endpoint had significant higher prevalence of significant aortic stenosis (AS), defined by moderate or severe AS (59 vs. 37.5%, p = 0.031). These patients also had higher interventricular septal wall thickness (19 ± 3.6 vs. 17.7 ± 3.1, p = 0.041) and average E/e' (18.2 ± 4.4 vs. 13.5 ± 6.2, p < 0.001). They exhibited worse right ventricular global longitudinal strain (RV GLS) (-10.4 ± 4.3 vs. 12.7 ± 4.6%, p = 0.010), tricuspid annular plane systolic excursion (TAPSE) (16.2 ± 4.6 mm vs. 18.4 ± 4.5 mm, p = 0.016), left ventricular global longitudinal strain (LV GLS) (-10.2 ± 4.1 vs. -11.8 ± 3.6%, p = 0.034), peak atrial longitudinal strain (PALS) (7.8 ± 5.1 vs.11.5 ± 6.2, p = 0.002) and left atrium total emptying fraction (LATEF) (24.3 ± 12.3 vs. 34 ± 14.4%, p < 0.001). Multivariate regression analysis, that included ProBNP and eGFR, revealed that average E/e' (HR 1.17, 95%CI 1.04-1.33, p = 0.013) and RV GLS (HR 0.82, 95%CI 0.67-0.99, p = 0.045) were independent predictors of death.

Conclusions: These findings highlight the potential role of RV GLS and E/e' in assessing the prognosis of wtATTR-CM patients. Such echocardiographic parameters could be further integrated into existing staging system to better predict outcomes and guide clinical management.

CO 28. PREDICTORS OF ATRIAL FIBRILLATION IN WILD-TYPE TRANSTHYRETIN AMYLOID CARDIOMYOPATHY

Luísa Pinheiro, Margarida de Castro, Emídio Mata, Barbara Lage Garcia, Tamara Pereira, Filipa Cordeiro, Olga Azevedo, António Lourenço

Hospital da Senhora da Oliveira, EPE-Guimarães.

Introduction: In wild-type transthyretin amyloid cardiomyopathy (wtATTR-CM) the cardiac infiltration by amyloid fibrils leads to increased stiffness of the atrial walls and diastolic dysfunction. This leads to a high prevalence of atrial fibrillation (AF) in these patients.

Objectives: To identify predictors of AF occurrence in patients with wtATTR-CM.

Methods: Retrospective, single-center study of patients with the diagnosis of wtATTR-CM between 2014 and 2024 who were in sinus rhythm at the time of the diagnosis. Data on clinical, laboratory, and echocardiographic parameters were collected and compared between patients who developed
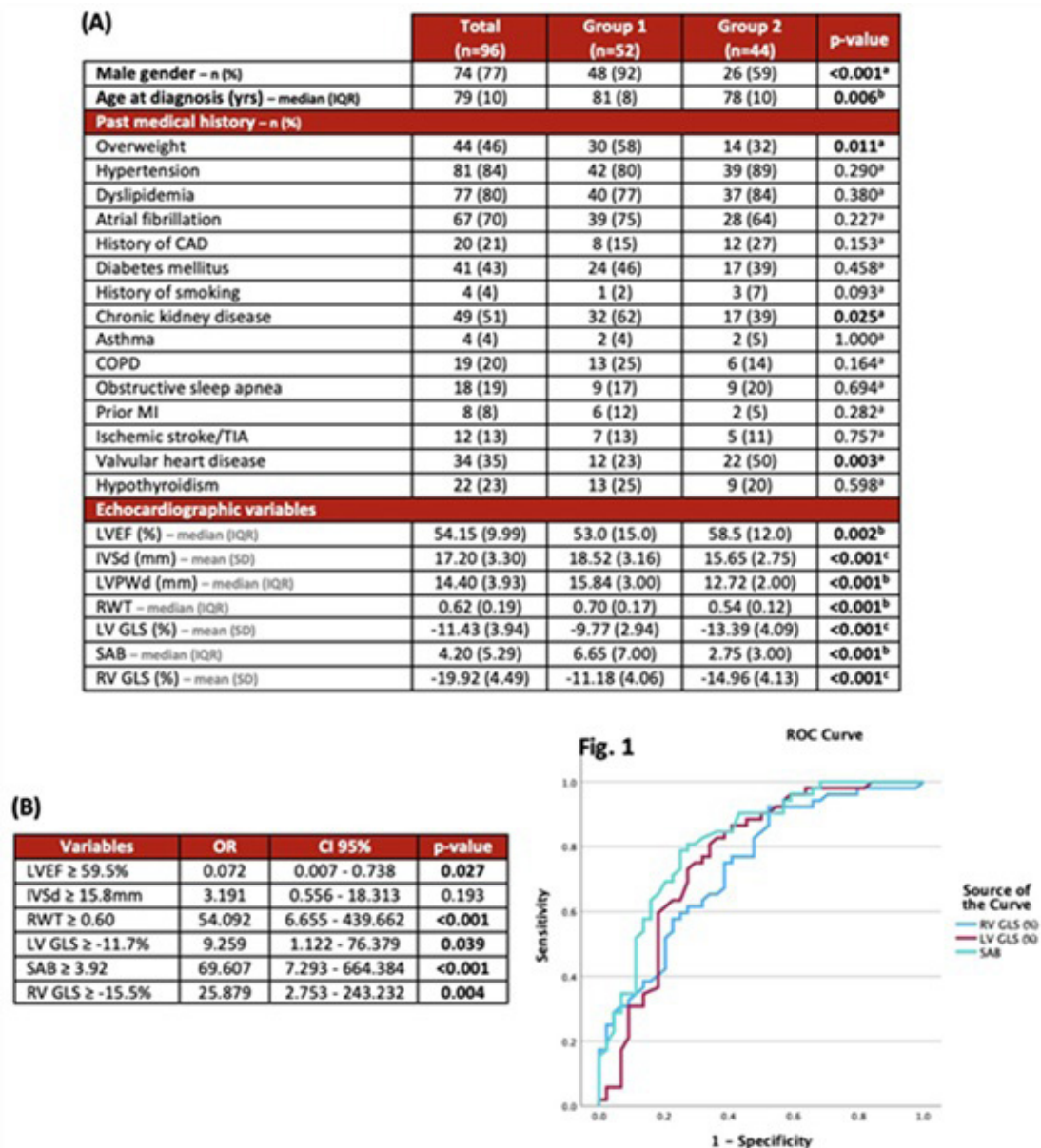
(A)

	Total (n=96)	Group 1 (n=52)	Group 2 (n=44)	p-value
Male gender – n (%)	74 (77)	48 (92)	26 (59)	<0.001[a]
Age at diagnosis (yrs) – median (IQR)	79 (10)	81 (8)	78 (10)	0.006[b]
Past medical history – n (%)				
Overweight	44 (46)	30 (58)	14 (32)	0.011[a]
Hypertension	81 (84)	42 (80)	39 (89)	0.290[a]
Dyslipidemia	77 (80)	40 (77)	37 (84)	0.380[a]
Atrial fibrillation	67 (70)	39 (75)	28 (64)	0.227[a]
History of CAD	20 (21)	8 (15)	12 (27)	0.153[a]
Diabetes mellitus	41 (43)	24 (46)	17 (39)	0.458[a]
History of smoking	4 (4)	1 (2)	3 (7)	0.093[a]
Chronic kidney disease	49 (51)	32 (62)	17 (39)	0.025[a]
Asthma	4 (4)	2 (4)	2 (5)	1.000[a]
COPD	19 (20)	13 (25)	6 (14)	0.164[a]
Obstructive sleep apnea	18 (19)	9 (17)	9 (20)	0.694[a]
Prior MI	8 (8)	6 (12)	2 (5)	0.282[a]
Ischemic stroke/TIA	12 (13)	7 (13)	5 (11)	0.757[a]
Valvular heart disease	34 (35)	12 (23)	22 (50)	0.003[a]
Hypothyroidism	22 (23)	13 (25)	9 (20)	0.598[a]
Echocardiographic variables				
LVEF (%) – median (IQR)	54.15 (9.99)	53.0 (15.0)	58.5 (12.0)	0.002[b]
IVSd (mm) – mean (SD)	17.20 (3.30)	18.52 (3.16)	15.65 (2.75)	<0.001[c]
LVPWd (mm) – median (IQR)	14.40 (3.93)	15.84 (3.00)	12.72 (2.00)	<0.001[b]
RWT – median (IQR)	0.62 (0.19)	0.70 (0.17)	0.54 (0.12)	<0.001[b]
LV GLS (%) – mean (SD)	-11.43 (3.94)	-9.77 (2.94)	-13.39 (4.09)	<0.001[c]
SAB – median (IQR)	4.20 (5.29)	6.65 (7.00)	2.75 (3.00)	<0.001[b]
RV GLS (%) – mean (SD)	-19.92 (4.49)	-11.18 (4.06)	-14.96 (4.13)	<0.001[c]

(B)

Variables	OR	CI 95%	p-value
LVEF ≥ 59.5%	0.072	0.007 - 0.738	0.027
IVSd ≥ 15.8mm	3.191	0.556 - 18.313	0.193
RWT ≥ 0.60	54.092	6.655 - 439.662	<0.001
LV GLS ≥ -11.7%	9.259	1.122 - 76.379	0.039
SAB ≥ 3.92	69.607	7.293 - 664.384	<0.001
RV GLS ≥ -15.5%	25.879	2.753 - 243.232	0.004

Fig. 1

Table 1. Patient baseline characteristics and echocardiographic variables (A) and multivariate logistic regression (B). Fig. 1. ROC curve analysis. Statistical analysis: [a]Chi-square test, [b]Mann-Whitney U test, [c]t-student test. Abbreviations: **AUC** - area under the ROC curve, **CAD** - coronary artery disease, **CI** - confidence interval, **COPD** - Chronic obstructive pulmonary disease, **GLS** - global longitudinal strain, **IVSd** interventricular septum thickness end diastole, **LV** - left ventricular, **LVEF** - left ventricular ejection fraction, **LVPWd** - left ventricular posterior wall end diastole, **MI** - myocardial infarction, **OR** - odds ratio, **ROC** - receiver operating characteristic, **RV** - right ventricular, **RWT** - relative wall thickness, **SAB** - septal longitudinal systolic apex-to-base ratio, **TIA** - transient ischemic attack.

Figure CO 26

AF vs. did not develop AF. Regression analyses were used to determine the independent predictors of the primary endpoint.

Results: Out of 111 patients, 59 patients were in sinus rhythm at the diagnosis (73% males, mean age 80 ± 6 years). The median follow up was 30 [IQR 16-36] months. During follow-up 30 patients (51%) developed AF. Patients who developed AF had a higher prevalence of chronic kidney disease (CKD) (50 vs. 24%, p = 0.024). The use of spironolactone (14 vs. 37%, p = 0.044) and beta blockers (21 vs. 50%, p = 0.011) was less common in those who developed AF. Regarding echocardiographic parameters, those who developed AF had higher average E/e' (17 ± 6.5 vs. 13 ± 6, p = 0.033), worst PALS (12.1 ± 4.5 vs. 15.5 ± 6.1%, p = 0.034), PACS (-6.3 ± 3.8 vs. -9 ± 5.5%, p = 0.03) and left atrium total emptying fraction (LATEF) (35 ± 12.3 vs.

41.6 ± 12.2%, p = 0.047). On multivariate regression analysis, CKD was an independent predictor of AF (OR 6.20, 95%CI 1.276-30.142, p = 0.04). The use of beta-blockers was a protective factor against AF (OR 0.10, 95%CI 0.017-0.585, p = 0.019). Additionally, higher E/e' ratio (OR 1.17, 95%CI 1.013-1.355, p = 0.039) and worst PACS (OR 1.328, 95%CI 1.005-1.755, p = 0.046) were also independent predictors of AF.

Conclusions: The study suggests that atrial deformation analysis, along with diastolic dysfunction assessment, can be valuable tools in predicting the risk of AF in wtATTR-CM patients. The use of beta-blockers in these patients may offer a protective effect, supported by recent studies suggesting that beta-blocker therapy could provide beneficial prognostic value.

CO 29. DECODING THE DECADES: TAFAMIDIS EFFICACY ACROSS DIFFERENT AGE GROUPS IN ATTR-CM PATIENTS

Catarina Gregório[1], Ana Abrantes[1], Miguel Raposo[1], João Fonseca[1], Marta Vilela[1], Diogo Ferreira[1], João Cravo[1], Catarina Campos[2], Isabel Conceição[2], Fausto J. Pinto[1], Dulce Brito[1], João R. Agostinho[3]

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Introduction: Transthyretin amyloid cardiomyopathy (ATTR-CM) is a severe condition primarily affecting elderly patients (pts), leading to heart failure (HF) and increased mortality. In a sub-analysis of ATTR-ACT, tafamidis 61 mg demonstrated efficacy for pts with ATTR-CM both in those aged < 80 and those aged ≥ 80 years, improving quality of life and functional capacity. However, it remains unclear whether the efficacy of tafamidis varies significantly among different age subgroups within the elderly population.

Objectives: To assess the impact of tafamidis 61 mg in ATTR-CM pts aged < 75, 75-85, and > 85 years.

Methods: Single-center retrospective study of ATTR-CM pts, categorized into 3 groups based on age: < 75, 75-85, and > 85 years. Clinical, laboratory, and echocardiographic parameters were collected. Kaplan-Meier survival analysis was used to compare the composite endpoint of HF hospitalization and cardiovascular (CV) death.

Results: 89 pts with ATTR-CM were included (< 75 years: 23 pts; 75-85 years: 40 pts; > 85 years: 26 pts). Patients < 75 years had a significantly higher prevalence of hereditary ATTR-CM (p < 0.001). Effort dyspnea was the predominant initial symptom in the 75-85 and > 85-year subgroups (p = 0.002), whereas younger pts more commonly presented with carpal tunnel syndrome (p = 0.04) or sensory-motor polyneuropathy (p = 0.001). Older pts (75-85 and > 85 years) were predominantly in NYHA class II/III (p = 0.009) and required higher diuretic doses (p = 0.08), while younger pts showed better functional capacity, with a higher proportion in NYHA class I (p < 0.001). NT-proBNP levels were significantly higher in pts > 75 years (p < 0.001). At baseline, groups were comparable in LVEF and LV hypertrophy (p = NS), but global longitudinal strain was more impaired in pts > 85 years (< 75: -21.7 ± 0.8, 75-85: -14.5 ± 1.1, > 85: -10.1 ± 2.3; p = 0.039) (Table 1). During a follow-up period of 24.9 ± 2.1 months, tafamidis treatment in pts aged > 85 years was associated with a greater reduction in NT-proBNP compared to the other 2 groups (p = 0.041) and a reduction in diuretic doses compared to pts aged < 75 years (p = 0.044). However, no improvement in NYHA functional class (p = NS) or significant differences in KCCQ score were observed across the groups at follow-up (p = NS). Echocardiographic parameters remained comparable among all groups throughout the study. Similarly, the composite endpoint of HF hospitalizations and CV death showed no statistically significant differences between groups during follow-up (Log Rank 5.71, p = 0.06 (Figure 1). A sub-analysis of pts aged ≥ 90 years (all with ATTRwt) revealed outcomes consistent with the overall population, emphasizing that this very elderly subgroup also benefits from tafamidis therapy.

Conclusions: This study highlights the benefits of tafamidis in elderly pts, including those ≥ 85 years, and supports its use in all age groups to improve cardiovascular outcomes in ATTR-CM.

CO 30. AMYLOID CARDIOMYOPATHY: SPECIFICITIES OF TRANSTHYRETIN V30 MUTATION COMPARED TO WILD TYPE FORMS

Mariana Pereira Santos[1], Alexandra Pinto Pires[2], David Sá Couto[1], Diana Ribeiro[1], Pedro Monteiro[1], Tiago Peixoto[1], Andreia Campinas[1], Marta Fontes Oliveira[1], Sara Fernandes[1], Hipólito Reis[1], Severo Torres[1], Patrícia Rodrigues[1]

[1]ULS Santo António. [2]Instituto de Ciências Biomédicas Abel Salazar.

Introduction: Transthyretin amyloidosis (ATTR) results from mutations in the TTR gene (vATTR) or conformational changes in wild-type protein (wtATTR). Regarding TTR mutations, the Familial Amyloid Polyneuropathy phenotype is endemic in Portugal, with the V30M being the most common pathogenic variant. Our goal is to characterize cardiac manifestations of V30M ATTR patients, particularly amyloid cardiomyopathy (CM).

Methods: We conducted a retrospective study including patients with TTR V30M mutation, with and without CM, consecutively observed at our center in Cardiology appointments in 2019 and followed for at least 5 years. Diagnostic criteria for ATTR-CM were considered according to ESC recommendations. Data on severe aortic stenosis, atrial fibrillation (Afib) and conduction abnormalities, were also collected. "Significant conduction disease" was considered in patients with a clear recommendation for pacemaker implantation or in those whose initial indication was uncertain but who eventually required more than 10% pacing. V30M ATTR-CM patients were compared to a cohort with wtATTR-CM.

Results: We enrolled a total of 248 TTR V30M patients, with a mean age of 54 years old, mostly male (53%) and with early onset disease (< 50 years) (68%). 49 (21%) patients fulfilled the criteria for ATTR-CM diagnosis. Significant electric conduction diseases were present in 31% of patients and were notably higher within the CM group (57 vs. 25%, p < 0.001). Overall, among pacemaker carriers, only 61% (n = 77) had a significant conduction disease. Afib was noted in 11% of the entire cohort, being significantly more frequent among patients with CM (31 vs. 6%, p < 0.001). Severe aortic stenosis was rare, present in only 4 patients of the entire cohort. In comparison with a cohort of patients with wtATTR-CM (n = 44), patients with V30M vATTR-CM were significantly younger and had more electric conduction abnormalities and orthostatic hypotension. On the other hand, AFib, systolic dysfunction and hypertension were less frequent, which parallelled with lower levels of NT-proBNP and troponin T (Table 1).

	<75 years (n= 23)	75-85 years (n=40)	>85 years (n=26)
Male, n (%)	21 (91)	36 (90)	19 (73)
ATTRwt, n (%)	3 (13)	19 (48)	15 (58)
NYHA class – T0, n (%)			
I	15 (65)	10 (25)	2 (8)
II	6 (26)	24 (60)	19 (73)
III	2 (9)	6 (15)	5 (19)
NYHA class – T1, n (%)			
I	15 (65)	11 (28)	3 (12)
II	7 (30)	28 (70)	21 (80)
III	1 (4)	1 (2)	2 (8)
KCCQ score – T1, n	329.6±29.2	306.4±25.7	264.1±41.7
Δ NTproBNP, pg/mL	-386.9±464.6	-72.7±766.6	1931.4±1443.4
Δ Furosemide, mg	5.7±3.6	5.3±4.6	-1.1±4.5

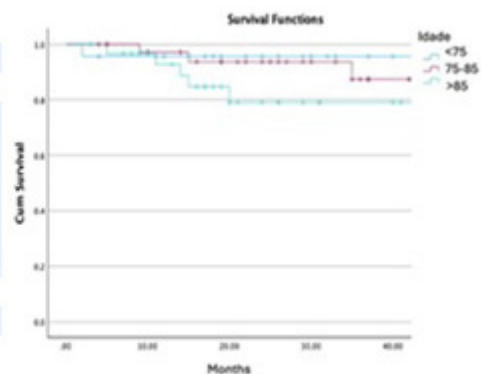Table 1 – Demographic Characteristics of the ATTR-CM Population Under Tafamidis Therapy by Age Group

Figure 1 – Time to Event Analysis of Cardiovascular Death and Heart Failure Hospitalization Across Three Age Groups

CO29 Figure

Table 1 - Comparative characteristics of patients with vATTR-CM (V30M) and wtATTR-CM

	wtATTR-CM (n=44)		vATTR-CM V30M (n=49)		p value
	n	%	n	%	
Mean age, years (±SD)	80.7	(6.7)	62.4	(13.7)	<0.001
Mean age at presentation, years (±SD)	76.8	(5.3)	47.0	(17.2)	<0.001
Median disease duration, years (IQR)	3.5	(2.8)	12.0	(16.0)	<0.001
Early-onset (< 50 years)	0	0	28	59.6	<0.001
Males	43	97.7	38	77.6	0.004
Severe aortic stenosis	6	13.6	2	4.1	0.143*
Orthostatic hypotension	2	4.5	27	55.1	<0.001
Hypertension	32	72.7	8	16.3	<0.001
Atrial fibrillation	30	68.2	15	30.6	<0.001
Any conduction disease	22	50.0	39	79.6	0.003
Significant conduction disease	10	22.7	28	57.1	<0.001
Pacemaker	11	25.0	34	69.4	<0.001
LV hypertrophy	44	100.0	49	100.0	-
Median max wall thickness, mm (IQR)	18	(4)	14	(3)	<0.001
Median LV mass, g/m2 (IQR)	171	(65)	125	(55)	<0.001
Median LA volume, ml/m2 (IQR)	54	(18)	39.5	(10)	<0.001
Mean LVEF, % (±SD)	43	(11.4)	60	(9.0)	<0.001
LV systolic dysfunction	29	65.8	5	10.2	<0.001*
LV diastolic dysfunction	4	21.1	6	12.2	0.678*
Median NT-proBNP, pg/ml (IQR)	2701	(10096)	839	(1988)	<0.001
Median troponin T, ng/L (IQR)	81	(72.5)	31.5	(32.0)	<0.001
Mean creatinine clearance, ml/min (±SD)	50	(23)	82	(25)	<0.001
Other manifestations					
- Neurological	3	12.0	44	89.8	<0.001
- Gastrointestinal	0	0	24	49.0	<0.001
- Ophthalmological	1	3.6	15	30.6	0.005
- Renal	0	9	7	14.3	0.044*
- Urological	0	0	17	34.7	<0.001
Mean BMI, kg/m2 (±SD)	25.5	3.3	24.4	4.4	0.178

*Fisher's exact test

Abbreviations: IQR, interquartile range; LA, left atria; LV, left ventricle; LVEF, left ventricle ejection fraction; SD, standard deviation

Conclusions: Our findings highlight the need for thorough cardiovascular evaluation in TTR V30M patients due to frequent conduction disease and CM. V30M ATTR-CM patients are younger, have more conduction abnormalities, and a lower prevalence of AFib compared to those with wtATTR-CM. Further prospective studies are needed to explore differences in CM between variant and wild-type cases.

Sexta-feira, 11 Abril de 2025 | 15:00-16:00

Espaço Ágora | Sessão de Comunicações Orais 07 – Prémio Ferrer melhor comunicação oral em prevenção secundária

CO 31. IMPACT OF LIPOPROTEIN A ON LONG-TERM OUTCOMES IN ACUTE CORONARY SYNDROME: A RETROSPECTIVE COHORT ANALYSIS

Cátia Oliveira, Ana Pinho, Catarina Marques, Luís Santos, André Cabrita, Helena Moreira, Pedro Palma, Miguel Rocha, Bernardo Cruz, Emanuel Oliveira, Joana Gonçalves, Rui André Rodrigues

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Introduction: Lipoprotein(a) [Lp(a)] has emerged as an important cardiovascular risk factor (CVRF). Higher Lp(a) levels (> 50 mg/dL) have been linked to increased CV risk, but the exact cut-off and its impact on outcomes remain unclear. This study aimed to examine the effect of high Lp(a) on post-acute coronary syndrome (ACS) complications and outcomes during follow-up.
Methods: This retrospective cohort study included 225 patients (pts) admitted with ACS between January 2020 and October 2023 at a tertiary care center. Lp(a) levels were measured on admission, and the analysis focused on pts with Lp(a) > 50 mg/dL. Data was obtained from medical records, and follow-up outcomes were assessed.
Results: The cohort had a mean age of 56.8 years, with 18.7% women and a high prevalence of CVRF (96%). Of the patients, 48% had non-ST-segment elevation ACS and 52% had ST-segment elevation ACS. The median follow-up was 26 months, with a median Lp(a) level of 36.6 mg/dL. Among the 87 pts with Lp(a) > 50 mg/dL, no significant differences were observed in baseline characteristics compared to Lp(a) < 50 mg/dL pts, especially regarding LDL-c levels at admission (p = 0.6), except for a higher prevalence of family history of premature coronary heart disease (CHD) (p = 0.04). Patients with higher Lp(a) were more likely to be on dyslipidemia medications prior to the index event (p = 0.02) and were more often prescribed higher-intensity regimens (p < 0.001). In terms of in-hospital outcomes, both groups were comparable regarding coronary angiography (p = 0.3), revascularization (p = 0.7), Killip classification (p = 0.3), left ventricular dysfunction (p = 0.1), and immediate post-ACS complications (p = 0.9). However, pts with elevated Lp(a) showed more complex coronary disease, with higher rates of multivessel involvement (p < 0.01). During long-term follow-up, the high Lp(a) group had a significantly higher rate of CV events (log-rank p = 0.03), with a mean time-to first-CV-event of 23.5 months. A total of 10.7% of the cohort experienced a CV event, including a new ACS episode (5.3%) and heart failure hospitalization (4.1%). All-cause mortality was 5.4%, with 3.2% attributed to cardiovascular death.
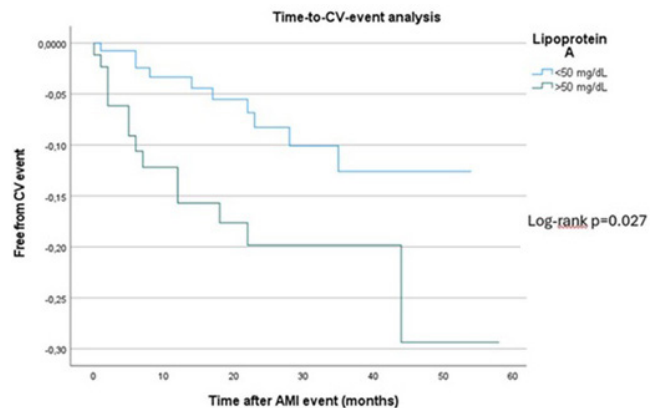

Figure 1. Time-to-event analysis

Conclusions: In this cohort of ACS patients, elevated Lp(a) levels (> 50 mg/dL) were associated with worse long-term CV outcomes, despite similar baseline characteristics, including lipid levels at admission. Additionally, elevated Lp(a) was linked to a higher incidence of a family history of premature CHD, suggesting a genetic predisposition. These findings highlight the importance of Lp(a) in identifying high-risk ACS patients who may require closer monitoring and more aggressive CV risk management. Further studies are needed to confirm these results and explore therapeutic strategies for managing elevated Lp(a) in this high-risk subgroup.

CO 32. CORONARY ARTERY DISEASE AND THE BAD DUAL: HOMOCYSTEINE AND LIPOPROTEIN (A)

Francisco Sousa[1], Maria Isabel Mendonça[2], Débora Sá[1], Gonçalo Abreu[1], Matilde Ferreira[1], Eva Henriques[2], Sofia Borges[2], Sónia Freitas[2], Mariana Rodrigues[1], António Drumond[1], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

[1]Hospital Central do Funchal. [2]Research Centre Dr.ª Maria Isabel Mendonça, SESARAM EPERAM. [3]Faculdade de Ciências Médicas de Lisboa/NOVA Medical School.
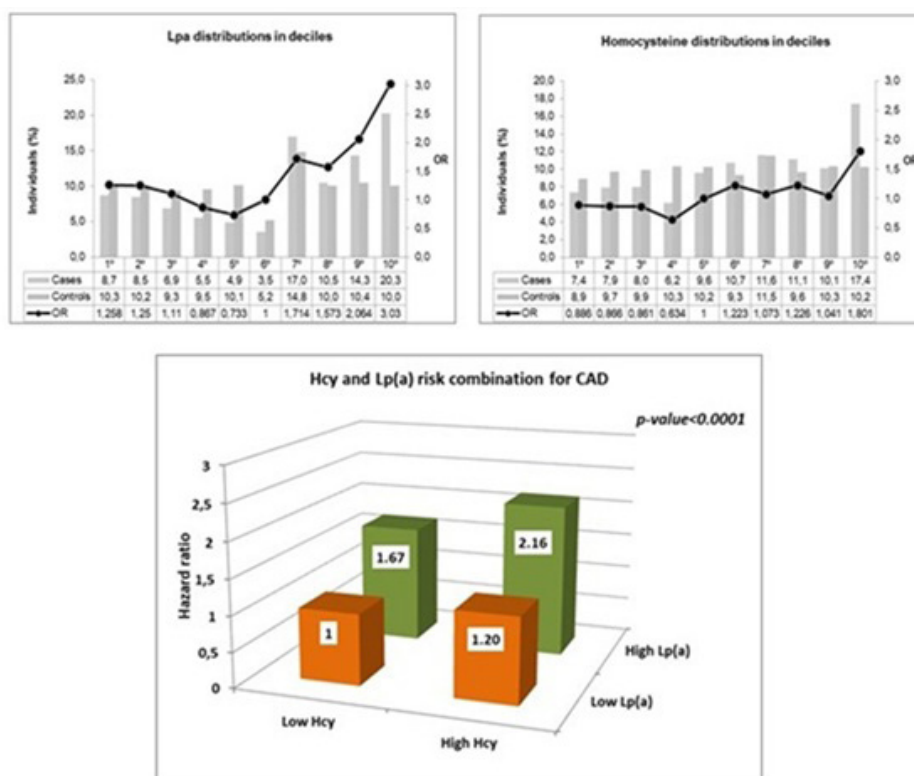
Figure CO32

Introduction: High homocysteine (Hcy) and Lipoprotein [Lp(a)] levels are independent risk factors for coronary artery disease (CAD) through several mechanisms, such as endothelial dysfunction, increased permeability of lipids and inflammation. It promotes the release of free Apo(a) from Lp(a). Free Apo(a) has high fibrin affinity and inhibits plasminogen binding, altering fibrinolysis. Identifying individuals with the dual risk focus on preventive measures might decrease the risk of this atherothrombotic disease.

Objectives: Evaluate Hcy and Lp(a) as independent risk factors for CAD in a Portuguese population, establishing the cut-off value for the appearance CAD in our population. Finally, investigate whether there is a positive interaction between these two markers.

Methods: We performed a case-control study with 1722 coronary patients and 1435 controls (aged 53.0 ± 7.8 years; 77.6% male) matched by sex and age. Hcy and Lp(a) levels were determined and stratified into deciles. Multivariate logistic regression adjusted for age and gender was performed using Hcy and Lp(a) deciles to investigate the independent risk of CAD. Our disease cut-off is the point along the deciles when the risk begins. Finally, a second regression analysis was performed with Hcy and Lp(a) combination and adjusted for age, sex, smoking, hypertension, diabetes, dyslipidemia, BMI ≥ 30 Kg/m^2, physical inactivity and CAD family history to evaluate their synergistic interaction.

Results: After a multivariate regression concerning Hcy, the first four deciles (lower values) presented CAD protection. From this point (fifth decile), the CAD risk begins, and as Hcy levels increase, CAD risk also increases. In the 10th decile, the CAD risk was 80% higher than the reference. In the case of Lp(a), the 6th decile was the reference, starting the significant risk below these. On the 10th, CAD risk was 200% higher than the reference. The combination of Hcy and Lp(a) higher values had an increased risk of 2.16 (95%CI: 1.73-2.69; p < 0.0001).

Conclusions: High levels of Lp(a) and Hcy were independent risk factors for CAD in our population. There was an interaction between Lp(a) and Hcy that significantly potentiates the CAD risk. These findings highlight the importance of identifying individuals with this dual risk factor of elevated Hcy and Lp(a) to focus on preventive measures that might decrease the CAD risk in our population. This interaction deserves to be investigated in relation to other ethnicities.

CO 33. ASSOCIATIONS BETWEEN AN INSULIN RESISTANCE INDEX AND SUBCLINICAL ATHEROSCLEROSIS PROGRESSION IN A CORONARY POPULATION

Gonçalo Bettencourt Abreu[1], Isabel Mendonça[2], Débora Sá[1], Francisco Sousa[1], Matilde Ferreira[1], Eva Henriques[2], Sofia Borges[2], António Drummond[1], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dr.ª Maria Isabel Mendonça, SESARAM EPERAM. [3]Universidade NOVA de Lisboa.

Introduction: Insulin resistance (IR), with its myriad proatherogenic effects, is a relevant risk factor for atherosclerosis. The triglyceride-glucose index (TyG) is a marker of IR and subclinical atherosclerosis. Its potential in coronary artery disease (CAD) prognostic assessment has little been explored, but the evidence suggests significant potential.

Objectives: Investigate the association between an IR index, triglyceride-glucose index (TyG), and cardiovascular and non-vascular events in a coronary population.

Methods: We included 1719 coronary patients with at least 70% stenosis in one or more main coronary arteries or their primary branches on coronary angiography. These patients were in stabilized phase after appropriate interventional approach (angioplasty with coronary stenting), coronary artery bypass graft (CABG) surgery and suitable medical therapy despite some residual Ischemia. Total events, including cardiovascular (CV) events, and non CV mortality were registered throughout an extended follow-up (average 7.0 ± 5.7 years). TyG was calculated through the formula ln[Triglyceride mg/dl*fast blood glucose (FBG) mg/dl)/2], which was subsequently stratified into terciles. All analyses were performed using the TyG 3rd tercile relatively to 1st. Bivariate analysis evaluated its association with other markers: pulse wave velocity (PWV), fibrinogen, C reactive protein (CRP), and clinical variables. A multivariate Cox regression analysis assessed the variables associated with total events.

Results: TyG was associated with PWV (p < 0.0001), CRP (p < 0.0001), kidney failure (p < 0.0001), peripheral vascular disease (p < 0.0001), stroke (p < 0.0001), CV events (p = 0.001), and total events (p < 0.0001) in bivariate analysis. After
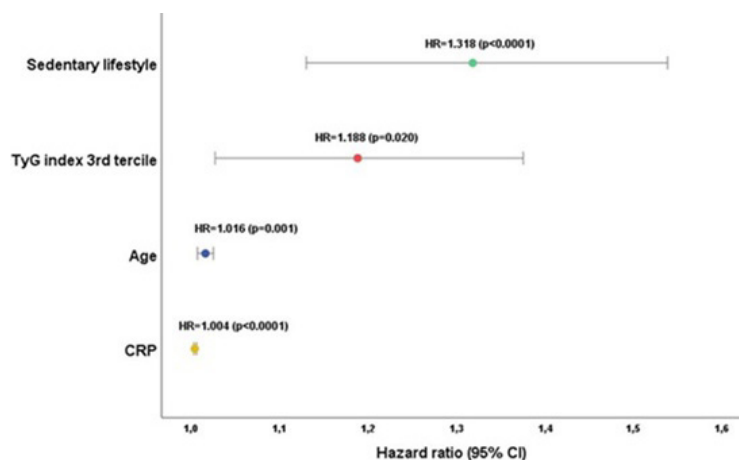
Variables independently associated with total events (Cox regression analysis)

Figure CO33

Cox analysis adjusted to age, gender, diabetes, dyslipidemia, hypertension, smoking, alcohol > 300/week, obesity, sedentary lifestyle, CRP, fibrinogen, lipoprotein(a), PWV and TyG index, this marker remained as a significant and independent risk factor for total events (HR-1.19; p = 0.020), together with age (p = 0.001), sedentary lifestyle (p < 0.0001) and high CRP (p < 0.0001).
Conclusions: TyG index, cheap and easy to determine, was strongly associated with residual inflammation, atherosclerosis progression, CV events and mortality. Early identification of patients with higher TyG indices before deleterious events occur may be valuable for predicting disease progression in high-risk patients, allowing timely adoption of appropriate preventive measures.

CO 34. C-REACTIVE PROTEIN LEVEL AND RISK OF CARDIOVASCULAR EVENTS IN PATIENTS WITH CORONARY ARTERY DISEASE

Gonçalo Bettencourt Abreu[1], Isabel Mendonça[2], Débora Sá[1], Francisco Sousa[1], Matilde Ferreira[1], Eva Henriques[2], Sónia Freitas[2], Mariana Rodrigues[2], Sofia Borges[2], António Drummond[1], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dr.ª Maria Isabel Mendonça, SESARAM EPERAM. [3]Universidade NOVA de Lisboa.

Introduction: The prognosis of cardiovascular disease can be predicted through various indicators, such as biochemical, imaging and genetic. C reactive protein (CRP) is a valuable inflammatory biomarker in different clinical conditions such as coronary artery disease (CAD). CRP biomarkers are easy to get, cheap, and sensitive for predicting deleterious events.
Objectives: To investigate the association between CRP levels and the risk of vascular and non-vascular outcomes in a Southern European population with CAD.
Methods: We performed an extended prospective study with 1,719 CAD patients with a follow-up of 7.3 ± 6.5 years. All demographic, biochemical, and clinical data, as well as CRP levels, were collected. The outcome was CV events occurrence [myocardial infarction or unstable angina, ischemic stroke, new admission by heart failure, revascularization (angioplasty, CABG) or cardiovascular death]. CRP levels were stratified into quintiles (Q) below 10 mg/L (1st Q CRP ≤ 1.2 mg/L; 2nd Q CRP 1.21-2.53 mg/L; 3rd Q CRP 2.54-2.60 mg/L; 4th Q CRP 2.61-3.69 mg/L and 5th Q CRP 3.70-10 mg/L and above 10 mg/L (> 10 mg/L). Associations between baseline CRP concentrations and primary outcome were assessed using Cox proportional hazard models adjusted for all confounders (age, sex, smoking status, diabetes mellitus, body mass index, hypertension, diabetes, dyslipidemia, physical inactivity, alcohol and CAD family history). Kaplan-Meier estimated differences in the survival probability in each CRP quintile and in the subgroup > 10 mg/L.
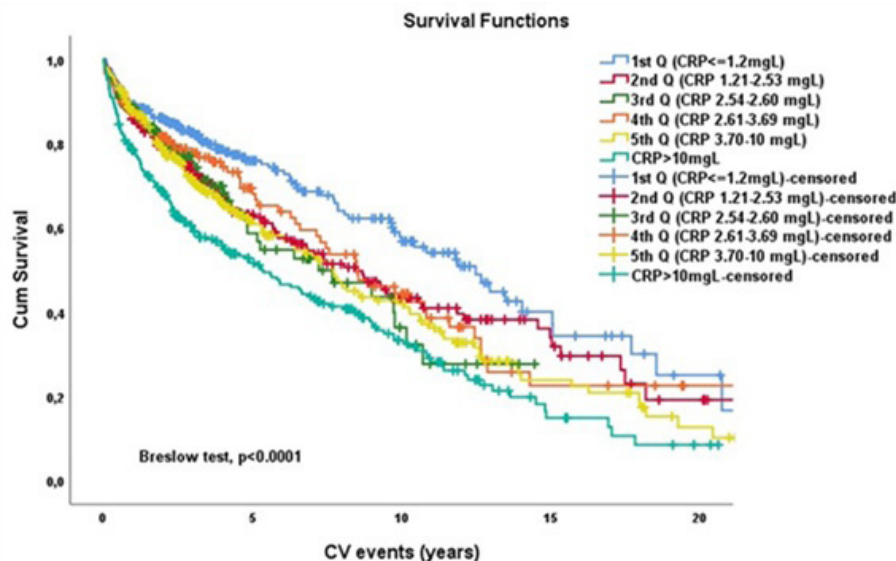

Figure CO34

Results: After Cox regression analysis, physical inactivity (p = 0.001), alcohol (p = 0.049), and CRP (p < 0.0001) remained in the equation as significantly associated with CV events. Specifically, the significances were: p = 0.023 for 2ndQ; p = 0.020 for 3rdQ; p = 0.002 for 5thQ and p < 0.0001 for CRP > 10 mg/L. CRP 4thQ did not reach statistical significance. The risk demonstrated by high CRP levels for the CV events occurrence is more significant than the previously established cardiovascular risk factors.

Conclusions: Our findings demonstrated that higher CRP concentrations in coronary patients were independently associated with an increased risk of recurrent CVD events. As a biomarker, CRP highlights the importance of inflammation in cardiovascular disease.

CO 35. IDENTIFYING REDUCE-IT TRIAL ELIGIBLE PATIENTS IN A STRUCTURED CORONARY DISEASE FOLLOW-UP PROGRAM

Marta Leite[1], Inês Neves[1], Marta Almeida[1], André Lobo[1], Sílvia O. Diaz[2], Diogo Ferreira[1], Gualter Santos Silva[1], Eduardo Vilela[1], Ricardo Fontes-Carvalho[1]

[1]ULSGE. [2]Faculdade de Medicina da Universidade do Porto.

Introduction: The REDUCE-IT trial demonstrated significant cardiovascular benefits of icosapent ethyl in patients with elevated triglycerides (TG) and optimized statin therapy. Identifying eligible patients in real-world settings is critical to translating these findings into practice and assess the cost-effectiveness of initiating this therapy in patients with high triglycerides levels after an acute coronary syndrome (ACS).

Objectives: This study aimed to evaluate the prevalence of patients meeting REDUCE-IT inclusion criteria within a Structured Coronary-Disease Follow-up Program (SCCC).

Methods: We conducted a retrospective analysis of patients enrolled in the SCCC program. The SCCC is a structured outpatient program implemented in our center in 2021 for all patients up to 12 months after an ACS and involves regular follow-up consultations focused on optimizing cardiovascular risk factor control. Inclusion criteria for this analysis mirrored those of the REDUCE-IT trial: age ≥ 45 years, history of cardiovascular disease, TG levels of 135-499 mg/dL measured at any point during the 12-month program, LDL-C levels of 41-199 mg/dL, and stable statin therapy for at least four weeks.

Results: Among 343 patients managed under the SCCC program, 27 (7.9%) fulfilled the REDUCE-IT inclusion criteria. Eligible patients had a median TG level of 176 mg/dL (IQR: 145-230) and an LDL-C level of 92 mg/dL (IQR: 71-115), with all on stable statin therapy for at least four weeks. These findings highlight a subpopulation that may benefit from icosapent ethyl to further reduce residual cardiovascular risk.

Conclusions: Approximately 8% of patients within a structured coronary-disease follow-up program met the inclusion criteria for the REDUCE-IT trial. Identifying such patients in real-world clinical settings is essential for targeted intervention and optimizing cardiovascular outcomes. Further studies are warranted to assess the impact of implementing REDUCE-IT findings in this population.

Sábado, 12 Abril de 2025 | 08:00-09:00

Espaço Ágora | Sessão de Comunicações Orais 08 – Otimizar resultados na TAVI: perfil do doente, técnicas e válvulas

CO 36. FINDING THE PERFECT MATCH: PROFILING AORTIC ANNULUS IN TAVI PATIENTS

Ana Lobato de Faria Abrantes, Catarina Gregório, Miguel Azaredo Raposo, Daniel Cazeiro, João Cravo, Marta Vilela, Sofia Esteves, Miguel Nobre Menezes, Cláudia Jorge, Pedro Carrilho Ferreira, Pedro Cardoso, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Transcatheter Aortic Valve Implantation (TAVI) has become the standard treatment for severe aortic stenosis (SAS) in elderly or high-risk patients. Accurate aortic annulus (AA) sizing is crucial for successful TAVI, as incorrect prosthesis sizing can lead to adverse outcomes.
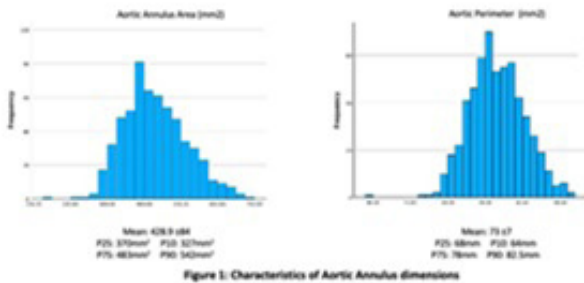

Figure CO36
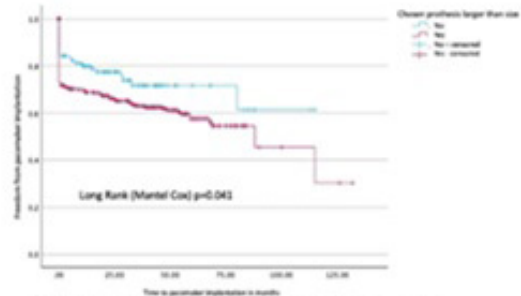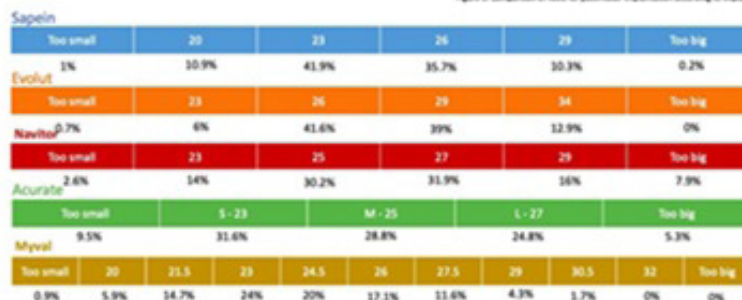
Objectives: To describe AA characteristics and evaluate differences in TAVI outcomes when comparing implanted prosthesis size to brand recommended size (BRS), according to AA measurement.

Methods: Single center retrospective study of consecutive pts with SAS who underwent TAVI from 2014 to November 2023. AA measurements were obtained via computed tomography scan revised by an interventional cardiologist. AA was classified as small if below 10th percentile and large if above the 90th percentile. For each pt we evaluated all possible prosthesis options, based exclusively on AA measurement, matching the recommended size provided by the respective brands (Sapien, Evolut, Navitor, Accurate, Myval). Oversizing was defined as an oversizing index above 20% for self expandable valves and 10% for balloon expandable valves. Elderly pts were defined as age above 75. Kaplan-Meier survival analyses were used to compare the outcomes between groups.

Results: We included 580 pts, 45% men with a mean age of 84 ± 8 years. AA dimension characteristics are shown in Figure 1. Women and elderly patients had significantly smaller AA diameters (Ad) and perimeters (Ap) compared to men and younger patients (Sex: Ad 22 ± 2 vs. 25 ± 2, Ap 69 ± 6 vs. 78 ± 7, p < 0.001; Age: Ad 23 ± 2 vs. 25 ± 3, Ap 73 ± 7 vs. 77 ± 9, p < 0.001). Distribution of pts according to BRS prostheses is present in Figure2, all patients had at least one prosthetic size suitable for their AA. Sapien 26, Sapien 23 and Evolut 26 and 29 accounted for 83% of the implanted valves. The size of the implanted valve differed from the BRS in 82% of patients, with 67% receiving a larger prosthesis. Elderly patients and men had a 2-fold and 2.3-fold increased likelihood of receiving a larger valve, respectively (OR 0.48 [0.21-0.91], p = 0.026; OR 2.3 [1.5-3.5], p = 0.004). Receiving a prosthesis larger than BRS significantly increased the risk of procedural complications (OR 1.6 [1.1-2.5], p = 0.015), oversizing (OR 6.1 [3.3-11.8], p < 0.001), and the need for pacemaker implantation (35.6 vs. 24.5%, OR 1.76 [1.1-2.8], p = 0.016) during a mean follow-up of 39 months (Figure 3). However, no differences were found regarding prosthetic function, death, or heart failure hospitalization during follow-up.

Conclusions: These findings highlight the importance of precise AA measurement and careful prosthesis selection to minimize procedural risks and improve patient outcomes.

CO 37. TRANSCATHETER AORTIC VALVE IMPLANTATION WITHOUT CARDIAC SURGERY BACKUP: FIRST NATIONAL SINGLE-CENTER EXPERIENCE ASSESSING SAFETY AND EFFICACY OUTCOMES
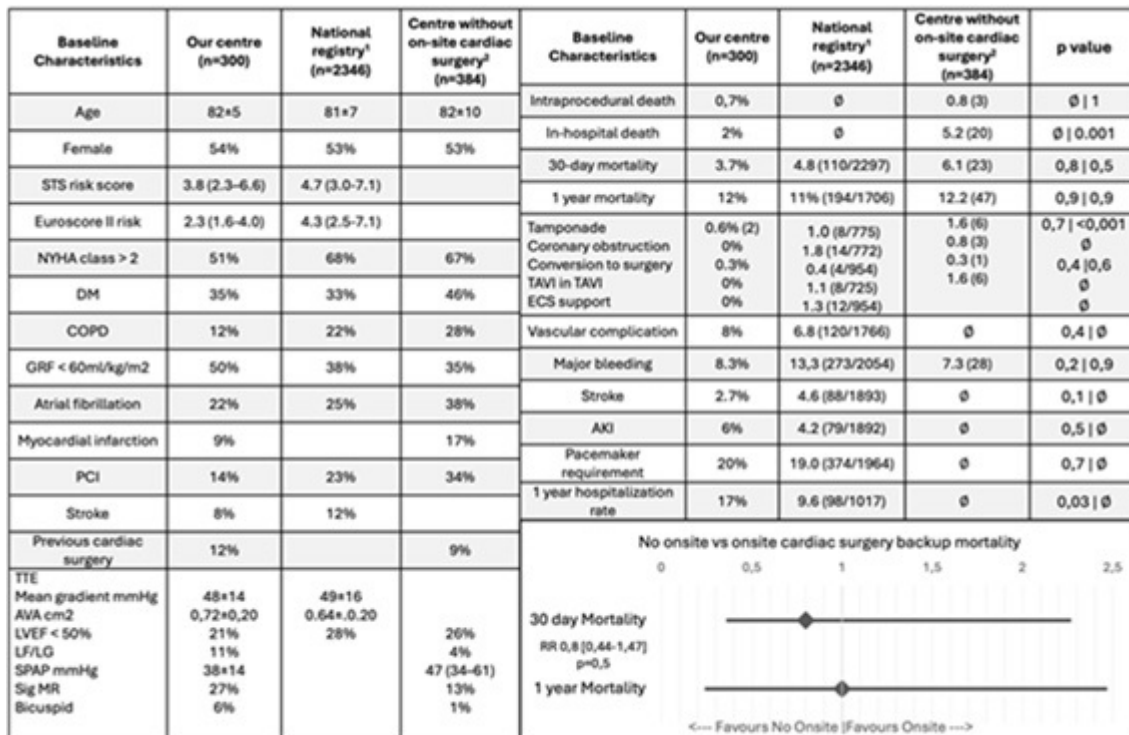
António Maria Rocha de Almeida, Marta Paralta Figueiredo, Renato Fernandes, Ângela Bento, David Neves, Diogo Brás, Rita Rocha, Manuel Trinca, Álvaro Laranjeira Santos, Lino Patrício

Hospital do Espírito Santo, EPE, Évora.

Introduction: Transcatheter aortic valve implantation (TAVI) is traditionally performed with cardiac surgery backup onsite. Yet, TAVI development has enabled it to be conducted safely outside these centers. This study aims to describe our experience and the outcomes of TAVI in this paradigm shift to a center without a cardiac surgery backup onsite.

Methods: A retrospective cohort of 300 TAVI patients at a center without cardiac surgery backup onsite between 2020 and 2024 was analyzed. The primary endpoints were procedural death, 30-day mortality, and stroke. Secondary outcomes included in-hospital mortality, length of hospital stay, surgery-required complications, and permanent pacemaker implantation.

Results: 300 patients underwent TAVI, with a mean age of 82 ± 5 years, and 54% female. The median STS risk score was 3.8 [2.3-6.6], with 20% classified as high-risk patients (STS > 8). Baseline echocardiographic characteristics were a mean aortic gradient of 48 ± 14 mmHg, left ventricular ejection fraction of 57 ± 12%, and systolic pulmonary artery pressure of 38 ± 14 mmHg. The mean aortic valve calcium score was 2,912 ± 1,572 UA. The bicuspid aortic valve was present in 6% of patients (n = 18), and valve-in-valve procedures were performed in 7 cases (2.3%). Compared with the national TAVI registry, there were no significant differences in baseline characteristics. Most procedures were elective (83%, n = 249). Femoral access was preferred in 99% of cases, with the contralateral femoral artery as secondary access in 90%. Self-expandable Evolut CoreValve was used in 96% of procedures. Procedural success rate was 99% (n = 298). In-hospital and 30-day mortality was 2% and 3.7%, respectively; stroke occurred in 2.7%, and a pacemaker was required in 20%. Tamponade occurred in 0.6% of cases (n = 2), and surgical intervention in 0.3% (n = 1). There was 8% of major

Baseline Characteristics	Our centre (n=300)	National registry[1] (n=2346)	Centre without on-site cardiac surgery[2] (n=384)
Age	82±5	81±7	82±10
Female	54%	53%	53%
STS risk score	3.8 (2.3–6.6)	4.7 (3.0–7.1)	
Euroscore II risk	2.3 (1.6–4.0)	4.3 (2.5–7.1)	
NYHA class > 2	51%	68%	67%
DM	35%	33%	46%
COPD	12%	22%	28%
GRF < 60ml/kg/m2	50%	38%	35%
Atrial fibrillation	22%	25%	38%
Myocardial infarction	9%		17%
PCI	14%	23%	34%
Stroke	8%	12%	
Previous cardiac surgery	12%		9%
TTE Mean gradient mmHg AVA cm2 LVEF < 50% LF/LG SPAP mmHg Sig MR Bicuspid	48±14 0,72±0,20 21% 11% 38±14 27% 6%	49±16 0.64±.0.20 28%	26% 4% 47 (34–61) 13% 1%

Baseline Characteristics	Our centre (n=300)	National registry[1] (n=2346)	Centre without on-site cardiac surgery[2] (n=384)	p value
Intraprocedural death	0,7%	Ø	0.8 (3)	Ø | 1
In-hospital death	2%	Ø	5.2 (20)	Ø | 0.001
30-day mortality	3.7%	4.8 (110/2297)	6.1 (23)	0,8 | 0,5
1 year mortality	12%	11% (194/1706)	12.2 (47)	0,9 | 0,9
Tamponade Coronary obstruction Conversion to surgery TAVI in TAVI ECS support	0.6% (2) 0% 0.3% 0% 0%	1.0 (8/775) 1.8 (14/772) 0.4 (4/954) 1.1 (8/725) 1.3 (12/954)	1.6 (6) 0.8 (3) 0.3 (1) 1.6 (6) Ø Ø	0,7 | <0,001 0,4 |0,6 Ø Ø
Vascular complication	8%	6.8 (120/1766)	Ø	0,4 | Ø
Major bleeding	8.3%	13,3 (273/2054)	7.3 (28)	0,2 | 0,9
Stroke	2.7%	4.6 (88/1893)	Ø	0,1 | Ø
AKI	6%	4.2 (79/1892)	Ø	0,5 | Ø
Pacemaker requirement	20%	19.0 (374/1964)	Ø	0,7 | Ø
1 year hospitalization rate	17%	9.6 (98/1017)	Ø	0,03 | Ø

No onsite vs onsite cardiac surgery backup mortality

30 day Mortality — RR 0,8 [0,44-1,47] p=0,5

1 year Mortality

<--- Favours No Onsite |Favours Onsite --->

1)Guerreiro, C., Ferreira, P. C., Teles, R. C., Braga, P., Canas da Silva, P., Patrício, L., Silva, J. C., Baptista, J., de Sousa Almeida, M., Gama Ribeiro, V., Silva, B., Brito, J., Infante Oliveira, E., Cacela, D., Madeira, S., & Silveira, J. (2020). Short and long-term clinical impact of transcatheter aortic valve implantation in Portugal according to different access routes: Data from the Portuguese National Registry of TAVI. Revista Portuguesa de Cardiologia, 39(12), 705–717. https://doi.org/10.1016/j.repc.2020.02.014
2)Roa Garrido, J., Jimenez Mazuecos, J., Sigüenzad, A., Cardenal Piris, R., Gallardo-López, A., Vaquerizo, B., Lázaro-García, R., Lozano Ruiz-Poveda, F., Jimenez Cabrera, F., & Díaz-Fernandez, J. F. (2019). Transfemoral TAVR at Hospitals Without On-Site Cardiac Surgery Department in Spain. JACC: Cardiovascular Interventions, 12(9), 896-898. https://doi.org/10.1016/j.jcin.2019.02.006

Figure CO 37

bleeding and vascular complication rates. There were no cases of coronary obstruction, the need for extra-circulatory support, or TAVI in TAVI deployment as a bailout. The median hospital stay was 3 days, 2 at the ICU level. Significant symptomatic improvement was verified in 91% of the cases. After 1 year, the mortality rate was 12%. There were no significant differences in outcomes compared to the TAVI national registry results and in a center without cardiac surgery onsite (Table 1).

Conclusions: This first national single-center experience of TAVI performed without cardiac surgery backup demonstrates excellent safety and efficacy outcomes. Procedural success was achieved in 99% of cases, with low in-hospital and 30-day mortality rates, stroke, and major complications. One-year survival was comparable to outcomes from centers with onsite surgical backup. These findings suggest that TAVI can be safely performed in appropriately equipped centers without immediate access to cardiac surgery, potentially broadening the accessibility of this procedure.

CO 38. EXPLORING IMPLANTATION DEPTH AND PROCEDURAL OUTCOMES IN TRANSCATHETER AORTIC VALVE REPLACEMENT

Miguel Abrantes de Figueiredo, Inês Rodrigues, Fernando Ferreira, Francisco Cardoso, Mariana Coelho, Francisco Albuquerque, André Grazina, Tiago Mendonça, António Fiarresga, Rúben Ramos, Rui Cruz Ferreira, Duarte Cacela

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

Introduction: Contemporary evidence showed an influence of transcatheter heart valve implantation depth (ID) on a multitude of outcomes, including conduction disturbances (CD) requiring permanent pacemaker implantation (PPI) and paravalvular leakage (PVL). However, a standardized protocol for determining and reporting ID in Transcatheter Aortic Valve Replacement (TAVR) is not so well established.

Objectives: To evaluate the ID and short-term procedural outcomes of patients undergoing TAVR with self-expandable transcatheter valves.

Methods: A retrospective analysis of the procedural angiograms of patients that underwent TAVR with self-expandable valves between January 2023 and November 2024 in a single high-volume tertiary center in Portugal was performed. ID was measured at the level of the non-coronary cusp (NCC) and the left coronary cusp (LCC) in the final aortic root angiogram in a left-anterior-oblique projection. Moreover, 2 additional categories were created: the arithmetic mean (AM) and the greatest value of the ID values obtained. Optimal implantation depth was defined according to the manufacturer's recommendations. PPI and echocardiographic evaluation were performed according to the current indications and institutional protocols.

Results: Of the 170 patients included, 102 underwent TAVR with the *Evolut Pro/Pro+* platform and the remaining patients with the *Navitor* platform.

A mean NCC ID of 6.18 mm and a mean LCC ID of 6.98 mm was determined, with no statistically significant differences regarding the platform or the valve size utilized. Optimal ID was obtained in 11.8% to 23.5% of cases and a deep valve positioning was the most frequent result (Figure). Cusp Overlap Technique was the fluoroscopic approach used by default with corrective measures done with the 3 Cusp View in 25.3% of cases (without differences in the overall ID between those groups). There was a PPI rate of 35.9%, with a significantly deeper valve positioning across all measuring categories (p < 0.01) in this group. Optimal ID at the NCC was associated with the absence of CD requiring PPI (Chi-Square analysis, p = 0.012). Shallow valve implantation was associated with significant PVL (Fisher's Exact Test, p < 0.01).

Conclusions: ID is a procedural metric that influences hemodynamic and electrophysiological outcomes. A sub-optimal deeper valve positioning was associated with PPI and a sub-optimal shallower valve placement was associated with significant PVL.

CO 39. TAVI PARAVALVULAR LEAKS – 1 YEAR EVALUATION AND MULTIMODAL PREDICTORS

Inês Caldeira Araújo, Miguel Azaredo Raposo, Ana Abrantes, Catarina Gregório, João Fonseca, Daniel Cazeiro, Diogo Ferreira, Cláudia Jorge, Miguel Nobre Menezes, João Silva Marques, Pedro Carrilho Ferreira, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Paravalvular leak (PVL) is a common complication after transcatheter aortic valve implantation (TAVI), associated with adverse outcomes, including heart failure and reduced survival. Identifying predictors of PVL is essential for improving procedural outcomes and patient selection.

Objectives: To evaluate predictors of one-year TAVI moderate to severe PVL.

Methods: We conducted a single center retrospective study, studying patients (pts) who underwent TAVI procedure 2014 to 2022 and had a 1-year follow-up echocardiographic evaluation. Baseline echocardiographic and CT-derived data were collected and analyzed. For statistical analysis Mann-Whitney, Chi-square tests and logistic regression were performed.

Results: We included 743 pts, 54% of which were female, with a mean age of 82 ± 6.5 years. 20% of pts had "very severe AS" defined as Vmax ≥ 5 m/s or mean gradient ≥ 60 mmHg. Aortic valve (AV) annular eccentricity [1-D(min)/D(max)] and AV calcium score were derived from cardiac CT – mean 3,291 ± 1,687 AU and median 0.15 (IQR 0.08) respectively. Valve type distribution was balanced, with 50% receiving balloon-expandable (BEV) and 50% self-expandable valves (SEV). Overexpansion index (OI) was calculated based on area for BEV and perimeter for SEV – median 14.4 (IQR 15.4). At echocardiographic evaluation before discharge, 61% had a minor and 3.5% moderate leaks. At 1-year reassessment, 35% had minor leaks, 4% moderate
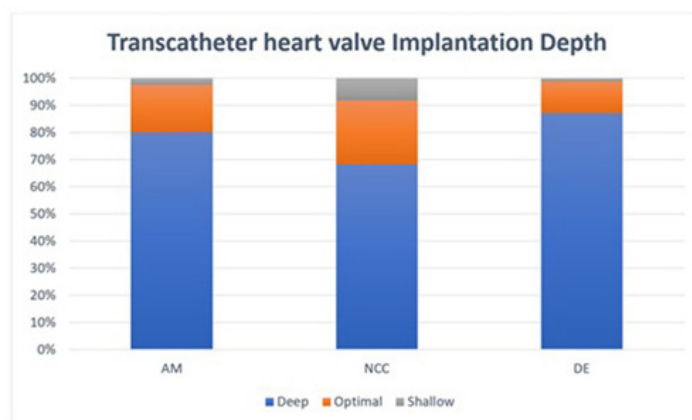

Figure 1: Transcatheter heart valve Implantation Depth according to the measuring category. AM (arithmetic mean); DE (deepest edge); NCC (non-coronary cusp)

Figure CO 38

and 0.3% severe. PVL severity had worsened in 10% of pts and improved in 34% with 44% of pts completely resolving a previously existing PVL. Pts with an OI > 20% had a 3.88 higher odd of leak resolution at 1 year (p = 0.02). On bivariate analysis, significant associations were observed between 1-year moderate to severe PVL and eccentricity index; smallest AV diameter on CT; AV ring area; SEV vs. BEV (p = 0.002; OR 0.28 for SEV) and very severe AS (p = 0.03; OR 2.3). AV calcium score and overexpansion index had no significant association.

Conclusions: TAVI PVL was linked to annular eccentricity, smaller diameter, AV ring area, and valve type, with self-expandable valves reducing risk. Very severe aortic stenosis increased PVL risk, while greater overexpansion improved leak resolution. Pre-procedural imaging and valve selection remain critical to minimizing PVL.

CO 40. IS SMART ENOUGH? BEV VS. SEV IN PATIENTS WITH SMALL AORTIC ANNULI

Sofia Esteves, Miguel Azaredo Raposo, Miguel Nobre Menezes, Ana Abrantes, Catarina Santos Gregório, Diogo Rosa Ferreira, Inês Caldeira de Araújo, Cláudia Moreira Jorge, João Silva Marques, Pedro Carrilho Ferreira, Pedro Pinto Cardoso, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: The recently published SMART randomized trial showed self-expanding aortic valves (SEV) to be non-inferior to balloon-expandable valves (BEV) among patients with aortic stenosis and a small aortic annulus (defined as CT area ≤ 4.3 cm^2) undergoing TAVR.

Objectives: To evaluate outcomes of SEV compared with BEV among patients who underwent TAVR and had a small aortic annulus.

Methods: Retrospective single center study, studying patients submitted to TAVR from 2013 to 2023. Clinical, echocardiographic, and computer tomography data were analyzed. Small aortic annulus was defined as CT area ≤ 4.3 cm^2. For statistical analysis, independent samples t-test, Chi-square, Kaplan-Meier curves and Cox regression were used.

Results: We analyzed a population of 351 patients, 52% of whom received a SEV and 48% a BEV. Mean follow-up (FUP) time was 37.7 ± 24.3 months. Regarding demographics and comorbidities (Table 1), female sex was the only significantly different factor, with 66% females in the SEV group and 53% in the BEV. Echocardiographic evaluation at discharge showed similar results for SEV and BEV regarding maximum (SEV: 17 vs. BEV: 19 mmHg) and mean (SEV: 9 vs. BEV: 10 mmHg) transprosthetic gradients. Doppler velocity index (DVI) was significantly lower for BEV (SEV: 0.6 vs. BEV: 0.5, p = 0.02). Reevaluation at 1 year post procedure revealed reduced maximum (SEV: 16 vs. BEV: 22 p

<.01) and medium (SEV: 8 vs. BEV: 11 p < 0.01) gradients comparing to BEV, as well as higher DVI (SEV: 0.62 vs. BEV: 0.49 p = 0.05). Analyzing outcomes at 1 year, there were no significative differences regarding death (SEV: 17 vs. BEV: 23); valve dysfunction defined as mean gradient ≥ 20 mm (SEV: 4 vs. BEV: 5%) and moderate to severe leak (SEV: 5 vs. BEV: 2.5%). As for outcomes at FUP, stroke and cardiovascular admission had no significative difference. Permanent pacemaker implantation (PPI) was similar during index admission (SEV: 27 vs. BEV: 23% p = NS). However, at FUP, SEV had higher need for PPI (SEV: 35 vs. BEV: 22% p = 0.01). Survival analysis shows a 43% higher hazard of death at a mean FUP of 38 months for BEV comparing to SEV.

Conclusions: The SMART trial showed non-inferiority of SEV choice vs. BEV in patients with small aortic annuli. Our analysis suggests it may in fact be superior, reducing transvalvular gradients at 1 year and overall mortality at a mean FUP of 38 months. Larger, multicentric trials are required to confirm this hypothesis.

Sábado, 12 Abril de 2025 | 08:00-09:00

Sala Arquivo | Sessão de Comunicações Orais 09 – Cardiologia de intervenção/ estrutural

CO 41. UNFREEZING THE PATH WITH ICE-ING: REVOLUTIONIZING LEFT ATRIAL APPENDAGE OCCLUSION

Catarina Gregório, Miguel Nobre Menezes, Ana Abrantes, Miguel Raposo, Ana Rita Francisco, Catarina Oliveira, Tiago Rodrigues, João Silva Marques, Gustavo Lima da Silva, João de Sousa, Pedro Cardoso, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Intraprocedural imaging is essential for transcatheter left atrial appendage occlusion (LAAO). While pivotal trials have relied on transesophageal echocardiography (TEE), intracardiac echocardiography (ICE) is emerging as a promising alternative, offering real-time imaging with no need for general anesthesia and potentially shorter procedural times.

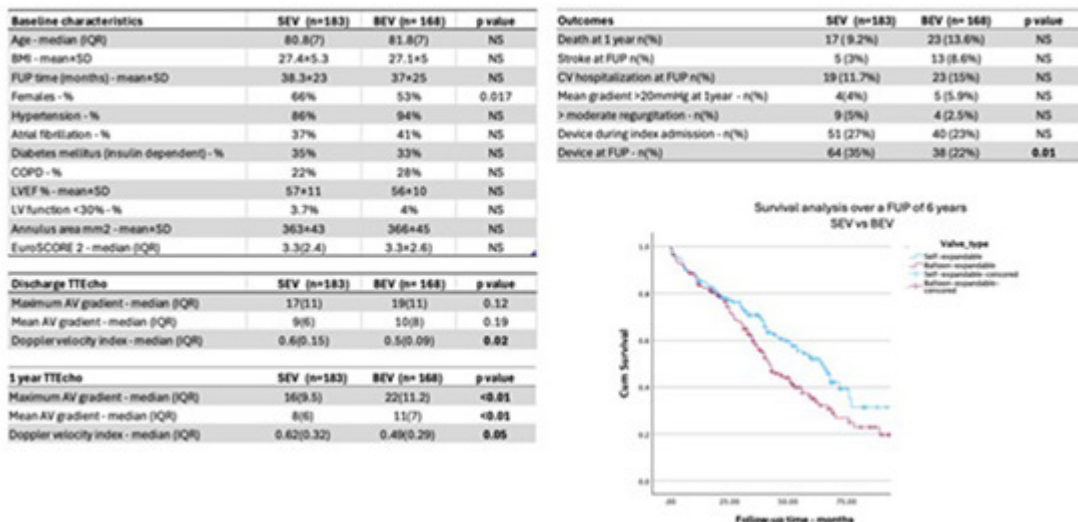Fig 1. Comparison of patients with small anulli receiving SEV vs BEV

Baseline characteristics	SEV (n=183)	BEV (n= 168)	p value
Age - median (IQR)	80.8(7)	81.8(7)	NS
BMI - mean±SD	27.4±5.3	27.1±5	NS
FUP time (months) - mean±SD	38.3±23	37±25	NS
Females - %	66%	53%	0.017
Hypertension - %	86%	94%	NS
Atrial fibrillation - %	37%	41%	NS
Diabetes mellitus (insulin dependent) - %	35%	33%	NS
COPD - %	22%	28%	NS
LVEF % - mean±SD	57±11	56±10	NS
LV function <30% - %	3.7%	4%	NS
Annulus area mm2 - mean±SD	363±43	366±45	NS
EuroSCORE 2 - median (IQR)	3.3(2.4)	3.3±2.6)	NS

Discharge TTEcho	SEV (n=183)	BEV (n= 168)	p value
Maximum AV gradient - median (IQR)	17(11)	19(11)	0.12
Mean AV gradient - median (IQR)	9(6)	10(8)	0.19
Doppler velocity index - median (IQR)	0.6(0.15)	0.5(0.09)	0.02

1 year TTEcho	SEV (n=183)	BEV (n= 168)	p value
Maximum AV gradient - median (IQR)	16(9.5)	22(11.2)	<0.01
Mean AV gradient - median (IQR)	8(6)	11(7)	<0.01
Doppler velocity index - median (IQR)	0.62(0.32)	0.49(0.29)	0.05

Outcomes	SEV (n=183)	BEV (n= 168)	p value
Death at 1 year n(%)	17 (9.2%)	23 (13.6%)	NS
Stroke at FUP n(%)	5 (3%)	13 (8.6%)	NS
CV hospitalization at FUP n(%)	19 (11.7%)	23 (15%)	NS
Mean gradient >20mmHg at 1year - n(%)	4(4%)	5 (5.9%)	NS
> moderate regurgitation - n(%)	9 (5%)	4 (2.5%)	NS
Device during index admission - n(%)	51 (27%)	40 (23%)	NS
Device at FUP - n(%)	64 (35%)	38 (22%)	0.01

Survival analysis over a FUP of 6 years SEV vs BEV

Figure CO 40

	ICE-patients	TEE-patients	P-value
	(N=61)	(N=154)	
CHA$_2$DS$_2$-VASc score	3.7±0.2	4.3±0.1	0.001
HAS-BLED score	2.8±0.1	3.2±0.1	NS
Procedural time, n (%)	61±21	92±36	0.013
Acute success, n (%)	58 (95.1)	149 (96.8)	NS
Acute complications, n (%)	2 (3.3)	7 (5.2)	NS
Minor bleeding	1 (1.6)	27 (18.2)	NS
Major bleeding	2 (3.3)	1 (0.6)	NS
Ischemic events, n (%)	3 (4.9)	10 (15.4)	NS
Stroke	1 (1.6)	6 (3.9)	NS
Other embolic event	1 (1.6)	0 (0)	NS
CV death	1 (1.6)	4 (2.6)	NS

Table 1 - Comparison between ICE and TEE populations for baseline characteristics, procedural details, ischemic and hemorrhagic events.

Figure CO 41

Objectives: To compare the procedural and clinical outcomes of LAAO guided by ICE vs. TEE.

Methods: Single-center retrospective study of pts who underwent percutaneous LAAO between November 2009-December 2024. Patients were divided into 2 groups based on the imaging modality used: ICE or TEE. Clinical endpoints included acute and long-term safety (bleeding or device-related issues) and efficacy (absence of stroke, systemic embolism or cardiovascular death). Kaplan-Meier survival analysis was performed to evaluate the efficacy and safety endpoints.

Results: LAAO was attempted in 215 pts, including 61 cases (28%) with ICE and 154 (72%) with TEE. Baseline characteristics were similar between groups, although ICE pts had a lower CHA2DS2-VASc score (ICE 3.7 ± 0.2 vs. TEE 4.3 ± 0.1, p = 0.01) and fewer prior ischemic strokes (ICE 24 vs. TEE 42%, p = 0.02). Procedures guided by ICE had significantly shorter procedural times (ICE 61 ± 21 vs. TEE 92 ± 36 min, p = 0.013), with an average reduction of 11 min. The type of device implanted (Watchman: ICE 100%, TEE 92%), mean device size (ICE 29 ± 1 mm, TEE 28 ± 1 mm, p = NS), and implantation success rates (ICE 95 vs. TEE 97%) were comparable, with no device embolizations in either group. None of the ICE-guided procedures required general anesthesia nor sedation. Acute postprocedural complications were less frequent with ICE (1 minor venous access hematoma without transfusion) compared to TEE (4 pericardial effusions requiring percutaneous intervention and 3 vascular access complications, one of which major). However, all major complications occurred up to early 2015, during the initial phase of the LAAO program. After LAAO, DAPT was the preferred strategy in the TEE group, followed by VKA and aspirin, while in the ICE group, DAPT was the predominant choice (p < 0.001). Follow-up analysis is limited by shorter follow-up (24.3 ± 3.5 months) and slightly lower CHA2DS2-VASc score in the ICE group. However, the annual stroke/systemic embolic rate was 1.6%, a 65% to 77% relative risk reduction vs. the expected rate from a CHA2DS2-VASc score of 3 or 4, respectively. Furthermore, the primary safety endpoint occurred at similar rates in both groups. In the ICE group, 2 major bleeding events occurred (gastrointestinal and genitourinary) and 1 minor bleeding event, comparable to the TEE group (Log Rank p = 0.51).

Conclusions: ICE-guided LAAO is a safe and effective alternative to traditional methods, providing comparable outcomes with reduced procedural time without affecting device implantation success rates or efficacy.

CO 42. IMPROVING PATIENT SELECTION FOR PERCUTANEOUS SUTURE-MEDIATED PATENT FORAMEN OVALE CLOSURE: THE SWAT CRITERIA

Inês Gomes Campos[1], Joel Monteiro[1], Bruno Bragança[1], Inês Oliveira[1], Mauro Moreira[1], José Luís Ferraro[1], Ana Rodrigo Costa[1], Rafaela G. Lopes[1], Marta Tavares Silva[2], João Carlos Silva[2], Rui André Rodrigues[2], Aurora Andrade[1]

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Introduction: Percutaneous suture-mediated patent foramen ovale (PFO) closure with NobleStitch EL has demonstrated high immediate success rates and absence of significant procedural complications. However, long-term follow-up results show non-negligible rates of significant (grade > = 2) residual right-to-left shunt (RLS).

Objectives: To identify predictors of significant residual RLS in order to improve patient selection for NobleStitch EL procedure.

Methods: Single-center retrospective observational registry of consecutive patients admitted for PFO closure with NobleStitch EL between January 2020 and September 2024. Patient and baseline PFO echocardiographic characteristics were collected. Patients were followed up to 2.5 years (mean 533 ± 398 days). The primary outcome was significant residual RLS during follow-up. Predictors were identified using logistic regression and were combined in an additive model.

Results: Among 79 patients included (mean age 48.5 ± 12.6 years, 55.7% female), 95% were referred for PFO closure for cryptogenic stroke and transit ischemic attack, with high RoPE score (median 6). PFO was *tunnel-like* in 81.2%, with median length 10.0 mm (IQR 8.3), width 3.0 mm (IQR 2.0) and atrial septal aneurysm in 41.6% of the patients. Baseline spontaneous RLS was present in 87.8% patients. During follow-up, 30 patients (40.0%) had significant residual RLS. The variables identified as predictors for significant residual RLS were presence of *tunnel-like* PFO, PFO width (optimal cutoff ≥ 4 mm), presence of atrial septal aneurysm and presence of baseline spontaneous shunt. An additive model was created – the SWAT criteria (Spontaneous shunt, Width ≥ 4 mm, Aneurysm, Tunnel) – showing very good prediction accuracy (AUC 0.822; 95% IC 0.709-0.935). Patients with SWAT 0 or 1 showed significant lower residual RLS at follow-up than patients with SWAT 3 or 4 (9.1 vs. 78.3%, p < 0.001).

Conclusions: This study represents the largest and longest national registry of patients undergoing PFO closure with NobleStitch EL. Our findings indicate that long-term significant RLS is strongly associated with specific anatomical aspects of the atrial septum, emphasizing the critical role of detailed PFO characterization in suture-mediated closure. The SWAT criteria demonstrated high predictive accuracy for significant residual RLS during follow-up, offering a practical tool for identifying suitable candidates for this procedure.

CO 43. PERCUTANEOUS SUTURE-MEDIATED PATENT FORAMEN OVALE CLOSURE: RESULTS FROM THE LARGEST NATIONAL REGISTRY

Inês Gomes Campos[1], Joel Monteiro[1], Bruno Bragança[1], Inês Oliveira[1], Mauro Moreira[1], José Luís Ferraro[1], Rafaela G. Lopes[1], Ana Rodrigo Costa[1], Marta Tavares Silva[2], João Carlos Silva[2], Rui André Rodrigues[2], Aurora Andrade[1]

[1]Centro Hospitalar do Tâmega e Sousa, EPE/Hospital Padre Américo, Vale do Sousa. [2]Centro Hospitalar de S. João, EPE.

Introduction: Percutaneous suture-mediated patent foramen ovale (PFO) closure with NobleStitch EL has demonstrated high immediate success rates and absence of significant procedural complications. However, data on long-term outcomes remain scarce.

Objectives: To assess the efficacy and long-term safety profile of NobleStitch EL procedure.

Methods: Single-center retrospective observational registry of consecutive patients admitted for PFO closure with NobleStitch EL between January 2020 and September 2024. Patient and baseline PFO echocardiographic characteristics were collected. Patients were followed up to 2.5 years (mean 533 ± 398 days) and recurrence of cerebral events, incidence of atrial fibrillation, residual right-to-left shunt (RLS) and need for additional PFO intervention were recorded.

Results: Among 79 patients included (mean age 48.5 ± 12.6 years, 55.7% female), 95% were referred for PFO closure for cryptogenic stroke and transit ischemic attack (TIA), with high RoPE score (median 6). PFO was *tunnel-like* in 81.2%, with median length 10.0 mm (IQR 8.3), width 3.0 mm (IQR 2.0) and atrial septal aneurysm in 41.6%. Baseline spontaneous RLS was present in 87.8% patients. Two stitches were used in 7 patients and one of them had a device implanted due to significant residual RLS (grade ≥ 2) at the end of the procedure. Three procedural complications occurred: 1 groin hematoma, 1 TIA and 1 iatrogenic atrial septal defect that had a device implanted 2 days later. During follow-up, 30 patients (40.0%) had significant residual RLS and 28 (35.4%) were submitted to a new procedure: device implantation in 20 patients, additional suture in 2 patients, surgical closure in 1 patient and 5 patients were awaiting reintervention. The mechanisms of ineffective closure most frequently reported were partial detachment (60.9%) and atrial septal tear (21.7%). There were 3 cases of late PFO reopening, one of them with recurrence of PFO-related stroke that had a device implanted 3 months later. No patient had atrial fibrillation.

Table 1: Baseline characteristics of the study population (n=79).

General characteristics	Results
Age (years) - mean ± SD	48.5 ±12.6
Female gender - n (%)	44 (55.7)
Medical history - n (%)	
Hypertension	21 (26.6)
Diabetes mellitus	4 (5.1)
Dyslipidemia	47 (59.5)
Smoker	25 (31.6)
Overweight and Obesity	51 (64.6)
Family history of CAD	2 (2.5)
Migraine	1 (1.3)
Autoimmune disease	3 (3.8)
Thrombophilia	8 (10.1)
Cancer	3 (3.8)
PFO closure indication	
Cryptogenic stroke	71 (89.9)
Transient ischemic attack	4 (5.1)
Cardiovascular event	2 (2.5)
Platypnea-orthodeoxia syndrome	2 (2.5)
RoPE Score - median (IQR)	6 (2.0)
PFO echocardiographic characteristics	
Tunnel-like - n (%)	56 (81.2)
PFO length (mm) - median (IQR)	10.0 (8.3)
PFO width (mm) - median (IQR)	3.0 (2.0)
Spontaneous RLS - n (%)	65 (87.8)
Eustachian valve - n (%)	22 (28.6)
Chiari network - n (%)	2 (2.6)
Atrial septal aneurysm - n (%)	32 (41.6)

Legend: CAD - Coronary artery disease. IQR - Interquartile range. PFO - Patent foramen ovale. RoPE - Risk of peripheral embolism. RLS - Right-to-left-shunt. SD - Standard deviation.

Conclusions: This study represents the largest and longest national registry of patients submitted to PFO closure with NobleStitch EL. This suture-mediated technique was shown to be safe, though associated with a non-negligible rate of shunt patency or PFO reopening during follow-up, requiring re-intervention with another suture or device. This highlights the need for better patient selection and the importance of longer follow-up.

CO 44. TRANSCATHETER PULMONARY VALVE IMPLANTATION EXPERIENCE IN A PORTUGUESE CONGENITAL HEART DISEASE CENTER

Ana Isabel Pinho, Ana Filipa Amador, Marisa Pereira, João Carlos Silva, Jorge Moreira, Edite Pereira, Maria João Baptista, Sofia Granja, Carla Sousa, Rui André Rodrigues, Cristina Cruz

Centro Hospitalar Universitário de S. João, EPE.

Introduction: Right ventricular outflow tract (RVOT) obstruction occurs in various congenital heart defects. Following surgical repair, patients often experience residual pulmonic stenosis and/or insufficiency in the native outflow tract or the right ventricle to pulmonary artery (RV-to-PA) conduit. As an alternative to surgical pulmonary valve replacement (PVR), the introduction of transcatheter pulmonary valve implantation (TPVI) at the early 2000 has provided a less invasive treatment option.

Objectives: To analyse the indications, procedure-related characteristics and follow up of patients submitted to TPVI in a Portuguese Congenital Heart Disease Reference Center (start of program in 2015).

Results: Twenty-two patients were proposed and assessed as fit to TPVI; mean age 25.3 years-old (range 10-51 years-old), 11 (50%) were male, 2 patients had DiGeorge Syndrome. The primary diagnosis were: Tetralogy of Fallot (45.5%), Truncus Arteriosus (31.8%), pulmonary stenosis related to D-transposition of the great arteries (18.2%) and to double outlet right ventricle (4.5%). Mean number of open-heart surgeries was 1.6; there was RV-to-PA conduits in 12 patients, patch-extended RVOT in 9 and 1 patient had previously implanted a percutaneous pulmonary valve. Primary indication for TPVI was stenosis (45.4%), followed by regurgitation (40.9%) and mixed lesion in 13.6%. All patients underwent general anaesthesia and femoral access; 20 completed implantation with success; one procedure was aborted due to coronary anatomy (risk of left main artery occlusion) and another was interrupted due to obstruction of right pulmonary artery after RVOT stenting. Pre-stenting was performed in 16 patients, with a mean number of 1.9 (range 1-5) stents. Regarding the type of valve, 90% were balloon expandable (11 Melody, 4 MyVal and 3 Sapiens) and the remaining 2 patients had an auto expandable Vennus Valve implanted. Complications were registered in 3 (13.6%) patients – 1 had obstruction of PA branches with need for surgical intervention, 1 had balloon rupture retrieved percutaneously, and another suffered bleeding from vascular access, managed conservatively. During a mean follow-up time of 3.8 years, there were no deaths nor valve thrombosis; one patient with Melody valve had stent fracture. Four patients evolved with moderate pulmonary stenosis, asymptomatic. Three patients had late endocarditis of prosthesis, all treated with antibiotic and surgical PVR.

Conclusions: In this cohort, TPVI procedure had few complications and the short-medium term outcomes were favourable. Questions over endocarditis risk still prevail in the TPVI population and there is need for head-to-head comparisons to PVR.

CO 45. TO STENT OR NOT TO STENT IN TRUE BIFURCATION: WHAT IS THE BEST APPROACH FOR THE SIDE BRANCH IN A LEFT MAIN ARTERY BIFURCATION?

Rita Louro, Marta Figueiredo, Rafael Viana, Orlando Luquengo, António Almeida, Miguel Carias, Tânia Enereciano, David Neves, Ângela Bento, Renato Fernandes, Gustavo Sá Mendes, Lino Patrício

Hospital Évora.

Introduction: The left main (LM) bifurcation supplies the left ventricle, and effective management of the side branch necessitates a well-considered intervention technique. The gold standard for these lesions is the provisional

Primary Outcomes

Primary outcome, n (%)	Provisional stent (n=36)			Drug eluting balloon (n=10)			Two-stent (n=6)		
	Total @ FUP 18 (35.0)	6 month	12 month	Total @ FUP 19 +16.2	6 month	12 month	Total @ FUP 55 (135.0)	6 month	12 month
Death from cardiovascular causes, myocardial infarction, stroke, or target lesion revascularization	14 (38.9)	9 (25.0)	12 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	4 (66.7)	2 (33.3)	2 (33.3)
Components of primary outcome, n (%)	2								
Death from cardiovascular causes	8 (25.8)	6 (16.7)	7 (19.4)	0 (0.0)	0 (0.0)	0 (0.0)	2 (33.3)	2 (33.3)	2 (33.3)
Myocardial infarction	5 (16.7)	2 (22.2)	4 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (50.0)	0 (0.0)	0 (0.0)
Stroke	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Target lesion revascularization (TLR)	4 (13.3)	0 (0.0)	4 (13.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (50.0)	0 (0.0)	0 (0.0)

Total @ FUP, presented in month as median (IQR) for PS and 2S and as mean+SD for DEB

Figure CO 45

stenting (PS) technique, however, in LM robust evidence comparing PS or two stent (2S) technique is scarce. New approaches such as drug-eluting balloons (DEB) offer promising alternatives, warranting further data comparing strategies.

Methods: Retrospective analysis, in a single centre between 2011 and 2024, of patients with true bifurcation of LM treated percutaneously (Medina 101, 111 or 011) to evaluate the non-inferiority strategy of side branch DEB versus PS and 2S techniques. Patients were allocated into 3 groups based on the side branch intervention: PS, 2S, or DEB. The primary outcome was composed of cardiovascular death, myocardial infarction (MI), stroke or target lesion revascularization (TLR). Secondary outcomes were length of stay, in-hospital mortality and total death.

Results: A total of 113 patients underwent a percutaneous approach for bifurcating LM disease, 52 of those had side branch evolvement and were included in this analysis. A total 36 patients underwent PS, 10 DEB, and 6 a 2S strategy. Regarding baseline characteristics, the SYNTAX score and the presentation (acute versus chronic coronary syndromes) were similar across groups. DEB group included older patients (82.1 ± 4.1 vs. 70.6 ± 9.4). DEB group experienced no events during the follow-up period (FUP). In contrast, the PS and 2S groups had higher cardiovascular death and myocardial infarction (table). In the PS and 2S groups, most events occurred in early FUP (@1 year), reinforcing the favourable outcomes of DEB, with a median FUP of 19 months. The Kaplan-Meier curve illustrates superior survival in the drug-eluting balloon group compared to the other strategies.

Conclusions: Treating the LM bifurcation side branches remains a nuanced decision. This cohort study, illustrating our experience on LM true bifurcating lesions, DEB demonstrated non-inferiority of DEB strategy compared to PS and 2S, with no MACE during FUP, while providing complete revascularization of bifurcation in a safer mode with less foreign material. The sample size is small, as this represents an initial experience with DEB in the lateral vessel, with larger populations required to validate these findings and refine treatment strategies for LM bifurcations.

Sábado, 12 Abril de 2025 | 08:00-09:00

Sala Arrábida | Sessão de Comunicações Orais 10 – Doença cardiovascular em doentes oncológicos e anticoagulação

CO 46. CLINICAL OUTCOMES OF TAVI IN PATIENTS WITH ACTIVE CANCER – A BRIDGE TO SUCCESS?

Rita Almeida Carvalho[1], Luís Raposo[1], João Vítor Slaviero[2], Ana Duarte Mendes[3], Francisco Albuquerque[1], Catarina Brízido[1], Pedro de Araújo Gonçalves[1], Henrique Mesquita Gabriel[1], João Brito[1], Marisa Trabulo[1], Rui Campante Teles[1], Manuel Almeida[1]

[1]Hospital Santa Cruz ULSLO. [2]Instituto de Cardiologia de Porto Alegre. [3]Hospital Fernando Fonseca, EPE.

Introduction and objectives: Oncologic disease is an increasingly prevalent condition that introduces additional challenges for transcatheter aortic valve intervention (TAVI) due to associated comorbidities and its impact on long-term outcomes. This study assessed the prognosis of patients with active cancer and concomitant aortic stenosis (AS) deemed eligible for TAVI.

Methods: Retrospective single-center study of patients with active cancer - defined as malignancy undergoing treatment, planned for treatment, or with treatment completed within one year - who underwent TAVI between November 2008 and October 2024. Eligible patients had severe AS or bioprosthetic valve dysfunction and underwent either transcatheter aortic valve replacement (TAVR) or balloon aortic valvuloplasty (BAV), with BAV used as a bridging procedure in cases of uncertain prognosis. Data on
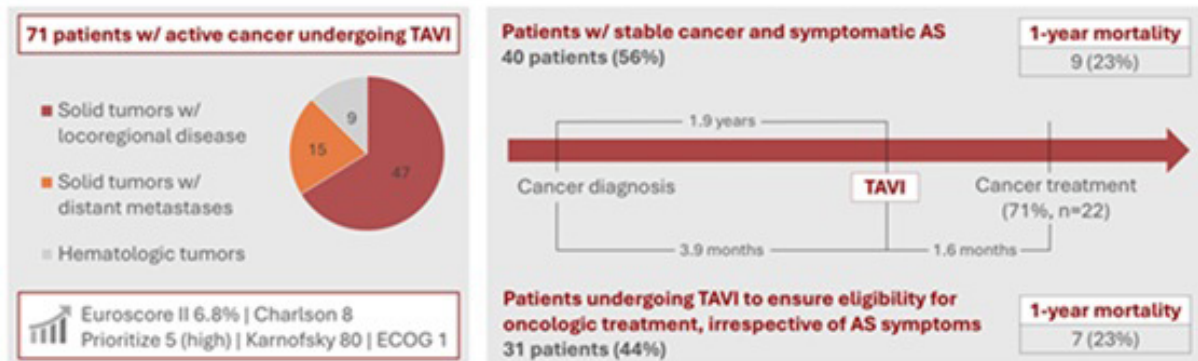

Figure 1. Timeline of median times to TAVI, oncologic treatments, and outcomes in patients with active cancer undergoing TAVI.

Figure CO 46

demographics, clinical and echocardiographic parameters, malignancy characteristics, procedural details, and follow-up outcomes were analyzed. **Results:** Among 2,185 TAVI patients, 71 (3.2%) had active cancer (mean age 77 ± 15 years; 51% male). Most had solid tumors (87%, n = 62), predominantly gastrointestinal (31%, n = 22) and prostate (16%, n = 11). Cancer stages included localized (stage 1/2 40%, n = 28), locoregionally advanced (24%, n = 17), and metastatic disease (21%, n = 15). Patients had high surgical risk and significant comorbidities (mean EuroSCORE II 6.8 ± 7.0%; Charlson index 8.0 ± 1.8; Karnofsky score 80 ± 12). Bleeding was a common cancer-related symptom (25%, n = 18), particularly in gastrointestinal cancers (15%, n = 11). The mean aortic gradient was 45.9 ± 11.1 mmHg, and 17% (n = 12) had left ventricular ejection fraction < 40%. Most were severely symptomatic (NYHA III/IV 52%, n = 37) with a median NT-proBNP of 1,959 pg/mL (IQR 815-4,064). In 40 patients (56%) with stable cancer and symptomatic AS, TAVR was performed at a median of 1.9 years (IQR 1.0-1.7) after cancer diagnosis. In this group, 23% (n = 9) died within the first-year post-procedure. The remaining 31 patients (44%) had recent cancer diagnoses prior to TAVI (median 3.9 months, IQR 2.9-7.0), and intervention was conducted to ensure eligibility for oncologic treatment regardless of AS symptoms. In this group, BAV was initially performed in 12 patients, with 7 subsequently undergoing TAVR after a median of 8.4 months (IQR 7.6-10.3). Following TAVI, 71% (n = 22) received oncologic treatment, primarily surgery (29%, n = 9). In this subset, 23% (n = 7) died within the first-year post-procedure. Overall mortality was 23% at 1 year and 44% over a median follow-up of 1.4 years (IQR 0.5-2.5), with a median survival of 11.5 months (IQR 3.7-24.6). **Conclusions:** Careful patient selection and a multidisciplinary approach are crucial for optimizing outcomes in patients with active cancer undergoing TAVI. Further research is needed to evaluate long-term outcomes in this population.

CO 47. CLOSING THE GAP: LEFT ATRIAL APPENDAGE OCCLUSION IN ATRIAL FIBRILLATION PATIENTS WITH CANCER

Sofia Esteves, Miguel Nobre Menezes, Catarina Santos Gregório, Ana Abrantes, Ana Rita Francisco, Catarina Simões Oliveira, Tiago Rodrigues, João Silva Marques, Gustavo Lima da Silva, João de Sousa, Pedro Pinto Cardoso, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Left atrial appendage occlusion (LAAO) is increasingly used to prevent stroke in patients with atrial fibrillation (AF), particularly those with contraindications to long-term anticoagulation. This approach is particularly relevant for cancer patients, who face a high risk of thromboembolic events and potential complications from anticoagulant therapy. However, data on LAAO in this population are limited.
Objectives: To evaluate the safety and efficacy of LAAO in cancer patients with AF compared to those without cancer.
Methods: A single-center retrospective study of patients who underwent percutaneous LAAO between November 2009 and December 2024. Procedure details, complications, CHA2DS2-VASc, and HAS-BLED scores were analyzed. Adjustments for these scores ensured comparable groups. Efficacy was defined as stroke, systemic embolism, or all-cause death. Safety endpoints included procedural complications and major bleeding events. Kaplan-Meier survival analysis was performed to evaluate efficacy and safety outcomes.
Results: Among 215 patients, 42 had a history of cancer (13 gastrointestinal, 10 hematologic, 4 genitourinary). Of these, 15.9% had active cancer, while 84.1% had previous cancer. The mean age was 74.4 ± 1.2 years, with 36% male; 55% had permanent AF, and 36% had a prior stroke. Median CHA2DS2-VASc and HAS-BLED scores were comparable between groups (4.1 ± 0.2 vs. 4.1 ± 0.1, p = NS; 3.2 ± 0.2 vs. 3.0 ± 0.1, p = NS). Referral reasons for LAAO in cancer patients included gastrointestinal bleeding (41%), high bleeding risk (14%), and anemia (10%). The procedure duration was 86.9 ± 5.2 minutes, with a 92.9% success rate, similar to non-cancer patients. Watchman devices were implanted in 39 patients, Amulet devices in the rest, with an average size of 27 ± 1 mm (p = NS). No acute procedural complications were observed in cancer patients. After the procedure, 26% of patients were on therapy with VKAs and aspirin (used until 2014), 46% were on dual antiplatelet therapy, and 14% were on NOACs, with no differences the two groups. Major bleeding events occurred in 2 patients (1 genitourinary, 1 gastrointestinal), while minor bleeding events were reported in 7 cases (9 events in cancer patients vs. 22 events in non-cancer patients, p = 0.12), as defined by the VARC 3 criteria. During a follow-up of 52.8 ± 7.8 months, 18 cancer patients died (none from cardiovascular causes), and 1 patient had an ischemic stroke, representing 0.4% of the patients. No significant differences were found between cancer and non-cancer patients regarding safety (LogRank p = 0.44) or efficacy outcomes (LogRank p = 0.11).
Conclusions: In real-world practice, LAAO is a safe and effective option for cancer patients with AF, with outcomes similar to non-cancer patients. It should be considered a valuable strategy for managing these high-risk patients.

		Patients with Cancer	Other patients	P-value
		(N=42)	(N=173)	
Baseline demographics				
Age, years		74.4±1.2	74.5±0.7	NS
Male gender, n (%)		27 (64)	110 (64)	NS
Arterial hypertension, n (%)		37 (89)	162 (94)	NS
Diabetes, n (%)		13 (31)	53 (31)	NS
Previous stroke, n (%)		15 (36)	65 (38)	NS
CHA₂DS₂-VASc score		4.1±0.2	4.1±0.1	NS
HAS-BLED score		3.2±0.2	3.0±0.1	NS
Acute success, n (%)		39 (92.9)	168 (97.2)	NS
Acute complications, n (%)		0	8 (4.6)	NS
Hemorrhagic events, n (%)		9 (21)	22 (13)	NS
	Minor bleeding	7 (17)	21 (12)	NS
	Major bleeding	2 (5)	1 (2)	NS
Ischemic events, n (%)		1 (0.4)	11 (6)	NS
	Stroke	1 (0.4)	7 (4)	NS
	Other embolic event	0	4 (2)	NS

Table 1 - Comparison of baseline demographics, procedure time, success rates, complications, and long-term safety and efficacy between cancer and non-cancer patients who underwent LAAO.
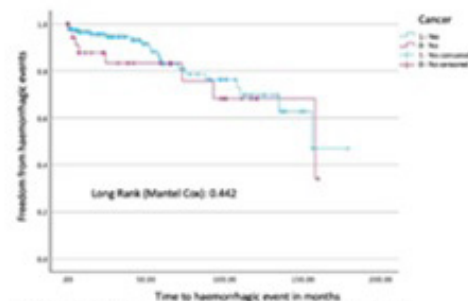

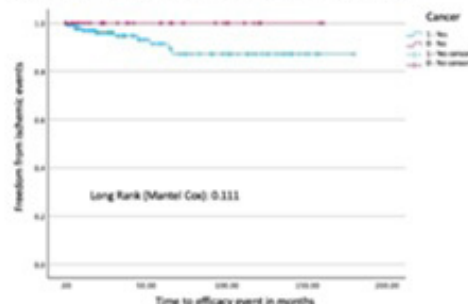Figure 1 - Survival analysis for the safety endpoint according to presence of cancer.

Figure 2 - Survival analysis for the efficacy endpoint according to presence of cancer.

Figure CO 47

CO 48. BODY FAT AS A PREDICTOR OF IMPAIRED CARDIORESPIRATORY FITNESS IN BREAST CANCER PATIENTS TREATED WITH ANTHRACYCLINES

Luísa Pinheiro, Margarida de Castro, Mariana Tinoco, Emídio Mata, Bárbara Lage Garcia, Tamara Pereira, Mário Lourenço, Filipa Castro, Alexandre Teixeira, Gonçalo Torres, Olga Azevedo, António Lourenço

Hospital da Senhora da Oliveira, EPE-Guimarães.

Introduction: Cardiorespiratory fitness (CRF), indicated by peak oxygen consumption (Vo2peak), is a strong predictor of quality of life, heart failure (HF) and mortality in cancer patients. Anthracycline chemotherapy (AC) is known to reduce CRF, independently from left ventricular ejection fraction (LVEF) and global longitudinal strain (GLS). Non-cardiac mechanisms underlying this decline in CRF remain however unclear. Body composition, which can be affected by cancer/cancer treatment-induced metabolic changes, may influence physical activity and clinical outcomes. Therefore, assessing body composition may provide valuable insights into the factors contributing to impaired CRF in breast cancer (BC) patients treated with AC.

Objectives: To evaluate the impact of AC in body composition of BC patients and to assess whether body composition these changes after AC are associated with impaired CRF.

Methods: A prospective study was conducted in women diagnosed with BC undergoing AC. Participants were assessed at two time points: before AC and twelve months post-AC. During each visit, cardiopulmonary exercise testing (CPET) was performed to measure CRF, and body composition was analysed using Bioelectric impedance analysis (BIA). Functional disability (FD) was defined as a Vo2peak ≤ 18.0 mL/kg/min.

Results: A total of 32 women were included in the study. FD increased significantly over time, from 9% prior to AC to 44% one month after AC and 53% six months post-AC. Before AC, patients with FD, had a significantly higher body mass index (BMI) (35.3 ± 1.0 vs. 26.2 ± 3.2 kg/m^2, $p < 0.001$), as well as higher body fat (39.5 ± 5.6 vs. 23.4 ± 6.3 kg, $p < 0.001$) and visceral fat levels (18.3 ± 2.1 vs. 10.4 ± 3.7, $p = 0.001$). Twelve months after AC, patients with FD also exhibited higher body fat and visceral fat levels (27.9 ± 9.1 vs. 21.9 ± 5.5 kg, $p = 0.034$; 14.2 ± 6.2 vs. 9.4 ± 3.6, $p = 0.013$). A significant association was found between body fat and Vo2peak, with body fat being independently associated to lower Vo2peak (each unit increase in body fat was associated with a decrease of -0.146 in Vo2peak, $p = 0.004$).

Conclusions: This study underscores the multifactorial nature of impaired CRF in BC patients undergoing AC. Body fat is independently and inversely associated with Vo2peak, highlighting the importance of non-cardiac factors, such as body composition, when evaluating CRF in this population. Further research is needed to better understand the impact of body composition on the overall health and physical performance of BC patients treated with AC.

CO 49. META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS ON THE EFFICACY OF DIRECT ORAL ANTICOAGULANTS IN LEFT VENTRICULAR THROMBOSIS: AN UPDATED PERSPECTIVE

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

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

Introduction: Left ventricular thrombus (LVT) secondary to left ventricular dysfunction represents a clinical challenge with profound implications for patient morbidity and mortality. A substantial body of evidence has emerged on this topic. However, much of it is derived from observational studies, which lack randomization and consequently impose significant limitations. In line with this, the 2023 guidelines for Acute Coronary Syndrome recommend the use of direct oral anticoagulants (DOACs) or warfarin for LVT management, yet this recommendation is based on a single randomized controlled trial (RCT) with limited data, hindering critical analysis.

Objectives: Conduct a systematic review and meta-analysis to assess the efficacy and safety profile of DOACs compared with warfarin in the management of LVT.

Methods: We systematically searched the Cochrane Controlled Register of Trials, EMBASE, and PubMed, focusing exclusively on RCTs. We sought studies comparing the use of DOACs, without restrictions on active principles, against warfarin. The primary outcomes were overall thrombus resolution and major bleeding events, while secondary endpoints included all-cause mortality and stroke. We pooled dichotomous data using odds ratios (OR) to describe effect sizes, employing the Mantel-Haenszel procedure within a random-effects model, with a 95% confidence interval. Heterogeneity was assessed statistically using the I^2 index (< 25% low, 25-50% moderate, > 50% high heterogeneity).
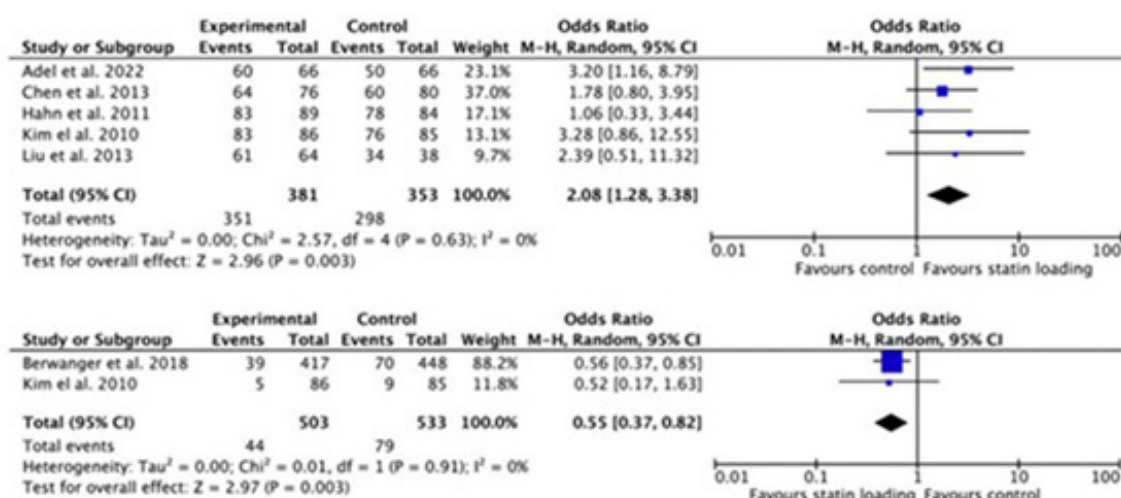

Image 1. Forest plot graphics of the analysed outcomes. 1.1 Post-percutaneous coronary intervention Thrombolysis In Myocardial Infarction flow 3; 1.2 Major Adverse Cardiovascular Events, defined as cardiovascular death, nonfatal myocardial infarction, or nonfatal stroke within 30 days.
CI – Confidence interval. M-H – Mantel-Haenszel.

Figure CO 49

Results: Of the 290 records identified, 7 studies were included, providing data on 530 patients. Our meta-analysis revealed no significant differences in overall LVT resolution (pooled OR 1.52 [0.97, 2.36], p = 0.92, I² = 0), despite a trend favoring the DOAC group. Additionally, no differences were observed between groups regarding major bleeding events (pooled OR 0.51 [0.17, 1.52], p = 0.47, I² = 0). Furthermore, no differences were found regarding all-cause mortality (pooled OR 0.70 [0.20, 2.42], p = 0.57, I² = 0) or stroke (pooled OR 0.56 [0.12, 2.57], p = 0.42, I² = 0).

Conclusions: This meta-analysis indicates that DOACs are effective and safe alternatives to warfarin in the management of LVT. The advantages of DOACs, including their oral administration and ease of management, make them a more favourable option in contemporary clinical practice. Nevertheless, further large RCTs are necessary to further elucidate their role and optimize treatment strategies in this patient population.

CO 50. INAPPROPRIATE DIRECT ORAL ANTICOAGULANT DOSING IN ATRIAL FIBRILLATION: A PORTUGUESE SINGLE-CENTER STUDY

Inês Brito e Cruz, Daniela Maurício, Ana Margarida Coutinho, Rita Bertão Ventura, Mafalda Griné, Tomás Carlos, Luísa Gomes Rocha, Maria João Primo, Didier Martinez, Luís Leite, Lino Gonçalves

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

Introduction: Direct Oral Anticoagulants (DOACs) are the first-line treatment in Atrial Fibrillation (AF). These therapies require dose adjustments based on factors such as age, renal function, body weight, and drug-drug interactions, increasing the risk of inappropriate dosing. Multiple studies showed that incorrect dosing regimens, whether under or overdosing, are associated with increased morbidity and mortality. This study aimed to evaluate the prevalence of inappropriate DOAC dosing and assess the association between the type of DOAC and dosing appropriateness in a cohort of AF patients.

Cohort Characterization per DOAC dose
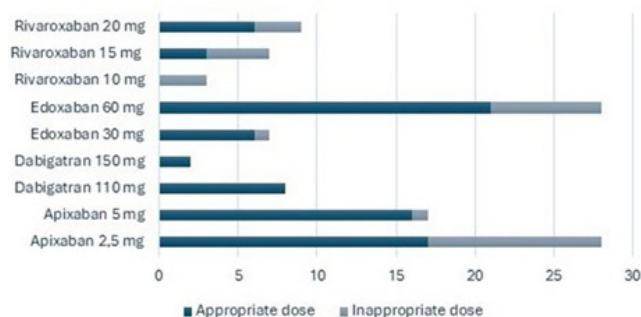
Percentage of dose appropriateness per DOAC type
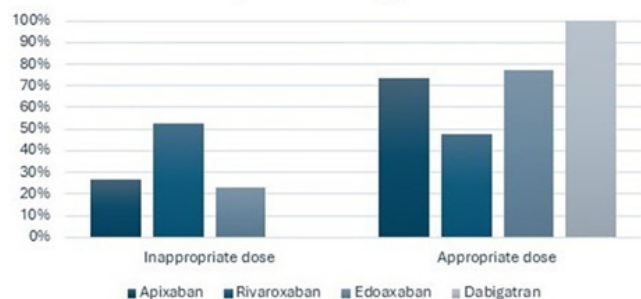
Methods: A single-center retrospective study reviewed 685 patients who underwent an electrocardiogram in the emergency department between March 24 and March 30, 2024. Among these, 141 patients were identified as having either known or newly diagnosed AF. Patients were excluded if they were on warfarin, died during hospitalization, experienced major bleeding, had incomplete data. Those with specific conditions such as an estimated glomerular filtration rate < 15 or total dependency were also excluded, resulting in 109 eligible patients. Dosing appropriateness was assessed according to the European Society of Cardiology guidelines 2024 for AF.

Results: The cohort included 109 patients with AF (mean age 80.8 ± 11.8 years, 64% female) receiving DOACs: apixaban (n = 45, 41%), edoxaban (n = 35, 32%), rivaroxaban (n = 19, 17%) and dabigatran (n = 10, 9%). Inappropriate dosing was observed in 30 patients (28%), of whom 19 (63%) were underdosed and 11 (37%) were overdosed. Apixaban accounted for the highest number of inappropriate doses (n = 12, 9 underdoses, 3 overdoses). Rivaroxaban had 10 inappropriate doses (6 underdoses, 4 overdoses), while edoxaban had 8 (1 underdose, 7 overdoses). Notably, no inappropriate doses were observed with dabigatran. A chi-square test revealed a significant association between the type of DOAC and dosing appropriateness (p = 0.017). Furthermore, the type of DOAC was also statistically significant for both underdosing (p = 0.001) and overdosing (p = 0.001) within the inappropriate dosing group.

Conclusions: This single-center study highlights that inappropriate DOAC dosing is a prevalent issue in clinical practice, particularly as underdosing. These findings underscore the importance of careful dosing and monitoring of DOAC regimens to minimize errors and reduce the risk of adverse outcomes in AF patients.

Sábado, 12 Abril de 2025 | 08:00-09:00

Sala D. Luís | Sessão de Comunicações Orais 11– Avanços na gestão da insuficiência cardíaca

CO 51. INTERMITTENT LEVOSIMENDAN AND SURVIVAL OUTCOMES IN ADVANCED HEART FAILURE: A REAL-WORLD, SINGLE-CENTRE STUDY

João Fernandes Pedro[1], Catarina Gregório[1], Ana Abrantes[1], Fátima Salazar[2], Ana Francês[2], Rafael Santos[1], Joana Rigueira[1], Doroteia Silva[1], Nuno Lousada[1], Fausto J. Pinto[1], Dulce Brito[1], João R. Agostinho[1]

[1]Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa. [2]Cardiology Department, Hospital de Santa Maria (ULS Santa Maria).

Introduction: Previous studies suggest that intermittent levosimendan administration (iLev) in patients with advanced heart failure (HF) may be associated with a reduction in HF admissions, however its impact on survival is still not well established.

Objectives: The aim of this study was to evaluate the prognostic impact of intermittent levosimendan administration in a cohort of patients with advanced heart failure.

Methods: Single-center, prospective, one-arm study of consecutive advanced HF patients who received iLev therapy at a tertiary hospital. The total number of HF admissions after iLev initiation was compared to the number of HF admissions that occurred in the exact same time period before starting iLev for each patient. The impact of iLev in survival was assessed by comparing the predicted life expectancy (PLE) at baseline estimated by the Seattle Heart Failure Model (SHFM) with the observed

survival. For patients that have not surpassed their PLE nor died at the end of follow-up, a PLE recalculation was performed and the PLE difference was used to evaluate the survival benefit. Left ventricle (LV) assist device implant and heart transplant dates were considered the end of follow-up in patients that undergone these procedures. Wilcoxon test, Kaplan-Meier and Cox regression analyses were used to assess the prognostic impact of iLev.

Results: The study included 34 advanced HF patients - 79.4% male; median age of 68 (IQR 63-73) years; baseline LV ejection fraction of 24% (IQR 16%-27%); mostly in NYHA Class III (82.4%). The median follow-up time was 1.3 years (IQR 0.7-2.7 years). Of these, 35.3% surpassed their PLE, 32.4% died before reaching it and 32.3% were still alive but had not yet reached it. The median PLE determined by the SHFM at baseline was 30.5 (IQR 21-44) months and the observed survival or recalculated PLE at the end of follow-up was 39.5 (IQR 11-54.25) months. Survival analysis demonstrated that patients receiving iLev had a significantly better survival probability when compared to their baseline predicted survival (HR 0.409; 95%CI 0.224-0.747; p = 0.004) (Figure 1). iLev was also associated with a reduction in the total number of HF admissions: 4 admissions/patient/year before iLev Vs. 2 HF admissions/patient/year (p < 0.001).

Time to CV death

HR 0,409 (95%CI 0.224-0.747; p=0.004)

After iLev
Before iLev
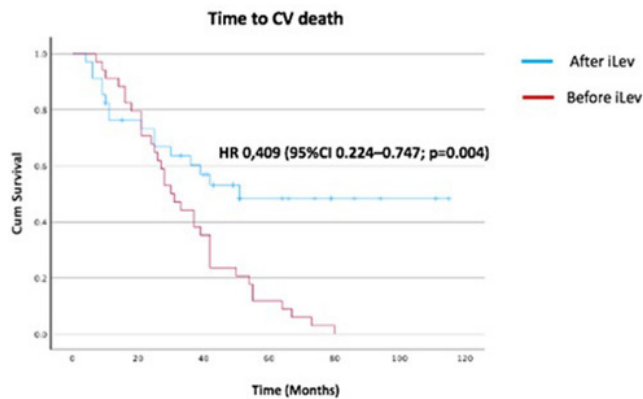
Conclusions: Intermittent levosimendan administration may be associated with improved survival and with a reduction in HF admissions in advanced HF patients, highlighting its role as a supporting therapy in a particular subset of patients with highly complex clinical needs and a lack of readily available effective therapeutic options.

CO 52. IMPACT OF FUNCTIONAL MITRAL REGURGITATION ON OUTCOMES FOLLOWING CARDIAC RESYNCHRONIZATION THERAPY FOR HEART FAILURE

Isabel Martins Moreira, Marta Catarina Bernardo, Luís Sousa Azevedo, Isabel Nóbrega Fernandes, José P. Guimarães, Sílvia Leão, Renato Margato, José Paulo Fontes, Inês Silveira, Ilídio Moreira

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

Introduction: Functional mitral regurgitation (FMR) is common in heart failure (HF) patients undergoing cardiac resynchronization therapy (CRT). Although CRT can improve FMR, the long-term evolution and prognostic significance of FMR post-CRT remain unclear.

Objectives: This study aims to evaluate the prevalence, evolution, and prognostic impact of FMR in HF patients undergoing CRT.

Methods: We conducted a single-center retrospective study of consecutive patients who underwent CRT implantation between January 2017 and April 2024. Echocardiographic assessments were performed at baseline and 6-12 months post-CRT. FMR severity was classified as mild, moderate or severe, according to quantitative and qualitative methods, and FMR improvement was defined as a reduction of ≥ 1 grade in MR class. Patients with a ≥ 15% reduction in left ventricle end-systolic

volume (LVESV) or a ≥ 10% increase in left ventricle ejection fraction (LVEF) were considered responders to CRT. The primary endpoint was major adverse cardiac events (MACE), including cardiovascular mortality or HF hospitalization.

Results: A total of 206 patients (median age 74 [IQR 66-79] years, 68.4% male, 67.5% non-ischemic etiology, 88.7% NYHA class II-III) were evaluated. At baseline, FMR was present in 152 patients (55.3% mild, 34.2% moderate, 10.5% severe), with a total of 68 patients having significant FMR (moderate or severe). Significant FMR was more common in older patients (74.0 vs. 71.5 years, p = 0.012) and women (54.9 vs. 36.0%, p = 0.024). At 1-year follow-up, FMR improved in 59.6% of patients with significant FMR. As expected, these patients exhibited better CRT response (90.3 vs. 60.0%, p = 0.015), lower LVESV (65 [43-96] ml vs. 128 [101-169] ml) and lower proBNP levels (567 [277-1,692] pg/mL vs. 4071 [1,203-9,351] pg/mL, p < 0.001). During a mean follow-up of 35 ± 24 months, 18 (8.7%) patients died from cardiovascular causes and 44 (21.4%) experienced MACE. Persistent significant FMR post-CRT was associated with an increased risk of MACE, after adjusting for CRT response (HR: 4.369, 95%CI 1.425-13.398, p = 0.01).

Significant mitral regurgitation post-CRT
No significant MR
Significant MR

p=0,01
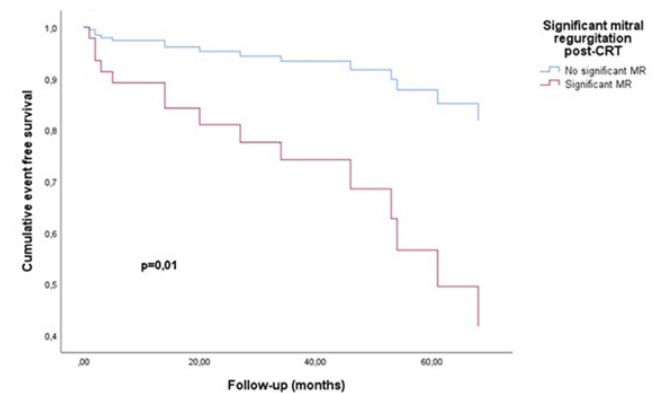
Conclusions: In this study, 59.6% of patients experienced FMR improvement, which correlated with better therapeutic response and prognosis. In contrast, persistent significant FMR post-CRT was associated with a higher incidence of MACE, regardless of CRT responsiveness. These findings highlight the need for closer follow-up and the importance of considering valvular interventions in patients with persistent FMR post-CRT.

CO 53. CRT-P VS. CRT-D IN NON-ISCHEMIC CARDIOMYOPATHY: STILL A MATTER OF DEBATE

Marta Catarina Bernardo, Isabel Martins Moreira, Luís Sousa Azevedo, Isabel Nóbrega Fernandes, José P. Guimarães, Sílvia Leão, Renato Margato, José Paulo Fontes, Pedro Mateus, Sofia Silva Carvalho, José Ilídio Moreira

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

Introduction: Cardiac resynchronization therapy (CRT) is a treatment with proven evidence in patients with heart failure and desynchrony. However, adding a defibrillator in patients with non-ischemic cardiomyopathy (NICM) is still a matter of debate and there are no clear recommendations about it.

Objectives: To compare a population of patients (pts) with NICM that received CRT-D with the ones that received CRT-P in terms of basal characteristics, implant complications and clinical evolution.

Methods: Retrospective study of consecutive pts with NICM and a left ventricular ejection fraction (LVEF) ≤ 35% submitted to CRT implantation in a single centre between 2017 to 2024. The primary outcome was all-cause death and the secondary outcome was cardiovascular (CV) death. Response to CRT was defined as ≥ 10% improvement in LVEF or ≥ 15% reduction in left ventricular end systolic volume.

Results: Out of a total of 221 pts, we included 91 pts, 58.2% male, median age 73.0 (IQR 36-87) years. The rate of success of transvenous implantation was 96.7% and the remaining pts implanted epicardial lead. Pts who implanted CRT-D were significantly younger (67 (IQR 36-84) years vs. 78 (IQR 51-87) years (p < 0.001)). We found no significant differences between groups in terms of cardiovascular risk factors, rates of atrial fibrillation (37 vs. 33%, p = 0.75) or chronic kidney disease (p = 0.08). Both groups had similar LVEF (26 ± 5 vs. 27 ± 5%, p = 0.31) as well as rates of left bundle branch block (65 vs. 61%, p = 0.64). The pro-BNP of the CRT-P group was significantly higher compared to CRT-D group (1,760 (129- 8,761) pg/ml vs. 3546 (IQR 418-15,115) pg/ml, p = 0.004). There were no differences between the two groups in complications, namely hematoma (p = 0.46), infection (p = 0.38) or lead dislodgement (p = 0.84). During a median follow-up of 39 (IQR 17-61) months, 20 (22%) patients died (55% of CV causes), 10 (11.0%) had ventricular tachycardia/ appropriate therapy and 88% presented echocardiographic response to CRT. There were no differences between the groups in all-cause death (18 vs. 28%, p = 0.78) or CV death (14 vs. 10%, p = 0.62). In a multivariate analysis, after adjusting for age and pro-BNP, the implantation of a defibrillator didn't reduce all-cause mortality (HR: 1.23; 95%CI: 0.50-3.18, p = 0.62) (Figure 1) or CV mortality (HR: 1.8; 95%CI: 0.53-6.21, p = 0.35) (Figure 2).
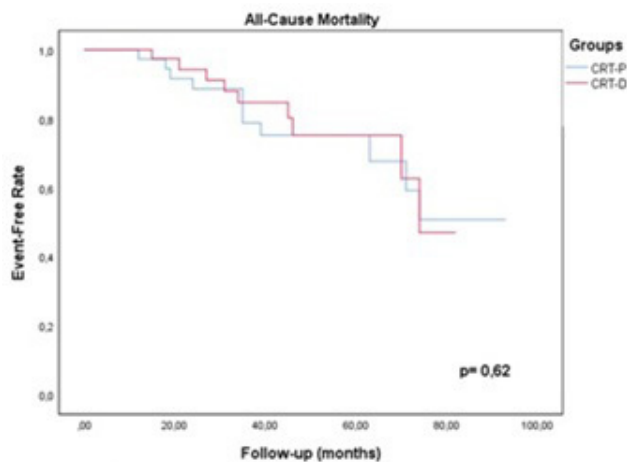
Figure 1- Kaplan-Meier curve for all-cause mortality.
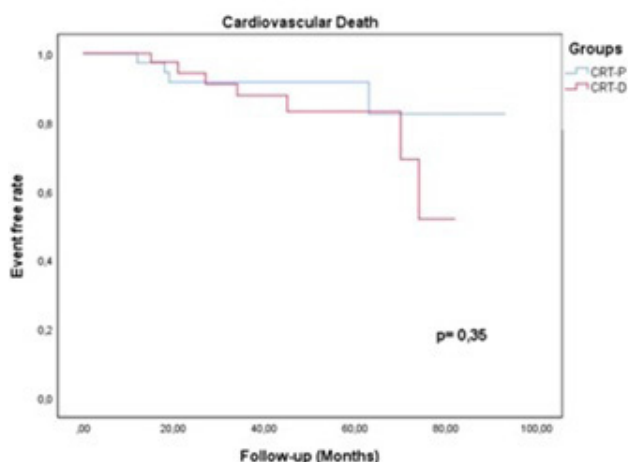
Figure 2- Kaplan-Meier curve for cardiovascular death.

Conclusions: In our population of pts with NICM and a LVEF ≤ 35% and an indication to CRT, the addition of a defibrillator lead was not significantly associated with a reduction in all-cause mortality or cardiovascular mortality, suggesting the need to improve risk stratification to identify the best candidates for CRT-D implantation in this setting.

CO 54. THE RELATIONSHIP BETWEEN SEX AND CARDIAC RESYNCHRONIZATION THERAPY: WHAT ABOUT WOMEN?

Marta Catarina Bernardo, Isabel Martins Moreira, Luís Sousa Azevedo, Isabel Nóbrega Fernandes, José P. Guimarães, Sílvia Leão, Renato Margato, José Paulo Fontes, Pedro Mateus, Sofia Silva Carvalho, José Ilídio Moreira

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

Introduction: Women are underrepresented in cardiac resynchronization trials; however, they have been shown to derive a greater benefit from CRT compared to men.
Objectives: To determine sex-specific differences in CRT in our population.
Methods: Single center retrospective study of patients (pts) submitted CRT implantation between 2017 and 2024. Echocardiographic CRT response was defined as a reduction in left ventricular end-systolic volume (LVESV) ≥ 15% or an improvement in LVEF ≥ 10%. Superresponse was defined as an increase in LVEF ≥ 20% or a reduction in LVESV ≥ 30%. The mean follow-up time was 36.3 ± 23.9 months.
Results: We included 182 pts, 69% males, age 74 (IQR 66-79) years, median LVEF 29% (IQR 25-33). Males had higher rate of tobacco use (38 vs. 7%, p < 0.005), obstructive sleep apnoea (12 vs. 2%, p = 0.026) and previous stroke (14 vs. 0%, p = 0.003). Ischemic aetiology was significantly more common in males (40 vs. 18%, p = 0.003), who also had higher rates of obstructive coronary disease (63 vs. 34%, p = 0.005) and prior revascularization (43 vs. 20%, p = 0.003). Women were more likely to present with left bundle branch block (51 vs. 78%, p 0.001). The mean QRS duration was 161 ± 28 ms with no differences between sexes. Women presented with higher NHYA functional class (NHYA Class III-IV in 35 vs. 53%, p = 0.029). No differences in LVEF between groups. Men had higher prevalence of valvular prostheses (14 vs. 4%, p = 0.047), and more dilated ventricles (mean left ventricular end-diastolic volume: 107 ± 35 ml/m2 vs. 93 ± 39 ml/m^2, p = 0.003; mean left ventricle diameter: 65 ± 8 mm vs. 61 ± 7 mm, p = 0.005). There were no significant differences in pre-CRT medication use, although men showed a trend toward higher use of sacubitril-valsartan (41.3 vs. 26.8%, p = 0.06). Women had higher CRT response rates compared to men (70 vs. 89%, p = 0.01) and were more likely to achieve superresponse (55 vs. 80%, p = 0.003). In multivariate analysis, after adjusting for possible confounders, female sex was an independent predictor of CRT response (HR 4.2, 95%CI: 1.4-12.4, p = 0.008). Regarding clinical evolution, there were no differences in heart failure hospitalizations (log-rank p = 0.92), but higher rates of cardiovascular mortality in men (12.8 vs. 3.6%, log-rank p = 0.035).
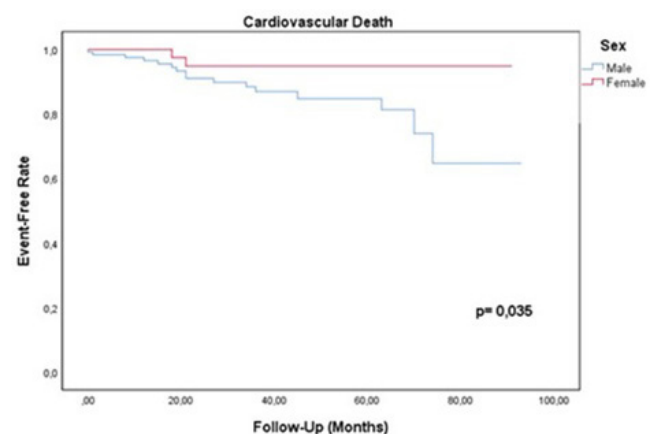
Conclusions: In our cohort, women showed significantly higher response rates to cardiac resynchronization therapy (CRT) and better clinical outcomes. Despite having less dilated ventricles and larger QRS widths, female gender was independently associated with improved CRT response. The higher prevalence of ischemic aetiology may contribute the poorer prognosis in males. These findings highlight the importance of increasing female representation in CRT trials and further investigating sex-specific factors affecting CRT outcomes.

CO 55. REDUCING THE BURDEN OF ADVANCED HEART FAILURE: A CLINICAL AND ECONOMICAL ANALYSIS OF AN INTERMITTENT LEVOSIMENDAN PROGRAMME

João Fernandes Pedro[1], Catarina Gregório[1], Ana Abrantes[1], Fátima Salazar[2], Ana Francês[2], Rafael Santos[1], Joana Rigueira[1], Doroteia Silva[1], Nuno Lousada[1], Fausto J. Pinto[1], Dulce Brito[1], João R. Agostinho[1]

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

Introduction: Advanced heart failure (HF) entails a high economic burden, mainly due to the frequent hospitalizations and emergency department (ER) visits that patients require. Previous studies suggest that intermittent levosimendan administrations (iLev) can reduce this economic burden by reducing HF-related admissions.

Objectives: To assess the impact of intermittent levosimendan treatment in the heart failure related economic burden in patients with advanced heart failure.

Methods: One-arm, prospective, single-center study of consecutive advanced heart failure patients receiving iLev at a tertiary hospital. The total number of HF-related hospitalizations and ER visits since iLev initiation and in the exact same time frame before iLev and the total number of iLev administrations, either as a 24-hour inpatient or a 6-hour outpatient administration were recorded. Cost analysis was based on standardized Ministry of Health rates for HF-related hospitalizations, ER visits and 6-hour day care hospital visits and the price of a levosimendan dose. Wilcoxon Signed-Rank Test was used for comparison.

Results: Over a 6-year period, 283 levosimendan infusions were administered to 34 patients, including 142 inpatient 24-hour infusions and 141 outpatient infusions. The median age was 68 (IQR 63-73) years, and the median left ventricle ejection fraction was 24% (IQR 16-27%). The median follow-up was 1.3 years (IQR 0.7-2.7 years). Within this time frame, the median number of admissions per patient before iLev was 4 (IQR 2-5) and after iLev, 2 (IQR1-3). The median number of ER visits before iLev was 5 (IQR 3-14) and 2 [IQR 1-5] after iLev. A significant reduction in both HF-related hospitalizations (p < 0.001) and ER visits (p < 0.001) after iLev initiation was observed. The mean cost per patient before treatment was €17,298.00 (IQR €8,957-23,696) and €10,682.50 (IQR €6,268-18,540) after iLev, representing a significant reduction in costs (p = 0.010). In the deterministic analysis, the mean total savings per patient after starting iLev was - €4,112.76.

Conclusions: Intermittent levosimendan infusions in patients with advanced HF resulted in a reduction in heart failure related hospital admissions, emergency department visits and overall healthcare costs. These results suggest that intermittent Levosimendan administration may be cost-effective and may generate important savings when used in a well select population with advanced heart failure.

Sábado, 12 Abril de 2025 | 08:00-09:00

Sala D. Maria | Sessão de Comunicações Orais 12 – Avanços em ablação: técnicas, ferramentas e resultados

CO 56. ZERO-FLUOROSCOPY ATRIAL FIBRILLATION ABLATION: INITIAL EXPERIENCE IN A SINGLE-CENTER COHORT

Miguel Sobral Domingues, Joana Certo Pereira, Francisco Moscoso Costa, Daniel Gomes, Gustavo Rodrigues, Daniel Matos, João Carmo, Pedro Galvão Santos, Pedro Carmo, Francisco Morgado, Diogo Cavaco, Pedro Adragão

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

Introduction: Zero-fluoroscopy (ZF) atrial fibrillation (AF) ablation is an innovative technique, combining intracardiac echocardiography (ICE) and mapping systems to avoid radiation exposure for both patients and physicians.

Objectives: This study aimed to describe a single-center experience with ZF AF ablation, focusing on procedural techniques, immediate success rates, and safety outcomes.

Methods: Retrospective data were collected for consecutive ZF ablation procedures performed between October 2023 and December 2024. A descriptive and statistical analysis was conducted for procedural features, immediate efficacy, and safety outcomes.
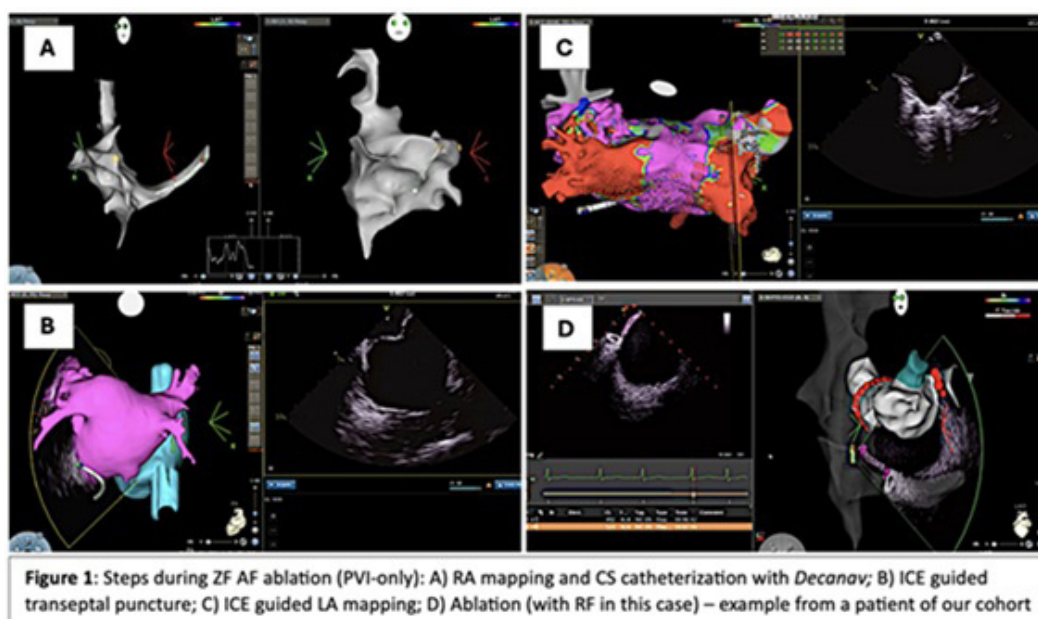

Figure 1: Steps during ZF AF ablation (PVI-only): A) RA mapping and CS catheterization with *Decanav;* B) ICE guided transeptal puncture; C) ICE guided LA mapping; D) Ablation (with RF in this case) – example from a patient of our cohort

Figure CO 56

Results: During the study period, 44 ZF ablation procedures were performed, including 22 AF ablation cases (60% male; mean age: 59 years). Paroxysmal AF accounted for 80% of cases and persistent AF for 20%. This represented 2% of the total AF ablation cohort (n = 758) during the same period. All patients underwent right atrial mapping and coronary sinus catheterization using a *Decanav* catheter. Transseptal puncture and left atrial mapping were guided by intracardiac echocardiography (ICE) with *CARTO 3* (n = 20) and *Ensite NavX* (n = 2) mapping systems. *Cartosound FAM* IA based module was employed for anatomical mapping in 50% of cases (n = 11). Complete pulmonary vein isolation (PVI) was achieved in all patients, with additional linear ablation performed in 4 cases. Radiofrequency was used in 14 patients (64%) and pulse field ablation (PFA) in 8 patients (36%). Among PFA cases, *VARIPULSE* ablation catheter was used in 5 patients and *FARAPULSE* in 3 patients. Sinus rhythm was restored in 85% of cases, with 15% requiring electrical cardioversion. For cases with PVI-only, median left-sided catheter dwelling time and total procedure time were comparable to the global AF ablation cohort (46 min [IQR 38-58] vs. 55 min [IQR 44-72] and 78 min [IQR 73-115] vs. 79 min [IQR 63-106]; both, p > 0.05). No complications, including cardiac tamponade, stroke, or major vascular hemorrhage, were reported.

Conclusions: Our findings demonstrate the feasibility of ZF AF ablation, achieving radiation-free procedures with high safety and efficacy. Complete pulmonary vein isolation was successful in all cases, with no significant increase in procedure duration compared to standard fluoroscopy-guided ablation. This technique offers a promising and safer alternative for the treatment of AF, for both patients and physicians.

CO 57. PULSED FIELD ABLATION: A NEW STANDARD FOR SINGLE-SHOT ATRIAL FIBRILLATION ABLATION

Ana Lobato de Faria Abrantes, Miguel Azaredo Raposo, Catarina Gregório, João Cravo, Ana Bernardes, Joana Brito, Nelson Cunha, Afonso Nunes Ferreira, Gustavo Lima da Silva, Nuno Cortez-Dias, Fausto J. Pinto, João de Sousa

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Pulsed field ablation (PFA) induces cell death through electroporation, offering a potentially safer and more effective method for atrial fibrillation (AF) ablation.

Objectives: To compare the acute and long-term efficacy, safety, and procedural duration of PFA and cryoablation (CA) for pulmonary vein isolation (PVI).

Methods: This single-center, prospective study included AF patients (pts) undergoing PVI with either PFA (Farapulse system) or CA from January 2023 to November 2024. Ablation included cavotricuspid isthmus (CTI) ablation for pts with concomitant atrial flutter (AFL). Groups were matched using propensity scores based on AF type and CHA_2DS_2-VASc scores. Acute success was defined as complete PVI. Safety was assessed by major/minor complications, and procedural duration was defined as the total skin-to-skin time. Kaplan-Meier survival analysis was used to compare the long-term efficacy, defined as freedom from AF, or atrial tachycardia post a 90-day blanking period.

Results: Of 315 pts undergoing PVI, 204 were matched (1:1): 64% male, 66 ± 13 years, CHA_2DS_2-VASc 2.4 ± 1.3, with paroxysmal (69%), short-duration (14%), or long-standing persistent AF (15%). Acute success (PFA: 99 vs. CA: 96%), major (PFA: 2 vs. CA: 1%) and minor complications (PFA: 1 vs. 5%) showed no significant differences (Table 1). Procedure time, which included CTI ablation in 20%, was shorter with PFA (55 ± 25 vs. 84 ± 28 min, p < 0.001) with similar fluoroscopy times (Table 1). One PFA pt died from femoral hemorrhage within 30 days. Over a 469 ± 19 days median follow-up, long-term efficacy showed no significant difference (PFA: 72 vs. CA: 66%) (Table 2).

Conclusions: PFA is an innovative technology for rapid PVI with comparable safety and efficacy, establishing it as the preferred single-shot AF ablation technique.

CO 58. ELECTROPHYSIOLOGICAL CHARACTERIZATION OF TACHYCARDIA CIRCUIT AND UNDERLYING SUBSTRATE IN ATYPICAL ATRIAL FLUTTERS

Guilherme Portugal[1], Mariana Pereira[2], Pedro Silva Cunha[1], Bruno Valente[1], Hélder Santos[1], Sofia Jacinto[1], Inês Neves[1], Rui Cruz Ferreira[1], Mário Martins Oliveira[1]

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

Introduction: Atypical atrial flutter (AFL) is an uncommon arrythmia due to an underlying atrial electrophysiological substrate which may be idiopathic or related to previous interventions. Data is lacking on the electrophysiological characterization of AFL circuits, which may help in the understanding of this complex arrhythmia.

Methods: Consecutive patients submitted to atypical atrial flutter ablation in a tertiary center were included. Only patients where the entire circuit

Safety outcome, n	PFA (N= 102)	CA (N=102)	pValue
Any major complication			
Hemopericardium	2	0	NS
Stroke	0	1	NS
Retroperitoneal bleeding	0	0	NS
Any minor complication			
Vascular access	1	2	NS
Transient phrenic nerve palsy	0	1	NS
Pericarditis	0	2	NS

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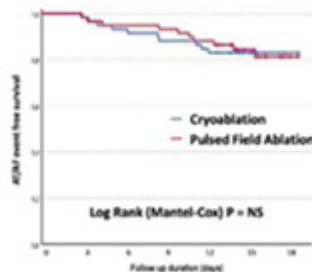

Table 2: Comparison of pulsed field ablation to cryoablation regarding acute regarding long-term efficacy
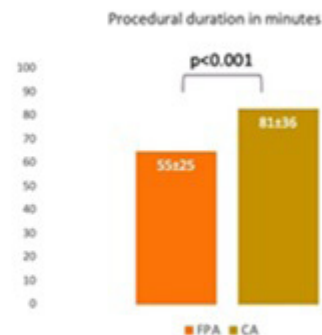
Procedural duration in minutes

p<0.001

55±25 · 81±36

■ FPA ■ CA

Table 3: Comparison of pulsed field ablation to cryoablation regarding procedural duration.

Figure CO 57

was mapped were included in the final analysis. The activation map was divided in 10 isochronal segments; after analysis of the tachycardia circuit, each segment was categorized as common isthmus or as outer loop. The propagation velocity was manually calculated for each segment. In addition, the presence of atrial substrate, defined as bipolar voltage < 0.3 mV, was assessed for each tachycardia component and calculated as a percentage of the total area of the circuit segment.

Results: 25 AFL circuits in 21 patients were analyzed, with a mean cycle length 280 ± 46 ms. All 21 patients had circuits related with low atrial voltage areas, which were due to previous intervention in 54% and spontaneous in 46%. The mechanism was microreentry in 12% and macroreentry in 88%, with 3,577 ± 1,911 points per activation map. The tachycardia was mapped to the left atrium in 72%, right atrium in 24% and was biatrial in 1 case; 11 circuits were single-loop, 14 were double loop and 1 was triple-loop. A total of 355 AFL segments were assessed of which 56 corresponded to the common isthmus and 299 to an outer loop; each circuit had a mean of 4 isthmus and 6 outer loop segments. Wavespeed velocity was 0.56 ± 0.37 m/s and did not differ between isthmus and outer loop (0.54 vs. 0.56, p = 0.73); a representative chart plotting the wavespeed for the different circuit isochrones is presented on Figure 1. The mean length of the tachycardia isthmus was 56 ± 27 vs. 116 ± 42 mm for the outer loop (p < 0.001). At multivariate regression analysis, critical isthmus segments were predicted by a smaller isochronal area (OR 1.15, CI 1.10-1.20, p < 0.001) and higher percentage of fibrosis (OR 7.3, CI 1.2-45, p = 0.03).
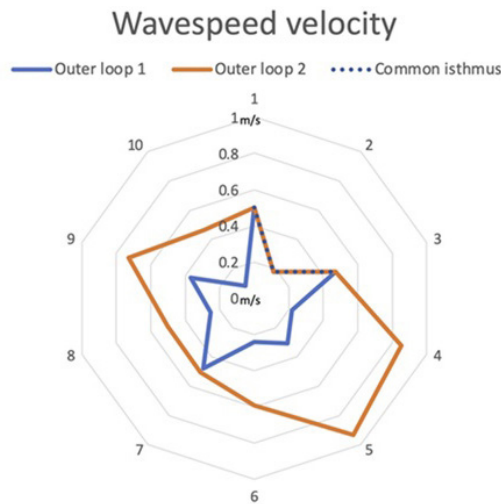
Markers 1 through 10 are consecutive isochrones and corresponding wavespeed of the circuit segment in a representative activation map

Conclusions: AFL circuits are invariably related to atrial substrate. Most circuits are complex, consisting of 2 or more loops. The critical isthmus has similar wavespeed velocity to the remaining tachycardia circuit but is more commonly found in narrow areas with high percentage of atrial fibrosis.

CO 59. VALIDATION OF IMAGELESS ELECTROCARDIOGRAPHIC IMAGING FOR ACCESSORY PATHWAY LOCALISATION IN WPW SYNDROME

Sofia Monteiro[1], Jana Reventós Presmanes[2], Marta Martínez Pérez[3], Guilherme Portugal[1], Guilherme Lourenço[1], Pedro Silva Cunha[1], Andreu Climent[3], Mário Oliveira[1], Sérgio Laranjo[1]

[1]Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Santa Marta. [2]Hospital Clínic Barcelona, Institut Clínic Cardiovascular (ICCV). [3]Universitat Politècnica de Valencia, ITACA, Valencia.

Introduction and objectives: Catheter ablation is the definitive treatment for Wolff-Parkinson-White (WPW) syndrome, where precise preprocedural localisation of accessory pathways (APs) is critical to optimise outcomes and reduce procedural time. Traditional imaging and ECG techniques often fall short, particularly for septal APs. This study evaluated the diagnostic accuracy of an imageless electrocardiographic imaging (ECGi) system that does not require additional CT or MRI in localising APs for targeted ablation.

Methods: In this single-centre prospective study, adult and paediatric patients with WPW syndrome referred for AP ablation were consecutively enrolled. Non-invasive electroanatomic mapping was conducted using an imageless ECGi system, which uses a 128-electrode array to record body-surface potentials, a 3D torso model generated via a structured light camera, and an artificial intelligence algorithm to estimate the patient's biventricular geometry. Epicardial electrograms were computed to obtain epicardial ventricular activation maps. The atrioventricular junction was divided into 11 regions using a modified Pappone classification to support AP localisation, with only the pathway responsible for ventricular pre-excitation being analysed in patients with multiple APs. The differential diagnostic capacity of the 12-lead ECG and ECGi was assessed by comparing the predicted AP locations with the ablation sites in invasive electroanatomical mapping (EAM) across three endpoints: (1) localisation within the same region, (2) within the same or adjacent regions, and (3) correct laterality (right, left, or septal).

Results: The study included 14 adult patients (mean age: 34.4 ± 16.4 years, 71.4% male) and six paediatric patients (mean age: 14.3 ± 0.71 years, 100% male). AP distribution included eleven septal pathways, eight left-sided pathways, and 1 Mahaim fibre. ECGi achieved a global accuracy rate of 80.0% in precisely localising APs to the correctly predefined AV region. When allowing for localisation in the adjacent area, the accuracy improved to 95.0%, and the accuracy in identifying laterality (right, left, or septal) was 90.0%. Notably, all mislocalizations were confined to septal pathways, suggesting the potential limitations of the current ECGi configuration in these complex anatomical regions. ECGi's diagnostic capacity was significantly superior to the 12-lead ECG (p < 0.05), which achieved an average accuracy of 45% for precise AP localisation, 70% when including the adjacent region, and 72.5% for laterality.
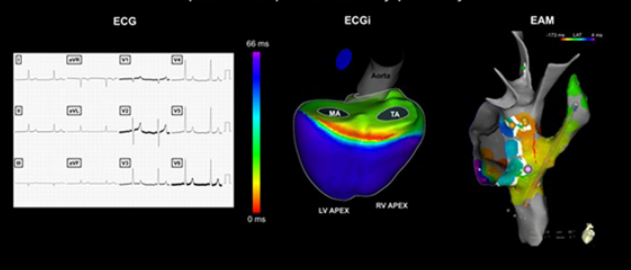

Accessory pathway locations distribution and confusion matrix with ECGi accuracy per region
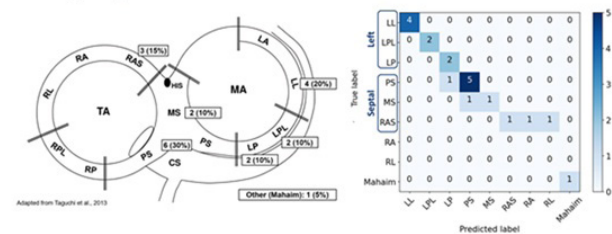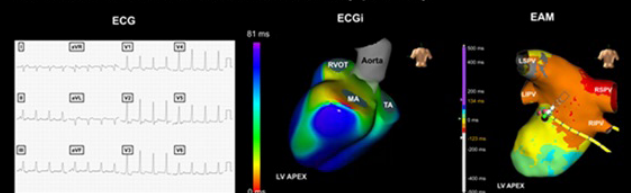
Conclusions: ECGi demonstrates a higher accuracy than the 12-lead ECG for AP localisation in WPW syndrome, supporting its use as a diagnostic tool for pre-ablation planning. Future integration of endocardial and epicardial mapping could improve accuracy for septal APs, further enhancing targeted ablation.

CO 60. LONG-TERM OUTCOMES OF VENTRICULAR TACHYCARDIA ABLATION IN PATIENTS PRESENTING WITH ELECTRICAL STORM
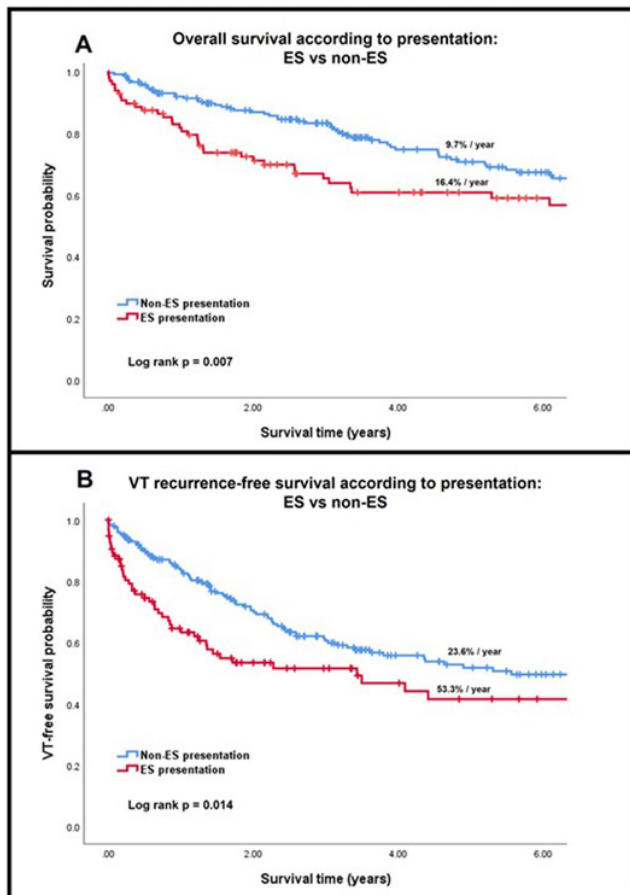
Joana Certo Pereira, Rita Barbosa Sousa, Daniel A. Gomes, Daniel Matos, Gustavo Rodrigues, João Carmo, Pedro Galvão Santos, Pedro Carmo, Francisco Moscoso Costa, Diogo Cavaco, Francisco Belo Morgado, Pedro Adragão

ULS Lisboa Ocidental, Santa Cruz.

Introduction: Catheter ablation (CA) is an established therapy for drug-resistant ventricular tachycardia (VT). Although previous reports suggest higher recurrence and mortality rates in patients presenting with electrical storm (ES), data on mid- and long-term outcomes remain scarce. We aimed to evaluate the clinical characteristics and long-term outcomes of patients presenting with ES undergoing VT ablation.

Methods: Single-centre registry of consecutive patients undergoing scar-related VT ablation from 2010 to 2024. ES was defined as ≥ 3 episodes of sustained VT or ventricular fibrillation in 24h. Clinical and procedural characteristics were assessed and compared between groups. Primary outcomes were VT-free survival and all-cause mortality. Safety outcome was a composite of tamponade, hemodynamic decompensation, acute heart failure, stroke, and procedure-related mortality.

Figure 1. Overall survival and VT recurrence-free survival according to presentation: Electrical Storm versus non-Electrical Storm.

A Overall survival according to presentation: ES vs non-ES

9.7% / year
16.4% / year

Non-ES presentation
ES presentation

Log rank p = 0.007

B VT recurrence-free survival according to presentation: ES vs non-ES

23.6% / year
53.3% / year

Non-ES presentation
ES presentation

Log rank p = 0.014

Results: A total of 298 patients (aged 65 ± 13years, 91% male, mean left ventricular ejection fraction [LVEF] 34 ± 11%, 67% with ischemic cardiomyopathy, 20% redo procedures) were included. ES at presentation was observed in 32% (N = 96). Patients with ES had worse functional status (NYHA III-IV: 38.5 vs. 17.8%, p < 0.001), although there were no differences regarding age, sex, aetiology, and LVEF. Procedure and fluoroscopy duration were similar (165 vs. 154 min, p = 0.20; and 15 vs. 13 min, p = 0.20; respectively), and acute non-inducibility of VT was achieved in 81.4%

(p = 0.772). Overall, the VT ablation approach was endocardial in 83.6% (n = 249), epicardial in 7.3% (n = 22), and combined in 9.1% (n = 27). Major complications were rare, including 2 cases of tamponade, 2 right ventricular punctures, 1 cases of acute heart failure with hemodynamic decompensation, and 2 procedure-related death. The complications rate was higher in the ES group (5.2 vs. 1.0%, p = 0.025). During a median follow-up of 3.4 (IQR 1.4-7.2) years, 127 patients (42.6%) suffered a VT relapse and 104 (34.9%) died. Compared to others, patients presenting with ES had higher rates of VT recurrence (53.3%/year vs. 23.6%/year, log rank p = 0.014) and death (16.4%/year vs. 9.7%/year, log rank p = 0.007) (Figure 1). ES remained independently associated with VT recurrence, even after adjusting for six clinical confounders (aHR 1.50 [95%CI 1.02-2.19], p = 0.039). Non-ischaemic aetiology (aHR 1.79 [95%CI 1.21-2.66], p = 0.004), atrial fibrillation (aHR 1.71 [95%CI 1.17-2.52], p = 0.006) and chronic kidney disease (aHR 1.59 [95%CI 1.08-2.35], p = 0.019) were the other predictors of relapse.

Conclusions: Patients presenting with ES undergoing VT ablation had higher rates of VT recurrence, mortality, and major complications compared to those without ES, even achieving similar acute procedural success. ES was an independent predictor of poorer long-term outcomes, highlighting the need for targeted strategies to improve prognosis in this high-risk population.

Sábado, 12 Abril de 2025 | 08:00-09:00

Sala Infante | Sessão de Comunicações Orais 13 – Fronteiras inovadoras no diagnóstico da doença arterial coronária e avaliação de risco: da imagem avançada aos resultados clínicos

CO 61. DIAGNÓSTICO DE DOENÇA CORONÁRIA ESTÁVEL POR ANGIO TOMOGRAFIA COMPUTADORIZADA COMO EXAME DE PRIMEIRA LINHA: ANÁLISE DE CUSTOS NUM CENTRO DE RESPONSABILIDADE INTEGRADA

Cláudia Russo[1], David Neves[1], Diogo Brás[1], Rita Rocha[1], Ricardo Ribeiro[1], Margarida Figo[1], Carlos Patinho[1], Amílcar Silva[1], Liliana Boieiro[1], Marisa Serrano[1], Sandra Oliveira[2], Lino Patrício[1]

[1]Hospital do Espírito Santo, EPE, Évora. [2]Instituto Politécnico de Santarém.

In the health sector, we must always promote greater efficiency, with a view to reducing failures in the services provided and thus guaranteeing greater quality in the care and treatment of users of the National Health Service (SNS), making correct and efficient use of the scarce resources available to us. In recent years, there has been an increase in cases of acute myocardial infarction (AMI) in the Portuguese population, largely due to cardiovascular risk factors. Most of these cases could have been avoided with good control of these factors, healthy lifestyle habits and early diagnostic imaging. Computed Tomography Angiography of the heart (CT Angiography) has recently emerged and can replace some tests. On its own, it helps to confirm and/or exclude CAD with its ability to detect CAD, calculate the coronary artery calcium score, as well as other cardiac pathologies. It also allows for extracardiac findings of decisive relevance to the patient's prognosis. It is a non-invasive test that is carried out with the injection of iodinated contrast to assess the flow of the arteries. The Centro de Responsabilidade Integrada Cérebro-Cardiovascular do Alentejo (CRIA) has cardiac CT Angiography equipment and aims to increase its capacity for correct diagnosis, reducing the time and waiting list for treatment of CD in the Alentejo. It also aims to reduce healthcare costs. The general aim of the project presented here is to assess whether the implementation of a protocol for the diagnosis and/or exclusion of stable CD, using CT angiography as a first-line test, is economically advantageous. Whether there will be *savings* for the Alentejo

Central Local Health Unit (ULSAC). For this study, a survey was carried out of the number of MCDTs carried out in 2023 for the diagnosis of stable CD, the amount spent by ULSAC on these exams, as well as the amount spent on referring patients abroad for MCDTs that do not exist in this health unit. A survey was carried out of the costs per CT angiography, with human resources and consumables. We projected the amount that would be spent if the number of CT angiograms doubled as proposed by the project, and the amount that would be saved by reducing all other MCDTs by 50% and even eliminating others for the detection of stable CD. With the implementation of this project, it is estimated that ULSAC would *save* €345,045.16/year, but with great clinical benefit.

CO 62. ASSESSMENT OF MYOCARDIAL BLOOD FLOW CHANGES USING [13N]NH3 PET-CT IN CHRONIC TOTAL CORONARY OCCLUSION PATIENTS UNDERGOING PCI

Tomás M. Carlos[1], Inês Brito e Cruz[1], Luís Leite[1], Gustavo Campos[1], Rodolfo Silva[2], Andreia Gomes[2], Miguel Castelo-Branco[2], Antero Abrunhosa[2], Lino Gonçalves[1], Maria João Ferreira[1]

[1]Centro Hospitalar e Universitário de Coimbra/Hospitais da Universidade de Coimbra. [2]Instituto de Ciências Nucleares Aplicadas à Saúde (ICNAS), Coimbra.

Introduction: In chronic total coronary occlusions (CTO) the affected myocardium becomes vascularized by collateral networks from adjacent coronary vessels. The perfusion in the CTO territory is decreased, mainly in stress conditions, but also in remote areas because of the "steal phenomenon". There is limited data about changes in quantitative perfusion in these patients after percutaneous coronary intervention (PCI). Our aim was to assess changes in myocardial blood flow (MBF), measured in $mL.min^{-1}.g^{-1}$, in both CTO and remote myocardium territories after PCI, using $[^{13}N]NH_3$ positron emission tomography computed tomography (PET-CT).
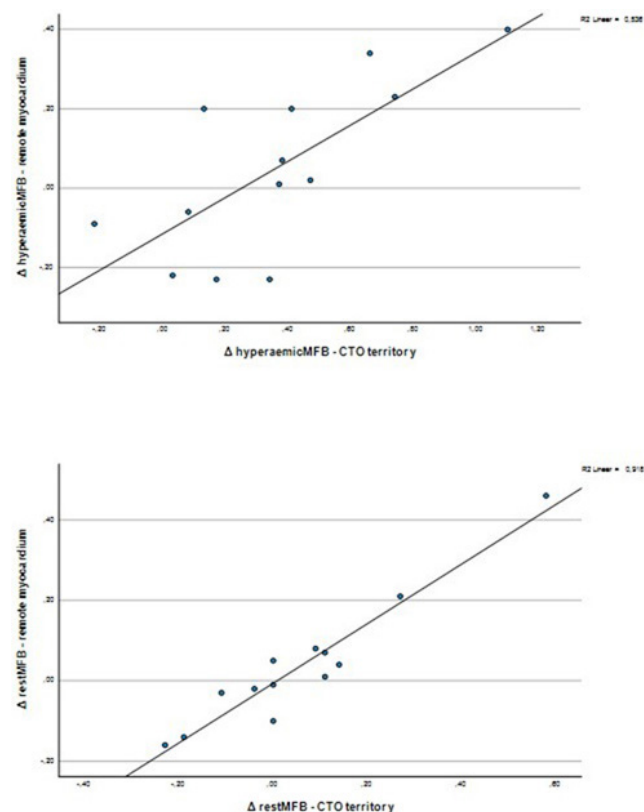
Methods: We performed a single-centre prospective study involving patients with CTO who underwent myocardial quantitative perfusion assessment using $[^{13}N]NH_3$ both before and after PCI. Patients were excluded if they lacked indication for PCI based on current guidelines, had inadequate follow-up, insufficient data or did not complete imaging either before or after the procedure.

Results: Within our cohort of 19 patients with CTO who underwent PCI, 13 were submitted to pre and post- procedural assessment with $[^{13}N]NH_3$ PET-CT. The mean age was 68 years (± 4.3) and 76.9% were male. After PCI, hyperaemic MBF (hMBF) increased in CTO territory (Δ 0.36 ± 0.34, p = 0.003), whereas no statistically significant difference was observed in the remote myocardium (Δ 0.05 ± 0.21, p = 0.423). At rest, MBF (rMBF) did not significantly change after PCI in either CTO territory (Δ 0.06 ± 0.21, *p* = 0.351) or remote myocardium (Δ 0.04 ± 0.16, *p* = 0.444). Myocardial flow reserve also showed no differences between the two groups. Alterations in MBF in the CTO territory exhibited a strong linear correlation with the corresponding changes in the remote myocardium (hMBF: r = 0.732, *p* = 0.004; rMBF: r = 0.958, *p* < 0.001).

Conclusions: PCI reestablishes normal coronary perfusion and may lead to the regression of the collateral network. In our study, myocardial perfusion increased in the CTO territory in stress conditions, with no differences being observed at rest or in the remote myocardium in both conditions. Interestingly, a more significant improvement in CTO territory perfusion was associated with a greater increase in MBF in remote myocardium, likely reflecting the reduction of a previously larger coronary "steal phenomenon" after PCI.

CO 63. ASSOCIATION BETWEEN ABDOMINAL FAT DISTRIBUTION AND SEVERITY OF CORONARY ARTERY DISEASE: DATA FROM A LARGE COHORT OF PATIENTS SUBMITTED TO CARDIAC CT SCAN

Cátia Costa[1], Fábio Sousa Nunes[2], António S. Barros[1], João Manuel Pedrosa[3], Ricardo Fontes-Carvalho[2]

[1]Faculdade de Medicina da Universidade do Porto. [2]Unidade Local de Saúde de Gaia/Espinho. [3]INESC TEC - Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência.

Introduction: Obesity is known as an important risk factor for the development of coronary artery disease (CAD). However, recent studies have suggested that abdominal fat distribution (AFD), such as the ratio between visceral and subcutaneous adipose tissue area, can be a stronger predictor of the presence and severity of CAD.

Objectives: We aimed to evaluate the association between different ratios of AFD, such as subcutaneous adipose tissue volume (SATVol) and visceral adipose tissue volume (VATVol) to Body Mass Index (BMI), SATVol and VATVol to total abdominal volume (AbdVol), and VATVol to SATVol, with CAD severity, assessed by coronary computed tomography angiography (CCTA) and the CAD-RADS classification system.

Methods: Retrospective analysis including 1641 patients who underwent CCTA for CAD assessment (2006-2023). Beyond cardiac CT, all patients acquired a single slice CT scan at abdominal level (L4/L5-S1 level). CAD-RADS data were extracted, and abdominal fat volumes (visceral and subcutaneous) were measured by filtering voxels with attenuation values between -150 and -50 HU. The association between AFD and the CAD-RADS was assessed using Welch's test and pairwise Games-Howell test.

Results: From the 1,641 patients (mean age 57 ± 10 years; 57% male), 62% were classified as CAD-RADS 0, 14% as CAD-RADS 1, 4% as CAD-RADS 2, 13% as CAD-RADS 3, 4% CAD-RADS 4, and 3% as CAD-RADS 5. Overall, an increase in all VATVol ratios was associated with greater CAD severity. The strongest association was observed with VATVol/BMI ratio (p < 0.0001; $\log_e(BF_{01})$ = -59.17), with the mean VATVol/BMI ratio increasing as CAD severity worsened. The second-strongest association with CAD severity was observed with VATVol/AbdVol ratio (p < 0.0001; $\log_e(BF_{01})$ = -47.91), followed by the VATVol/SATVol ratio (p < 0.0001; $\log_e(BF_{01})$ = -43.61). The SATVol/AbdVol ratio inversely correlated with CAD severity (p < 0.0001; $\log_e(BF_{01})$ = -39.96), with its mean decreasing as CAD severity worsened. A similar pattern was observed for the SATVol/BMI ratio, although with a weaker magnitude of evidence (p < 0.0001; $\log_e(BF_{01})$ = -8.31).

Conclusions: This study showed that the pattern of AFD is associated with CAD severity, particularly the ratios of VATVol/BMI and SATVol/AbdVol. These findings highlight the distinct roles of VAT and SAT in cardiovascular
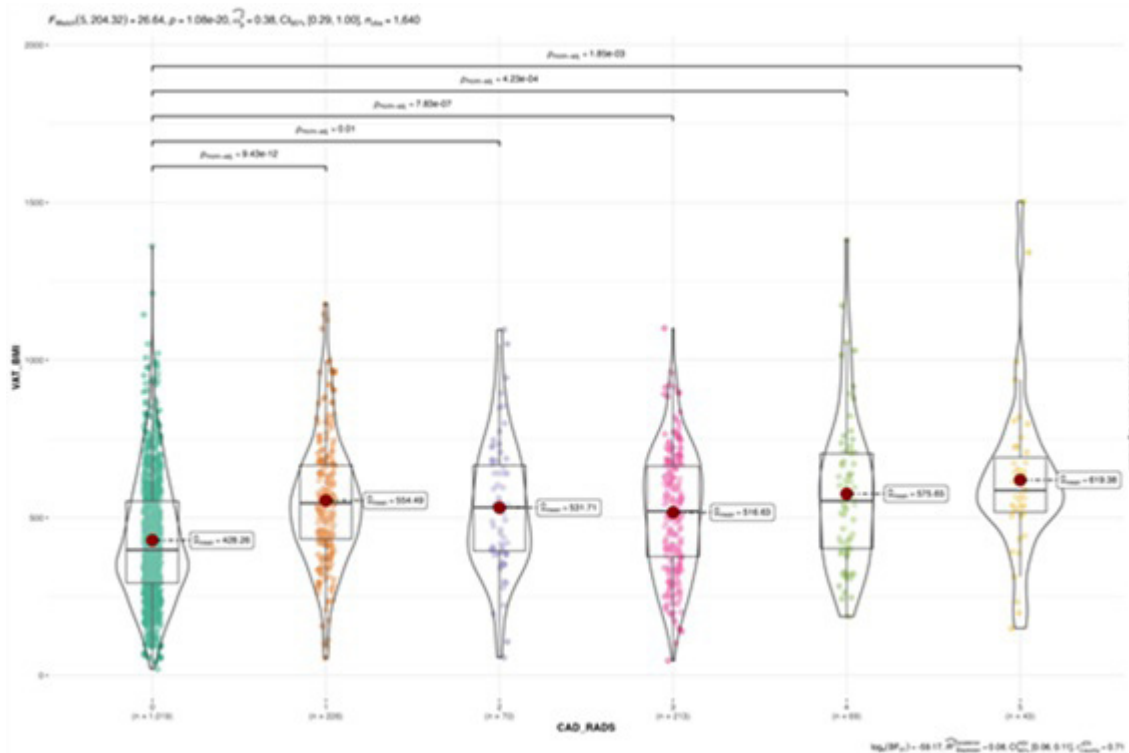
Figure CO 63

risk, with VAT linked to worsening CAD and SAT having a more beneficial metabolic effect. These data can be useful for individualized CAD risk stratification.

CO 64. STRUCTURAL INVASIVELY-ASSESSED CORONARY MICROVASCULAR DYSFUNCTION PHENOTYPE ASSOCIATES WITH THE PRESENCE OF MYOCARDIAL FIBROSIS IN CARDIAC MAGNETIC RESONANCE

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

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

Introduction: Coronary microvascular disfunction (CMD) is related to the affection of the coronary microvasculature, common in hypertrophic cardiomyopathy (HCM). Invasive assessment of CMD through thermodilution methods allows for the calculation of coronary flow reserve (CFR) and index of microvascular resistance (IMR) - categorizing these patients (P) under a functional (low CFR normal IMR) or structural (low CFR high IMR) CMD phenotype. A structural disease phenotype is expected to be associated to myocardial fibrosis - however, this has never been demonstrated.
Objectives: To correlate findings of a structural invasively assessed CMD phenotype with myocardial fibrosis evaluated by cardiac magnetic resonance (CMR).
Methods: In a prospective single-center study, we opportunistically recruited consecutive adult P with an established diagnosis of HCM that had an indication to pursue elective coronarography (Figure 1). 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. P characteristics, coronary hemodynamic invasive assessment, and CMR data with quantification of late gadolinium enhancement (LGE) were obtained. A logistic regression model was used to test the predictive effect of LGE on CMD phenotype.
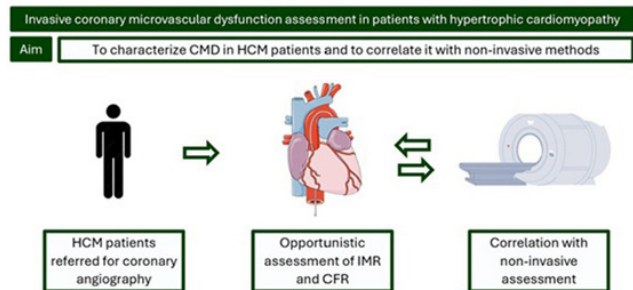

Figure 1 – Study workflow

Results: 34 consecutive P underwent invasive coronary microvascular assessment. Of these 13 P - median age 65 [57-75], 7 (54%) of which female - had a CFR ≤ 2 and CMR with LGE evaluation data available and were therefore included in this analysis (Table 1). Median CFR was 1.5 [1.2-1.5] and median IMR was 19 [14-20]. A total of 3 P (23%) had a phenotype compatible

with structural CMD, with the remaining P presenting a functional CMD phenotype (Table 2). CMR revealed a median 8% [6%-15%] LGE of LV mass quantification. P with a structural CMD phenotype had a statistically significant higher LGE% – median 17% [14-19] vs. 6% [6-8] (Table 3). In a logistical regression model, the LGE% correlated with the presence of a structural CMD phenotype – OR 1.4 (95%CI 1.00-1.96, p = 0.047).

Conclusions: In a prospective cohort of HCM P, an invasively-assessed structural CMD phenotype was associated with the presence of extensive myocardial fibrosis assessed by CMR. A percentual increase in LGE correlated with higher odds of finding a structural CMD phenotype.

CO 65. EPICARDIAL ADIPOSE TISSUE VOLUME ARE RELATED TO SUBCLINICAL ATHEROSCLEROSIS AND MAJOR ADVERSE CARDIAC EVENTS IN ASYMPTOMATIC SUBJECTS

Gonçalo Bettencourt Abreu[1], Isabel Mendonça[2], Débora Sá[1], Francisco Sousa[1], Matilde Ferreira[1], Eva Henriques[2], Sónia Freitas[2], Mariana Rodrigues[2], Sofia Borges[2], António Drummond[2], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

[1]Hospital Dr. Nélio Mendonça. [2]Research Centre Dr.ª Maria Isabel Mendonça, SESARAM EPERAM. [3]Universidade NOVA de Lisboa.

Introduction: Epicardial adipose tissue (EAT) volume is an imaging biomarker to detect individuals with a higher risk of coronary atherosclerosis. Recent research has shown its association with Coronary Artery Disease (CAD) prognosis.

Objectives: We propose to investigate whether CACS and EAT volume are associated in our population and, additionally, study the role of EAT volume alone in preventing overall major cardiovascular events (MACE) in a population free of cardiovascular disease.

Methods: This prospective study included 1,024 participants (58.3 ± 8.4 years; 75.6% male) from a Southern European population without apparent CAD and followed during an extended period (average 6.1 ± 4.8 years). All demographic, biochemical, CV risk factors and clinical data were performed. Non-contrast CT images obtained CACS and EAT, which was measured using a postprocessing workstation-the "TeraRecon Aquarius Workstation". Data were displayed as mean and standard deviation (SD). Student's t-test compared the numerical variables and Chi-square the categorical. Cox regression analysis, entering EAT volume, estimated variables independently associated with prognosis after adjustment to co-variates (age, gender, family history, alcohol, smoking, physical inactivity, body mass index, dyslipidemia and type 2 diabetes). Kaplan-Meier estimated the events-free survival. Statistical significance was defined as p < 0.05, and all analyses were performed using SPSS statistical software version 25.0.

Results: Increased EAT was associated with higher CAC score categories (p < 0.0001). After Cox regression analysis, the increased EAT volume was associated with an adjusted hazard ratio of 1.95 (95%CI: 1.02-3.75; p = 0.044). Higher EAT volumes presented worse survival free of events, when compared to lower EAT volumes.
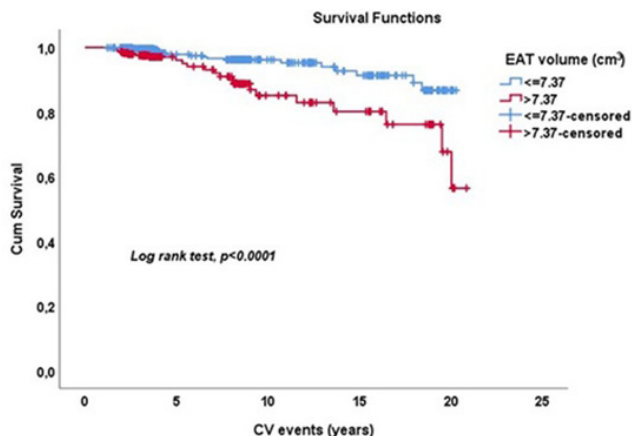
Events-free survival analysis in the patients with low and high EAT volume

Conclusions: Our findings demonstrated that epicardial adipose tissue and CAC score categories are correlated significantly. When used 4,777 independently, EAT volume is a significant risk factor for MACES, and subjects with a high EAT volume had a worse vascular prognosis.

Sábado, 12 Abril de 2025 | 09:00-10:30

Espaço Ágora | Sessão de Comunicações Orais 14 – Prémio Jovem Investigador (Clínica e Básica)

CO 66. ECGI TO GUIDE VT ABLATION IN STRUCTURAL HEART DISEASE

Ana Lobato de Faria Abrantes, Afonso Nunes Ferreira, Catarina Gregório, Miguel Raposo, João Fonseca, Diogo Ferreira, Irina Neves, Joana Brito, Gustavo Lima da Silva, Nuno Cortez-Dias, Fausto J. Pinto, João de Sousa

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: The efficacy of ventricular tachycardia (VT) ablation in patients (pts) with structural heart disease (SHD) remains sub-optimal, due to complex circuits and inability to map the clinical VT. Electrocardiographic imaging (ECGi) may allow to map the clinical VT, facilitating procedural planning. Its use in this specific setting has not been validated.

Objectives: Evaluate the accuracy of EGCi in predicting the area of interest for VT ablation and compare its accuracy with multidetector computed tomography (MDCT) and late gadolinium enhancement cardiac magnetic resonance (LE-CMR).

Methods: This prospective single-center study included pts with SHD referred for VT ablation. All pts underwent pre-procedural MDCT, and 55% also underwent LE-CMR, both segmented with ADAS-VT software. The MDCT area of interest was defined as the region with a wall thickness ≤ 6 mm. The LE-CMR area of interest was defined as the region with pixel signal intensity (PSI) ≥ 40 ± 5%. Heterogeneous tissue corridors were predicted in PSI maps, and their areas were measured. Noninvasive programmed stimulation was performed using a 252-electrode noninvasive 3D mapping system (CardioInsight™) under mild sedation after a 72h anti-arrhythmic drug suspension. The ECGi area of interest was identified as the earliest activated area (initial 20 ± 5 ms since the first dV/dT). MDCT, LE-CMR, and ECGi maps were co-registered and integrated into the electroanatomical mapping (EAM) system for the VT ablation procedure. The area of interest predicted by each pre-procedural planning method was compared to the location of local abnormal ventricular activities (LAVA). In pts in whom the clinical VT was mapped, the VT exit site location was also analyzed.

Results: We studied 20 pts (67 ± 14 years, 90% male, 50% ischemic SHD, LVEF 37 ± 11%). ≥ 1 sustained VT was mapped during the ECGi study in all patients. The median concordance between ECGi and EAM for the delineation of the area of interest for ablation was 61.6% [24.1-73.1] (Figure 1). ECGi correctly predicted the segments displaying LAVAs in 95% of pts, with a discordance of 8 mm in the remaining 5%. Among the various methods, ECGi was the most accurate in predicting the segment of interest for VT ablation, presenting a sensitivity of 92.5 ± 24.5%, specificity of 98.7 ± 2.7%, and accuracy of 98.2 ± 2.8%, p < 0.01 (Figure 2). ECGi analysis resulted in a more restricted area of interest (11.6 ± 6.9 cm²) compared to MDCT (67.5 ± 53.3 cm²), LE-CMR (55.9 ± 17.4 cm²), and LE-CMR corridors (20.5 ± 10.4 cm²), p < 0.01. During the ablation procedure, 17 VTs were mapped in 12 pts. We found an 88% overlap between the ECGi and the EAM-confirmed VT exit site.

Conclusions: ECGi is a valuable resource for pre-procedural planning in pts with SHD undergoing VT ablation, on top of advanced imaging modalities, accurately predicting the location of LAVAs and the VT exit site.
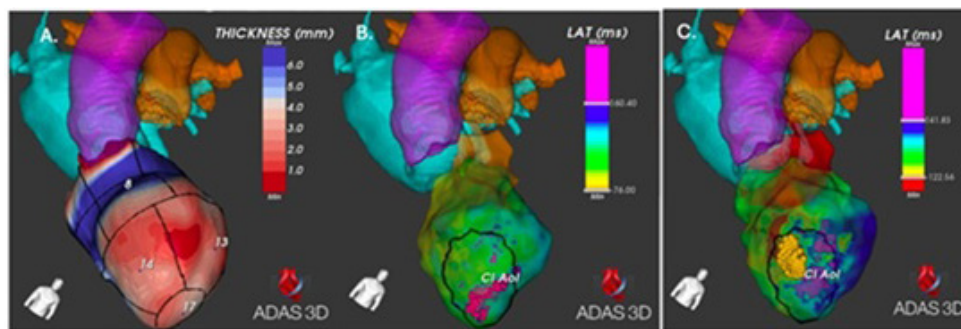
A. MDCT segmented with ADAS-VT software, demonstrating a large antero-apical ischemic scar.
B. Endocardial substrate map collected with Octaray and Carto™, with pink tags labeling LAVAs and black circle depicting the area of interest predicted by the ECGi.
C. Endocardial VT activation map covering the full VT cycle length, with yellow tags depicting the exit site region.

Figure 1: concordance between ECGi and EAM for the delineation of the area of interest for ablation

Pre-procedural planning	MDCT	LE-CMR (BZ+core)	LE-CMR (corridors)	ECGi (vs LE-CMR)
Sensitivity	65.0±48.9	60.0±45.9	66.7±50.0	92.5±24.5 (P=0.01)
Specificity	60.5±20.1	65.4±12.8	77.3±18.6	98.7±2.7 (P < 0.01)
Accuracy	60.9±18.3	60.9±18.3	76.3±20.4	98.2±2.8 (P < 0.01)

Figure 2: Comparison of sensitivity, specificity and accuracy for area of interest prediction according to pre-procedural planning method

Figure CO 66

CO 67. SUBCLINICAL FOCAL FIBROSIS AND ABNORMAL LEFT VENTRICULAR STRAIN IN PATIENTS WITH SARCOIDOSIS WITHOUT CLINICAL EVIDENCE OF CARDIAC DISEASE

João Mendes Cravo, Ana Abrantes, Beatriz Garcia, Catarina Gregório, Ana Margarida Martins, Catarina Oliveira, Ana Cristina Mendes, Joana Rigueira, Rui Plácido, Fausto J. Pinto, Ana G. Almeida

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Introduction: Cardiac involvement in systemic sarcoidosis occurs in 20-25% of patients and is associated with poor outcome and reduced survival. The identification of cardiac sarcoidosis is challenging in asymptomatic patients using conventional methods including echocardiography. We aimed to assess the role of CMR for detecting subclinical cardiac sarcoidosis (CSc) in patients with demonstrated pulmonary sarcoidosis, without cardiac symptoms and normal conventional echocardiogram.
Methods: We included consecutive patients with pulmonary sarcoidosis referred for CMR study from a specialized sarcoidosis ambulatory clinic in a tertiary university hospital. Inclusion criterion was the diagnosis of sarcoidosis and absence of clinical signs of cardiovascular disease. Exclusion criteria included the presence of atrial fibrillation, more than mild valvular heart disease, ischemic heart disease and general contra-indications to CMR and/or gadolinium. All patients underwent CMR at 3.0T. CMR study included cine CMR (bSSFP) for LV function, T2-weighed imaging, late gadolinium enhancement (LGE) with gadobutrol 0.20 mmol/Kg. Strain imaging was obtained using feature tracking analysis (Circle, CVI).
Results: 54 patients were included, 50 ± 14 year-old, 17 male. A control group of 18 healthy individuals were assessed by feature tracking. ECG and conventional echocardiograms were normal in all. LV end-diastolic volume and ejection fraction were normal in all patients (72 ± 12 ml/m² and 58 ± 6% respectively). No myocardial signal changes were found on T2-weighed imaging. Focal LGE was found in 18%, predominantly involving the midwall and or subepicardium of the basal septum and lateral myocardial segments. Regarding strain analysis, patients with sarcoidosis had significantly lower LV peak longitudinal strain than the controls (-15.3 ± 1.9 versus -18.0 ± 1.1,

p = 0.006). In 22 patients, including 11 patients with focal LGE and other 11 without LGE, strain values were abnormal, with a mean value of -13.5 ± 1.2.
Conclusions: In patients with systemic sarcoidosis and absence of clinical, electrocardiographic and echocardiographic involvement, CMR showed subclinical involvement in a substantial proportion, with focal LGE and abnormal longitudinal strain probably due to more widespread myocardial disease. The impact of these findings on the outcome is currently being assessed by our group.

CO 68. CAN MY ECHO WORK AS A CRYSTALBALL? – ECHOCARDIOGRAPHIC PARAMETERS PREDICTING RESIDUAL PULMONARY HYPERTENSION AFTER PULMONARY ENDARTERECTOMY

João Mirinha Luz, Filipa Ferreira, Sofia Alegria, Bárbara Marques Ferreira, Ana Cláudia Vieira, Débora Repolho, Diogo Cunha, Oliveira Baltazar, Nazar Ilchyshyn, Liliana Brochado, Adriana Silva, Hélder Pereira

Hospital Garcia de Orta, EPE.

Introduction and objectives: Chronic thromboembolic pulmonary hypertension (CTEPH) results from post thromboembolic fibrotic occlusions within the pulmonary arteries and its small branches, associated with pre-capillary pulmonary hypertension (PH). Surgical removal of those occlusions, by pulmonary endarterectomy (PEA), should be considered in all CTEPH patients (pts), being potentially curative. It is estimated that 25% of pts maintain PH after PEA, described as residual PH, which comprises therapeutic and prognostic implications. The aim of this study is to evaluate if echocardiographic (echo) parameters that could predict development of residual PH after PEA.
Methods: We conducted a retrospective, observational, unicentric study of pts with confirmed diagnosis of CTEPH subjected to PEA, between January 2010 and October 2024. All pts were subjected to throughout transthoracic echo at diagnosis. 3 to 6 months after PEA, patients were subjected to RHC to evaluate presence of residual PH (characterized by mean pulmonary artery pressure ≥ 30 mmHg). Right heart echo parameters (disclosed in Table 1) were assessed and compared between pts.

Results: 39 pts were diagnosed with CTEPH and underwent PEA during the follow-up period. Mean age at time of diagnosis was 57.3 years-old. 46.2% (18 pts) had documented residual PH after PEA. Echo parameters that were significantly different between the two groups were: tricuspid annular plane systolic excursion (TAPSE; p = 0.009); tele-diastolic right ventricular area (TDRVA; p = 0.001); tele-sistolic right ventricular area (TSRVA; p = 0.003); fractional area change (FAC; 0.036); TAPSE/pulmonary artery systolic pressure (PASP) ratio (p = 0.002); diastolic (DER; p = 0.007) and systolic eccentric ratio (SER; p = 0.036). TSRVA and TDRVA were independently associated with residual PH (p = 0.023; p = 0.013). By using ROC curves, pts with TDRVA above 27.13 cm^2 [area under the curve (AUC) 0.880, sensitivity (S) 90%, specificity (E) 90%, odds ratio (OR) 81) and TSRVA above 19.54 cm^2 (AUC 0.875, S 90%, E 89%, OR 72) had higher probability of developing residual PH after PEA (graphic 1 and 2).

	Residual PH (n=18)	No residual PH (N=21)	p-value
TAPSE (mean; mmHg)	15.8	20.0	**0.009**
RVOT AccT (mean; ms)	71.2	81.5	0.171
TDRVA (mean; cm2)	30.5	21.4	**0.001**
TSRVA (median; cm2)	23.4	14.3	**0.003**
FAC (median; %)	20.4	36.0	**0.036**
TR velocity (mean; m/s)	4.58	4.14	0.062
TAPSE/PASP ratio (median; mm/mmHg)	0.16	0.24	**0.002**
Tricuspid S' wave (median; cm/s)	9.17	10.4	0.259
DER (median)	1.63	1.07	**0.007**
SER (mean)	1.70	1.35	**0.036**

Figure 1 – echo parameters evaluated at diagnosis; RVOT AccT – right ventricular outflow tract acceleration time; TR velocity – tricuspid regurgitation velocity

Graphic 1 – ROC curve for TDRVA

Graphic 2 – ROC curve for TSRVA
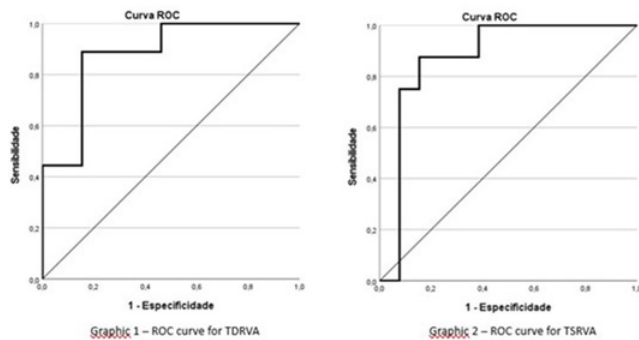
Conclusions: Echo is a paramount exam when evaluating CTEPH pts, and this study shows that it can somewhat predict the development of residual PH. Ventricular remodeling in CTEPH, evaluated in terms of right ventricular area, was independently associated with residual PH, but validation in larger cohorts is mandatory.

CO 69. MYOCARDIAL WORK AND EXERCISE LVEF AS PREDICTORS OF IMPAIRED CARDIORESPIRATORY FITNESS IN BREAST CANCER PATIENTS TREATED WITH ANTHRACYCLINES

Margarida de Castro, Luísa Pinheiro, Mariana Tinoco, Emídio Mata, Bárbara Lage, Tamara Pereira, Mário Lourenço, Alexandra Teixeira, Mafalda Cunha, Olga Azevedo, João Português, António Lourenço

Unidade Local de Saúde do Alto Ave.

Introduction: Anthracycline chemotherapy (AC) for breast cancer (BC) patients may be responsible for cancer therapy-related cardiac dysfunction (CTRCD). Alternative echocardiographic markers, besides LVEF and GLS, are being explored for their potential in early detection of CTRCD. In addition, impaired CRF has been recognized as a predictor of development of heart failure (HF).
Objectives: To explore the effects of AC on advanced echocardiographic parameters at rest and during exercise in BC patients (pts); and to assess whether these parameters are associated with impaired cardiorespiratory fitness (CRF).
Methods: We conducted a prospective study involving women with early-stage BC undergoing AC, with or without radiotherapy, and without HER2-directed

therapies, between May 2022 and December 2023. Each pt had 3 visits: before starting AC, early after (1-month), and at short-term follow-up (FU) (6-months) after completing AC. During each visit, the pts performed cardiopulmonary exercise test (CPET) with modified Bruce protocol on a treadmill and resting and exercise echocardiogram. Functional disability (FD) was defined as a Vo2peak ≤ 18.0 mL/kg/min at CPET. Vo2peak was defined as the highest oxygen consumption rate over a 15-20 second interval in the last 90 seconds of exercise.
Results: 32 women were included, with a mean age of 50.8 ± 9.3 years. The mean cumulative dose of AC (doxorubicin) was 230 ± 21 mg/m^2. All pts met the criteria for maximum exercise testing. Before AC, the mean Vo2peak was 22.7 ± 3.7 mL/kg/min. It dropped to 18.6 ± 3.7 mL/kg/min at 1-month (p < 0.001) and to 19.7 ± 4.7 mL/kg/min at 6-months (p < 0.001). FD increased from 9% pre-AC to 44% at 1-month and 53% at 6-months post-AC. One-month post-AC, patients with FD had lower LVEF (62.8 ± 5.9 vs. 69.5 ± 3.6%), contractile reserve (1.4 ± 7.9 vs. 8.8 ± 4.2%) and stroke volume (SV) (68.6 ± 13.5 vs. 87.7 ± 24.4 ml) during exercise. Six-months post-AC, patients with FD had lower SV (46.6 ± 9.8 vs. 60.3 ± 11.4 ml/beat) and CO (3.4 ± 0.6 vs. 4.6 ± 1.2 L/min), lower 2D-GLS (-17.4 ± 1.7 vs. -19.6 ± 2.0%), global work index (GWI) (1,457 ± 241 vs. 1,729 ± 250 mmHg%, p = 0.014), and global constructive work (GCW) (1,768 ± 299 vs. 1,989 ± 293 mmHg%) at rest than patients without FD. During exercise, these patients also had lower SV (66.9 ± 19.3 vs. 86.4 ± 26 ml). In univariate analysis (Table 1), age, GWI, exercise LVEF, exercise CO significantly influenced Vo2peak during follow-up. In our multivariable model (Table 1), resting GWI and exercise LVEF were independently associated with Vo2peak.

Table 1: Univariable and Multivariable Associations Between Clinical, Analytical, and Echocardiographic Parameters and VO2peak (Dependent Variable).

	Univariable association with VO2peak			Multivariable association with VO2 peak		
	Beta	SE	p-value	Beta	SE	p-value
Age	-0.15	0.06	**0.020**	-0.088	0.04	**0.049**
LV GLS (%)			0.156			
GWI (mmHg%)	0.003	0.001	**0.014**	0.003	0.001	**0.012**
LV 3D-GLS (%)			0.192			
LV 3D-GAS (%)			0.688			
Exercise LVEF (%)	0.28	0.07	**<0.001**	0.277	0.07	**<0.001**
Exercise LV GLS (%)			0.084			
Exercise GWI (mmHg%)			0.889			0.003
Exercise CO (L/min)	0.24	0.11	**0.031**	0.237	0.08	**0.007**
β2-microglobulin (mg/dL)			0.555			
IL-6 (pg/mL)			0.578			
sFlt-1 (pg/mL)			0.785			
PlGF (pg/mL)			0.289			
MPO (IU/mL)	-2.74	0.60	**0.036**			
Body fat (kg)	-0.15	0.06	**0.025**	-0.146	0.05	**0.004**

Multivariable association Marginal R^2: 0.572 and Conditional R^2: 0.702 for entire model; all beta values represent the average change in VO2peak for a unit change. CO: Cardiac Output; IL-6: Interleukin-6; GAS: Global Area Strain; GLS: Global Longitudinal Strain; GWI: Global Work Index; LV: Left ventricle; LVEF: Left Ventricle Ejection Fraction; MPO: myeloperoxidase; PlGF: Placental growth factor; sFlt-1: soluble fms-like tyrosine kinase-1

Conclusions: Significant and persistent CRF reductions are common in BC pts post-AC. While current echocardiographic markers of CTRCD, such as resting LVEF and GLS, were not associated to CRF measured by Vo2peak, resting GWI and exercise LVEF were. As CRF is a predictor of HF risk, resting GWI and exercise LVEF could be useful echo markers to identify pts at increased long-term risk of HF.

CO 70. INCREMENTAL PROGNOSTIC VALUE OF CT-DERIVED EXTRACELLULAR VOLUME IN SEVERE AORTIC STENOSIS

Rita Almeida Carvalho, Márcia Presume, Rita Reis Santos, Francisco Albuquerque, Pedro Lopes, Francisco Gama, Cláudia Silva, Pedro Freitas, Sara Guerreiro, João Abecasis, Rui Campante Teles, António Ferreira

Hospital Santa Cruz ULSLO.

Introduction: Severe aortic stenosis (AS) has a poor prognosis without timely intervention. While risk stratification is primarily guided by clinical scores, myocardial extracellular volume estimation using cardiac computed tomography (ECV-CT), a marker of fibrosis, has emerged as a promising prognostic tool. This study sought to determine if ECV-CT can provide independent and incremental prognostic information to established clinical risk markers.
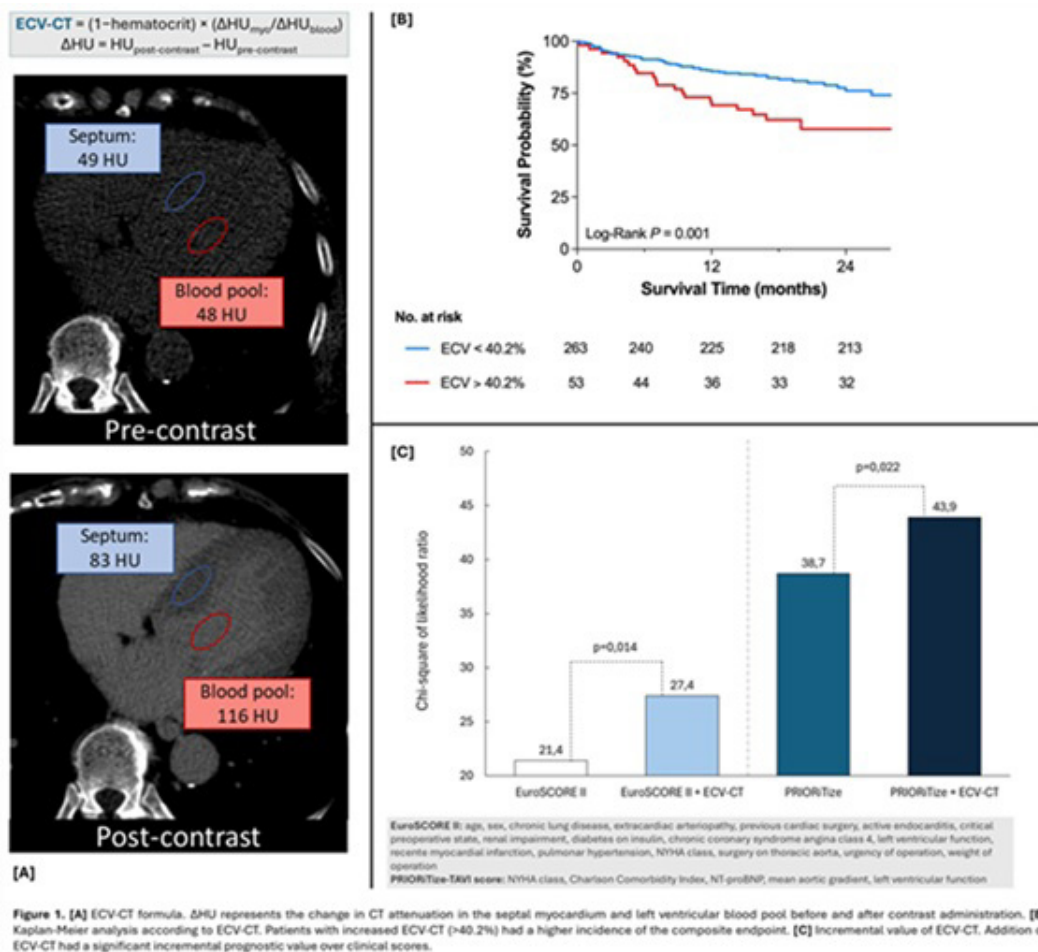
$$ECV\text{-}CT = (1-\text{hematocrit}) \times (\Delta HU_{myo}/\Delta HU_{blood})$$
$$\Delta HU = HU_{post\text{-}contrast} - HU_{pre\text{-}contrast}$$

Figure 1. [A] ECV-CT formula. ΔHU represents the change in CT attenuation in the septal myocardium and left ventricular blood pool before and after contrast administration. [B] Kaplan-Meier analysis according to ECV-CT. Patients with increased ECV-CT (>40.2%) had a higher incidence of the composite endpoint. [C] Incremental value of ECV-CT. Addition of ECV-CT had a significant incremental prognostic value over clinical scores.

Figure CO 70

Methods: This prospective single-center study included consecutive patients with severe symptomatic AS undergoing pre-TAVR (transcatheter aortic valve replacement) CT. Patients with prosthetic aortic valves or known cardiac amyloidosis were excluded. Imaging was performed using a 192-slice dual-source CT scanner, with ECV-CT obtained via an additional post-contrast, low-radiation-dose, prospective acquisition (Figure 1A). ECV-CT values were compared with two risk scores: EuroSCORE II and PRIORiTize-TAVI. The composite endpoint was time to all-cause mortality or cardiovascular hospitalization.

Results: A total of 316 patients (mean age 81 ± 8 years; 44% male; mean transaortic gradient 50 ± 15 mmHg; mean aortic valve area 0.74 ± 0.19 cm²; mean left ventricular ejection fraction 56 ± 11%) were analyzed. The median ECV-CT was 33.9% (IQR 29.5-38.7). Over a median follow-up of 340 days (IQR 198-517), the composite endpoint occurred in 72 patients (23%), including 47 deaths (15%) and 25 cardiovascular hospitalizations (8%). Patients reaching the endpoint were older (84 ± 8 vs. 80 ± 8 years, p = 0.012), had lower LV ejection fraction (51 ± 13 vs. 57 ± 10%, p < 0.001), higher NT-proBNP levels (4,002 pg/mL (IQR 929-8,678) vs. 838 (IQR 377-2,126), p < 0.001), and higher scores on both EuroSCORE II (6.32 ± 5.12 vs. 4.05 ± 3.23%, p = 0.002) and PRIORiTize (4.4 ± 1.6 vs. 3.3 ± 1.3, p = 0.008). These patients also had higher median ECV-CT values (39.8% (IQR 33.5-44.2) vs. 32.9% (IQR 29.5-38.3), p = 0.001). Decision tree analysis identified an ECV-CT value ≥ 40.2% as the best threshold for predicting outcomes (Figure 1B). Patients with ECV-CT ≥ 40.2% (n = 53) accounted for 17% of the study population but were responsible for 29% of all events. Multivariate Cox regression showed that logECV-CT remained an independent predictor of the composite endpoint after adjusting for EuroSCORE II (HR 4.2, 95%CI 1.3-13.9, p = 0.016) and PRIORiTize (HR 3.9, 95%CI 1.3-11.6, p = 0.012). Finally, nested regression models of the global Chi-square value of the likelihood ratio test demonstrated that incorporating logECV-CT significantly improved the predictive performance of both EuroSCORE II and PRIORiTize (Figure 1C).

Conclusions: CT-derived ECV provides incremental prognostic value beyond clinical scoring systems in patients with severe AS, aiding in identifying higher-risk patients. The potential role of this marker for clinical decision-making warrants further investigation.

Domingo, 13 Abril de 2025 | 08:30-09:30

Espaço Ágora | Sessão de Comunicações Orais 15 – Inteligência artificial em cardiologia: aproveitar o potencial!

CO 71. COULD CHATGPT BE A CARDIOLOGY RESIDENT IN PORTUGAL?

Mafalda Griné, Gonçalo Ferraz-Costa, Rita Bertão Ventura, Inês Brito e Cruz, Bernardo Resende, Luísa Rocha, Tomás Carlos, Manuel Oliveira-Santos, Rogério Teixeira

ULS Coimbra.

Introduction: Artificial intelligence-based tools, such as ChatGPT (OpenAI, United States of America) are increasingly being used for medical exam preparation and clinical decision support. We sought to evaluate ChatGPT's
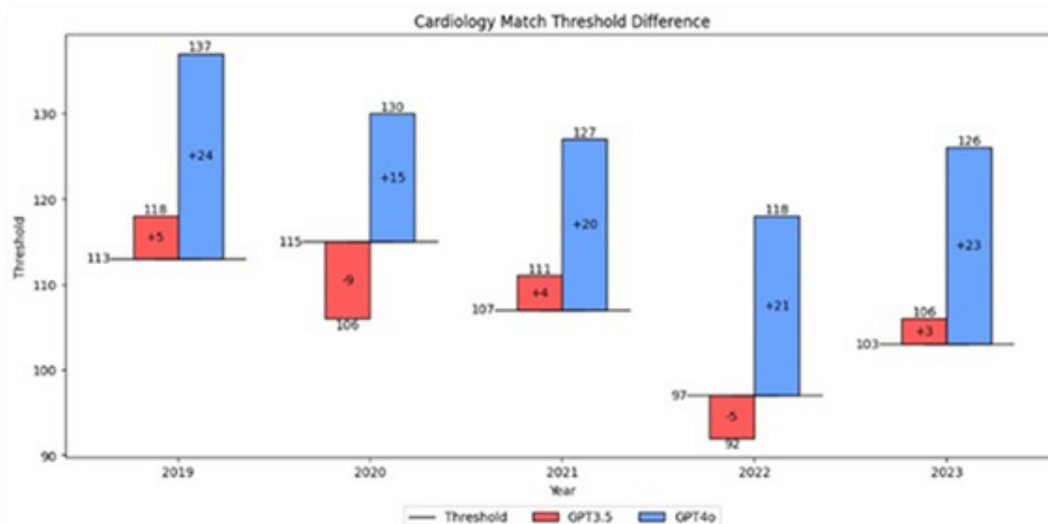
Figure CO 71

performance on *Prova Nacional de Acesso* (PNA) and determine whether it would be able to match into a Cardiology residency program.

Methods: We submitted all questions from the 2019 to 2023 editions of the PNA to ChatGPT 3.5 and ChatGPT 4o (version A order). A new chat window was created for each part of each exam. Performance was gauged against average exam scores and the score of the last candidate to match into Cardiology each year.

Results: ChatGPT 4o correctly answered 638 out of 750 questions, reflecting an 85% accuracy rate, compared to a 71% accuracy rate by ChatGPT 3.5 (median 127 points (Interquartile Range (IQR): 122.5-134) for ChatGPT-4o and median 106 points [IQR: 99-114.5] for ChatGPT-3.5). ChatGPT 4o surpassed the median score for each exam edition, while ChatGPT 3.5 performed below the 50th percentile once (2022). Additionally, ChatGPT 4o ranked within the top 1% in two exam editions (2019 and 2023), achieving the highest score. The minimum score required to match into Cardiology ranged between 97 and 115. ChatGPT 3.5 exceeded the matching threshold in 3 exam editions, while ChatGPT 4o could have matched into Cardiology every year.

Conclusions: ChatGPT-4o demonstrated excellent performance on PNA, consistently outperforming its predecessor and the average exam participant, achieving high enough scores to secure a Cardiology residency spot every edition.

CO 72. PRELIMINARY RESULTS FROM THE EXTERNAL VALIDATION OF AN ARTIFICIAL INTELLIGENCE MODEL FOR OCCLUSION MYOCARDIAL INFARCTION DETECTION

Mafalda Griné[1], Catarina Sena Silva[2], Henrique Sena Silva[3], Rita Bertão Ventura[1], Tomás Carlos[1], Bernardo Resende[1], Luísa Rocha[1], Manuel Oliveira-Santos[1], Miguel Nobre Menezes[2], Lino Gonçalves[1]

[1]ULS Coimbra. [2]ULS St Maria. [3]Faculdade de Medicina da Universidade de Coimbra.

Introduction: Around 15 to 30% of patients presenting without significant ST-segment elevation have an acutely occluded coronary artery. These patients have a worse prognosis, likely related to delayed revascularization. We aimed to test a novel artificial intelligence (AI) model designed to enhance the detection of these cases based on admission 12-lead electrocardiograms (ECGs).

Methods: A total of 658 ECGs from 398 patients admitted to the emergency department with suspected acute coronary syndrome (ACS) were retrospectively analyzed via the OMI AI ECG Model (Powerful Medical, Slovakia). The primary endpoint was the detection of occlusion myocardial

infarction (OMI), defined as angiographic evidence of an acute culprit lesion with either 0-2 TIMI flow and positive troponin or TIMI 3 flow and significant troponin elevation (i.e. high-sensitivity troponin I ≥ 5000 ng/L). The model's performance was compared with the current gold standard.

Results: In this initial test set, we identified 147 (36.9%) OMI cases. The OMI AI ECG Model achieved 72% accuracy (95% confidence interval (CI): 67.4-76.5), 44.2% sensitivity (95%CI: 37.2-51.6), 91.9% specificity (95%CI: 88.7-94.8), 79.6% PPV (95%CI: 71.9-86.6), NPV 69.8% (95%CI: 63.9-75.4), and a 0.422 Mathew's correlation coefficient (MCC; 95%CI: 0.341-0.503), whereas the ST-segment elevation myocardial infarction (STEMI) criteria had 66.3% accuracy (95%CI: 61.0-71.3), 28.5% sensitivity (95%CI: 22.3-35.3), 93.2% specificity (95%CI: 90.1-96.1), 75.0% PPV (95%CI: 64.8-84.5), 64.6% NPV (95%CI: 58.6-70.4), and a 0.293 MCC (95%CI: 0.206-0.38)]. Demographic parameters, such as age and sex, did not impact model performance. Notably, within the patient group who underwent coronary angiography within 2 hours of admission, the model's sensitivity increased to 81.2% (CI: 73.1-88.5), reflecting good model performance in acute/active case detection.
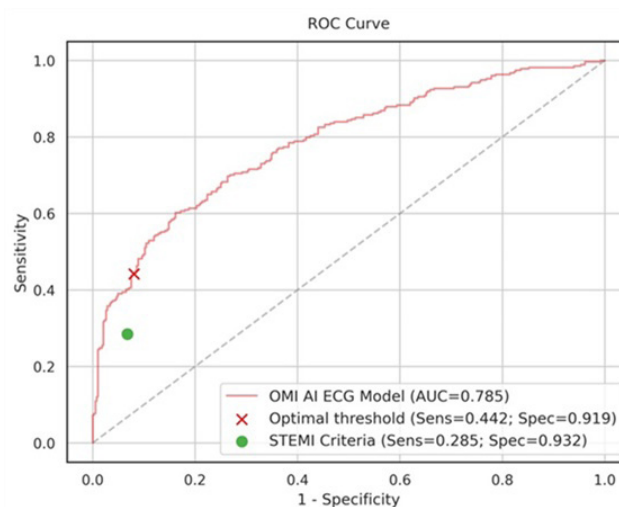
Conclusions: In this challenging all-comer suspect ACS cohort, the OMI AI ECG Model outperformed the STEMI criteria in active OMI detection, with about 1.5 times higher sensitivity, without compromising specificity. This tool may contribute to better patient triage and timely revascularization.

CO 73. PHENOTYPING HEART FAILURE WITH REDUCED EJECTION FRACTION: A MACHINE LEARNING APPROACH TO PATIENT STRATIFICATION

Diogo Rosa Ferreira[1], Sofia Morgado[2], Fátima Salazar[3], Ana Francês[3], Rafael Santos[1], Joana Rigueira[1], Doroteia Silva[1], Nuno Lousada[1], Fausto Pinto[1], Dulce Brito[1], João Agostinho[1]

[1]Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa. [2]Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa. [3]Unidade Local de Saúde de Santa Maria.

Introduction: Left ventricular ejection fraction (LVEF) is a key marker in heart failure with reduced ejection fraction (HFrEF). However, relying solely on LVEF oversimplifies HFrEF, especially in terms of treatment response and comorbidities. This study used a machine learning approach to identify subgroups of HFrEF patients, aiming to improve treatment strategies and guide personalized decision-making.

Methods: We conducted a prospective cohort study including patients with newly diagnosed HFrEF followed at a tertiary clinic from 2020-24. Clinical data underwent preprocessing (outlier correction, imputation of missing values, normalization). Dimensionality reduction was done using Principal Component Analysis, retaining components based on the Kaiser criterion. Agglomerative hierarchical clustering with Ward's linkage identified subgroups. Statistical comparisons between clusters utilized Mann-Whitney U, Kruskal-Wallis, Kaplan-Meier survival analysis, and log-rank tests. The primary outcome was a composite of heart failure hospitalizations (HHF) or cardiovascular (CV) death at 2 years.

Results: The study included 213 patients, with a mean age of 64 years and baseline LVEF of 28.5%. Follow-up averaged 2.4 years. Clustering revealed three subgroups: Responders, Frail, and Resilient. The Responders group, mostly non-ischemic, had the lowest LVEF and elevated left atrial volume index, NTproBNP, and GGT, reflecting a congestive phenotype. Despite pronounced adverse remodeling, this group experienced the greatest LVEF recovery following optimized medical therapy (OMT). The Frail group, the oldest cohort, had balanced ischemic and non-ischemic etiologies, with low hemoglobin, estimated glomerular filtration rate (eGFR), ferritin, transferrin saturation (TSAT), LDL, and uric acid, suggesting undernutrition. It had the highest baseline LVEF but the poorest outcomes. The Resilient group, similar in age to the Responders, had higher baseline LVEF, lower NTproBNP and LAVI, better hemoglobin, eGFR, ferritin, and TSAT, and a higher body mass index compared to the Frail group. LVEF improved across all groups with OMT, but prognosis varied significantly. The Frail group had an eightfold higher risk of HHF or CV death compared to the Resilient group (HR: 8.2; 95%CI: 2.7-24.3; p < 0.001) and nearly twice the risk compared to Responders (HR: 1.9; 95%CI: 1.1-3.4; p = 0.019). Responders had 2.2 times the risk of the composite outcome compared to Resilient patients (HR: 2.2; 95%CI: 1.1-4.5;

p = 0.036). A user-friendly software was developed to classify any HFrEF patient into these clusters.

Conclusions: This study demonstrates that machine learning can identify distinct HFrEF subgroups with unique characteristics and outcomes. Phenotypic stratification goes beyond LVEF, enabling personalized treatment strategies to improve outcomes, particularly for high-risk groups.

CO 74. IMPROVING PACEMAKER IMPLANTATION PREDICTION AFTER TAVR: CREATION AND VALIDATION OF A MACHINE LEARNING BASED MODEL

Francisco Barbas de Albuquerque[1], Miguel Marques Antunes[1], Tomás Barbas de Albuquerque[2], Barbara Teixeira[1], André Grazina[1], Fernando Ferreira[1], Inês Rodrigues[1], António Fiarresga[1], Rúben Ramos[1], Rui Ferreira[1], Duarte Cacela[1], Mário Oliveira[1]

[1]Hospital de Santa Marta. [2]Investigador Independente.

Introduction: Pacemaker (PM) implantation (I) is a common complication after TAVR. 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 PMI after TAVR, compare it with a regression-based model and validate it in a prospective cohort.

Methods: Single-center retrospective study on patients (P) that underwent TAVR between 2018 and 2024. A full review of demographic, clinical, electrocardiographic, echocardiographic, cardiac CT scan and intra-procedural data was performed. Both pre- and intra-procedural variables were included in the dataset to train the model. A Python script was developed to build a Binary Classification model. Due to dataset imbalance, a SMOTE-based upsampling technique was performed on the minority class. The XGBoost (eXtremeGradient Boosting) open-source software library and algorithm was used to train the ML-based prediction model. To achieve better performance, we implemented an Ensemble Model approach consisting of 21 Binary Classifiers. For each P, the final prediction was determined by aggregating the predictions from all classifiers and selecting the most frequently predicted value. Both testing and validation model performance metrics were computed using the confusion matrix of predictions and are as follows: weighted precision (WP), weighted recall (WR) and weighted f1-score (WF1). In addition, a logistic regression was executed for performance comparison between models. ROC curves AUC were developed for both models.

Results: From a total of 770 TAVR procedures during the study period, 611 P entered the analysis. Mean age was 82 years and 44% were male. PM implantation occurred in 170 (27.8%) P. Using our XGBoost Ensemble ML algorithm a scoring model was generated. The highest weighted variables
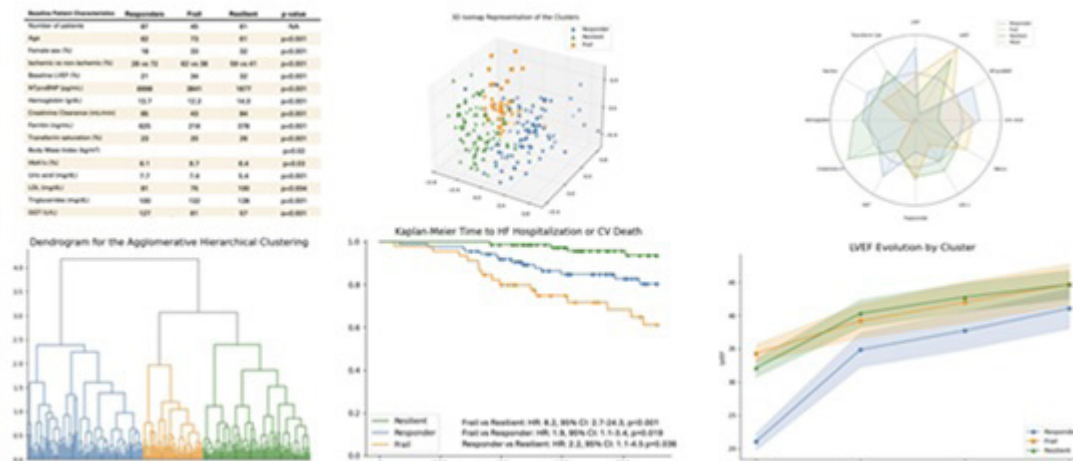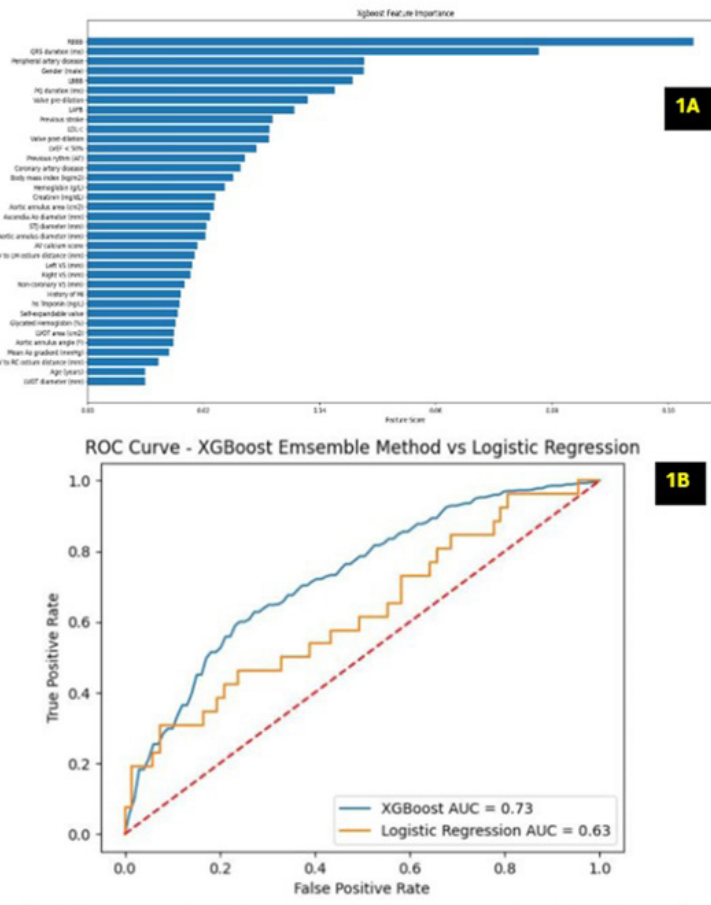

Figure CO 73

Figure CO 74

were the presence of right bundle branch block, QRS duration, peripheral artery disease, male gender and left bundle branch block (figure 1A). The ML-based model performance metrics were: WP of 58.47%, WR of 59.07% and WF1 of 58.69%. The logistic regression model had the following metrics: WP of 48.45%, WR of 54.80% and WF1 of 51.43%. The XGBoost AUC was 0.73 and the LogRegression AUC was 0.63 (Figure 1B). Seventy-one P enter the prospective validation cohort. PMI occurred in 23 (32%) P. The metrics from our ML-based model in the validation cohort were: WP of 66.17%, WR of 64.48% and WF1 of 65.42%. The metrics from logistic-regression based model were: WP of 58.22%, WR of 52.28% and WF1 of 55.09%.

Conclusions: We created and validated a ML-based prediction model for PMI after TAVI. This model outperformed the traditional used regression-based model. This underscores the move towards a more personalized medicine, where AI and ML-based models may enhance clinical decision-making for better patient outcomes.

CO 75. ACUTE KIDNEY INJURY POST-TAVI: DOES IT STILL IMPACT PROGNOSIS?

Miguel Azaredo Raposo, Catarina Gregório, Ana Abrantes, Daniel Cazeiro, Diogo Ferreira, João Cravo, Marta Vilela, Pedro Carrilho Ferreira, João Silva Marques, Miguel Nobre Menezes, Fausto J. Pinto

Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@ RISE, Faculdade de Medicina, Universidade de Lisboa.

Introduction: Transcatheter aortic valve implantation (TAVI) procedure has evolved over the years, with reduction of periprocedural complications. Acute kidney injury (AKI) is a frequent complication that affects outcomes and survival.

Objectives: To determine the incidence of post-TAVI AKI, its predictors and impact on outcomes.

Methods: Retrospective single center study, analyzing a population of non-consecutive pts who underwent TAVI in a single center between 2014 and 2023, not previously under dialysis. AKI was defined using AKI Network criteria from stages 0 to 3. Univariate analysis with independent T-student and Chi-square tests was conducted to define associations between baseline characteristics and AKI. Multivariate analysis with logistic regression was conducted to identify predictors of AKI. Kaplan-Meier survival curves were drawn and compared between grades of AKI and hazard ratios were calculated with cox regression.

Results: We analyzed a population of 835 patients (pts) with a mean age of 82 ± 6.3 years, 54.4% female, with a mean FUP of 39 ± 26 months. 29% of pts had CKD, 7.2% with severe CKD (stage IV or V). Regarding AKI, 20.8% of pts developed stage 1 AKI; 4.1% stage 2 and 1.9% stage 3. Patients with severe CKD at baseline had a significative association with grade 2 or higher AKI (p < 0.01, OR 2.1). There was a significant difference between pts having any degree of post-TAVI AKI and death during FUP (OR 2.1 [CI 1.5-2.8] p <.01). Regarding survival analysis (Figure 1), there was a 46% increase in hazard for death during mean FUP for patients with any degree of AKI post-TAVI. This increase of hazard is proportional to severity of AKI, being non significative for pts with stage 1 (HR 1.3 p = 0.055), 61% increase in hazard for grade 2 AKI and (HR 1.61 p = 0.04) and 240% increase in hazard for patients sustaining grade 3 AKI post procedure (HR 3.4 p < 0.01). Pts with an AKI grade 2 or 3 post procedure displayed an odds ratio of 2.7 for death at FUP. On univariate analysis, basal hemoglobin (Hb), post-TAVI Hb drop, baseline creatinine, hypertension and general anesthesia had significant associations with post-procedural grade 2 or 3 AKI. On multivariate analysis, only basal Hb, Hb drop and basal creatinine could predict grade 2 or 3 AKI. Other factor such as contrast volume, procedural time, age and EuroSCORE II had no significant association with AKI.
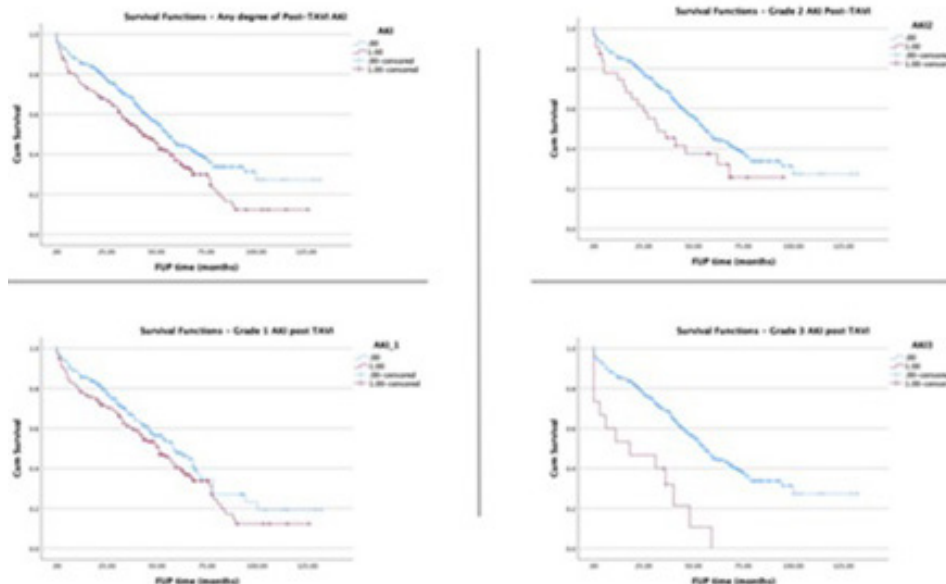
Figure CO 75

Conclusions: Over 20% of pts develop some degree. AKI is associated with worse outcomes, especially grades 2 and 3, significatively impacting mortality. AKIs etiology is multifactorial, with an interplay of multiple factors which expand well beyond the nephrotoxic insult from contrast. Hemoglobin reduction should be avoided, and special attention should be given for patients with baseline severe CKD.

Domingo, 13 Abril de 2025 | 08:30-09:30

Sala Arrábida | Sessão de Comunicações Orais 16 – Avanços no diagnóstico e tratamento de miocardiopatias
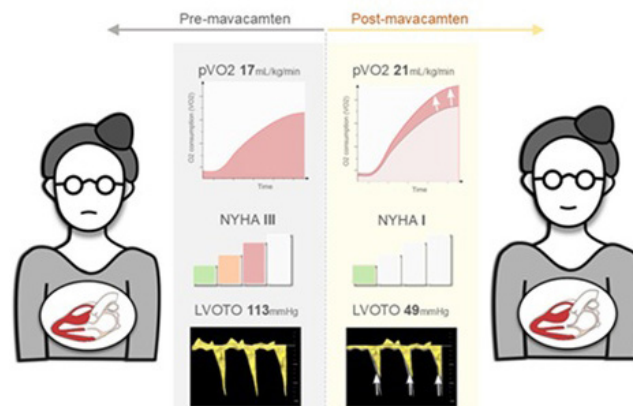
CO 76. MAVACAMTEN USE IN A REAL-WORLD COHORT OF OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY PATIENTS: INSIGHTS FROM THE INITIAL CENTRE EXPERIENCE

Maria Rita Giestas Lima, Débora Silva Correia, Rita Carvalho, Rita Amador, Tânia Laranjeira, Pedro Lopes, Sérgio Maltês, Gonçalo Cunha, Miguel Mendes, Regina Ribeiras, Bruno Rocha, Carlos Aguiar

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

Introduction: Mavacamten was recently approved for the treatment of obstructive hypertrophic cardiomyopathy (HOCM) in patients who remain symptomatic despite first-line medical therapy. We aimed to describe the first real-world experience of this drug in a Portuguese cohort of patients with HOCM.

Methods: Single-centre prospective study enrolling patients with HOCM [peak left ventricle outflow tract obstruction (LVOTO) ≥ 50 mmHg] treated with mavacamten. All patients fulfilled the following criteria: moderate symptoms (NYHA III) despite first-line medical treatment with beta-blockers (BB) and/or calcium channel blockers (CCB), or who were intolerant to or had a contraindication for BB/CCB therapy; LV ejection fraction (LVEF) > 55%.

Following treatment, patients underwent transthoracic echocardiography at 1, 2, 3 and, thereafter, every 3 months. Cardiopulmonary exercise testing (CPET) and quality-of-life assessment using SF-36v2 score were performed at baseline and at 6 months. Efficacy and safety endpoints were evaluated in patients with at least 6 months follow-up.

Results: Overall, 20 patients with symptomatic HOCM initiated treatment with mavacamten: 15 (75%) were female; median age 65 (58-71) years; and 2 patients (10%) had significant residual LVOTO despite prior surgical myectomy. Genetic testing showed positive sarcomeric mutations in 7 patients (50%) and negative results in another 7 (50%). CYP2C19 genotyping revealed normal metabolizers in all but 2 patients (10%) which were intermediate metabolizers. At baseline, 19 patients (95%) were treated with BB (bisoprolol equivalent mean dose 7 ± 3 mg), and 4 (20%) discontinued CCB before starting mavacamten. All patients were at NYHA III, with median SF-36v2 score 104 ± 14, median NT-proBNP 1,250 (296-2,909) pg/mL, with a mean LVEF 65 ± 6% and maximal LVOTO 105 ± 39 mmHg. Treatment began at a median dose of 2.5 (2.5-5) mg and was significantly titrated up to 5 (5-10) mg at a median follow-up of 7 (1-11) months. Follow-up data (at 6-months) was available in 10 (50%) patients. Mavacamten associated with an improvement in cardiac symptoms (NYHA I: 0 vs. 50%, p < 0.001), SF-36v2 score (104 ± 14 vs. 109 ± 9; p = 0.180) and LVOTO (113 ± 36 *vs.* 49 ± 40 mmHg; p = 0.008), without remarkable changes in NT-proBNP, LVEF or global longitudinal strain. CPET showed a significant improvement in peak VO$_2$ (17 ± 6 vs. 21 ± 6; p = 0.043) with 10 (50%) patients having met the primary

efficacy endpoint of EXPLORER-HCM. No patient stopped the drug due to adverse events: none had LVOTO < 20 mmHg during the initiation phase (1-3 months) nor LVEF < 50% at any time. One patient discontinued treatment at 6-months due to planned pregnancy.

Conclusions: Treatment with mavacamten in selected patients with symptomatic HOCM was safe and associated with significant clinical improvement, thus reproducing the main findings of the EXPLORER-HCM trial in a real-world setting.

CO 77. EFFECT OF MAVACAMTEN ON THE REMODELLING AND MICROSTRUCTURAL ARCHITECTURE OF THE MYOCARDIUM: A PRELIMINARY MECHANISTIC STUDY

Sílvia Aguiar Oliveira Rosa[1], Miguel Marques Antunes[1], Vera Ferreira[1], Inês Miranda[2], Isabel Cardoso[1], José Viegas[1], Cláudia Marra[3], Filipa Gerardo[2], Rodrigo Brandão[2], Maria Passos[2], Rui Cruz Ferreira[1], João Augusto[2]

[1]Hospital de Santa Marta. [2]Hospital Prof. Dr. Fernando da Fonseca, EPE/Hospital Amadora Sintra. [3]Centro Hospitalar Universitário de Lisboa Central, EPE/Hospital de Curry Cabral.

Introduction: Mavacamten is an allosteric inhibitor of cardiac myosin, capable of modifying myosin mechanochemistry leading to a reduction in sarcomere force generation, myocardial hypercontractility, and left ventricular outflow tract obstruction in patients with hypertrophic cardiomyopathy (HCM).

Objectives: To study the effect of mavacamten in ventricular remodelling, microvascular dysfunction, left ventricular (LV) strain and interstitial and replacement fibrosis, assessed by cardiovascular magnetic resonance (CMR).

Methods: We conducted a prospective observational study in HCM patients from two different centers. Eligible patients were required to have left ventricular outflow tract (LVOT) obstruction and were prescribed mavacamten as part of clinical care. All patients were treated with mavacamten for at least 24 weeks, with doses individualized to achieve targeted reductions in LVOT gradients based on echocardiographic assessments. We measured the effect of mavacamten at 24 weeks on microvascular dysfunction assessed by myocardial blood flow after stress perfusion CMR with regadenoson, specifically reporting the proportion (%) of LV hypoperfusion. We additionally obtained other CMR-derived metrics at baseline and follow-up: LV and right ventricle ejection fraction (LVEF, RVEF), LV and RV volumes, LV mass, global longitudinal and radial strains (GLS, GRS), native T1 and T2 mapping, extracellular volume (ECV), and percentage of LV late gadolinium enhancement (LGE). LVOT gradient was measured on echocardiogram.

Results: A total of 8 HCM patients were included, mean age 59.4 ± 9.5 years, 62.5% were male. Mavacamten reduced LVOT obstruction (gradient from 99.0 [80.8-115.3] mmHg to 20 [14.0-44.0] mmHg), reflecting the concomitant reduction in LVEF (baseline 67.9% ± 6.2%, follow-up 63.0% ± 4.9%). CMR

demonstrated stability in terms of ventricular adverse remodelling (no significant changes in LV and RV volumes or RVEF) and no progression in measures of fibrosis (stable native T1 mapping, ECV and% LGE). Notably, mavacamten decreased LV mass and improved LV systolic performance assessed by ventricular strain. Four patients concluded baseline and follow-up stress perfusion. Mavacamten reduced LV hypoperfusion (from 21.0 ± 15.5% to 15.6 ± 11.9%) (Figure 1 and 2). All results are detailed in Table 1.

Conclusions: Mavacamten caused a reverse remodelling of the LV, leading to an improvement in systolic performance assessed by LV strain, and reduced microvascular ischemic burden.

CO 78. ECHOCARDIOGRAPHIC EVOLUTION OF SYMPTOMATIC PATIENTS WITH OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY TREATED WITH MAVACAMTEN: EXPERIENCE OF A PORTUGUESE TERTIARY CARE CENTER

José Miguel Viegas, Pedro Garcia Brás, Inês Grácio Almeida, Isabel Cardoso, Miguel Marques Antunes, Rui Cruz Ferreira, Sílvia Aguiar Rosa

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

Introduction: Mavacamten, a first-in-class cardiac myosin inhibitor, received marketing authorization throughout the European Union in June 2023. The purpose of this study was to evaluate echocardiographic changes over time in patients (pts) with obstructive hypertrophic cardiomyopathy (oHCM) treated in a Portuguese tertiary hospital.

Methods: A standardized registry was prospectively performed for all pts who started mavacamten at a single oHCM referral center. Echocardiographic measures of cardiac structure and function were assessed at baseline and subsequently in accordance with the product characteristics. Data were compared using paired t-test.

Results: A total of 18 pts, 61% male, mean age 57 ± 16 years. 2 pts had latent exercise-provoked left ventricular outflow tract (LVOT) obstruction. No CYP2C19 poor metabolisers were identified. The mean follow-up period was 18 ± 10 weeks. At this point, 8 pts (44%) had completed the titration phase and reached the maintenance dose of the drug, of which 1pt on 5 mg, 1pt on 15 mg, and the remaining on 10 mg per day. Echocardiographic parameters at baseline and during follow-up are presented in Figure 1. Pts showed rapid and sustained reduction in both resting and Valsalva LVOT gradients (20 and 24% reduction from baseline, respectively, at the 5 mg dose, and 60% reduction at the 10 mg dose). 1 pt required a dose reduction per protocol due to a decrease in LVOT gradient to < 20 mmHg. There was a decline in LV ejection fraction (LVEF), however, no patient had to discontinue treatment due to an LVEF < 50%. A marked improvement in diastolic function was evident early, even before the complete resolution of LVOT obstruction, while right ventricular function parameters remained unchanged.

Figure CO 77

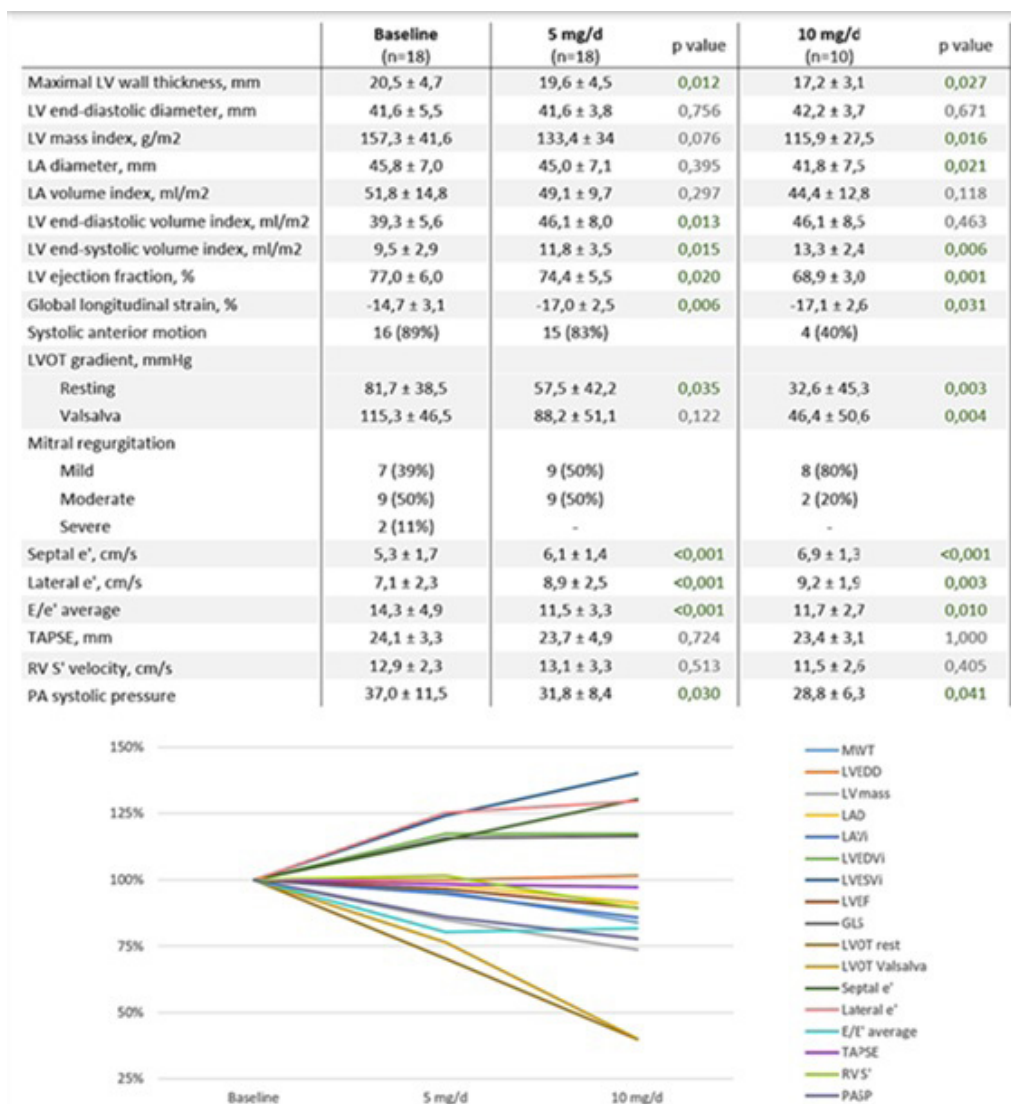|	Baseline (n=18)	5 mg/d (n=18)	p value	10 mg/d (n=10)	p value
Maximal LV wall thickness, mm	20,5 ± 4,7	19,6 ± 4,5	0,012	17,2 ± 3,1	0,027
LV end-diastolic diameter, mm	41,6 ± 5,5	41,6 ± 3,8	0,756	42,2 ± 3,7	0,671
LV mass index, g/m2	157,3 ± 41,6	133,4 ± 34	0,076	115,9 ± 27,5	0,016
LA diameter, mm	45,8 ± 7,0	45,0 ± 7,1	0,395	41,8 ± 7,5	0,021
LA volume index, ml/m2	51,8 ± 14,8	49,1 ± 9,7	0,297	44,4 ± 12,8	0,118
LV end-diastolic volume index, ml/m2	39,3 ± 5,6	46,1 ± 8,0	0,013	46,1 ± 8,5	0,463
LV end-systolic volume index, ml/m2	9,5 ± 2,9	11,8 ± 3,5	0,015	13,3 ± 2,4	0,006
LV ejection fraction, %	77,0 ± 6,0	74,4 ± 5,5	0,020	68,9 ± 3,0	0,001
Global longitudinal strain, %	-14,7 ± 3,1	-17,0 ± 2,5	0,006	-17,1 ± 2,6	0,031
Systolic anterior motion	16 (89%)	15 (83%)		4 (40%)	
LVOT gradient, mmHg					
Resting	81,7 ± 38,5	57,5 ± 42,2	0,035	32,6 ± 45,3	0,003
Valsalva	115,3 ± 46,5	88,2 ± 51,1	0,122	46,4 ± 50,6	0,004
Mitral regurgitation					
Mild	7 (39%)	9 (50%)		8 (80%)	
Moderate	9 (50%)	9 (50%)		2 (20%)	
Severe	2 (11%)	-		-	
Septal e', cm/s	5,3 ± 1,7	6,1 ± 1,4	<0,001	6,9 ± 1,3	<0,001
Lateral e', cm/s	7,1 ± 2,3	8,9 ± 2,5	<0,001	9,2 ± 1,9	0,003
E/e' average	14,3 ± 4,9	11,5 ± 3,3	<0,001	11,7 ± 2,7	0,010
TAPSE, mm	24,1 ± 3,3	23,7 ± 4,9	0,724	23,4 ± 3,1	1,000
RV S' velocity, cm/s	12,9 ± 2,3	13,1 ± 3,3	0,513	11,5 ± 2,6	0,405
PA systolic pressure	37,0 ± 11,5	31,8 ± 8,4	0,030	28,8 ± 6,3	0,041

Figure CO 78

Conclusions: Mavacamten significantly improved echocardiographic outcomes in this Portuguese cohort of symptomatic oHCM pts. These findings align with clinical trial data, confirming its efficacy in reducing obstruction and improving myocardial relaxation.

CO 79. THE INFLUENCE OF GENOTYPE ON THE PHENOTYPE AND PROGNOSIS OF PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

Inês Macedo Conde, Mónica Dias, Sofia Fernandes, Carla Ferreira, Filipe Vilela, Bárbara Rocha, João Faria, Catarina Vieira, Vítor Hugo Pereira

Hospital de Braga.

Introduction: Hypertrophic cardiomyopathy (HCM) is a genetically heterogeneous condition characterized by diverse clinical manifestations, ranging from asymptomatic cases to severe heart failure and sudden cardiac death. Advances in cardiac imaging and genetic testing have enhanced our understanding of the disease, revealing complex interplays between genotype and phenotype. However, the precise impact of specific genetic variants on clinical and imaging characteristics, as well as long-term outcomes, remains incompletely understood.

Objectives: To evaluate the influence of genotype on clinical and imaging phenotypes, and on a 2-year prognosis in HCM patients.

Methods: Observational, retrospective, single-center study, including 117 patients diagnosed with HCM through cardiac MRI between 2018 and 2024. Genetic test results (negative, variant of unknown significance, or positive and affected genes) were correlated with clinical and MRI data. For prognosis analysis, patients diagnosed between 2023 and 2024 were excluded, and comparisons were made between different genotype groups regarding the occurrence of MACE, cardiac hospitalizations, death, and non-sustained ventricular tachycardia (NSVT) in Holter monitoring after 1 year.

Results: 117 patients (67.5% male, mean age 62.9 ± 1.2 years) were included in our sample. Patients with positive genetic results had more severe symptoms, greater left ventricular (LV) wall thickness, lower LV ejection fraction, more fibrosis, and a higher likelihood of MACE and hospitalizations. Between the positive and VUS groups, there were no differences in the prevalence of NYHA class III or the presence of LGE, as well as in the likelihood of cardiac hospitalizations. Patients with VUS were more symptomatic and had more fibrosis compared to patients with a negative genetic test. Thin filament mutations were associated with worse imaging phenotypes. Specifically, patients with TPM1 mutations were more likely to develop NSVT.

Conclusions: Genotype influences the phenotype and prognosis of HCM patients, underscoring the importance of understanding the genetic basis of this disease.

CO 80. "RING-LIKE" LATE GADOLINIUM ENHANCEMENT: EXPLORING PATTERNS AND OUTCOMES

Rita Almeida Carvalho, Débora Correia, Rita Amador, Sérgio Maltês, Gonçalo Cunha, Pedro Lopes, Catarina Brízido, Christopher Strong, João Abecasis, Bruno Rocha, Carlos Aguiar, António Ferreira

Hospital Santa Cruz ULSLO.

Introduction: Left ventricular (LV) scar with a "ring-like" pattern detected by late gadolinium enhancement (LGE) on cardiac magnetic resonance (CMR) has been associated with an increased risk for ventricular arrhythmias and sudden cardiac death (SCD). However, the used definition varies between studies. We aimed to assess the differences across available definitions.
Methods: Retrospective single-center study of consecutive patients undergoing CMR and LGE study. A "ring-like" pattern was broadly identified by the presence of non-subendocardial (mid-wall and/or sub-epicardial) LGE involving at least three adjacent myocardial segments, as per the standardized AHA 17-segment model. Those with acute myocarditis and specific myocardial diseases (other than dilated cardiomyopathy) were excluded. The primary endpoint was a composite of death, sustained ventricular tachycardia (VT), or implantable cardioverter-defibrillator (ICD) shocks.
Results: Among 4,528 patients undergoing CMR, 210 (4.6%) exhibited a "ring-like" pattern, of whom 88 (42%) were excluded due to specific etiologies. Thus, 122 patients were assessed (mean age 60 ± 18 years; 80% male; 61% NYHA I; mean left ventricular ejection fraction (LVEF) 42 ± 14%; family history of cardiomyopathy or SCD in 5%). Mixed mid-wall and sub-epicardial patterns predominated (53%), followed by isolated mid-wall (34%). LGE was most prevalent in the basal segments (88%), followed by mid (48%) and apical walls (36%), involving 7 ± 3 segments overall and 4 ± 1 segments per ring. During a median follow-up of 12 (4-22) months, 25 (20%) patients had an event of the primary endpoint (13 VT, 7 deaths and 5 ICD shocks). These patients were older (67 ± 10 *vs.* 58 ± 19 years, p = 0.032), more often with SCD in first degree family members (12 vs. 3%, p = 0.044), with more cardiovascular symptoms (palpitations 40 vs. 18%, p = 0.007; syncope 36 vs. 7%, p < 0.001), structural heart disease (LVEF 36 ± 13 vs. 43 ± 14%, p = 0.028; LV end-diastolic volume 233 ± 59 *vs.* 193 ± 64 mL, p = 0.006), and higher native T1 mapping values (1,079 ± 85 *vs.* 1,033 ± 52 ms, p = 0.008). Patients with an event of the primary endpoint had a higher number of overall segments with mid-wall or sub-epicardial LGE (9 ± 4 *vs.* 7 ± 3; p < 0.001), even though the number of segments involved in each ring *per se* was similar to other patients (4 ± 1 *vs.* 4 ± 1; p = 0.089). Their rings more frequently

exhibited a mixed pattern (68 *vs.* 48%, p = 0.042), having more involvement of the mid (76 vs. 40%, p = 0.001) and apical (36 *vs.* 8%, p < 0.001) walls, as well as more often presenting with LGE in the right ventricle (8 *vs.* 1%, p = 0.046).
Conclusions: Our data suggests that different "ring-like" patterns may have varying degrees of association with the risk of arrhythmic events. Patients with mixed-type "ring-like" involving mid and apical walls were particularly more likely to have had an event of the primary outcome.

Domingo, 13 Abril de 2025 | 08:30-09:30

Sala D. Luís | Sessão de Comunicações Orais 17 – Reabilitação cardíaca: estratificação de risco, impacto do exercício e o papel da educação na melhoria dos resultados dos doentes

CO 81. MYERS AND MECKI SCORES IN CARDIAC REHABILITATION - COMPREHENSIVE AND SIMPLE AND RELIABLE TOOLS FOR RISK STRATIFICATION

João Mendes Cravo[1], Catarina Gregório[1], Marta Ramalhinho[2], Paula Sousa[3], Mariana Ferreira[4], Pedro Alves da Silva[1], Nelson Cunha[1], Inês Aguiar-Ricardo[1], Fausto J. Pinto[1], Ana Abreu[1]

[1]*Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa.* [2]*Department of Physical and rehabilitation Medicine, CHULN.* [3]*Centro Hospitalar Universitário de Lisboa Norte, EPE/Hospital de Santa Maria.* [4]*Clinical and Health Psychologist, cognitive behavioral psychotherapist. Psychiatry and Mental Health Service-CHULN.*

Introduction: Several cardiovascular risk stratification protocols exist, but few integrate cardiopulmonary exercise testing (CPET) parameters. The role of CPET in assessing patients and stratifying cardiovascular risk is becoming
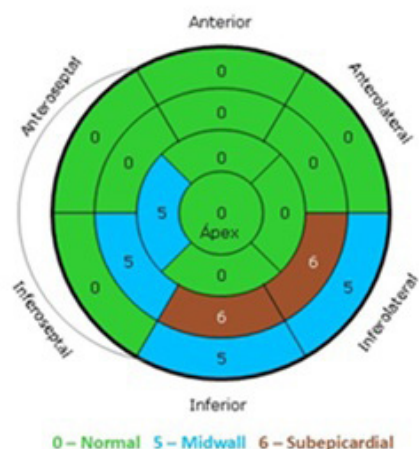

Figure 1. Example of a patient with a "ring-like" LGE pattern associated with "high-risk" features.
This patient exhibited a mixed-type LGE involving three mid-ventricular inferior segments and extending into the right ventricle. There was moderate biventricular dysfunction (LVEF 46%, RVEF 35%) and significant right ventricular dilation (RVEDVi 135mL/m²). The patient met the Padua's criteria for biventricular arrhythmogenic cardiomyopathy. Family history was unremarkable, and genetic testing for arrhythmogenic and dilated cardiomyopathy panels was negative. During follow-up, this patient experienced episodes of sustained ventricular tachycardia and implanted an ICD for secondary prevention.

Figure CO 80

increasingly recognized. Objective scores, such as the Meyers and MECKI scores, which incorporate CPET parameters, are well established in heart failure, but their utility in other populations, including coronary artery disease, is yet to be validated.

Objectives: To evaluate the MECKI and Meyers scores as risk stratification tools in patients undergoing cardiac rehabilitation (CR).

Methods: Prospective observational single-center study including patients enrolled in a phase II CR program between 2016 and 2024. The MECKI score was calculated using peak VO2, VE/VCO2 slope, hemoglobin levels, sodium levels, MDRD-estimated glomerular filtration rate and left ventricular ejection fraction (LVEF). The Myers score based on CPET parameters (peak VO2, PetCO2, OUES, HR and VE/VCO2) classified patients into low-, intermediate-, or high-risk categories. Both scores were assessed before and after CR. For analysis on clinical outcomes, a composite outcome of all-cause mortality, cardiovascular hospitalizations and urgent visits was defined.

Results: We gathered 550 patients who completed a phase II CR program (80% male, mean age 63.3 ± 11 years). The mean number of exercise sessions attended was 14. Among the participants, 83% had ischemic heart disease, with 49% presenting multivessel coronary disease and 29% with incomplete revascularization. The median MECKI score decreased from 2.29 (0.7-4.8) to 0.95 (0.4-1.8) after completing the program. Similarly, the mean Myers score decreased from 6.02 ± 0.4 to 4.69 ± 0.4 after CR. Regarding risk stratification using the Myers score, the proportion of patients in the low-risk category increased from 51% to 64% post-CR, while the intermediate-risk group decreased from 42% to 32% and the high-risk group from 7% to 4%. These changes reflected statistically significant improvements in MECKI and Meyers scores from baseline evaluations after CR completion (p < 0.001), in line with amelioration of patient risk profile. The mean follow-up duration was 2.97 ± 1.69 years. During this period, 44 patients were hospitalized and 21 patients died. A statistically significant association was found between high-risk Meyers scores post-CR and adverse outcomes (p < 0.001). Additionally, a trend toward higher event rates was observed in patients whose MECKI and Meyers scores did not improve between pre- and post-CR assessments.

Conclusions: The MECKI and Meyers scores were easily applied in our population and improved after CR, effectively identifying high-risk patients with higher rates of adverse outcomes. These scores help stratify post-phase II CR patients, guiding tailored care and intensive follow-up for high-risk individuals.

CO 82. THE ROLE OF PEAK VO2 IN CARDIAC REHABILITATION: PREDICTORS OF NON-RESPONSE AND THEIR IMPACT ON LONG-TERM OUTCOMES

Ana Rita M. Figueiredo[1], Miguel Raposo[1], Catarina Gregório[1], Ana Abrantes[1], Bruno Bento[2], Sílvia Fiuza[3], Graça Araújo[2], Pedro Alves da Silva[1], Nelson Cunha[1], Inês Aguiar-Ricardo[1], Fausto J. Pinto[1], Ana Abreu[1]

[1]Department of Cardiology, Hospital de Santa Maria (ULSSM), CAML, CCUL@RISE, Faculdade de Medicina, Universidade de Lisboa. [2]Hospital de Santa Maria (ULSSM), Faculty of Medicine of the University of Lisbon, Department of Physical and Rehabilitation Medicine, Lisbon. [3]Department of Cardiology, Hospital de Santa Maria (ULSSM).

Introduction: The positive impact of cardiac rehabilitation in terms of improvement in functional capacity, quality of life, and prognosis is well established. However, not all patients respond adequately to the programs.

Objectives: The objective of this work is to determine the rate and predictors of non-response to a cardiac rehabilitation program in terms of functional capacity. Additionally, it aims to evaluate the impact of non-response on prognosis.

Methods: Prospective observational single-center study including patients enrolled in a phase II CR program between 2016 and 2024. Clinical, imaging, laboratory and CPET data were collected. The population was divided into two groups: responders and non-responders to the CR program. A responder was defined as someone who showed an improvement in peak VO2 of at least 1 ml/kg/min in the CPET after completing the program.

Results: A total of 236 patients completed a phase II CR program, of these 105 were non-responders to the CR program. The peak VO2 increased by

2.9 ml/kg/min (1.9-4.6) in the responders group compared to a decrease of 0.3 ml/kg/min (-2.15-0.2) in the non-responders group. The baseline walking test results were similar between the groups, but the responders group showed improvement at the end of the program (539m vs. 575 m, p = 0.03). Both groups were similar regarding baseline characteristics, except for the presence of diabetes, hypertension, age and BMI. In the non-responder group, the percentage of diabetics was higher (37 vs. 22%, p = 0.02), as well hypertension (79.5 vs. 56.5%, p = 0.04). Non-responders were older (61.2 ± 0.9 years vs. 57.8 ± 1.2 years, p = 0.024) and more obese (28.3 ± vs. 27.0, p = 0.023). There was a significant correlation between non-response to CR and diabetes (p = 0.02), with a 52% probability of no improvement in peak VO2 among diabetics. Patients aged 62 or older demonstrated a statistically significant association with no improvement in peak VO2 (p = 0.024). The mean follow-up time was 2.97 ± 1.69 years. Seven deaths were recorded and 12 hospitalizations. Non-responders reported a higher incidence of events and mortality compared to the responder group (1.4 vs. 1% for reinfarction, and 4 vs. 2% for deaths, respectively). A statistically significant correlation was observed between composite outcomes and a peak VO2 ≤ 15 ml/kg/min (p = 0.02).

Conclusions: Our findings highlight the importance of peak VO2 improvement in monitoring functional improvement during cardiac rehabilitation and its role in reducing events during follow-up. Diabetes and age were identified as predictors of non-improvement, emphasizing the need to enhance adherence and tailored interventions in these high-risk groups.

CO 83. NONSPECIFIC VENTRICULAR REPOLARIZATION ABNORMALITIES: A BENIGN FINDING OR A PROGNOSTIC CONCERN?

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

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

Introduction: Nonspecific ventricular repolarization abnormalities (NVRA) are minor electrocardiographic changes in the ST segment and/or T wave often described in individuals without apparent heart disease. Although their clinical significance remains uncertain, often no further investigation is pursued, and they are usually disregarded in the absence of accompanying symptoms.

Objectives: To assess the impact of NVRA on the prognosis of individuals without established cardiovascular disease (CVD).

Methods: This analysis included 8,561 participants from the Third Report of the National Health and Nutrition Examination Survey who performed an ECG. Individuals with prior CVD or major ECG changes (e.g. QRS ≥ 120 ms, pathological Q waves or non-sinus rhythm) were excluded from the analysis. NVRAs were defined as subtle T wave changes (< 1 mm) and/or ST-segment depression < 0.5 mm. Relevant demographic, clinical and laboratorial data were compared between patients with and without NVRAs. The prognostic impact of NVRAs on all-cause and cardiovascular mortality was assessed using a Cox regression model to adjust for cofounders.

Results: A total of 6.766 participants were included, of which 739 (12%) had NVRAs. This group was older (mean age 62.6 ± 12.5 vs. 57.4 ± 12.9 years, p < 0.001), less frequently male (38.6 vs. 45.9%, p < 0.001) or of white race (65.1 vs. 74.6%, p < 0.001). This group had higher rates of hypertension (67.4 vs. 41.4%, p < 0.001), diabetes mellitus (21.9 vs. 14.8%, p < 0.001), dyslipidaemia (24.0 vs. 23.1%, p < 0.001) and higher BMI (28.2 vs. 26.7 kg/m², p < 0.001). After a mean follow-up of 18.6 ± 7.3 years, the overall all-cause mortality rate in the cohort was 49.2%, and CV mortality was 13.1%. The NVRA group experienced significantly higher all-cause mortality (64.1 vs. 47.2%, p < 0.001) and CV mortality (19.8 vs. 12.2%, p < 0.001) compared to the non-NVRA group. In multivariate Cox regression analysis, NVRA remained significantly associated with increased all-cause mortality (HR 1.21, 95%CI 1.06-1.40, p = 0.006), but not CV mortality (HR 1.20, 95%CI 0.91-1.59, p = 0.180). Conventional CV risk factors were predictors of both all-cause and CV mortality.

Conclusions: NVRAs are associated with higher all-cause mortality in individuals without CVD, indicating that NVRA may not be a benign finding and instead serve as a useful marker for poor overall prognosis. The clinical

Table 1 – Baseline clinical characteristics of individuals without established cardiovascular disease.

			No NVRA n=5.439 (88%)	NVRA n=739 (12%)	Total 6.178	p-value
Gender	Male	n (%)	2.498 (45.9%)	285 (38.6%)	2.774 (44.9%)	<0.001
	Female	n (%)	2.941 (54.1%)	454 (61.4%)	3.395 (55.1%)	
Age (years)		MeanSD	57.4 ± 12.9	62.6 ± 12.5		<0.001
White race		n (%)	4.055 (74.6%)	481 (65.1%)		<0.001
Hypertension		n (%)	2.254 (41.4%)	498 (67.4%)		<0.001
Dyslipidimia		n (%)	1.256 (23.1%)	177 (24.0%)		<0.001
Diabetes mellitus		n (%)	806 (14.8%)	162 (21.9%)		<0.001
Current or past history of smoking		n (%)	2.964 (54.5%)	374 (50.6%)		0.047
COPD		n (%)	427 (7.9%)	59 (8.0%)		0.90
BMI		n (%)	26.7 (23.8 – 30.3)	28.2 (25 – 31.5)		<0.001
Systolic BP		n (%)	129 ± 18	141 ± 21		<0.001
Diastolic BP		n (%)	76 ± 10	78 ± 11		<0.001
Total cholesterol		n (%)	217 ± 43	222 ± 44		<0.001
HbA1c		n (%)	5.7 ± 1.2	6.0 ±1.4		<0.001

Figure CO 83

relevance of NVRA in relation to cardiovascular events remains unclear and warrants further investigation.

CO 84. REALLY WORTH THE EFFORT: UNVEILING EXERCISE PULMONARY HYPERTENSION – A SINGLE CENTRE EXPERIENCE

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

Hospital Garcia de Orta, EPE.

Introduction and objectives: The 2022 ESC/ERS Pulmonary Hypertension (PH) guidelines brought us the definition of exercise pulmonary hypertension (E-PH), characterized by a mean pulmonary artery pressure to cardiac output ratio (mPAP/CO) slope above 3 mmHg/L/min, assessed by exercise right heart catheterization (E-RHC). Cardiopulmonary exercise test (CPET), though the evaluation of some metabolic parameters, could evaluate the probability of presence of PH. The aim of this study was to correlate parameters obtained in CPET, in predicting presence of E-PH in E-RHC. This study reflects the 2-plus years of evaluating patients with suspected E-PH.
Methods: We performed an observational, cross-sectional and unicentric study that included patients (pts) with dyspnea on effort, with risk factors for PH, but with low echocardiographic probability and normal NTproBNP. Pts were subjected to sequential CPET and E-RHC between January 2022 to October 2024. CPET was performed in a treadmill, using staged protocols - Bruce and modified Bruce. E-RHC used a protocol of 15 minutes (mts) in total, with stepwise workload increase of 10 Watts every 3 mts, and mPAP/CO slope was evaluated at peak effort.

	E-PH (n=20)	No E-PH (n=9)	p-value
VO2 peak (%; median)	83.5	87.0	0.390
VE/VCO2 slope (mean)	38.3	32.9	**0.013**
PET CO2 AT (median)	32.5	34.0	0.527
VE/VCO2 AT <34	6	6	0.08
VE/VCO2 AT >34	13	3	

Table 1 – CPET results in pts with and without E-PH

Results: Twenty-nine pts were included. Median age at the time of CPET was 64 years-old. Main diagnosis was chronic thromboembolic disease (CTED), including patients who previously were subjected to pulmonary endarterectomy and had no residual PH or patients with CTED who had been treated with ballon pulmonary angioplasty. Modified Bruce was the main protocol used for CPET (86%, n = 25), with mean effort time of 10.6 ± 2.7 mts. Regarding E-RHC, 93% of patients performed 9 or more minutes of exercise. Twenty pts (69%) had confirmed E-PH, with mean mPAP/CO slope in peak exercise of 4.62 mmHg/L/min. In pts with confirmed E-PH, VE/VCO2 slope was significantly higher (38.25 vs. 32.88, p = 0.013), but no differences were seen regarding percentage of VO2 peak or PETCO2 at anaerobic threshold (AT) (Table 1). Using a cutoff of 34 for respiratory equivalent for CO2 at first AT, we've seen more pts with confirmed E-PH with values above 34, but no statistical difference was obtained (p = 0.08).
Conclusions: Our study shows that CPET could be a paramount exam regarding evaluation of pts at risk for E-PH, with documented differences in VE/VCO2 slope. This study also shows that larger cohorts are needed to define the optimal cutoff values to define higher probability of E-PH, predicting the need for E-RHC or not.

CO 85. TEACHING YOUR HEART TO HEAL: THE ROLE OF PATIENT EDUCATION IN IMPROVING OUTCOMES IN PRIMARY ANGIOPLASTY FOR STEMI

Ana Raquel Carvalho Santos, Ricardo Carvalheiro, Francisco Albuquerque, Pedro Brás, André Grazina, Inês Rodrigues, Tiago Mendonça, Luis Morais, Ruben Ramos, Tiago Pereira da Silva, Duarte Cacela, Rui Ferreira

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

Introduction: Primary angioplasty has evolved significantly over the past two decades. This study explores trends in patient characteristics, comorbidities, quality of life, and the role of patient education in improving adherence and survival across three periods.
Methods: A retrospective cohort study was conducted on primary angioplasty data from 2002 to 2023 divided by three periods: 2002-2009 (Decade 1; 1,356 patients), 2010-2019 (Decade 2; 2,465 patients), and 2020-2023 (Decade 3; 1,155 patients). We assessed changes in patient demographics (age), comorbidities (hypertension [HTA] and heart failure [HF]), mortality, readmissions (30-day, 1-year, 3-year, and 5-year), quality of life (Perceived Health Status, Daily activity), and education outcomes (Therapeutic adherence, Autonomy taking medicines).
Results: There was a significant increase in patient age and the prevalence of HTA and HF, reflecting a more complex patient population. Despite this, readmission rates significantly decreased at 1, 3, and 5 years (p < 0.0001), and long-term mortality showed a substantial decline, especially in 2020-2022 (p < 0.0001). Improvements in quality of life were noted, with Perceived Health Status and Daily Activity showing significant gains at 30 days and 3 years (p = 0.0007, p = 0.0008), highlighting the benefits of early intervention. Patient education played a critical role in these outcomes. Therapeutic Adherence significantly improved at 30 days, 1 year, and 5 years (p < 0.0001), reflecting the effectiveness of structured discharge education and follow-up. Similarly, Autonomy taking medicines improved at 30 days and 1 year (p < 0.0001), indicating the importance of educating patients to manage their medications. Strong negative correlations were

observed between adherence and mortality, particularly at 1 year (r = -0.79) and 5 years (r = -0.60), underscoring the importance of education in improving survival.

Conclusions: This study underscores the critical role of patient education in improving both short- and long-term outcomes in primary angioplasty for STEMI. Despite an aging and more complex patient population, improvements in adherence, medication autonomy, and quality of life suggest that patient education is key to reducing mortality and improving recovery.

Domingo, 13 Abril de 2025 | 08:30-09:30

Sala D. Maria | Sessão de Comunicações Orais 18 – Imagem avançada e biomarcadores na estratificação de risco cardiovascular: da ressonância magnética de perfusão à remodelagem cardíaca

CO 86. PROGNOSTIC VALUE OF STRESS PERFUSION CARDIAC MAGNETIC RESONANCE: REAL-WORLD EVIDENCE FROM A LARGE PORTUGUESE COHORT

Miguel Sobral Domingues, André Garcia, Rui Gomes, Pedro Lopes, Kamil Stankowski, Francisco Gama, Cláudia Silva, Sara Guerreiro, João Abecasis, Pedro Freitas, António Ferreira

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

Introduction and objectives: Vasodilator stress perfusion cardiovascular magnetic resonance (CMR) has demonstrated good diagnostic performance for detecting obstructive coronary artery disease (CAD), but its prognostic value is sometimes regarded as less well established compared with other imaging modalities. The aim of this study was to assess the prognostic value of stress CMR in a contemporary cohort of patients with known or suspected CAD.

Methods: Consecutive patients undergoing adenosine stress perfusion CMR on a 1.5T scanner between 2019 and 2023 were followed for the occurrence of major adverse events, defined as all-cause mortality, non-fatal myocardial infarction (MI), cardiovascular hospitalization and late coronary revascularization (> 12 months post-CMR). The primary endpoint was defined as the composite of all-cause death and non-fatal MI. Secondary outcomes were defined as the occurrence of each individual major event. Survival analysis was performed to determine the prognostic value of inducible myocardial ischemia (≥ 2 segments) and late gadolinium enhancement (LGE) with ischemic pattern.

Results: A total of 1,043 patients (66% male; mean age 68 ± 11 years) were analyzed. Among them, 46.5% (n = 485) had known CAD, including 28.8% (n = 300) with previous MI, 29.2% (n = 305) with prior percutaneous coronary intervention (PCI), and 11.7% (n = 122) with prior coronary artery bypass grafting (CABG). Stress CMR was positive for ischemia in 268 patients (24.7%) and showed ischemic LGE in 426 (40.8%). A total of 157 patients (15.1%) had both inducible ischemia and ischemic LGE. Non-ischemic LGE was incidentally detected in 278 cases (26.6%). Over a median follow-up of 2.9 years, 215 events (20.6%) were recorded (84 deaths, 33 non-fatal MI's, 81 cardiovascular hospitalizations and 17 late revascularizations). Survival analysis showed significantly higher risks for the primary composite endpoint in patients with inducible ischemia, ischemic LGE, or both (Figure 1). Prognostic significance was consistent across each individual event analyzed (all log-rank p < 0.001). Multivariable Cox regression identified age (HR 1.05, 95%CI 1.03-1.07, p < 0.001), LV ejection fraction (HR 0.97, 95%CI 0.96-0.99, p < 0.001), inducible ischemia (HR 1.59, 95%CI 1.09-2.32, p = 0.015) and ischemic LGE (HR 1.70, 95%CI 1.07-2.69, p = 0.024) as independent predictors of the primary endpoint.

Conclusions: Both ischemia and ischemic LGE detected by stress perfusion CMR are significantly associated with an increased risk of the primary composite outcome of death and non-fatal MI. These findings confirm the prognostic value of stress perfusion CMR and support its application in routine clinical practice.

CO 87. REDUCED MRI-BASED RIGHT-TO-LEFT VENTRICULAR BLOOD POOL T2 RATIO PREDICTS ADVERSE EVENTS AND IMPAIRED CARDIOPULMONARY FUNCTION IN HEART FAILURE PATIENTS

Débora Sá[1], Ana Rita Bello[2], Pedro Lopes[2], Gonçalo Cunha[2], Bruno Rocha[2], Pedro Freitas[2], Sara Guerreiro[2], Cláudia Silva[2], Kamil Stankowski[3], Francisco Gama[2], João Abecasis[2], António Ferreira[2]

[1]Hospital Dr. Nélio Mendonça. [2]Hospital de Santa Cruz. [3]Humanitas Research Hospital.

Introduction: Cardiovascular magnetic resonance (CMR) T2 mapping is a sensitive tool for assessing blood oxygenation levels. A reduced right
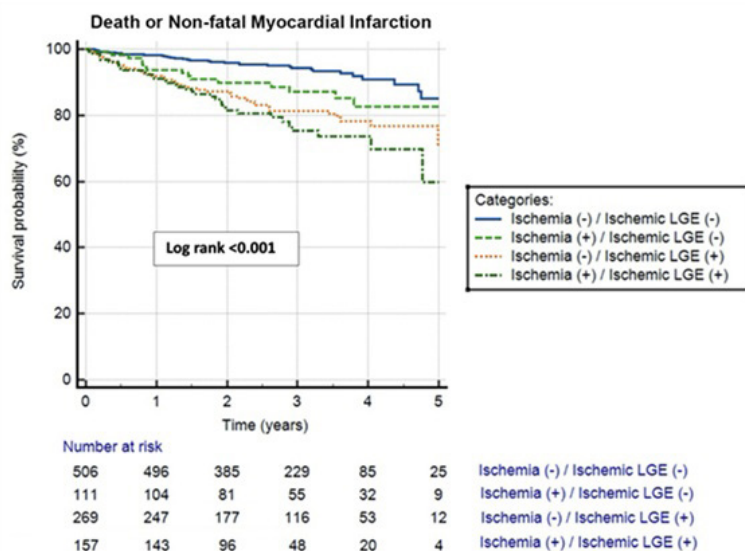

Figure CO 86

ventricular (RV) to left ventricular (LV) blood pool (BP) T2 relaxation time has been observed in patients with Heart Failure (HF) -due to increased peripheral oxygen extraction-, but its association with adverse clinical outcomes and physiologic parameters remains unexplored. This study aimed to assess the prognostic value of the RV/LV BP T2 ratio and its correlation with cardiopulmonary exercise metrics in patients with HF with reduced and mildly reduced ejection fraction (HFrEF and HFmrEF).

Methods: This retrospective, single-center cohort study included adult patients with HF and LVEF < 50% who underwent CMR with T2 mapping (T2-prep SSFP) between 2019-2024. Patients with congenital heart disease and/or known shunts were excluded. RV and LV BP T2 values were measured on a mid-ventricular short-axis slice, excluding trabeculations, papillary muscles, and inflow artifacts. The study endpoint was a composite of all-cause death or hospital admission for decompensated HF. In a subset of patients who underwent clinically indicated cardiopulmonary exercise testing (CPET) within one year of CMR, RV/LV BP T2 ratio was correlated with metrics of HF severity.

Results: A total of 301 patients were included (66% male, mean age 60 ± 16 years, median LVEF 35%; 36% with ischemic etiology). The mean RV/LV BP T2 ratio was 0.70 ± 0.11. After a median follow-up of 22 ± 17 months, 49 patients (14.1%) experienced the outcome (31 deaths, 18 HF hospitalizations). ROC curve analysis showed good discriminatory power of RV/LV BP T2 ratio for predicting outcome, with an AUC of 0.76 (95%CI: 0.69-0.83, p = 0.001). A RV/LV BP T2 ratio cut-point of 0.72 had 94% sensitivity and 46% specificity for MACE. Patients with values ≤ 0.72 represent 61% of the population but account for 94% of the events (Figure 2). After Cox regression adjustment for age, LVEF, NYHA class and ischemic etiology, RV/LV BP T2 ratio remained an independent predictor of outcome (adjusted HR 0.92 per 1% increase, 95%CI 0.89-0.96, p < 0.001). In the subset of 49 patients with CPET, RV/LV BP T2 ratio correlated with peak oxygen uptake (VO2, r = 0.43, p = 0.002) and ventilatory efficiency (VE/VCO2, r = -0.34, p = 0.020).

Figure 1: Two examples of CMR images with T2 mapping weighting at mid-ventricular short-axis slice, showing high and low RV/LV T2 ratios.
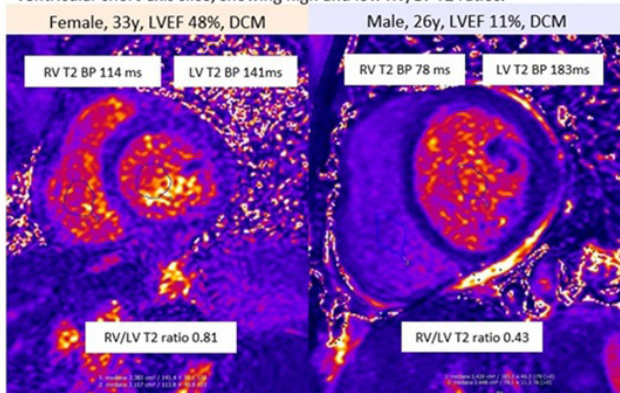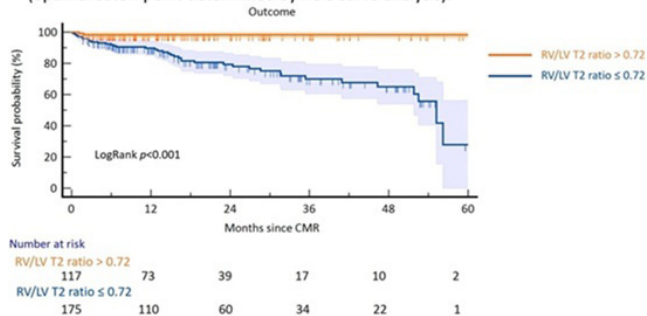

Figure 2: Kaplan-Meier survival curves comparing RV/LV ratio > 0.72 and ≤ 0.72 (optimal cutoff point determined by ROC curve analysis).

Conclusions: Decreased RV/LV T2 ratio correlates with impaired CPET parameters and is independently associated with higher risk of death and HF hospitalization. This biomarker can be readily obtained from routine CMR protocols and may serve as an additional tool to aid in assessing HF severity and prognosis.

CO 88. EPICARDIAL ADIPOSE TISSUE PLAYS AN ADDITIONAL ROLE IN CARDIOVASCULAR RISK ASSESSMENT TOGETHER WITH CORONARY ARTERY CALCIUM SCORE

Débora Sá[1], Maria Isabel Mendonça[2], Francisco Sousa[1], Gonçalo Abreu[1], Matilde Ferreira[1], João Adriano Sousa[1], Marco Gomes Serrão[1], Eva Henriques[2], Sónia Freitas[2], António Drumond[1], Ana Célia Sousa[2], Roberto Palma dos Reis[3]

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

Introduction: Recent research has shown that Epicardial Adipose Tissue (EAT) and the Coronary Artery Calcium Score (CACS), both assessed through a cardiac computed tomography (CT), are strongly associated with patient prognosis and the risk of adverse cardiovascular (CV) outcomes. Nevertheless, it is unclear if EAT remains an event risk tool when considering the CACS.

Objectives: Study the role of Epicardial Adipose Tissue in cardiovascular risk when CAC score influence is present.

Methods: A prospective study with 1,024 healthy participants (58.3 ± 8.4 years; 75.6% male) followed during an average of 6.1 ± 4.8 years. Non-contrast CT images for CACS were obtained at baseline, and the EAT volume was analyzed. Kaplan-Meier estimator was used to assess the additional predictive value of EAT relative to the CACS in four models for the risk of all-cause CV adverse events. A Cox regression analysis was performed with the CACS and EAT combination and adjusted for all other covariables.

Results: After an extended follow-up period, 41 participants (4%) had CV events. Kaplan-Meier, stratified by EAT and CAC, showed the lowest EAT and CACS had the best probability of survival, and those with higher EAT volume and CACS had the worst survival. After Cox regression analysis, increased EAT and CAC was associated with an adjusted hazard ratio of 5.51 (95%CI: 2.33 to 13.00; p < 0.0001), predicting CV events.
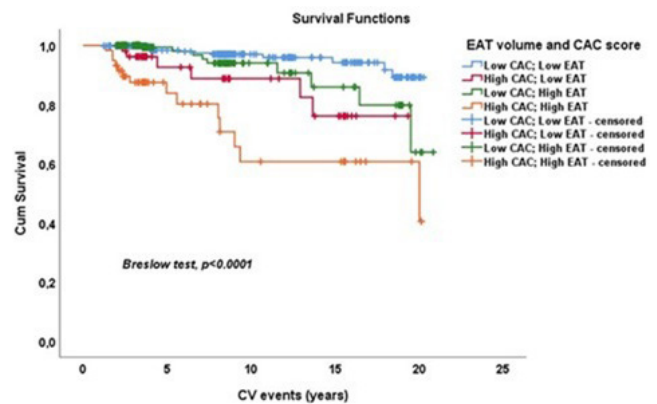
Events-free survival time of EAT volume and CAC score combination models
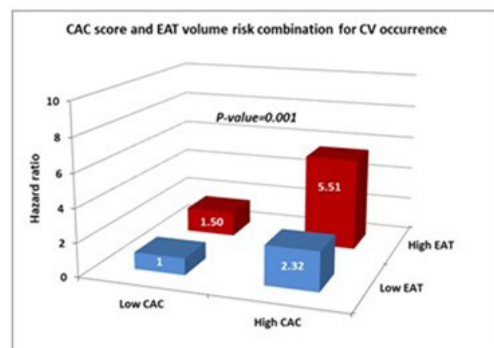
Conclusions: Increased EAT volume is associated with more CV events, probably due to atherosclerosis advance. There is an incremental predictive

value when the increased EAT volume is added to the increased CAC score in predicting CV events. Strategies to reduce EAT volume may decrease subclinical atherosclerosis and improve outcomes with adequate measures like physical exercise, proper diet and pharmaceutical intervention.

CO 89. INCREMENTAL PROGNOSTIC ROLE OF LEFT VENTRICULAR GLOBAL LONGITUDINAL STRAIN AFTER ACUTE MYOCARDIAL INFARCTION

Rui Miguel Gomes, Débora da Silva Correia, Márcia Presume, C. Santo-Jorge, Rita Barbosa, Samuel Azevedo, Sara Guerreiro, Liliana Marta, Carlos Aguiar, Marisa Trabulo, Regina Ribeiras, Jorge Ferreira

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

Introduction: Left ventricular (LV) systolic function is a key predictor of outcomes after acute myocardial infarction (AMI). While global longitudinal strain (GLS) has demonstrated additional prognostic value in patients with mildly to moderately depressed LV ejection fraction (LVEF), its significance in patients with more severely reduced LVEF remains less well established. In the early post-AMI phase, LVEF may have limitations in accurately identifying significant systolic dysfunction. GLS, a more precise and operator-independent measure of LV deformation, offers potential for improved assessment of LV systolic function in this setting.

	LVEF ≤40% or GLS≤16% (n=121)	Others (n=58)	p-value
Demographics			
Age, years	63±18	62±13	0.499
BMI, Kg/m²	29.6±2.4	26.6 ± 3.7	0.456
Killip ≥3, n (%)	4 (6)	0	0.038
NT-proBNP, pg/mL	1448 [607-3477]	339.5 [165-727]	<0.001
Peak Troponin, ng/L	2712.5 [770-8212]	986 [279-3300]	<0.001
Transthoracic Echocardiography			
EDVi, ml/m²	57 [50-69]	54 [45-59]	0.001
LAVI ml/m²	32 [24-41]	30 [24-40]	0.414
E/E'	9 [7-12]	8 [6.6-10.8]	0.087
Follow-Up			
NT-proBNP at 3-months, pg/mL	575 [147-1820]	142 [62-388]	0.005
NT-proBNP at 6-months, pg/mL	469 [106-1042]	151 [64-286]	0.009
Heart Failure (HF), n (%)	39 (32)	6 (10)	0.002
CV Hospitalization, n (%)	10 (8)	5 (9)	0.948
All-cause Mortality, n (%)	4 (4)	1 (2)	0.516
HF + CV Hospitalization+ All-cause Mortality, n (%)	45 (37)	9 (16)	0.003

Table 1- Differences between groups in demographics, ETT and Follow-up. Mean ± SD, Median [IQR]

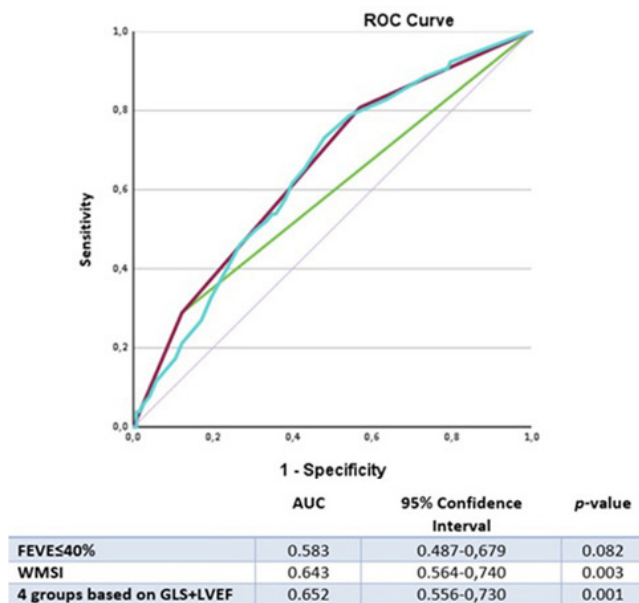|	AUC	95% Confidence Interval	p-value
FEVES≤40%	0.583	0.487-0.679	0.082
WMSI	0.643	0.564-0.740	0.003
4 groups based on GLS+LVEF	0.652	0.556-0.730	0.001

Figure 1 and Table2- ROC Curves for LVEF≤40%, WMSI and 4 groups based on GLS+LVEF

Objectives: Evaluate the incremental value of GLS in the estimation of LV systolic function in patients with LVEF ≤ 40% and its prognostic implications following AMI.

Methods: Single-centre prospective cohort of 333 consecutive patients admitted with AMI between 2023 and 2024 (65 ± 16 years, 74% male). After the acute phase, all patients underwent echocardiography a mean of 4 ± 6 days after admission. Patients with previously known coronary artery disease or heart failure (HF), or incomplete echocardiographic data were excluded. Baseline characteristics and outcomes were compared between patients with LVEF ≤ 40% or GLS ≤ -16%, and all other patients. The incremental value of GLS for the prediction of the composite endpoint of HF, cardiovascular (CV) hospitalization and all-cause death was evaluated by dividing patients into four groups based on LVEF and GLS: "LVEF > 40%+GLS > -16", "LVEF > 40%+GLS ≤ -16", "LVEF ≤ 40%+GLS > -16" and "LVEF ≤ 40%+GLS ≤ -16." ROC curve analyses were used to compare the incremental predictive value of GLS beyond LVEF and wall motion score index (WMSI) for the composite endpoint.

Results: 179 patients were included (mean age 62 ± 16 years, 74% male, 58% STEMI and 31% with anterior AMI). Among these, 24% (n = 43) had mildly reduced LVEF, 18% (n = 32) LVEF ≤ 40% and 67% (n = 119) had GLS ≤ -16%. WMSI was > 1 in 19% (n = 63). Patients with LVEF ≤ 40% or GLS ≤ -16% (n = 121) presented with higher Killip class (≥ 3 in 6 vs. 0%, p = 0.038), higher peak hsTnT (2,712 [770-8,212] vs. 986 [279-3,300], p < 0.001), and higher peak NT-proBNP (1,448 [607-3,477] vs. 339.5 [165-727] pg/mL, p < 0.001). Over a median follow-up of 324 ± 110 days, 54 patients (30%) reached the composite endpoint, with the majority coming from the group with LVEF ≤ 40% or GLS ≤ -16% (Table 1). Stratifying patients into groups based on LVEF and GLS demonstrated a higher area under the curve (AUC) compared to only using LVEF ≤ 40% or WMSI alone (FEVE ≤ 40%: AUC 0.583, p = 0.082; WMSI: AUC 0.643, p = 0.003; 4 groups based on GLS and FEVE: 0.652, p = 0.001) (Figure 1).

Conclusions: In this cohort, stratifying patients based on both LVEF and GLS provided a more accurate prediction of clinical outcomes compared to using LVEF ≤ 40% or WMSI alone.

CO 90. CHARACTERISATION OF LEFT ATRIAL DEFORMATION DURING CARDIOVASCULAR REVERSE REMODELLING INDUCED BY PREGNANCY AND ITS POTENTIAL PREDICTORS

Ana Barros[1], Ana Filipa Ferreira[1], Rui Alves[1], Juliana Morais[1], Débora Veiga[1], Maria João Azevedo[2], Carla Sousa[3], Ana Paula Machado[3], Adelino Leite-Moreira[1], Carla Ramalho[1], António S. Barros[1], Inês Falcão-Pires[1]

[1]Faculdade de Medicina da Universidade do Porto. [2]I3S-Instituto de Investigação e Inovação em Saúde, UP. [3]Centro Hospitalar Universitário de São João.

Introduction: Haemodynamic overload during pregnancy leads to changes in the cardiovascular (CV) system, which may normalise within 6-12 months postpartum through a process called CV reverse remodelling (RR). Although cardiac systolic function is preserved during pregnancy and the postpartum period, impaired cardiac relaxation has been described during pregnancy and recovery after delivery. Left atrial (LA) strain has been named as a potential predictor of diastolic dysfunction; hence, it is relevant in this context.

Objectives: To characterise LA strain during CV RR induced by pregnancy and identify its potential predictors.

Methods: This prospective cohort study included volunteer pregnant women recruited from two tertiary healthcare centres between February 2019 and December 2023. Participants were evaluated by transthoracic echocardiography in the 3rd trimester [PT3, 30-35 weeks gestation, peak of CV remodelling] and in the 1st (PP1), 6th (PP2), and 12th (PP3) months postpartum, during CV RR. Generalised linear mixed-effect models were used to evaluate the CV RR, including the variation in LA strain and its potential predictors.

Results: We included 169 women with a median age of 34 [31;37] years, having 35.5% at least one CV risk factor prior to pregnancy. After delivery, we observed a significant reduction in LA volume (49 [42;56] mL/m²·⁷ to 41 [34;51] mL/m²·⁷, p < 0.001) and E/e' (6.67 [5.44;7.96] to 5.79 [4.87;6.54], p < 0.001) as soon as 1 month postpartum. Regarding LA deformation, a significant reduction in LA strain was found from PT3 to PP1 (32 [29;40]% to 29 [26;34]%, p < 0.001) and recovering in PP2 (32 [29;40]% to 33 [30;38]%, p = 0.031). Although left ventricular (LV) systolic function was preserved during the follow-up period, a significant increase in global longitudinal strain (GLS, -21.6

[-23.9;-20.1]% to -22.85 [-24.4;-21.1]%, p = 0.019) and ejection fraction (60 [58; 63]% to 61 [58;64]%, p = 0.016) was observed from PT3 to PP2. In our cohort sample, LV GLS was an independent predictor of LA strain (-0.53 [-0.74,-0.32], p < 0.001). The presence of CV risk factors (0.03 [-1.65.1.70], p = 0.974), pregnancy complications (-0.43 [-2.14;1.29], p = 0.6624), LA volume (-0.10 [-0.34.0.13], p = 0.399), E/e' (0.05 [-0.42.0.52], p = 0.830), and age (-0.04 [-0.21.0.13], p = 0.632) showed no significant impact on LA strain.

Conclusions: Although LA volume and E/e' demonstrated recovery at 1 month postpartum, LA deformation exhibited significant improvement only after 6 months. LV GLS was identified as an independent predictor of LA strain.

Domingo, 13 Abril de 2025 | 08:30-09:30

Sala Infante | Sessão de Comunicações Orais 19 – Doença valvular

CO 91. EFFECTIVE REGURGITANT ORIFICE AREA AND LEFT VENTRICULAR VOLUME IMPACT ON HOSPITALIZATIONS EFFECTS OF TRANSCATHETER EDGE-TO-EDGE MITRAL VALVE REPAIR: A META-REGRESSION ANALYSIS

Bárbara Lage Garcia, Emídio Mata, Margarida Castro, Luísa Pinheiro, Mariana Tinoco, João Português, Francisco Ferreira, Sílvia Ribeiro, Lucy Calvo, António Lourenço

Unidade Local de Saúde do Alto Ave.

Introduction: The impact of transcatheter edge-to-edge mitral valve repair (MTEER) on reducing hospitalizations in patients with secondary mitral regurgitation (SMR) remains a topic of debate. This meta-regression evaluates how baseline effective regurgitant orifice area (EROA) and left ventricular end-diastolic volume (LVEDV) influence hospitalization effects of MTEER when compared to guideline-directed medical therapy (GDMT).

Methods: In September 2024, a systematic search was performed in PubMed, the Cochrane Central Register of Controlled Trials, Scopus, and Web of Science to identify randomized controlled trials (RCTs) involving patients with SMR randomized to either MTEER plus GDMT or GDMT alone and reporting hazard ratios (HR) for hospitalizations. HRs between the two groups for all hospitalizations (first and recurrent) at 24 months were pooled using a mixed-effects meta-regression model (DerSimonian-Laird) with EROA and LVEDV as moderators.

Results: From 1,558 identified articles, the final analysis included the COAPT, MITRA-FR, and RESHAPE-HF2 trials with a total of 1,423 patients. Meta-regression revealed a baseline HR for 24-month all hospitalizations for a patient with an EROA of 0.2 cm² of 0.758 [95%CI: 0.359-1.600], with an increase by a factor of 0.873 [95%CI: 0.508-1.501] per 0.1 cm² increase in EROA. Baseline EROA did not influence the outcome significantly (p = 0.622), having a pseudo-R² of -2.09, indicating no improvement in model fit. As for a baseline LVEDV impact, a baseline HR for 24-month all hospitalizations for a reference LVEDV of 180 mL estimated at 0.500 [0.374-0.668], with a borderline non-significant increase by a factor of 1.077 [0.994-1.166] per additional 10 mL (p = 0.0687, pseudo-R² = 1.00).

Conclusions: This meta-regression found no significant effect of baseline EROA on hospitalization outcomes for SMR patients undergoing MTEER. However, a borderline trend suggested that larger baseline LVEDV may be associated with a higher risk of hospitalization. These findings highlight the complexity of predicting hospitalization outcomes after MTEER and suggest that baseline LVEDV may be more relevant than EROA in determining MTEER benefits in SMR. Nevertheless, the limited dataset raises concerns about the robustness of these conclusions.

CO 92. PROGNOSTIC IMPACT OF MITRAL BALLOON VALVULOPLASTY FOR MITRAL STENOSIS PATIENTS: WHEN THE RIGHT HEART CATHETERIZATION IS THE ANSWER

Fernando Nascimento Ferreira, Mariana Caetano Coelho, Bárbara Lacerda Teixeira, Sofia Jacinto, Inês Rodrigues, Ana Teresa Timóteo, Luís Bernardes, Duarte Cacela, Cristina Fondinho, Luís Almeida Morais, Rui Cruz Ferreira

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

ROC Curve

PAP = 35mmHg
Sensitivity 87,5%
Specificity 69.4%
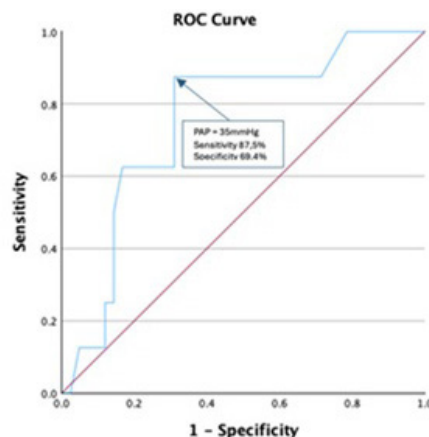
Variables	Univariate		Multivariate	
	OR (95% CI)	p value	OR (95% CI)	p value
Mean PAP ≥ 35 mmHg by RHC	7.81 (1.42 – 42.83)	0.018	6.65 (1.16 - 38.20)	0.034
Age in years	0.99 (0.95-1.0)	0.353	0.97 (0.92 – 1.06)	0.310
NYHA Class	1.089 (0.43-2.75)	0.857	1.40 (0.43 – 5.15)	0.578
Wilkins Score	1.32 (0.86 – 2.0)	0.210	0.74 (0.74 - 2.01)	0.414
Left Atrial volume in Echo	1.0 (0.96 – 1,01)	0.960	1.03 (0.62 – 1.10)	0.405
SPAP in Echo	1.03 (0.99 – 1.06)	0.156	1.0 (0.95 - 1.06)	0.973

Figure CO 92

Introduction: Mitral balloon valvuloplasty (MBV) is a well-established procedure used to treat patients with mitral stenosis, a condition that often leads to the development of pulmonary hypertension (PH). While MBV effectively reduces left atrial pressure and improves PH, previous PH is associated with worse outcomes and its prognostic value in this population is not fully understood. This study aims to assess the relevance of right heart haemodynamics, comparing to non-invasive parameters, in predicting prognosis following BMV, with a focus on determining a cut-off value for mean PAP that best correlates with patient outcomes.

Objectives: Assess the prognostic significance of mean PAP in patients undergoing balloon mitral valvuloplasty.

Methods: A retrospective analysis was performed on consecutive patients with severe mitral stenosis who underwent PMBV between 2010 and 2024 in a single centre. Mean PAP was measured for each patient, and a ROC curve analysis was used to determine the optimal cut-off value. Patients were divided into two groups based on a mean PAP threshold of 35 mmHg (derived from ROC analysis). Prognostic significance was assessed considering other factors such as age, NYHA class, Wilkins score, left atrial volume and systolic pulmonary artery pressure (SPAP).

Results: 51 pt were included in the analysis, the median age was 49 years and 80.4% were female and 50% was NYHA class III or higher, on Echo the median Wilkins score was 8, with mitral average mean gradient of 12 mmHg and mean anatomic Mitral Valve area was 1.04 cm^2, PSAP 49.6 mmHg and on right heart catheterization the average mean PAP was 35.2 mmHg. ROC analysis identified a mean PAP threshold of 35 mmHg as the best predictor of adverse outcomes. Patients with PAP > 35 mmHg had significantly worse prognosis, with more cardiovascular death or reintervention rate, with an odds ratio of 6.65 (95%CI: 1.16-38.19). In multivariate analysis, this parameter becomes the most powerful predictor of events, comparing to non-invasive echocardiographic measures like the Wilkins score, and PSAP.

Conclusions: In patients undergoing balloon mitral valvuloplasty, a mean pulmonary artery pressure greater than 35 mmHg is the stronger predictor of adverse outcomes. This finding highlights the value of invasive PAP evaluation as an independent prognostic tool, comparing to non-invasive echocardiographic measures. Further research is needed to explore the benefits of incorporating PAP measurement into routine risk assessment for BMV candidates.

CO 93. THE IMPACT OF AORTIC DISTENSIBILITY IN PATIENTS WITH BICUSPID AORTIC VALVE STENOSIS

Débora da Silva Correia[1], Kamil Stankowski[2], João Abecasis[1], Pedro Lopes[1], Rita Reis Santos[1], Rita Lima[1], Telma Lima[1], António Ferreira[1], Maria João Andrade[1], Regina Ribeiras[1], Sância Ramos[1], Pedro Adragão[1]

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Introduction: Ventricular adaptation to aortic stenosis (AS) is influenced by both valve obstruction and overall vascular load. Bicuspid aortic valve (BAV) is associated with intrinsic aortopathy, impacting aortic stiffness. We aimed to compare aortic stiffness, using distensibility as its surrogate marker, between AS patients with BAV and tricuspid aortic valve (TAV) and to assess its impact on LV remodeling.

Methods: Single-centre, prospective cohort study of 158 patients with severe symptomatic AS (71 ± 8 years, 50% male; mean transaortic gradient 61 ± 17 mmHg, mean indexed aortic valve area 0.4 ± 0.1 cm^2/m^2 and mean LV ejection fraction 58 ± 9%) referred for SAVR between 2019 and 2022. Patients with previous cardiomyopathy, concomitant moderate/severe aortic regurgitation and severe non-AS valvulopathy were excluded. All participants underwent transthoracic echocardiography (TTE) and cardiac magnetic resonance (CMR) before SAVR. Valve morphology was determined from TTE or surgical operative reports. Average systolic and diastolic ascending aortic (AA) dimensions were measured at *cine* images on the horizontal three-chamber and coronal left ventricular outflow views, at the level of pulmonary artery bifurcation. Maximum and minimum aortic areas were then inferred and aortic distensibility calculated. Relative aortic valve load (VL) and valvulo-arterial impedance (Zva) were calculated and correlated with aortic distensibility. LV ventricular geometric remodeling, defined from CMR, was assessed according to valve morphology and aortic distensibility.

Results: A total of 123 patients were included (71 years [IQR 9]; 50% male), 13% with BAV, and 87% with TAV (25 patients with undetermined valve morphology). All patients had normal flow/high gradient AS, and BAV cases exhibited the ascending phenotype without root involvement. BAV patients were younger, with lower prevalence of hypertension and with higher prevalence of aortopathy. AS severity indexes were similar between groups, except for higher mean transvalvular gradients in BAV (Table 1). BAV patients
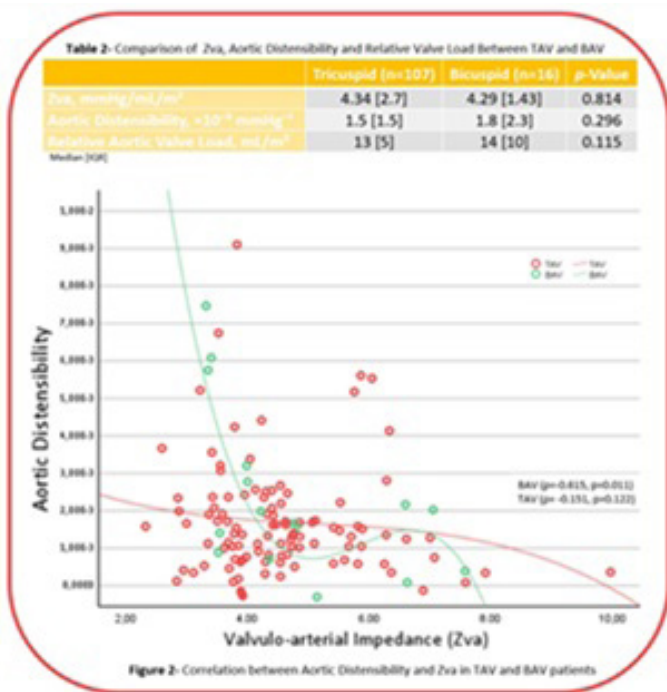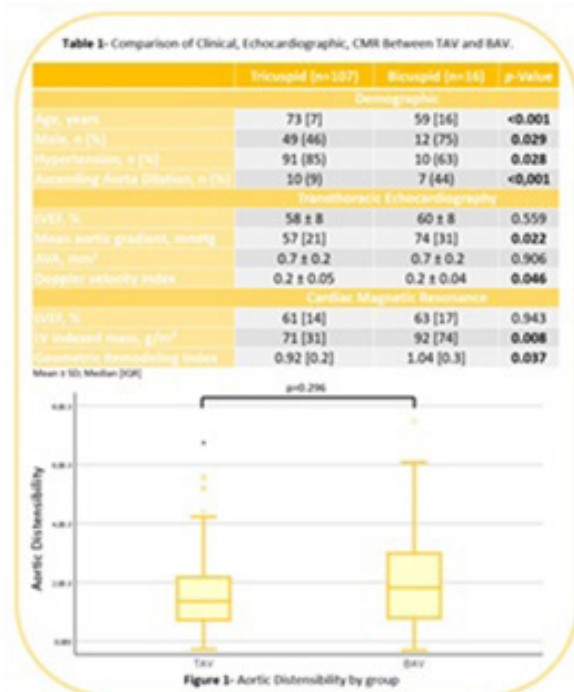

Figure CO 93

exhibited higher aortic distensibility and VL, though these differences were not statistically significant. Zva values were comparable between groups (Table 2). A negative correlation was found between distensibility and Zva in BAV patients (ρ = -0.615, p = 0.011) but not in the TAV group (ρ = -0.151, p = 0.122) (Figure 2). LV geometric remodeling had no significant correlation with aortic distensibility in both group of patients (ρ -0.114, p = 0.246 in BAV and ρ 0.137, p = 0.264 in TAV).

Conclusions: Aortic distensibility was similar between BAV and TAV patients and showed no association with LV remodeling in either group. However, in BAV patients there was a significant negative correlation between distensibility and Zva, favouring a distinct ventricular-valvular and vascular relationship in this subgroup.

CO 94. CALCIUM IDENTIFICATION AND SCORING BASED ON 3D TRANSESOPHAGEAL ECHOCARDIOGRAPHY - AN EXPLORATORY STUDY ON AORTIC VALVE STENOSIS

Paula Fazendas[1], Rita Bairros[2], Luís Brito Elvas[2], Liliana Brochado[3], João Carlos Ferreira[4], Ana Rita Pereira[3], Cristina Martins[3], José Pereira[3], Cândida Lourenço[3], Tomás Brandão[2], Hélder Pereira[3], Ana G. Almeida[1]

[1]Centro Cardiovascular da Universidade de Lisboa. [2]Instituto Universitário de Lisboa (ISCTE-IUL). [3]Hospital Garcia de Orta, EPE. [4]Instituto Universitário de Lisboa (ISCTE-IUL).

Introduction: Calcium score of the aortic valve has emerged as a tool for assessing aortic valve severity. Computed tomography (CT) is needed for calcium quantification according to the Agatson score. The use of CT scans is limited due to ionizing radiation and availability. Calcium identification based on echo pixels using artificial intelligence (AI) systems have shown promising results in transthoracic echocardiography (TTE). Nevertheless, this technique is highly dependent on the patient's acoustic window. We propose that transesophageal echocardiography (TEE) obviates the poor acoustic window and could be used for sequential follow-up of patients since no ionizing radiation is used. We also propose that 3D TEE could be more adequate to estimate total valve calcium burden because it allows for identification of calcium pixels in a greater portion of the aortic valve, when compared to 2D techniques.

Objectives: Quantification by AI of the calcium burden of the aortic valve by 3D TEE (Standard method: Computer tomography).
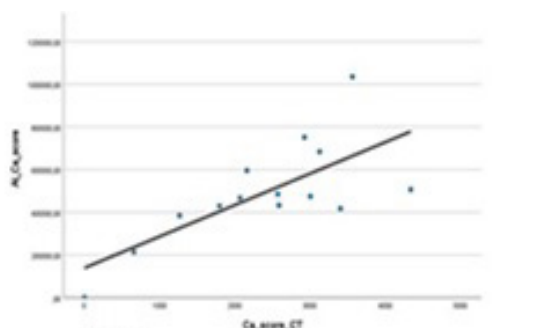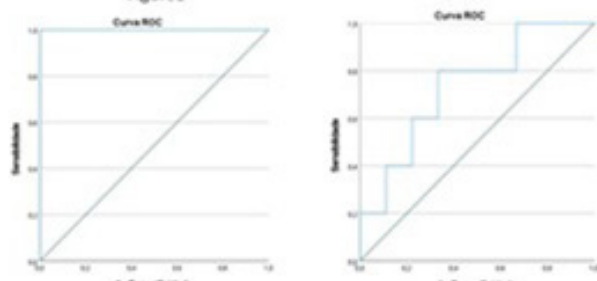

Figure 1

Figure 2- A   Figure 2- B

Methods: Prospective study. Population: 14 individuals, 6 males, 13 patients with moderate or severe aortic stenosis by TTE, median age 77 years (IQR

15). Imagiologic studies: TEE exam: 3D volume sets acquired in 3D zoom at the level of the aortic valve, stored in DICOM for post-processing. In the MPR quantification software contiguous 1.5 mm slices were obtained of the aortic valve in diastole, in short axis view. A Computer Vision (CV) model was applied to echocardiographic images, via adaptive image segmentation and Deep Learning to identify speckles and artifacts generated by the presence of calcium and hence quantify the amount of calcification of the valve. To train the model, images from a healthy control were used. The concordance of the Ca speckles of the 3D TEE images and the Agatston score was compared.

Results: CT Ca score: mean 2,391 ± 1,176; AI_Ca_score: 491,652 ± 240,952, The delay between TEE and CT scans was 55 days (IQR 75), The AI Ca score showed a significant positive correlation with the CT Agatston Ca_score: R = 0.72 (CI 95% 0.30-0.90) (Figure 1). The ROC curve analysis to detect very likely or likely severe calcification showed an excellent result with an AUC of 1 (Figure 2A) for a cutoff of 300,068 in the AI Ca Score, and a good result to detect very likely severe calcification with an AUC of 0.73 (Figure 2B) for a cutoff of 471061.5 in the AI Ca Score, with a Sensibility of 80% and Specificity of 67%.

Conclusions: In this pilot study we conclude that identification of calcification of the aortic valve by AI from TEE 3D images is feasible and correlates positively with CT scans with a good performance do detect severe calcification. This model should be applied to further ranges of aortic valve calcification to better discriminate severity of the disease.

CO 95. AGING HEARTS: TRANSCATHETER AORTIC VALVE REPLACEMENT ASSESSMENT IN THE NONAGENARIAN POPULATION - A SINGLE CENTER EXPERIENCE

Tatiana Pereira dos Santos, Ana L. Silva, Mariana Rodrigues Simões, Gonçalo Terleira Batista, Rafaela Fernandes, Tomás M. Carlos, Bernardo Lisboa Resende, Luísa Gomes Rocha, Mafalda Griné, Elisabete Jorge, Marco Costa, Lino Gonçalves

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

Introduction: Nonagenarians pose a significant challenge for cardiology interventions due to their clinical frailty and comorbidities. Transcatheter aortic valve replacement (TAVR) has demonstrated safety in high surgical risk patients, with more evidence concerning low to intermediate risk patients. The aging population, coupled with a high prevalence of severe aortic stenosis, underscores the need for deeper insights. However, studies and randomized control trials frequently suffer from insufficient representation of this age cohort, hampering our ability to definitively assess the efficacy and safety of interventions in nonagenarians.

Methods: Retrospective analysis of TAVR patients aged ≥ 90 years at a tertiary hospital (March 2020-June 2024). The purpose was to evaluate the characteristics, outcomes, and safety of patients ≥ 90 years who underwent TAVR for severe aortic stenosis and compare their mortality with younger patients.

Results: Among 903 patients, 50 were nonaganerians, median age of 91 (IQR 5), and 50% were male. Median follow-up was 506 (IQR 609) days. Cardiovascular (CV) risk factors included: 20% diabetes, 86% hypertension, and 60% dyslipidemia. The majority were in NYHA class II (58%) and III (32%). The mean EuroSCORE II was 3.16% ± 2.26%, with a mean LVEF of 55.7% ± 11.9%, and a mean transaortic gradient of 48.8 ± 13.5 mmHg. Procedurally was used transfemoral access, with 82% self-expandable valves. There were 2 immediate access complications, a hematoma at the primary access site and a vessel rupture, promptly resolved. There was also 1 case of retroperitoneal hematoma. Pacemaker implantation was required in 20%. TAVR patients had an all-cause mortality of 11.1%. For nonaganerians, there were 8 deaths (16%), one due to CV causes (stroke), with the others having unknown causes. Kaplan-Meyer survival analysis showed that the survival rates for nonaganerians versus patients < 90 years of age were 94.0% versus 93.2% at 12 months and 79.1% versus 84.8% at 36 months, with no statistically significant difference (p = 0.226). No difference in mortality between sexes (p = 0.702).
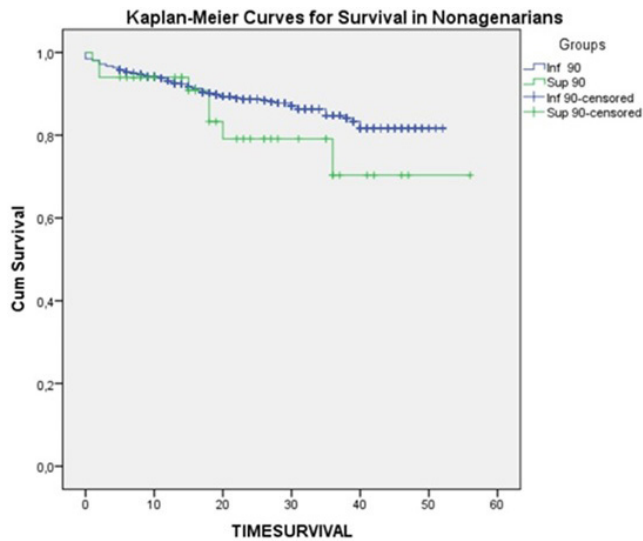
Conclusions: This study demonstrates that TAVR appears to be a safe procedure in fit patients aged ≥ 90 years, with a low complications rates and overall mortality comparable to younger patients. A better representation of this subgroup is needed in studies concerning the high prevalence of this disease and high mortality without interventional treatment.

Espaço Ágora | Sessão de Comunicações Orais 20 – Prémio Melhor Comunicação Oral

CO 96. IMPACT OF USING THE 2024 ESC GUIDELINE-RECOMMENDED METHOD FOR ESTIMATING THE LIKELIHOOD OF OBSTRUCTIVE CORONARY DISEASE - A CARDIAC CT STUDY

Rita Barbosa Sousa, Rita Lima, Samuel Azevedo, Débora da Silva Correia, Kamil Stankowski, Pedro Lopes, Sara Guerreiro, Cláudia Silva, Francisco Gama, Pedro Freitas, João Abecasis, António Ferreira

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Introduction: The 2024 ESC guidelines on chronic coronary syndromes incorporate risk factors alongside traditional parameters such as age, sex and symptom typicality to estimate the pre-test probability (PTP) of obstructive coronary artery disease (CAD). The Guidelines also suggest using coronary artery calcium score (CACS, Class IIa recommendation) to reclassify patients with a low PTP (> 5% to ≤ 15%).

Objectives: To assess the potential impact of using the new 2024 ESC-PTP model in symptomatic patients undergoing coronary computed tomography angiography (CCTA) for suspected CAD.

Methods: We conducted a retrospective analysis of prospectively collected data from consecutive patients undergoing CCTA for suspected CAD. CACS
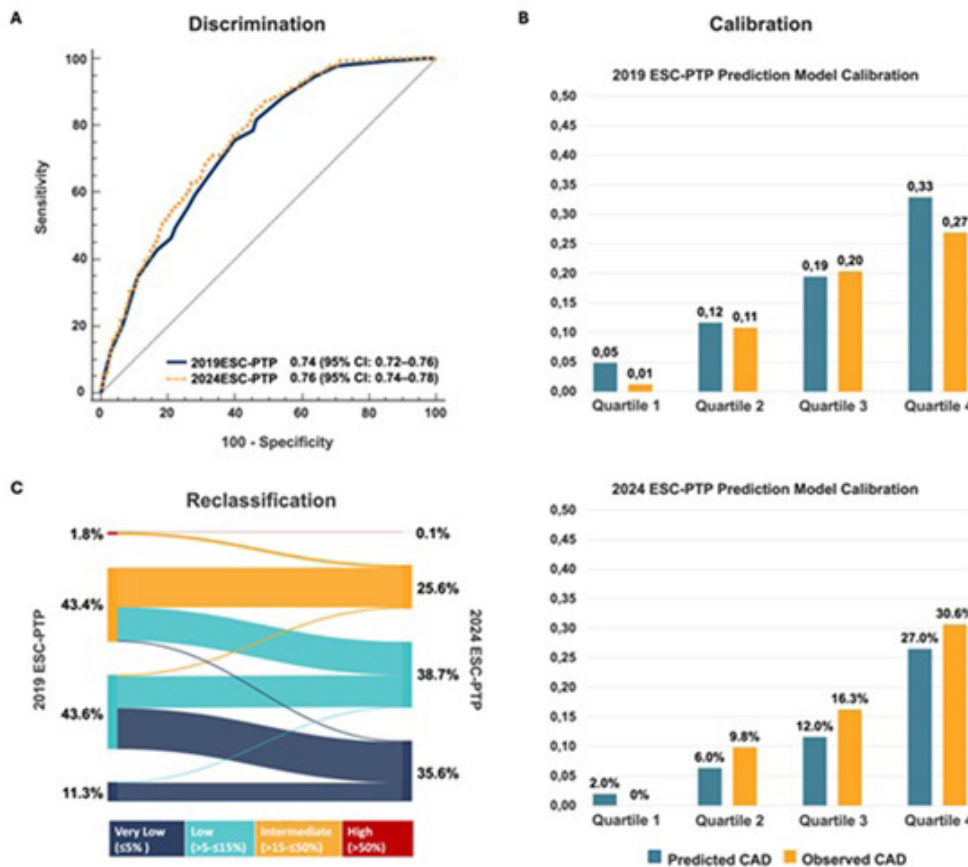

Figure 1 – (A) Receiver operating characteristic (ROC) curves showing that the 2024 ESC-PTP model achieves the highest discriminatory ability compared to the 2019 ESC-PTP (p=0.031). (B) Comparison of predicted vs. observed CAD across quartiles for each model. (C) Reclassification of clinical likelihood categories for CAD (very low, ≤5%; low, >5% to ≤15%; moderate, >15% to ≤50%; high, >50%) based on the 2024 ESC-PTP, as compared to the categories defined by the 2019 ESC-PTP.

Figure CO 96

was performed immediately prior to CCTA. Key exclusion criteria included asymptomatic patients, symptoms other than chest pain or dyspnea, known CAD, preoperative assessment, known LVEF < 50%, suspected acute coronary syndrome or age < 30 years. Obstructive CAD was defined as any luminal stenosis ≥ 50% on CCTA. Whenever downstream testing was performed, patients were reclassified accordingly. Discrimination and calibration were assessed. Reclassification was analyzed across PTP categories [Very Low (≤ 5%); Low (> 5 to ≤ 15%); Moderate (> 15 to ≤ 50%); High (> 50%)].

Results: A total of 1,595 patients were included (42% male (n = 671); median age 64 [IQR 56-72] years). Obstructive CAD prevalence was 14.2% (n = 226). Compared to the 2019 ESC-PTP, the 2024 ESC-PTP showed improved discrimination, with C-statistics of 0.76 (95%CI: 0.74-0.78, p < 0.001) vs. 0.74 (95%CI: 0.72-0.76, p < 0.001), p = 0.031 for comparison. In terms of calibration, the 2019 ESC-PTP overestimated the likelihood of CAD by 18.0% (p < 0.001), while the 2024 ESC-PTP underestimated it by 19.4% (p < 0.001). The 2024 ESC-PTP model reclassified 47.3% of patients (n = 755) previously categorized by the 2019 ESC-PTP model, with 97.2% (n = 734) of these being reassigned to a lower risk category (Figure 1C). The proportion classified as Very Low PTP increased from 11.3% to 35.6%. Among patients classified as Low PTP by 2024 ESC-PTP (n = 617), adding CACS to the diagnostic pathway would reclassify 41.3% (n = 255) to Very Low PTP, with only 1.6% of these (n = 4) showing obstructive CAD.

Conclusions: In patients undergoing CCTA for suspected CAD, the 2024 ESC-PTP offers slightly better discrimination than the 2019 ESC-PTP but seems to underestimate the likelihood of disease. This new method reclassifies almost half of these patients to lower categories, potentially impacting testing decisions. Using CACS in patients with Low PTP could obviate further testing in roughly 40% of these patients, but at the cost of 1-2% missed diagnoses.

CO 97. STENT PERFORMANCE IN THE SPOTLIGHT: SIMULATION USING 3D-PRINTED BIFURCATION MODELS

Catarina Simões de Oliveira[1], Miguel Raposo[1], Diogo Ferreira[1], Daniel Cazeiro[1], Tiago Rodrigues[1], Miguel Nobre Menezes[1], Helena Santiago[2], Helena Correia[2], Manuel F.C. Pereira[3], Fausto J. Pinto[1], João Silva Marques[1]

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Introduction: The treatment of ostial lesions in the left anterior descending artery (LAD) poses significant challenges. Left main crossover stenting tests the limits of contemporary drug eluting stents (DES). There is a gap in evidence for guiding stent selection in this context.

Objectives: This study sought to compare the performance of different DES in a standardized left main bifurcation lesion (Medina 0.1,0) using 3D-printing and a realistic simulation environment (Image A and B).

Methods: A realistic left main anatomy with an eccentric ostial LAD lesion was replicated using 3D-printing with flexible resin. Tests were performed using a realistic simulator with pulsatile flow in the cath lab. Five 3.5 mm DES (Xience Skypoint, Onyx Frontier, Synergy, Orsiro Mission and Ultimaster Tansei) were implanted in similar 3D-printed models using a standardized protocol following European Bifurcation Club recommendations that included final POT using a 6 mm balloon (Image C). Angiography, OCT and IVUS runs were acquired at each procedural step and images were blindly reviewed and analyzed offline (Image D). Micro-CT was used after each intervention for comprehensive analysis of DES performance (Image E).

Results: Micro-CT analysis revealed that stent expansion at the ostial lesion was higher using Ultimaster and lower with Synergy. Xience achieved the highest and Synergy the lowest expansion in the left main after POT. Observed overexpansion was 147% of the nominal stent diameter, on average. Importantly, all stents kept structural integrity. Accordingly, stent malapposition after POT assessed by OCT was lower for Ultimaster and Xience stents and higher for Synergy. On micro-CT, the stent cell area at the side-branch showed substantial variation (3.3-13.1 mm^2) being lower for Synergy and higher for Ultimaster. Regarding stent length, Xience, Orsiro and Onyx elongated after POT (4.3 mm, 1.6 mm and 1.5 mm, respectively) and Ultimaster shortened (-1.5 mm). Synergy showed no significant length change. When employing micro-CT as the benchmark for evaluating intravascular imaging techniques in analyzing the outcomes of bifurcation interventions, OCT demonstrated superior performance compared to IVUS. There was a strong correlation between OCT and micro-CT stent measurements in distal left main and at the ostial stenosis (distal left main area p = 0.037, r = 0.9; stenosis stent area p = 0.026, r = 0.92).

Conclusions: This study underscores the potential influence of DES platform selection on the outcomes of bifurcation interventions, particularly when there is a significant size disparity between the distal and proximal landing zones, as well as complex ostial stenosis. The integration of 3D-printed anatomical models in simulation testing marks a significant leap forward offering a novel pathway to enhance the safety, efficacy, and personalization of interventions.
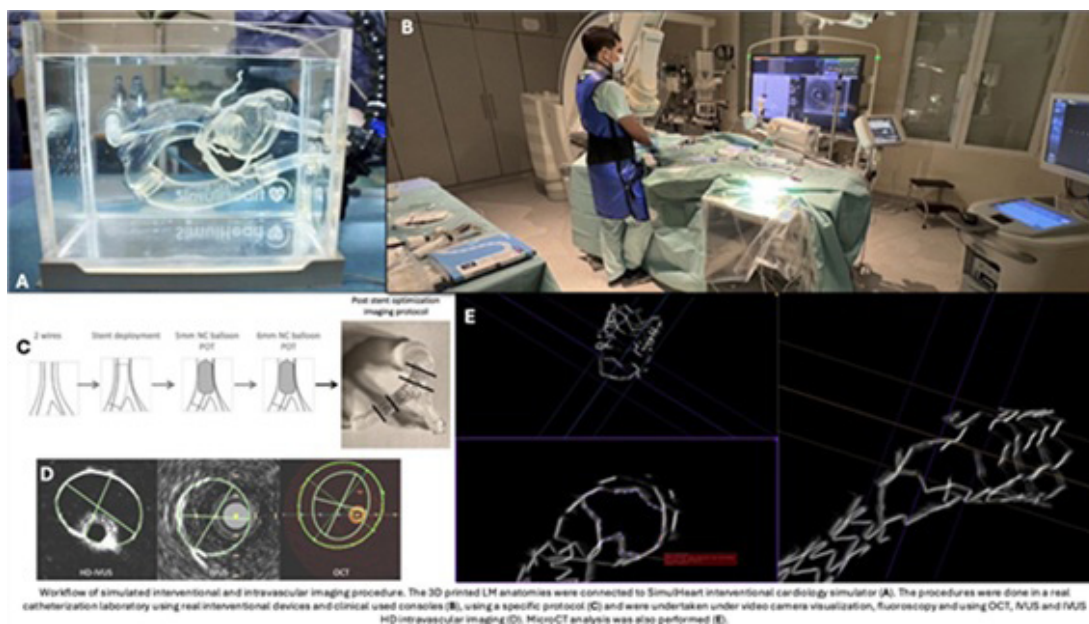

Figure CO 97

CO 98. MACHINE LEARNING ALGORITHMS FOR PREDICTING ARRHYTHMIC EVENTS IN HYPERTROPHIC CARDIOMYOPATHY: LIMITED ENHANCEMENT BEYOND LATE GADOLINIUM ENHANCEMENT

Joana Certo Pereira, Rita Amador, Armando Vieira, Rita Carvalho, Bruno Castilho, Edmundo Arteaga, Carlos Rochitte, João Abecasis, Pedro Lopes, Pedro Freitas, Pedro Adragão, António M. Ferreira

ULS Lisboa Ocidental, Santa Cruz.

Introduction and objectives: The optimal tool for predicting arrhythmic risk in Hypertrophic cardiomyopathy (HCM) remains a topic of ongoing debate. Artificial intelligence techniques, particularly machine learning (ML) predictive modelling, hold promise for improving risk stratification. The purpose of this study was to develop and assess the performance of a ML model integrating common clinical features to predict arrhythmic events in patients with HCM.

Methods: We conducted a post-hoc analysis of an international multicenter registry of 530 HCM patients (median age of 49 years (IQR 35-61), 57% male) who underwent cardiac magnetic resonance (CMR) for diagnostic confirmation and risk stratification. The dataset comprised clinical, echocardiographic, and CMR variables, including quantification of late gadolinium enhancement (LGE) using the 6 SD method. The study endpoint was a composite of sudden cardiac death (SCD), aborted SCD, and sustained ventricular tachycardia (VT). A total of 28 events (15 SCDs, 6 aborted SCD and 7 sustained VTs) were accrued over a median follow-up of 4.1 (IQR 1.8-7.3) years. Using these data, several ML models [including Logistic Regression, Decision Trees, Gradient Boosting Machines, Support Vector Machines and Random Forest (RF)] were developed to predict the study endpoint. The predictive performance of the best model was then compared to the ESC HCM risk score and to the amount of LGE.

Results: After testing several models, the RF was the most effective method. Key predictive features included LGE percentage, left ventricular ejection fraction, left atrial diameter, and left ventricular indexed mass (Figure 1A). After 5-fold cross-validation, the RF model showed good performance for predicting arrhythmic events, achieving a time-weighted AUC of 0.78 (95%CI: 0.76-0.82, p < 0.001). This performance substantially outperformed the ESC HCM risk score, which achieved a time-weighted AUC of 0.64 (95%CI 0.62-0.67; p < 0.001), p < 0.001 for comparison. However, when compared to LGE alone, which attained a time-weighted AUC of 0.76

(95%CI: 0.73-0.84, p < 0.001), the RF model provided only a modest, statistically non-significant improvement in predicting the study endpoint (p = 0.817 for comparison).

Conclusions: A machine learning model using readily available clinical variables significantly outperformed the ESC HCM risk score in predicting arrhythmic events in HCM. However, its incremental value over LGE alone was modest, underscoring the strong predictive value of this imaging biomarker. Future research exploring AI-driven image analysis and other innovative approaches may yield better results.

CO 99. DYNAMIC CT PERFUSION TO IDENTIFY HEMODYNAMICALLY SIGNIFICANT CORONARY ARTERY DISEASE: PRELIMINARY RESULTS OF A "ONE-STOP-SHOP" APPROACH

Débora da Silva Correia[1], Joana Certo Pereira[1], Rita Barbosa[1], Kamil Stankowski[2], Sara Guereiro[1], Francisco Gama[1], Cláudia Silva[1], João Abecasis[1], Pedro Freitas[1], Pedro Lopes[1], António Ferreira[1]

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[2]IRCCS Humanitas Research Hospital, Milano, Italy.

Introduction: Coronary CT Angiography (CCTA) is effective for diagnosing coronary artery disease (CAD) but often overestimates stenosis severity and lacks hemodynamic evaluation. Dynamic stress CT perfusion (CTP) has emerged as a potential strategy to combine anatomical and functional assessment in a single scan. The aim of this study was to assess the impact on clinical pathways of performing CTP in patients with ≥ 50% stenosis on CCTA.

Methods: In this single-center study, patients with suspected CAD and ≥ 50% stenosis on CCTA who underwent stress dynamic CTP were compared with patients with ≥ 50% stenosis on CCTA who didn't undergo CTP. To improve comparability, patients were matched in a 1:2 ratio based on age, sex, body mass index, pretest probability, coronary calcium score, and CAD-RADS. Perfusion scans were performed on a 192-slice scanner, using regadenoson as stressor agent. Hemodynamically significant CAD was defined as ≥ 90% stenosis on invasive coronary angiography (ICA), positive functional assessment, or decision to revascularization. The primary outcome was the rate of invasive angiographies without significant CAD. Secondary outcomes were time to diagnosis and total radiation exposure including downstream

Figure1. ML for predicting arrhythmic events in HCM: Feature importance in RF model (1A) and ROC curve analysis of RF ML model, LGE %, and ESC HCM risk score for predicting arrhythmic events in HCM (1B).
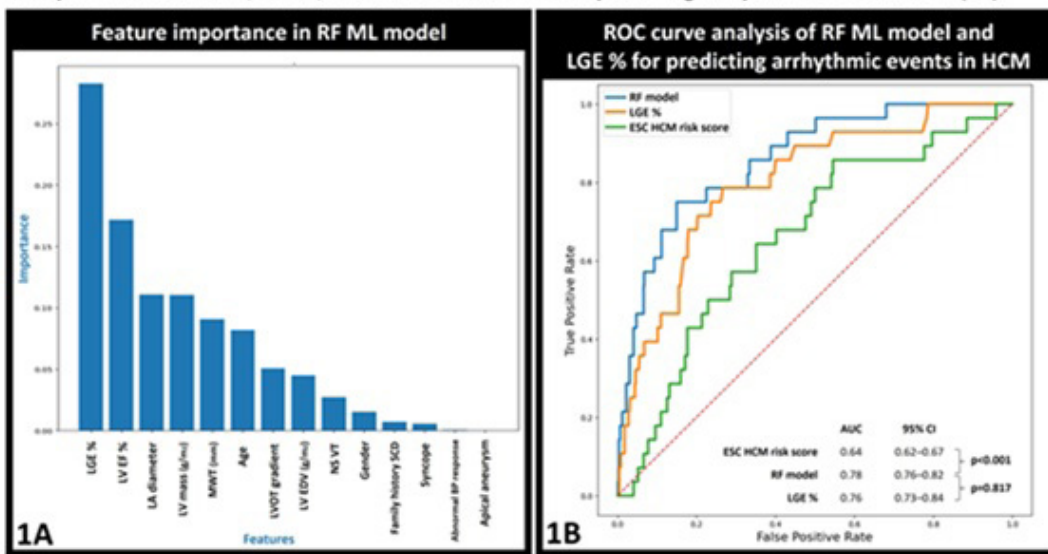
RF: Random Forest; ML: Machine Learning; LGE: Late gadolinium enhancement; HCM: Hypertrophic Cardiomyopathy; ESC: European Society of Cardiology; AUC: area under the curve; LV: left ventricular; EF: ejection fraction; LA: left atrium; MWT: myocardial wall thickness; LVOT: LV outflow tract; EDV: end-diastolic volume; NS VT: Non-sustained ventricular tachycardia; SCD: sudden cardiac death; BP: blood pressure.

Figure CO 98

Table 1 - Baseline Characteristics of both groups. Median ± SD. Median [IQR]

	"CCTA only" (n=94)	"CCTA+CTP" (n=47)	p-value
Age, years	66.3 ± 9.9	69.0 ± 8.9	0.104
Male	57 (61%)	39 (83%)	0.007
Body mass index, kg/m2	27.8 [5.4]	28.1 [5.7]	0.898
Pre-test probability ESC 2024	18 ± 12%	19 ± 11%	0.589
Coronary Calcium Score	305 [336]	731 [1583]	<0.001
CAD RADS ≥ 4	45 (48%)	27 (57%)	0.284
Downstream Ischemia Testing	12 (13%)	0 (0%)	0.010
Invasive coronary angiograms	47 (53%)	18 (39%)	0.132
Negative invasive angiography rate	19 (40%)	2 (11%)	0.001
Leading to revascularization	28 (60%)	16 (89%)	0.036
Total effective radiation dose, mSv	5.7 [7]	6.5 [5]	0.341
Median time to diagnosis from CCTA, days	10 [155]	0 [184]	0.004

Figure 1- Sankey diagram of diagnostic path in the "CCTA only" patients. % related to the previous step

Figure 2- Sankey diagram of diagnostic path in the "CCTA+CTP" patients. % related to the previous step
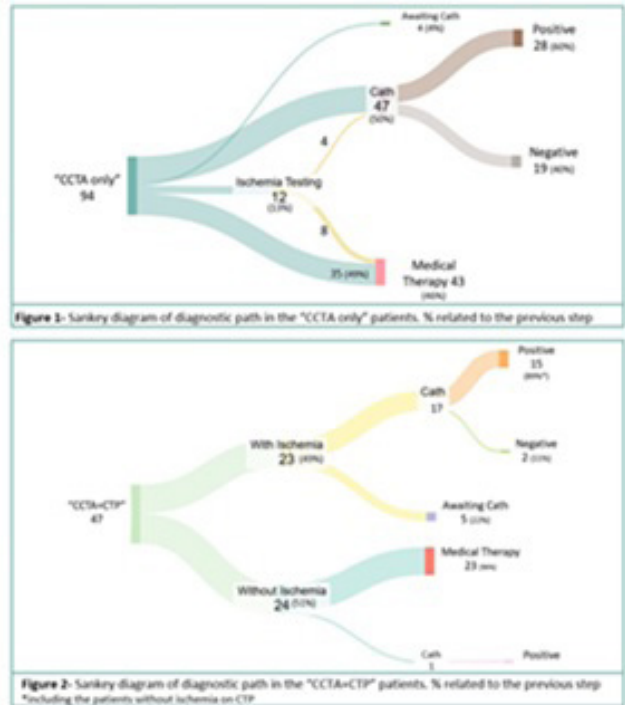*including the patients without ischemia on CTP

Figure CO 99

testing. All decisions on downstream testing, ICA, and revascularization were at the cardiologist's discretion.

Results: A total of 141 patients were studied (67 ± 10 years, 68% male), 47 of whom underwent CCTA+CTP, and 94 CCTA only. The groups were comparable, except for a higher proportion of males and higher calcium scores in the CCTA+CTP group (Table 1). Overall, 49% perfusion scans were considered positive. Downstream ischemia testing was performed in 13% of "CCTA only" patients compared to none in the other group (*p* = 0.009). Invasive coronary angiography was performed in 50% of "CCTA only" patients and 36% of CCTA+CTP patients. The "CCTA+CTP" group had a significantly lower rate of negative invasive angiography (4 vs. 20%, p = 0.001). One patient without significant ischemia on CTP underwent ICA with positive invasive functional assessment. The proportion of ICA leading to revascularization was also higher in CCTA+CTP, with a positive predictive value (PPV) of 86 vs. 59% on "CCTA only" group (p < 0.001). Median time to diagnosis was significant lower in the "CCTA+CTP" group. Performing Perfusion CT added a median effective radiation dose of 3.6 [3-4] mSv to the scan protocol, but this difference was offset by additional downstream testing in the "CCTA only" group. Over a median follow-up of 515 days, no patient without ischemia on CCTA+CTP had an acute coronary event.

Conclusions: Performing stress CTP in patients with ≥ 50% stenosis on CCTA seems to streamline diagnosis by decreasing downstream ischemia testing, negative invasive angiographies, and time to diagnosis. After accounting for these, the overall effective radiation dose is not increased by using this strategy.

CO 100. RADIOMICS-BASED ARTIFICIAL INTELLIGENCE MODEL ALLOWS FOR PERSONALIZED PREDICTION OF VENTRICULAR ARRHYTHMIAS IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

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Introduction: Ventricular arrythmias (VA) are potentially life-threatening in hypertrophic cardiomyopathy (HCM) patients (P). Traditional risk models have limited accuracy to predict these events. Artificial intelligence models allow for deep quantitative phenotyping of high-dimensional radiomics data derived from cardiac magnetic resonance (CMR), which may enhance VA risk stratification in HCM.

Objectives: To develop a model able to predict VA events derived from CMR left ventricular (LV) late gadolinium enhancement (LGE) imaging.

Methods: CMR images from 63 HCM P (median age 54 [43-66] years, 35% female), prospectively followed at a Cardiomyopathy Clinic were analyzed. The LV wall was manually segmented using 3D Slicer 5.2.2. We extracted 1223 features using PyRadiomics (v3.1.0), covering shape, first order and textural features from original and filtered images, which were z-score normalized for intensity discretization. The outcome was a time-to-event analysis of a composite of VA – ventricular fibrillation (VF), ventricular tachycardia, (VT), and non-sustained VT (NSVT) - with T0 being the day of the CMR. Sixty-three P were randomly split in a 75%:25% ratio into a 47P (training) and 16P (held-out testing) sets. A Random Survival Forest (RSF) was optimized using a 5-fold cross-validation and performance was assessed with the concordance index (c-index).

Results: The studied cohort had a median 12% [6-18] of LV mass LGE. The primary outcome occurred in 14 (22%) P-1 VF, 2 VT and 11 NSVT – over a median follow-up of 3.6 [1.5-4.2] years. The RSF with 30 estimators (2 samples/split;10 samples/leaf) yielded a c-index of 0.872 ± 0.146. A c-index of 0.761 was achieved when tested in P not used for training (held-out set). Permutation importance analysis identified the features that were key to the model (Figure 1). Patients who suffered events had a higher presence of heterogeneity-related features in their myocardium (Figure 2). Finally, the model allowed for the creation of unique risk curves for each individual P, with which a physician can capture a personalized evolution of the arrhythmic risk of each P throughout time (Figure 3).

Conclusions: For the first time, a LV LGE radiomic-based model performed a time-to-event analysis of VA. This approach showed strong internal and external validation performance, enabling the development of individualized risk profiles. Further model refinement and validation could allow clinicians to predict individual arrhythmic risk since the day a CMR is performed.
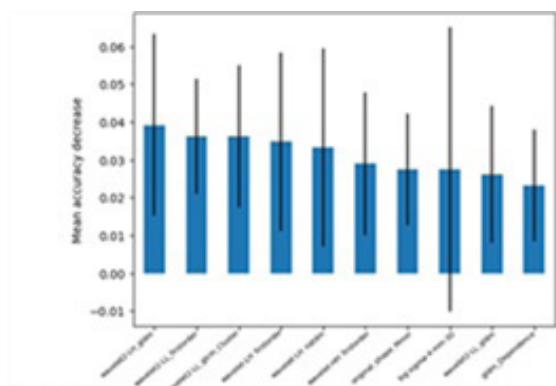
Figure 1 – Top 10 radiomic features – related to tissue heterogeneity and architectural entropy – with the highest importance for event classification, using the permutation method
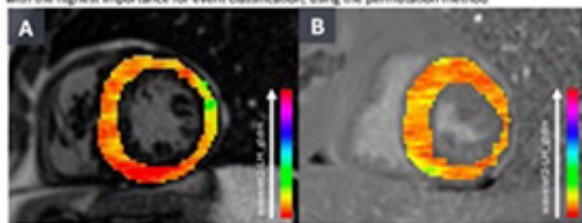

Figure 2 – Cardiac magnetic resonance with visual distribution of the highest-relevance feature for the AI model on the LV myocardium. In Panel A we can see a higher presence of the feature (lower wall) comparing to Panel B. Patient A had a ventricular fibrillation event, whereas Patient B is event-free.
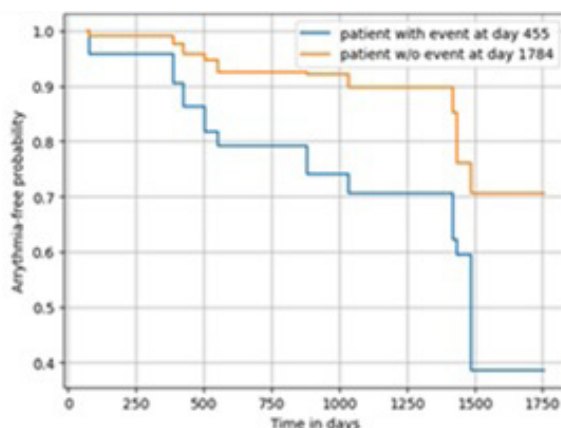

Figure 3 – The time to-event model allows for the derivation of personalized Kaplan-Meier curves, informing physician decisions regarding the risk for the patient of a ventricular arrhythmic outcome at a certain point in time (T0 = CMR date). In this case two curves were derived for patients A (blue) and B (orange) from Figure 2. Patient A had an event at day 455 (ventricular fibrillation) and patient B is event free at day 1784. This graph depicts the arrhythmic risk that would be calculated based on our model for each patient at each point in time. The cumulative risk of having an event increases with time. We can see that patient A (blue line) has hypothetical significantly higher risk of having an arrhythmic event (lower arrythmia free probability) than patient B. The more accurate the model, the higher the difference between curves that it will be able to provide to the physician, allowing for the tailoring of protective strategies throughout the follow up - that starts at day 0, the day of cardiac magnetic resonance.

Figure CO 100

Domingo, 13 Abril de 2025 | 12:00-12:30

Sala Arrábida | Sessão de Comunicações Orais 21 – Prémio Manuel Machado Macedo

CO 101. LESS-INVASIVE AORTIC VALVE REPLACEMENT: MID-TERM SINGLE-CENTER RESULTS

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ULS Coimbra.

Introduction: Less invasive aortic valve replacement has proved to be a safe approach for the treatment of aortic valve disease and is associated with reduced transfusion requirements, reduced intensive care and length of hospital stay, less pain and improved aesthetic appearance as quality of life including return to work.

Objectives: The aim of this study was to evaluate single center 4-year results of surgical aortic valve replacement by upper hemi-sternotomy approach.

Methods: We reviewed 562 patients who underwent surgical aortic valve replacement by less invasive approach–upper hemi-sternotomy by 3rd and 4th right intercostal space from January 2021 to March 2024. Patients underwent aortic valve replacement by classic sternotomy were excluded. We analyzed the early and mid-term outcomes, in-hospital death and a subgroup survival analysis.

Results: Mean age of group was 67.8 ± 10.7 years, 28.4% older than 75 years old (n = 160), 65% were males. The preoperative data showed 59% of patients on NYHA III-IV, 1.9% had previous disability stroke, 34.7% with arterial hypertension; 11.8% with severe aortic regurgitation, 77.6% with severe aortic stenosis, 33.8% with bicuspid aortic valve. Mean LVEF was 59.8 ± 7.9%, maximum/medium Aorta-LV Gradients 81.5 ± 21.6/50.5 ± 13.4mmHg and a mean EuroSCORE II 1.7 ± 2.6%. There were implanted 75.4% of biological/24% of mechanical prosthesis and 3 cases of aortic valve repair. Associated procedures: transannular aortic root enlargement in 2%, IV septum myectomy in 9.4%, left atrial appendage occlusion in 1.4% and aortic valve replacement associated to ascending Aorta replacement in 3.7%. The mean extra-corporal circulation time was 80.9 ± 23.2 min and aortic cross-clamping time 50 ± 16.6 min. About postoperative data, inotropic support > 12 hours was needed in 3% of patients, V-A ECMO in 0.2%, paroxysmal atrial fibrillation in 22.7%, 3rd degree AV block with need of permanent pacemaker implantation in 1.6%, early prosthetic endocarditis in 0.3%, acute kidney injury in 10.6%, stroke in 1%, redo surgery due to cardiac tamponade in 1.6%. Four patients (0.7%) needed intra-operative conversion to sternotomy. The mean timing to discharge was 5.8 ± 3.6 days. The 30-day mortality was 0.7%. In the mid-term follow-up period analysis, the 4-year survival rate was 96.4 ± 2.7% and the 4-year time free of MACCE events was 94.7 ± 3.8%. About patients over 75 years old, the 30-day mortality was 0.6%. In the mid-term follow-up period, the 4-year survival rate was 94.4 ± 4.3% and the 4-year time free of MACCE events was 93.2 ± 4.8%.

Conclusions: From the perspective of saving lives, the results of single center casuistic about minimally invasive aortic valve replacement approach were very acceptable according to literature and showed the way we should adopt to improve as quality of life. Even in selected older patients as an alternative this procedure showed to be very safe and effective.

CO 102. DEVELOPMENT AND VALIDATION OF AN OPEN-SOURCE 3D SLICER PLUGIN FOR TAVI SIZING

Sofia Esteves, Miguel Nobre Menezes, João Silva Marques, Cláudia Moreira Jorque, Pedro Carrilho Ferreira, Tiago Rodrigues, Ana Rita Francisco, Catarina Simões de Oliveira, Marta Vilela, Miguel Azaredo Raposo, Daniel Inácio Cazeiro, Fausto J. Pinto

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Introduction: TAVI planning with dedicated CT software is a key component of any TAVI program. The Pie Medical 3mensio software suite is the most commonly used system. Some competitors are also available. However, all this software is limited by very significant costs, both upfront and regarding updates. As a result, open source or more affordable software would be
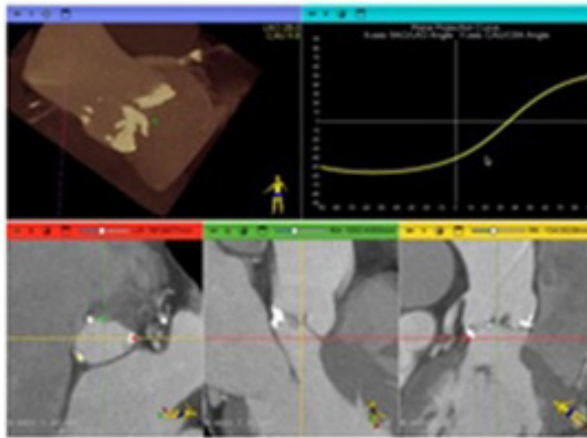
Figure 1: Aortic valve measurement with Python Plugin.

	Trimensio	Python Plugin	P value
Minimum diameter (mm), mean ± SD	21.1 ± 2.67	21.1 ± 2.8	0.996
Maximum diameter (mm), mean ± SD	26.57 ± 2.92	26.47 ± 3.33	0.996
Perimeter (mm), mean ± SD	75.26 ± 8.62	75.89 ± 7.86	< 0.001
Area (mm²), mean ± SD	442.07 ± 99.63	443.98 ± 104.45	0.464

Table 1: Measurements carried out with Trimensio and the developed Python Plugin.

Figure CO 102

ideal in order to reduce the costs of TAVI and increasing availability. We aimed to develop an open-source software plugin for TAVI sizing, comparing its results with the gold standard, 3mensio.

Methods: A python plugin for the open-source software 3D Slicer was written by an Interventional Cardiologist with python coding knowledge, aided by artificial intelligence coding assistants. The software requires the input of the 3 cusps nadir and marking reference points of the aortic ring, similarly to the 3mensio software. From there, the fluoroscopic angles and ring measurements are made automatically (Figure 1). 50 consecutive successful TAVI cases were selected. Measurements had been carried out by Interventional Cardiologists proficient in TAVI using the 3mensio software. Measurements were then carried out in the 3D slicer plugin. The results of the aortic annulus measurements were then compared between the two software methods (perimeter, area, area derived diameter, mean diameter, maximum diameter, minimum diameter), using the t-test for assessing differences.

Results: A total of 50 measurements carried out with 3mensio software revealed a mean minimum diameter of 21.1 ± 2.68 mm; mean maximum diameter of 26.465 ± 2.92 mm, mean perimeter of 75.26 ± 8.62 mm and mean area of 442.07 ± 99.63 mm². Regarding the measurements done with the python plugin, the mean minimum diameter was 21.09 ± 2.8 mm; mean maximum diameter was 26.47 ± 3.33 mm; mean perimeter was 75.89 ± 7.86 mm; mean area was 443.98 ± 104.45 mm² and a mean area derived from mean diameter was 236.19 ± 27.5 mm². The comparison of the two measurements revealed that only the perimeter was significantly different between the 2 tools (p value < 0.001), with an absolute mean difference of 1.21 mm.

Conclusions: Our plugin produced measurements for aortic annulus dimensions that were highly comparable to those generated by the gold standard Trimensio software, with no significant differences observed for most parameters. The only exception was the perimeter, which showed a statistically significant but small absolute difference of 1.21 mm. Despite being statistically significative, this difference is probably not clinically relevant. The open-source plugin may offer a viable alternative for TAVI sizing, potentially reducing software-related costs and increasing accessibility to TAVI programs.