Rev Port Cardiol. 2020;**39(Espec Congr)**:5-41

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

COMUNICAÇÕES ORAIS (CO)

Sessão de Comunicações Orais - Arritmias

CO 1. RELATIONSHIP BETWEEN EPICARDIAL FAT AND LEFT ATRIUM FIBROSIS IN PATIENTS WITH ATRIAL FIBRILLATION

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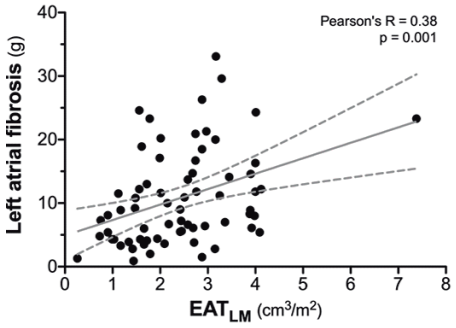
Introduction: Epicardial adipose tissue (EAT) has recently been shown to be associated with the presence, severity, and recurrence of atrial fibrillation (AF). Although the pathophysiological mechanisms underlying this association remain to be established, several hypotheses have been put forward, including direct adipocyte infiltration, oxidative stress, and the secretion of adipokines causing inflammation and fibrosis of atrial tissue. We hypothesized that the volume of EAT and the amount of left atrium (LA) fibrosis assessed by non-invasive imaging would be significantly correlated in patients with AF, and that both would predict time to relapse after pulmonary vein isolation (PVI).
Methods: Sixty-eight patients with AF being studied for a first PVI procedure underwent both cardiac computerized tomography (CT) and cardiac magnetic resonance (CMR) within less than 48h. EAT was quantified on contrast-enhanced CT images. LA fibrosis was quantified on isotropic 1.5mm 3D delayed enhancement CMR for image intensity ratio values > 1.20. Radiofrequency PVI was performed using an irrigated contact force-sensing ablation catheter, guided by electroanatomical mapping. After PVI, patients were followed for AF recurrence, defined as symptomatic or documented AF after a 3-month blanking period. Pearson's correlation coefficient was used for gauging the correlation between EAT_{LM} volume and LA fibrosis. The relationship between these two variables and time to AF recurrence was assessed by Cox regression.
Results: Most of the 68 patients (46 men, mean age 61 ± 12 years) had paroxysmal AF (71%, n = 48). The mean body mass index (BMI) was 28.0 ± 4.0 Kg/m^2. Patients had a median EAT_{LM} volume of 2.4 cm^3/m^2 [interquartile range (IQR) 1.6-3.2 cm^3/m^2], and a median estimated amount of LA fibrosis of 8.9 g (IQR 5-15 g), corresponding to 8% (IQR 5-11%) of the total LA wall mass. The correlation between EAT_{LM} and LA fibrosis was statistically significant but weak (Pearson's R = 0.38, p = 0.001)-Figure 1. During a median follow-up of 22 months (IQR 12-31), 31 patients (46%) suffered AF recurrence. Four predictors of relapse were identified in univariate Cox regression: EAT_{LM} (HR 2.19, 95%CI 1.65-2.91, p < 0.001), LA fibrosis (HR 1.05, 95%CI 1.01-1.09, p = 0.033), non-paroxysmal AF (HR 3.36, 95%CI 1.64-6.87, p = 0.001), and LA volume (HR 1.03, 95%CI 1.01-1.06, p = 0.006). Multivariate analysis yielded two independent predictors of time to AF relapse: EAT_{LM} (HR 2.05, 95%CI 1.51-2.79, p < 0.001), and non-paroxysmal AF (HR 2.36, 95%CI 1.08-5.16, p = 0.031).



Conclusions: The weak correlation between EAT and LA suggests that LA fibrosis is not the main mechanism by which EAT and AF are linked. EAT was more strongly associated with AF recurrence than LA fibrosis, which supports the existence of other, more important mediators between EAT and this arrhythmia.

CO 2. COMBINED ENDOCARDIAL AND EPICARDIAL VENTRICULAR TACHYCARDIA ABLATION FOR ISCHEMIC AND NONISCHEMIC DILATED CARDIOMYOPATHY

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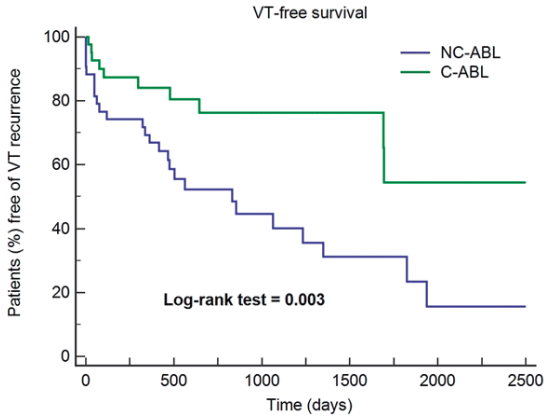
Introduction: Patients with ischemic (IHD) and nonischemic (NICM) dilated heart disease and reduced left ventricular ejection fraction are at increased risk of ventricular tachycardias (VTs) or sudden cardiac death. VT catheter ablation is an invasive treatment modality for antiarrhythmic drugs-resistant VT that reduces arrhythmic episodes, improves quality of life and improves survival in patients with electrical storm. Direct comparison of the outcomes from combined and non-combined endoepicardial ablations is limited by patient characteristics, follow-up durations, protocols heterogeneity and scarcity of randomized trials. We aim to investigate the long-term clinical outcomes of these 2 strategies in the IHD and NICM populations.
Methods: Multicentric observational registry including 316 consecutive patients who underwent combined (C-ABL) and non-combined (NC-ABL) endo-epicardial ventricular tachycardia (VT) ablation for drug-resistant VT between January 2008 and July 2019. Chagas' disease patients were excluded. Primary and secondary efficacy endpoints were defined as VT-free survival and all-cause death after ablation. Safety outcomes were defined by 30-days mortality and procedure-related complications.

Results: Most of the patients were male (85%), with IHD (67%) and a mean age of 63 ± 13 years. During a mean follow-up of 3 ± 2 years, 117 (37%) patients had VT recurrence and 73 (23%) died. Multivariate survival analysis identified storm (ES) at presentation (HR = 2.17; 95%CI 1.44-3.25), IHD (HR = 0.53, 95%CI 0.36-0.78), left ventricular ejection fraction (LEVF) (HR = 0.97, 95%CI 0.95-0.99), New York Heart Association (NYHA) functional class III or IV (HR = 1.79, 95%CI 1.13-2.85) and C-ABL (HR = 0.49, 95%CI 0.27-0.92) as independent predictors of VT recurrence. In 135 patients undergoing two or more ablation procedures only C-ABL (HR = 0.36, 95%CI 0.17-0.80) and ES at presentation (HR = 2.42, 95%CI 1.24-4.70) were independent predictors of arrhythmia recurrence. The independent predictors of all-cause mortality were ES (HR = 2.17, 95%CI 1.33-3.54), LVEF (HR = 0.95, 95%CI 0.92-0.98), age (HR = 1.03, 95%CI 1.01-1.05), NYHA functional class III or IV (HR = 2.04, 95%CI 1.12-3.73), and C-ABL (HR = 0.22, 95%CI 0.05-0.91). The survival benefit was only seen in patients with a previous ablation (P for interaction = 0.04) (Figure). Mortality at 30-days was similar between NC-ABL and C-ABL (4% vs 2%, respectively, p = 0.777), as was the complication rate (10.3% vs 15.1% respectively, p = 0.336).



Conclusions: A combined endo-epicardial approach appears to be associated with greater VT-free survival and overall survival in ischemic and nonischemic patients undergoing repeated VT catheter ablations. Both strategies seem equally safe.

CO 3. THE LONG STORY OF FIRE AND ICE: WHO IS THE WINNER?

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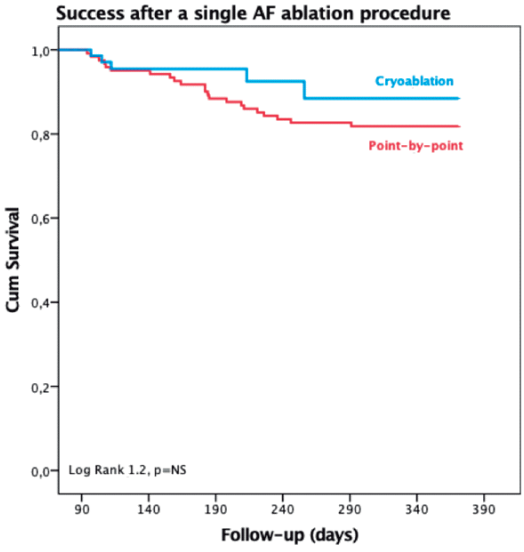
Introduction: Atrial fibrillation (AF) is increasing in prevalence, along with the number of AF ablation procedures. Recently, one-shot techniques for AF ablation, such as cryoablation, have proved to perform pulmonary vein isolation (PVI) faster than the traditional point-by-point (PbP) ablation with irrigated catheter and 3D electroanatomic mapping. However, data on the efficacy and safety profiles of cryoablation are lacking.
Objectives: To evaluate the efficacy and safety profiles of cryoablation and compare it to the conventional AF ablation technique (PbP with irrigated catheter).
Methods: Single-center study of AF patients refractory to antiarrhythmic therapy who performed 1st AF ablation procedure. The ablation strategy consisted of PVI with cryoablation or PbP with irrigated catheter, complemented with ablation of the cavo-tricuspid isthmus in patients with history of concomitant flutter. Monitoring was performed with a 7-day event loop recorder at 3, 6 and 12 months and annually from the 2nd year. Success was defined by AF-free survival or any maintained supraventricular tachycardia (duration > 30 seconds). Propensity score matching was performed according to age and AF type (paroxysmal, short or long-term persistent).
Results: 422 procedures were performed, with evaluation of 249 propensity matched procedures: 125 PbP vs 124 cryoablation (30.1% female, 58.1 ± 12.2 years old, follow-up duration 28.5 ± 28.2 months). Baseline clinical and therapeutic characteristics were similar between groups. From these patients, 74.4% had paroxysmal AF, 12% short-standing and 13.6% long-standing persistent AF. Among patients treated with cryoablation, 99% of the pulmonary veins were acutely isolated (499/504), similar to the 97.8% immediate success of PbP ablation (502/514), p = NS. Although the complication rate was similar between cryoablation and PbP (6.5% vs 6.4%, p = NS), the risk of hemopericardium was lower with cryoablation (0% vs 4%, p = 0.024). The duration of the procedure and the fluoroscopy time were both reduced with the cryoablation vs PbP [95.0 (75-120) min vs 210 (190-259) min, p < 0.01; 14.0 (10-19.7) min vs 27.0 (15.5-40.0) min, respectively]. The 1-year success rate after 1st ablation was 94.3% for cryoablation and 82.3% for PbP, with no difference between groups. A lower number of patients with cryoablation suspended antiarrhythmic therapy at 12 months (6% vs 19%, p < 0.01).



Conclusions: In 1st AF ablation procedures, cryoablation has demonstrated to be a safe and effective procedure, with similar acute and 12-month success rates to conventional point-by-point ablation. Cryoablation can represent an added value in AF ablation, making the procedure simpler, faster and with a lower risk of cardiac tamponade.

CO 4. ANATOMIC GUIDED ABLATION OF THE RIGHT GANGLIONATED PLEXUS IS ENOUGH FOR CARDIAC AUTONOMIC DENERVATION IN PATIENTS WITH SIGNIFICANT BRADYARRHYTHMIAS

Dinis Valbom Mesquita[1], Leonor Parreira[1], Pedro Carmo[2], Diogo Cavaco[2], Pedro Amador[1], Rita Marinheiro[1], Francisco Costa[2], Marta Fonseca[1], José Farinha[1], Ana Esteves[1], António Pinheiro[1], Artur Lopes[1], Mauricio Scanavacca[3], Pedro Adragão[2]

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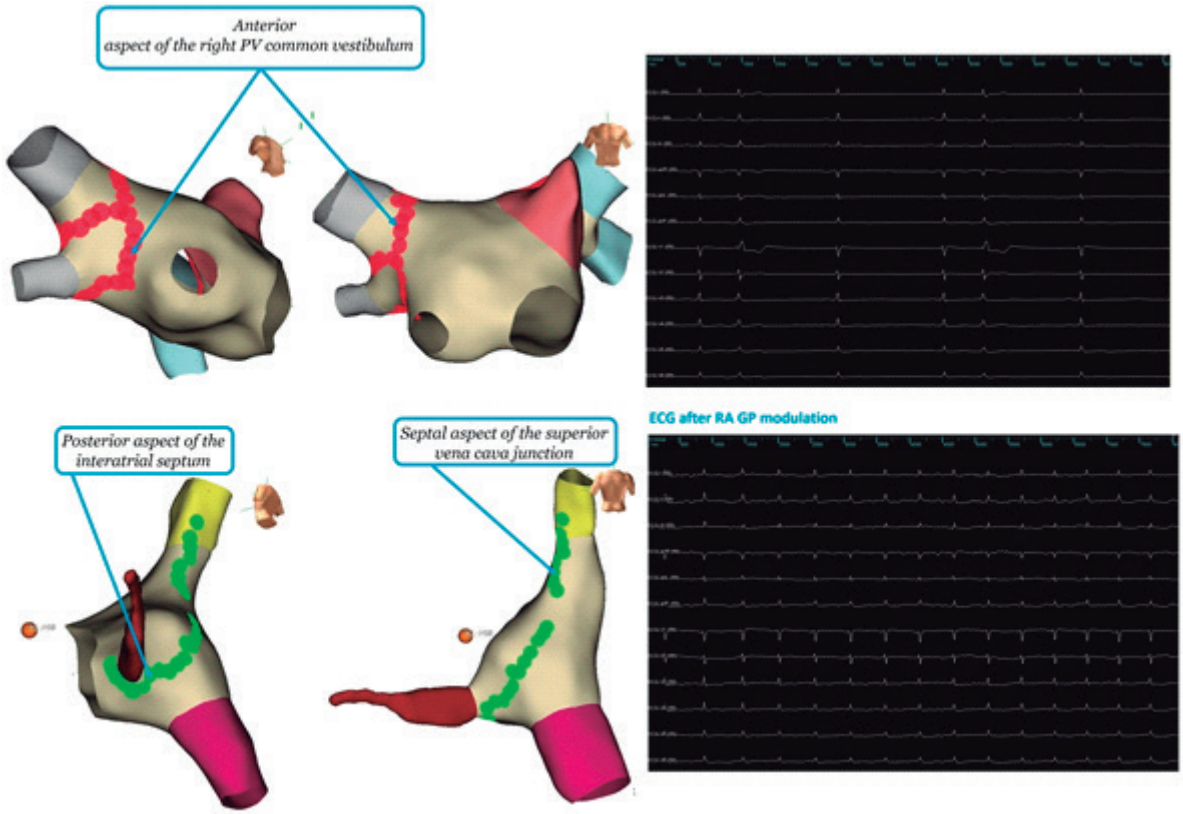
Introduction: In patients with significant bradyarrhytmias, cardiac denervation is an alternative therapeutic approach. Previous reports proposed different methods (as high frequency stimulation of ganglionated plexus and voltage mapping) and targets (right and left atrial ganglionated



CO 4 Figure

plexus) for adequate denervation. There is no consensus on the best way to perform these procedures, in spite the right atrial ganglia plexus (GP) ablation seeming to be the most contributive to its success.
Objectives: We aim to understand if performing anatomic guided ablation of just the atrial right plexus proves to be a valid and successful strategy to perform cardiac denervation in patients with severe bradyarrhytmias.
Methods: We enrolled patients with severe symptomatic bradyarrhytmias (sinus arrest, transient AV block and cardioinhibitory syncope), after exclusion of reversible causes. We performed eletroanatomic mapping of the right and left atria and used an irrigated tip catheter for ablation, aiming at the anterior right GP at the right pulmonary veins antrum along with ablation at the superior vena cava junction and the inferior right GP at the posterior aspect of the right inferior pulmonary vein along with ablation of the right aspect of the interatrial septum, between the posterior wall and coronary sinus ostium (Figure). We assessed the PW and Wenckenback cycle lengths (CL) pre and post procedure in patients with sinus arrest or AV block, respectively, and the patients had new 24h holter readings at least 30 days from the index procedure.
Results: We enrolled 12 patients: 9 males (75%), median age of 49.5 years (IQR 36-61.75). All patients had structurally normal hearts. Overall, 5 patients had simultaneous pulmonary vein isolation for previously documented atrial fibrillation. Among the cohort 2 patients had ILR and 2 were diagnosed upon Tilt testing. There were 7 patients (58.3%) with sinus bradycardia (2 patients had sinus arrest with pauses of 8 and 13 seconds), 2 patients with cardioinhibitory syncope (with pauses of 23 and 28 seconds) and 3 patients were referred for transient high grade AV block. The ablation procedure led to a median sinus rate acceleration of 15 bpm (IQR 3-29), a median decrease of 320 ms in PW (IQR 23.75-609.5) in patients with sinus arrest and a decrease of 80 ms in wenckenback CL (IQR 60-200) in patients with AV block. With a median follow up of 133.50 days (IQR 36-61.75), no patient had recurrence of symptoms and there was no recurrence of pauses or AV block among the cohort.
Conclusions: In selected patients with severe functional paroxysmal bradyarrhytmias, cardiac denervation using an ablation strategy purely based on anatomic aspects and targeting only the right GP, seems to be an effective therapeutic approach.

CO 5. A MACHINE-LEARNING ALGORITHM TO PREDICT ATRIAL FIBRILLATION RECURRENCE AFTER A PULMONARY VEIN ISOLATION PROCEDURE

Daniel Matos[1], António Miguel Ferreira[1], Adriano Sousa[2], Gustavo Rodrigues[1], João Carmo[1], Pedro Freitas[1], Sara Guerreiro[1], João Abecasis[1], Francisco Costa[1], Pedro Carmo[1], Carla Saraiva[1], Diogo Cavaco[1], Francisco Morgado[1], Miguel Mendes[1], Pedro Adragão[1]

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Introduction: Contemporary risk models to predict the recurrence of atrial fibrillation (AF) after pulmonary vein isolation have limited predictive ability. Models with high specificity seem particularly suited for the setting of AF ablation, where they could be used as gatekeepers to withhold intervention in patients with low likelihood of success. Machine learning (ML) has the potential to identify complex nonlinear patterns within datasets, improving the predictive power of models. This study sought to determine whether ML can be used to better identify patients who will relapse within one year of an AF ablation procedure.
Methods: We assessed 484 patients (294 men, mean age 61 ± 12 years, 76% with paroxysmal AF) who underwent radiofrequency pulmonary vein isolation (PVI) for symptomatic drug-refractory AF. Using this dataset, a machine-learning model based on Support Vector Machines (SVM) was developed to predict AF recurrence within one year of the procedure. The following variables were used to feed the model: type of AF (paroxysmal vs non-paroxysmal), previous ablation procedure, left atrium (LA) volume, and epicardial fat volume (both derived from pre-ablation cardiac CT). The algorithm was trained in a random sample of 70% of the study population (n = 339) and tested in the remainder 30% (n = 145).
Results: A total of 130 patients (27%) suffered AF recurrence within one year of the procedure. The ML model predicted AF recurrence with 75% accuracy (95%CI 67-82%), yielding a sensitivity and specificity of 25% (95%CI 13-41%) and 94% (95%CI 88-98%), respectively. The corresponding positive and negative predictive values were 62% (95%CI 39-81%) and 77% (95%CI 67-82%),

respectively. The relative weight of the variables in the ML model was: epicardial fat 56%, type of AF 23%, previous ablation 14%, and LA volume 7%. A high-risk subgroup representing 10.8% of patients was identified with the ML algorithm. In this subgroup, one-year recurrence was 62%, representing 24% of the total number of recurrences.
Conclusions: A machine-learning model showed high specificity in the identification of patients who relapse during the first year after AF ablation. In the future, these tools may be useful to improve patient selection.

CO 6. ELECTROCARDIOGRAPHIC NON TYPE-1 BRUGADA PATTERN CRITERIA IN THE YOUNG SCD-SOS COHORT

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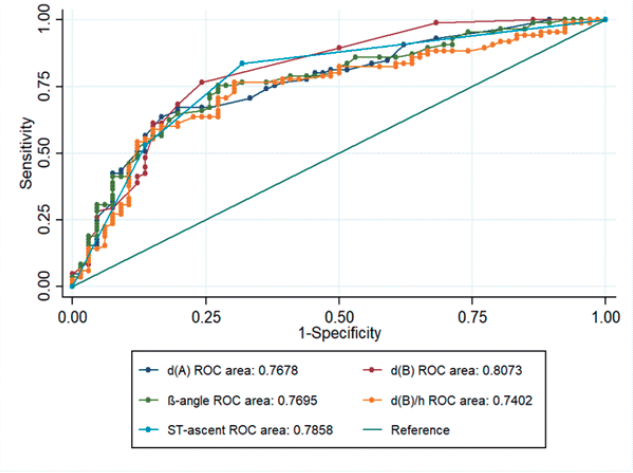
Introduction: Differentiating non-Type 1 Brugada pattern (non-T1BrP) from an athlete's ECG remains challenging. We aimed to study the diagnostic accuracy and the reproducibility of the measurements of the electrocardiographic non-T1BrP criteria in the young adults from the Sudden Cardiac Death-Screening Of risk factorS (SCD-SOS) cohort.
Methods: We performed a cross-sectional study in which we reviewed 14662 ECGs of SCD-SOS participants and selected 2494 that presented an rSr' pattern in V1-V2. Among these, 98 were classified by an expert for the presence of non-T1BrP and we performed manual measurements of the diagnostic criteria. We estimated intraobserver concordance, as well as criteria accuracy and most appropriate cut-off points.



Leads V1-V2	Sensitivity	Specificity	Positive likelihood ratio
d(A) ≥ 80ms (2mm)	63.53%	83.33%	3.812
d(B) ≥ 50ms (1.25mm)	57.65%	84.85%	3.805
d(B)/h ≥ 0.45	57.65%	84.85%	3.805
ß-angle ≥ 16.5º	75.29%	72.73%	2.761
ST-ascent ≥ 0.5mm	83.72%	68.18%	2.631

Results: We detected a rSr'-pattern in V1-V2 in 17% of the individuals and found that it was associated with higher PQ, QTc intervals, male gender and lower BMI. The manual measurement of non-T1BrP criteria was reproducible (minimal intraobserver concordance of 0.824; 95%CI 0.742-0.881) and accurate. The criteria with higher discriminatory capacity were the d(B) (AUC 0.807; 95%CI 0.736-0.878) and the ST-ascent (AUC 0.786; 95%CI 0.715-0.857). The previously defined cut-offs had very low sensitivity (19.23%), despite high specificity (95.65%), so we defined new cut-offs: d(A) ≥ 80 ms (2 mm), d(B) ≥ 48 ms (1.25 mm), d(B)/h ≥ 0.45 and β-angle ≥ 16.5º. The addition of the degree of ST-ascent to a model with these 4 parameters presented a C-statistics of 0.861 (95%CI 0.806-0.916) for the diagnosis of non-T1BrP by an expert in sudden arrhythmic death and channelopathies.
Conclusions: We showed that these 5 parameters of the r'-wave in V1/V2 are accurate and reproducible. Additionally, we re-defined cut-off points for the parameters that may help untrained clinicians to identify young individuals who should be referred for provocative drug testing for Brugada Syndrome.

Sessão de Comunicações Orais - Ciência Básica

CO 7. Β-3 ADRENOCEPTORS: A THERAPEUTIC TARGET FOR PULMONARY ARTERIAL HYPERTENSION

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Introduction: Pulmonary Arterial Hypertension (PAH) is an incurable disease with a poor prognosis. Currently available therapies exclusively act as pulmonary vasodilators, and only slightly increase survival. PAH is defined by a mean pulmonary arterial pressure (mPAP) > 20 mmHg, a pulmonary arterial wedge pressure ≤ 15 mmHg and a pulmonary vascular resistance (PVR) ≥ 3 Wood units. It is characterized by a pre-capillary arteriopathy including vascular remodelling and plexiform lesions, resulting in increased PVR, right ventricular (RV) hypertrophy, progressive right heart failure and ultimately death. The β-3 adrenergic receptor (β3AR), thought to be restricted to adipocytes, is expressed in the heart and pulmonary vessels. Stimulating β3ARs, using approved drugs that specifically activate this receptor (mirabegron), has shown benefits in experimental left ventricular (LV) heart failure. Despite that, it's effects in PAH are still unknown. Hypothesis: due to the vasoactive and cardioprotective effects of β3AR agonists, we hypothesize that activating this receptor could provide a double target effect, serving as a new treatment for PAH.
Methods: Employing a translational approach, we first quantified the expression of β3AR in pulmonary tissue from patients and rats with PAH. Using the monocrotaline (MCT)- -induced PAH model, we determined the acute and chronic effects of BRL37344 and mirabegron (intravenous and orally available β3AR agonists, respectively), using telemetry (DSI dual pressure), high resolution transthoracic echocardiography (Vevo 2100) and pressure-volume analysis. Finally, we determined the effects and mechanisms of mirabegron in isolated small pulmonary arteries (myography).
Results: Both human and rat lung tissue expresses the β3AR, and while its expression (mRNA) was decreased in tissue from PAH patients, no differences were observed in the animal model. Acute administration of BRL37344 increased cardiac output (CO) in both control and MCT animals, without affecting PAP, reducing PVR. Treatment with mirabegron in telemetry- -implanted animals was safe and resulted in increased heart rate, without affecting RV pressures or causing hypotension. An initial protocol showed no beneficial effects using low-dose mirabegron, while high dose treatment with a clinically available form (Betmiga™, Astellas Pharma) attenuated the development of MCT-induced PAH, and significantly improved RV and LV diastolic function. Finally, mirabegron induced relaxation of small pulmonary arteries, isolated from both control or MCT animals, in a β1/β2 AR-independent, and nitric oxide-dependent manner.
Conclusions: With our work, we have shown that β3AR agonists are a safe and efficient therapy for experimental PAH, opening the door for the repurposing of these drugs to PAH patients.

CO 8. THE ATP-SENSITIVE P2X4 RECEPTOR IS A NEW THERAPEUTIC TARGET FOR HEART RATE CONTROL

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Increased heart rate (HR) is negatively correlated with cardiovascular outcome. Negative chronotropic drugs that change prognosis of heart failure (HF) are currently limited to beta-blockers and ivabradine. Combining negative chronotropic drugs are often needed for patients that do not tolerate single-agent escalating dosage and lack adequate HR control. Thus, novel well-tolerated negative chronotropic drugs are urgently needed. Adenosine slows down HR through A1 receptors (A1R) activation in the human sinoatrial node (SAN). Contrary to adenosine, activation of ATP-sensitive P2X4 receptors (P2X4R) increase ventricular contraction strength, but their role in the SAN is unknown. ATP (pEC50 = 4.05) concentration-dependently reduced HR in rat spontaneously beating atria. Inhibition of NTPDases with POM-1 enhanced the negative chronotropic effect of ATP (pEC50 = 5.10; $p < 0.05$). ATP and ATPγS (100 μM) were equipotent in decreasing HR (-19 ± 5% vs -18 ± 5%, $p > 0.05$). PPADS (10 μM) antagonized the ATP effect on HR (-20 ± 2% vs -11 ± 4%, $p < 0.05$); the same occurred by blocking the P2X4R with 5-BDBD (10 μM; -31 ± 7% vs -17 ± 5%, $p < 0.05$), but not with the A1R antagonist, DPCPX (3 nM; -19 ± 3% vs -21 ± 4%, $p > 0.05$). Positive allosteric modulation of P2X4R with ivermectin (30 μM) enhanced the negative chronotropic effect of ATP (pEC50 = 4.99; $p < 0.05$). CTP (1 mM) mimicked the negative chronotropic action of ATP (-22 ± 1%) in a 5-BDBD (10 μM)-sensitive manner (-12 ± 2%, n = 5, $p < 0.05$). Inhibition of the Na+/Ca2+ exchanger (NCX) with KB-R7943 (3 μM; -19 ± 4% vs -8 ± 3%, $p < 0.05$) or ORM-10103 (3 μM; -29 ± 4% vs -17 ± 5%, $p < 0.05$), attenuated ATP-induced negative chronotropy. A negative inotropic action of ATP (100 μM) in paced right ventricular (RV) strips was only evidence after blockage of P2X4R or NCX with 5-BDBD (10 μM; -6 ± 2% vs -19 ± 5%, $p < 0.05$) and KB-R7943 (3 μM; -5 ± 2% vs -19 ± 5%, $p < 0.05$), respectively. Co-localization of P2X4R and NCX1 was observed in SAN and RV cardiomyocytes by immunofluorescence confocal microscopy. In conclusion, activation of P2X4R exerts a dual role in decreasing HR and increasing ventricular inotropy. This dual mechanism is operated by NCX inhibition, in a digitalis-like manner. Therefore, the P2X4R represents a novel therapeutic target for HR control in patients with acutely deteriorated HF, ischemic disease and possibly atrial fibrillation.

CO 9. PLASMA LIPIDOMIC PROFILING IN HEART FAILURE WITH PRESERVED EJECTION FRACTION

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Introduction: Despite increasing prevalence and impact on healthcare costs, the pathophysiological mechanisms of heart failure with preserved ejection fraction (HFpEF) remain poorly understood. Circulating plasma metabolites have long been a prominent source for potential cardiovascular disease (CVD) signature markers and especially, lipids may represent important traits for CVD characterization. However, a detailed evaluation of plasma lipidome in HFpEF patients is still lacking and may provide important mechanistic clues with potential therapeutic impact.
Objectives: To evaluate lipidomic profile in stable HFpEF patients and its associations with clinical data.
Methods: Single-center and prospective cohort study including stable HFpEF patients (n = 51) and comorbidity-matched controls (n = 9). Fasted plasma lipidome was performed using top-down shotgun analysis and lipidome composition. Multivariate (PCA and PLS-DA) were applied for data exploration purposes and to provide a data-driven hypothesis-generating mechanism, regarding the major lipids traits associated with the HFpEF as well as concerning the impact of statin therapy. Predictive models, based on multivariable logistic regression, were used to highlights the role of lipids classes and provide a semi-quantitative profile regarding the association between lipid classes and HFpEF and statin therapy.
Results: Analysing the plasma lipidome profile adjusted for age and HDL, it was possible to identify a characteristic profile associated with HFpEF trait which is mostly characterized by a relative elevation of triacylglycerides (TAGs). On the other hand, statin therapy show clearly an influence regarding phosphocholine lipid family, particularly PC(16:0) (1,2-dipalmitoyl-sn-glycero-3-phosphocholine).
Conclusions: Lipidomic analysis identified a subset of lipids differentially present in HFpEF patients, when compared with comorbidity-matched controls. Moreover, statin therapy significantly alters lipidomic profile in HFpEF patients.

CO 10. CHANGES ON DIASTOLIC FUNCTION AFTER PHYSICAL EXERCISE IN A DOXORUBICIN MODEL-PRELIMINARY RESULTS FROM TRACKING3C TRANSLATIONAL PROJECT

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Advances in breast cancer (BC) therapy have improved the survival and quality of life of BC patients, however these improvements are attenuated by the cardiac dysfunction that may occur in a subset of patients which might be due to an increase in sympathetic (SNS) tone promoted by chemotherapy, contributing to left ventricular ejection fraction decrease and leading to chemotherapy discontinuation. Physical exercise has been shown to decrease SNS activity and counteract the negative effects of cancer therapies on the cardiovascular system. At present, it is not possible to predict which patients will be affected and the methods currently used are insufficient and insensible. Using animal experiments is possible to deeply evaluate cardiac function together with a larger anatomo-histological and molecular assessment of the heart. Therefore, the first task of the TRACKING3C project aimed to develop and functionally characterize a doxorubicin (DOX) animal model together with the exercise efficacy to mitigate the adverse cardiovascular effects evoked by treatment. For that, adult healthy female wistar rats (n = 16), aged > 3 months, were intraperitoneally treated with doxorubicin (DOX; 3.5 mg/Kg) at weekly intervals for up to 4 weeks. Half of the animals were included in moderate exercise training in a treadmill (30 min/day at 15 m/min) during the treatments. Routine echocardiography measurements were recorded at baseline and 1 week after of treatment. Upon anesthesia, blood pressure (BP), heart (HR) and respiratory rates (RR) were measured. Results show that DOX evokes bradypnea which was restored to normal values by physical training. Cardiovascular parameters remained unchanged upon DOX but systolic and diastolic pressures and cardiac output increased after exercise. This might be due to an increase in stroke volume due to longer diastoles as showed by echocardiography despite total peripheral resistance was not evaluated. Nevertheless still preliminary and needing complementary autonomic and molecular studies, these findings suggest that lifestyle interventions, namely moderate exercise, can improve cardiovascular health in at-risk populations.

CO 11. CHEMOREFLEX OVEREXCITATION, BAROREFLEX IMPAIRMENT, SYMPATHOVAGAL IMBALANCE AND MULTIPLE ORGAN DYSFUNCTION INDUCED BY LIPOPOLYSACCHARIDE-EXPOSED RATS

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Animal models are essential to clarify the pathophysiological mechanisms of Sepsis. One of the most used is the Toxaemia model that serves to study the basic biology of sepsis. Here, we evaluate the effect of lipopolysaccharide (LPS)-induced systemic inflammation on hemodynamic responses over time in anaesthetized and unanesthetized rats. Male rats were injected IP with either LPS (12 mg/kg; LPS12 group) or saline (SHAM group). At 6 and 24h post-injection, an autonomic evaluation was performed in both awake animals, with continuous radio-telemetry recording of blood pressure (BP), and in anesthetized animals, with BP, electrocardiogram (ECG), heart rate (HR), tracheal pressure, respiratory frequency (RF) continuously monitored. Biochemical analysis was executed to quantify organ dysfunction. LPS significantly induced a rise in BP, HR and RF, indicative of tachycardia and tachypnea. Increases in BP were corroborated by the elevation of norepinephrine and epinephrine serum concentrations. The higher RF was concomitant with a higher chemoreflex sensitivity. The autonomic data reveals an overexcitation of the sympathetic tone resulting in a sympathovagal imbalance, concomitant with a decrease in the baroreflex sensitivity. Serum analysis yielded higher levels of biomarkers for renal and liver dysfunction as well as pancreatic and neuromuscular injury. Our data suggest that during the early stages of the systemic inflammatory response, LPS treatment leads to the cardiovascular system loses the ability to control appropriately the arterial pressure due to the baroreflex impairment as well as the sympathovagal imbalance. Thereby, the present findings indicate that LPS exposure results in profound hemodynamic and neuronal modifications.

Sessão de Comunicações Orais - Doença Coronária

CO 12. EVOLUTION OF IN-HOSPITAL MANAGEMENT IN ST SEGMENT ELEVATION MYOCARDIAL INFARCTION IN PORTUGUESE HOSPITALS OVER THE YEARS

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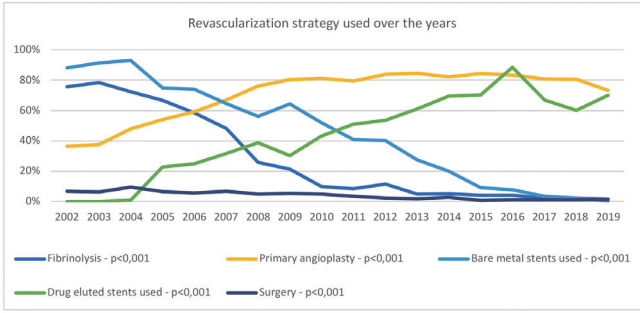
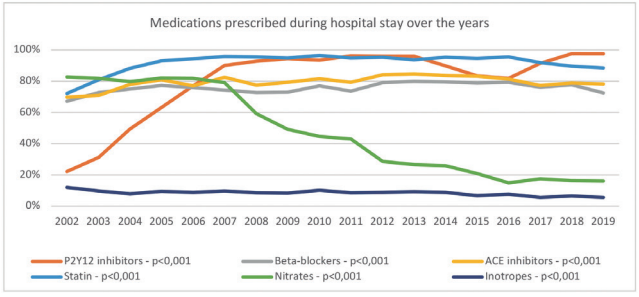
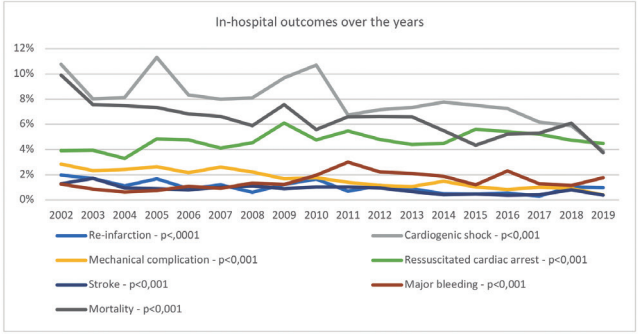
Objectives: To assess the evolution of in-hospital management of ST Segment Elevation Myocardial Infarction (STEMI) over the years in Portuguese Hospitals and its impact on in-hospital complications and mortality.
Methods: A nationwide electronic prospective registry that included all patients admitted to Portuguese hospitals with a diagnosis of Acute Coronary Syndrome since 2002 until 2019 was used to collect all data relative to patients admitted with a STEMI diagnosis during that time frame. Data on demographic data, clinical data, revascularization strategy, medication during hospitalization. We compared the data and its evolution over the years to assess for trends. For statistical analysis, Qui-square tests were used to assess tendencies in categorical variables, and Kruskal-Wallis tests were used to assess tendencies in numerical variables. A p-value < 0.05 was considered statistically significant.
Results: During the study, a total of 24,425 patients were admitted for STEMI in Portuguese hospitals, 74.3% were male and average age of 63.9 ± 13.6 years.We report a progressive increase in patients treated with aspirin, P2Y12 inhibitors (from 22.2% to 97.6%, p < 0.001), beta blockers 62,% to 72.4%, p < 0.001), ACE inhibitors (68.9% to 78.2%, p < 0.001) and statins (72.1% to 88.4%, p < 0.001), a progressive decrease in GP 2a3b inhibitors (20.9 to 14.6%, p < 0.001), enoxaparin (55.2% to 29.9%, p < 0.001), nitrates (82.7% to 16.1%, p < 0.001), calcium channel blockers (5.0% to 3.1%, p < 0.001) and inotropes (12.0% to 5.6%, p < 0.001). There was an increase of the use primary coronary angioplasty (36.4% to 73.2%, p < 0.001), and of drug eluting stents (0% to 70.1%, p < 0.001) a decrease in the use of fibrinolysis (75.7% to 1.6%, p < 0.001), bare metal stents (88.1% to 0.3%, p < 0.001) and intra-aortic balloon pump (1.8% to 0%, p = 0.009), but not in invasive mechanical ventilation (2.5% to 1.9%, p = 0.142).Less patients had moderate to severely impaired left ventricle ejection fraction (28.8% to 14.9%, p < 0.001), and there was a significant reduction in almost all in-hospital complications: re-infarction (2.0% to 1.0%, p < 0.001); heart failure (36.2% to 9.9%, p < 0.001); cardiogenic shock (10.8% to 3.9%, p < 0.001); AV block (5.8% to 2.5%, p < 0.001); mechanical complications (2.8% to 0.4%, p < 0.001); stroke (1.3% to 0.4%, p < 0.001); in-hospital mortality (9.9% to 3.8%, p < 0.001); as well as length of stay ([4-10] days to [3-6] days, p < 0.001). Exceptions were an increase in major bleeding (0.9% to 1.8%, p < 0.001) and resuscitated cardiac arrest (3.9% to 4.5%, p = 0.001).







Conclusions: In 17 years, we report a progressive evolution of the in-hospital treatment of STEMI patients in Portuguese hospitals, with a higher prescription of guideline recommended medications, use of invasive reperfusion techniques and last generation stents, resulting in a lower rate of in-hospital complications and mortality.

CO 13. LOWER GENETIC SCORE FOR CAD TRANSLATED IN IMPROVED SURVIVAL AND REDUCED ADVERSE CARDIOVASCULAR EVENTS

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Introduction: Genetic predisposition scores have been proposed for better risk stratification in Coronary artery disease (CAD). The possible implication

of genetic variants in worse outcomes and reduced survival after a coronary event might challenge our standard practice in secondary prevention setting.
Objectives: Analyze a 33 genetic variants risk score (GRS) influence in cardiovascular (CV) mortality and major adverse cardiovascular events (MACE).
Methods: 1,599 patients selected from GENEMACOR study population (53.3 ± 7.9 years, 78.3% males) with significant coronary disease (at least one > 75% epicardial coronary stenosis by angiography) with a mean Follow up of 4.5 ± 3.6 years. Genotyping used a standard Taqman technique (Applied Biosytems) with specifics primers for 33 variants associated with CAD in south European populations. GRS was calculated under the additive model and a median value was used to define High and low GRS. Primary endpoint (CV mortality) and a combined end point (CV mortality+ Myocardial infarction + revascularization) were analyzed in the 2 GRS subgroups: GRS < 27 (n = 839) and GRS > 27 (n = 760). Two Cox regression models and hazard ratios (HR) were computed one adjusted for age and sex, and a fully adjusted model for possible influencing variables in CAD outcomes.
Results: During Follow up, 176 CV deaths and 237 needed revascularization. Higher GRS was found in patients with MACE and CV mortality (28 (15-36) vs 27 (16-38). Patients with GRS > 27 had a HR of 1.482 (1.098-1.999; p = 0.010) for CV mortality and a HR of 1.271 (1.048-1.542, p = 0.015) for combined end point occurrence adjusted for age and genre. After further adjustment for potential confounding variables, Higher GRS was also associated with higher CV mortality (HR 1.528, p = 0.006) and occurrence of combined end point of MACE (HR 1.281; p = 0.012).

GRSa	Adjusted model		Multi-Adjusted model	
	OR (95% CI)	P value	OR (95% CI)	P value
MACE (CV mortality+ Myocardial infarction + revascularization)				
Low	1	-----	1	-----
Moderate/High	1.271 (1.048 – 1.542)	0.015	1.281 (1.056 – 1.555)	0.012
CV mortality				
Low	1	-----	1	-----
Moderate/High	1.482 (1.098 – 1.999)	0.010	1.528 (1.132 – 2.063)	0.006

**Forward wald method adjusted for the variables age and gender. The multi-adjusted model was adjusted for the variables age, gender, smoking status, AHT, Dyslipidemia, Diabetes and multi-vessel disease. GRSa – Genetic risk score additive; OR – Odds ratio; CI – Confidence interval; MACE – Major adverse coronary events; CV – Cardiovascular; Statistically significant for p<0.05.*

Conclusions: Despite standard care under modern therapeutic drugs, higher genetic predisposition to CAD was associated with higher cardiovascular mortality and adverse events in our population. New therapeutic genetic targets and a tailored medicine may further improve current prognosis in coronary patients.

CO 15. TEMPORAL TRENDS IN REFERRAL PATTERNS FOR INVASIVE CORONARY ANGIOGRAPHY-A MULTICENTER 10-YEAR ANALYSIS

Mariana Gonçalves[1], David Roque[2], Pedro Gonçalves[1], Miguel Borges Santos[3], Rui Campante Teles[1], Sérgio Baptista[2], Catarina Brízido[1], Mariana Faustino[3], Pedro Farto e Abreu[3], Manuel de Sousa Almeida[1], António Ferreira[4]

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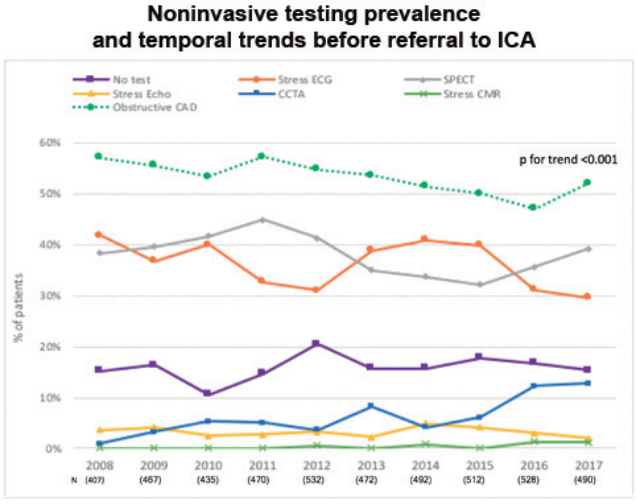
Introduction: The evaluation of patients with suspected stable coronary artery disease (CAD) is based on clinical assessment and noninvasive testing serving as "gatekeeper" for invasive coronary angiography (ICA). The purpose of this study was to assess the temporal trends in the usage pattern of non-invasive testing before ICA and its diagnostic yield in patients with suspected CAD.
Methods: Cross-sectional observational multicenter study of 4805 consecutive patients (60% male, mean age 66 ± 10 years) without known CAD, undergoing elective ICA due to stable chest pain symptoms in two centers between January 2008 and December 2017. The use of noninvasive testing and the proportion of patients with obstructive CAD (defined as the presence of at least one ≥ 50% stenosis on ICA) were assessed.
Results: From an initial cohort of 11,102 patients undergoing ICA, 4,805 patients were identified with initial suspicion of stable angina. Overall, 4,038 (84%) had a positive noninvasive test: SPECT (38%, n = 1,828), exercise ECG (36%, n = 1,731), coronary CT angiography (6%, n = 302), stress echocardiogram (3%, n = 157), or stress cardiac magnetic resonance (0.4%, n = 20). Obstructive CAD was found in 53% (n = 2543) of the patients, with 46% (n = 2209) having at least one stenosis > 70%. Only 38% (n = 1997) underwent revascularization either by percutaneous coronary intervention or surgery. Overall, only 12% of the patients with obstructive CAD underwent invasive functional assessment. This proportion did not increase significantly over the years (p for trend 0.405). The prevalence of obstructive CAD was higher in patients with vs without previous noninvasive testing (54% vs 46%, respectively, p < 0.001) and tended to decrease during the study period (p for trend < 0.001). Over this 10-year period, there were small but statistically significant decreases in the proportion of patients referred after exercise testing and SPECT (p for trend 0.005 and 0.006, respectively), and increases in referral after coronary CT angiography and stress CMR (both p for trend < 0.001). The proportion of patients referred without previous testing remained stable (p for trend 0.251).



Conclusions: Half of the patients undergoing ICA for suspected CAD did not present obstructive coronary lesion. This proportion tended to increase over the 10-year span of this study. Better clinical assessment tools and diagnostic pathways for stable CAD seem to be needed.

CO 16. PATTERNS OF REVASCULARIZATION IN STABLE ISCHEMIC HEART DISEASE IN THE PRE-ISCHEMIA ERA

Francisco Albuquerque, Catarina Brizido, Sérgio Madeira, Rui Campante Teles, Luís Raposo, Henrique Mesquita Gabriel, Sílvio Leal, Mariana Gonçalves, João Brito, Pedro Gonçalves, Manuel Almeida, Miguel Mendes

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

Introduction: New evidence on the role of myocardial revascularization in stable ischemic heart disease (SIHD), recently presented, showed that revascularization guided by the presence of moderate-to severe ischemia relieves angina more effectively than optimal medical therapy (OMT), without a significant benefit in hard clinical endpoints.
Objectives: To assess the representativeness of the ISCHEMIA trial in a real-world population and compare management strategies between patients who fulfill the eligibility criteria of the trial (Group 1, G1) and those who do not (Group 2, G2).
Methods: Single centre retrospective analysis including all consecutive patients referred to coronary angiography (CA) for SIHD from January

2018 to December 2019. Patients were stratified in two groups (G1 and G2) according to the ISCHEMIA trial inclusion and exclusion criteria. G1 was compared with G2 and with a subset of G2 with obstructive coronary artery disease (CAD), defined as > = 70% luminal stenosis in at least one coronary artery or > 50% for the left main.
Results: A total of 1020 patients underwent CA, of whom only 124 (12.2%) would have been eligible for the ISCHEMIA trial (G1). Overall, there were no significant differences in baseline characteristics between the two groups (table). G1 patients had more extensive and severe disease, presenting more frequently with proximal left anterior descending (LAD) involvement (26.6% vs 10.4%; p < 0.001), two vessel disease without proximal LAD stenosis (23.4% vs 10.3%; p < 0.001) and three vessel disease (18.5% vs 5.9%; p < 0.001). These patients had higher rates of revascularization, both CABG (25.8% vs 10.8%, p < 0.001) and PCI (56.5% vs 39.5%, p < 0.001). However, when comparing G1 with the subset of G2 patients with obstructive CAD, G1 patients had higher rates of CABG (26.8% vs 17.8%, p = 0.034) but there were no differences on the rates of PCI (58.0% vs 56.9%, p = 0.916).

Table 1 – Baseline Characteristics of the patients

Baseline Characteristics	Group 1 (n=132)	Group 2 (n = 888)	P-value
Age - Years	68.9 (± 9.2)	67.9 (±9.8)	0.51
Sex - male no. (%)	102 (77.3)	614 (69.1)	0.07
Hypertension - no. (%)	107 (81.1)	707 (79.6)	0.82
Dyslipidemia - no. (%)	98 (74.2)	656 (73.9)	1.00
Diabetes mellitus type 2 - no. (%)	59 (44.7)	317 (35.7)	0.53
Active smoking - no. (%)	49 (37.1)	340 (38.3)	0.95
History familiar of CV disease - no. (%)	25 (18.9)	108 (12.2)	0.04
Chronic Pulmonar Disase - no. (%)	8 (6.1)	78 (8.8)	0.31
CKD - no. (%)	4 (3.0)	48 (5.4)	0.27

Conclusions: Patients included in the ISCHEMIA trial are underrepresented in a real-world population of SIHD patients referred to coronary angiography. PCI rates were similar among patients with at least one significant coronary artery stenosis, regardless of previous evidence or severity of ischemia. Our findings underline the need for further refinement in criteria for revascularization in SIHD.

CO 17. THE POTENTIAL BENEFIT OF THE EPICARDIAL LEFT VENTRICULAR LEAD IN ISCHEMIC CARDIOMIOPATHY

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[1]Hospital Senhora da Oliveira. [2]Centro Hospitalar do Alto Ave, EPE/Hospital da Senhora da Oliveira.

Introduction: Transvenous coronary sinus leads is the most common approach for cardiac resynchronization therapy (CRT). However, this approach is not possible in a substantial proportion of patients and epicardial leads (EPL), which allows the identification of the best myocardial location to pacing by avoiding fibrotic areas, are an alternative. In this analysis we aimed to access whether these two therapies lead to different outcomes regarding left ventricular ejection fraction (LVEF).
Methods: We performed a retrospective, single-center study of 143 patients undergoing CRT implantation between 2013 and 2017 according to the current guidelines indications. Clinical, electrocardiographic and echocardiographic parameters were evaluated.
Results: A total of 143 patients underwent CRT implantation in our center since between 2013 and 2017. Of these a total of 59 patients were included in our analysis, from whom all data were available, and these represent our sample. Forty-four percent had ischemic cardiomyopathy (ICM). In 33.8% (n = 23) an epicardial lead was implanted for cardiac ressynchronization. Patients with transvenous leads were more frequently male (59.6% vs 40.4%). There were no significant differences in age, QRS duration and LVEF pre-implantation. At baseline, median LVEF in patients with EPL was 28 ± 6% and 25 ± 8% in patients with transvenous leads (p = 0.356). Six months after resynchronization median LVEF was also not different between groups (37 ± 13% in patients with transvenous leads and 42 ± 20% in patient with EPL; p = 0.248). However, patients with ischemic cardiomyopathy showed a statistically significant higher LVEF with EPL compared with patients with non-ischemic cardiomyopathy (p = 0.01).
Conclusions: In our sample, patients with ischemic cardiomyopathy showed a higher increase in LVEF with cardiac ressynchronization with epicardial leads. This effect may be due to a best myocardial location for pacing by avoiding fibrotic areas.

CO 14. OPTIMIZING DIAGNOSIS OF OBSTRUCTIVE CORONARY ARTERY DISEASE BY CT ANGIOGRAPHY: RCT'S FINAL RESULTS

João Reis, Rúben Ramos, Pedro Modas Daniel, Sílvia Aguiar Rosa, Luís Almeida Morais, Madalena Cruz, Rita Moreira, Tiago Mendonça, André Viveiros Monteiro, Cecília Leal, Hugo Marques, Luísa Figueiredo, Rui Cruz Ferreira

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

Objectives: In patients (pts) with suspected coronary artery disease (CAD), computed tomographic angiography (CTA) may improve pt selection for invasive coronary angiography (ICA) as alternative to functional testing. However. the role of CTA in symptomatic pts after abnormal functional test (FT) is incompletely defined.
Methods and results: This randomized clinical trial conducted in single academic tertiary center selected 218 symptomatic pts with mild to moderately abnormal FT referred to ICA to receive either the originally intended ICA (n = 103) or CTA (n = 115). CTA interpretation and subsequent care decisions were made by the clinical team. Pts with high risk features on FT, previous acute coronary syndrome, previously documented CAD, chronic kidney disease (GFR < 60 ml/min/1.73 m^2) or persistent atrial fibrillation were excluded. The primary endpoint was the percentage of ICA with no significant obstructive CAD (no stenosis ≥ 50%) in each group. Diagnostic (DY) and revascularization (RY) yields of ICA in either group were also assessed. Pts were followed up for at least 1 year for the primary safety endpoint of all cause death/nonfatal myocardial infarction/stroke. Unplanned revascularization (UP) and symptomatic status (SS) were also evaluated. Pts averaged 68 ± 9 years of age, 60% were male, 29% were diabetic. Nuclear perfusion stress test was used in 33.9% in CTA group and 31.1% in control group (p = 0.655). Mean post (functional) test probability of obstructive CAD was 34%. Overall prevalence of obstructive CAD was 32.1%. In the CTA group, ICA was cancelled by referring physicians in 83 of the pts (72.2%) after receiving CTA results. For those undergoing ICA, non-obstructive CAD was found in 5 pts (15.6%) in the CTA-guided arm and 60 (58.3%) in the usual care arm (p < 0.001 Mean cumulative radiation exposure related to diagnostic work up was similar in both groups (6 ± 14 vs 5 ± 14 mSv, p = 0.152). Both DY (84.4% vs 41.7, p < 0.001) and RY (71.9% vs 38.8%, p = 0.001) yields were significantly higher for CTA-guided ICA as compared to standard FT-guided ICA. The rate of the primary safety endpoint was similar between both groups (1.9% vs 0%, p = 0.244), as well as the rates of UP (0.9% vs 0.9%, p = 1.000) and SS (persistent angina: 29.6% vs 24.8%, p = 0.425).

	Selective ICA referral strategy	Direct ICA strategy	*p* Value
% of ICA without obstructive CAD	15.6	58.3	<0.001
Diagnostic Yied (%)	84.8	41.7	<0.001
Revascularization Yied (%)	71.9	38.8	0.001
Mean cumulative radiation exposure (mSv)	6±14	5±14	0.152
Mean cumulative contrast dose (mL)	87.5±21	77±40	0.026
All cause death/ nonfatal myocardial infarction/ stroke (%)	0	1.9	0.244
Unplanned revascularization (%)	0.9	0.9	1.000
Symptomatic status (%)	24.8	29.6	0.425

Conclusions: In pts with suspected CAD and mild to moderately abnormal ischemia test, a diagnostic strategy including CTA as gatekeeper is safe, effective and significantly improves diagnostic and revascularization yields of ICA.

Sessão de Comunicações Orais - Doenças do Miocárdio

CO 23. RELATIONSHIP BETWEEN MICROCIRCULATORY DYSFUNCTION, MYOCARDIAL FIBROSIS AND ARRHYTHMIAS IN HYPERTROPHIC CARDIOMYOPATHY

Sílvia Aguiar[1], Luís Lopes[2], António Fiarresga[1], Boban Thomas[3], Gonçalo Branco[3], Ricardo Pereira[3], Ana Barão[3], Luís Baquero[3], Rui Cruz Ferreira[1], Miguel Mota Carmo[4]

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Introduction: Microcirculatory dysfunction constitutes one of the most important pathophysiological features in hypertrophic cardiomyopathy (HCM). Chronic and recurrent myocardial ischemia may lead to fibrosis, which constitutes an arrhythmic subtract.
Objectives: To analyze the relationship between coronary microcirculatory dysfunction and: a) myocardial fibrosis assessed by cardiovascular magnetic resonance (CMR); b) supraventricular and ventricular arrhythmias.
Methods: The present study prospectively included HCM adult patients (P) who underwent CMR, including parametric mapping, perfusion imaging during regadenoson-induced hyperemia and late gadolinium enhancement (LGE) assessment. Supraventricular and ventricular arrhythmias were documented by 12 lead electrocardiogram and 24h Holter monitoring. Epicardial coronary artery disease was excluded by computed tomography or invasive coronary angiography. For perfusion assessment, the myocardium was divided into 32 subsegments (16 AHA segments subdivided into an endocardial and epicardial layer, excluding segment 17). Ischemic burden was calculated as the number of involved subsegments, assigning 3% of myocardium to each subsegment.
Results: 38 P were enrolled (55% male, mean age 56.9 ± 14.2 years). Asymmetric septal hypertrophy was seen in 20P (53%), apical in 14P (37%), concentric in 4P (10%), with maximal wall thickness (MWT) of 20.5 ± 4.9 mm; 26% with evidence of LVOT obstruction. Ischemic burden was greater in concentric hypertrophy comparing with the remaining patterns, and correlated with the severity of left ventricular hypertrophy (LVH), by MWT and LV mass (Table). Higher ischemic burden was correlated with higher values of native T1 mapping (Spearman correlation factor 0.540; p < 0.001) (Table). A correlation between ischemic burden and amount of fibrosis quantified by LGE was also noted (Spearman correlation factor 0.414; p < 0.011) (Table). regarding arrhythmic events, P with documented atrial fibrillation presented more severe ischemia compared with P in sinus rhythm. Despite no difference in perfusion was noted between P with and without non-sustained ventricular tachycardia (NSVT) (Table), P with significant hypoperfusion and LGE trend to have more NSVT (Figure).
Conclusions: In HCM patients, the severity of microcirculatory dysfunction was associated with more extensive myocardial fibrosis and atrial fibrillation. The combination of significant ischemia and fibrosis trend to increase the occurrence of NSVT.

CO 18. INFLAMMATORY INFILTRATE DRIVES MYOCARDIAL INJURY IN HUMAN SEPTIC CARDIOMYOPATHY

Francisco Vasques Nóvoa[1], José M.G. Alvarenga[2], António Angélico-Gonçalves[2], João Martinho-Nobrega[2], Dina Leitão[2], Perpétua Pinto-do-Ó[3], Diana S. Nascimento[3], Fátima Carneiro[4], Adelino Leite Moreira[2], Roberto Roncon[1]

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Introduction: Despite the prognostic impact of myocardial dysfunction in septic shock, the mechanisms of septic cardiomyopathy are still poorly understood. Myocardial infiltration of inflammatory cells has been observed in experimental models of sepsis and anecdotally described in human postmortem observations. However, the pathophysiological role of inflammatory cell myocardial infiltration in human septic cardiomyopathy is still poorly understood.
Objectives: To characterize myocardial inflammatory infiltrate and evaluate its association with myocardial injury in human Septic Cardiomyopathy.
Methods: Post-mortem transmural myocardial specimens from septic shock with positive blood cultures (n = 40) and nonseptic control patients (sudden non-cardiac death; n = 10) were collected together with antemortem clinical and analytical data. Staining was performed for CD3 (T cells), CD8 (Cytotoxic T cells), CD68 (macrophages), CD163 (M2 macrophages) and myeloperoxidase (MPO, Neutrophills) in an automated IHC system. Slides were scanned and cell density was analyzed with a dedicated image analysis software.

Table 1

CMR parameters	Ischemic burden (% of LV)	p-value
LVH pattern		0.041
Septal	21.3±18.4	
Apical	15.6±9.1	
Concentric	39.8±22.9	
Maximal wall thickness(mm)		<0.001
≤20	13.2±13.2	
>20	33.4±15.5	
LV mass (g/m2)		0.007
≤100	15.8±14.3	
>100	31.4±18.0	
Obstruction		0.244
Non-obstructive HCM	19.5±16.9	
Obstructive HCM	25.8±18.0	
Native T1 mapping (ms)		0.003
≤1010	9.8±9.6	
>1010	26.3±17.6	
LGE (% of LV)		0.012
<10	12.8±12.6	
10-15	20.3±15.5	
>15	31.6±18.8	
Supraventricular arrhythmia		0.011
Sinus rhythm	17.8±16.3	
Atrial fibrillation	33.8±14.9	
Ventricular arrhythmia		0.208
Without NSVT	20.7±19.1	
NSVT	26.5±15.3	

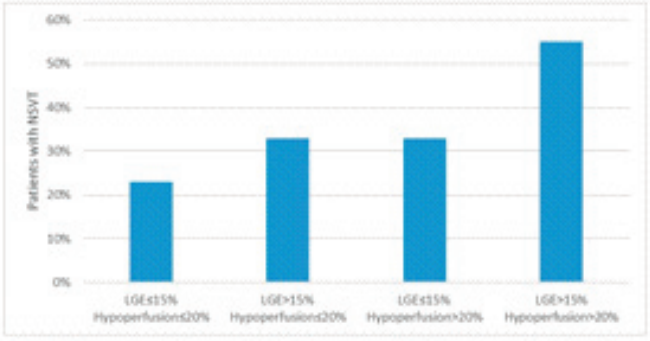

Figure 1. Proportion of patients with NSVT according with LGE and hypoperfusion burden.

CO 23 Figure

Results: Septic patients presented histologically with severe myocarditis and a significantly higher number of myocardial inflammatory cells for all analyzed cell markers when compared with the control group. Interestingly, higher inflammatory cell infiltration was observed in younger patients. Indeed, a negative association was observed between age and infiltration for most cell types, with the exception of MPO+ cells. Prolonged ICU length of stay was associated with a significant increase in CD8+ T cell myocardial infiltration. Importantly, CD3+ and MPO+ cell infiltration correlated positively with the antemortem troponin plasma levels after adjusting for relevant clinical factors.
Conclusions: Sepsis-induced severe myocarditis was documented in most patients dying with septic shock. Myocardial infiltration of certain inflammatory cell subtypes is positively associated with myocardial injury, unraveling a potentially important role of these cells in human septic cardiomyopathy pathophysiology with therapeutic implications.

CO 19. ASSOCIATION BETWEEN MICROCIRCULATORY DYSFUNCTION AND IMPAIRED MYOCARDIAL DEFORMATION IN HYPERTROPHIC CARDIOMYOPATHY

Sílvia Aguiar[1], Luísa Branco[1], Boban Thomas[2], António Fiarresga[1], Luís Lopes[3], Ana Galrinho[1], Mafalda Selas[1], Filipa Silva[1], Ricardo Pereira[2], Gonçalo Branco[2], Ana Barão[2], Luís Baquero[2], Miguel Mota Carmo[4], Rui Cruz Ferreira[1]

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Introduction: Microcirculatory dysfunction may impair left ventricular (LV) performance in hypertrophic cardiomyopathy (HCM).
Objectives: To analyze the relationship between coronary microcirculatory dysfunction and LV myocardial deformation in HCM.
Methods: The present study prospectively included HCM adult patients (P). Microcirculatory dysfunction was assessed by stress cardiovascular magnetic resonance (CMR), during regadenoson-induced hyperemia. For perfusion assessment, the myocardium was divided into 32 subsegments (16 AHA segments subdivided into an endocardial and epicardial layer, excluding segment 17). Ischemic burden was calculated as the number of involved subsegments, assigning 3% of myocardium to each subsegment. Epicardial coronary artery disease was excluded by computed tomography or invasive coronary angiography. LV myocardial deformation was evaluated by two (2D) and three-dimensional (3D) speckle-tracking echocardiography (STE), including global longitudinal strain (GLS), peak systolic dispersion (PDS), global circumferential strain (GCS), global radial strain (GRS), area strain, twist and torsion.

Echocardiography	Ischemic burden (% of LV)		
2D parameters	≤ 20% (n=15)	> 20% (n=16)	p-value
GLS (%)	-15.6±2.7	-12.1±4.7	0.016
PSD (ms)	73.2±25.6	102.1±57.6	0.150
3D parameters			
GLS (%)	-10.3±4.5	-7.3±3.0	0.010
GCS (%)	-12.6±3.0	-10.1±4.5	0.079
GRS (%)	30.8±8.5	22.8±11.4	0.035
Area strain(%)	-20.8±4.9	-15.8±6.3	0.020
Twist (deg)	6.0±4.8	4.1±4.0	0.175
Torsion (deg/cm)	1.2±0.9	0.8±0.7	0.232

Table 1. Comparison between speckle-tracking echocardiography parameters, according to ischemic burden. GLS- global longitudinal strain; PDS - Peak systolic dispersion; GCS - global circumferential strain; GRS - global radial strain; LV left ventricular

Results: 31 P were enrolled (51% male, mean age 57.8 ± 15.5 years). Asymmetric septal hypertrophy was seen in 55%, apical in 29%, concentric in 16%, with maximal wall thickness (MWT) of 20.5 ± 4.9 mm; 26% with evidence of LVOT obstruction; LV ejection fraction 67.9 ± 7.9%. In 2DSTE analysis, P with more ischemia (> 20% of LV) presented more severe impaired GLS and greater PDS, comparing with patients with ≤ 20% of ischemia (Table). Similarly, 3DSTE imaging showed worse LV performance in P with greater ischemic burden, expressed by significant difference in GLS, GRS and area strain. GCS also trended to be worse in the presence of > 20% of ischemia. No statistically significant difference was achieved between groups regarding twist and torsion (Table). The stronger correlation was found between 2D GLS and ischemic burden (Pearson correlation factor 0.545; p = 0.002).
Conclusions: In HCM, the severity of ischemia secondary to microcirculation dysfunction was associated with impairment in LV myocardial deformation evaluated by 2D and 3D STE.

CO 20. STAGES OF CARDIAC INVOLVEMENT IN PRE-HYPERTROPHIC FABRY DISEASE: AN INTEGRATED ELECTROCARDIOGRAPHIC AND CARDIOVASCULAR MAGNETIC RESONANCE APPROACH

João B. Augusto[1], Nicolas Johner[2], Dipen Shah[2], Sabrina Nordin[3], Kristopher Knott[3], Stefania Rosmini[3], Clement Lau[4], Mashael Alfarih[3], Rebecca Hughes[3], Andreas Seraphim[3], Ravi Vijapurapu[5], Anish Bhuva[3], Linda Lin[3], Natalia Ojrzynska[3], Tarekegn Geberhiwot[6], Gabriella Captur[7], Uma Ramaswami[8], Richard P Steeds[5], Rebecca Kozor[9], Derralynn Hughes[8], James C Moon[3], Mehdi Namdar[2]

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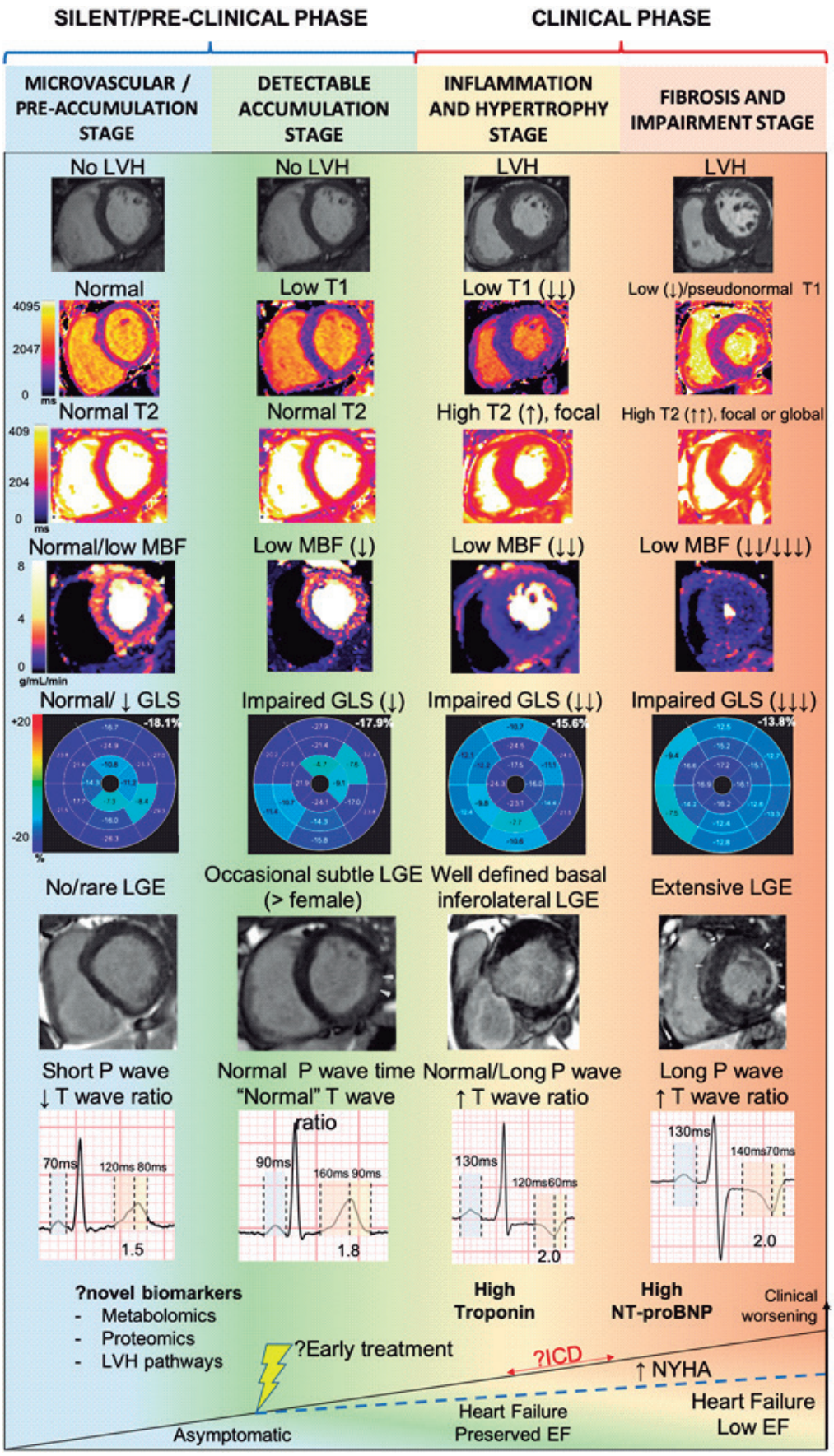
Introduction: Fabry disease (OMIM 301500; FD) is a rare X-linked lysosomal storage disorder caused by mutations in the α-galactosidase A gene (*GLA*). The consequence is progressive sphingolipid accumulation that affects multiple organs, but the main cause of death is cardiac via heart failure and arrhythmia. Cardiac involvement in FD occurs prior to left ventricular hypertrophy (LVH) and is characterized by low myocardial native T1 reflecting sphingolipid storage, as measured by cardiovascular magnetic resonance (CMR), and ECG changes. Here we hypothesize that a pre-storage (pre-low T1) myocardial phenotype might occur even earlier, prior to T1 lowering.
Methods: FD patients and age-, sex- and heart rate-matched healthy controls underwent same-day ECG with advanced analysis and multiparametric CMR (cines, global longitudinal strain [GLS], T1, T2 and stress perfusion mappings [myocardial blood flow, MBF], and late gadolinium enhancement [LGE]).
Results: 114 Fabry patients (46 ± 13 years, 61% female) and 76 controls (49 ± 15 years, 50% female) were included. First, Fabry patients with LVH (n = 42, 56%) showed previously described changes: lower MBF, GLS and T1, but higher T2 and %LGE (all p < 0.05); ECG changes were also pronounced with LVH: longer P wave, QRS and QT times, more pathological repolarization and LVH voltage criteria (all p < 0.05). Second, in pre-LVH FD (n = 72, 63%), low T1 patients (n = 32, 44%) had higher LV mass, longer QRS (90 ± 11 vs 85 ± 12 ms), higher maximum Q wave amplitude (2 [1-2] vs 1 [1-2] mm) and R wave amplitude in V1 (3 [2-4] vs 2 [1-3] mm) than those with normal T1 (all p < 0.05). With low T1, patients also had greater Sokolow-Lyon (22 [16-28] vs 17 [13-23] mm, p = 0.031) and Cornell indexes (911 [590-1,330] vs 578 [433-984] mm·ms, p = 0.042), longer R wave peak times in V5 (42 ± 6 vs 39 ± 5 ms, p = 0.006) and a higher prevalence of fQRS (44 vs 18%, p = 0.020). Finally, pre-LVH FD with normal T1 (n = 40, 56%) also had abnormalities compared to controls: more impaired GLS (-18 ± 2 vs -20 ± 2%, p < 0.001), microvascular changes (lower MBF 2.5 ± 0.7 vs 3.0 ± 0.8 mL/g/min, p = 0.028), T2 elevation (50 ± 4 vs 48 ± 2 ms, p = 0.027) and limited%LV LGE (%LGE 0.3 ± 1.1 vs 0%, p = 0.004). ECG abnormalities included shorter P wave duration (88 ± 12 vs 94 ± 15 ms, p = 0.010) and T wave peak time (T_{onset}-$T_{peak;}$ 104 ± 28 vs 115 ± 20 ms, p = 0.015), resulting in a more symmetric T wave with lower T wave time ratio (T_{onset}-T_{peak})/(T_{peak}-T_{end}) (1.5 ± 0.4 vs 1.8 ± 0.4, p < 0.001) than controls.
Conclusions: FD has a measurable myocardial phenotype pre-LVH and even pre-detectable myocyte storage with microvascular dysfunction, subtly impaired GLS and altered atrial depolarization and ventricular repolarization intervals. We therefore defined what should be the stages of cardiac involvement in this disease (Figure).


SILENT/PRE-CLINICAL PHASE
CLINICAL PHASE
MICROVASCULAR / PRE-ACCUMULATION STAGE
DETECTABLE ACCUMULATION STAGE
INFLAMMATION AND HYPERTROPHY STAGE
FIBROSIS AND IMPAIRMENT STAGE
No LVH
No LVH
LVH
LVH
Normal
Low T1
Low T1 (↓↓)
Low (↓)/pseudonormal T1
4095
2047
0
ms
Normal T2
Normal T2
High T2 (↑), focal
High T2 (↑↑), focal or global
409
204
0
ms
Normal/low MBF
Low MBF (↓)
Low MBF (↓↓)
Low MBF (↓↓/↓↓↓)
8
4
0
g/mL/min
Normal/ ↓ GLS
Impaired GLS (↓)
Impaired GLS (↓↓)
Impaired GLS (↓↓↓)
+20
-20
%
-18.1%
-17.9%
-15.6%
-13.8%
No/rare LGE
Occasional subtle LGE (> female)
Well defined basal inferolateral LGE
Extensive LGE
Short P wave
↓ T wave ratio
Normal P wave time
"Normal" T wave ratio
Normal/Long P wave
↑ T wave ratio
Long P wave
↑ T wave ratio
70ms
120ms 80ms
1.5
90ms
160ms 90ms
1.8
130ms
120ms60ms
2.0
130ms
140ms70ms
2.0
?novel biomarkers
- Metabolomics
- Proteomics
- LVH pathways
High Troponin
High NT-proBNP
Clinical worsening
?Early treatment
?ICD
↑ NYHA
Asymptomatic
Heart Failure Preserved EF
Heart Failure Low EF

CO 20 Figure

CO 21. LEFT VENTRICLE TRANSRADIAL ENDOMYOCARDIAL BIOPSY: INITIAL EXPERIENCE OF A TERTIARY CENTER

Tiago Rodrigues[1], Miguel Nobre Menezes[2], Rafael Santos[3], Nelson Cunha[2], Afonso Nunes_Ferreira[2], Joana Rigueira[2], Inês Aguiar Ricardo[2], Pedro Silveiro António[2], Pedro S. Morais[2], Sara Couto Pereira[2], Fausto J. Pinto[3], Pedro Canas da Silva[2]

[1]Centro Hospitalar de Lisboa Norte, EPE/Hospital de Santa Maria. [2]Serviço de Cardiologia, Departamento de Coração e Vasos, Centro Hospitalar Universitário Lisboa Norte, Centro Cardiovascular da Universidade de Lisboa, Faculdade de Medicina, Universidade de Lisboa. [3]Cardiology Department, Santa Maria University Hospital (CHULN), CAML, CCUL, Lisbon School of Medicine, Universidade de Lisboa.

Introduction and objectives: over the last decade, several studies have suggested that left ventricle endomyocardial biopsy is safer and has a higher diagnostic yield that transvenous right ventricle biopsy. In addition, recent publications suggest the transradial approach is a feasible and safe alternative to the transfemoral approach, for sampling the left ventricle. We aim to report our initial experience with transradial endomyocardial biopsy with regards to feasibility, safety and usefulness.
Methods: Single center registry of consecutive patients undergoing intended transradial left endomyocardial biopsy. Clinical and technical data were prospectively collected, with a particular focus on success rate and complications.
Results: Thirty-four (34) patients were screened for left ventricle biopsy. Thirty-two (32) were selected for intended transradial approach (mean age 52 ± 18 years old, 26 male). Success rate was 100% with no crossover to femoral approach (28 right radial artery and 4 left radial artery). There were no major complications. Two patients experienced mild radial spasm. Two of them also had a run of non-sustained ventricular tachycardia. The indication for the biopsy was either myocarditis or cardiomyopathy of unknown etiology. The final diagnosis was acute lymphocytic myocarditis in 6 patients, chronic myocarditis in 1 patient, AL amyloidosis in 7 patients and ATTR amyloidosis in 10 patients. Myocarditis was ruled out in 8 patients and amyloidosis in 1 patient. The last patient samples are still undergoing histopathology analysis.
Conclusions: Transradial left ventricle endomyocardial biopsy is a very safe and feasible method of sampling myocardium for histopathological analysis, with a good diagnostic yield and clinically meaningful results in well selected patients.

CO 22. ACUTE PERICARDITIS: SHOULD I STAY OR SHOULD I GO?

João Ferreira, Mariana Luís, Rui Baptista, Sílvia Monteiro, Lino Gonçalves

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

Introduction: The European Society of Cardiology (ESC) guidelines for the diagnosis and management of pericardial diseases identify predictive factors of poor prognosis and advise either in favor or against hospitalization according to their presence. We aim to evaluate the adequacy of hospitalization criteria in a cohort of patients presenting to the emergency department (ED) with acute pericarditis.
Methods: Retrospective analysis of patients admitted in ED with acute pericarditis, from 2009 to 2019. All patients were evaluated by a cardiologist during ED stay who decided if the patient was to be discharged or hospitalized. Hospitalized and discharged patients were compared regarding the primary outcome, defined by a composite of need for pericardiocentesis and/or cardiac surgery, pericarditis recurrence and all-cause death. The clinical decision was then counterpoised with ESC guidelines.
Results: A total of 192 patients were included in the analysis (mean age 46 ± 18.5 years-old and 83.3% male) of which 87 (45.5%) were hospitalized. Clinico-demographic features are presented in the Table. A total of 25% (n = 48) registered the primary outcome, mainly due to acute pericarditis recurrence, occurring in 21.9% (n = 42). No death was registered during ED stay or hospitalization. Having at least 1 major risk criteria (OR = 3.14, 95%CI 1.59-6.19, p = 0.001), but not a minor one (OR = 1.47, 95%CI 0.69-3.14, p = 0.315), was predictive of recurrence. Predictors of recurrence were: glucocorticoid therapy (OR = 11.93, 95%CI 3.13-45.5, p < 0.001), fever at admission (OR = 2.67, 95%CI 1.29-5.49, p = 0.008), immunosuppression (OR = 4.03, 95%CI 1.280-12.659, p = 0.017) and increased cardiothoracic index (OR 3.85, 95%CI 1.67-8.86, p = 0.002). Regarding the hospitalization/discharge decision, the ESC guidelines were respected in 72.9% (n = 140) of the cases. However, no significant difference in the primary outcome was noted whether the ESC guidelines were respected or not (27.5% *vs* 24.3%, p = 0.707). Acute pericarditis recurrence was also similar between the groups (25.5% *vs* 21.4%, p = 0.561).
Conclusions: Discrepancy between current guidelines and clinical reasoning did not translate into different outcomes. Although guidelines should always guide clinical decision-making, local factors have to be taken into account when it comes to the decision to hospitalize or discharge a patient with acute pericarditis.

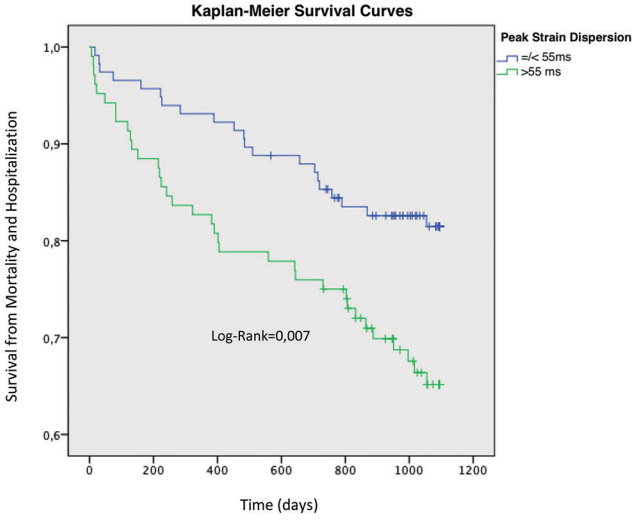
Sessão de Comunicações Orais - Imagem

CO 24. PEAK STRAIN DISPERSION: A NEW PROMISING PROGNOSTIC PREDICTOR EARLY AFTER STEMI

João Sousa Bispo[1], Pedro Azevedo[2], Pedro Freitas[3], Sara Borges[3], Gonçalo Cunha[3], Pedro Lopes [3], Carla Reis[3], Eduarda Horta[3], Marisa Trabulo[3], João Abecassis[3], Manuel Canada[3], Regina Ribeiras[3], Maria João Borges Andrade[3]

[1]Centro Hospitalar do Algarve, EPE/Hospital de Faro. [2]Centro Hospitalar e Universitário do Algarve. [3]Centro Hospitalar de Lisboa Ocidental, EPE/Hospital de Santa Cruz.

Introduction: Several studies have addressed the importance of transthoracic echocardiography (TTE) in risk prediction of subsequent adverse events after ST elevation myocardial infarction (STEMI). While several traditional echo parameters have a well established prognostic value, data derived from 2D-Speckle Tracking Echocardiography (2DSTE) needs further investigation.
Objectives: To determine if 2DSTE parameters provide additional information beyond conventional echocardiography to predict long-term adverse outcomes in patients admitted with STEMI.



Methods: Retrospective, single-center study, that included all patients without previous cardiovascular events admitted with STEMI (who underwent

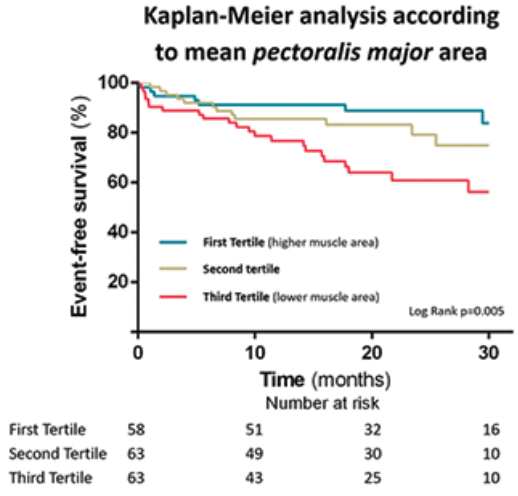
primary coronary angioplasty) between 2015 and 2016. Patients with poor acoustic windows, severe valvular disease, and those who died during hospital stay were excluded. We reviewed all pre-discharge TTE to assess conventional parameters of LV systolic and diastolic function and data obtained by 2DSTE: global longitudinal strain (GLS) and peak strain dispersion (PSD), an index that is the standard deviation from time to peak strain of all segments over the entire cardiac cycle. Demographic and clinical data was obtained through electronic hospital records. The primary endpoint was a composite of all-cause mortality and cardiovascular re-admission at 3 years. Survival analysis was used to determine independent predictors of the primary endpoint.
Results: 248 patients were included, mean age 61 ± 14 years, 73% males. Mean LVEF was 49.8 ± 10.1% with 18% of patients having LVEF < 40%. Mean LAVi was 33 ± 10 ml/m², mean GLS was -14 ± 4%, and PSD was 59 ± 21msec. Average follow-up was 40 ± 13 months, with a 3 year combined endpoint of mortality and hospitalization of 26% (n = 65). Univariate analysis revealead an association between LAVi, GLS and PSD and mortality or hospitalization. However, on multivariate analysis only LAVi (HR 1.02-1.08; p < 0.001) and PSD (HR 1.001-1.022; p = 0.045) remained independent predictors of the primary endpoint.
Conclusions: PSD derived by longitudinal strain analysis is a promising prognostic predictor after STEMI. PSD outperformed conventional echocardiographic parameters in the risk stratification of STEMI patients at discharge.

CO 25. AXIAL MUSCLE SIZE QUANTIFICATION BY CARDIAC MRI AS A STRONG PREDICTOR OF MAJOR EVENTS IN HF

Gonçalo Cunha[1], Bruno Rocha[1], Pedro Freitas[1], Pedro Lopes[1], Carolina Padrão[1], Telma Lima[1], Ricardo Lopes[1], Afonso Grego[1], Fernando Marques[1], Patrícia Santim[1], Ana Santos[1], Sara Guerreiro[1], Carlos Aguiar[1], Maria João Borges Andrade[1], João Abecasis[1], Carla Saraiva[1], Miguel Mendes[2], António Ferreira[3]

[1]Centro Hospitalar de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [2]Hospital Sta Cruz. [3]Unica-Unidade de imagem cardiovascular por TC e RM do Hospital da Luz Lisboa.

Introduction: Clinical overt cardiac cachexia is a late and ominous sign in patients with heart failure (HF) and reduced left ventricular ejection fraction (LVEF). Low muscle mass could serve as a surrogate of subclinical cardiac cachexia and has already been shown to predict major adverse events in HF patients. The main goal of this study was to assess the feasibility and prognostic significance of a simplified muscle mass quantification by cardiac magnetic resonance (CMR) in HF with reduced LVEF.



Methods: HF patients with LVEF < 40% referred for a clinically indicated CMR (1.5T scanner) were retrospectively identified in a single center. The main exclusion criteria were known primary muscle disease, diagnosed or suspected infiltrative myocardial disease and implanted device. The area of both *pectoralis major* muscles was measured on standard axial images at the level of the carina using manual outlining. To account for the effect of age and gender, *pectoralis major* muscle area was expressed as the difference in standard deviations in relation to the mean *pectoralis major* muscle area of a healthy cohort of 32 females and 37 males aged between 50 and 80 years old. The primary endpoint was a composite of all-cause mortality or HF hospitalization. Survival analysis was performed with Cox-regression hazards model and Kaplan-Meier.
Results: A total of 184 HF patients were included (mean age 65 ± 12 years; 78% male; LVEF 30 ± 8%). Lower *pectoralis major* area was significantly correlated with older age (r = -0.36, p < 0.001), lower LVEF (r = 0.14, p = 0.050) and higher NT-proBNP (r = -0.44, p < 0.001). During a median follow-up of 22 months (IQR: 14-29) there were 44 (23.9%) patients who met the primary endpoint (a total of 15 patients died and 29 had at least one HF hospitalization). In multivariate analysis, LVEF (HR per 1%: 0.95; CI: 0.91-0.98; p = 0.004), creatinine (HR per 1mg/dL: 2.12; CI: 1.09-4.11; p = 0.026) and *pectoralis major* area (HR per 1 SD below the mean: 1.40; CI: 1.01-1-1.95; p = 0.047) were independent primary endpoint predictors.
Conclusions: *Pectoralis major* size measured by CMR in HFrEF was independently associated with a higher risk of death or HF hospitalization. Further studies need to be undertaken to establish appropriate age and gender-adjusted cut-offs of muscle areas that identify high-risk subgroups.

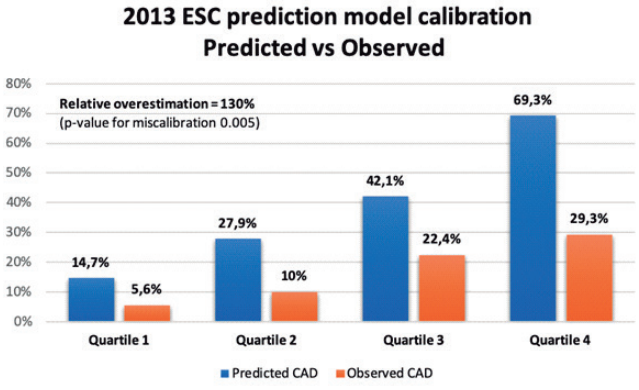
CO 26. PRE-TEST PROBABILITY OF OBSTRUCTIVE CAD IN THE NEW GUIDELINES: TOO MUCH, TOO LITTLE OR JUST ENOUGH?

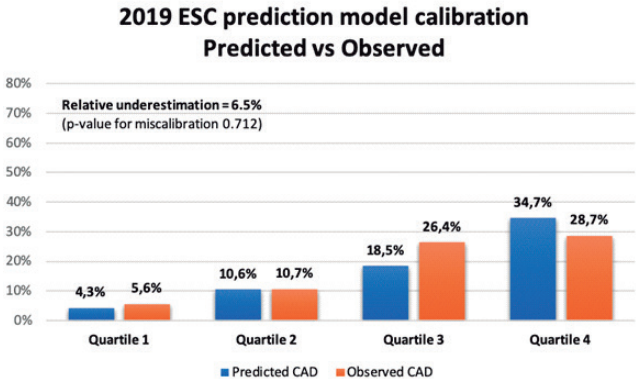
Pedro M. Lopes, Francisco Albuquerque, Pedro Freitas, Bruno ML Rocha, Gonçalo J.L. Cunha, Gustavo Mendes, Ana Coutinho Santos, João Abecasis, Sara Guerreiro, Carla Saraiva, Miguel Mendes, António M. Ferreira

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

Introduction: Previous 2013 ESC guidelines recommended the use of the Modified Diamond-Forrester method to assess the pre-test probability (PTP) of obstructive coronary artery disease (CAD). The 2019 ESC Chronic Coronary Syndrome guidelines updated this recommendation with a major downgrade in PTP. The aim of this study was to compare the performance of these two methods in patients with stable chest pain undergoing coronary computed tomography angiography (CCTA) for suspected CAD.
Methods: We performed a retrospective analysis on prospectively collected data from a cohort of consecutive patients undergoing CCTA for suspected CAD from October 2016 to 2019. Key exclusion criteria were age < 30 years-old, known CAD, suspected acute coronary syndrome or symptoms other than chest pain. Obstructive CAD was defined as any luminal stenosis ≥ 50% on CCTA. Whenever invasive coronary angiography (ICA) was subsequently performed, patients were reclassified if luminal stenosis was < 50%. The two PTP prediction models were assessed for calibration and discrimination.
Results: A total of 320 patients (median age 63 years [IQR 53-70], 59% women) were included. Chest pain characteristics were: 48% atypical angina, 38% non-anginal chest pain, 14% typical angina. The observed prevalence of obstructive CAD was 16.3% (n = 52). Patients with obstructive CAD were more often male, were significantly older and had a higher prevalence of typical angina and cardiovascular risk factors (except for family history of CAD). On average, individual PTP was 22.1% lower in the new guidelines. The 2013 prediction model significantly overestimated the likelihood of obstructive CAD (mean PTP 37.3% vs 16.3%; relative overestimation of 130%, p-value for miscalibration 0.005). The updated 2019 method showed good calibration for predicting the likelihood of obstructive CAD (mean PTP 15.2% vs 16.3%; relative underestimation of 6.5%, p-value for miscalibration 0.712). The two approaches showed similar discriminative power, with a C-statistics of 0.730 and 0.735 for the 2013 and 2019 methods, respectively (p-value for comparison 0.933). Stratification by gender produced similar results.
Conclusions: In patients with stable chest pain undergoing CCTA, the updated 2019 prediction model allows for a more precise estimation of pre-

test probabilities of obstructive CAD than the previous model. Adoption of this new score may improve disease prediction and change the downstream diagnostic pathway in a significant proportion of cases.





CO 27. MYOCARDIAL WORK IMPROVEMENT AFTER SACUBITRIL-VALSARTAN: A NEW PARAMETER FOR A NEW TREATMENT

André Grazina, António Valentim Gonçalves, Ana Galrinho, Tiago Pereira-da-Silva, Luísa Branco, Pedro Rio, Ana Teresa Timóteo, João Abreu, Rui M. Soares, Rita Ilhão Moreira, Isabel Cardoso, Rui Cruz Ferreira

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Introduction: Myocardial work (MW) is a new transthoracic echocardiographic (TTE) parameter that enhances the information provided through left ventricular (LV) global longitudinal strain (GLS). Nothing is known about the impact of Sacubitril/Valsartan therapy on MW parameters.
Objectives: This study aims to evaluate the effects of Sacubitril/Valsartan on LV MW in Heart Failure (HF) patients.
Methods: Prospective evaluation of chronic HF patients with LV ejection fraction ≤ 40% despite optimized standard of care therapy for at least 6 months, in which Sacubitril-Valsartan therapy was started and no other HF treatment was expected to change. TTE study was performed before and six months after Sacubitril-Valsartan therapy. A semiautomated analysis of LV GLS was performed after two-dimensional images were acquired in the standard apical four-, three- and two-chamber views. Valvular timings obtained from TTE and the instantaneous systolic pressure value estimated by a brachial artery cuff were used to estimate a normalized, patient specific LV pressure curve. After that, MW was estimated using custom software of GE Vivid E95 ultrasound system. The paired samples t-Test was used for the analysis of the variables. Statistical differences with a p value < 0.05 were considered significant.

Results: Of the 42 patients, 35 (83.3%) completed the six-months follow-up with Sacubitril-Valsartan, since 2 patients (4.8%) died and 5 patients (11.9%) discontinued treatment for adverse events. No patient was lost during the follow-up. Mean age was 58.6 ± 11.1 years, with 82.9% of male patients and 42.9% with ischemic etiology for HF. The table represents the mean values for TTE parameters before and 6 months after Sacubitril-Valsartan therapy. TTE data showed a significant reduction in LV dimensions and atrial volumes, as well as an improvement in LV ejection fraction (29.3% vs 35.2%, p = 0.001) and GLS (-7.0% vs -8.9%, p = 0.001). MW had a significant increase in global constructive work (720.2 mmHg% vs 900.6 mmHg%, p = 0.016) and global work efficiency (78.6% vs 86.6%, p = 0.027), with a non-significant decrease in global wasted work (150.2 mmHg% vs 136.8 mmHg%, p = 0.441) at six months.

Table 1 Echocardiographic data before and after 6-months of Sacubitril-Valsartan therapy

	Time 0	6 months	*p*
ECHOCARDIOGRAPHIC DATA			
Left ventricle end-diastolic diameter (mm)	71.3 ± 8.4	66.9 ± 7.6	**0.001**
Left ventricle end-systolic diameter (mm)	57.8 ± 9.4	53.1 ± 9.3	**0.002**
Interventricular septum (mm)	9.6 ± 1.7	9.9 ± 1.9	0.280
Left ventricular ejection fraction (%)	29.3 ± 6.4	35.2 ± 8.6	**0.001**
Global longitudinal strain (%)	- 7.0 ± 2.6	- 8.9 ± 2.8	**0.001**
Myocardial Constructive Work (mmHg%)	720.2 ± 230.5	900.6 ± 343.2	**0.016**
Myocardial Wasted Work (mmHg%)	150.2 ± 83.3	136.8 ± 54.2	0.441
Myocardial work index (mmHg%)	572.3 ± 206.9	824.6 ± 290.6	**< 0.001**
Myocardial Work Efficiency (%)	78.6 ± 10.8	86.6 ± 12.0	**0.027**
Mean septal/lateral E/e´	13.6 ± 4.5	12.8 ± 4.6	0.449
Pulmonary artery systolic pressure (mmHg)	38.3 ± 12.2	30.9 ± 10.6	**< 0.001**
Left atrium volume (ml/m²)	51.5 ± 22.6	43.7 ± 15.8	**0.004**
Right atrium volume (ml/m²)	33.1 ± 4.4	28.5 ± 13.5	**0.036**
Tricuspid annular systolic excursion (mm)	19.2 ± 4.4	20.0 ± 4.8	0.404

Values are mean ± standard deviation;

Conclusions: Sacubitril-Valsartan was associated with signs of reverse remodelling by usual TTE. MW seems to be a new tool providing information for the comprehension of the reverse remodelling mechanism, as revealed by an increase in constructive work and work efficiency with Sacubitril-Valsartan therapy.

CO 28. CARDIAC MICROCALCIFICATION BURDEN: GLOBAL ASSESSMENT IN HIGH CARDIOVASCULAR RISK PATIENTS

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Introduction: Sodium fluoride (^{18}F-NaF) atherosclerotic plaque uptake in positron emission tomography with computed tomography (PET-CT) potentially identifies active microcalcification. We aimed to evaluate global cardiac microcalcification activity with ^{18}F-NaF, as a measure of unstable microcalcification burden, in high cardiovascular (CV) risk patients, to explore its association to CV risk factors and other calcification assessment methods. There is no data on this cardiac molecular "instability" marker in patients with high CV risk.
Methods: Twenty five high CV risk individuals without previous CV events from a single centre were prospectively scanned with ^{18}F-NaF PET-CT. Total cardiac ^{18}F-NaF uptake was measured as global molecular calcium score (GMCS), which was retrospectively calculated by summing the product of mean standardized uptake value (SUV) and volume of the region of interest (ROI) on every slice within the borders of the heart. The result was then divided by the number of slices to adjust for the volume.
Results: Mean age was 64 years, 56% male and 96% Caucasian. Median GMCS was 342.58, IQR 174.02-609.52. Individuals with more than five CV risk factors (45.8%) had increased overall GMCS (365.08, IQR 240.79-565.83 vs

291.57, IQR 174.022-609.52, p = 0.04), which was positively correlated with predicted fatal CV risk by SCORE (r = 0.49, p = 0.02). There was a moderate correlation between GMCS and weight (r = 0.77, p < 0.01), body mass index (r = 0.79, p < 0.01), abdominal perimeter (r = 0.76, p < 0.01) and thoracic fat volume (r = 0.60, p = 0.02). There was no correlation between GMCS and coronary calcium score (r = 0.09, p = 0.75) nor coronary artery wall ^{18}F-NaF uptake. As an exploratory endpoint, individuals with heart failure with preserved ejection fraction (HFpEF) (n = 4) had higher GMCS (488.58, IQR 402.84-609.52 vs 316.66 IQR 174.92-565.83, p = 0.01).
Conclusions: In a high CV risk group, the global cardiac microcalcification burden was related to CV risk factors, weight, BMI, abdominal perimeter and thoracic fat volume. For the first time, we report an association between GMCS and HFpEF, putatively due to cardiac fibrosis, which require further validation in larger studies.

CO 29. MYOCARDIAL EDEMA IN FABRY DISEASE

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Introduction: Fabry disease (FD) is a rare X-linked lysosomal storage disorder caused by mutations in the gene *GLA* encoding for α-galactosidase A. Progressive sphingolipid accumulation affects multiple organs, including the heart, where it leads to left ventricular hypertrophy (LVH), myocardial fibrosis and cardiomyopathy. Cardiovascular magnetic resonance (CMR) can demonstrate myocardial processes in FD such as low native T1 (sphingolipid storage) and late gadolinium enhancement (LGE, scar). Recently, high T2 (edema) has been observed in the basal inferolateral wall (BIFL) along with troponin elevation. We hypothesized that edema and myocyte injury would be chronically associated and have electrical, mechanical and disease associations in FD.
Methods: A prospective international multicenter study was conducted in 4 centres. 186 consecutive FD patients (45.2 ± 1.1 years, 58% females), 28 hypertrophic cardiomyopathies (HCM), 30 chronic myocardial infarctions (cMI) and 59 healthy volunteers (HVs) underwent CMR with T1 and T2 mapping, cines and LGE imaging. ECG and high-sensitivity troponin were also available on the same day as the CMR. Fabry patients were followed for 1 year after CMR and the Fabry Stabilization Index (FASTEX) clinical score was recorded (higher scores indicating clinical worsening).
Results: T2 is elevated in the LGE, but more so in Fabry patients: FD 58.2 ± 5.0 ms vs HCM 55.6 ± 4.3 ms, cMI 53.7 ± 3.4ms and HVs 48.9 ± 2.5 ms, p < 0.001. When LGE was present there was also global T2 elevation (53.1 ± 2.9 vs 50.6 ± 2.2 ms without LGE, p < 0.001). 38% of FD patients had high troponin and the strongest predictor of increased troponin was high BIFL T2 (OR 18.2, 95%CI 3.7-90.9, p < 0.0001). Interestingly, both troponin and BIFL T2 levels were chronic after 1 year: a slight increase in BIFL T2 was seen (from 55.2 ± 5.8 ms to 56.3 ± 6.9 ms, delta mean T2 +1.1 ms, p = 0.081), with a similar trend found in troponin (from 17 [1-35] ng/L to 22 [7-41] ng/L, delta median +5 ng/L, p = 0.094). High BIFL T2 was associated with baseline global longitudinal strain impairment(measured with feature tracking, p = 0.005) and electrocardiographic abnormalities (long PR, complete bundle branch block, LVH voltage criteria, long QTc and T-wave inversion, all p < 0.05) and predicted clinical worsening after 1 year (FASTEX > 20%, p = 0.034).
Conclusions: LGE in Fabry has chronic local T2 elevation that is strongly associated with chronic troponin elevation. In addition there is slight global T2 elevation. Both are associated with ECG and mechanical changes and clinical worsening over 1 year.

Sessão de Comunicações Orais - Hipertensão Pulmonar e Congénitos

CO 30. TEMPO ATÉ TERAPÊUTICA FIBRINOLÍTICA NO TEP, QUAL O IMPACTO PROGNÓSTICO?

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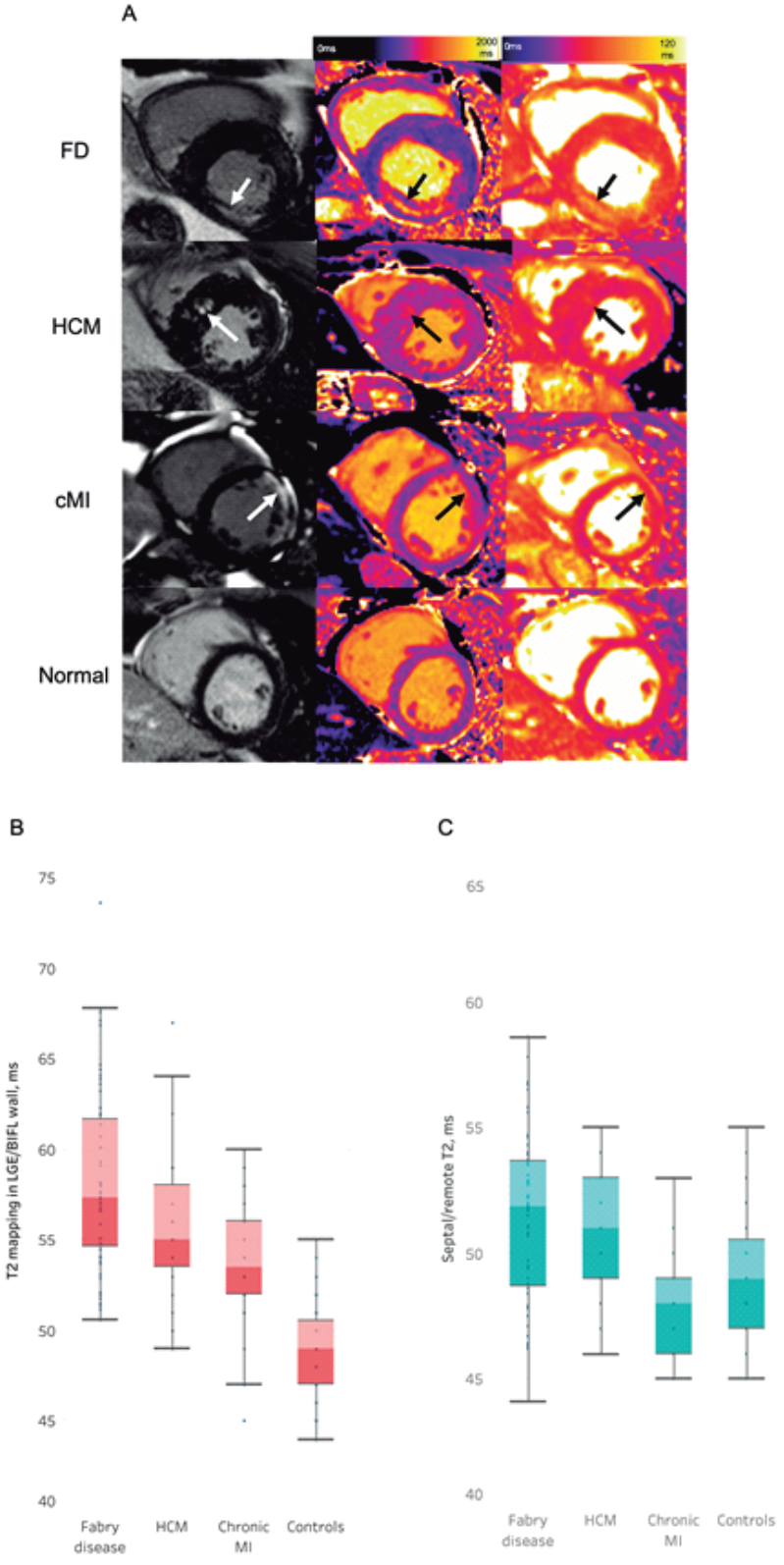
Introdução: A trombólise (T) na embolia pulmonar (EP) tem por objetivo otimizar a lise de trombos, de forma a reduzir eventos como morte e disfunção do ventrículo direito (VD). Em comparação com patologias como o EAM e o AVC, a janela de oportunidade para tratamento pode ser superior.
Objetivo: Avaliar o efeito prognóstico da T ao longo do tempo e tentar definir um intervalo terapêutico ideal para a realização de T.
Métodos: Selecionados todos os doentes admitidos numa unidade de cuidados intensivos cardíacos, em 4 anos consecutivos, por EP e que foram submetidos a T. Classificação do risco da EP segundo as *guidelines* da ESC de 2014. Na EP de risco intermédio-alto (IA) a realização de T dependeu da decisão do médico de serviço. Avaliado o intervalo de tempo (IT) entre o início dos sintomas o início da T. Calculada a mediana do IT e assim definidos 2 grupos: T tardia (TT) se IT superior à mediana; T Precoce (TP) se inferior à mediana. A resolução da disfunção do VD foi avaliada por normalização das dimensões do VD ou da PSAP por ecocardiograma na data de alta. Comparação de grupos relativamente a: morte intra-hospitalar (MIH), resolução da disfunção do VD, complicação hemorrágica (CH) e o *endpoint* combinado (EC) no *follow-up* (FU) de até 2 anos (EC: morte, EP recorrente e internamento por insuficiência cardíaca).
Resultados: Amostra de 99 doentes. 59,6% (n = 59) sexo feminino. Idade média de 62,0 ± 18,4 anos. TEP de risco IA em 74,7% (n = 74) e risco A em 25,3% (n = 25). MIH de 10,1% (n = 10). CE em 19,8% (n = 19). EC em 21,2% (n = 18). Mediana de tempo até T da população geral de 12 horas [1-168]: 14 horas [1-168] na EP de risco IA e 12 horas [2-168] na EP risco A. Por regressão logística verifica-se que na EP de alto risco, o risco de MIH aumenta à medida que aumenta o IT até à realização de T (HR 1,039, IC95 1,006-1,072, p = 0,019), prevendo-se que IT < 73H é preditor de sobrevivência no internamento. Em comparação com o grupo TP, o grupo TT está associado a maior MIH intra-hospitalar na EP de risco A (66,7% *versus* 5,3%, p = 0,001). Sem diferenças na MIH entre o IT decorrido na EP de risco IA (7,1% *versus* 6,5%, p = 0,92). Sem relação entre complicação hemorrágica e IT até T (tanto no TEP de risco A como no IA). Sem diferenças na melhoria da disfunção do ventrículo direito entre os grupos. Contudo, quando a T foi administrada antes da 6H, verificava-se uma maior resolução da disfunção do VD por normalização de dimensões do VD (95,8% *versus* 74,5%, p = 0,028) e PSAP (94,4% *versus* 66,7%, p = 0,022) na EP de risco IA. No FU a 2 anos, não se verificaram diferenças entre os grupos em relação ao EC, mesmo após estratificação de risco (23,7% *versus* 15,4%, p > 0,05).
Conclusões: A T tem impacto na mortalidade da EP de risco A, quanto mais cedo for administrada, estabelecendo-se benefício até às 73 horas. Parece igualmente haver resolução da disfunção do VD se a terapêutica for administrada antes das 6h na EP de risco IA. Desta forma, podemos concluir que o tratamento atempado da EP pode influenciar o prognóstico.

Figure 2. T2 mapping across different cohorts. (A) Corresponding short axis slices in (from top to bottom) Fabry disease (FD), hypertrophic cardiomyopathy (HCM), chronic myocardial infarction (cMI) and normal controls. Left column shows late gadolinium enhancement (LGE) images, middle column shows MOLLI T1 maps and right column T2 maps. White arrows point to the late gadolinium enhancement (LGE); black arrows mark matching areas of abnormal T1 and T2 signal. FD shows higher T2 signal in LGE compared to the other three cohorts. (B) Box and whisker plot comparing T2 values in LGE/basal inferolateral (BIFL) wall for each cohort. T2 values were higher for Fabry disease.



CO 29 Figure

CO 31. NEW ONSET ATRIAL FIBRILLATION AFTER PERCUTANEOUS PATENT FORAMEN OVALE CLOSURE-HOW SERIOUS IS THIS PROBLEM?

Vera Ferreira, Luís Morais, Lídia Sousa, António Fiarresga, José Diogo Martins, Ana Teresa Timóteo, André Viveiros Monteiro, Petra Loureiro, Cristina Soares, Alexandra Castelo, Pedro Garcia Brás, Fátima Pinto, Ana Agapito, Rui Cruz Ferreira

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Introduction: Percutaneous Patent Foramen Ovale (pPFO) closure benefits for secondary prevention after cardio-embolic stroke have recently been proved. With the increasing number of cases and procedures, a concern with new onset atrial fibrillation (NOAF) has been raised.
Objectives: To evaluate long-term outcome regarding NOAF rate and to identify its predictors and clinical impact, in a real population submitted to pPFO closure.
Methods: From 2000 to 2017, consecutive patients (P) submitted to pPFO closure in a tertiary centre were prospectively enrolled. The primary endpoint was NOAF rate and secondary endpoints were all-cause, neurologic and cardiac mortality rates and recurrent ischemic events. Previous and follow-up electrocardiographic, echocardiographic and 24-hour heart rhythm monitoring data were analysed. Follow-up was performed through medical visits, medical charts consultation and a phone call based system, in order to assess clinical status, on-going treatment and events.
Results: 496 patients were submitted to pPFO. Immediate success was achieved in 98.8% and 9.1% presented a residual shunt on the 1st year TEE. Mean age was 45.0 ± 11.2 years-old with 50.2% of males. The prevalence of hypertension, hypercholesterolemia and atrial septum aneurysm (ASA) was 25.7%, 45.0% and 46.3%, respectively. Pre-procedural mean left atrial (LA) diameter was 36.0 ± 5.3 mm. FU data was available for 490 (98.6%), for a mean FU time of 7.41 ± 3.51 years. 34 P (6.9%) presented ischemic events recurrence (26 strokes and 8 TIA). The primary endpoint was observed in 21 P (4.3%) during the FU period. Median time to 1st AF episode since PFO closure was 5.90 ± 5.53 years. 11 P (52.3%) initiated oral anticoagulation. In univariate analysis, age (44.6 ± 11.3 vs 51.8 ± 6.0 years, p = 0.005) and hypertension (24.7% vs 47.6%, p = 0.019) were predictors of NOAF in this population. In multivariated analysis, only age remained a predictor of NOAF (OR 1.05 (1.007-1.101), p = 0.025). LA pre pPFO closure dimensions, ASA, device type or size and the presence of residual shunt in TEE were not determinants of AF occurrence. The incidence of NOAF was associated with the need for hospitalization due to cardiac causes (19% vs 3.2%, p = 0.001) and a trend towards higher rate of recurrent stroke (4.9% vs 14.3%, p = 0.06).
Conclusions: Despite being a highly successful and safe procedure in most patients, pPFO closure was associated with a non-negligenciable rate of NOAF during long-term follow-up. NOAF predictors were related with classical cardiovascular risk factors, such as age and hypertension. None of the procedure or device features were associated with NOAF. Yet, a clinical impact was attributed to NOAF, with more hospitalizations and a trend towards ischemic events recurrence. As young patients submitted to pPFO closure grow older, prevention strategies to diagnose and treat NOAF should be endeavoured.

CO 32. CARDIOPULMONARY EXERCISE TESTING IN REPAIRED TETRALOGY OF FALLOT-ASSESSING PULMONARY REGURGITATION

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Introduction and objectives: The optimal timing for pulmonary valve replacement (PVR) in asymptomatic patients with repaired Tetralogy of Fallot (TOF) and pulmonary regurgitation (PR) remains uncertain but is often guided by imaging characterization of the right ventricle. As cardiopulmonary exercise testing (CPET) performance is a strong and an accessible prognostic indicator, we assessed which CPET parameters best correlate with pulmonary regurgitation severity to potentially improve identification of high-risk patients.
Methods: A retrospective chart review was done from 2009 to 2018 on patients with TOF who underwent maximal effort cardiopulmonary exercise testing with cycle ergometry and with concurrent pulmonary function testing. Demographics, standard measures of CPET interpretation, and major cardiovascular outcomes were collected.
Results: Cardiopulmonary exercise test was performed in 54 TOF patients (59% male), with a mean age of 34 ± 9 years. 30 patients (56%) had severe pulmonary regurgitation and 26 patients (48%) were submitted to PVR, with a 0% mortality rate. PVR was performed a mean 28 ± 7 years after TOF repair surgery. There was moderate to severe right ventricular dysfunction in 11 patients (20%).12 patients (22%) had a hospitalization for heart failure. Arrhythmic events occurred in 9 patients (17%), mainly atrial fibrillation or atrial flutter (67%). 2 patients (4%) received an implantable cardioverter-defibrillator for secondary prevention of sudden cardiac death. Peak VO_2 consumption (pVO_2) showed no statistically significant correlation with severity of pulmonary regurgitation (HR 0.26, CI 0.879-1.036, p = 0.262) or PVR (HR 0.92, CI 0.829-1.028, p = 0.914), while percent of predicted pVO_2 significantly correlated with severity of pulmonary regurgitation (HR 1.05, CI 1.007-1.089, p = 0.020) and PVR (HR 1.06, CI 1.008-1.129, p = 0.025). Cardiorespiratory optimal point (HR 0.94, CI 0.786-1.120, p = 0.480) and maximum end-tidal carbon dioxide pressure (HR 1.07, CI 0.964-1.182, p = 0.213) also did not correlate with pulmonary regurgitation or PVR.
Conclusions: Percent of predicted peak VO_2 had the highest predictive power of all CPET parameters analysed in adult TOF patients. Preoperative CPET could be an accessible way to identify sooner high-risk patients for PVR and should therefore be included in the routine assessment of these patients.

CO 33. EFFECTIVENESS AND SAFETY OF BALLOON PULMONARY ANGIOPLASTY IN A SMALL COHORT OF CTEPH PATIENTS

Rafael Santos[1], Cláudia Jorge[2], Miguel Nobre Menezes[2], Rui Plácido[2], Tatiana Guimarães[2], Nuno Lousada[2], Inês Aguiar-Ricardo[1], Joana Rigueira[2], Tiago Rodrigues[3], Nelson Cunha [2], Afonso Nunes-Ferreira[1], Pedro Silvério António[4], Sara Couto Pereira[2], Pedro S. Morais[2], Fausto J. Pinto[2], Pedro Canas da Silva[3]

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Introduction: Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare and potentially life-threatening disease. Balloon pulmonary angioplasty (BPA) is an emerging procedure to treat CTEPH patients who are not candidates to surgery-pulmonary thromboendarterectomy (PTE)-or still have residual pulmonary hypertension and remain symptomatic after PTE.
Objectives: To evaluate the early results of a BPA program at a pulmonary hypertension referral center and its impact on the pulmonary hemodynamics parameters and NT-proBNP value.
Methods: we performed a prospective single center study of patients who were submitted to BPA since May 2018 until November 2019 and in whom after repeated sessions a decrease in mean pulmonary arterial pressure (PAPm) bellow 30 mmHg was achieved. Demographic, clinical, laboratorial (NT-proBNP), pulmonary hemodynamic data (right-sided heart catheterization), procedure characteristics and complications were analyzed. For statistical analysis, the Wilcoxon test was used.
Results: During this period, 8 patients were submitted to BPA and met criteria for complete revascularization. The median age was 73 years (IQ 65-75.5), with just 1 male patient. The median number of sessions was 4 (minimum 2, maximum 7). All of the patients were on specific vasodilator therapy and receiving anticoagulation (5 with warfarin and 3 with a NOAC) and three patients were on oxygen therapy. Half of the patients had a previous history of PTE (the median time between surgery and BPA was 24.5 months). Mild hemoptysis was the only complication-5 (14%) events in

a total of 36 sessions. Short duration noninvasive ventilation with CPAP was performed with resolution. No cases of reperfusion injury were reported. Regarding the pulmonary hemodynamics status, a clear decrease in PAPm was observed, from 40 mmHg (IQ36.5-46.5) before BPA to 26 mmHg (IQ21.25-28.5) after BPA (p = 0.012) and in vascular pulmonary resistance-5.6 WU (IQ4.42-11.21) before BPA vs 3.45 WU (IQ3.2-4.43) after BPA (p = 0.046). There were no significant changes in cardiac output. It was also found a statistically significant decrease in NT-proBNP-550 ng/L (IQ 208.5-1801) before BPA vs 313 ng/L (IQ 162.75-845.25) after BPA (p = 0.025).
Conclusions: Although our cohort is small, BPA has proven to be a safe procedure, with a few complications of mild degree and with a significant improvement in pulmonary hemodynamics parameters and NT-proBNP values, which is in agreement with the existing literature.

CO 34. PREDICTORS OF PERSISTENT PULMONARY HYPERTENSION AFTER PULMONARY ENDARTERECTOMY IN CTEPH

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Introduction: Pulmonary endarterectomy (PEA) is the treatment of choice for most patients (pts) with chronic thromboembolic pulmonary hypertension (CTEPH) in the presence of favorable anatomical features and can be potentially curative. The aim of this study was to identify clinical and hemodynamic predictors of persistent pulmonary hypertension (pPH) after PEA.
Methods: Retrospective single-center study of consecutive pts with clinical and hemodynamic diagnosis of CTEPH undergoing PEA. Demographic, clinical, laboratorial, CT scan and hemodynamic data were collected before and after the procedure. For statistical analysis chi-square and T-student tests were used, with prediction of clinical, laboratorial and hemodynamic response with binary logistic regression model.
Results: Between January 2016 and February 2019, 24 pts with CTEPH underwent PEA (mean age: 59.7 ± 12.9 years; 54.2% were female, basal weight: 80.3 ± 17.3 Kg). The mean follow-up was 5.6 ± 6.4 months. Heritable coagulopathy was diagnosed in 20.8% pts and antiphospholipid syndrome in 12.5%. All the pts were under anticoagulation therapy and 87.5% pts were under specific pulmonary vasodilator therapy (sildenafil 41.7%; bonsentan 16.7%; macicentan 4.2%; ambrisentan 12.5%; epoprostenol 4.2%; riociguat 37.5%). At baseline, median WHO functional class was II, 6-minute walk distance 312.2 ± 90.9m and 37.5% of pts were under long duration oxygen therapy. Regarding laboratorial data, mean hemoglobin (Hb) was 13.9 ± 2.1 g/dL, mean Cr 1.1 ± 0.28 mg/dL and mean NT-proBNP 148.7 ± 234.0 pg/mL. At basal hemodynamic evaluation, the mean pulmonary artery pressure (mPAP) was 51.0 ± 11.6 mmHg, mean pulmonar capillary wedge pressure (PCWP) 13.4 ± 3.7 mmHg, cardiac output 3.8 ± 1.0 L/min and cardiac index (CI) 1.9 ± 0.7 L/min/m^2. On CT scan, the mean pulmonary artery diameter was 37.4 ± 6.6 mm, right ventricle (RV) and left ventricle (LV) basal diameters were 53.4 ± 8.5 mm and 40.1 ± 7.7 mm on axial CT sections, respectively. RV/LV basal diameters ratio was 1.39 ± 0.44 mm. RV and LV areas were 33.6 ± 11.8 mm and 24.2 ± 7.7 mm on 4-chamber view, respectively. After surgery, 45.8% pts (n = 11) had pPH. There was an association of pPH with presurgical low weight and Hb levels (p = 0.019 for both), higher WHO functional class (p = 0.023), less LV basal diameter and LV area (p = 0.045; p = 0.017). On univariate analysis, functional WHO class (p = 0.039, OR 11.7, CI 1.14-119.54), basal Hb values (p = 0.039, OR 0.601, CI 0.371-0.97) and smaller LV area (p = 0.044, OR 0.837, IC: 0.704-0.995) were predictors of pPH, the last one being an independent predictor (p = 0.044, OR 0.837, IC: 0.704-0.995).
Conclusions: This study showed that functional WHO class, basal Hb values and smaller LV area were predictors of PPH. Smaller LV area was also an independent predictor of pPH. We hypothesized that remodeling conditions secondary to RV dilatation may be related with worst outcomes after PEA.

CO 35. BALLOON PULMONARY ANGIOPLASTY 6 MONTHS RESULTS: SHORT TERM PERFORMANCE OF THE NEW KID ON THE BLOCK FOR CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION

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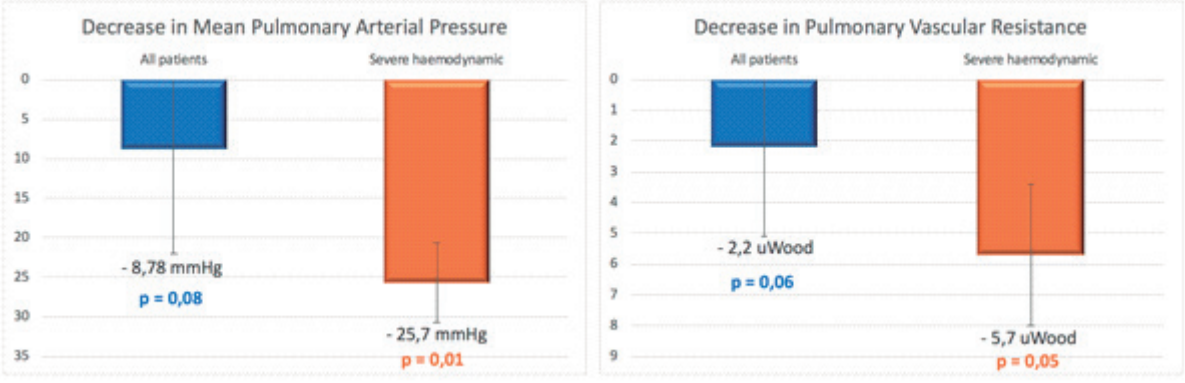
Introduction: Chronic thromboembolic pulmonary hypertension (CTEPH) had poor prognosis when treated only medically. Balloon pulmonary angioplasty (BPA) is emerging as an alternative therapy in patients (pts) with residual/recurrent pulmonary hypertension (PH) after pulmonary endarterectomy or inoperable disease. The aim of this study was to evaluate the short-term efficacy and safety of BPA programme.
Methods: Prospective single-centre study that included all BPA sessions performed from 2017 to 2019. Blood analyses, 6-minute walking test (6MWT) and right heart catheterization was performed at baseline and 6-months after the last session.
Results: From a total of 64 sessions, 57 were performed in CTEPH pts: 11 pts, mean age 65.8 ± 12.7 years, 72.7% female and 63.6% with inoperable disease. At baseline, all pts had functional capacity limitation (WHO functional class ≥ II), 72.6% were treated with pulmonary vasodilator therapy (including 2 pts under intravenous prostacyclin analogs) and 18.2% were under long-term oxygen therapy. The mean walked distance in 6MWT was 377.5 ± 66.1 meters, mean pulmonary arterial pressure (mPAP) was 33.0 ± 11.4 mmHg and pulmonary vascular resistance (PVR) 5.1 ± 3.8 uWood. Three pts (27.3%) presented severe haemodynamic disease (mPAP > 40 mmHg). The BPA programme was completed with a 6-months follow-up in 9 pts



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(81.8%): median of 4.5 sessions per patient with 4.0 ± 1.6 vessels dilated per session. A significant functional improvement was observed: all pts were in functional class I ($p < 0.01$) and the mean increase in 6 minute walked distance was 46.7 meters. There was also a trend for significant haemodynamic improvement with a 24.9% decrease in mPAP ($p = 0.08$) and a 43.6% decrease in PVR ($p = 0.06$). In the severe haemodynamic subgroup, the reduction was significant (Figure): 50.9% in mPAP ($p = 0.01$) and 67.1% in PVR ($p = 0.05$). Intravenous prostacyclin analogs and long-term oxygen therapy were completed withdrawn. Minor complications were recorded in 24.6%. Pulmonary vascular lesions were the most common. No serious complications were reported.
Conclusions: This study confirms that a BPA strategy improves short-term symptoms, exercise capacity and haemodynamics with an acceptable risk-benefit ratio in pts with residual/recurrent PH after pulmonary endarterectomy or inoperable CTEPH. These data are in line with those published in the literature and encourage the development of the technique at a national level.

Prémio Jovem Investigador

CO 41. THYROID HORMONE AS A THERAPY FOR HEART FAILURE WITH PRESERVED EJECTION FRACTION IN A RAT MODEL

Alexandre Gonçalves, João Sérgio Neves, Catarina Vale, Madalena von Haffe, Glória Conceição, Daniela Miranda-Silva, Dulce Fontoura, João Almeida-Coelho, Sara Leite, André P. Lourenço, Inês Falcão-Pires, Adelino Leite Moreira

Faculdade de Medicina da Universidade do Porto.

Introduction: Heart failure with preserved ejection fraction (HFpEF) now represents over 50% of heart failure patients, while being the leading cause of morbimortality and remaining elusive to effective therapeutic intervention. Approximately 22% of HFpEF patients present reduced triiodothyronine (T3) levels and these lower levels are inversely correlated to HFpEF severity, symptomatology and prognosis. The present study aims to evaluate the impact of T3 supplementation in the cardiac function of an HFpEF animal model as a possible therapy for this disease.
Methods: Starting at 14 weeks of age, ZSF1 Obese rats (HFpEF, n = 8) were randomly allocated to either receive an oral administration of T3 (0.04-0.06 μg/mL, n = 5) or vehicle. ZSF1 Lean rats (CT, n = 8) were used as control throughout the experiments. Thyroid function was systematically assessed every two weeks via serum T3, T4 and TSH levels to fine-tune the administered T3 dosage. Echocardiographic evaluation was conducted at 22nd week followed by terminal hemodynamic, tissue collection and morphometric assessment by the 24th week. Single isolated cardiomyocyte function was studied using a combination of field fluorescent recordings through the FURA-2 probe (cytosolic Ca^{2+} kinetics) and optical edge detection (sarcomere shortening) at 37 ºC.
Results: We confirmed that HFpEF rats had lower T3 levels in the serum and left ventricle when compared to CT. Oral T3 supplementation was found to be effective at normalizing the left ventricular levels without variation in serum levels. Echocardiographic and hemodynamic evaluations revealed impaired diastolic (IVRT, E/e', LAA, exp and systolic (S', Ea) function in the HFpEF model. In this regard, T3 treated rats shown significant functional improvements in all parameters. Lastly, functional studies at the isolated cardiomyocyte level found substantial Ca^{2+} kinetics (time to peak Ca^{2+} and Ca^{2+} decay half-time), contractile amplitude and relaxation impairments (exp), in the HFpEF model corroborating the *in vivo* results. Cardiomyocytes isolated from the treated group displayed a complete normalization of Ca^{2+} handling and contractile capacity.
Conclusions: Together our results shown T3 to improve and even normalize several functional parameters associated to HFpEF, specifically diastolic disfunction, thus supporting it as a promising therapy for HFpEF when a disruption in thyroid function is found.

CO 38. ROLE OF UROCORTIN-2 IN HEART FAILURE WITH PRESERVED EJECTION FRACTION

Rui Adão, Glória Conceição, Daniela Miranda-Silva, Sónia Miranda, Luís D. Pimentel, Pedro Vaz-Salvador, Carolina Maia-Rocha, Pedro Mendes-Ferreira, André P. Lourenço, Inês Falcão-Pires, Adelino Leite Moreira, Carmen Brás-Silva

Faculdade de Medicina da Universidade do Porto.

Introduction: Heart failure with preserved ejection fraction (HFpEF) is frequently accompanied by the metabolic syndrome and kidney disease. Because current treatment options of HFpEF are limited, evaluation of therapies in experimental models of HFpEF with the metabolic syndrome is needed. Urocortin 2 (Ucn2) is a cardioprotective peptide belonging to the corticotrophin-releasing hormone (CRH) family. In animal models and humans with HF with reduced ejection fraction, Ucn2 has been shown to exert favorable effects on left ventricle (LV) function, as well as on neurohumoral and renal parameters.
Objectives: In this work we studied the role of the Ucn2/CRHR2 system in the pathophysiology of HFpEF, and we evaluated the efficacy of Ucn2 as a novel therapeutic strategy in this disease.
Methods: Ucn2 (15 μg/Kg/day, subcutaneous) or vehicle was administered to lean and obese ZSF1 rats aged 18 to 30 weeks (6-7 animals/group). Animals were then used for oxygen consumption under maximum effort (VO2max) evaluation, oral glucose tolerance test, insulin resistance test and sample collection after 12 weeks of treatment. Temporal evolution of cardiac (dys) function was assessed by echocardiography.
Results: mRNA expression of Ucn2 and CRHR2 is decreased in LV from ZSF1 obese rats compared to ZSF1 lean, and it is correlated to left atrium area and diastolic function (E/E'). Although Ucn-2 chronic treatment did not attenuate the body weight gain and the impaired exercise capacity in experimental HFpEF, Ucn-2 treatment improved glucose tolerance in ZSF1 obese rats. By echocardiography, we demonstrated that there is no differences in ejection fraction between groups and that Ucn-2 therapy attenuated LV mass in ZSF1-Obese animals compared to non-treated group. No differences were observed in E/E' parameter.
Conclusions: This study suggests that chronic administration of Ucn2 could be beneficial in patients with HFpEF, attenuating LV remodelling and improving glucose tolerance.

CO 39. MACHINE LEARNING WALL THICKNESS MEASUREMENT IN HYPERTROPHIC CARDIOMYOPATHY EXCEEDS PERFORMANCE OF WORLD EXPERTS

João B. Augusto[1], Rhodri Davies[2], Anish Bhuva[2], Kristopher Knott[2], Mashael Al-Farih[2], Clement Lau[3], Rebecca Hughes[2], Andreas Seraphim[2], Luís Lopes[2], Gabriella Captur[4], Peter Kellman[5], Bernhard Gerber[6], Ntobeko Ntusi[7], Milind Y Desai[8], Christian Hamilton Craig[9], João Cavalcante[10], Gianluca Pontone[11], Erik Schelbert[12], Chiara Bucciarelli-Ducci[13], Steffen E Petersen[2], Charlotte Manisty[2], James C Moon[2]

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Table. Test-retest reproducibility of MWT stratified by observer.

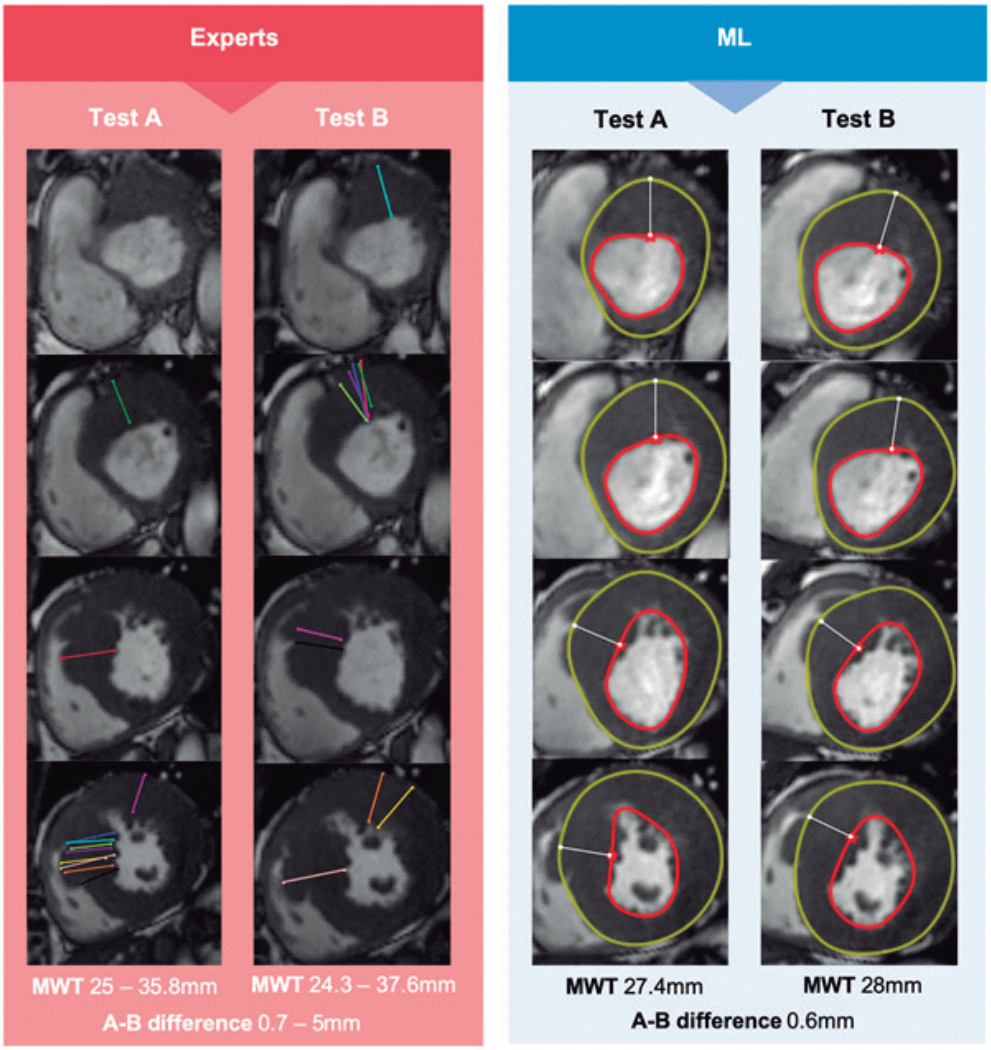
	Average MWT, mm	Absolute MWT difference, mm	Bland-Altman bias and limits of agreement, mm	CoV (95% confidence interval), %	P value for CoV vs ML
Machine learning	16.8±4.1	0.7±0.6	-0.1 (-2.0 – 1.7)	4.3 (3.3 – 5.1)	-
Expert 1	16.4±1.9	3.7±2.0**	0.4 (-5 – 5.9)	12.1 (8.2 – 15.0)	**<0.001**
Expert 2	15.7±3.9**	2.0±1.7**	-1.1 (-5.9 – 3.7)	11.9 (8.8 – 14.4)	**<0.001**
Expert 3	19.0±4.7**	1.6±1.5**	-0.2 (-4.5 – 4.1)	7.9 (6.1 – 9.4)	**<0.001**
Expert 4	17.4±3.9*	1.7±1.4**	0.3 (-3.9 – 4.6)	8.7 (7.2 – 10.0)	**<0.001**
Expert 5	14.9±4.2**	1.9±1.3**	1.1 (-2.9 – 5.1)	11.2 (9.4 – 12.8)	**<0.001**
Expert 6	15.8±4.2**	1.4±1.2**	-0.1 (-3.8 – 3.6)	8.3 (6.5 – 9.8)	**<0.001**
Expert 7	18.9±4.9**	1.4±1.2**	-0.1 (-3.7 – 3.4)	6.7 (5.3 – 7.9)	**<0.001**
Expert 8	15.8±4.1**	1.2±1.2*	-0.2 (-3.6 – 3.2)	8.3 (5.6 – 10.3)	**<0.001**
Expert 9	18.6±4.7**	1.3±1.2*	-0.8 (-4.0 – 2.4)	6.9 (5.1 – 8.3)	**<0.001**
Expert 10	16.7±3.9	1.1±0.9*	0 (-2.8 – 2.8)	5.7 (4.6 – 6.5)	**0.034**
Expert 11	19.0±4.7**	1.3±1.1**	-1 (-3.7 – 1.7)	5.9 (4.5 – 7.1)	**0.013**

CoV, coefficient of variance; MWT, maximum wall thickness.

Average MWT between test-retest across all study subjects.

* p<0.05 vs. machine learning using paired Student's t-test

** p<0.001 vs machine learning using paired Student's t-test



CO 39 Figure

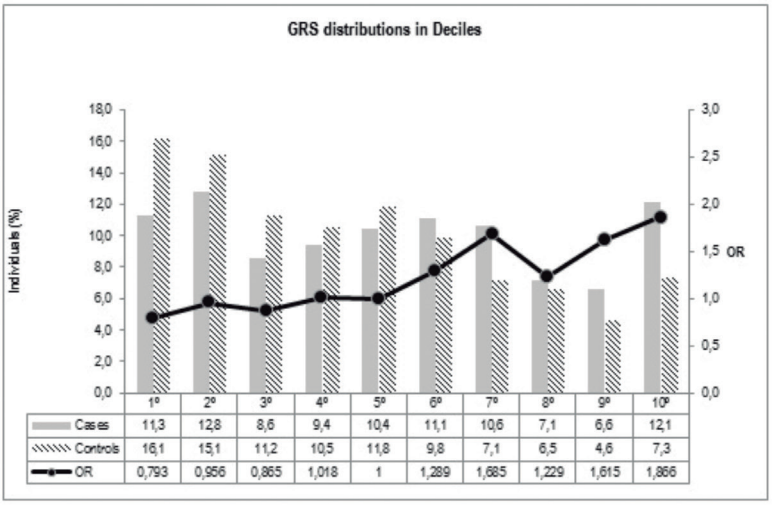
Introduction: Maximum wall thickness (MWT) is essential in hypertrophic cardiomyopathy (HCM) diagnosis and risk stratification, but its measurement is not standardized. Cardiac MRI (CMR) is the modality of choice to measure MWT, but human observers still make mistakes: (1) they do not measure every single myocardium segment in every single slice, (2) it is difficult to calliper two non-parallel edges and find where MWT is truly maximum and (3) the length of the calliper can be confounded by discrepancies in edge detection (e.g. trabeculae, blood-myocardium interface). We developed a fully automated machine learning (ML) algorithm, optimized it for MWT measurement in HCM, and compared this to the human performance of 11 world experts in CMR and HCM, using precision (repeatability) applied to a dataset of patients scanned twice.
Methods: *Training dataset*: Endo- and epicardial end-diastolic contours were derived using a fully-automated convolutional neural network trained on 1,923 independent multi-centre multi-disease cases (14 centres from 3 countries, 10 scanner models, 2 field strengths, with balanced pathologies-health, athletes, myocardial infarction, aortic stenosis, HCM, dilated cardiomyopathy, infiltrative diseases) all segmented by a single expert. *Patients:* 60 HCM patients were scanned twice (scan:rescan) in the same session (no biological variability) at different field strengths and vendors (Siemens, GE, Philips) in 5 other centres to allow generalizability. The protocol consisted of long axes cines and a short axis (SAX) bSSFP cine stack. Between scans, patients were brought out of the bore, repositioned on the table and re-isocentered. *Wall thickness:* MWT was measured in the SAX cine stack in end-diastole (scans A and B) by 11 experts (from 6 countries). For ML performance, the contours were based on a repurposed algorithm used for brain cortical thickness measurement, applying the Laplace equation for all contour points-effectively creating nested smoothly deforming surfaces from endo- to epicardium. We created orthogonal field lines to connect endo-and epicardial points, measured these distances and took the maximum as MWT.
Results: The ML was more precise than experts across several metrics: (1) absolute MWT difference between test-retest for ML was under-millimetric (0.7 ± 0.6 mm) and significantly inferior to all other experts ($p < 0.05$, Table), (2) Bland-Altman limits of agreement interval (upper minus lower limit) were narrower in ML (3.7 vs 7.7 mm for experts average), (3) coefficient of variation was lower in ML (4.3 [3.3-5.1]%) than all experts ($p < 0.05$ versus each expert, Table). A study designed to detect a 2 mm change in MWT as an endpoint would need on average 2.3 times fewer patients (1.3 to 4 times) if analyzed by ML than by humans (90% power, alpha = 0.05).
Conclusions: ML fully automated MWT measurement in HCM is feasible and is more precise than human experts.

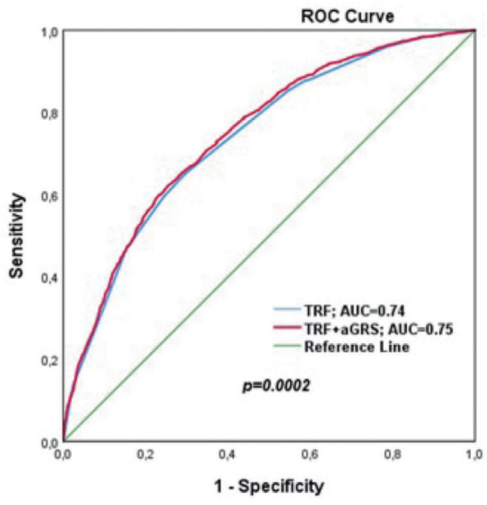
CO 36. HAS THE TIME COME TO INTEGRATE GENETIC RISK SCORES INTO CLINICAL PRACTICE?

Flávio Mendonça[1], Maria Isabel Mendonça[2], Andreia Pereira[3], Joel Monteiro[3], João Sousa[3], Marina Santos[3], Margarida Temtem[3], Ana Célia Sousa[2], Eva Henriques[2], Sónia Freitas[2], Ana Isabel Freitas[2], Drumond Freitas[3], Roberto Palma dos Reis[4]

[1]Hospital Santa Cruz. [2]Hospital Dr. Nélio Mendonça-Unidade de Investigação Dra. Maria Isabel Mendonça. [3]Hospital Dr. Nélio Mendonça-Hospital Central do Funchal. [4]Nova Medical School.

Introduction: The risk for Coronary Artery Disease (CAD) is determined by both genetic and environmental factors, as well as by the interaction between them. It is estimated that genetic factors could account for 40% to 55% of the existing variability among the population (inheritability). Therefore, some authors have advised that it is time we integrated genetic risk scores into clinical practice.
Objectives: The aim of this study was to evaluate the magnitude of the association between an additive genetic risk score (aGRS) and CAD based on the cumulative number of risk alleles in these variants, and to estimate whether their use is valuable in clinical practice.
Methods: A case-control study was performed in a Portuguese population. We enrolled 3,120 participants, of whom 1,687 were CAD patients and 1,433 were normal controls. Controls were paired to cases with respect to gender and age. 33 genetic variants known to be associated with CAD were selected, and an aGRS was calculated for each individual. The aGRS was further subdivided into deciles groups, in order to estimate the CAD risk in each decile, defined by the number of risk alleles. The magnitude of the risk (odds ratio) was calculated for each group by multiple logistic regression using the 5th decile as the reference group (median). In order to evaluate the ability of the aGRS to discriminate susceptibility to CAD, two genetic models were performed, the first with traditional risk factors (TRF) and second with TRF plus aGRS. The AUC of the two ROC curves was calculated.
Results: A higher prevalence of cases over controls became apparent from the 6th decile of the aGRS, reflecting the higher number of risk alleles present (Figure). The difference in CAD risk was only significant from the 6th decile, increasing gradually until the 10th decile. The odds ratio (OR) for the last decile related to 5th decile (median) was 1.87 (95%CI: 1.36-2.56; $p < 0.0001$). The first model yielded an AUC = 0.738 (95%CI: 0.720-0.755) and the second model was slightly more discriminative for CAD risk (AUC = 0.748; 95%CI: 0.730-0.765). The DeLong test was significant ($p = 0.0002$).
Conclusions: Adding an aGRS to the non-genetic risk factors resulted in a modest improvement in the ability to discriminate the risk of CAD. Such





CO 36 Figure

improvement, even if statistically significant, does not appear to be of real value in clinical practice yet. We anticipate that with the development of further knowledge about different SNPs and their complex interactions, and with the inclusion of rare genetic variants, genetic risk scores will be better suited for use in a clinical setting.

CO 37. HEREDITARY TRANSTHYRETIN AMYLOIDOSIS: PREDICTORS OF CONDUCTION DISEASE

André Dias-Frias, Patricia Rodrigues, Maria Trêpa, Marta Fontes-Oliveira, Ricardo Costa, Andreia Campinas, Hipólito Reis, Severo Torres

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

Introduction: Pacemakers are frequently needed due to a high prevalence of conduction disease in mutated ATTR amyloidosis (mATTR). We aimed to identify the variables associated with the need of pacemaker implantation in this population.
Methods: We retrospectively studied 255 patients with suspicion of heart involvement of mATTR observed at our cardiology clinic during the last year. Clinical and outcome data were retrieved by chart review. We have defined the need for pacemaker implantation as: 1) the formal guidelines indications or 2) Ventricular pacing > 10% in patients who had prophylactic pacemaker implantation prior to liver transplantation (LT). This way, we have defined 3 different groups: group 1: patients with no evidence of conduction disease; group 2: patients with conduction disease, but no formal indication for pacemaker implantation; and group 3: patients with formal indication for pacemaker implantation or ventricular pacing > 10% in patients who had prophylactic pacemaker implantation prior to hepatic transplantation.
Results: We included 255 patients (50 ± 14 years, 53% male, 52,5% treated with tafamidis and 27% had prior LT, and 10% with atrial fibrillation), 43,3% with no evidence of conduction disease, 32,3% with conduction disease, but no formal indication for pacemaker implantation and 24,4% with formal indication for pacemaker implantation. Patients with formal indication for pacemaker implantation were older, with longer duration of neurologic manifestations, with higher concentration of both Troponin T and NT-proBNP and with higher number of organs affected. In multivariate analysis, longer duration of neurologic manifestations (OR 1,090, IC95% 1,036-1,145, p-value 0,001), Left ventricular (LV) maximal wall thickness (OR 1,230, IC95% 1,070-1,414, p-value 0,004), neurologic staging (OR 3,420, IC95% 1,443-8,104, p-value 0,005) and higher number of organs affected (OR 1,719, IC95% 1,218-2,424, p-value 0,002) all showed to be independent predictors of the need for pacemaker implantation, in contrast to LV ejection fraction and serum concentration of Troponin T and NT-proBNP. We've also found a statistical significant association between conduction disease and ophthalmic manifestations.
Conclusions: Our findings suggest that the need for pacemaker implantation in patients with mATTR is closer linked to the duration, severity and affected number of organs than to cardiac biomarkers or echocardiographic findings.

CO 40. PREDICTING PACEMAKER IMPLANTATION AFTER TAVR WITH PROCEDURAL CT

Francisco F Gama, Pedro Gonçalves, António Ferreira, Rui Campante Teles, João Abecasis, João Brito, Gustavo Mendes, Mariana Gonçalves, Afonso Félix Oliveira, Pedro Freitas, Manuel Almeida, Miguel Mendes

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

Introduction and objectives: The need for permanent pacemaker implantation (PPMI) is a burdensome complication of transcatheter aortic valve replacement (TAVR). Calcium distribution in the aortic-valvular complex (AVC) and, more recently, membranous septum (MS) length seem to be surrogate markers for conduction abnormalities after specific last generation balloon and self-expandable expandable valves. We sought to evaluate whether such pre-procedural association remains across the entire device spectrum.
Methods: Single-centre prospective study of 239 consecutive patients (140 women, median age of 84) with severe symptomatic aortic stenosis patients who underwent ECG-gated contrast-enhanced multi-detector computed tomography (MSCT) before TAVR since Jun/2017. Exclusion criteria were those with previous PPMI, previous bioprothesis, congenital bicuspid valve, and poor imaging quality. The J-score with an 850-Hounsfield unit threshold was used to detect areas of calcium in the region of interest. AVC was characterized by leaflet sector and region, using 3 mensio Valves software 7.0™. An independent team retrospectively measured MS length blindly by

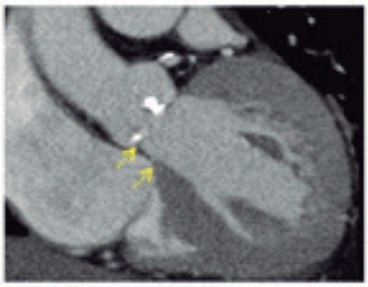
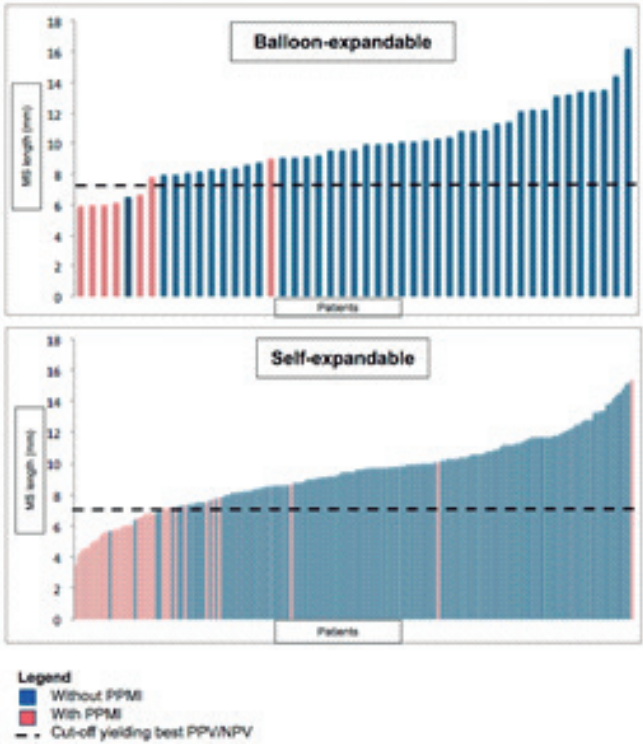


Figure 1: Contrast-enhanced CT coronal view with MS length sizing



CO 40 Figure

determining the thinnest part of the interventricular septum in the coronal view in the better-defined systolic phase (usually at 40% of the R-R interval, Figure). Device selection (75.8% self-expandable devices, 20.1% balloon expandable, 3.1% other) and positioning were performed according to the operator criteria. Final implant depth was assessed based on the pre-release angiogram or final aortography.

Results: Mortality at 30-days was 1.3% and PPMI occurred in 43 patients (18%). Median MS length was 9.59 mm (IQR: 3.11 mm). After multivariable logistic regression analysis, MS length emerged as the single significant protective predictor for PPMI (OR: 0.14; 95% 95%CI: 0.05-0.42; p < 0.001), independently of the device used (p < 0.001). MS length showed strong discriminatory ability for PPMI (c-statistic 0.93; 95%CI 0.88-0.99). Sensitivity/specificity decision plots yielded an MS length of 6.9 mm as the optimal cut-off point for predicting the need for PPMI with a positive and negative predictive value of 91% and 93%, respectively (Figure). There wasn't any calcium accumulation within a specific region of AVC that independently predicted the outcome.

Conclusions: In our experience, a short membranous septum was strongly and independently associated with new permanent pacemaker implantation, regardless of the device type. Our findings suggest that this simple measure should be routinely made to help device selection and implantation technique.

Sessão de Comunicações Orais - Insuficiência Cardíaca

CO 42. ANTIARRHYTHMIC EFFECT OF SACUBITRIL-VALSARTAN: CAUSE OR CONSEQUENCE OF CLINICAL IMPROVEMENT?

António Valentim Gonçalves[1], Tiago Pereira-da-Silva[1], Ana Galrinho[1], Isabel Cardoso[1], André Grazina[1], Luísa Branco[1], Pedro Rio[1], Ana Teresa Timóteo[1], João Reis[1], Rui Soares[1], Joana Feliciano[2], Rita Ilhão Moreira[1], Tiago Mendonça[1], Tânia Mano[1], Rui Cruz Ferreira[1]

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Introduction: Sacubitril/Valsartan significantly reduced sudden cardiac death in the PARADIGM-HF trial. However, there is little published data regarding the possible explanations for the antiarrhythmic effects found with Sacubitril-Valsartan therapy. Previous trials have shown that

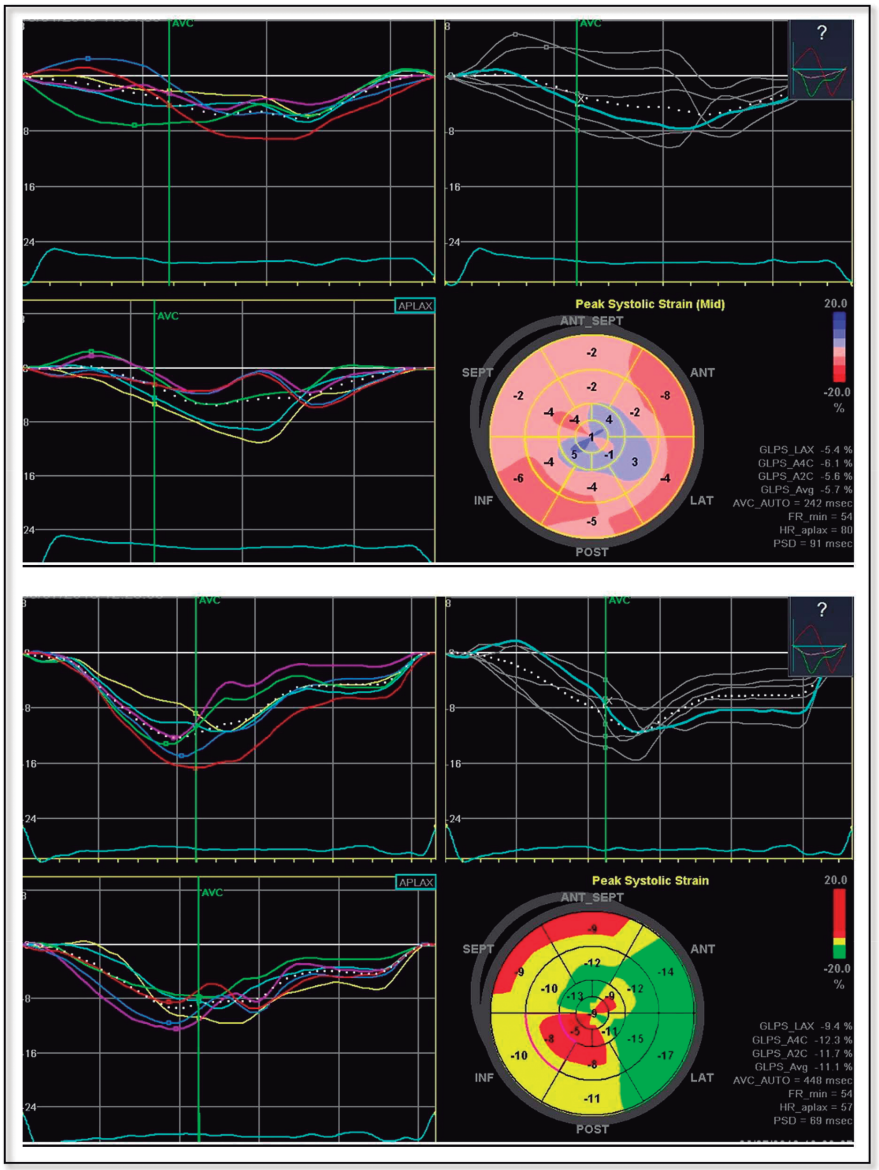

Figure 1 – Mechanical dispersion index (PSD value) reduction before (upper picture) and after (below picture) 6 months of LCZ696 therapy in a patient with a TTN gene mutation, causing Dilated Cardiomyopathy.

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mechanical dispersion by strain echocardiography can predict arrhythmic events in Heart Failure (HF) patients. The aim of this study was to compare electrocardiographic (ECG) parameters and mechanical dispersion index with left ventricular (LV) global longitudinal strain (GLS) analysis before and after Sacubitril-Valsartan therapy.
Methods: Prospective evaluation of chronic HF patients with LV ejection fraction ≤ 40% despite optimized standard of care therapy for at least 6 months, in which Sacubitril-Valsartan therapy was started and no additional HF treatment was expected to change. ECG and transthoracic echocardiographic data were gathered in the week before starting Sacubitril-Valsartan therapy and 6 months after therapy. A semiautomated analysis of LV GLS was made and mechanical dispersion index was defined as the standard deviation from the 16 time intervals corresponding to each LV segment.
Results: Of the 42 patients, 35 (83%) completed the 6 months of follow-up, since 2 (5%) patients died and 5 (12%) discontinued treatment for adverse events. Mean age was 59 ± 11 years. During the 6 months of follow-up, there was no change in the heart rate (72 ± 13 vs 67 ± 12, p = 0.067) or in the beta-blockers dose as assessed by per cent of target dose (69 ± 29% vs 71 ± 28%, p = 0.278). QTc interval (452 vs 426 msec, p < 0.001) and QRS interval (125 vs 121msec, p = 0.033) were reduced after 6 months of Sacubitril-Valsartan therapy. Mechanical dispersion index (88 vs 78 msec, p = 0.036) was also significantly reduced after therapy. Figure shows an example of mechanical dispersion index reduction.
Conclusions: Sacubitril-Valsartan has been linked with an antiarrhythmic effect not fully understood. To the best of our knowledge, this was the first prospective study evaluating the ECG changes and the impact of LCZ696 on mechanical dispersion index, with a significant reduction in QTc, QRS intervals and mechanical dispersion index.

CO 43. LUNG WATER QUANTIFICATION BY CARDIAC MAGNETIC RESONANCE IMAGING: A NOVEL PROGNOSTIC TOOL IN HF

Bruno Rocha[1], Gonçalo Cunha[1], Pedro Freitas[1], Pedro M Lopes[1], Carolina Padrão[1], Telma Lima[1], Ricardo Lopes[1], Afonso Grego[1], Fernando Marques[1], Patrícia Santim[1], Ana Coutinho Santos[1], Sara Guerreiro[1], António Tralhão[1], António Ventosa[2], Maria João Borges Andrade[1], Carlos Aguiar[1], João Abecasis[1], Carla Saraiva[1], Miguel Mendes[3], António M. Ferreira[1]

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Introduction: Cardiac magnetic resonance (CMR) imaging has recently been proposed to quantify lung water density (LWD, %) non-invasively. Given that pulmonary congestion plays a key role in the pathophysiology of Heart Failure (HF), we designed a study to assess the prognostic significance of a simplified LWD measure in patients with HF and reduced left ventricular ejection fraction (LVEF).
Methods: We conducted a single-center retrospective study of consecutive patients with HF and LVEF < 50% who underwent CMR on a 1.5T scanner. Those with severe interstitial lung disease or chronic liver disease were excluded. All measurements were performed in a parasagittal plane at the right midclavicular line on a standard HASTE sequence, which is widely available in all CMR studies. As previously reported, LWD was determined by the lung-to-liver signal ratio multiplied by 0.7. A cohort of 102 healthy controls was used to derive the upper limit of normal (mean + 2SD) of the LWD (21.2%). The primary endpoint was a composite of all-cause death or HF hospitalization.
Results: A total of 290 HF patients (mean age 64 ± 12 years, 74.8% male, 56.2% of ischemic etiology) with a mean LVEF of 34 ± 10% were included. LWD measurement took on average 35 ± 4 seconds and showed excellent inter-observer agreement (intra-class correlation coefficient > 0.90). LWD was increased in 65 (22.4%) patients. Compared to those with normal LWD, the former were more symptomatic (NYHA ≥ III: 29.2% vs 1.8%; p = 0.017) and had higher median NT-proBNP [1,973 (IQR: 809-3,766) vs 802 (IQR: 355-2,157 pg/mL); p < 0.001]. During a median follow-up of 21 months (IQR: 13-29), 20 (6.9%) patients died and 40 (13.8%) had at least one HF hospitalization. In multivariate analysis, LVEF (HR per 1%: 0.96; 95%CI: 0.93-0.99; p = 0.024), creatinine (HR per 1 mg/dL: 2.43; 95%CI: 1.25-4.71; p = 0.009) and LWD (HR per 1%: 1.06; 95%CI: 1.01-1.12; p = 0.013) were independent predictors of the primary endpoint. The findings were mainly driven by an association between LWD and HF hospitalization (HR per 1%: 1.08; 95%CI: 1.03-1.13; p = 0.002).

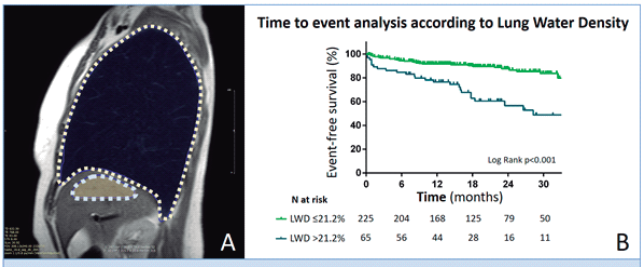


Figure 1: (A) Method for imaging Lung Water – Lung and Hepatic user-selected region of interest (ROI); **(B)** Kaplan-Meier survival curves for 290 patients with HF and increased (>21.2%) or normal LWD (≤21.2%).

Conclusions: A CMR-derived method for LWD quantification independently predicts an increased risk of death or HF hospitalization in HF patients with LVEF < 50%. Our results support LWD measurement as a simple, reproducible and widely available method, further adding to the prognostic role of CMR in this population.

CO 44. CLINICAL OUTCOMES IN HFREF AND GOOD FUNCTIONAL CAPACITY: THE DECEPTION OF STABILITY

Sérgio Maltês[1], Bruno Rocha[2], Gonçalo Cunha[2], João Presume[2], Francisco Albuquerque[2], Pedro Lopes [2], Francisco Gama[2], Pedro Freitas[2], Anaí Durazzo[2], António Tralhão[2], António Ventosa[3], Carlos Aguiar[2], Miguel Mendes[2]

[1]Unidade de Insuficiência Cardíaca, Hospital São Francisco Xavier-Centro Hospitalar Lisboa Ocidental. [2]Centro Hospitalar de Lisboa Ocidental, EPE/Hospital de Santa Cruz. [3]Hospital dos Lusíadas-Lisboa.

Introduction: Cardiopulmonary stress test (CPET) is recommended in Heart Failure (HF) risk stratification, as peak O_2 consumption (pVO_2), minute ventilation/carbon dioxide production (VE/VCO_2) slope and exercise oscillatory ventilation (EOV) identify patients at risk of major events. The aim of this study was to assess clinical outcomes in seemingly low-risk HF patients (i.e., pVO2 ≥ 18 mL/Kg/min) with reduced left ventricular ejection fraction (LVEF).
Methods: This is a single-center retrospective observational study enrolling consecutive HF patients with LVEF < 40% who performed a CPET between 2003-2018 and had a pVO_2 ≥ 18mL/kg/min. The primary endpoint was a composite of all-cause death or HF hospitalizations.
Results: Overall, 101 patients (mean age of 53.2 ± 10.3 years; 86% male; 39.8% with hypertension and 10.7% diabetes mellitus; 47.6% ischemic HF) with a mean LVEF of 30.5 ± 5.9% were assessed. At baseline, mean pVO_2 was 22.0 ± 3.3 ml/kg/min, median VE/VCO2 was 32.0 (IQR: 29.0-36.0) and 25 patients (24.8%) had EOV. NTproBNP was > 125 pg/mL in 92% patients, and > 600 pg/mL in 36%. The median NT-proBNP was 427 (IQR 221-745) pg/mL (Figure 1). Over a median follow-up of 67.0 (IQR: 17.0-124.0) months, 33 (32.7%) patients met the primary endpoint: 16 (15.8%) patients died and 19 (18.8%) had at least one HF hospitalization, with approximately 20% of events happening in the first three years after the CPET (Figure 2).
Conclusions: In a seemingly low-risk population with HF and LVEF < 40%, the vast majority showed persistent neurohormonal activation, and one in every three patients had a major cardiovascular event over a median follow-up of roughly 5 years. These findings support optimization of evidence-based treatment and resisting treatment inertia in HF with reduced LVEF, even when patients are clinically stable and present a good functional class.

Figure 1. NT-proBNP distribution

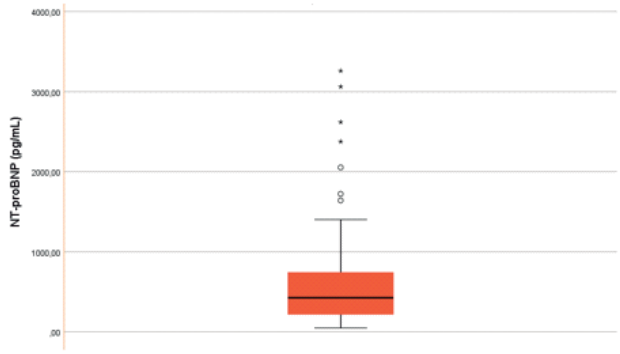
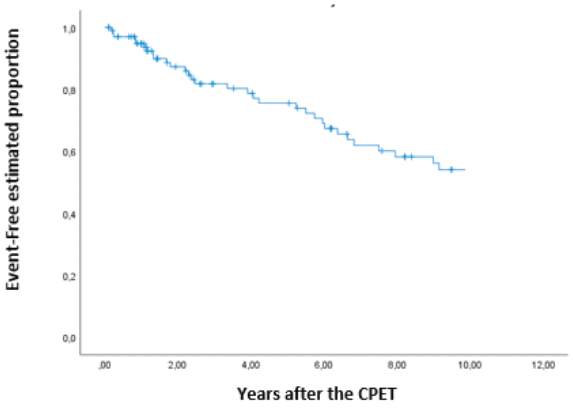


Figure 2. Survival Kaplan-Meier for composite endpoint of admission for HF or all-cause mortality in patients with HF with reduced LVEF and pVO_2 ≥18ml/kg/min



CO 45. THE HUGE IMPACT IN LEFT VENTRICULAR REVERSE REMODELING OF A SINGLE DRUG: A REAL-WORLD DATA WITH ARNI

Sofia Martinho[1], José Almeida[2], Flávio Freitas[2], Valdirene Gonçalves[2], Cátia Ferreira[2], João Ferreira[2], James Milner[2], Margarida Robalo[3], Fátima Franco[2], Susana Costa[2], Rui Baptista[2], Lino Gonçalves[2]

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Introduction: The PROVE-HF study, demonstrated that a reduction in NT-proBNP concentration was correlated with improvements in markers of cardiac volume and function at 12 months, in patients with heart failure with reduce ejection fraction (HFrEF) treated with sacubitril-valsartan. We aimed to assess left ventricular reverse remodeling parameters in a real-world cohort of HFrEF patients treated with ARNI.
Methods: We conducted a single-centre, retrospective, observational study of 140 HFrEF patients treated with the maximum, target dose (97/103 mg bid) of ARNI. Of these, we analysed those (n = 52) who had done an echocardiogram at baseline and 6-months after achieving the target dose. Baseline clinical, laboratory and demographic characteristics were evaluated and a clinical and echocardiographic follow-up, including left ventricular ejection fraction (LVEF), left ventricular global longitudinal strain (GLS), left ventricular end-systolic volume (LVESV), and diameter (LVESD), left ventricular end-diastolic volume (LVEDV) and diameter (LVEDD), mean E/e' ratio and mitral valve regurgitation (MR) severity, were conducted from ARNI initiation to a 6-month landmark.
Results: Mean age was 60 ± 11 years and 85% were male. At baseline, 58% were on NYHA II and 45% in NYHA III-IV functional class; median NT-proBNP was 660 (IQR 283-1,331) pg/dL and mean LVEF 29 ± 8%. Functional class improved significantly, 6 months after target dose, all patients were in NYHA II (56%) or I (44%) (p = 0.035). There was a numerical improvement in NT-proBNP, but without statistical significance (p = 0.122). Regarding echocardiography, more than half of patients (57.7%) improved LVEF (from 29 ± 8% to 37 ± 10%, mean increase 8.0 ± 9.8%; 95%CI 5.2 to 10.9, p < 0.0001). We found a significant improvement in GLS [-1.8 ± 2 (95%CI -2.6 to -0.9%, p < 0.001)], a significant decrease in chamber volumes (LVESV, -33 ± 35mL, 95%CI -44 mL to -22 mL, p < 0.0001 and LVEDV, -36 ± 41, 95%CI -49 to -23, p < 0.0001) and diameter [LVESD, 6 ± 13 mm (95%CI -10 to -2, p = 0.003) and LVEDD, 5 ± 10 mm (95%CI -8 to -2, p = 0.001)]. We also identified a significant decrease in E/e' 3 ± 6 (95%CI -5 to -0.6, p = 0.014) and a significant improvement MR severity (p = 0.014).
Conclusions: We observed that in an HFrEF patient population treated with ARNI, there was a significant clinical improvement, who may be explained by a robust impact on reverse remodelling, even upon a short follow-up time. A significant improvement in both systolic and diastolic function was found, reinforcing the magnitude of the impact of this drug in a real-world HFrEF population.

CO 46. LDL-C CUT-OFF IN HEART FAILURE- SHOULD WE FOLLOW THE GUIDELINES?

Beatriz Valente Silva [1], Catarina Duarte[2], Joana Brito[1], João Agostinho[1], Sara Couto Pereira[1], Rafael Santos[1], Nelson Cunha[1], Pedro Alves da Silva[1], Pedro Silvério António[1], Pedro S. Morais[1], Fausto J. Pinto[1], Dulce Brito[1]

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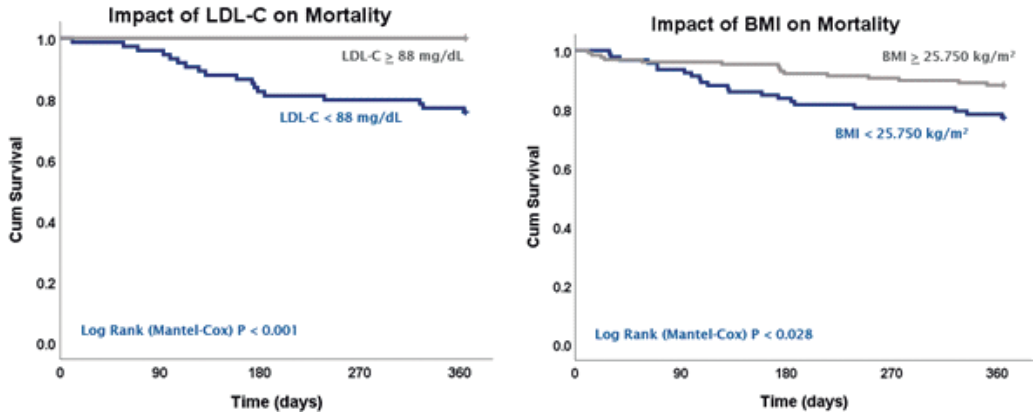
Introduction: The 2019 ESC guidelines on dyslipidaemia management recommend tighter LDL-cholesterol (LDL) control in order to prevent cardiovascular (CV) events. However, it is not yet proven that aggressive treatment of dyslipidaemia in Heart Failure (HF) patients (pts) has an impact on prognosis, and some published data even suggest that a tight control in these pts may be deleterious. Also, the same effect may be expected with aggressive body mass index (BMI) lowering or poor glycemic control.
Objectives: To evaluate the impact of LDL-C, HbA1c and BMI on HF pts mortality rate.
Methods: Single center study that included consecutive pts hospitalized for acute/decompensated chronic HF in a tertiary Hospital between January 2016 and December 2018, and followed for 12 months. Clinical, demographic and laboratorial data were collected. The impact of LDL, HbA1c and BMI on mortality was assessed using Cox regression and Kaplan-Meier curve, after adjustment for age, sex, functional class, ejection fraction and HF aetiology. A safety cut-off was established when any of these variables was deemed protective using ROC curve analysis. Pts were categorized according to CV risk classification.
Results: Two hundred twenty-four patients (71.68 ± 13.45 years, 63.8% males) were included. Eighty-four (37.5%) pts had type 2 Diabetes, 39.7% had HF of ischemic aetiology and the median left ventricular ejection fraction was 34% IQR 25-49.5 (60.3% HFreF; 13.8% HFmrEF; 22.3% HFpEF). The median BMI was 25.4 IQR 23.1-30.5 kg/m^2, median LDL, 89.5; IQR 64-106 mg/dL and median HbA1c, 6.4 ± IQR 5.6-6.8. The overall mortality rate during follow-up was 16.1%. According to the CV risk classification 39.7% pts were at very high risk and 19.6% pts at high risk. On multivariate analysis HbA1c (HR 1.5; IQR 1.1-1.9; p = 0.007) and female sex (HR 9.453; IQR 2.4-37.2) were independent predictors of mortality; LDL (OR 1.05; IQR 1.022-1.075; p < 0.001,) and BMI (OR 1.23; IQR 1.075-1.404; p = 0.002) were independent protective factors. In the high and very high-risk population higher levels of LDL-C were still protective. (OR 1.05; IQR 1.02-1.06; p = 0.013). In the study population, LDL-C of 88 mg/dL was found to be the lower threshold associated with no increased risk of mortality (AUC 0.819; sensitivity 56.6%, specificity 100%); for high and very high CV risk pts a LDL-C safety cut-off of 84 mg/dL can be used (AUC 0.815; sensitivity 59.3%). A BMI safety cut-off for mortality of 25.250 Kg/m^2 was found (AUC 0.627; sensitivity 61.2%; specificity 58.3%).
Conclusions: This study supports the theory of the obesity and LDL paradox in HF, whereas, higher HbA1c is associated with higher mortality rate. Even though 2019 ESC dyslipidaemia guidelines suggest tighter LDL control for very



CO 46 Figure

high and high risk patients, the recommended cut-offs may be deleterious in HF patients as a level of LDL-Cholesterol below 88 mg/gL in our cohort was associated with higher mortality.

CO 47. RISK STRATIFICATION IN HEART FAILURE WITH PRESERVED EJECTION FRACTION: WHAT IS THE BEST SCORE?

Inês Pires, João Miguel Santos, Hugo Antunes, Maria Luísa Gonçalves, Joana Correia, José Costa Cabral, Inês Almeida

Centro Hospitalar Tondela-Viseu, EPE/Hospital de São Teotónio, EPE.

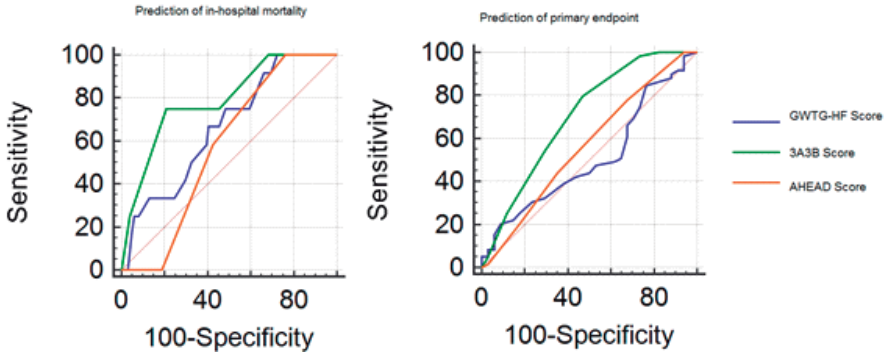
Introduction: There are many risk scores in patients (P) with heart failure (HF), but few are specific for HF with preserved ejection fraction (HFpEF) and few apply readily available variables. 3A3B Score, developed in Japanese HFpEF P, predicts their long-term prognosis. GWTG-HF score predicts in-hospital mortality (IHM) in American P with acute HF. AHEAD score estimates short- and long-term prognosis of Czech P with acute HF. This study compares risk prediction of these scores in HFpEF.
Methods: All P admitted with acute HFpEF in a Cardiology Department for 7 years were included. Scores were obtained at admission. 3A3B (range 0-7) uses age ≥ 75 years (2 points), and albumin < 3.7 mg/dL, anemia, body mass index < 22 kg/m², BNP ≥ 300 pg/mL, and BUN ≥ 25 μg/dL (1 point each). GWTG-HF (range 0-100) considers race, age, systolic blood pressure, heart rate, BUN and sodium levels and chronic obstructive pulmonary disease. AHEAD (range 0-5) uses atrial fibrillation, anemia, age > 70 years, creatinine > 1.47 mg/dL and diabetes mellitus. IHM and all-cause mortality or hospitalization for HF at 24 months (FUevents) were evaluated. Statistical analysis used chi-square and independent-samples T tests, binary logistic and Cox proportional hazards regressions and ROC curves.
Results: 478 P were studied (61.3% female, mean age 79.4 ± 8.3 years). Mean 3A3B, GWTG-HF and AHEAD scores were 3.4 ± 1.6, 39.2 ± 8.1 and 2.5 ± 1, respectively. IHM was 3.4%. P who died had higher 3A3B than those who survived (4.8 ± 1.2 vs 3.2 ± 1.5, p < 0.001), but their GWTG-HF (43.2 ± 6.7 vs 39 ± 8.1, p = 0.065) and AHEAD (2.5 ± 0.5 vs 2.5 ± 1, p = 0.572) scores were not statistically significant different. 3A3B predicted IHM (OR 2.486; p = 0.001) unlike the other scores. 60.3% P had FUevents and they had higher 3A3B (3.6 ± 1.2 vs 2.4 ± 1.7, p < 0.001), GWTG-HF (39.4 ± 8 vs 37.2 ± 7.9, p = 0.015) and AHEAD (2.7 ± 1 vs 2.4 ± 1.1, p = 0.006) scores than those without FUevents. Unadjusted hazard ratio for occurrence of FUevents was 1.138 (p < 0.001) for 3A3B, 1.024 (p = 0.010) for GWTG-HF and 1.186 (p = 0.007) for AHEAD. 3A3B score had the best discriminatory power to predict IHM (AUC 0.791, 95%CI 0.704-0.862) and FUevents (AUC 0.702, 95%CI 0.598-0.793)-figure 1, and outperformed the other scores in predicting FUevents.
Conclusions: 3A3B score predicted IHM and FUevents in HFpEF, and had better predictive power than GWTG-HF and AHEAD scores in FUevents. These results highlight the importance of developing risk prediction tools specific for HFpEF.

Sessão de Comunicações Orais - Cardiologia de Intervenção

CO 48. COST-EFFECTIVENESS OF TRANSCATHETER AORTIC VALVE IMPLANTATION VERSUS SURGICAL AORTIC VALVE REPLACEMENT IN PATIENTS WITH SEVERE AORTIC STENOSIS

Sara Maia[1], Rui J. Cerqueira[2], Paulo Pinho[1], Francisca Saraiva[3], Afonso Pedrosa[1], Rui Rodrigues[1], Paulo Araújo[2], Marta Tavares Silva[4], Adelino Leite Moreira[3], Filipe Macedo[4], Susana Oliveira[4]

[1]Centro Hospitalar de S. João, EPE. [2]Centro Hospitalar Universitário de São João. [3]Faculdade de Medicina da Universidade do Porto. [4]Faculdade de Economia da Universidade do Porto.



CO 47 Figure

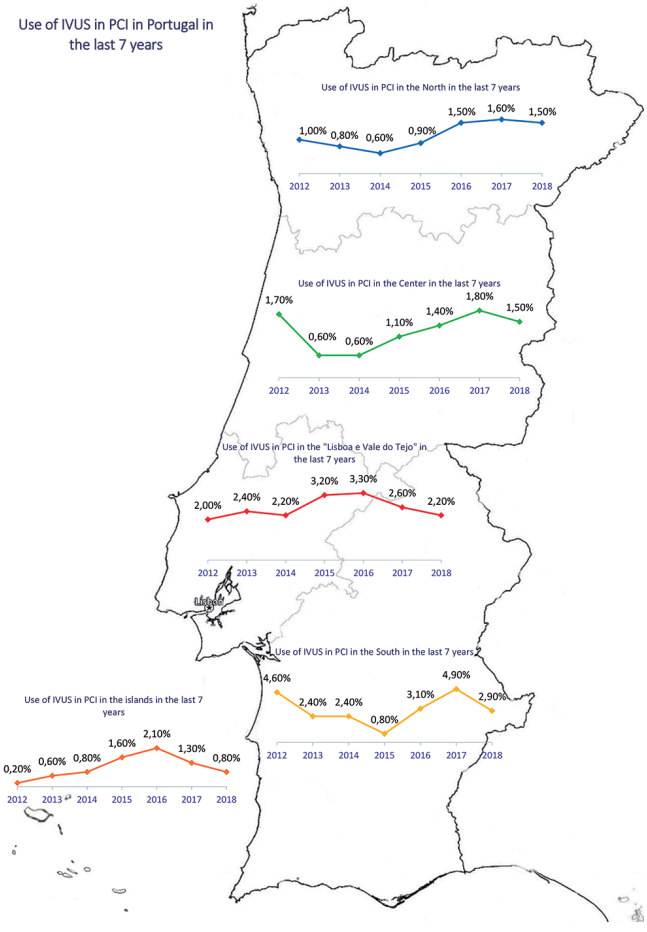
Introduction: Transcatheter aortic valve implantation (TAVI) has emerged as a new treatment option for patients with severe aortic stenosis. Despite its low periprocedural risk profile in comparison to surgical aortic valve replacement (SAVR), the high device costs might impact their implementation in budget-constrained countries.
Objectives: To evaluate cost-effectiveness of transfemoral TAVI versus SAVR in patients with severe aortic stenosis.
Methods: Retrospective single-center cohort including a group of consecutive patients undergoing transfemoral TAVI between January 2015 and December 2017, and a group of patients undergoing isolated SAVR in the same time horizon and selected according to gender and age. Follow-up information (New York Heart Association class and all-cause mortality) was consulted after 1, 6 and 12 months of the procedure and the multiple imputation method was used to treat the missing data. Costs were determined from the perspective of the Health Care Provider. The effectiveness was measured in Quality Adjusted Life Years (QALY). The Incremental Cost Effectiveness Ratio (ICER) was calculated and a willingness to pay threshold of 30,000 €/QALY was considered. Appropriate statistical tests were used to compare two independent groups, multivariable Cox Regression was applied to survival analysis and the bootstrap resampling method with 1,000 simulations was used to represent the cost-effectiveness plan.
Results: We included 112 individuals in each group. Mean patient's age was 81 ± 5 and 60.7% were female. Time to discharge was 8.7 ± 8.2 days for TAVI and 13.5 ± 22.8 days for SAVR (p = 0.042). Median Society of Thoracic Surgeons (STS) score was 4.55% and 3.49% in TAVI and SAVR groups, respectively (p < 0.001). After adjusting for STS score, no difference in 1-year all-cause mortality was found between the two groups (HR: 1.652; 95%CI: 0.487-5.607). Costs related to human resources, drugs and hospitalization were lower in TAVI (3,577 € vs 6,313 €), but those concerning materials, diagnostic tests and use of the cardiac catheterization laboratory were higher (20,857 € vs 3,196 €). The ICER was 465,874 €/QALY. Subgroup and sensitivity analysis showed nevertheless that patients with STS > 8% had an ICER of 36,988 €/QALY and the scenario of 90% off on percutaneous valve prosthesis cost of 30,547 €/QALY.
Conclusions: In this single-center retrospective study TAVI, compared to SAVR, was not considered cost-effective. However, in the two previous scenarios (high STS score and low percutaneous valve prosthesis cost) it may be closer to being cost-effective. Further prospective and multi-center studies are needed to provide an extensive estimation of cost-effectiveness of TAVI in Portugal.

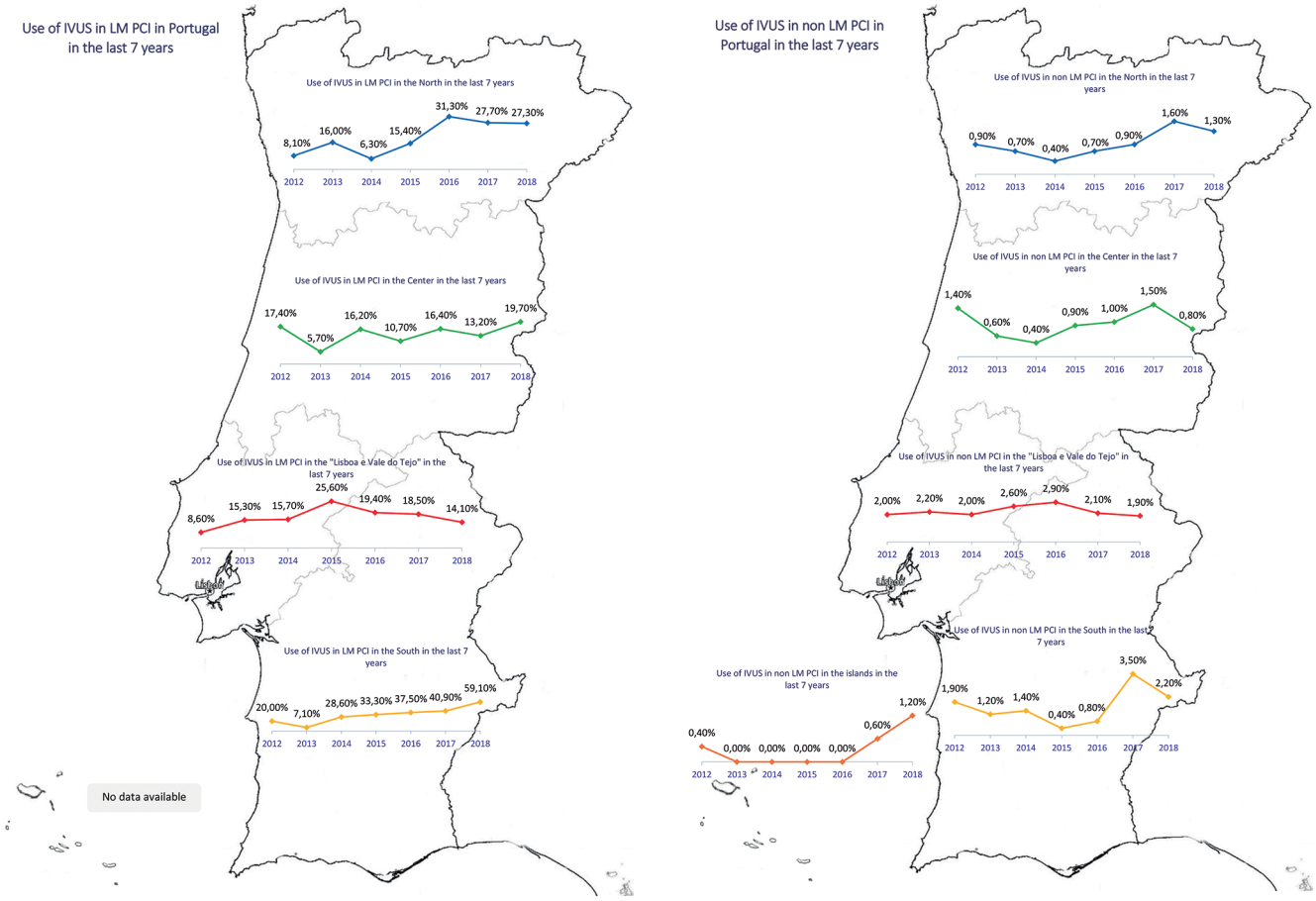
CO 49. INTRAVASCULAR ULTRASOUNDS IN PORTUGAL: USAGE TREND AND OUTCOMES

Carla Marques Pires[1], Carlos Galvão Braga[1], Marco Costa[2], Pedro Canas da Silva[3], Rui Ferreira[4], Rui Teles[5], Filipe Seixo[6], Jorge Marques[1], João Costa[1], Hélder Pereira[7], Pedro Pinto Cardoso[8], João Brum da Silveira[9], Pedro Farto e Abreu[10], José Baptista[11], Renato Fernandes[12], Pedro Costa Ferreira[13], Graça Caires[14], Dinis Martins[15], Luís Bernardes[16], Francisco Pereira Machado[17], Fernando Matias[18], José Palos[19], Hugo Vinhas[20], Paulino Sousa[21], João Carlos Silva[22], Pedro Braga[23], em nome dos investigadores do Registo Nacional de Cardiologia de Intervenção[24]

[1]Hospital de Braga. [2]Centro Hospitalar e Universitário de Coimbra/Hospitais da Universidade de Coimbra. [3]Hospital de Santa Maria. [4]Hospital de Santa Marta. [5]Hospital de Santa Cruz. [6]Hospital São Bernardo. [7]Hospital Garcia de Orta. [8]Hospital Lusíadas. [9]Centro Hospitalar do Porto, EPE/Hospital Geral de Santo António. [10]Hospital Prof. Dr. Fernando Fonseca. [11]Centro Hospitalar de Leiria/Hospital de Santo André. [12]Hospital do Espírito Santo de Évora. [13]Centro Hospitalar Tondela-Viseu. [14]Hospital Dr. Nélio Mendonça. [15]Hospital do Divino Espírito Santo. [16]CUF Infante Santo. [17]Hospital da Luz. [18]Hospital da Cruz Vermelha. [19]Unidade de intervenção cardiovascular do Algarve. [20]Centro Hospitalar do Algarve, EPE/Hospital de Faro. [21]Centro Hospitalar de Trás os Montes e Alto Douro. [22]Centro Hospitalar do Tâmega e Sousa. [23]Centro Hospitalar de Vila Nova de Gaia/Espinho. [24]Centro Nacional de Colecção de Dados em Cardiologia.

Introduction: The current guidelines on myocardial revascularization recommend the use of Intravascular ultrasounds (IVUS) in selected patients (pts) to optimize stent apposition (IIaB) and to assess severity and optimize treatment of unprotected left main (LM) lesions (IIaB).
Objectives: To evaluate the use of IVUS in the last 7 years in Portugal and to assess if the use of IVUS in LM percutaneous coronary intervention (PCI) had impact on outcomes.
Methods: A multicentric retrospective study in which we evaluated the use of IVUS in the last 7 years (2012-2018) in 5 different regions of Portugal in pts submitted to LM and non-LM PCI. A multivariate analysis was performed to assess if the use of IVUS in LM PCI had impact on inhospital and 1-year follow-up (FUP) MACE (death/myocardial infarction).
Results: The present study showed a progressive increased use of IVUS in PCI in Portugal (p value < 0.001), but with some regional asymmetries: in the North (p value < 0.001), Center (p value = 0.03) and Islands (p value = 0.03) this trend to increased use was observed, but not on "Lisboa e Vale do Tejo" (p value = 0.15) and South (p value = 0.72). An overall growth in the use of IVUS in LM PCI was also documented (p < 0.001), but again regional differences were encountered, with Center (p value = 0.37) and "Lisboa e Vale do Tejo" (p value = 0.15) showing no statistically significant progression on its use in this setting. In addition, there was also an increased use of IVUS in non-LM PCI in Portugal (p value = 0.02), but on regional analysis only the North showed a significant variation (p value = 0.002). Subsequently, we found that inhospital MACE incidence was statistically lower in pts submitted to LM PCI with IVUS guidance (1.4 vs 3.9%, p = 0.024), but this wasn't confirmed on multivariate analysis adjusted to confounding factors (p value = 0.309). At 1-year FUP of pts submitted to LM PCI, we found a trend to fewer events with IVUS guidance, but the Kaplan Meier curves (p value = 0.07) and Cox regression analysis (p value = 0.879) didn't demonstrate a significant impact of IVUS on 1-year MACE.





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Conclusions: This study shows that in line with current guidelines the overall use of IVUS in Portugal has been significantly increasing in the last years. Despite a trend to fewer events with IVUS guidance in LM PCI, there wasn't a statistical impact on inhospital and 1-year MACE.

CO 50. TRANSAPICAL OFF-PUMP MITRAL VALVE REPAIR WITH NEOCHORD IMPLANTATION: EARLY CLINICAL AND ECHOCARDIOGRAPHIC RESULTS

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Introduction: Transapical off-pump NeoChord implantation is a minimally invasive surgical mitral valve repair (MVr) procedure to treat degenerative mitral regurgitation (MR), which is performed using the NeoChord DS1000® system under 2D and 3D transesophageal echocardiographic (TEE) guidance on a beating heart, and has been demonstrated to be safe and effective in carefully selected patients.
Objectives: The authors aim to analyze short-term clinical and echocardiographic results after mitral valve repair using the NeoChord system.
Methods: All patients that underwent transapical off-pump mitral valve repair with NeoChord implantation in our center, between December 2017 and October 2019, were included. The procedure was performed by left minithoracotomy, under general anaesthesia, using 2D and 3D TEE guidance. All patients presented with severe primary MR due to flail/prolapse of one leaflet (anterior or posterior).

Results: Eighteen patients were included in the analysis, the mean age was 65 ± 15 years, 72% were male. The mean EuroSCORE II was 1.9 ± 1.6. The prevalence of AF was 16.7%. Patients had NYHA class ≥ II in 77.8% of cases (N = 14). Mean EROA was 1.0 ± 0.4 cm^2, with a mean RVol 146 ± 42 mL, and a mean Leaflet-to-Annulus index of 1.29 ± 0.14. MR was due to leaflet prolapse in 50% (N = 9), and flail leaflet in 50% (N = 9). Anatomic type A (isolated P2 defect) was the predominant form, in 66.7% (N = 12). Successful repair, defined by none, trace or mild mitral regurgitation, by implantation of 2 to 4 neochordae, was achieved in all 18 patients. No major complications arose intra-procedurally. Median ICU stay was 1 day (IQR 0.5). The median follow-up (F-UP) was 194 days. NYHA class was ≤ II in all patients, which represented a significant improvement in symptomatic status (p = 0.002). MR was quantified in grade ≤ II in 88.2% (N = 15) patients by the time of discharge. In F-UP, 3 patients had grade III MR, and 2 patients had grade IV MR. There was a significant reduction in mean indexed LA volume (63 ± 7 mL/m^2 pre-procedure, compared to 35 ± 6 mL/m^2 in F-UP, p = 0.038), mean indexed LV end-diastolic volume (87 ± 7 mL/m^2 vs 79 ± 9 ml/m^2, p = 0.001), and PSAP (44 ± 4 vs 31 ± 8 mmHg, p = 0.002); with no significant differences regarding tricuspid regurgitation severity or LV systolic function. The re-intervention rate was 11.1% (N = 2, both patients being submitted to a re-do Neochord, either with new chord attachment and/or re-tensioning). No major adverse cardiac or cerebrovascular events were registered.
Conclusions: In selected patients, minimally invasive MVr using the NeoChord system, is safe, effective and reproducible. Early clinical and echocardiographic results suggest a significant symptomatic improvement, sustained MR grade decrease, and favourable left cardiac chambers' remodelling, with low re-intervention rates. These results warrant further confirmation in larger cohorts, over a longer follow-up period.

CO 51. PROGNOSTIC IMPACT OF CORONARY ARTERY DISEASE SEVERITY AND REVASCULARIZATION IN TAVI PATIENTS

Gualter Santos Silva[1], Cláudio Guerreiro[1], Ana Raquel Barbosa[1], Pedro Gonçalves Teixeira[1], Cátia Serena[2], Pedro Ribeiro Queirós[1], Mariana Ribeiro Silva[1], Mariana Brandão[1], Diogo Ferreira[1], Francisco Sampaio[2], Daniel Caeiro[1], Alberto Rodrigues[1], Pedro Braga[1]

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Introduction: Coronary artery disease (CAD) is highly prevalent in patients with severe aortic stenosis. In patients who undergo surgical aortic valve replacement, the presence of CAD and the need for CABG adversely influences short- and long-term outcomes. However, the impact of concomitant CAD and its revascularization in patients undergoing transcatheter aortic valve implantation (TAVI) is still a matter of debate.
Objectives: The aim of this study was to evaluate the prognostic impact of CAD severity in 1-year all-cause mortality of patients undergoing TAVI and whether prior complete or incomplete reasonable revascularization can improve prognosis after TAVI.
Methods and results: Retrospective analysis of a total of 575 patients (51.3% female, mean age 79.7 ± 7.7 years) who underwent TAVI from August 2007 to November 2018. 50.3% of patients had significant CAD (at least one stenosis > 50%) which 54.2% of these had history of prior revascularization (64.8% complete or incomplete reasonable revascularization and 35.2% incomplete revascularization). Pre-TAVI CAD severity was defined by the SYNTAX Score (SS) and reasonable revascularization by the residual SYNTAX Score (rSS). Patients without history of revascularization were stratified into 3 groups: no CAD (SS = 0); nonsevere CAD (SS between 1 and 22); and severe CAD (SS ≥ 23); Patients who had undergone revascularization prior to TAVI were separated into 2 categories based on their residual SS: complete or incomplete reasonable revascularization (rSS < 8) and incomplete revascularization (rSS≥ 8). The primary end point was an all-cause mortality. At 1 year, patients with severe CAD had significantly higher rates of mortality (no CAD: 9.8%, nonsevere CAD: 12.6%, severe CAD: 38.9%; p = 0.001) without significant differences between patients with no CAD and nonsevere CAD (p = 1.00). Patients with high rSS had significantly higher rates of mortality comparing to no CAD or rSS < 8 (no CAD: 9.8%, rSS < 8: 8.6%; rSS ≥ 8: 28.0%, p = 0.001).
Conclusions: In our study, the presence of severe CAD (SS > = 23) prior to TAVI was associated with increased 1-year all-cause mortality. In patients with previous history of revascularization, a complete/reasonable revascularization (lower rSS) was associated with lower long-term mortality, which may attenuate the association of severe CAD and mortality and therefore improve the prognosis of these patients.

CO 52. CORONARY CHRONIC TOTAL OCCLUSIONS: 8-YEAR EXPERIENCE FROM A DEDICATED SINGLE-CENTER PROGRAM

Catarina Brízido[1], Henrique Mesquita Gabriel[1], Mariana Gonçalves[1], Sérgio Madeira[1], Sílvio Leal[1], Rita Carvalheira Santos[2], João Brito[1], Luís Raposo[1], Pedro Gonçalves[1], Rui Campante Teles[1], Manuel Almeida[1], Miguel Mendes[1]

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Introduction: Coronary chronic total occlusion (CTOs) percutaneous coronary intervention (PCI) is a complex procedure that has shown to be safe and effective in symptom relief when performed by CTO-PCI experienced operators. Our aim was to evaluate procedural and clinical outcomes of CTO-PCI in a high-volume center.
Methods: Single-center retrospective analysis of all patients included in a CTO-PCI dedicated program from January/2011 to November/2019. Baseline characteristics, procedural related features and clinical outcomes were analyzed. Predictors of procedural success were assessed with uni- and multivariate analysis using binary logistic regression.
Results: A total of 183 patients were referred to our CTO-PCI dedicated program (mean age 65 ± 9 years, 79% males). There were 169 patients with single vessel CTO and 14 patients with double occlusion (8 treated within the same procedure). Target vessel was RCA in 51%, LAD in 25% and circumflex artery in 24%. The median J-CTO score was 2 (IQR 1-3) and 70% of lesions had J-CTO score ≥ 2. CTO-PCI attempt was made for 196 lesions throughout 210 procedures, with a success of 83% (n = 163) per CTO and 81% (n = 149) per patient. Most procedures where uneventful (96%), with 6 severe complications and 3 deaths. Higher J-CTO scores predicted procedural failure (HR 2.1, 95%CI 1.2-3.7; p = 0.006), as did using the retrograde approach (95%CI 1.01-6.26; p = 0.046). PCI success was independent of the target coronary artery, number of previous attempts and arterial access. Baseline characteristics and clinical cardiovascular background did not influence each patient outcome. During a median follow-up of 41 months (IQR 20-68), all-cause mortality was 12% (n = 22). Most patients who were alive at follow-up remained asymptomatic (69%) or in CCS class 1 (11.5%). 6.5% of patients (n = 12) underwent at least one target lesion revascularization since CTO-PCI.
Conclusions: We report good success rates without significant safety concerns in a cohort of patients with technically difficult lesions (as classified by J-CTO score). Our dedicated CTO-PCI program resulted in long lasting symptom improvement with low rates of repeated revascularization.

CO 53. PORTUGUESE SINGLE CENTRE EXPERIENCE IN PERCUTANEOUS CATHETER-DIRECTED TREATMENT FOR ACUTE PULMONARY EMBOLISM: IS TIME FOR A LUNG FAST-TRACK SYSTEM ("VIA VERDE PULMONAR")

Ana Rita Pereira[1], Rita Calé[1], Filipa Ferreira[2], Maria José Loureiro[1], Débora Repolho[2], Tiago Judas[1], Melanie Ferreira[1], Ana Gomes[1], Filipe Gonzalez[1], Corinna Lohmann[1], Hugo Moreira[3], Ana Cristina Martins[1], Hélder Pereira[2]

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Introduction: Acute pulmonary embolism (PE) is the most common cause of cardiovascular death after myocardial infarction and stroke. Interest in its management and outcomes recently reemerged with the development of percutaneous catheter-directed treatments (CDTs).
Objectives: To evaluate the efficacy and safety of CDTs for acute high- and intermediate-high-risk PE.
Methods: Retrospective multicentre study including consecutive pts undergoing CDTs for central location, acute PE from 2018 to 2019. Pts were eligible for CDTs if had intermediate-high-risk with at least one early sign of haemodynamic decompensation or high-risk with systemic thrombolysis contraindication or failure. Invasive measurement of pulmonary artery pressures was performed before and after procedure. Clinical, laboratorial and echocardiographic data at baseline, after procedure and 3-months follow-up were collected.
Results: 28 pts were included: mean age 66.7 ± 15.5 years, 58.8% female, 42.9% with high-risk PE, 64.3% in class IV or V of original PESI score, 17.9% with concomitant active cancer. Right ventricular (RV) dysfunction was present in 74.7% and aminergic support was needed in 50%. Median values of high-sensitivity cardiac troponin and NTproBNP were 70 (42.0-136.5) ng/L and 6965.5 (2,926.0-12,305.0) pg/mL, respectively. PE was bilateral in 96.4%. Concerning procedure, femoral venous access was used in all cases and bilateral intervention was performed in 47.1%. All pts underwent mechanical thrombectomy (Penumbra Indigo aspiration system CAT8® used in 93%). A bolus injection of alteplase was administered to 20.6%, median dose of 12.5 mg. Mean procedural duration was 111.1 ± 30.2 minutes, mean contrast volume 161.6 ± 44.2 mL and median effective radiation dose 767570.0 (600,700.0-1,442,270.0) μGy. No device related-death or device-related injury were reported. After percutaneous treatment, there was a significant decreased in mean pulmonary arterial pressure (- 5.5 mmHg, p < 0.01), mean paO_2/fiO_2 ratio (+ 76.8, p < 0.01), need for aminergic support at first 48 hours after procedure (- 50%, p = 0.03) and RV dysfunction (TAPSE + 4.7 mm, p = 0.02; tricuspid S' wave + 4.2 m/s, p = 0.03) (Figure). In-hospital mortality rate was 17.9% (n = 5; 3 pts died due to hospital-acquired infections, 1 patient after PE recurrence and 1 due to RV failure). 3-months follow-up were completed in 21 out of the 23 hospital-discharged pts with a survival rate of 90.5% (2 pts died from cancer).

	Before procedure	After procedure	Difference	p-value
Mean pulmonary arterial pressure (mmHg)	37.6 ± 11.0	21.5 ± 8.1	- 5.5 mmHg	p < 0.01
paO_2/fiO_2 ratio	226.4 ± 82.4	303.2 ± 109.8	+ 76.8	p < 0.01
Aminergic support (*n*)	14	7	- 50%	p = 0.03
Right ventricular function				
TAPSE (mm)	14.8 ± 3.0	18.4 ± 2.8	+ 4.7 mm	p = 0.02
Tricuspid S' wave (m/s)	9.3 ± 1.2	13.6 ± 0.5	+ 4.2 m/s	p = 0.03

Conclusions: This study confirms the efficacy of CDTs for acute high- and intermediate-high-risk PE, improving clinical and haemodynamic parameters, gas exchange and echocardiographic signs of RV overload. Nevertheless, all-cause mortality rate was elevated, probably related with baseline high risk features assessed by original PESI score as well as concomitant comorbidities of the study population.

Sessão de Comunicações Orais - Dispositivos Médicos

CO 54. LEAD REMOVAL, A SAFE PROCEDURE IN A REFERRAL CENTER

Rita Marinheiro[1], José Pedro Neves[2], Francisco Morgado[2], Marcio Madeira[2], Pedro Magro[2], Pedro Carmo[2], Diogo Cavaco[2], Francisco Costa[2], João Carmo[2], Ana Braga[2], Miguel Abecassis[2], Marta Marques[2], Sérgio Boshoff[2], José Calquinha[2], Pedro Adragão[2]

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Introduction: The number of lead removal of cardiac implantable electronic devices (CIED) has increased in recent years as a consequence of a larger number of implantations and aging of this population. Although once considered a "dark face" of CIED, it has evolved in the last decades with many improvements in materials and techniques used.
Objectives: Analyze all lead extraction procedures (transvenous or open surgery) performed in a single center and short- and long-term outcomes.
Methods: All lead extractions performed between 2008 and 2017 were retrospectively reviewed. Patients' characteristics and indication for device implantation; indications for lead extraction; techniques used and personnel; complications peri- and post-procedural and short and long-term follow-up were evaluated.
Results: A total of 189 patients (330 leads) were included (mean 69 ± 14 years, 73% male). Patients' characteristics are presented in panel A. Lead explant was performed in 30 patients (16%) and lead extraction in 159 (84%). The most common indication for lead removal was infection (73%) (panel B). Cardiac surgeons were responsible for 75% of the procedures. Techniques used are presented in panel C. Surgical approach was necessary in 14 patients (7%) due to unsuccessful transvenous removal (n = 3), large vegetation in the lead (n = 4), concomitant valvular endocarditis (n = 2), other indication for open surgery (n = 4) and complicated transvenous removal (n = 1). Removal was tried in 330 leads. Of those, 298 were completely removed, 14 were partially removed and 18 were not removed (> 4 cm of remnant material). On an individual patient basis, clinical success was achieved in 185 patients (97%). Complications occurred in 6 patients: 3 persistent infections, 1 stroke, 2 vessel rupture. Related-procedural mortality was 1.5% (n = 3). The median follow-up was 54 (IQR 20-87) months. Long-term survival was worse in patients with infection (log-rank p = 0.01) (panel D1) even after adjustment for other baseline characteristics, but it was not statistically different between patients who performed transvenous approach and open heart surgery (logrank p = 0.62) (panel D2).
Conclusions: Lead removal was associated with a high success rate with low all cause complication and mortality rates. Emergent surgery due to acute complications was very rare and open heart surgery was mostly elective and not associated with a worse outcome.

CO 55. A MODIFIED SNARE TECHNIQUE IMPROVES LEFT VENTRICULAR LEAD IMPLANT SUCCESS AND RESPONSE RATE TO CARDIAC RESYNCHRONIZATION THERAPY

Afonso Nunes-Ferreira[1], Pedro Silvério António[2], Inês Aguiar-Ricardo[3], Tiago Rodrigues[4], Joana Rigueira[3], Rafael Santos[1], Nelson Cunha [3], Sara Couto Pereira[3], Mafalda Carrington[5], Ana Bernardes[1], Fausto J. Pinto[1], João de Sousa[1], Pedro Marques[1]

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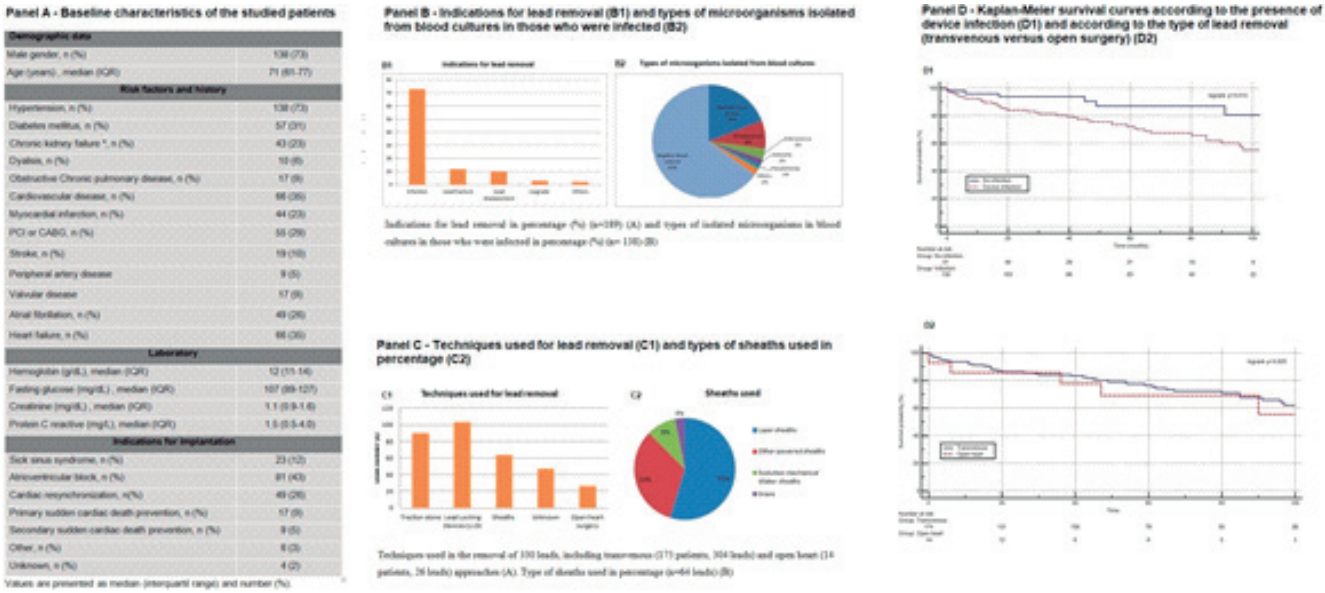
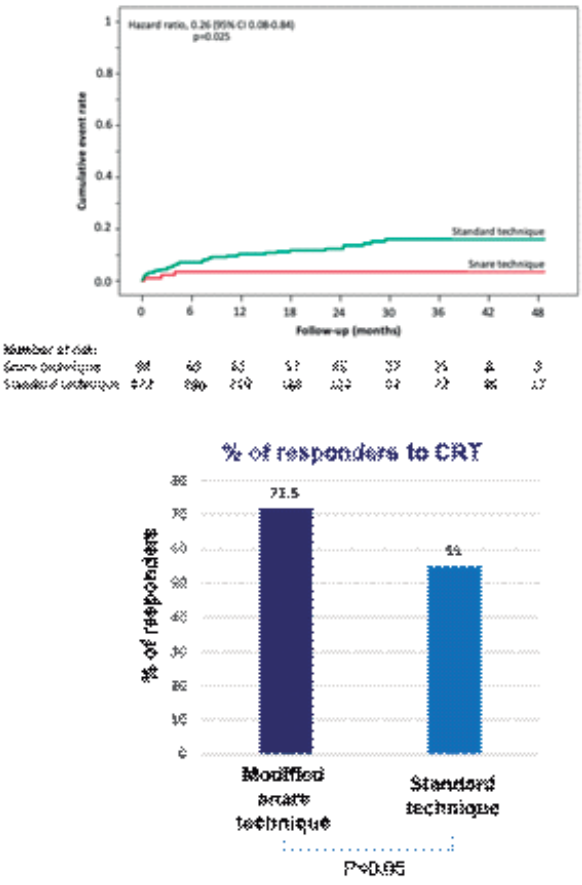


CO 54 Figure

Population Characteristics	Snare Group (N=94)	Standard Group (N=472)	P value
Age, years (mean ± standard deviation)	70.9±10.1	72.2±10.2	0.62
Female gender, n (%)	23 (24.5%)	125 (26.5%)	0.74
Ejection fraction <30%, n (%)	62 (65.5%)	302 (64%)	0.75
Comorbidities			
Hypertension, n (%)	82 (87%)	408 (86.4%)	0.89
Dyslipidemia, n (%)	59 (62.7%)	276 (58.5%)	0.46
Diabetes, n (%)	41 (44%)	178 (37.7%)	0.33
CKD (GFR < 60mL/min/1.73m²), n (%)	16 (17%)	101 (21.4%)	0.36
COPD, n (%)	7 (7.4%)	43 (9.1%)	0.47
AF, n (%)	26 (27.6%)	148 (31.4%)	0.49
NYHA Functional Class			
II, n (%)	72 (76.6%)	260 (55.1%)	0.01
III, n (%)	22 (23.4%)	191 (40.5%)	
Heart Failure Etiology			
Ischemic cardiopathy, n (%)	37 (39.4%)	176 (37.3%)	0.63
Dilated cardiomyopathy, n (%)	47 (50%)	269 (57.1%)	0.20
Valvular cardiopathy, n (%)	4 (4.3%)	17 (3.6%)	0.97
Hypertrophic cardiomyopathy, n (%)	1 (1%)	2 (0.4%)	0.46
Other, n (%)	5 (5.3%)	8 (1.6%)	0.02
Electrocardiographic Characteristics			
Left Bundle Branch Block, n (%)	50 (53.2%)	291 (61.7%)	0.01
QRS duration, ms (median [IQR])	161 [148-177]	161 [146-177]	0.76
Echocardiographic Characteristics			
Ejection ejection (%)	28.2±8.2%	30.8±11.6%	0.06
LV ESV (mL)	127.8±64.1	131.5±64.7	0.73
Device Type			
CRT-P, n (%)	31 (33%)	212 (45%)	0.03
CRT-D, n (%)	63 (67%)	260 (55%)	



CO 55 Figure

Introduction: Left ventricular (LV) lead placement is often the most challenging aspect of cardiac resynchronization therapy (CRT) device implantation, with a failure rate up to 10% due to complex coronary anatomies.
Objectives: To evaluate the efficacy of a modified snare technique in the LV lead implantation in cases of standard technique failure and to evaluate its impact in the response rate to CRT.
Methods: A prospective study was conducted of patients (pts) indicated for a CRT implant. When LV lead delivery to the target vessel failed using standard techniques, a modified snare technique was implemented. Pts were evaluated every 6 months. Efficacy was quantified by long-term surgical intervention rates. Pts were evaluated with transthoracic echocardiography before CRT implant and between 6-12 months post-implant. Pts with ejection fraction (EF) elevation ≥ 10% or LV end-systolic volume (ESV) reduction ≥ 15% were classified as responders. Pts with EF elevation ≥ 20% or LV ESV reduction ≥ 30% were classified as super-responders. Analysis with Cox regression and Kaplan-Meier methods.
Results: From 2015-2019, 566 CRTs were implanted (26.1% female, 72 ± 10.2 years old, follow-up 18.9 ± 15.8 months). Standard LV implant technique failed in 94 cases (16.6%), of which the modified snare technique was successful in 97.9% with LV lead implant in a lateral vein in 94.7% of cases. Baseline clinical characteristics were similar between patients who implanted LV lead with snare vs standard technique. The 4-year surgical intervention rate was lower with the modified snare implant technique than with the standard technique (3.2% vs 10.2%, HR 0.26, 95%CI 0.08-0.84, p < 0.05), with a risk reduction of 74% and a number needed to treat of 14. Major complications were similar between groups. The response rate to CRT was higher in the modified snare technique than in the standard approach (71.1% vs 55.0%, p < 0.05). In patients who implanted the LV lead with the snare technique, EF increased from 28.1 ± 8.2% to 36.1 ± 11.1% (p < 0.05) and LV ESV decreased from 127.8 ± 64.0 mL to 99.8 ± 61.1mL (p = 0.01). The super-response rate was similar between groups (33.3% vs 27.8%, p = NS).
Conclusions: For challenging coronary sinus anatomies that preclude LV lead placement by standard methods, modified snare alternative was effective, with lower surgical intervention rates and higher response rate to resynchronization therapy, probably due to the implant of LV lead in the target lateral vein.

CO 56. MULTIPOINT PACING IN CARDIAC RESYNCHRONIZATION THERAPY-HOW TO IMPROVE REMODELING CRITERIA AND ITS IMPACT IN QUALITY OF LIFE

Afonso Nunes-Ferreira[1], Pedro Silvério António[2], Inês Aguiar-Ricardo[3], Tiago Rodrigues[4], Joana Rigueira[3], Nelson Cunha [3], Rafael Santos[1], Pedro Morais[1], Mafalda Carrington[5], Igor Santos[1], Ana Bernardes[1], Fausto J. Pinto[1], João de Sousa[1], Pedro Marques[1]

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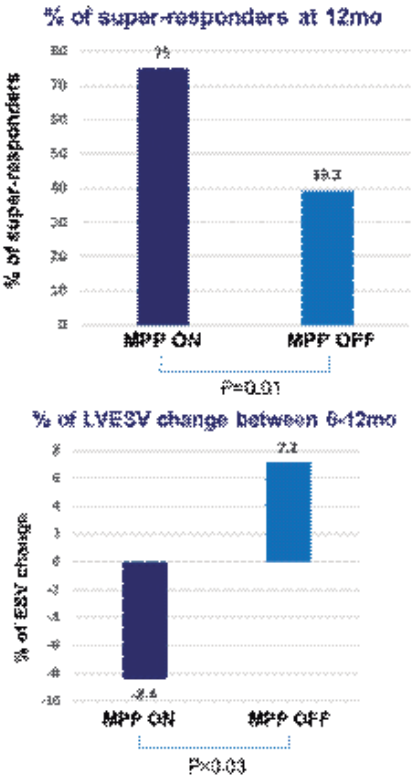
Introduction: 30-40% of patients who implant cardiac resynchronization therapy (CRT) are non-responders. Several studies are evaluating the conversion rate of non-responder to responder with multipoint pacing (MPP) in the. However, there is still lack of information about conversion to super-responders and the impact in quality of life of MPP.
Objectives: To evaluate the impact of MPP in conversion to super-responders and its impact in the quality of life of patients.
Methods: Randomized clinical trial of non-AF patients with indication for CRT and who implanted the Quartet™ quadripolar left ventricle (LV) lead. After

Baseline population characteristics	MPP ON (n=24)	MPP OFF (n=28)	P value
Age (years)	64.7±9.4	67.9±9.9	NS
Female sex – N (%)	10 (41.7)	9 (32.1)	NS
Co-morbidities – N (%)			
Hypertension	22 (91.7)	24 (85.7)	NS
Dyslipidemia	15 (62.5)	13 (46.4)	NS
Diabetes	10 (41.7)	10 (35.7)	NS
CKD (GFR < 60mL/min/1.73m^2)	3 (12.5)	3 (10.7)	NS
HF NYHA II	18 (75.0)	20 (71.4)	NS
HF NYHA III	6 (25.0)	8 (28.6)	
Mean NTproBNP – pg/mL	2642±2490	2758±5433	NS
Heart failure etiology – N (%)			
Dilated cardiomyopathy	18 (75.0)	22 (82.1)	NS
Ischemic cardiopathy	6 (25.0)	5 (17.9)	NS
Valvular cardiopathy	0 (0.0)	1 (3.6)	NS
Electrocardiographic characteristics			
Median QRS duration (IQR) - ms	162 (150-178)	162 (150-183)	NS
Echocardiographic characteristics			
Mean ESV – ml	152.7±70.3	136.2±47.2	NS
Mean LVEF - %	28.6±7.4	29.4±6.7	NS
Device type			
CRT-P	6 (25.0)	12 (42.9)	NS
CRT-D	18 (75.0)	16 (57.1)	



CO 56 Figure

implant, CRTs were programmed on biventricular pacing according to the latest activated area for 6 months. After a 6-month follow-up, patients were randomized in a 1:1 fashion to MPP ON or MPP OFF. MPP was programmed with the two widest spaced LV electrodes and with a LV1-LV2 to LV2-RV delay of 5ms. Patients were followed-up for 12 months with a 6-month evaluation of NTproBNP, echocardiographic remodeling criteria (LV end systolic volume (ESV) and LV ejection fraction), and quality of life (QoL) evaluated by EQ-5D, Minnesota Living with Heart Failure (MLWHF) questionnaire and 6-minute walk test (6MWT).
Results: 76 patients were included, 62 with a completed 12-month follow-up (mean age 67.2 ± 10.2 years, 32.3% female, 77.4% dilated cardiomyopathy). Among these patients, 24 were randomized to MPP ON, 28 to MPP OFF. Six patients died and 4 were lost to follow-up. At 6 months, the overall response rate (reduction in ESV ≥ 15%) was 75%. At 12 months, patients randomized to MPP ON had a super-response rate (reduction in ESV ≥ 30%) higher than patients with MPP OFF (75% vs 39.3%, p = 0.01). Between 6-12 months, patients assigned to MPP ON had a higher reduction in ESV (93.4 ± 52.3 mL to 82.1 ± 40.5 mL, p = 0.04) and an improvement in LVEF (38.3 ± 9.8% to 45.1 ± 11.1%, p < 0.01) compared to patients with MPP OFF (92.2 ± 47.3 mL to 95.4 ± 47.5 mL, p = NS; 37.1 ± 12.0% to 40.2 ± 9.2%, p = NS). QoL of patients with MPP ON improved during follow up (EQ-5D 78.3% to 86.3%, p < 0.01; MLWHF 12.1 to 6.6, p = 0.03, 6MWT 316m to 239m, p = NS; NTproBNP 1,608 ± 2,450 pg/mL to 775 ± 914 pg/mL, p = NS) and was unchanged in MPP OFF patients (76.6% to 74.2%; MLWHF 12.7 to 12.7; 6MWT 338m to 299m, NTproBNP 1,112 ± 1442 pg/mL to 1,383 ± 2,118 pg/mL, for all p = NS).
Conclusions: In our population, patients with CRT programmed with MPP ON, when compared to MPP OFF, had an improvement in the super-response rate and in QoL, probably due to the decrease in ESV.

CO 59. THE GENDER GAP IN CARDIAC RESYNCHRONISATION THERAPY

James Milner[1], Ana Sofia Martinho[1], Cátia Ferreira [2], André Azul Freitas[2], José Paulo Almeida[2], João André Ferreira[2], Natália António[1], Miguel Ventura[1], João Cristóvão[1], Luís Elvas[1], Lino Gonçalves[2]

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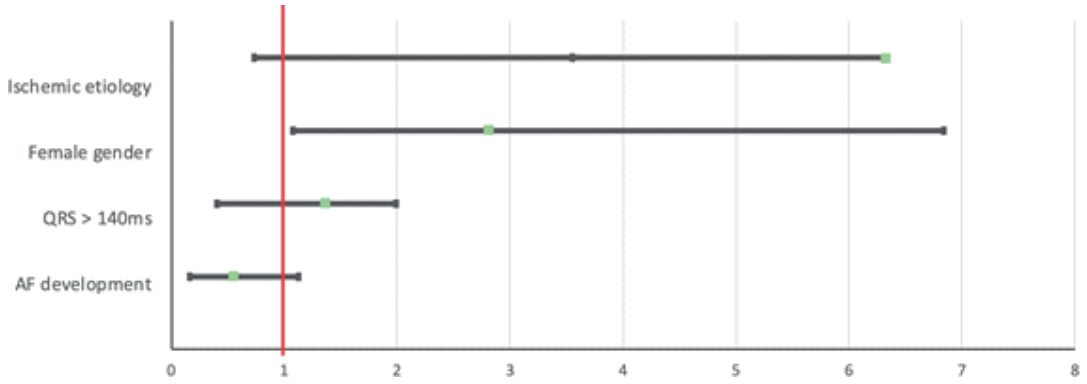
Introduction: Despite conflicting evidence that females may respond more favourably to cardiac resynchronization therapy (CRT), they have been underrepresented in major trials. We aim to evaluate response to CRT and long-term outcomes in female patients submitted to resynchronization.
Methods: Single-center, retrospective study of 434 consecutive patients submitted to CRT between 2004 and 2014. Patients were sorted into 2 groups according to gender: Group A, with 302 males patients (70%) and group B, with 132 female patients (30%). Baseline demographic, clinical and echocardiographic characteristics were compared. Median follow-up was 31 months. The primary co-endpoints were response to CRT (defined as a reduction in left ventricular end-systolic volume of ≥ 15% at 6-months follow up), readmission due to decompensated heart failure (HF), progression to heart transplantation and all-cause mortality.
Results: Age at CRT implantation was similar in both groups (65 ± 11), with a higher prevalence of non-ischemic etiology in women (70 vs 55%, p = 0.01). Most patients received CRT with defibrillator in both groups. Similar prevalence of other co-morbidities (such as arterial hypertension, dyslipidemia, type 2 diabetes mellitus and chronic kidney disease) and pharmacological therapy were registered, except for more males taking statins (74 vs 59%, p =.006). Basal QRS duration was longer in females (154 ± 25 vs 143 ± 32, p = 0.03), but left ventricular ejection fraction was similar in both groups (26 ± 7 vs 27 ± 7, p = 0.224). During follow-up, 26% of males with no prior history of atrial fibrillation (AF) developed AF, which happened in only 12% of female patients (p = 0.007). Women exhibited better echocardiographic (66 vs 46%, p = 0.002) and functional (68 vs 54%, p = 0.039) response to CRT and, despite similar progression to heart transplantation and all-cause mortality, readmission due to decompensated HF was higher in males (34 vs 24%, p = 0.005). In multivariate analysis, after adjustment for HF etiology, AF development and QRS duration, female gender remained as an independent predictor of response to CRT (OR 2.723, 95%CI 1.083-6.845, p = 0.033).
Conclusions: In this cohort, female gender was associated with better response to CRT and less readmissions for decompensated HF. Though factors such as less ischemic etiology and less AF development may contribute towards this difference, female gender was an independent predictor of response to CRT in our model.



CO 59 Figure

CO 57. HIS BUNDLE PACING AS AN ALTERNATIVE TO CARDIAC RESYNCHRONIZATION: A SINGLE CENTER EXPERIENCE

José Alencar[1], Fabio Klemz[2], Francisco Costa[2], Gustavo Rodrigues[2], João Carmo[2], Daniel Matos[2], Flávio Mendonça[1], Pedro Carmo[2], Francisco Morgado[2], Diogo Cavaco[2], Pedro Adragão[2]

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

Introduction: Permanent His bundle pacing (HBP) is an emerging alternative to right ventricular apex pacing. It has the potential to restore physiological activation of the ventricles and achieve synchron. This technique might also be useful as an alternative to biventricular pacing.
Methods: We aim to assess electrocardiographic and clinical outcomes of the patients of a tertiary cardiologic center in Portugal submitted to permanent HBP as an alternative to biventricular pacing to achieve cardiac resynchronization therapy (CRT) in years 2018 and 2019.
Results: Permanent HBP in order to achieve cardiac resynchronization was performed in 17 (11 CRT-D, 4 CRT-P and 2 double-chamber ICD with His electrode connected to atrial channel). patients from March 2018 to December 2019. Mean age was 77 years (48-90) and 41% were female. 35% had a complete left bundle branch block (LBBB), 23% had right apex ventricle pacing, 11% had narrow QRS (with programmed future AV nodal ablation) and 5% had right bundle branch block (RBBB) pattern previous to implant. Immediate post-implant QRS measure demonstrated significant narrowing from a median of 184 ms to 155 ms (p: 0.02, Wilcoxon signed-rank test). 11 of the 17 patients had a 6 months follow-up, and an improvement in New York Heart Association (NYHA) functional class was noticed: 2.54 to 1.81 (p: 0.02, Pearson correlation test). Only one of these 11 patients on follow-up (9%) worsen NYHA functional class (anemia under investigation). Pocket-related complications occurred in 1 patient-hematoma.
Conclusions: In this single center report, permanent HBP as an alternative to cardiac resynchronization significantly reduced QRS length and improved NYHA functional class without significant complications.

CO 58. LONG-TERM PERFORMANCE OF LEADLESS PACEMAKER: RESULTS FROM A MULTICENTRE REGISTRY

João Carmo[1], Diogo Cavaco[1], Fabio Klemz[1], Pedro Carmo[1], Francisco Moscoso Costa[1], Gustavo Rodrigues[1], José Alencar[1], Maria Salomé Carvalho[1], Daniel Matos[1], Francisco Morgado[1], Pedro Adragão[1], Miguel Mendes[2]

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Introduction: The leadless has emerged as an alternative to conventional pacing. First studies showed a high implantation success rate and a low complication rate. The long-term performance of these devices remains uncertain.

Objectives: To evaluate the safety and electrical performance at long-term follow-up of the Micra™ leadless pacemaker (MLP).
Methods: Prospective registry from two centres that included 97 consecutive patients who were implanted with a MLP between June 2015 and December 2018. The safety and efficacy of the device were assessed.
Results: The cohort had a mean age of 77 ± 11 years old and 36% were female. The indications for pacing were atrial fibrillation with atrioventricular node (AV) disease (71%), complete AV block (19%) and sinus node disease (10%). Micra was implanted with success in all patients. During the first 30 days, complications were low (3%): one femoral pseudo-aneurysm needing surgical treatment, one pericardial effusion without need for drainage and one conventional pacemaker implantation in the following day because of loss of ventricular capture. Two patients died in the first 30 days after implantation but it was unrelated to the procedure or device. The electrical performance was excellent at implantation and long-term follow-up (mean 26 months). The mortality at the end of follow-up was 24%.

	Implantation	Follow-up	P value
R wave (mV)	10 (7-13)	13 (10-18)	<0.001
Pacing threshold (V)/0.24 ms	0.5 (0.38-0.75)	0.5 (0.38-0.63)	NS
Impedance (ohms)	690 (605-895)	560 (480-640)	NS

Conclusions: Long-term performance of the Micra pacemaker remains consistent with previously reported data and complications were low.

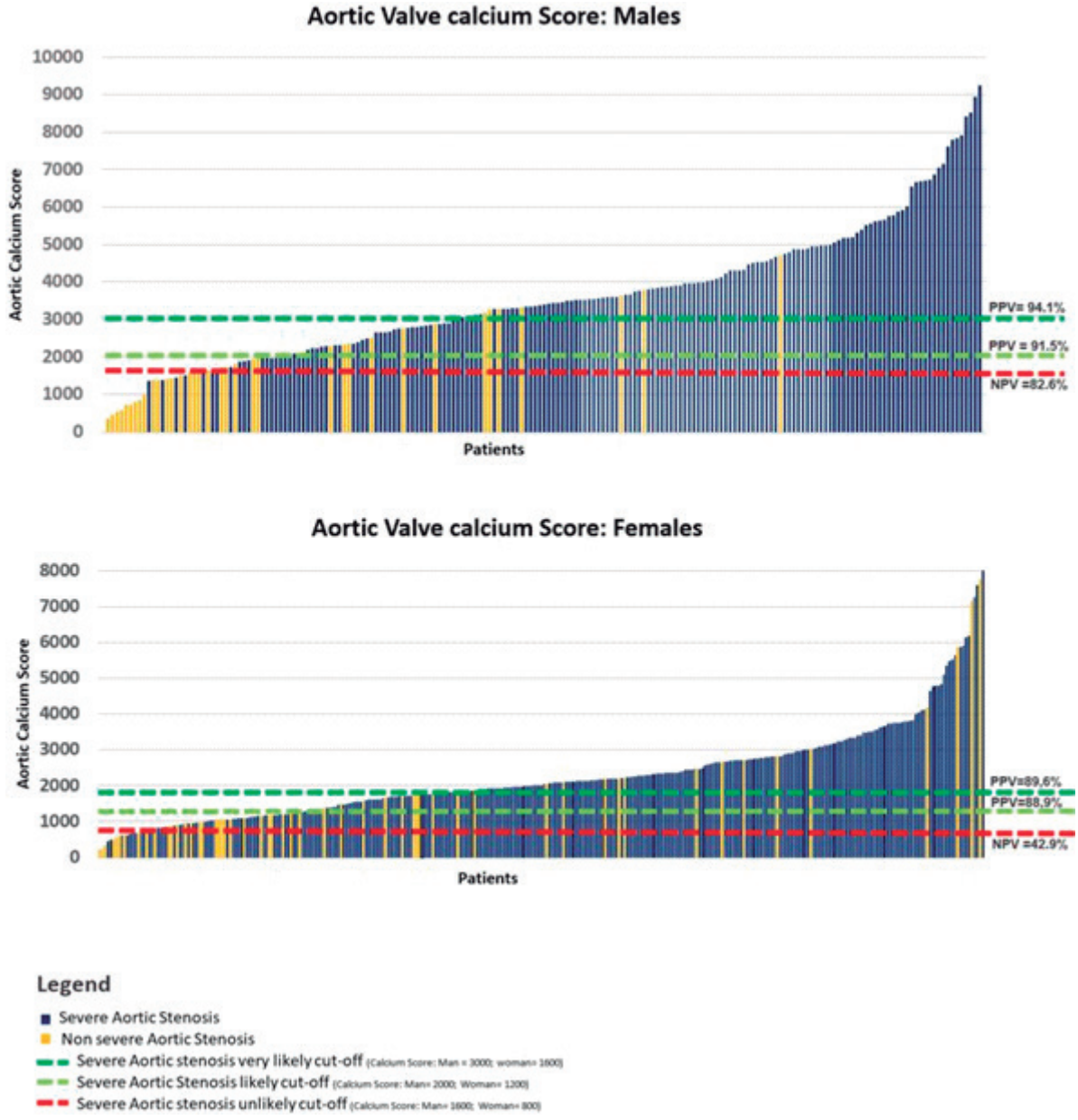
Sessão de Comunicações Orais - Doença Valvular

CO 60. CALCIUM SCORE OF THE AORTIC VALVE AS AN AID TO GRADE AORTIC STENOSIS SEVERITY

Gustavo Sá Mendes, António Ferreira, Pedro Freitas, Pedro Lopes, Rui Campante Teles, Maria João Borges Andrade, João Abecasis, Regina Ribeiras, Sara Guerreiro, Marisa Trabulo, Claudia Silva, Manuel Canada, Carla Saraiva, Ana Coutinho Santos, Pedro Gonçalves, João Brito, Tiago Nolasco, Eduarda Horta, Carla Reis, Telma Lima, Miguel Mendes

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

Introduction: The calcium score of the aortic valve (CaScAoV) is now recommended as a supporting tool to assist in the grading of aortic stenosis



(AS) severity when echocardiographic assessment is inconclusive. However, the proposed CaScAoV cut-offs for considering severe AS "unlikely", "likely", or "very likely" have never been validated in Portuguese cohorts.

Objectives: The purpose of this study was to assess the performance of the proposed CaScAoV cut-offs in identifying patients with severe aortic stenosis.

Methods: A total of 513 consecutive patients (median age 83 years [IQR 79-87], 38% males) evaluated at a single-centre TAVI-programme between Jan/2016 and Nov/2019 were retrospectively identified. Only patients with an ECG-gated cardiac computed tomography (CT) and a transthoracic echocardiography performed within a 6-month time-frame were included. Main exclusion criteria were left ventricular ejection fraction < 50%, indexed stroke volume < 35 ml/m^2, previous valve surgery and bicuspid aortic disease. CaScAoV was measured according to the Agatston method (Agatston units-AU). As previously reported, the likelihood of aortic stenosis as assessed by CT was categorized as: "very likely" (> 3,000 AU for men, > 1600 AU for women); "likely" (> 2,000 AU for men, > 1,200 AU for women) ; or unlikely (< 1,600 AU for men, < 800 AU for women). Diagnostic tests performance measures were calculated for each category. Separate analyses were performed for each gender.

Results: Severe AS (mean gradient ≥ 40 mmHg) was present in 422 patients (overall 82.3%: 83.1% in females and 80.8% in males), with a median transvalvular gradient of 49 mmHg (IQR 42-60). Overall, the discriminative ability of the CaScAoV to distinguish severe from non-severe AS was higher in men when compared with women (c-statistic 0.86 [95%CI 0.80-0.93] vs 0.72 [95%CI 0.64-0.80], p for comparison < 0.001). In males, the "very likely" cut-off had a sensitivity of 71% (95%CI 63-78%), a specificity of 81% (95%CI 65-92%), a positive predictive value (PPV) of 94% (95%CI 89-97%) and a negative predictive value (NPV) of 40% (95%CI 33-46%) for the diagnosis of severe AS. Conversely, in women the sensitivity was 75% (95%CI 69-80%), specificity was 57% (95%CI 43-71%), PPV was 90% (95%CI 86-92%) and NPV was 32% (95%CI 25-39%). On the other end of the spectrum, the "unlikely" cut-off showed poor performance in dismissing severe AS, particularly in females-NPV of 43% (95%CI 25-63%) in women vs 83% (95%CI 63-93%) in men.

Conclusions: In our population, the discriminative power of CaScAoV for identifying patients with severe AS was lower than in previously published cohorts, particularly in females. While very high CaScAoV is strongly supportive of severe AS, caution should be employed when interpreting low CaScAoV values in women, since the recommended cut-off value does not allow the safe exclusion of severe aortic stenosis.

CO 61. DISPROPORTIONATE FUNCTIONAL MITRAL REGURGITATION: CLINICAL VALIDATION OF A NEW CONCEPTUAL FRAMEWORK

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Introduction: Disproportionate functional mitral regurgitation (FMR) is a novel concept that tries to identify hemodynamically significant FMR by readjusting the effective regurgitant orifice area (EROA) and regurgitant volume (RegVol) cut-offs according to left ventricular end-diastolic volume (LVEDV) and left ventricular ejection fraction (LVEF). However, this theoretical concept lacks clinical validation. The aim of this study was to assess the clinical significance of disproportionate FMR.

a)

$$regurgitant\ fraction = \frac{regurgitant\ volume}{LV\ stroke\ volume}$$

$$\leftrightarrow regurgitant\ volume = regurgitant\ fraction \times LV\ stroke\ volume$$

$$\leftrightarrow regurgitant\ volume = regurgitant\ fraction \times (LVEDV - LVESV)$$

$$\leftrightarrow regurgitant\ volume = regurgitant\ fraction \times LVEF \times LVEDV$$

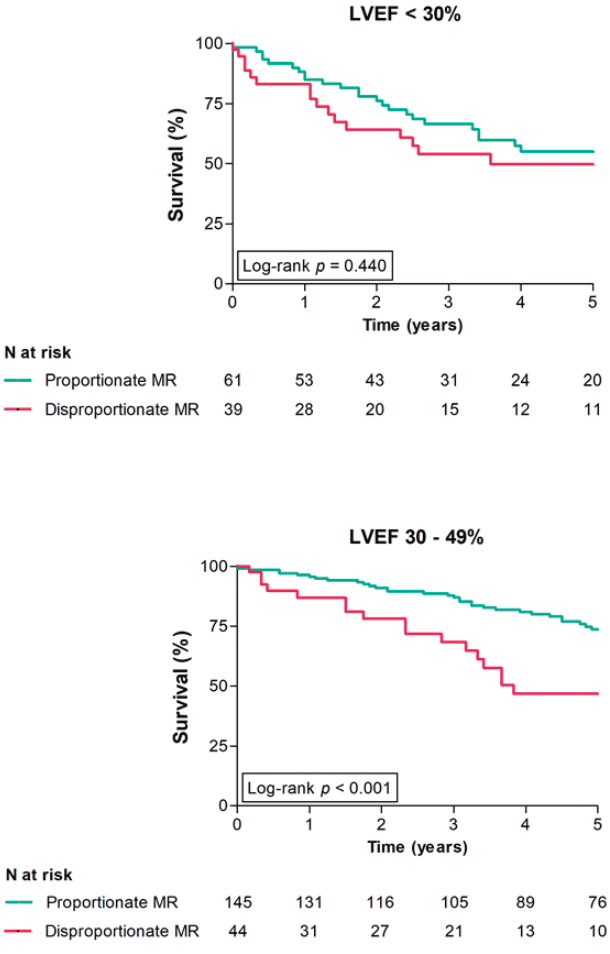
At regurgitant fraction = 50% (haemodynamically significant MR):

$$\leftrightarrow theoretical\ cutoff\ regurgitant\ volume = 50\% \times LVEF \times LVEDV$$

Therefore, disproportional MR occurs when:

$$measured\ regurgitant\ volume\ (PISA\ method) > theoretical\ cutoff\ regurgitant\ volume$$

b)



Methods: Patients with at least mild FMR and reduced LVEF (< 50%) who underwent transthoracic echocardiography between 2010 and 2014 were retrospectively identified in our laboratory database. Optimal medical therapy (including cardiac resynchronization when indicated) for ≥ 3 months was a prerequisite for inclusion. Hemodynamically significant FMR was defined as regurgitant fraction > 50% and the patient-specific theoretical RegVol cut-off was calculated according to the formula presented in Figure 1a. The difference between the estimated RegVol by the PISA method and the theoretical RegVol cut-off was considered to represent the haemodynamic burden of MR. The primary endpoint was all-cause death. Patients were censured if mitral intervention or heart transplant was undertaken. Survival analysis was used to assess the effect of disproportionate FMR on mortality in 2 subgroups (LVEF < 30% and 30-49%).

Results: A total of 289 patients (median age 69 years [IQR 60-77], 75% male, 53% of ischemic aetiology) were included. More than 90% were on beta-blockers and renin-angiotensin inhibitors, 44% on aldosterone receptor antagonists, and 73% had implanted devices. The median LVEF and LVEDV were 34% (IQR 27-41) and 170 mL (IQR 128-220), respectively. Median EROA was 10 mm² (IQR 3-21) and RegVol was 15 mL (IQR 4-30). RegVol distribution across the cohort was: < 10 mL: 41%; 10-20 mL: 18%; 20-30 mL: 15% and > 30 mL: 26%. Disproportionate FMR was present in 83 patients (29%). These patients had significantly higher SPAP values (41 mmHg [IQR 33-50] vs 33 mmHg [IQR 29-40]; p < 0.001). During a median follow-up of 44 months (IQR 19-73), 106 patients died. In the LVEF < 30% subgroup, age (HR 1.05 per year [1.02-1.08]; p < 0.001), LVEF (HR 0.94 per 1% [0.89-0.99]; p = 0.042) and TAPSE (HR 0.92 per mm [0.86-0.99]; p = 0.030) were independent predictors of mortality. In the LVEF 30-49% subgroup, age (HR 1.05 per year [1.02-1.08]; p = 0.003), LVEF (HR 0.94 per 1% [0.89-0.99]; p = 0.020) and disproportionate FMR (HR 1.02 per mL [1.01-1.03]; p = 0.01) were independently associated with increased mortality.

Conclusions: Disproportionate FMR proved to be an important independent predictor of mortality in patients with LVEF between 30-49%. These findings were not replicated in those with LVEF < 30%, where the degree of biventricular dysfunction seems to outweigh all other echocardiographic parameters, leaving FMR as a bystander.

CO 62. LV REPLACEMENT FIBROSIS IN AORTIC STENOSIS: PREVALENCE AND RELATION TO LV REMODELLING AND FUNCTION

Gustavo Sá Mendes, João Abecasis, António Ferreira, Regina Ribeiras, Carla Saraiva, Sara Guerreiro, Eduarda Horta, Carolina Padrão, Victor Gil, Miguel Mendes, José Pedro Neves

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

Introduction: Progressive myocardial fibrosis takes part in left ventricular (LV) remodeling in aortic stenosis (AS) and drives the transition from hypertrophy to heart failure. Replacement fibrosis may be characterized by late gadolinium enhancement (LGE) in cardiac magnetic resonance (CMR).

Objectives: To assess the prevalence and association between LGE and indexes of LV function in patients with severe aortic stenosis.

Methods: We prospectively studied 53 consecutive patients (age: 71 ± 8 years [min. 51- max. 84], 54.7% men) with severe symptomatic AS, referred for surgical aortic valve replacement with no previous history of ischemic cardiomyopathy. Aortic valve mean gradient was 54.6 mmHg [IQR 46.6-63.2] and aortic valve area 0.74 cm² [IQR 0.61-0.89]; all patients with high gradient, 4 with low-flow. CMR with tissue characterization (T1 mapping, LGE and extracellular volume by ECV quantification-using 5SD from remote myocardium as signal intensity cut-off), was performed before surgery. AS severity indexes, LV mass, systolic and diastolic LV function indexes including global longitudinal strain (GLS) and torsion were compared in both groups of patients, with and without LGE.

Results: Mid-wall LGE was present in 36 patients (67.9%) with a median fraction of 6.0% [IQR 4.9-12.7%] of LV mass. Native T1 value and ECV were within normal ranges (median values: 1047ms [IQR 1,028-1,084]; 22% [IQR 18-25], respectively). Median CMR LV ejection fraction and mass were 64.5% [IQR 51.3-70.8%] (11 patients with reduced EF) and 76.5 g/m² [IQR 57.4-94.8 g/m²], respectively. Median GLS was -13.9% [IQR -11.4--17.0%] and torsion was 24.2º [IQR 19.8-32.5º]. Patients with LGE had significantly higher LV mass (87.1 g/m² vs 63.3 g/m², p = 0.001), worse GLS (-14.4% vs -16.9%, p = 0.041) and higher NT-proBNP values (1,333.7 ng/mL vs 559.9 ng/mL, p = 0.004) (Figure).

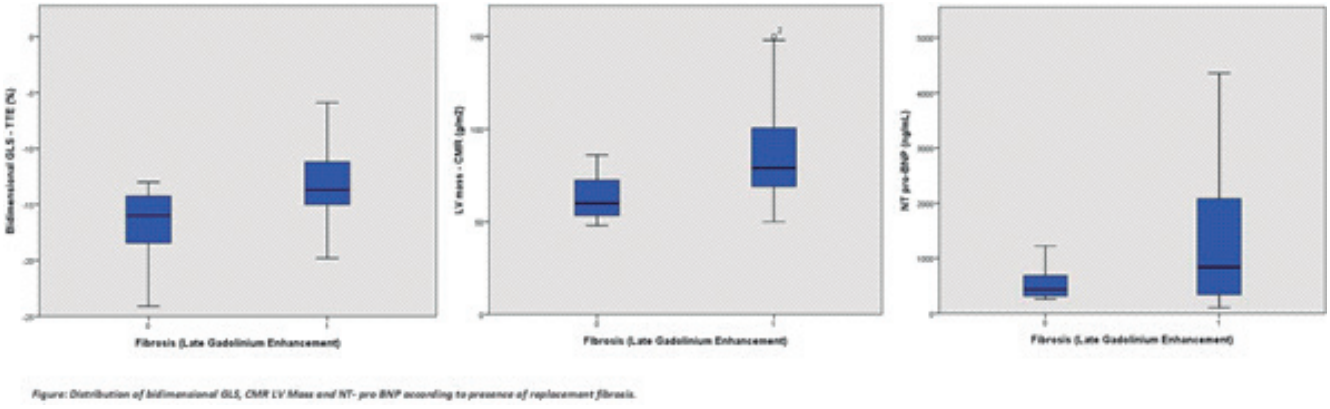


Figure: Distribution of bidimensional GLS, CMR LV Mass and NT- pro BNP according to presence of replacement fibrosis.

CO 62 Figure

Conclusions: Non-ischemic LGE is common in this group of patients with severe symptomatic high gradient aortic stenosis. As it is more prevalent in patients with more pronounced LVH, lower longitudinal deformation and higher NT-proBNP values, it probably represents a more advanced stage of the disease.

CO 63. OUTCOMES AFTER AORTIC VALVE REPLACEMENT: MECHANICAL VS BIOPROSTHETIC VALVES IN PATIENTS 50-70 YEARS

Rafael Gonçalves da Rocha[1], Rui J. Cerqueira[2], Francisca Saraiva[1], Soraia Moreira[3], Jorge Almeida[3], Mário Jorge Amorim[3], Paulo Pinho[3], André Lourenço[3], Adelino Leite Moreira[1]

[1]Faculdade de Medicina da Universidade do Porto. [2]Centro Hospitalar Universitário de São João. [3]Centro Hospitalar de S. João, EPE.

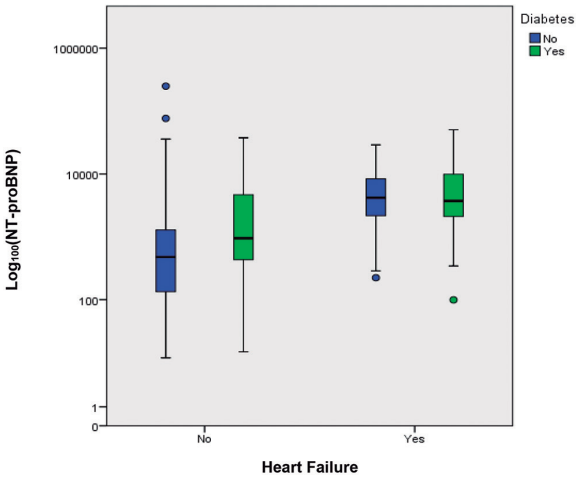
Introduction: The choice of the best prosthetic valve for each patient is a recurring and controversial question in cardiac surgery, especially in the 50-70 year old age-group, in which European and American guidelines differ.
Objectives: To compare 7-year survival and freedom from reoperation, as well as early clinical and haemodynamic outcomes, after surgical aortic valve replacement (SAVR) with mechanical or bioprosthetic valves in patients aged 50-70 years.
Methods: We performed a single-center retrospective cohort study including all adults aged 50-70 years who underwent SAVR in 2012 with a mechanical or Freedom Solo®, Trifecta® or Perimount® bioprosthetic valves. Pre-, Peri- and Post-operative data, including EuroScoreII, follow-up echocardiogram performed at 3 (2-5) months and need of reoperation were obtained from patient and national records. Median follow-up was 7 years. Univariable analyses were performed using Kaplan-Meier curves and Log-Rank tests for survival and freedom from reoperation analyses. A Logistic Regression and a Cox Regression, both adjusted for EuroScoreII, were done to estimate the effect of prosthesis type on hospital mortality and late mortality, respectively.
Results: Of a total of 193 patients, 76 (39.4%) received mechanical valves and 117 (60.6%) received bioprosthetic valves. The former were significantly younger (59.5 [62-68] vs 66 years [55-63], p < 0.001), and had a higher prevalence of Atrial Fibrillation (AF) (32% vs 13.8%), p = 0.003). Furthermore, they were more likely to undergo concurrent interventions on other valves (31.6% vs 12%, p = 0.001), but less likely to undergo simultaneous CABG (19.7% vs 33.3%, p = 0.04). The median EuroScoreII was higher in the mechanical group (2.52% vs 1.95%, p = 0.06), as was early mortality (2.6% vs 7.9%). After adjusting for EuroScoreII, we did not find a significant difference in early mortality (OR = 2.32 [0.515-10.496], p = 0.272) or in 7-year survival (HR = 0.427 [0.157-1.162], p = 0.096). Freedom from reoperation at 7 years was higher in the mechanical group (100% vs 95.5%, Log-Rank = 0.076). Regarding haemodynamic performance at follow-up echocardiogram, there were no differences in mean transprosthesis gradient (14.15 mmHg in the Mechanical group vs 13 mmHg in the Bioprosthesis group, p = 0.115) or severe Patient-Prosthesis Mismatch (4.6% vs 5.1%, p = 0.888). However, reverse remodelling was not as pronounced (-14% vs -21%, p = 0.036).
Conclusions: Mechanical and bioprosthetic aortic valves prostheses were comparable in terms of mid-term survival and early haemodynamic performance, in the 50-70 age group. Further prospective and larger studies are needed to provide evidence-based recommendations on this topic.

CO 64. LEFT ATRIAL EMPTYING FRACTION: A POWERFUL PREDICTOR OF EVENTS IN SEVERE AORTIC STENOSIS

Valdirene Gonçalves[1], João Ferreira[1], André Azul Freitas[2], José Almeida[1], Sofia Martinho[2], Cátia Ferreira [2], James Milner[1], Patrícia Alves[2], Vera Marinho[1], Henrique Vieira[2], Lino Gonçalves[3]

[1]Centro Hospitalar e Universitário de Coimbra/Hospitais da Universidade de Coimbra. [2]Centro Hospitalar e Universitário de Coimbra. [3].

Introduction: Increasing evidence suggests that left atrial (LA) structural and functional changes have an important role in risk stratification and prediction of clinical outcomes. We know from multiple data that left atrial maximum volume (LAVI), measured at end-systole, is a powerful prognostic marker in multiple patient groups. However, recent studies have suggested that this marker may not be the best representative of diastolic function as it does not image the full spectrum of atrial mechanics. Another measure of LA function is the left atrial emptying fraction (LAEF), which has proved to be a significant prognostic marker in many patient groups. Less known is its role in event prediction in severe aortic stenosis patients, a disease with a very important burden in modern societies.
Objectives: The authors hypothesized that LAEF is a powerful predictor of clinical outcomes at 1 year in patients with severe aortic stenosis.
Methods: We retrospectively evaluated 151 patients referred to our echocardiography laboratory with the diagnosis of severe aortic stenosis. All patients underwent transthoracic echocardiography. LA maximum volume was indexed to body surface area. LAEF was calculated as LAVI-LA minimum volume divided by LAVI. Patients were followed for 1 year regarding clinical outcomes. Clinical outcome was defined as a composite of hospital admission for a cardiovascular (CV) cause, emergency department recurrence for a CV cause or CV death. Logistic binary regression was used to evaluate associations of LAEF with the outcome.
Results: A total of 51.7% of patients (n = 78) were males. Mean patient age was 76.6 ± 8.0 years. A total of 38.4% of patients were diabetics (n = 56), 96% had dyslipidaemia (n = 145) and 25% (n = 37) had atrial fibrillation. Mean left ventricular ejection fraction (LVEF) was 60.6 ± 7.3, and mean LAVI was 41.4 ± 12.1. In a multivariable regression model including clinical and echocardiographic markers, higher LAVI and pulmonary artery systolic pressure (PASP) were associated with lower LAEF. Receiver operating characteristic curve analysis showed that the predictive value of LAEF for outcomes at 1 year was 0.693 (AUC = 0.693, 95%CI 0.578-0.809, p = 0.002), performing better than other echocardiographic markers such as LAVI (AUC = 0.567, 95%CI 0.440-0.694, p = 0.286), PASP (AUC = 0.582, 95%CI 0.451-0.714, p = 0.191) and LVEF (AUC = 0.590, 95%CI 0.464-0.716, p = 0.153). After adjustment of baseline characteristics, a LAEF less than 41.3% remained a good predictor of clinical outcomes at 1 year (OR 2.615, 95%CI 1.085-6.305, p = 0.32).



Conclusions: In this cohort of severe aortic stenosis patients, a reduced LAEF was associated with a greater incidence of cardiovascular events, being a stronger predictor than LAVI, PASP or LVEF. This study suggests that LA dysfunction over LA volumes correlates better with clinical outcomes.

CO 65. CONDUCTION DISTURBANCES AFTER TAVI-REAL-LIFE DATA FROM A PORTUGUESE CENTER

Miguel Martins de Carvalho[1], Tânia Proença[1], Ricardo Alves Pinto[1], Catarina Martins Costa[1], Sofia Torres[1], Carlos Xavier Resende[1], Pedro Diogo Grilo[1], Ana Filipa Amador[1], João Calvão[1], Alzira Nunes[1], Paulo Maia Araújo[1], Roberto Rodrigues Pinto[2], Marta Tavares Silva[1], Gonçalo Pestana[1], Sívia Oliveira[1], Raquel Mota Garcia[1], Ana Lebreiro[2], Luís Adão[1], João Carlos Silva[1], Maria Júlia Maciel[1]

[1]Centro Hospitalar Universitário de São João. [2]Centro Hospitalar de S. João, EPE.

Introduction: Transcatheter aortic valve implantation (TAVI) is an established procedure to treat patients (pts) with symptomatic severe aortic stenosis. Despite major improvements, the occurrence of conduction disturbances has not decreased over time and remains the most frequent complication.

Objectives: To describe and evaluate new conduction disturbances in pts undergoing TAVI.

Methods: We retrospectively analyzed all pts who underwent TAVI at a tertiary Portuguese center from October 2014 to November 2019 (n = 371); pts with a previous pacemaker (PM) was excluded (n = 30). A pre- and post-procedure ECG was performed; clinical and ECG data was collected at presentation and up to 6 months after implantation.

Results: 341 pts underwent TAVI (57% female, mean age 81 ± 8 years). CoreValve Evolut R was used in 41.1% of cases, followed by CoreValve Evolut Pro (21.1%), Acurate Neo (12.9%), Edwards SAPIEN 3 (9.7%), Portico (9.1%), CoreValve (4.1%) and LOTUS (2.1%). 72% of pts were in sinus rhythm pre-TAVI, 22% in atrial fibrillation; 59% had normal atrioventricular (AV) conduction, 15% had 1st degree AV block (AVB); 55% had no intraventricular (IV) conduction disturbance, 8% had left bundle branch block (LBBB), 7% had right bundle branch block (RBBB), 6% had a RBBB plus fascicular block, 7% had left anterior fascicular block and 9% had nonspecific intraventricular conduction delay (NICD). During hospitalization 50.1% of pts exhibited de novo conduction disturbance, both AV (25.9%, $p < 0.001$) and IV (34.8%, $p < 0.001$). Regarding AV conduction, 20% of pts without previous disturbances developed 1st degree AVB and 9% advanced AVB; 9% of pts with previous 1st degree AVB developed advanced AVB. Concerning IV conduction, 30% of pts maintained normal conduction after the procedure, 38% were in LBBB, 6% RBBB, 7% RBBB plus fascicular block and 7% NICD. In pts with previous RBBB, 42% developed advanced AVB and 44% implanted PM; the presence of previous RBBB was a major risk factor for advanced AVB [OR = 8.5 (95%CI 4.0-17.6; $p < 0.001$)] and PM implantation [OR = 5.2 (95%CI 2.7-10.0; $p < 0.001$)]. At 6 months follow-up, 55% of new IV conduction disturbances resolved; *de novo* LBBB resolved in 56% of pts and fascicular block in 75%.

Conclusions: LBBB was the most frequent IV conduction disturbance after TAVI, but a significant proportion of cases resolved during follow-up. As reported in the literature, RBBB was a major risk factor for advanced AVB and PM implantation after TAVI in our population.