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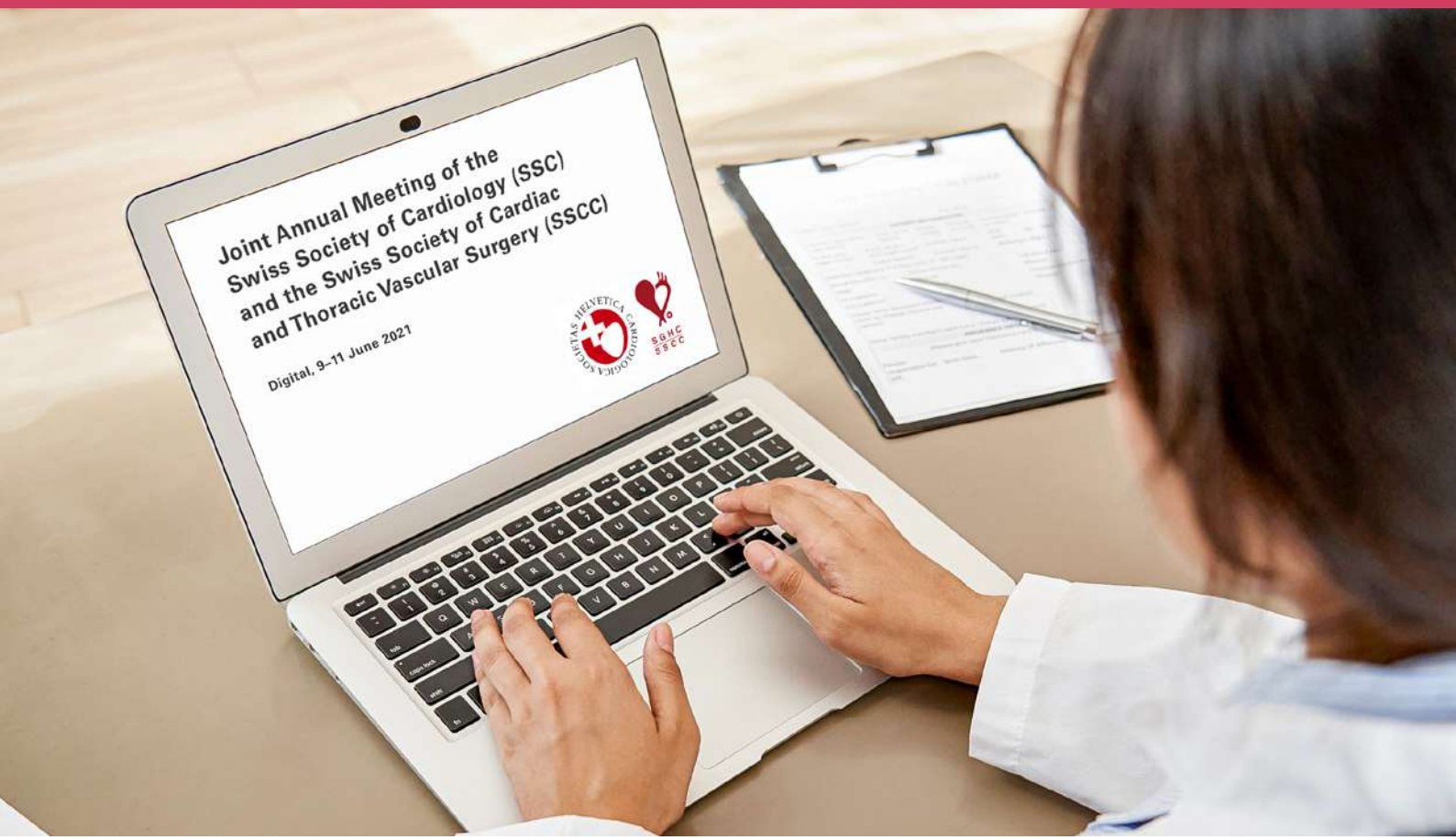
Cardiovascular Medicine

Supplementum
Abstracts

Joint Annual Meeting of the Swiss Society of Cardiology (SSC) and the Swiss Society of Cardiac and Thoracic Vascular Surgery (SSCC)

Digital, 9–11 June 2021



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Digital, 9–11 June 2021

Oral Presentations

ePoster

Oral Presentations

Valvular heart disease

O01

The clinical and economic value of a lean TAVI patient pathway

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Background: One of the challenges of the coronavirus disease 2019 (COVID 19) pandemic is the reduced availability of intermediate- or intensive care unit (IMC/ICU) beds and anesthesia care. Transcatheter aortic valve implantation (TAVI) is often performed with an anesthesiologist in the room and patients are monitored on IMC/ICU after the procedure.

Methods: Here, we compare clinical and financial outcomes of the first 70 patients treated with a lean TAVI patient pathway and compare them to the last 70 patients treated with a standard TAVI pathway. The main components of our lean TAVI pathway were:

1) perform TAVI without an anesthesiologist in the room,
2) monitor patients in the recovery area of the catheterization laboratory and not on IMC/ICU,
3) enable same-day admissions,
4) encourage early discharge.

Of note, anesthesia care and ICU were available as a backup, if needed.

Results: Baseline characteristics, in-hospital and 30-days outcomes (vascular complications, stroke, bleeding, new pacemakers, mortality) did not differ between the patient groups. Introduction of the lean TAVI pathway reduced the median duration of hospitalization from 5 (IQR 4-8) to 4 (IQR 3-6) days (p = 0.003). Total costs were reduced by 12% from 43'609 CHF (IQR 39'314-98'595) to 38'525 CHF (IQR 35'933-41'771, p< 0.001). While costs for material and implants remained unchanged, internal costs including physician fees, nursing, blood work, imaging, ICU and anesthesia care were reduced by 34% from 10'741 (IQR 8'705-14'515) to 7'069 (IQR 4'383-10'234, p< 0.001).

Conclusion: Our lean TAVI pathway significantly reduced the duration of hospitalization, use of hospital resources, patient transport routes and costs. This may help to mitigate the scarcity in hospital resources and increase the treatment capacity of other disciplines depending on these resources. Further studies with larger patient numbers are needed to confirm the safety and efficacy of this patient pathway.

Disclosure: ST is a proctor for Boston Scientific, Medtronic, Abbott and Biosensors, a consultant for Boston Scientific, Medtronic, Biosensors, Medira, Teleflex, VeoSource, Carag, has received institutional research grants from Boston Scientific and Fumedica and holds equity in Hi-D Imaging.

O02

Use of passive leg rise as an add-on to Dobutamine in patients with paradoxical low-flow, low-gradient aortic stenosis

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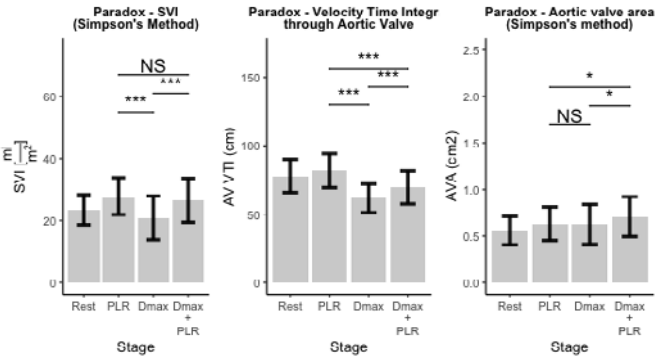
Background: Dobutamine has been proposed for the assessment of low-flow, low-gradient aortic stenosis (LFLGAS). However, in 1/3 of patients, no increase in stroke volume index can be achieved by Dobutamine, thus hampering its diagnostic value. This study evaluated the manoeuvre of intracavitary volume augmentation by passive leg rise (PLR) alone or on top of Dobutamine to increase stroke volume index (SVI) in patients with LFLGAS, particularly in paradoxical LFLGAS.

Methods: We examined 50 patients with LFLGAS. Patients were assigned to the "Paradox" group if left ventricular ejection fraction (LVEF) was ≥50% (n=29) and to the "LEF" group if LVEF was < 50% (n = 21). A modified Dobutamine stress echocardiography was performed in all patients with the following 4 steps: Rest, PLR alone, maximal Dobutamine infusion rate alone (Dmax) and Dobutamine plus PLR (Dmax + PLR). 3 SVI measurement methods were used: first the left ventricular outflow tract velocity time integral (LVOT VTI) method, second the 2D Simpson's method, and third the 3D method. The corresponding aortic valve area (AVA) was obtained by the continuity equation. The increase of those values compared to measurements at rest was calculated and compared between the 3 stress steps.

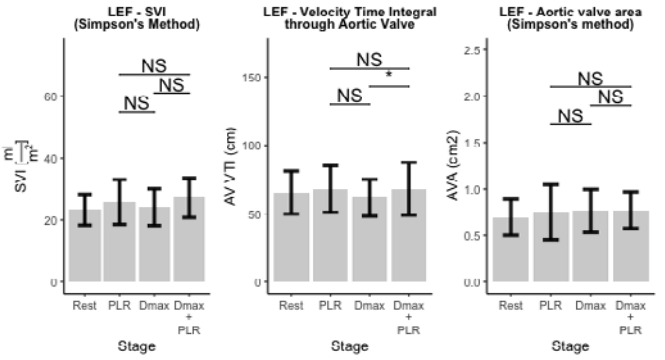
Results: In the paradox group, delta SVI with Dmax assessed by both Simpson´s (depicted in the figures) and 3d method was lowest compared to PLR and Dmax + PLR. PLR alone yielded an equally high delta SVI as Dmax + PLR in Simpson´s and 3d, and was at least as high as Dmax across all methods. Dobutamine alone yielded the lowest delta transaortic aortic valve VTI. The highest delta aortic valve area resulted for Dmax + PLR. In the LEF group, the three stress steps yielded an equally high delta SVI with Simpson´s method. Dmax never yielded a higher delta SVI than PLR alone. The yielded delta SVI was the highest for Dmax + PLR for both LVOT VTI and 3d method, although the difference were overall not as strong as in the Paradox group.

Conclusions: In patients with paradoxical LFLGAS, Dobutamine alone is inadequate for testing the potential of aortic valve opening augmentation. Instead, PLR alone or the addition of PLR on top of Dobutamine should be used for that purpose. In low EF, adding PLR to Dobutamine also seems useful although its diagnostic added value is less evident than in the Paradox group.



*NS: not significant, *: p<0.05, >0.01, **: p<0.01, >0.001, ***: p<0.001*

[Stroke Volume index (Simpson's method), AV VTI and AV area by continuity equation in Paradox group]



*NS: not significant, *: p<0.05, >0.01, **: p<0.01, >0.001, ***: p<0.001*

[Stroke Volume index (Simpson's method), AV VTI and AV area by continuity equation in LEF group]

Disclosure: There are no conflicts of interest. This work was supported by the Foundation Gottfried und Julia Bangerter-Rhyner.

O03

Midterm outcomes of aortic valve neocuspidization (AVneo) for aortic valve disease

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Introduction: Structural bioprosthetic valve deterioration remains a major limitation following aortic valve replacement. As an alternative, favorable results were reported with autologous pericardium AVNeo procedure described by Ozaki et al. We report our results of this procedure at midterm follow-up.

Material and method: Between november 2016 and december 2020, seventy patients (31 female and 39 male (mean age of 62±12 years) with aortic stenosis (AS) (n=53, 71%) or aortic regurgitation (AR) (n=17, 29%) underwent the procedure. Tricuspid valve was present in 34 (49%) patients, bicuspid in 35 (51%) and monocuspid in 1 (1%) patient. Euroscore and STS score were respectively 2.2±2 and 2±1.8 %. Six patients (8%) had active endocarditis. Combined procedure was performed in 33 (46%) patients.

Patients were followed up by echocardiography and clinical examination.

Results: The follow-up period was 24±12 months.

One patient died in-hospital (non valve related) and one patient underwent conventional aortic valve replacement for moderate regurgitation. Immediate post-operative peak pressure gradient (PPG) and mean pressure gradient (MPG) were respectively: 14±5 and 8±3 mmHg and aortic valve area (AVA) was 2.5±0.6 cm2.

During the follow-up period no patient died. Reintervention was needed in 2 patients (4%) respectively for endocarditis and suture tear with AR. At last follow-up PPG was 13±7 mmHg, MPG was 7±4 mmHg and AVA was 2.3±0.7 cm2.There was one recurrence of mild AS (1%). All patients were in NYHA class I (90%) or II (10%). Freedom from major valve related events (MAVRE) was 91.5 %, 98.5% for death, 95.2% for reintervention and 97.2% for endocarditis.

Conclusion: The midterm outcomes of AVNeo procedure with autologous glutaraldehyde fixed pericardium were acceptable in terms of survival, operative risk and valve related complications for all-comers patients population with various aortic valve disease.

Disclosure: Nothing to disclose

O04

1-year outcome after transapical or transaortic transcatheter aortic valve implantation in high-risk patients with unsuitable peripheral access

E. Ferrari[1], E. Pasotti[2], F. Toto[1], T. Torre[1], T. Theologou[1], T. Cassina[3], S. Demertzis[1], G. Pedrazzini[2]

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Objective: Transcatheter aortic valve implantation (TAVI) through a transapical or a direct transaortic access site is indicated in high-risk patients with aortic valve stenosis and concomitant vascular disease or unsuitable peripheral vascular access. The present study aims at analysing the 1-year clinical outcome of 134 consecutive high-risk patients who underwent a transapical (TA) or a direct transaortic (TAO) TAVI.

Methods: From March 2012 to June 2020, 70 transapical (TA-group) and 64 transaortic (TAO-group) procedures were performed by the hospital Heart-Team with balloon-expanding (n=103) or self-expanding (n=31) transcatheter valves. Clinical data up to 1-year follow-up were prospectively collected and retrospectively analysed.

Results: Mean age was 79.97±6.10 and 81.84±6.97 years, in TA-group and TAO-group, respectively (p=0.008). Female gender was more present in TAO-group: 62% vs 31% (p=0.001), while TA showed higher prevalence of previous vascular surgery (21% vs 3%, p=0.01), coronary disease (77% vs 56%, p=0.043), previous cardiac surgery (49% vs 3%, p< 0.001), kidney failure (50% vs 30%; p=0.178) and porcelain aorta (24% vs 3%; p< 0.001). EuroSCORE-II was 8.6±7.93 (TA) and 5.73±8.37 (TAO). Mean ejection fraction was 48.83±15.26% (TA) and 52.93±12.78% (TAO). In total, 103 Sapien (77%), 28 CoreValve (21%) and 3 Accurate (2%) were implanted with shorter procedural time for the transapical access (105.79±34.81 vs 118.58±45.20 minutes). Hospital mortality was 9% and 6% for TA and TAO-group, respectively (p=0.543). Stroke was never detected. New pacemaker implantation was necessary in 13 patients (10%). Hospital stay was similar: 11.67±6.66 days for TA and 11.88±13.28 days for TAO. Valve aortic gradient at discharge was 9.76±4.81mmHg for TA and 9.34±3.27mmHg for TAO, with moderate paravalvular leak accounting for 3% in both groups (p=0.674). At 1-year follow-up, 11/64 TA patients (17%) and 7/60 TAO patients (12%) have died (cardiovascular death 3% in both groups).

Conclusions: In our study, TA and TAO-TAVI patients show different risk profiles and the hospital mortality was adequately predicted by EuroSCORE-II. Survival at 1-year shows acceptable results for a high-risk population.

Disclosure: Enrico Ferrari is consultant for Edwards Lifesciences

O05

Right ventricular-pulmonary artery coupling in patients with severe aortic stenosis undergoing valve replacement: invasive hemodynamic correlates and long-term prognostic impact

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Introduction: The importance of the right ventricle (RV) in patients with heart failure and/or valve disease is increasingly recognized. RV function is ideally evaluated in relation to afterload, i.e. as RV to pulmonary artery coupling (RV-PA coupling). In patients with severe aortic stenosis (AS), there is evidence from non-invasive studies that RV-PA coupling may be relevant in terms of prognosis. However, the detailed hemodynamic profile of AS patients with impaired RV-PA coupling is unknown. We aimed to determine RV-PA coupling based on the combination of echocardiography and invasively measured pulmonary pressures and to assess its invasive hemodynamic correlates and its prognostic information in AS patients.

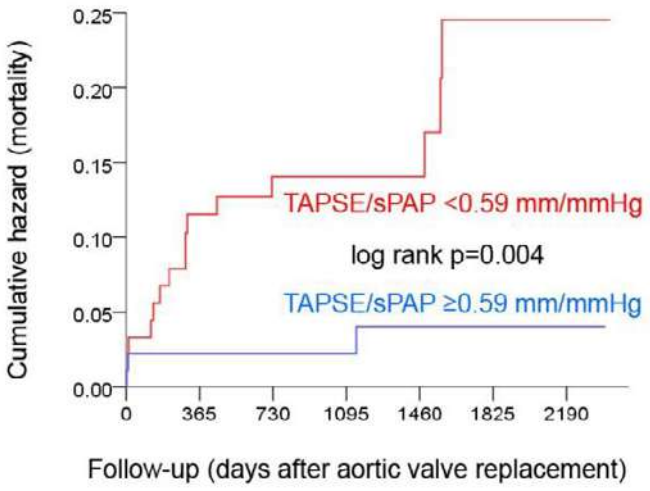
Methods: We studied 185 patients (mean age 75±10 years) with severe AS [indexed aortic valve area (AVAi) 0.42±0.12 cm^2/m^2, left ventricular ejection fraction (LVEF) 55±13%] undergoing right heart catheterization prior to surgical (60%) or transcatheter (40%) aortic valve replacement (AVR). To describe RV-PA coupling we calculated the ratio of tricuspid annular plane systolic excursion (TAPSE) to invasively assessed systolic pulmonary artery pressure (sPAP).

Results: The mean TAPSE, sPAP, and TAPSE/sPAP ratio were 21±5 mm, 42±16 mmHg, and 0.58±0.26 mm/mmHg. Patients with inframedian TAPSE/sPAP ratio (n=92) had smaller AVAi (0.40±0.11 vs. 0.45±0.13 cm2/m2; p=0.004), lower LVEF, higher right- and left sided filling pressures, higher pulmonary vascular resistance, higher RV stroke work, and lower stroke volume index than patients with supramedian TAPSE/sPAP ratio (n=93) (Table). After a median (interquartile range) follow-up of 40.4 (28.1-56.4) months after AVR patients with inframedian TAPSE/sPAP ratio had significantly higher mortality than those with supramedian TAPSE/sPAP ratio (Figure; p=0.004).

Conclusions: In severe AS patients, invasively assessed impaired RV-PA coupling (described by low TAPSE/sPAP ratio) identifies patients with an overall unfavorable hemodynamic profile and increased risk of post-AVR death. This underscores the value of a combined non-invasive and invasive pre-AVR hemodynamic assessment.

	Inframedian TAPSE/sPAP (n=92)	Supramedian TAPSE/sPAP (n=93)	P value
LVEF (%)	50±15	59±10	<0.001
TAPSE (mm)	18±4	24±4	<0.001
Mean right atrial pressure (mmHg)	9±5	5±3	<0.001
mPAP (mmHg)	34±10	20±5	<0.001
sPAP (mmHg)	53±15	31±6	<0.001
mPAWP (mmHg)	23±9	12±5	<0.001
Pulmonary vascular resistance (Wood units)	2.9±1.5	1.7±0.8	<0.001
Stroke volume index (ml/m^2)	32±12	37±10	0.001
RV stroke work (mmHg*ml)	19.0±6.6	13.2±4.6	<0.001

[Table]



[Figure 1. RVPA coupling]

Disclosure: Nothing to disclose

O06

Aortic valve replacement with rapid deployment aortic valves and annulus stabilization technique

E. Ferrari[1], E. Caporali[2], T. Torre[1], F. Toto[1], T. Cassina[3], S. Demertzis[1]

[1]Cardiac Surgery, [2]Cardiology, [3]Cardiac Anaesthesia, Cardiocentro Ticino Institute, Lugano, Switzerland

Objective: Rapid deployment aortic valve implantation with the Intuity valve is an alternative to standard bioprosthesis implantation allowing a shorter surgical and CPB time. By using this valve featuring a subvalvular stent, there is a risk of postoperative paravalvular leak, which is reported at 5-10%. The aortic annulus stabilization technique prevents this complication while adapting the aortic annulus to the valve prosthesis. We aim to report our clinical activity and the 1-year follow-up.

Methods: All patients underwent surgical aortic valve replacement with the Intuity valve system with concomitant annulus stabilization technique. Thirty-day and 1-year outcome, as well as echocardiographic data, were prospectively collected and retrospectively analysed for this study.

Results: A total of 55 consecutive patients (mean age 76.65±5.39years; 18 females; mean BMI: 25.86±5.34) suffering from aortic valve stenosis (49; 89%) or regurgitation (6, 11%) underwent Intuity aortic valve system implantation alone (25 cases, 45.45%) or in combination with other major cardiac procedures (30 cases, 54.54%). Mean Euroscore-II was 5.2±3.3. The new annulus stabilization technique was performed in all cases (100%). Mean Intuity valve size was 23.9±1.87mm (median: 25mm) and 24 cases (43.63%) were performed through an upper mini-sternotomy. Cardio-pulmonary bypass time and cross-clamp time were 91.2±30.42min and 69.07±24.11min, respectively. Surgical mortality was 1.8% (1 case), one patient required a revision for bleeding, 5 patients experienced acute renal failure not requiring dialysis, and 10 patients (18.2%) received a new pacemaker for conduction abnormalities. At discharge, echocardiogram showed absence of detectable paravalvular leak in all patients but one (mild) with peak and mean gradients of 17.2±6.4 and 8.7±3.1mmHg; ejection fraction of 52.5±16.6%. At 1-year follow-up, two patient were dead. Echocardiograms showed undetectable paravalvular leak in all patients, and peak and mean gradients of 14.6±5.1 and 8.1±2.8mmHg, respectively, with ejection fraction of 58±6.7%.

Conclusions: The aortic annulus stabilization technique performed during rapid deployment aortic valve implantation with Intuity bioprosthesis shows good results and prevents paravalvular leak at 1-year follow-up.

Disclosure: E Ferrari is consultant for Edwards Lifesciences

O07

Surgical mitral valve repair versus transcatheter edge-to-edge repair for treatment of secondary mitral regurgitation: a propensity score matched comparison of 2-year outcomes

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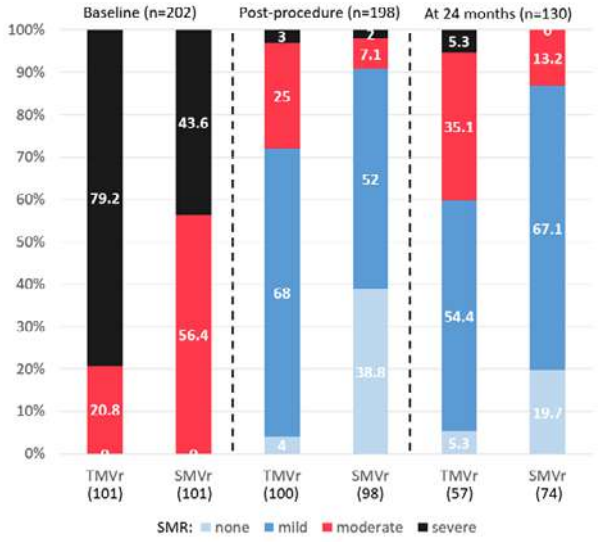
Introduction: Mitral valve (MV) interventions to correct severe secondary mitral regurgitation (SMR) have been proposed in patients with persisting heart failure (HF) symptoms despite guideline-directed medical therapy. However, there are limited data comparing transcatheter (TMVr) and surgical mitral valve repair (SMVr) for the treatment of SMR. This retrospective study was aimed at comparing the efficacy and clinical outcomes of TMVr and SMVr among patients with SMR.

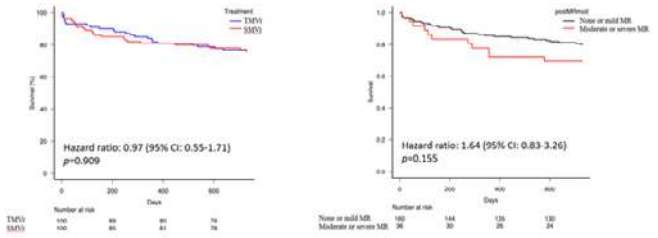
Method: Retrospective cohort study of TMVr and SMVr, as the treatment of SMR, performed at two Swiss centers between 2005 and 2018. To account for differences in patient demographics, 1:1 propensity score matching was performed. TMVr was performed using the MitraClip system, SMVr was performed using a restrictive ring annuloplasty. The primary endpoint was all-cause mortality within 2 years of follow-up after the procedure. Secondary endpoints included all-cause mortality at 30 days, the severity of SMR at discharge and at 2 years, functional status as assessed by New York Heart Association (NYHA) functional class, and the change in left ventricular ejection fraction (LVEF) at 2 years.

Results: 202 patients were matched. At 2 years, all-cause mortality was 24.3% for TMVr and 23.0% for SMVr (HR 0.97, 95%CI 0.55-1.71, P=0.909). Severe HF symptoms at 2 years were less prevalent after SMVr (NYHA III or IV: 13.5% vs. 29.5%, P=0.032) than after TMVr. A higher proportion of the SMVr patients had SMR reduction to none or mild at discharge (90.8% vs. 72.0%, P< 0.001) and 2 years (86.3% vs. 59.6%, P< 0.001). Among patients who achieved none or mild MR at discharge, 7 patients (10.1%) in the SMVr group and 15 patients (34.9%) in the TMVr group had progression of MR to ≥moderate at 2 years (P=0.003). LVEF significantly improved (+10.1±11.1%, P< 0.001) after SMVr (LVEF at 2 years: 45.7±12.8%), while LVEF remained unchanged (-1.3±8.9%, P=0.260) after TMVr group (LVEF at 2 years: 34.0±13.2%).

Conclusion: In a propensity matched cohort of patients with SMR, survival at 24 months did not differ between TMVr and SMVr, despite higher and more durable SMR reduction and better LVEF improvement in the surgical group.



[Mitral regurgitation Distribution at baseline, post-procedural, and at 2 years]



[Kaplan Meier curves for overall survival in treatment groups (left) and residual MR (right)]

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O08

Myocardial extracellular volume by T1 mapping: a new marker of ventricular arrhythmia occurrence in Mitral Valve Prolapse

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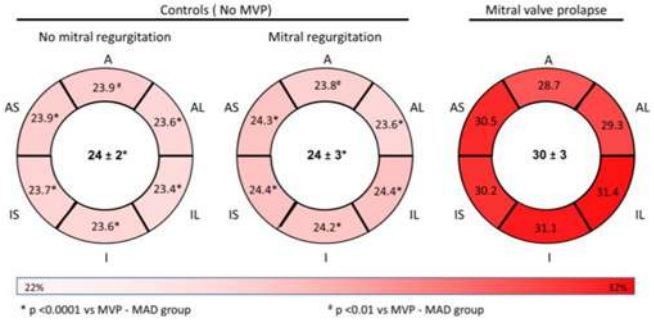
Background: In mitral valve prolapse (MVP,) mitro-annular disjunction (MAD) has been associated with myocardial replacement fibrosis and ventricular arrhythmias, but the potential arrhythmogenic role of interstitial fibrosis has not been established yet. We aimed to evaluate the relationship between MAD severity and myocardial interstitial fibrosis (MIF) at the left ventricular (LV) base in patients with MVP, and to assess the association between severity of MIF and occurrence of ventricular arrhythmias.

Methods: Thirty patients (50±17 yo) with MVP and MAD (MVP-MAD) underwent Cardiac Magnetic Resonance (CMR) with assessment of MAD length, late gadolinium enhancement (LGE) distribution and extension, and myocardial extracellular volume (ECV) of basal segments. The control group included 14 pts (53±22 yo) with mitral regurgitation without MAD (MR-NoMAD) and 10 pts with a normal CMR (NoMR-NoMAD). Fifteen of the 30 MVP-MAD patients underwent 24h-Holter monitoring.

Results: LGE was observed in 47% of MVP-MAD pts but absent in controls. ECV was higher in MVP-MAD than in MR-noMAD and NoMR-NoMAD pts (30±3% vs 24±3% and 24±2% respectively, p< 0.0001), as well as in MVP-MAD pts without LGE (29±3%, p< 0.0001). MAD length was correlated with ECV (rho=0.61, p=0.0003), but not with LGE extent. In MVP-MAD pts, LGE and ECV were equally performant to identify cases with "out of hospital cardiac arrest" (OHCA) (area under the ROC curve 0.81 vs 0.83, p=0.84). Among the MVP-MAD pts in whom a Holter was available, 87% had complex ventricular arrhythmias. Importantly, in MVP-MAD pts ECV was above the cut-off value of 28% in all, while only 53% had LGE.

Conclusion: Increased ECV, a marker of interstitial fibrosis, occurs in MVP-MAD pts in spite of the absence of LGE, and is correlated with MAD length and OHCA. ECV assessed by CMR should be part of the arrhythmic risk stratification of MVP patients in an effort to better assess interstitial fibrotic remodelling as it seems to provide additional prognostic information beyond LGE assessment.



[Fig.1]

Disclosure: Nothing to disclose

Basic Science with a pinch of rhythmology & valves

O09

JCAD enhances arterial thrombosis by regulating endothelial plasminogen activator inhibitor-1 and tissue factor expression

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Introduction: Arterial thrombosis underlies most acute CV events including myocardial infarction (MI). Variants in the Junctional cadherin 5 associated (JCAD, also known as KIAA1462) locus enhancing the expression of this protein associate with increased risk of coronary artery disease and MI by multiple genome-wide association studies. JCAD is highly expressed in endothelial cells where it colocalizes with VE-Cadherin, a component of cell junctions. Recently, JCAD was also shown to promote endothelial dysfunction and atherosclerosis through the Hippo pathway. Here we further investigate JCAD properties by exploring its putative role in arterial thrombosis.

Methods: JCAD knock-out (Jcad$^{-/-}$) underwent photochemically-induced carotid artery endothelial injury to trigger arterial thrombosis. To increase the translational value of our findings, primary human aortic endothelial cells (HAECs) treated with JCAD small interfering RNA (si-JCAD) or control siRNA (si-SCR) and stimulated with tumour necrosis factor (TNF)-α were also investigated.

Results: Compared to WT animals, Jcad$^{-/-}$ mice displayed reduced arterial thrombus formation following endothelial-specific damage. Pointing towards a blunted activation of the extrinsic coagulation cascade, Jcad$^{-/-}$ animals showed reduced tissue factor (TF) activity in carotid artery lysates as well as reduced level of arterial TF expression. Furthermore, augmented number of thrombus embolization episodes and increased circulating D-dimer suggested an increased activation of the fibrinolytic system in Jcad$^{-/-}$ mice. Indeed, Jcad$^{-/-}$ mice showed reduced vascular expression of the fibrinolysis inhibitor plasminogen activator inhibitor (PAI)-1 (Figure 1). In HAECs, JCAD-silencing inhibited TF and PAI-1 gene and protein expression both at basal level and in response to TNF-α. Furthermore, endothelial cells lacking JCAD displayed increased levels of LATS2 Kinase, which blunts the Hippo pathway by increasing YAP phosphorylation (Figure 2). Accordingly, p-YAP levels were higher in Jcad$^{-/-}$ animals as compared to WT littermates.

Conclusions: JCAD promotes arterial thrombosis by modulating coagulation cascade activation and fibrinolysis through endothelial TF and PAI-1. Whether JCAD plays a role in platelet aggregation, the third pathway of arterial thrombosis, remains to be explored. Our findings support JCAD as a therapeutic target for CV prevention by showing for the first time its involvement in regulation of atherothrombosis.

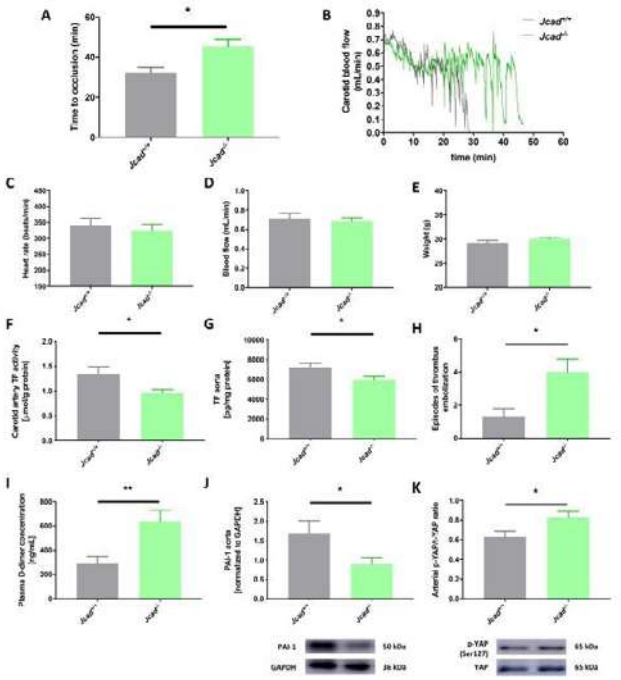

Figure 1. A. *Jcad*$^{-/-}$ mice show delayed time to thrombotic occlusion, as compared to WT ones (**B**, representative pictures). **C-E.** No difference in terms of initial blood flow, initial heart rate and body weight at the time of experiment is reported between the two groups. *Jcad*$^{-/-}$ animals show blunted levels of carotid artery tissue factor (TF) activity (**F**) as well as reduced level of protein in aorta lysate (**G**). Furthermore, *Jcad*$^{-/-}$ animals also showed higher thrombus embolization episodes (**H**) and plasma D-dimer levels (**I**), suggesting an increased fibrinolytic activity. (**J**) Accordingly, *Jcad*$^{-/-}$ animals display reduced levels of plasminogen activator-1 (PAI-1) in aorta lysate, as compared with WT mice. (**K**) In keeping with the previous literature, animals lacking *Jcad* show increased levels of YAP phosphorylation preventing its translocation into the nucleus.

[Figure 1]

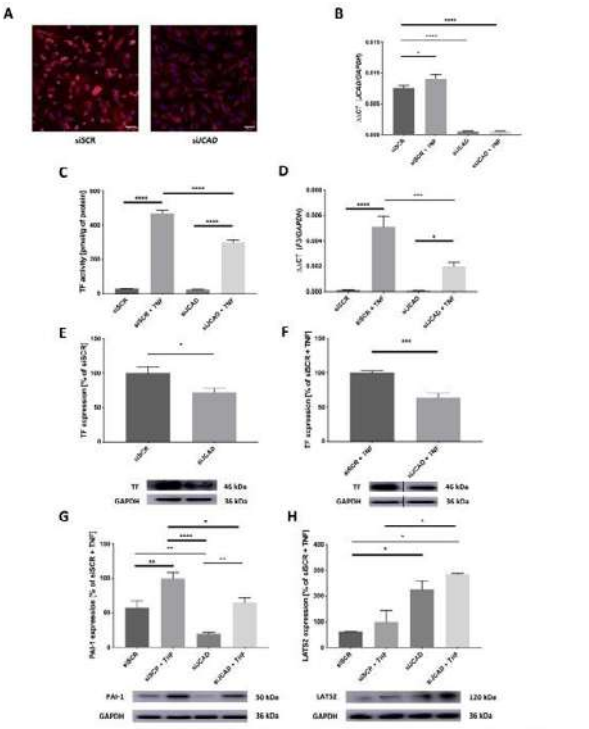

Figure 2. Human aortic endothelial cells (HAECs) treated with *JCAD* silencing RNA (si*JCAD*) display significantly reduced level of JCAD protein (**A**) and mRNA (**B**). (**C**) When stimulated with TNF-α, siSCR-treated HAECS shows higher TF activity as compared to si*JCAD*-treated ones. Such a difference was significant also at both transcriptional (**D**) and protein (**E-F**) levels. (**G**) Similarly, also PAI-1 expression was reduced in JCAD-silenced cells as compared to siSCR ones at basal conditions and after TNF-α stimulation. (**H**) In HAECs, JCAD-silencing induced the expression of LATS2, a positive regulator of YAP phosphorylation.

[Figure 2]

Disclosure: Nothing to disclose

O10

Therapeutic gene silencing of MMP-2 blunts age-dependent carotid stiffness by decreasing elastin degradation and augmenting eNOS activation

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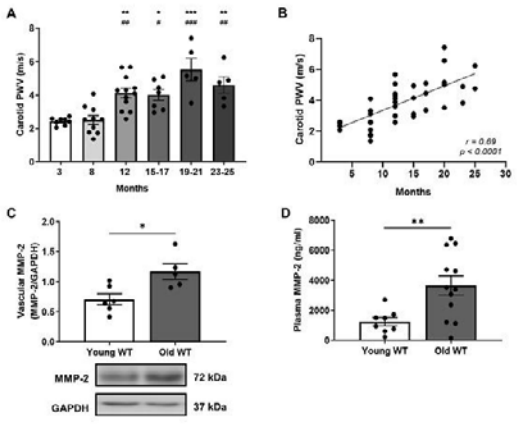
Background and aims: Arterial stiffness, condition characterized by a loss of elasticity of large arterial walls, is a hallmark of vascular aging that precedes and predicts the development of cardiovascular diseases. Age-dependent arterial stiffness is primarily attributed to increased levels of matrix metalloproteinase-2 (MMP-2). Nevertheless, the mechanistic link between age-dependent arterial stiffness and MMP-2 remains unclear. In this study, we investigated the effect and efficacy of therapeutic MMP-2 knockdown using small interfering RNA (siRNA) on age-dependent arterial stiffness.

Methods: Pulse wave velocity (PWV) was assessed in right carotid artery of wild type (WT) mice from different age groups. MMP-2 levels in the carotid artery and plasma of young (3 months) and old (20-25 months) WT mice were determined. Old WT mice (18-21 months) were treated for 4 weeks with either MMP-2 or scrambled siRNA, in which carotid PWV was assessed at baseline, 2 and 4 weeks after start of the treatment. An elastin breakdown product, desmosine (DES), was also measured in plasma of treated mice and in a human cohort (23-85 years old), in whom carotid-femoral PWV was assessed.

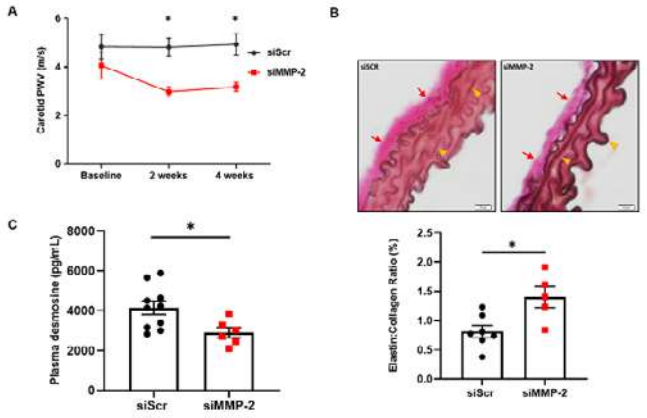
Results: Carotid PWV as well as vascular and circulating MMP-2 were elevated with increasing age in mice. (Figure 1) MMP-2 silencing treatment reduced vascular MMP-2 levels and attenuated age-dependent carotid stiffness. Moreover, siMMP-2 treated mice showed increased elastin to collagen ratio, lower plasma DES and enhanced phosphorylation of endothelial nitric oxide synthase (eNOS). (Figure 2) A direct interaction between MMP-2 and eNOS was observed and augmented with age. Lastly, plasma DES directly correlated with age and arterial stiffness in the human cohort.

Conclusions: Therapeutic MMP-2 silencing attenuates age-dependent carotid stiffness by blunting elastin degradation and augmenting eNOS activation. Thus, given the increasing clinical use of siRNA technology, MMP2 gene silencing should be investigated further as a potential therapeutic approach to mitigate age-dependent arterial stiffness and eventually CV diseases.



Carotid PWV and MMP-2 levels increase with age in WT mice. (A) Carotid PWV was measured in different age groups, 3-(n=8), 8-(n=10), 12-(n=13), 15-17-(n=7), 19-21-(n=5) and 23-25-(n=5) month-old mice to obtain a time course of carotid stiffness development. (B) Correlation between carotid PWV and age in wild type (WT) mice. Results are evaluated by Pearson correlation. (C) Western blot analysis of MMP-2 levels in the carotid arteries of young (3 months) and old (20-25 months) WT mice (n=5-6) (D) MMP-2 levels in the plasma of young (3 months) and old (20-25 months) WT mice (n=8-12). Results are presented as mean ± SEM, **P<0.05* ***P*<0.01 ****P*<0.0001 vs 3 months, # *P<0.05* ## *P*<0.01 ###*P*<0.0001 vs 8 months. MMP-2: matrix metalloproteinase 2; PWV: pulse wave velocity; RCCA: right common carotid artery; WT: wild-type.

[Figure 1]



Carotid PWV and elastin to collagen ratio in siMMP-2 and siScr mice. (A) Carotid PWV in siMMP-2 and siScr mice at baseline, 2 and 4 weeks after the treatment (n=6-10). Results are evaluated by 2-way ANOVA and Sidak's post hoc test (B) Elastin (yellow arrowhead) to collagen (red arrow) ratio in carotid arteries (scale bar is 10μm) (n=5-7) and (C) DES level in plasma of siMMP 2 and siScr mice at 4 weeks after the treatment (n=6-10). Results are evaluated by unpaired t-test and presented as mean ± SEM. **P*<0.05 vs siScr. DES: desmosine; MMP-2: matrix metalloproteinase 2; PWV: pulse wave velocity.

[Figure 2]

Disclosure: Nothing to disclose

O11

Doxorubicin-induced cardiotoxicity enhance SARS-CoV-2 infection susceptibility in human cardiomyocytes

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Introduction: Recent evidences suggested that SARS-CoV-2 virus may directly infect heart cells, eventually driving the insurgence of cardiac complications in COVID19 patients, including ischemic heart disease and atrial fibrillation. Angiotensin-converting enzyme 2 (ACE2), which serves as gateway for coronavirus entry, is expressed in cardiomyocytes (CM). It has been reported that its expression may be upregulated in stress conditions, as in CM during dilated and hypertrophic cardiomyopathy. We aimed to explore the susceptibility of human CM derived from induced pluripotent stem-cells (hiPS-CM) in presence of doxorubicin-induced stress (Dx-CM).

Methods: hiPS-CM were treated with a sub-apoptotic concentration of doxorubicin (200nM). Pseudo-typed lentiviral particles expressing different genotypes of SARS-CoV-2 Spike or mock, encoding a fluorescent reporter mCherry was used to evaluate susceptibility to virus entry in treated and control CM. Real time PCR and flow cytometry were used to evaluate respectively integration and expression of exogenous construct. The proximity ligation assay (PLA) was performed to directly visualize Spike-ACE2 interaction on the surface of CM.

Results: Oxidative and metabolic stress occured in Dx-CM as a result of exposure to doxorubicin, as demonstrated by a significant increase of number of DNA damage-associated γ-H2AX-positive foci, increased ROS levels and significant depolarization of mitochondria membrane potential (ΔΨm). Dx-CM showed a higher expression of the host-cell surface ACE2 as compared to control, thus suggesting an enhanced SARS-CoV-2 tropism. Indeed, PLA assay showed increased efficiency in virions binding onto surface of Dx-CM as compared to control. The integration of viral genome in host cells was increased by 2-folds in Dx-CM versus untreated CM as assessed by PCR. Data were further confirmed by flow cytometry analysis showing the expression of mCherry in infected cells.

Conclusion: Our preliminary results suggest that human stressed cardiomyocytes are more susceptible to SARS-CoV-2 infection then their control counterpart, suggesting a direct mechanism beyond cardiac comorbidities and COVID-19 disease.

Disclosure: Nothing to disclose

O12

Anti-Desmoglein2 Autoantibodies are present in patients with cardiac sarcoidosis and correlate with cardiac inflammation

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Background: Arrhythmogenic right ventricular cardiomyopathy (ARVC) has several phenocopies such as cardiac sarcoidosis (CS), idiopathic outflow tract ventricular tachycardia (OT-VT) and myocarditis. Differentiation between these entities can be challenging. Recently, we have identified diagnostic anti-desmoglein-2 autoantibodies (anti-DSG2 Abs) in patients with ARVC.We sought to examine whether anti-DSG2 Abs are also present in clinical phenocopies of ARVC.

Methods: Anti-DSG2 Abs in sera of 25, 19 and 22 patients with sarcoidosis, OT-VT and myocarditis, respectively, were assessed by western blots and ELISA. Clinical and imaging parameters, as well as conventional biomarkers were correlated to detected anti-DSG2 Ab intensity levels.

Results: Anti-DSG2 Abs, at various intensities, were identified in 6/25 (24%) patients with sarcoidosis, all presenting with CS, but were absent in patients with OT-VT and myocarditis. Cardiac ^{18}F-fluorodeoxyglucose positron emission tomography (^{18}F-FDG PET) was positive in all sarcoidosis patients with positive anti-DSG2 Abs, corresponding to a median PET maximum standardized uptake value (SUV_{max}) of 5.65 [IQR: 5.15 - 10.9]. In sarcoidosis patients without anti-DSG2 Abs, the SUV_{max} values were significantly lower with a median of 0 [IQR: 0 - 4] ($p = 0.011$). The Pearson correlation coefficient (R) was 0.188 ($p = 0.039$) indicating a positive correlation between cardiac ^{18}F-FDG uptake and anti-DSG2 Abs. No significant correlation was detected for any of the other clinical parameters and biomarkers.
Conclusions: In addition to being present in ARVC, anti-DSG2 Abs are also found in CS, a common phenocopy of ARVC; conversely, anti-DSG2 Abs are absent in idiopathic OT-VT and myocarditis. Anti-DSG2 Ab levels positively correlate with myocardial disease activity in CS as indicated by cardiac ^{18}F-FDG PET scanning.

Disclosure: Nothing to disclose

O13

Plasma beta-thromboglobulin is inversely associated with cerebral microbleeds in atrial fibrillation

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Background: Beta-thromboglobulin (BTG) is released from platelet alpha granules upon activation. We hypothesized that higher BTG-concentrations are associated with more ischemic lesions, but with fewer cerebral microbleeds (MB) on brain magnetic resonance imaging (MRI).

Methods: We assessed BTG levels and brain lesions detected by standardized brain MRI of 1,724 patients from the Swiss-AF cohort, a prospective, national, multicentre cohort study. Primary outcomes were presence, number and volumes of cerebral infarcts (large non-cortical and cortical infarcts (LNCCI; lesions involving the cortex and lesions not involving cortex with a diameter >20mm), small non-cortical infarcts (SNCI; diameter < 20mm)), and MBs at baseline. Data on cerebral infarcts were available in all patients, data on MBs were available in 1674 (97.1 %) patients. BTG was determined in Lithium Heparin Plasma using the Luminex Assay. We adjusted our regression analyses for age, sex, BMI, exercise, smoking, alcohol intake, AF type, family history of AF or coronary artery disease, hypertension, diabetes, kidney failure, history of stroke or TIA, heart failure, major bleeding, use of aspirin and type of anticoagulant.

Results: Overall, the mean age of our population at baseline was 72.5 years (SD 8.4), 27.3% were female. We found infarcts in 635 (36.8%) and MBs in 370 (21.5%) patients, respectively. After multivariable adjustment, 1-unit increase in ln(BTG) was associated with 25% lower odds of having MBs (odds ratio (OR) 0.75, 95% CI 0.59 - 0.95). The odds ratio for having SNCI was 1.05, 95% CI 0.82 - 1.34, and it was OR 0.84, 95% CI 0.65 - 1.08 for LNCCI. We also observed a positive relationship between ln(BTG) and LNCCI volumes (estimate 1.13, CI 0.80 - 1.61).

Conclusions: Increased levels of BTG were significantly associated with a lower probability of having microbleeds on brain MRI. Low grade platelet activation may improve vascular integrity at the expense of ischemic events.

Disclosure: Jürg H. Beer reports grants from the Swiss National Foundation of Science, the Swiss Society of Cardiology and the Kardio Foundation. The other authors have received support outside of the submitted work.

O14

Blunted *HEY2* expression in human calcific aortic valve stenosis irrespective of valve phenotype

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Aim: Calcific aortic valve disease (CAVD) is the most common type of valvular heart disease in Western Societies and its prevalence will further increase owing to population ageing. NOTCH1 mutations cause profound developmental defects of the aortic valve, accelerate calcium deposition and hasten the progressive narrowing of the aortic orifice. Herein, we sought to investigate whether genes identified by an Ingenuity Pathway Analysis (IPA) are differentially expressed in human stenotic aortic valves.

Methods: Bicuspid and tricuspid aortic valve leaflets were obtained from patients undergoing either surgical aortic valve replacement (SAVR; experimental group) or organ donation (controls). Upon QIAzol®-based RNA isolation, samples were subjected for RT-qPCR following initial gene selection done by IPA that, involved different pathways relevant to CAVD, including NOTCH1. Relative gene expression was assessed using the comparative CT method.

Results: In diseased tricuspid aortic valves, NOTCH1 expression was significantly attenuated compared to native leaflets. Likewise, the expression of its downstream transcription factor HEY2 was dampened in both, stenotic bicuspid and tricuspid valves, suggesting that HEY2 may be a downstream target that is deregulated in calcified aortic valves irrespective of their phenotype.

Conclusion: Our results show blunted HEY2 expression in both tricuspid and bicuspid aortic valves. The NOTCH1 signalling pathway, specifically its effector HEY2, might represent an interesting and promising target for further investigation in CAVD irrespective of valve phenotype. Unveiling key mechanisms that orchestrate the progressive narrowing and calcification of the aortic orifice might pave the way for therapeutic approaches that go beyond SAVR or trans-aortic valve insertion (TAVI).

Disclosure: Nothing to disclose

Rhythm disorders

O15

Personalized Atrial Fibrillation ablation by tailoring ablation index to the left atrial wall thickness. The "Ablate By-LAW" single center study

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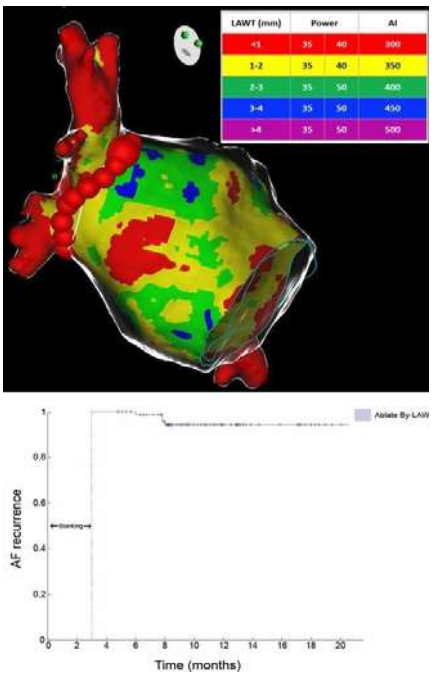
Introduction: Left atrial wall thickness (LAWT) is a determinant of transmural lesion formation during atrial fibrillation (AF) ablation. The utility of ablation index (AI) to dose radiofrequency delivery for the reduction of AF recurrences has already been proven with a target AI ≥ 400 at the posterior wall and ≥550 at the anterior wall. The aim of the study was to determine if adapting AI to atrial wall thickness (AWT) is feasible, effective and safe during AF ablation.

Methods: Consecutive patients referred for a first PAF ablation. LAWT 3D-maps were obtained from multidetector computed tomography (MDCT) and integrated into the CARTO navigation system. LAWT maps were semi-automatically computed from the MDCT as the local distance between the LA endo and epicardium and categorized into 1mm-layers and AI was titrated to the LAWT, as follows: Thickness < 1 mm (red): 300; 1-2 mm (yellow): 350; 2-3 mm (green): 400; 3-4 mm (blue): 450; > 4 mm (purple): 450 (Figure). The ablation line was designed in a personalized fashion to avoid thicker regions. All ablation procedures were performed under general anesthesia with a high frequency low-volume ventilation. Primary endpoints were acute efficacy and safety, and freedom from AF recurrences. Follow-up (FU) was scheduled at 1, 3, 6, and every 6 months thereafter.

Results: 90 patients [60 (67 %) male, age 58±13 years] were included. Mean LAWT was 1.25 ± 0.62 mm. Mean AI was 366 ± 26 on the right pulmonary veins (RPVs) with a first-pass isolation in 84 (93%) patients and 380 ± 42 on the left pulmonary veins (LPVs) with first-pass in 87 (97%). Procedure time was 59 min [49-66]; RF time 14 min [12,5-16]; fluoroscopy time 0.7 min [0.5-1.4]. No major complication occurred. Eighty-six out of 90 (95.5%) patients were free of recurrence after a mean FU of 11±4 months.

Conclusions: Personalized AF ablation, adapting the AI to LAWT allowed decreasing RF delivery, fluoroscopy and procedure time while obtaining a high rate of first-pass isolation. Lesion durability as estimated by freedom from AF recurrences was as high as in more demanding ablation protocols.



[A) LAWT-map with tailored AI protocol B) Kaplan Meier curve for AF recurrence]

Disclosure: Dr. Berruezo is stockholder of ADAS 3D Medical. Dr. Soto-Iglesias is an employee of Biosense Webster. The other authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

O16

Incidence of atrial fibrillation after ablation of cavotricuspid isthmus dependent, common atrial flutter

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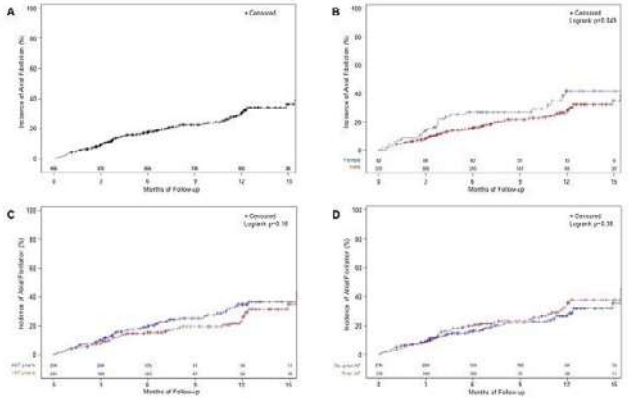
Introduction: Data on the optimal screening for atrial fibrillation (AF) after cavotricuspid-isthmus (CTI) ablation for common atrial flutter (cAFL) are scarce. We aimed to investigate prospectively the effectiveness of a standardized follow-up for AF-detection after cAFL ablation.

Methods: A total of 455 patients after cAFL ablation from 5 centers and at least one completed, standardized follow-up at 3, 6 and 12 months including a 24h Holter-ECG were included. The primary outcome was incident AF or non-CTI dependent atrial flutter. Predictors were investigated by Cox proportional-hazards models corrected for prior AF and additional pulmonary vein isolation.

Results: Mean age was 67 years, 18% were female and prior AF was known in 179 (39%) patients. Over a mean follow-up of 11.4±8.3 months after cAFL ablation, the primary outcome occurred in 107 patients corresponding to 18% at 6 months and 31% at 12 months of follow-up (Fig. A). We found a higher occurrence of the primary outcome in females (p=0.049) (Fig. B), but there was no difference in younger versus older patients (p=0.16) (Fig. C) or between patients with or without a history of AF (p=0.36) (Fig. D). Female sex (Hazard ratio (95% confidence intervals) 1.57 (1.01; 2.45); p=0.047) was the only independent predictor for the primary outcome.

Conclusions: AF or non-CTI dependent atrial flutter was detected in 31% of cAFL patients after cavotricuspid-isthmus ablation using a standardized follow-up over 1 year. There was no difference between patients with and without previously known episodes of AF. Only female sex was associated with AF occurrence.



[Incidence of atrial fibrillation or non-cavotricuspid-isthmus (CTI) dependent atrial flutter]

Disclosure: Nothing to disclose

O17

Impact of a predefined pacemapping protocol for ablation of patients with infrequent premature ventricular complexes at ablation: a prospective, multicenter study

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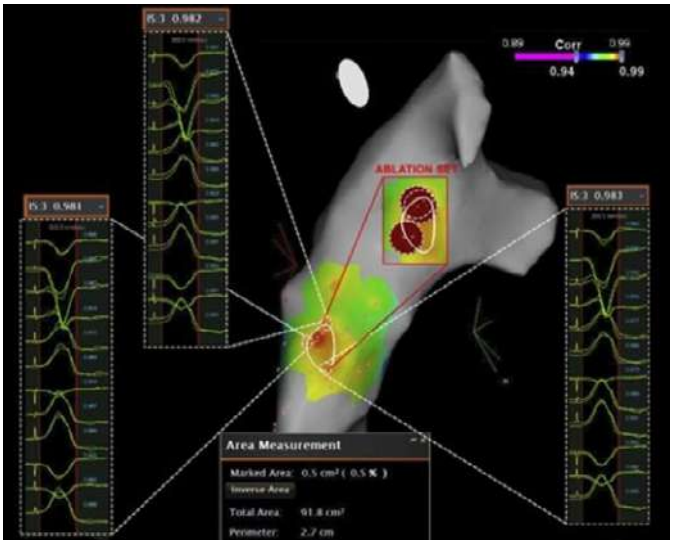
Background: Pacemapping (PM) is useful for aiding Premature Ventricular Complex (PVC) ablation. Its stand-alone clinical value when activation mapping is precluded due to intraprocedural low PCV burden is still to be defined.

Methods: Prospective, non-randomized, multicenter study including patients referred for first PVC ablation. A predefined PM protocol was performed whenever a burden < 1 PVC/min was found after a 15-min waiting period. PM was performed using the PASO module (CARTO3 navigation system). A minimum correlation of 94% was required for classifying an area as the PVC-SOO. After identifying the SOO, a high-density PM map with a fill threshold set to 6 was performed and ablation was delivered to the 'target area', (area delimited by the 3 best matching points above the minimum correlation of 94%). Three RF applications were systematically applied in the target area (40 W for RVOT and aortic root, 50 W for the subvalvular LVOT, 20-30 W in the distal coronary sinus, at operator's discretion in other locations. Clinical success was defined as a PVC-burden reduction of ≥ 80% in the 24-h Holter after 6 months.

Results: 105/185 patients (57%) underwent activation mapping, while 60/185 (32%) had to be PM-guided. 20 patients (11%) were canceled due to absence of PVCs. Baseline QRS, PVC burden and an OT origin were independent predictors of the need to undergo a PM-guided ablation. SOO distribution was: RVOT (44%), LV (23%), and LVOT (16%), with a significantly higher proportion of RVOT-SOO in the PM group (52% vs. 40%, p = 0.03). The mean PM correlation within that area of 95 ± 4%. Mean 10-ms isochronal area in LAT-guided procedures was significantly higher than the PM target area (1.7 ± 2.3 cm^2; p < 0.001). The mean number of acquired PM points was 39 ± 21 (IQR 6 - 98). Mean mapping (29 ± 22 min) and RF (135 ± 124 sec) times were similar both for LAT and PM-guided procedures, with significantly shorter procedure times in the PM group (53 ± 24 vs. 61 ± 26 min; p = 0.04). Clinical success after a 6-month follow-up reached 87% for the PM approach, similar to that of LAT mapping-based ablation procedures (90%; p = 0.58).

Conclusions: When LAT mapping is precluded by a very low PVC burden in patients referred for PVC ablation procedures, a first-line, stepwise PM and ablation protocol directed to a target area with > 94% matching correlation is a feasible alternative, reaching comparable clinical results regardless of the PVC-SOO and the presence of SHD.



[Example of local pacemap with correlation color-coded map]

Disclosure: Dr Teres was funded by the Swiss Heart Rhythm fundation research fellowship grant. Dr. Berruezo is stockholder of ADAS 3D Medical. Dr. Soto-Iglesias is an employee of Biosense Webster. The other authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

O18

Predictors of left atrial fibrosis in patients with atrial fibrillation referred for catheter ablation - data from a prospective study

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Introduction: Left atrial (LA) fibrosis in patients with atrial fibrillation (AF) is associated with an increased risk of AF recurrence after catheter ablation. Therefore, we searched for clinical risk factors that confer an increased risk and may influence treatment strategy.

Methods: We prospectively included 45 AF-patients undergoing electroanatomical voltage mapping-guided catheter ablation. LA low-voltage areas during sinus rhythm were measured with the CARTO3-mapping system and adjusted for LA volumes by computed tomography. Blood tests including NT-proBNP and echocardiographic parameters of left ventricular function were analyzed as well.

Results: Patients were 60.2±10.5 years old and 29% were female. LA fibrosis was present in 67%, with 36% having a fibrotic area of >5% (≥Utah-Stage1). Mean LVEF was 56.5%±10.7. Patients with LA fibrosis had higher serum NT-proBNP levels (612±1173vs.305±598 ng/l, p=0.042) and larger LA volumes (BSA-corrected 75.5±23.9vs.56.7±13.1ml/m^2,p=0.033). Females had higher NT-proBNP levels as compared to males (1161±1724vs.265±405ng/l,p=0.014). In univariable analyses, LA fibrosis was significantly associated with female gender, older age, persistent AF, increased LA volumes, hypertension, stroke, statin therapy, higher NT-proBNP values, LVEF and echocardiographic E/e'. In bivariable analyses, only higher NT-proBNP and a worse LVEF remained as an independent predictor of LA fibrosis.

Conclusions: In this single-center prospective study, higher serum NT-proBNP levels predicted the prevalence of LA fibrosis in patients referred for catheter ablation of AF. No gender-specific effect on LA fibrosis was detected.

Disclosure: Nothing to disclose

O19

Association of pulmonary vein isolation and cardiovascular outcome events in patients with atrial fibrillation: insights from two real-world registries in Switzerland

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Background: Patients with atrial fibrillation (AF) face an increased risk of adverse cardiovascular events. Recent evidence suggests that early rhythm control reduces this risk.

Methods: To investigate the associations between pulmonary vein isolation (PVI) and cardiovascular events in patients with AF, we analyzed data from two prospective cohort studies in Switzerland

(n=3'968). A total of 325 patients who underwent PVI during the first year of their enrollment were analyzed in the PVI group. Based on age categories, sex, AF type, history of diabetes and history of hypertension, 2'193 matched patients with no history of PVI maintained to the non-PVI group. Outcome events were all-cause mortality, hospital admission for acute heart failure, myocardial infarction (MI), a composite of stroke, transient ischemic attack and systemic embolism (Stroke/TIA/SE), and bleedings. We conducted multivariable adjusted Cox proportional-hazards models.

Results: Overall, 2'518 patients were included, median age was 66.0 years [IQR 61.0, 71.0], 25.8% were female. After a median follow-up time of 3.9 years, fewer patients in the PVI group died from any cause (incidence per 100 patient-years 0.64 versus 1.87, HR 0.37, 95%CI 0.19-0.75, p=0.006) or were admitted to hospital for acute heart failure (incidence per 100 patient-years 0.52 versus 1.72, HR 0.43, 95%CI 0.20-0.92, p=0.030). We found no significant association between PVI and Stroke/TIA/SE (HR 0.88, 95%CI 0.48-1.59, p=0.70), MI (HR 0.42, 95%CI 0.10-1.75, p=0.20) or bleeding (HR 0.75, 95% CI 0.51-1.12, p=0.12) (Table, Figure).

Conclusion: In our matched comparison, PVI was associated with a lower incidence rate of all-cause mortality and hospital admission for acute heart failure.

	Group	Number of events	Incidence rate (per 100 py)	Model 1		Model 2	
				Hazard Ratio (95% CI)	p-value	Hazard Ratio (95% CI)	p-value
Primary Outcomes							
All-cause mortality	PVI	10	0.64	0.35 (0.18, 0.70)	0.003	0.37 (0.19, 0.75)	0.006
	Non-PVI	103	1.87				
Hospital admission for acute heart failure	PVI	8	0.52	0.34 (0.16, 0.70)	0.003	0.43 (0.20, 0.92)	0.030
	Non-PVI	140	1.72				
Stroke/TIA and systemic embolism	PVI	14	0.91	0.89 (0.49, 1.60)	0.7	0.88 (0.48, 1.59)	0.7
	Non-PVI	93	1.09				
Myocardial infarction	PVI	3	0.19	0.28 (0.08, 0.95)	0.041	0.42 (0.10, 1.75)	0.2
	Non-PVI	50	0.58				
Secondary Outcome							
Major and clinically relevant non-major bleeding	PVI	32	2.16	0.70 (0.47, 1.04)	0.078	0.75 (0.51, 1.12)	0.2
	Non-PVI	266	3.27				

Matching was based on age categories, sex, AF type, history of diabetes and history of hypertension using Coarsened Exact Matching (CEM). To account for the effect of different strata sizes, weights generated throughout the matching process were applied. Patients with a history of PVI at baseline were not eligible for the control group.

Model 1 was adjusted for age, within each stratum. Model 2 was additionally adjusted for history of coronary artery disease and heart failure.

[Table: Association between PVI and cardiovascular events in a matched population]

Disclosure: Some of the authors have received support outside of submitted work.

O20

Yield of the electrophysiological study in patients with new-onset left bundle branch block after Transcatheter Aortic Valve Replacement: the PR interval matters

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Introduction: The identification of patients at risk of atrioventricular block (AVB) after transcatheter aortic valve replacement (TAVR) remains challenging especially in those with new-onset left bundle branch block (LBBB). Some studies suggest that performing an electrophysiological study (EPS) after TAVR may be useful, but tools to optimize the yield of such strategy are needed.

The purpose of the study is to investigate whether 12-lead ECG changes after TAVR may help identify patients with new-onset LBBB and abnormal EPS findings.

Methods: Consecutive patients with new-onset LBBB post-TAVR who underwent EPS between 2015 and 2020 were included. PR and QRS intervals were measured on 12-lead ECG pre-TAVR and during the EPS. Abnormal EPS was defined as an HV interval >55ms.

Results: Among 61 patients, 28 (45.9%) had an HV interval >55ms. PR and ΔPR interval (PRpost - pre-TAVR) were significantly longer in patients with prolonged HV (PR: 188±38 vs 228±34ms, p< 0.001; ΔPR: 10±30 vs 34±23ms, p=0.001), while no significant difference was found in QRS duration (145±14 vs 148±13ms, p=0.355).

PR and ΔPR intervals both effectively discriminated patients with HV >55ms (AUC=0.804 and 0.769, respectively; p< 0.001). (Fig.1)
A PR >200ms identified patients with abnormal EPS results with a sensitivity (Se) of 89% and a negative predictive value (NPV) of 88%. ΔPR ≥20ms alone provided a somewhat lower sensitivity (64%, NPV 58%), but applying both criteria (ie PR >200ms or ΔPR ≥20ms) identified almost every patients with abnormal HV (Se 96%, NPV 95%) (Fig.2).This would avoid about 1/3 of EPS with a positive PV of 64%.

Conclusions: PR interval assessment may be a useful tool to select patients with new-onset LBBB after TAVR who may benefit most from an EPS. In patients with a PR ≤200ms and a ΔPR < 20ms the likelihood of abnormal EPS is very low independently of the QRS changes.

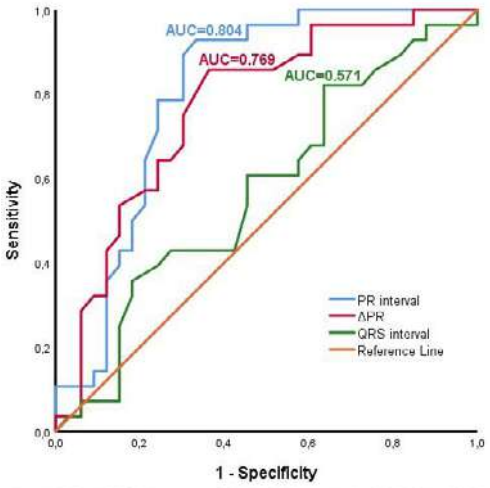

Fig.1: ECG and EPS findings post-TAVR - ROC curves for PR, ΔPR and QRS intervals to discriminate pts with an HV interval >55ms

[Figure 1]

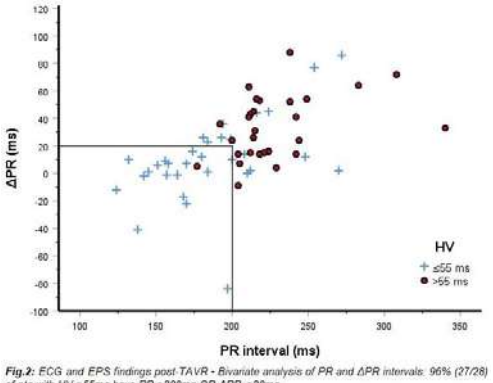

Fig.2: ECG and EPS findings post-TAVR - Bivariate analysis of PR and ΔPR intervals: 96% (27/28) of pts with HV >55ms have PR >200ms OR ΔPR ≥20ms

[Figure 2]

Disclosure: Nothing to disclose

O21

Can CRT-D patients safely be downgraded to CRT-P at the time of generator exchange? Multicentre experience with a follow-up of nearly 4 years after downgrade

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Introduction: In some patients, cardiac resynchronisation therapy (CRT) can lead to so-called "super-response" (LVEF≥50%). At battery depletion, downgrading from CRT-defibrillator to CRT-pacemaker could be an option for patients in primary prevention and no ICD therapies. Long-term data on arrhythmic events in super-responders is scarce and important for decision-making.

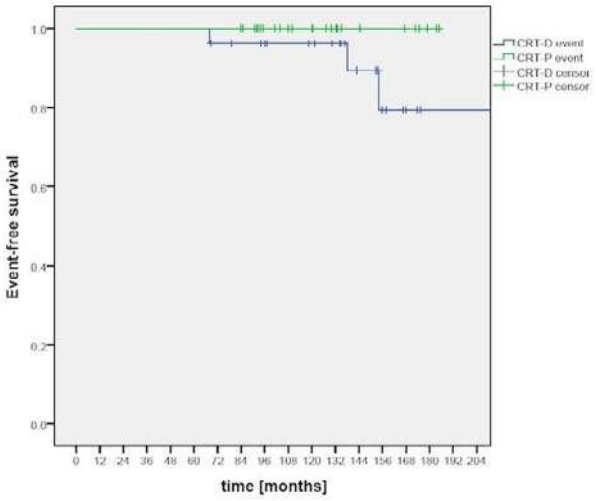
Methods: CRT-D patients from five centres, who experienced super-response at generator exchange (GE) were identified. Vital status, hospitalisation for sustained ventricular tachycardia (VT), relevant arrhythmias and appropriate ICD-therapy after GE were determined and patients divided in two groups (downgraded to CRT-P/ remaining on CRT-D). Assuming elevated arrhythmic risk due to still low LVEF during cardiac remodelling, arrhythmias occurring during first 18 months were not considered as event.

Results: Table 1 shows baseline characteristics.

	Overall (n = 52)	Downgrade (n = 26)	Control (n = 26)	p-value
Male gender (%)	25 (48)	11 (42)	14 (54)	0.58
Age [years]	60 (12)	63 (12)	56 (12)	0.05
EF baseline [%]	24 (6)	25 (5)	25 (5)	0.38
Ischemic Cardiomyopathy (%)	13 (25)	9 (35)	4 (15)	0.2
Hypertension (%)	24 (46)	14 (54)	10 (38)	0.4
Diabetes (%)	12 (23)	9 (35)	3 (12)	0.1
Chronic kidney disease (MDRD < 60ml/min) (%)	22 (42)	13 (50)	9 (35)	0.4
Sinus rhythm (%)	49 (94)	25 (96)	24 (92)	1
QRS width [ms]	165 (19)	159 (21)	171 (14)	0.02

[Table 1: Baseline characteristics]

Fifty-two patients (48% male) were followed for 132±38 months, 25% had coronary artery disease (CAD). Four arrhythmic events (8%) occurred in the 18 months after first implant: VT (CL 390ms@15months); VT (CL300ms@3 months); ventricular fibrillation@6 months; VT@1month. Twenty-six (50%) patients were downgraded after 79±29 months (LVEF 54±4%), twenty-six remained on CRT-D.
No cardiac death/arrhythmic events occurred in CRT-P group during follow-up (overall 125±33 months, after GE 46±25 months). One heart failure death and three arrhythmic events occurred in the CRT-D group (follow-up overall 139±40 months, after first GE 78±42 months): ventricular flutter in CAD with scar@138months; VT@68months, CL 245ms in dilated cardiomyopathy (DCM) with then normal LVEF; VT@154months, CL 290ms in DCM, while LVEF deteriorated (22%). Event-free survival is depicted in figure 1.



[Figure 1: Kaplan-Meier curve displaying the event-free survival of CRT-P and CRT-D patients.]

Conclusion: In 26 patients downgraded to CRT-P with a follow-up of nearly four years no arrhythmic events occurred. However, three events were observed in the CRT-D group (two in patients with normal LVEF). Whether downgrading selected patients from CRT-D to CRT-P should be offered thus remains unclear. Further research in a larger population is needed.

Disclosure: Nothing to disclose

O22

The S-ICD sensing algorithm is challenged by drug-induced electrocardiographic abnormalities in patients with brugada syndrome: results from a prospective multicenter study

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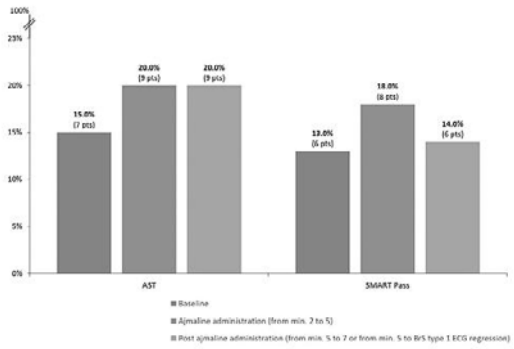
Introduction: Up to 18% of patients with Brugada syndrome (BrS) fails the pre-implant screening for subcutaneous implantable cardioverter-defibrillators (S-ICD). It is still unknown if the S-ICD sensing algorithm (SMART Pass filter, SP) can reduce the screening failure due to cardiac oversensing; ajmaline challenge is emerging as a valuable tool to unmask S-ICD screening failure in BrS patients without spontaneous BrS Type 1 ECG pattern. Therefore, we conducted this study to assess the ability of the SP filter to discriminate QRS and T-waves after ajmaline administration and to reduce the S-ICD screening failure.

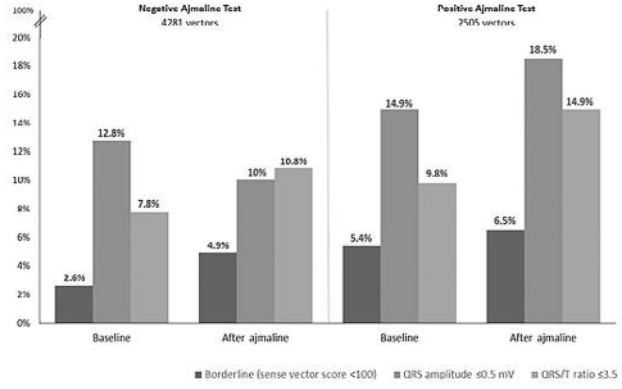
Methods: S-ICD automated screening was performed in patients with suspected BrS, undergoing ajmaline challenge. ECGs of three sensing vectors were collected before, during and after ajmaline administration, in different postures and locations of the electrodes (left and right parasternal). Screen-out rate without the SP was determined by the automated screening tool (AST) and screen-out rate with SP filter was estimated using a simulation model.

Results: Of 126 patients enrolled in the study, 46 (36%, mean age 45.5±12 years, males 79%) tested positive for BrS. In patients with drug induced BrS, 2505 sensing vectors were recorded for the analysis. AST failure rate after ajmaline administration was 20%, and decreased to 18% when SP filter was applied, whereas, vectors' failure rate decreased from 40% to 36%. The most frequent reason for screening failure was low amplitude of QRS and/or low QRS/T-wave ratio. In BrS patients, right parasternal leads position did not significantly reduce vectors' screen-out rate (21% right parasternal vs. 22% left parasternal). At multivariable analyses, there were no differences in screen failure rates over the test phases depending on the use of filter (2-way interaction p=0.521 (vector) and p=0.052 (patient)).

Conclusions: The SP filter does not significantly improve the overall S-ICD screen-out rate in patients with drug induced BrS.



[S-ICD screen-out rate before and after ajmaline administration in patients with BrS (N=46).]



[Causes of vectors screening failure (without SMART Pass Filter)]

Disclosure: The study was an investigator-initiated study supported by a grant by Boston Scientific Corporation (Marlborough, MA, USA). Data collection and ECG recordings were performed by the local investigator. Study management and study supervision was conducted by an independent clinical research organization.

O23

The CHA_2DS_2-VASc-Score to predict mortality and ICD therapy: a useful tool?

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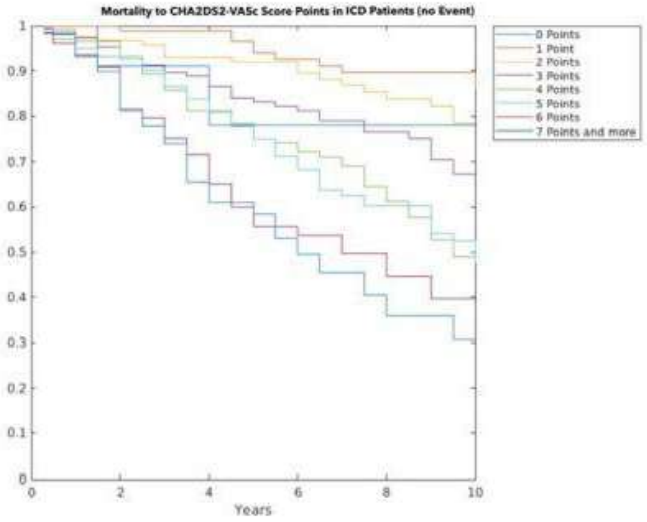
Background: The CHA_2DS_2-VASc-Score (CV-score) has been developed in and used for patients with atrial fibrillation (AF) to predict their risk of thromboembolic events and to guide anticoagulation therapy. As the score encompasses a variety of comorbidities, it might also be used to risk stratify candidates of implantable-cardioverter-defibrillator (ICD) placement.

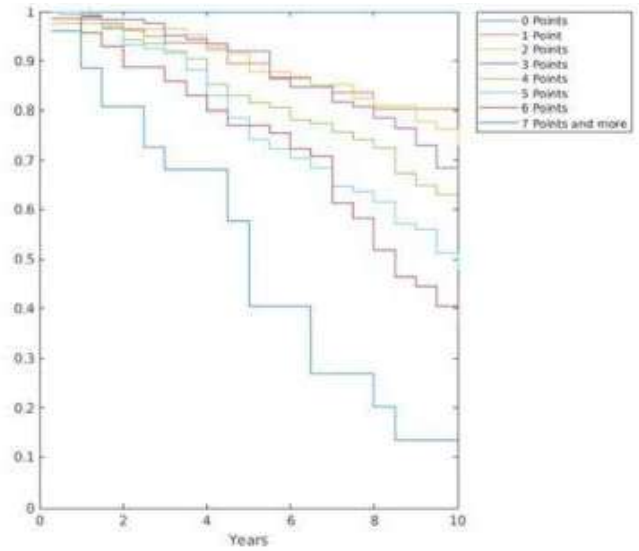
Methods: All patients in whom an ICD was implanted in a large tertiary hospital were included and their CV-score calculated. Patients were divided into 8 categories (taking together the scores >6 due to an otherwise small number of subjects in the groups). Kaplan Meier curves were drawn for all-cause mortality and for appropriate ICD therapy, i.e. ATP or direct shock.

Results: We included 1'624 patients with a follow-up of 83±11 months, 11% of whom were in AF at implant and 62% in a primary prevention indication. Items used for the CV-score were present as follows: stroke 10%, female gender and age >75 years 16%, diabetes 23%, age >65 years 50%, hypertension 59%, vascular disease (mostly coronary artery disease) 64%, heart failure 81%. During follow-up, 605 patients (37%) died and 665 (41%) experienced any form of ICD therapy. Figures 1 and 2 display mortality and ICD therapy in the different CV-score groups.

Conclusion: There is a strong and coherent correlation between the CHA_2DS_2-VASc-Score with overall mortality as well as with arrhythmic events. The score could thus be of value in risk stratification of ICD candidates.



[Figure 1 CV score and mortality]



[Figure 2 CV score and ICD therapies]

Disclosure: Schaer. Speaker bureau Medtronic

Heart failure

O24

Hemodynamic profile of patients with severe aortic stenosis and anemia

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Introduction: Anemia predicts mortality in patients with heart failure (HF) syndromes including HF with reduced and preserved left ventricular ejection fraction (LVEF) and HF in the context of valve disease. While patients with severe anemia but without HF have been shown to be characterized by high cardiac index (CI), reduced systemic vascular resistance (SVR) and somewhat increased filling pressures, the hemodynamic profile of patients with anemia and left ventricular dysfunction is unknown. We describe the detailed hemodynamics of patients with left ventricular dysfunction in the context of chronic pressure overload, i.e. aortic stenosis (AS) and anemia.

Methods: We studied 485 patients (mean age 74±10 years, 208 females) with severe AS [indexed aortic valve area (AVAi) 0.41±0.13 cm^2/m^2, LVEF 58±12%] undergoing cardiac catheterization. Patients with anemia (hemoglobin < 130 g/l in men, < 120 g/l in women) were compared to those without anemia.

Results: Patients with anemia were older, had worse renal function and higher B-type natriuretic peptide, and were more symptomatic and more likely to be treated with diuretics (Table 1). The severity of AS (AVAi: 0.42±0.14 vs. 0.40±0.12 cm^2/m^2; p=0.34) did not differ between patients with and without anemia. In contrast, patients with anemia had lower LVEF, higher mean right atrial pressure, mean pulmonary artery pressure, and mean pulmonary artery wedge pressure, and lower pulmonary artery capacitance (Table 2). While CI was similar in patients with and without anemia, anemic patients had lower mean arterial pressure (MAP) and SVR.

Conclusions: Severe AS patients with anemia have a distinct hemodynamic profile characterized by higher filling pressures and reduced pulmonary capacitance, reduced MAP and SVR but preserved CI. This may be due to volume expansion (true anemia) or hemodilution (pseudoanemia). These findings may have implications for our understanding of the role of anemia not only in AS but also non-AS HF syndromes.

	Anemia (n=117)	No anemia (n=368)	P value
Age (years)	78±7	73±11	<0.001
Sex (female)	54 (46%)	154 (42%)	0.41
eGFR (ml/min/1.73 m2)	62±25	77±29	<0.001
B-type natriuretic peptide (ng/l)	403 (127-834)	163 (62-360)	<0.001
NYHA I	17 (15%)	77 (21%)	0.01
NYHA II	50 (43%)	190 (52%)	
NYHA III	40 (34%)	90 (24%)	
NYHA IV	10 (8%)	11 (3%)	
Diuretic use	71 (61%)	168 (46%)	0.005

[Table 1. Data are given as mean+/-SD or median (IQR).]

	Anemia (n=117)	No anemia (n=368)	P value
Left ventricular ejection fraction (%)	55±13	58±12	0.02
Mean right atrial pressure (mmHg)	8±5	6±4	0.003
mPAP (mmHg)	29±11	24±9	<0.001
mPAWP (mmHg)	18±9	15±7	<0.001
Pulmonary vascular resistance (Wood units)	2.3±1.3	2.1±1.3	0.15
Pulmonary capacitance (ml/mmHg)	3.0±1.2	3.4±1.9	0.03
Mean arterial pressure (mmHg)	96±15	99±14	0.02
Systemic vascular resistance (Wood units)	19.2±5.0	20.7±5.2	0.007
Cardiac index (l/min/m2)	2.5±0.6	2.4±0.6	0.16

[Table 2. Data are given as mean+/-SD.]

Disclosure: Nothing to disclose

O25

Body composition and physical reconditioning after heart transplantation

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Introduction: After heart transplantation (HTx), maximal exercise capacity as measured by peak oxygen consumption (pVO2) in cardiopulmonary exercise testing (CPET) is limited to a 50-70% level of healthy controls. This study explores the role of body composition (BC) on pVO2.

Method: BC was assessed by dual-energy x-ray absorptiometry (n=95) in 48 HTx recipients (n=38 males; mean age 51±12 y) 1-9 years post-HTx. Pairs of appendicular lean mass (ALM) and fat mass (FM) and their correlation with pVO2 were analyzed separately as a function of the years posttransplant (period 1: 1-2 years [n=25]; period 2: 3-4 years [n=23]; period 3: 5-6 years [n=23]; period 4: 7-9 years [n=24]). Correlations applied linear regression analyses.

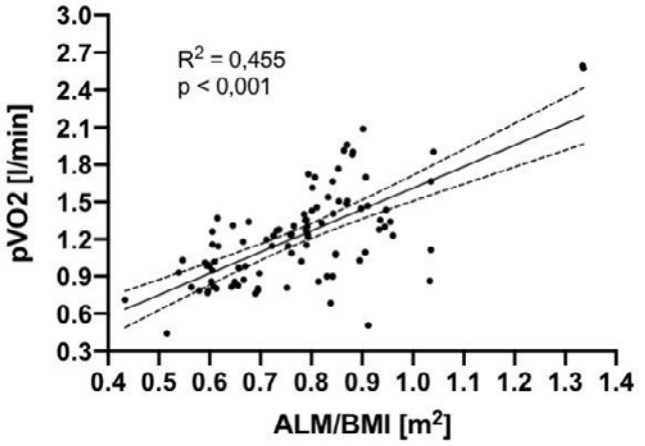
Results: A respiratory exchange ratio (RER) >1.0 was reached in >98% of CPET assessments. From period 1 to 4, absolute pVO2 improved from 0,98 to 1,35 [l/min] (p < 0,01) while pVO2 expressed in percent of predicted value increased only by trend from 54±14% to 63±12% (p=0,08). Peak heart rate (HR) increased by trend from 111(32) to 132(36) beats/min from period 1 to 3 (Table 1). The ventilatory anaerobic threshold (AT = VO_2 [l/min] achieved at AT) improved from 0,57(0,18) to 0,83(0,35) [l/min] (period 1 vs 3; p< 0,01), with median value remaining < 40% of predicted VO2max at each period.

With time interval to HTx, there was an increase of ALM normalized to $height^2$ (ALMI) (period 1 vs 4: 6,03 vs 7,41 kg/m^2; p=0,03) or BMI (ALM/BMI) (period 1 vs 4: 0,69 vs 0,84 m^2; p=0,02). Median FM normalized to $height^2$ (FMI) remained always elevated (>8.8 kg/m^2) (Table 1). FMI correlated strongly with BMI (R=0,9; p< 0,001).
ALM/BMI was the strongest anthropometric predictor of pVO2 [l/min], accounting for 45% of its variance (R^2=0,455; p< 0,001) (Figure 1). In a multiple regression model, AT, ALM, peak HR and FMI (in declining order of impact) were independent predictors of pVO2 [l/min], explaining about 80% of its variance altogether (R^2=0,814; p< 0,001). Only FMI impacted negatively while age and gender had no additional predictive value in the model.

Conclusion: In summary, increase of maximal exercise capacity remains modest after HTx for opposing effects of peripheral skeletal mass which increases pVO2 and adiposity which decreases pVO2.

	Period 1	Period 2	Period 3	Period 4	p
Gender male	14/25 (56%)	18/23 (78,3%)	18/23 (78,3%)	21/24 (87,5%)	ns
Age (y.)	54 (18)	59 (11)	57 (20)	58 (31)	ns
BMI (kg/m^2)	23,9 (7,1)	26,3 (6,9)	26,1 (6,1)	26,9 (7,5)	ns
ALMI (kg/m^2)	6,03 (2,08)	7,01 (2,33)	7,65 (3,34)	7,41 (1,39)	0,03
ALM/ BMI (m^2)	0,69 (0,18)	0,79 (0,20)	0,80 (0,19)	0,84 (0,20)	0,02
FMI (kg/m^2)	9,30 (3,17)	8,82 (4,04)	9,93 (6,56)	10,04 (6,74)	ns
pVO2 (l/min)	0,98 (0,34)	1,18 (0,54)	1,26 (0,63)	1,35 (0,35)	<0,01
Peak HR (/min)	111 (32)	128 (29)	132 (36)	126 (32)	0,06
AT (l/min)	0,57 (0,18)	0,60 (0,33)	0,83 (0,35)	0,79 (0,13)	< 0,01

[Table 1: Main baseline characteristics, BC and CPET findings by period after HTx. Values are presented as count (%) or median (IQR).]



[Figure 1: simple linear regression between pVO2 [l/min] and ALM/BMI [m²].]

Disclosure: Nothing to disclose

O26

Reducing the risk of glowing in the dark; a protocol to reduce patient and personal exposure to ionizing radiation during biopsy

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Introduction: Despite rapid progress in non-invasive techniques such as cMRI, endomyocardial biopsy (EMBx) remains the corner stone of the detection of rejection after cardiac transplantation. Since the first publications in the 1960's, the technique has hardly changed.

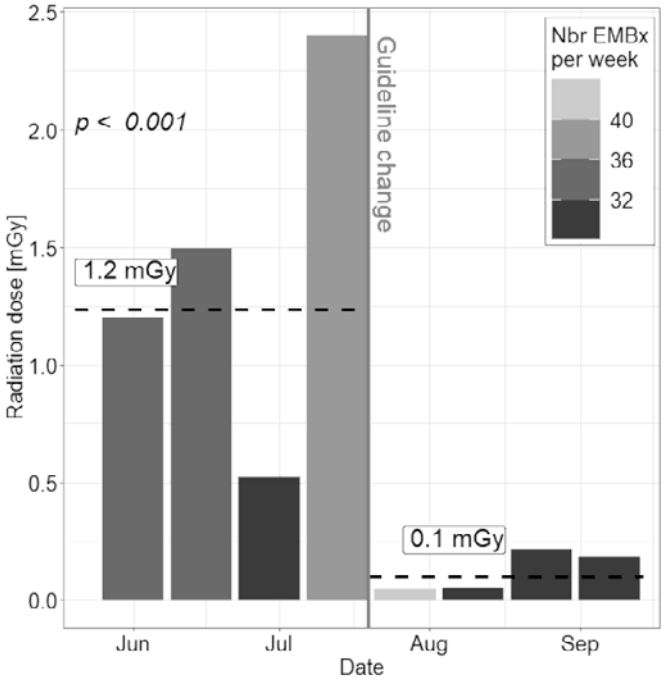
A typical heart transplanted patient will be exposed to 80-120mSv during the first four years after transplantation, 10-20% of this exposition resulting from EMBx. As the risk of malignancy is higher among transplant patients, efforts to reduce the exposition to ionizing energy are mandatory.

Methods: In order to reduce patient and personel exposition to radiation, a set of non-mandatory guidelines were introduced at our institution. This internal protocol is based on ECG guiding to reach the ventricular septum (SVS and VES), followed by a static fluoroscopy image to confirm adequate position. This is combined with a reduced amount of X-ray delivered to the patient by aggressive collimation and reduction of energy (A and KeV) applied to the vacuum chamber.

Two months after the adoption of this technique, we conducted an audit of the practice to observe radiation exposure and complication rates in comparison with the preceding 2 months.

Results: 143 biopsies were observed before, and 154 biopsies after implementation of the guidelines. The median radiation dose decreased from 1.2mGy to 0.1mGy (p< 0.001). This difference was due to a reduction of the duration of radiation (from 18 to 1.4sec. per biopsy, p< 0.001) and a reduction of the dose per second (from 0.06mGy/sec. to 0.04mGy/sec., p< 0.001). The two patient cohorts had comparable BMIs (26kg/m2 (+/-4.9), p=0.84). No complications were observed.

Conclusions: A reduction of radiation exposition to radiation is achievable with minimal changes in the procedure, and without posing additional risks. Adoption of such radiation reduction polices could result in a long-term reduction of neoplasia in transplant patients and treating interventionalists.



[Mean radiation per procedure, before and after the protocol]

Disclosure: Nothing to disclose

O27

Little bit of drug, more drug, or knife? A 10 years retrospective study on driveline infection in ventricular assist devices and their treatment

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Introduction: Infection during VAD support is the third most common cause of mortality, following neurological events and multi system organ failure of various aetiology, inclusive infection. VAD-associated Infection represents the second most common cause of morbidity in the first three months after implantation and the most common cause thereafter.

Knowing the epidemiology, the aetiology as well as the response to treatment is crucial to tailored treatment and reduced resistance.

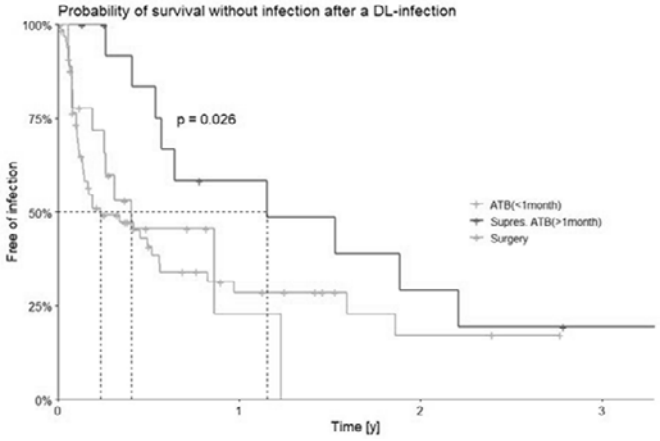
Methods: We retrospectively analyse collected information about infection sustained by patient implanted in our institution with a continuous flow ventricular assist device (cfVAD) between 01.01.2009 and 01.01.2019. Data on type of infection, associated clinic and treatment as well as time of re-infection were collected.

Results: During this period, we implanted 94 patients, 23% female (22), 10% HeartMate 2 (9), 19% HeartMate 3 (18), 67% Heartware (63). 25% were implanted as destination treatment (DT,23). Median age was 54years old (+/-12). 13% of patient (13) suffered from no infection. The 87% other suffered from 508 infections, 60% VAD-related (306), 70% Driveline (DL)-related (216). 35 different germs were documented in swabs. 41% (102) of DL infection were due to S.aureus, 15% (38) to P.aeruginosa. The first DL-infection appearing 162 (+/-230) days after implantation.

DL infection treatment was clearly documented in 198 infect episodes. 67% (134) were treated with short-term antibiotic (< one month), 14% (28) with suppressive long-standing antibiotic therapy and 18% (36) were treated surgically.Time to the first surgical treatment was 169 days (31-958), Time to first suppressive treatment was 262 days (15-673).

The median re-infection delay was 86 day (CI 53-189) for the short-term antibiotic duration, 148 day for surgical intervention and 422 days (CI 209-807) for long term antibiotic.

Conclusion: Treatment indication in our cohort varied, but it appears from our data that suppressive long-term treatment is potentially under used and less prone to failure.



[Probability of survival without infection after a DL-infection]

Disclosure: Nothing to disclose

O28

Differences in ePA-AC© in heart failure patients with or without readmission: a retrospective case-control study

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Introduction: Heart failure is one of the most frequent reasons for hospitalization in elderly people. In heart failure, approximately 22.8% of hospitalised patients are rehospitalised within 30 days. Risk factors for rehospitalisation are multifactorial and a substantial portion is due to non-cardiovascular reasons. The nursing assessment tool ePA-AC could provide information on risk factors for readmission. The aim of this study was to identify possible group differences in the items and scores of the ePA-AC discharge assessment with regard to the endpoint of unplanned readmissions within 30 days after discharge from index-hospitalisation.

Methods: Using a retrospective case-control design with n=406 participants in the period 2013-2019, differences in the ePA-AC variables were investigated by descriptive and comparative statistics. Chi-square test, Wilcoxon test and t-test were performed with two-sided alpha level $\alpha < .05$. Alpha error accumulation was accounted for by Benjamini & Hochberg correction.

Results: Across the entire study population of patients with heart failure (N=5262 hospitalisation cases), n=481 (9.1%) unplanned rehospitalisations were observed within 30 days after discharge. No significant group differences were found in all items and scores of the discharge ePA-AC. There is only weak evidence that the presence of acute respiratory impairment at time of discharge is higher in the patient with rehospitalisation (cases) than in those without rehospitalisation (controls) ($\chi^2=4.283$, df=1, p=.038 before and p>.05 after the correction of alpha error accumulation).

Conclusions: The items and scores of the nursing assessment instrument ePA-AC did not significantly differ between patients with or without 30-days readmission. Further exploration to assess the ePA-AC's potential to predict rehospitalisation in heart failure is needed.

Disclosure: Nothing to disclose

Coronary artery disease & acute cardiac care

O30

CCN family member 1 (CCN1) is an independent early marker of infarct size and left ventricular dysfunction in STEMI patients

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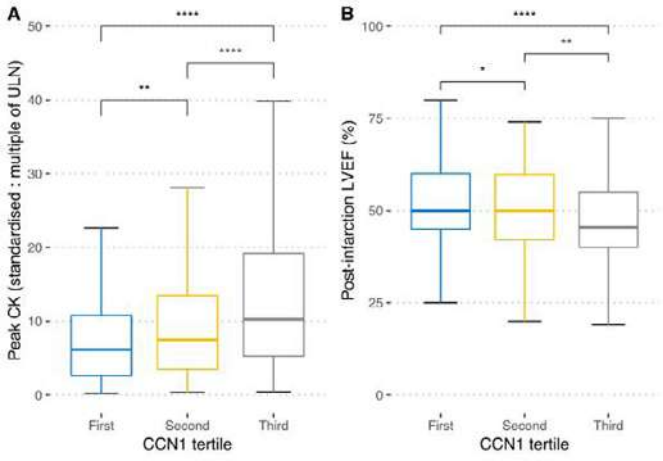
Introduction: CCN family member 1 (CCN1) has recently been proposed as a novel biomarker of myocardial injury, improving risk stratification among acute coronary syndrome patients when added to the GRACE score for the prediction of 30-day and one-year all-cause mortality. Among patients presenting with ST-segment elevation myocardial infarction (STEMI), we evaluated the utility of CCN1 as a predictor of two earlier endpoints: post-infarction left ventricular ejection fraction and final myocardial infarct size. Furthermore, we evaluated the impact of the addition of CCN1 to the discriminatory power of the CADILLAC score in the early risk stratification of STEMI patients immediately following primary percutaneous coronary intervention (PPCI).

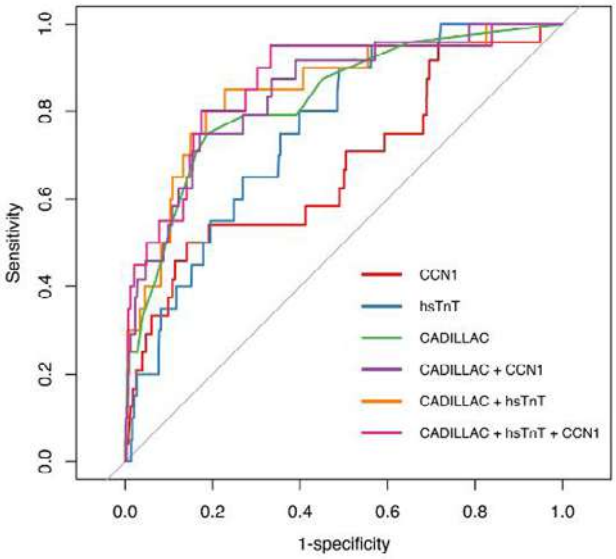
Methods: STEMI patients were obtained from the SPUM-ACS cohort of prospectively recruited patients admitted with acute coronary syndromes to four university hospitals in Switzerland. Serum CCN1 levels were measured from blood drawn from the arterial sheath prior to PPCI. Linear regression models assessed the association between CCN1 and peak creatinine kinase (CK) level, a surrogate marker of final infarct size, as well as post-infarction left ventricular ejection fraction (LVEF). Cox models assessed for an association between CCN1 and 30-day all-cause mortality.

Results: CCN1 was measured in 989 patients prior to PPCI, with a median value of 706.2 ng/l (IQR 434.3-1319.6). A significant correlation between CCN1 concentration and both myocardial infarction size (peak CK) and LVEF was observed in both univariate and multivariate analysis (both p< 0.001) (**Figure 1**). Even among patients with normal classical cardiac marker levels at the time of PPCI, CCN1 correlated significantly with final infarct size. The addition of CCN1 resulted in a significant improvement in the discriminatory performance of the CADILLAC score with regards to 30-day all-cause mortality (C index 0.826 to 0.845, IDI 0.026, p = 0.03) (**Figure 2**).

Conclusions: Compared with classical cardiac biomarkers, CCN1 is potentially the earliest predictor of final myocardial infarct size and post-infarction LVEF. Addition of CCN1 to the CADILLAC score significantly improved its discriminatory capacity. These findings support the use CCN1 in the very early risk stratification and management of STEMI patients immediately after PPCI.



[Figure 1. Correlation between CCN1 prior to PPCI and (A) peak CK ; (B) post-infarction LVEF.]



Model	C index	p value	IDI	p value
CCN1	0.674	<0.001		
hsTnT	0.757	<0.001		
CADILLAC	0.824	<0.001	Reference	
CADILLAC + CCN1	0.843	<0.001	0.026	0.030
CADILLAC + hsTnT	0.844	<0.001	0.021	0.040
CADILLAC + hsTnT + CCN1	0.862	<0.001	0.055	<0.001[§]

[Figure 2. Incremental discriminatory and reclassification capacities of CADILLAC score plus CCN1 and hsTnT.]

Disclosure: Nothing to disclose

O31

Long-term follow-up of a predominantly medically treated cohort with spontaneous coronary artery dissection: a Swiss single center study

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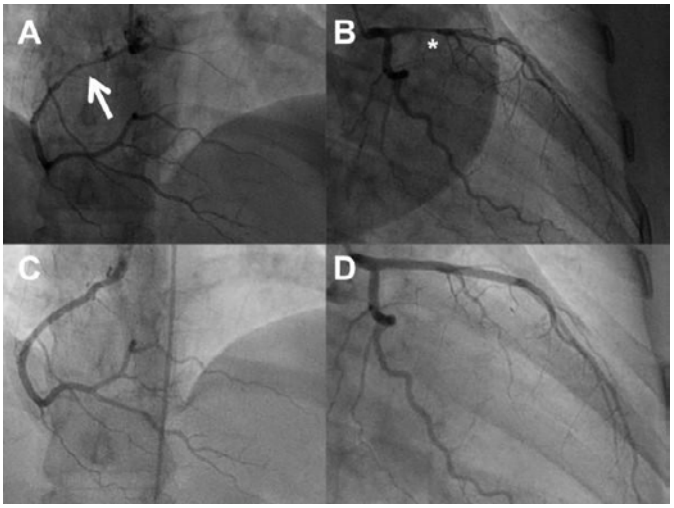
Introduction: Spontaneous coronary artery dissection (SCAD) is an increasingly diagnosed entity. However, there is still a limited number of published series, and information regarding long-term follow-up is sparse. We report on the hitherto largest Swiss single center cohort with a follow-up of up to 22 years.

Methods: SCAD cases were prospectively collected from June 1998 until December 2020. A strategy of systematic follow-up angiography was implemented. Information on long-term follow-up was collected from patients and treating physicians by the end of 2020.

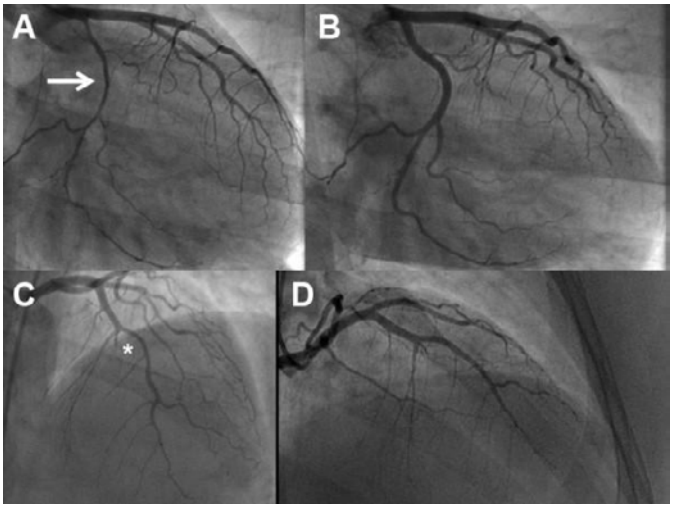
Results: We identified 105 SCAD patients (mean age 54±11 years, 98 females, 4 peripartum). Presentation was acute coronary syndrome in all. In 98 patients, one single vessel was dissected, and seven patients had multivessel SCAD. Treatment was conservative in most patients (n=96); eight patients were treated with stenting/balloon dilation, and one patient underwent bypass surgery. Follow-up angiograms were performed in 76 patients after a median

(interquartile) follow-up of 6.1 (5.5-6.6) months showing healing of the dissection (Figure 1) or a good result after percutaneous intervention respectively in 71 patients. After a median follow-up of 7.2 (3.2-12.3) years (longest follow-up: 22.5 years) there were 11 major cardiovascular events: SCAD of the same vessel (n=1), SCAD of a different vessel (n=7) (Figure 2), death due to cardiogenic and hemorrhagic shock in catastrophic peripartum left main SCAD (n=1), out of hospital cardiac arrest due to ventricular fibrillation with successful resuscitation 16 days after SCAD (n=1), and death with unclear cause (n=2).

Conclusions: This cohort representing one of the largest European SCAD series highlights the very variable clinical course during the acute phase and in the long term. Although most SCAD patients can be treated conservatively with subsequent healing of the dissection and good clinical outcome, there are few patients with dramatic acute presentation or events several years after the initial presentation.



[1. 41 y ♀ with RCA SCAD (A) 14days postpartum&LAD SCAD 8 d later (B). 6-months angiogram(C,D)]



[2. 40 y ♀ w. LCX SCAD (A,->), after 6mon (B), LAD SCAD (C, *) 7.8 y later, and 6mon angio(D)]

Disclosure: Nothing to disclose

O32

Colchicine in patients with coronary artery disease: a systematic review and meta-analysis of randomized trials

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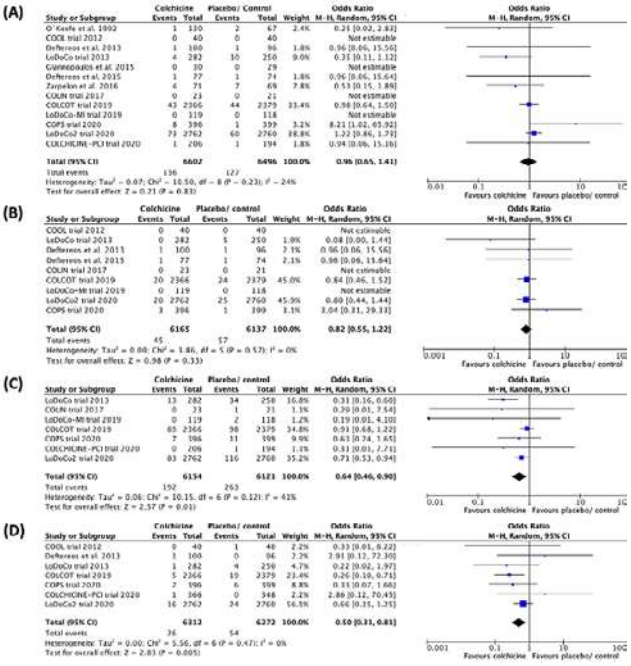
Introduction: Inflammation plays a pivotal role in coronary artery disease (CAD). The anti-inflammatory drug colchicine seems to reduce ischemic events in CAD patients. So far there is equipoise about its safety and impact on mortality. To evaluate the utility of colchicine in acute and chronic CAD patients, we performed a systematic review and meta-analysis.

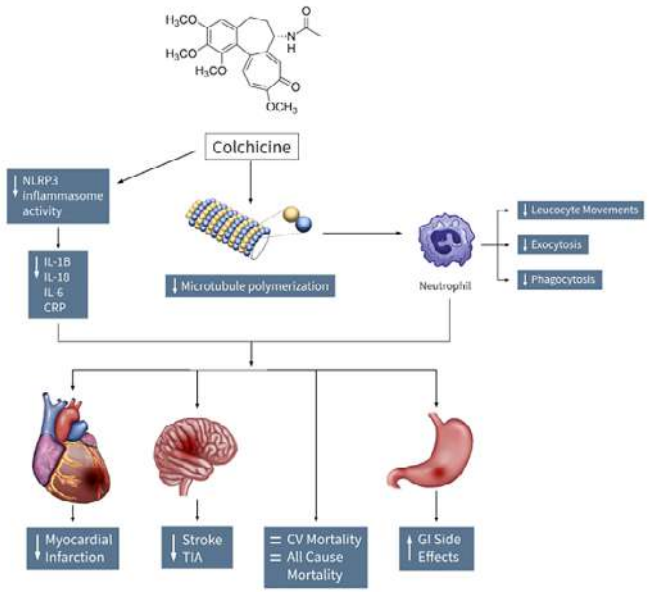
Methods: MEDLINE, EMBASE, Cochrane CENTRAL and conference abstracts were searched from January 1975 to October 2020. Randomized trials assessing colchicine compared to placebo/standard therapy in CAD patients were included. Data were combined using random-effects models. The reliability of the available data was tested using trial sequential analyses (TSA).

Results: Of 3108 citations, 13 randomized trials (n=13125) were included. Colchicine versus placebo/standard therapy in CAD patients reduced risk of myocardial infarction (MI) (OR 0.64, 95%CI 0.46-0.90, p=0.01; I^2 41%, shown in figure C) and stroke/TIA (OR 0.50, 95%CI 0.31-0.81; p=0.005; I^2 0%, shown in figure D). But treatment with colchicine compared to placebo/standard therapy had no influence on all-cause and cardiovascular mortality (OR 0.96, 95%CI 0.65-1.41, p=0.83; I^2 24%; and OR 0.82, 95%CI 0.55-1.22, p=0.45; I^2 0%, shown in figure A and B respectively). Colchicine significantly increased the risk for gastrointestinal (GI) side effects (p=0.0002). According to TSA, there is only sufficient evidence for a MI risk reduction with colchicine. Main results were summarized in the central illustration figure.

Conclusion: Among CAD patients, colchicine reduces the risk of ischemic events, namely MI and stroke, at the cost of a higher rate of GI upset. Moreover, colchicine seems not to influence mortality.



[Figure A-D]



[Central illustration figure]

Disclosure: No extramural funding was used to support this work. M.B. received consulting and speaker fees from Astra Zeneca, Amgen, Bayer and Mundipharma, as well as travel grants from Pfizer and Vifor SA. R Kobza has received institutional grant support from Abbott, Biotronik, Biosense Webster, Boston, Medtronic and SIS Medical. None of the other authors have any rel-evant conflicts to declare.

O33

Microvascular obstruction detection and treatment after primary PCI: preliminary results of the MOCA I study

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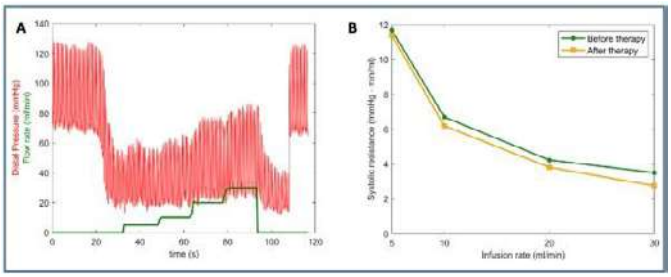
Background: Microvascular obstruction (MVO) complicates up to 50% of STEMIs and is related to a higher incidence of MACE at long-term follow-up. A diagnosis of MVO is not performed in the Cathlab but rather a few days later at CMR examinations, which precludes any possible dedicated treatment. MOCA I study is a first-in-human trial assessing the feasibility and safety of intra-procedural MVO assessment with CoFI catheter. The device selectively occludes the culprit vessel after PCI and, while measuring distal pressure, infuses saline downstream at different flow rates, allowing the calculation of dynamic microvascular resistance (MVR) by pressure response to controlled flow. The catheter can also be used to selectively administer therapeutic agents.

The ongoing trial aims at verifying the correlation between MVR and MVO at CMR and at exploring the possible therapeutic value of selective intracoronary infusion of Tirofiban.

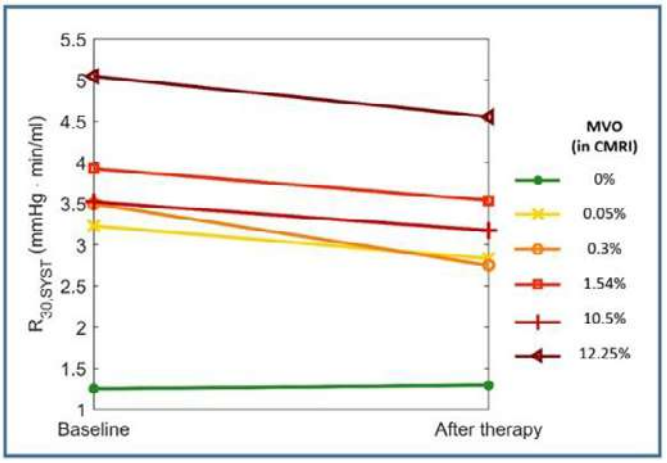
Methods: Twenty patients have been enrolled so far in phase II cohort, in whom an intraprocedural diagnostic sequence was performed. Six patients were enrolled in phase III and underwent both diagnostic and therapeutic sequences, assessing dynamic MVR before and after tirofiban infusion. Every enrolled patient underwent CMR 5±2 days after primary PCI to define the presence of MVO.

Results: Currently available data show that invasively-measured microvascular resistances may predict the presence of MVO at CMR (sensitivity 90%; specificity 88%; AUC 0.90, p< 0.0001). For phase III patients, a trend towards resistance reduction is being noticed (average reduction 10%, peak reduction 20%), but sample size is still too small to be conclusive.

Conclusions: Preliminary results of MOCA I study show that CoFI procedure is feasible, safe and can detect MVO after pPCI. Further data are required to assess whether or not selective tirofiban infusion can help to improve MVO. Dedicated studies are granted to clarify the eventual prognostic implications of such improvements.



[A. Pressure curves during intracoronary infusion. B. Pressure response to saline infusion before and]



[Pre-post variation of dynamic microvascular resistance in Phase III patients (n=6).]

Disclosure: Consulting fees (Prof. M. Valgimigli)

O34

Differential effects of newer-generation ultrathin-strut versus thicker-strut drug-eluting stents in chronic or acute coronary syndromes: a meta-analysis of randomized controlled trials

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Introduction: Newest-generation ultrathin-strut drug-eluting stents (DES) reduce target lesion failure (TLF) compared to thicker-strut second-generation DES in patients undergoing percutaneous coronary intervention (PCI). The differential effects of ultrathin- and thicker-strut DES in patients with chronic (CCS) or acute (ACS) coronary syndromes remain uncertain.

Methods: PubMed, Embase and Cochrane Central Register of Controlled Trials were searched for randomized controlled trials (RCTs) comparing newer-generation ultrathin- (strut thickness, < 70µm) versus thicker-strut (strut thickness, ≥70µm) DES. Patients were divided based on clinical presentation (CCS vs. ACS). The primary endpoint was target lesion failure (TLF), a composite of cardiac death, target-vessel myocardial infarction (MI), or clinically-indicated target lesion revascularization (TLR).

Results: A total of 22,766 patients from 16 RCTs were included. At a mean follow-up of 12.2 months, the risk of TLF was significantly lower among patients treated with ultrathin-strut compared to thicker-strut DES [risk ratio (RR), 0.85; 95% confidence interval (CI), 0.75-0.95; p=0.006], a difference driven by a lower risk of clinically-indicated TLR (RR, 0.75; 95%CI, 0.63-0.89; p< 0.001). There was no significant treatment interaction among patients presenting with ACS or CCS (RR, 0.97; 95%CI, 0.73-1.31, p=0.854), but the TLF risk was lower among ACS patients treated with ultrathin-strut compared to thicker-strut DES (RR, 0.85; 95%CI, 0.71-1.01; p=0.064).

Conclusions: Ultrathin-strut DES significantly reduce the risk of TLF compared to thicker-strut second-generation DES in patients undergoing PCI. The treatment effect was consistent among patients with ACS or CCS, but we found a signal suggesting a lower TLF risk in ACS patients treated with ultrathin-strut compared to thicker-strut DES.

Disclosure: Nothing to disclose

O35

Thrombectomy with NeVa™ stent retriever in acute coronary syndromes with large thrombus burden: early clinical experience from a multicenter observational study

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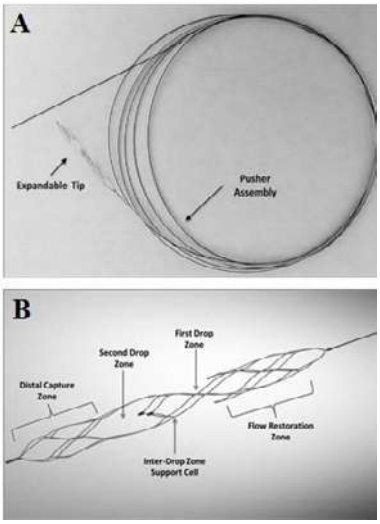
Introduction: Large thrombus burden (LTB) obstructing a coronary vessel is frequently found in patients with acute coronary syndrome (ACS) and is associated with a worse prognosis. To date, thrombectomy techniques or embolic protection devices did not show an improvement of clinical outcomes. We present the first report on the use of NeVa™ stent retriever in ACS patients with a LTB.

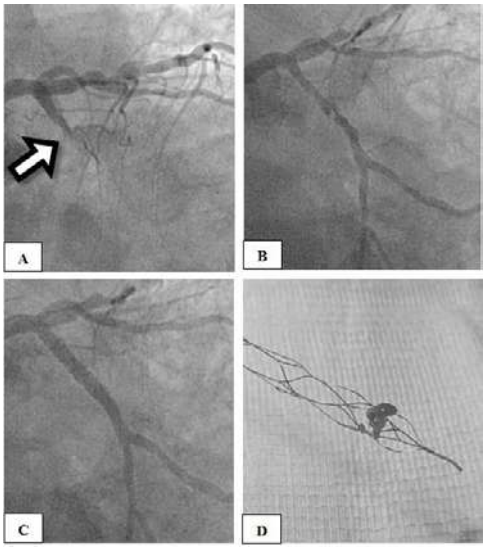
Method: We included patients with ACS and LTB at coronary angiography (TIMI thrombus grade TTG] ≥3) treated with mechanical thrombectomy with NeVa™ Stent retriever for "compassionate use" in addition to conventional percutaneous intervention (PCI) techniques. Any procedural and major cardiovascular complication occurring up to 30 days after the index PCI was assessed. Additionally, TIMI flow, TTG and ST-resolution (for patients with ST-elevation) were measured at different time points.

Results: Between 2019 and 2020, 51 patients were included. Thirty-one (60.8%) had TTG 5, 14 (27.4%) TTG 4, 8 (11.8%) TTG 3 at baseline. After NeVa stent use, we observed a reversible non-flow limiting coronary spasm in 11 (21.6%) patients and a successfully treated distal embolization in 1 patient. No other procedural complications or cardiovascular events related to NeVa stent were observed. After NeVa stent use, TIMI flow 3 increased from 17.6% to 78.4% (p< 0.001) and prevalence of TTG ≥3 decreased from 100% to 45% (p< 0.001). An external validation of these parameters through an independent Corelab is ongoing. Among 38 STEMI patients, ST elevation decreased from 3.3±1.3 mm at baseline to 1.4±1.5 mm after PCI (p< 0.001) and to 0.6±1.0 mm at discharge (p< 0.001).

Conclusion: In this case series of 51 ACS patients with LTB, NeVa stent retriever was not related to relevant procedural or 30 days adverse clinical outcomes and provided a significant improvement of TIMI flow, TTG and ST-elevation. Larger studies with a comparative group are needed to confirm these results.



[NeVa stent retriever. A: expandable tip and a pusher assembly. B: details of expandable tip]



[Angiography at baseline (A) after NeVa stent use (B) at end of PCI (C). Thrombus in NeVa stent (D)]

Disclosure: Dr. Valgimigli reports personal fees from Astra Zeneca, Alvimedica/CID, Abbott Vascular, Daiichi Sankyo, Opsens, Bayer, CoreFLOW, IDORSIA PHARMACEUTICALS LTD, Universität Basel - Dept. Klinische Forschung, Vifor, Bristol Myers Squib SA, iVascular, Medscape; grants and personal fees from Terumo; consulting fees from Vesalio outside the submitted work. The other authors have nothing to disclose.

O36

Soluble LOX-1 in acute coronary syndromes: a novel marker of increased risk for cardiovascular death beyond traditional and emerging risk factors

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Introduction: While inflammatory states and dyslipidemia confer a dismal prognosis following acute coronary syndromes, the role of the lectin-like oxidized low-density lipoprotein receptor-1 (LOX-1) which sits at the interface of these conditions remains elusive. Given the pivotal role of soluble LOX-1 (sLOX-1) in inflammatory processes underlying atherosclerotic plaque destabilization, we sought to investigate its prognostic utility and interplay with hs-CRP on the risk of adverse cardiovascular events in acute coronary syndromes (ACS).

Methods: 2'678 ACS patients were recruited in the prospective, multicentre SPUM-ACS trial. By employing high-sensitive enzyme-linked immunosorbent assay, sLOX-1 was assessed in the plasma of ACS patients at the time of admission and 150 sex- and age-matched healthy volunteers. ACS patients were followed at 1 and 12 months. Kaplan-Meier survival analysis and Cox proportional hazard regression models were used to assess the prognostic utility of sLOX-1 alone and in combination with hs-CRP.

Results: At the time of admission, ACS patients, especially those with ST-segment elevation ACS, had significantly elevated sLOX-1 levels as compared to controls. Patients in the upper sLOX-1 tertile (T3) were at heightened risk for CV death at 1 [T3, adjusted HR 4.04, 95% CI 1.52-10.79; P< 0.05] and 12 months [T3, adjusted HR 2.43, 95% CI 1.24-4.80; P< 0.05] independent of CV risk factors, including LDL-C and hs-CRP.

Conclusions: Plasma sLOX-1 alone and in combination with hs-CRP predicts poor CV survival in ACS independent of traditional and emerging risk factors and therefore represents a novel biomarker that may form the basis for the development of personalized risk stratification algorithms to predict fatal CV events following ACS.

Disclosure: Nothing to disclose

Congenital and Pediatric Cardiology

O37

Using dual-energy computed tomographic imaging in children with sickle cell disease at risk for pulmonary hypertension to detect early signs of pulmonary vascular disease: a prospective observational pilot study

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Introduction: Patients with homozygous sickle cell disease (SCD) are at high risk of developing pulmonary hypertension (PH), a severe independent risk factor for mortality. Nonspecific and late-appearing PH symptoms often result in late diagnosis revealing major irreversible pulmonary lesions. Existing screening tools, including echocardiography, are insufficient to detect early signs of the PH process. Dual-energy computed tomography (DECT) of the chest, allowing vascular, parenchymal and functional perfusion analyses, is routinely used in chronic thromboembolic PH, which shares similarities with SCD. Our study aims to detect early pulmonary vasculopathy using DECT in SCD children.

Method: This is a prospective observational pilot study, including homozygous SCD children (8 to 18 years old) followed in the Pediatric Hemato-Oncology Unit in Geneva, from June to December 2020. Study procedures include hemolytic anemia and cardiac biomarkers, echocardiography and DECT. Patients were free from any pulmonary injury (acute chest syndrome (ACS), pneumonia) for at least one month prior to procedures.

Results: 8 patients were enrolled (5 girls). Median age was 11.4 (IQR 9.3-11.9). Median hemoglobin rate was 76 G/L (IQR 73-79.2). 6/8 patients were treated by hydroxycarbamide. Three patients had one ACS event. One of them had 3 episodes of pneumonia. All patients had normal troponin and N-terminal-pro type B natriuretic peptide levels, and low pulmonary pressure estimated by echocardiography. 4/8 patients had DECT pathologic patterns: 2 with nodular ground-glass opacities (GGO) associated with patchy patterns of abnormal perfusion, 1 presented GGO and sequelae of infarction, 1 mosaic attenuation patterns of parenchymal abnormality.

Conclusion: Using DECT in homozygous SCD children, this pilot study demonstrated for the first time pulmonary lesions compatible with early signs of pulmonary vascular disease. These results support future larger trials for confirmation, possibly extending investigation to symptomatic SCD-related PH adult patients, to improve management and outcome of SCD patients.

Disclosure: Nothing to disclose

O38

Adults after arterial switch operation for transposition of the great arteries: the role of complex anatomy

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Introduction: Adults after the arterial switch operation (ASO) for transposition of the great arteries (TGA) is an evolving novel cohort in adult cardiology clinics. The aim of this study is a better understanding of residual lesions in adulthood and complications during follow-up.

Methods: Adults after the ASO enrolled in the Swiss Adult Congenital Heart disease Registry (SACHER) were included. We analyzed demographic characteristics, cardiac function, cardiac anatomy, surgical and medical history, cardiac imaging, cardiovascular fitness, laboratory parameters and cardiac related interventions during follow-up. Baseline characteristics and outcomes were stratified between complex (with ventricular septal defect) and simple (with intact intraventricular septum) TGA.

Results: In total, 149 patients (99 simple TGA and 50 complex TGA; mean age 24 years; 71% male) were included in the analysis. At baseline, patients with complex TGA have had more interventions related to the left ventricular outflow tract (LVOT) (16% vs 3%, p=0.01)) and cardiac devices (10% vs 2%, p=0.03). Functional cardiac status was similar between groups with the exceptions of a longer QRS duration in the complex group (106 [94-140] vs 96 [90-105] ms, p=0.001). Median follow-up was 27 (15-46) months. During follow-up, patients with complex TGA had more cardiac interventions compared to patients with simple TGA (7 (12%) vs 4 (4%), p=0.03). One patient with complex TGA died. During follow-up, a progression in QRS duration was observed in both groups (Δmedian [ms] of 4, p=0.001 and 2, p=0.007 for simple and complex, respectively) whereas the other parameters of cardiac function remained unchanged.

Conclusion: Patients with complex TGA and prior ASO have more cardiac re-interventions in early adulthood compared to those with simple TGA. The role of QRS duration and the presence of concomitant LVOT obstructions needs to be further investigated in larger cohorts with longer follow-up.

Disclosure: Nothing to disclose

O39

Rheumatic Heart Disease: a school-based experience in Guinea Bissau

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Introduction: Rheumatic heart disease (RHD) remains a major cardiovascular issue in developing countries.

Currently, large population-based data regarding RHD in Guinea Bissau are lacking and most of the patients are diagnosed with advanced stages. Our school-based echocardiography screening aimed at determining the prevalence of RHD and its socioeconomic distribution in Guinea Bissau.

Methods: Children (5-15 years old) from the Bissau region were enrolled from March 2017 to April 2020 in selected primary and secondary schools. Every child underwent echocardiography and group A streptococcus swab test. Presence of RHD was defined according to the World Heart Federation criteria for individuals ≤20 years.

Results: A total of 6784 children were screened: 585 (8.6%) participants had a positive swab test and received single dose of benzathine-penicillin-G, with the majority, 417(71.3%) living in rural areas.

A total of 6784 out-clinic echocardiography exams were performed; 1121(16,5%) were positive for RHD (possible or definite), of which 606(54.1%) were from rural areas.

Every child with RHD (definite or probable) was invited for an outpatient visit in a clinic in Bissau, 863(77%) attended the visit and echocardiography was repeated. RHD was confirmed in 659 cases (58.8%).

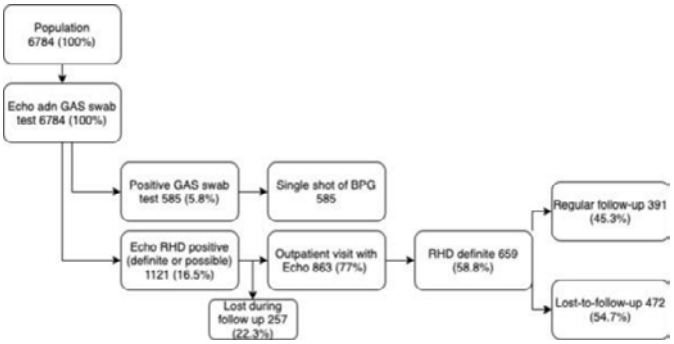
Every child with confirmed RHD started secondary prophylaxis with BPG (or oral erythromycin in case of known penicillin allergy) every 21-28 days. At a median follow-up of 3 years only 391(59.4%) continued regular administration.

Estimating a population of 798370 subjects aged 5-15 years, we calculated a national prevalence of silent RHD of 77522 subjects, almost 1 every 10 children.

Conclusions: A school-based echocardiographic screening has an important role in the detection of subclinical RHD. In our population the prevalence of RHD is 9.7 % with a significant difference between rural and urban areas, which is an additional challenge for health care providers. Additionally, regular administration of secondary prophylaxis is jeopardised by high attrition rate and lost-to-follow-ups.

Characteristic	Total	Rural	Urban	P-Value
Mean age (years)	10.4	10.5	10.2	.0001
Female sex, n (%)	3673 (54.1%)	1814 (26.7%)	1859 (27.4%)	.04
RHD, n (%)	1121 (16.5%)	606 (8.9%)	515 (7.6%)	.009
Positive GAS, n (%)	585 (8.6%)	417 (6.1%)	168 (2.5%)	.00001

[Table.1 Results: GAS, group A streptococcus; RHD, rheumatic heart disease]



[Graph 1. .GAS, Group A Streptococcus; BPG, benzathine penicillin G; RHD, rheumatic heart disease]

Disclosure: Nothing to disclose

O40

Type A aortic dissection at the end of 2nd spontaneous pregnancy - genetic evaluation reveals mosaic Turner syndrome

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Introduction: Aortic dissection (AD) during pregnancy is extremely rare, although pregnancy increases the risk of AD or rupture. Most common causes include connective tissue disorders such as Marfan syndrome, however, rarely AD during pregnancy was found due to Turner syndrome (TS).

Case report: A 27 year-old woman was diagnosed with bicuspid aortic valve (BAV), there was a negative family history for aortic disease. Age 30 y she had uneventful pregnancy of a healthy girl. Three months later, she had her last cardiac evaluation prior to the 2nd pregnancy and was found to have an aortic root size of 3.3cm, BAV with mild aortic regurgitation, mean aortic gradient 13mmHg. Age 32 y she had her second spontaneous pregnancy. In the 34th week of pregnancy she experienced sudden severe chest pain with dyspnea and dizziness. By echocardiography and computed tomography type A AD was diagnosed with severe aortic regurgitation (see Figures 1 and 2), the size of ascending aorta was 4.0cm. She underwent urgent C-section with delivery of a healthy boy and the,n on the same day, heart surgery with a mechanical composite graft. Postoperative course was uneventful apart from a residual small floating membrane in the proximal aortic arch. Physical exam showed a small body size (148cm), myopia, stretch marks and umbilical hernia. Additionally, arterial hypertension was diagnosed. Genetic evaluation was performed with the search of a genetic cause of AD. The panel including 32 aortopathy genes was normal. However, karyotype testing, which revealed Turner-Mosaic (45, X/36,XX (36% monosomy X). One year follow-up has been uneventful apart from posttraumatic stress disorder. Blood pressure is controlled with losartan.

Conclusion: Aortic dissection during pregnancy has to be evaluated by genetic analysis if the underlying disorder (eg Marfan syndrome) is not known. AD can rarely be due to Turner syndrome where it is known to occur at smaller aortic size than in other disorders, even more so in untreated arterial hypertension. BAV and hypertension as seen in this patient are the most frequent cardiovascular anomalies in Turner syndrome patients. Turner mosaic females can get pregnant spontaneously and should not be missed.

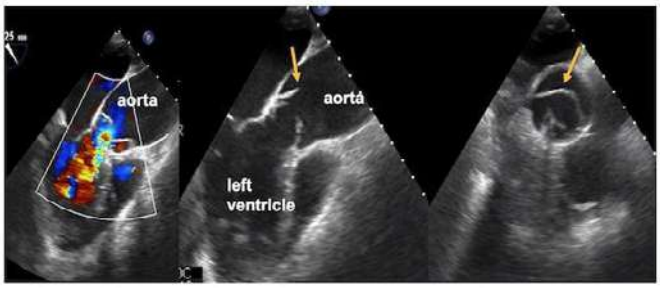

Figure 1. Transesophageal echoardiography showing type A aortic dissection (yellow arrow pointing to dissection membranes) with severe aortic regurgitation (left panel)

[Figure 1]

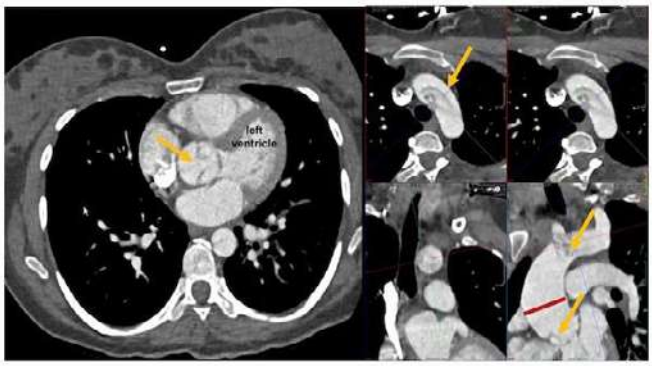

Figure 2. Computed tomography showing type A aortic dissection (yellow arrow pointing to dissection membranes) and dilatation of the ascending aorta of up to 4cm (red line)

[Figure 2]

Disclosure: Nothing to disclose

O41

Amniotic fluid embolism presenting with an acute ST-elevation myocardial infarction during labor

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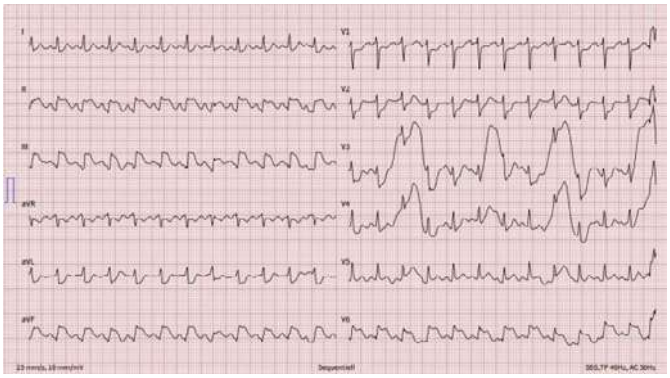
Case: Amniotic fluid embolism (AFE) is an extremely rare, life-threatening complication of labor leading to hyper-acute induction of inflammation and disseminated intravascular coagulation (DIC). Usually, acute pulmonary hypertension results in acute right ventricular failure while DIC manifests by hemorrhagic and ischemic complications, ultimately leading to multi-organ failure and death.

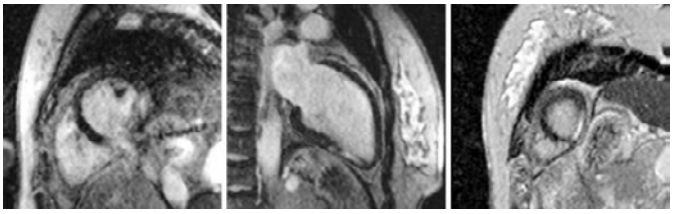
A 30-year old primigravida and primipara with no prior medical history was admitted for labor after intrauterine fetal death at 37 weeks gestation. Shortly after medical birth induction she suffered a convulsive seizure and cardiorespiratory arrest. Short mechanical resuscitation was performed before spontaneous circulation returned. Electrocardiogram showed an inferolateral ST-elevation myocardial infarction (STEMI; Figure 1). Laboratory results fulfilled the criteria for DIC and hemostatic resuscitation as well as mechanical hemostasis were performed.

Transesophageal echocardiography revealed hypo- to akinesia of the inferior wall. Right ventricular size and function were normal. Due to the ongoing DIC coronary angiography could not be performed. After transfer to the intensive care unit, ST-segment elevations resolved. Troponin T peaked at 6535 ng/l. Cardiac magnetic resonance imaging performed 3 months later showed a globally preserved left ventricular systolic function with inferior and inferolateral areas of akinesia. Late gadolinium enhancement demonstrated myocardial scarring in two different areas: mid inferolateral (25x22mm) as well as apical inferior and inferolateral (31x27mm). Referring to the coronary artery anatomy in the chest CT, the infarcted areas correlated with the supply territories of the RCA and distal RIVA or RCX, respectively. Perfusion imaging showed no inducible ischemia.

Conclusion: This is the first report of an acute myocardial infarction triggered by an AFE. The two separate areas of infarction, corresponding to the two different coronary territories suggest AFE-related thrombotic/embolic etiology. The patient, who has fully recovered, is pregnant again with expected delivery at the end of March 2021.



[Figure 1: 12-lead ECG with marked ST-elevation in II, III, aVF and V6]



[Figure 2: LGE with two separate myocardial scars 3 months after the STEMI.]

Disclosure: Nothing to disclose

O42

A ruptured sinus of Valsalva aneurysm

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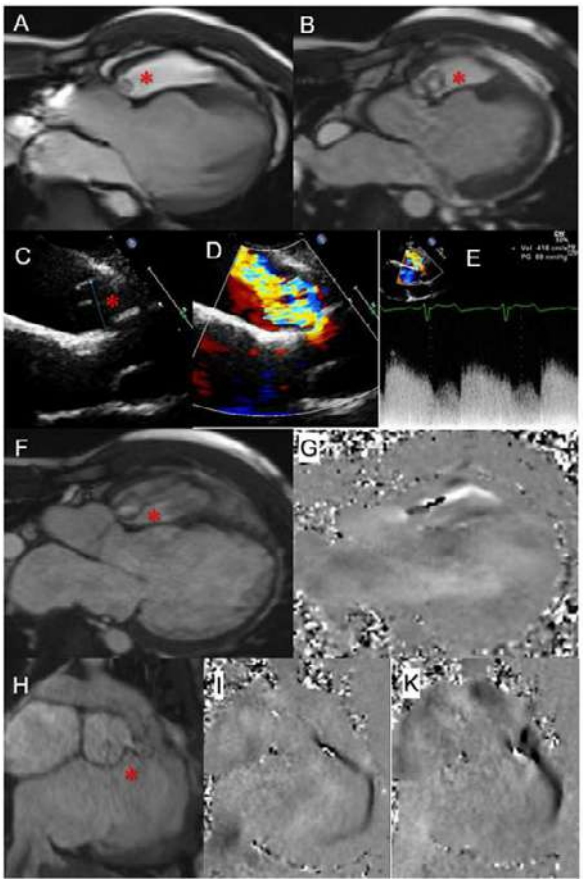
Introduction: Sinus of Valsalva aneurysm (SVA) is a rare condition and sometimes caused by traumatic injury, endocarditis, autoimmune disorders or previous surgery etc. It is unknown whether and when a SVA rupture can occur.

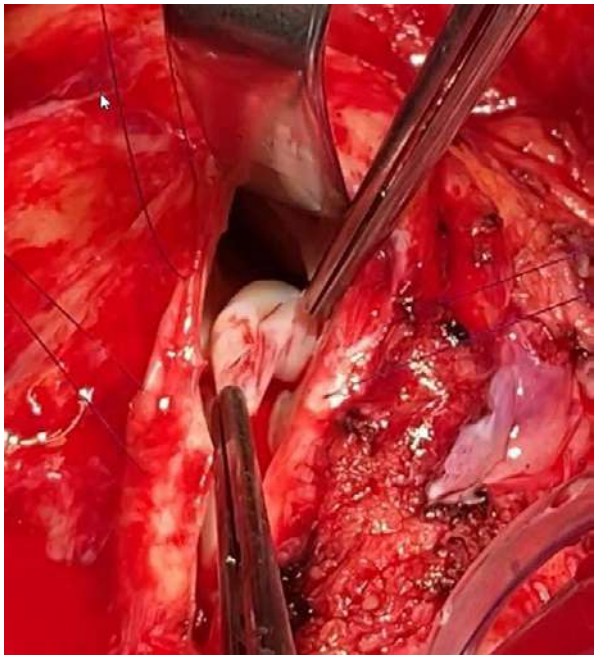
Methods: We report a case of a 29-year-old male with tetralogy of Fallot and previous surgical repair with VSD closure by Gore-tex-patch, right ventricular outflow tract (RVOT) myectomy, pulmonary valvulotomy and main pulmonary artery plasty by Gore-tex-patch at the age of two years. The patient was followed in our clinic with transthoracic echocardiography (TTE) and cardiac magnetic resonance (CMR).

Results: A CMR in 2018 showed a 13mm sized SVA of the right coronary cusp with prolapse into the RVOT, peak velocity 2.4m/s within the RVOT, but no shunt, moderate pulmonary regurgitation (PR) and mildly dilated right ventricle (RV; RVEDVi 125ml/m2, figure 1 B). Retrospectively, the SVA was already present in a previous CMR 10 years ago and measured 9mm (figure 1 A). Careful interrogation by TTE confirmed the presence of a SVA. Two years later by TTE, the SVA measured 18mm and a new systo-diastolic shunt with primarily diastolic flow was present (figure 1 C, D, E). Current CMR showed the ruptured SVA with increased size and diastolic shunt (figure 1 F, G). The cines of the RVOT view (figure 1 H, I, K) demonstrated early diastolic backward flow due to severe PR (fig. 1 K) and primarily late diastolic flow across the SVA (figure 1 I). By phase contrast sequences, backward flow in the ascending aorta was 37ml due to the shunt within the SVA, Qp/Qs 1.9 (MPA 75ml and ascending aortic 40ml net flow) as well as a severe PR. Due to primarily diastolic shunt volume and severe PR with subsequent RV volume overload, the size of the RV increased to RVEDVi 180ml/m2 (increase by 44%) with RVEF 33%, whereas the LV size increased by 31% due to volume overload. The patient was recently operated with SVA resection and closure and pulmonary valve replacement using a bioprosthesis (Perimount Magna Ease 25mm) and patchplasty of the RVOT and MPA. Figure 2 shows a still frame from an intra-operative video depicting the SVA.

Conclusion: SVA can increase by size and subsequently rupture. In our case, the SVA rupture into the RVOT resulted in volume overload of both ventricles. Careful follow-up is indicated in patients with SVA. So far, the cause of the SVA is unknown.



[Figure 1]



[Figure 2: Still frame from an intra-operative video depicting the SVA]

Disclosure: Nothing to disclose

Prevention, rehabilitation, sportscardiology and clinical cases

O43

Systemic blood pressure in patients with severe aortic stenosis: relationship with hemodynamics and prognosis after valve replacement

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Introduction: Systemic blood pressure (BP) in patients with severe aortic stenosis (AS) is difficult to interpret because BP is determined by both cardiac output and systemic vascular resistance (SVR), and the differential contribution of these two factors may vary. We aimed to describe the detailed hemodynamic profile of severe AS patients undergoing aortic valve replacement (AVR) according to mean arterial pressure (MAP) categories and the prognostic impact of MAP in this context.

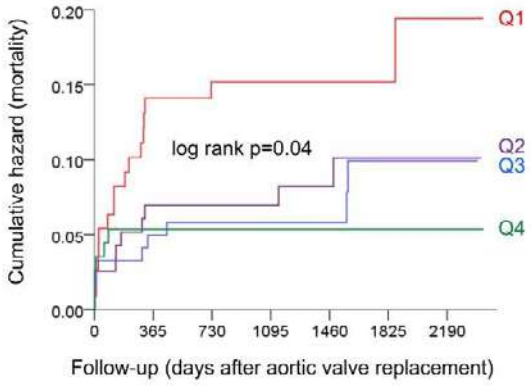
Methods: We studied 477 patients (mean age 74±10 years) with severe AS (indexed aortic valve area 0.41±0.13 cm^2/m^2, left ventricular ejection fraction 58±12%) undergoing right and left heart catheterization prior to surgical (71%) or transcatheter (29%) AVR. The population was divided into quartiles of invasively assessed MAP.

Results: The mean systolic BP, diastolic BP, and MAP in the entire population were 149±25, 68±11, and 98±14 mmHg. There was a continuous increase in left ventricular ejection fraction, SVR, and left ventricular stroke work, and a continuous decrease in indexed left atrial area and B-type natriuretic peptide from the first to the fourth MAP quartile (Table). In contrast, indexed aortic valve area, mean pulmonary artery pressure, mean pulmonary artery wedge pressure, pulmonary vascular resistance, and cardiac index did not significantly differ across MAP quartiles (Table). After a median (interquartile range) follow-up of 3.7 (2.6-5.2) years after AVR mortality was highest in patients in the first and lowest in the fourth MAP quartile (Figure). Patients in the first MAP quartile had a three-fold risk of death compared to patients in the fourth quartile [hazard ratio 3.08 (95%confidence interval 1.21-7.83); p=0.02].

Conclusions: In severe AS patients, higher MAP reflects higher SVR but good left ventricular performance and compensated cardiac output and filling pressures. The favorable post-AVR outcome of patients with high MAP seems to be explained by high left ventricular contractile reserve.

	Q1: MAP=81±6 mmHg (n=115)	Q2: MAP=93±3 mmHg (n=121)	Q3: MAP=102±3 mmHg (n=125)	Q4: MAP=117±7 mmHg (n=116)	P value
B-type natriuretic peptide (ng/l)	362 (92-844)	180 (72-368)	165 (70-348)	140 (73-289)	0.04
Left ventricular ejection fraction (%)	54±14	58±11	58±10	60±10	0.004
Indexed left atrial area (cm^2/m^2)	14.4±4.9	12.6±4.5	12.2±3.3	12.2±3.1	0.02
Indexed aortic valve area (cm^2/m^2)	0.42±0.15	0.41±0.13	0.40±0.11	0.41±0.11	0.48
mPAP (mmHg)	26±11	23±10	25±9	27±10	0.07
mPAWP (mmHg)	17±8	14±7	16±7	17±8	0.05
Systemic vascular resistance (Wood units)	17.4±4.9	18.9±4.4	20.8±3.9	24.1±5.1	<0.001
Cardiac index (l/min/m^2)	2.3±0.6	2.5±0.6	2.4±0.5	2.4±0.6	0.21
LV stroke work (mmHg*ml)	107±45	126±37	130±39	136±46	<0.001

[Table (also see text). Date are given as median (IQR) or mean+/-SD]



[Figure 1]

Disclosure: Nothing to disclose

O44

High very short-term cardiovascular risk: definition and primary-care bedside predictors from risk scores and carotid total plaque area observed in the ARCO cohort study

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Aims: We aim to assess the predictive value of atherosclerosis imaging beyond traditional risk calculators in subjects aged 30-65 years having a high very-short term (3-year) risk.

Method: High very-short term risk is defined by a cardiovascular risk of at least 20% in 3 years. We compared PROCAM and SCORE with carotid ultrasound (total plaque area, TPA) for cardiovascular risk detection during the first 3 years and during complete follow-up.

Results: In 2 842 subjects (age 50±8, 38% women) 154 (5.4%) cardiovascular events occurred (ASCVD: 41 myocardial infarctions, 16 strokes or TIA, 21 CABG, 41 PTCA, 35 coronary artery disease defined by invasive angiography) during a mean follow-up time of 5.9 (1-12) years. PROCAM risk was 5±6%, SCORE risk 1.3±1.6%. Net reclassification improvement (NRI) for PROCAM and SCORE using TPA increased significantly between 30% to 48%. At 3 years, 86 events had occurred. Discrimination at 3 years was significantly improved by 5% when TPA was incorporated into PROCAM and SCORE (Bayes posttest risk). Cox proportional-hazards model at 3 years showed that SCORE was not significant, but PROCAM was predicting cardiovascular events (p=0.0047) and various amounts of TPA, especially TPA ≥ 140 mm^2, remained a highly significant predictor (p< 0.0001). Patients with high very-short term risk remained undetected by PROCAM and SCORE. By 3 years, TPA ≥ 140 mm^2 event proportion was 24% (standard error: 3%).

Conclusion: In patients aged 30-65 years, TPA detects patients with a high very short-term cardiovascular risk occurring during the next 3 years not detected by PROCAM and SCORE. TPA≥140 mm^2, a marker of arterial age of 78 years in men and of 89 years in women, detected 54% of all events that occurred during the first 3 years of the observation period and event proportion was 24%. High very-short term risk may help patients to understand the need for installing preventive therapies and we show that TPA integrated into PROCAM and SCORE significantly improves discrimination of such patients.

Disclosure: Nothing to disclose

O45

A novel diagnostic score integrating atrial dimensions to differentiate between the athlete´s heart and arrhythmogenic right ventricular cardiomyopathy

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Introduction: The 2010 Task Force Criteria (TFC) have not been tested to differentiate ARVC from the athlete's heart. Moreover, some criteria are not available (myocardial biopsy, genetic testing, morphology of ventricular tachycardia) or subject to interobserver variability (right-ventricle regional wall motion abnormalities) in clinical practice. We hypothesized that atrial dimensions are useful and robust to differentiate between both entities and proposed a new diagnostic score based upon readily available parameters including echocardiographic atrial dimensions.

Methods: In this observational study, 21 patients with definite ARVC were matched for age, gender and body mass index to 42 athletes. Based on ROC analysis, following parameters were included in the score: indexed right/left atrial volumes (RAVI/LAVI ratio), NT-proBNP, RVOT measurements (PLAX and PSAX BSA-corrected), tricuspid annular motion velocity (TAM), precordial T-wave inversions and depolarization abnormalities according to TFC.

Results: ARVC patients had a higher RAVI/LAVI (1.76±1.5vs0.87±0.2,p< 0.001), lower right-ventricular function (fac:29±10.1vs42.2±5%,p< 0.001; TAM:19.8±5.4vs23.8±3.8mm,p=0.001), higher NT-proBNP (345±612vs48±57ng/l,p< 0.001). Our score showed a good performance, which is comparable to the 2010 TFC using those parameters which are available in routine clinical practice (AUC93%,p< 0.001(95%CI.874-.995)vsAUC97%,p< 0.001(95%CI.93-1). A score of 6/12 points yielded a specificity of 91% and an improved sensitivity of 67% for ARVC diagnosis as compared to a sensitivity of 41% of the above mentioned readily available 2010 TFC.

Conclusions: ARVC patients present with significantly larger RA compared to athletes, resulting in a greater RAVI/LAVI ratio. Our novel diagnostic score includes readily available clinical parameters and has a high diagnostic accuracy to differentiate between ARVC and the athlete´s heart.

Disclosure: Nothing to disclose

O46

TEE guided implantation of an atrial pacemaker lead for successful termination of a refractory ventricular fibrillation storm

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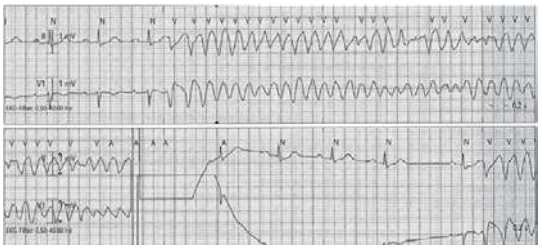
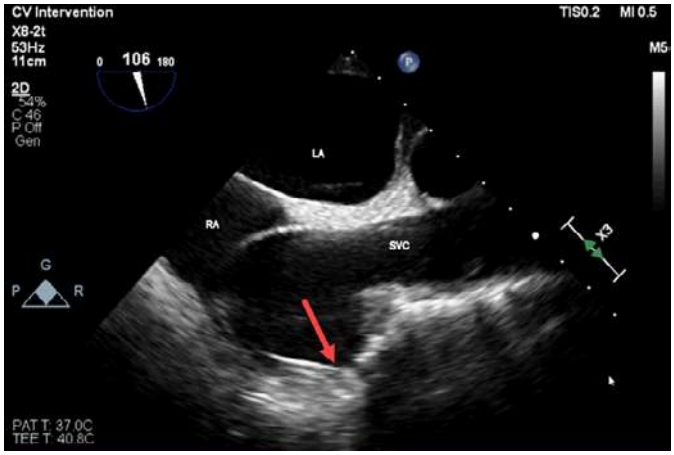
A previously healthy 49-year-old woman suffering from a refractory ventricular fibrillation (VF) storm was transferred on veno-arterial extracorporeal membrane oxygenation (ECMO) support to our tertiary care center. Repeated VF episodes emerged despite fractionated application of amiodarone iv, continuous iv lidocaine and esmolol as well as a potassium level kept in high normal range. A previous try with temporary pacing in the right ventricle at 90 beats per minute, triggered further episodes of VF.
Upon arrival, rare premature ventricular contractions (PVC) still triggered VF, leading to further defibrillations.



[Rhythm strip 25mm/sec: Repeated triggering of ventricular fibrillation by monomorphic premature ventricular contraction]

Through the right jugular internal vein a temporary pacing wire was placed in the right atrium under ECG guiding. No more VF episodes appeared at an atrial pacing rate of 90 beats per minute. Esmolol and lidocaine were replaced by continuous iv amiodarone. Hours later, the temporary pacing wire dislodged. Without atrial overdrive pacing for suppression of the PVC, VF re-emerged. This led to the decision to introduce a permanently screwed in right atrial pacemaker lead to guarantee stable atrial pacing. The pacemaker lead was introduced via the right jugular internal vein and advanced till visualized in the superior vena cava in a TEE bi-caval view. Under TEE guidance



[TEE guided fixation of standard atrial pacemaker lead in right atrial appendage. SVC: superior vena cava. RA: right atrium. LA: left atrium]

placement of the tip of the lead in the right atrial appendage as well as the evaluation of contact to the wall were readily visible. Successful fixation was tested by gently advancing the lead bend towards the tricuspid valve. Necessary slack was evaluated, folding or entangling of the lead could be excluded. Lead measurements revealed current of injury, stable impedance, good sensing and excellent pacing thresholds. The pacemaker lead was fixed to the skin with a non-resorbable thread and connected to a pacemaker programmed AAI 90 per minute. The semi-permanent pacemaker was secured with medical adhesive to the neck. The further clinical course under atrial pacing and iv amiodarone was favorable and allowed for removal of the ECMO 2 days later. The neurological outcome was excellent. The ventricular ectopy became very rare.
Application of a combined strategy to suppress the PVC medicamentousely and by atrial overdrive pacing was successful. Placing a standard pacemaker lead in the right atrium under TEE guidance, was a safe and valuable alternative to fluoroscopy. By doing so, a high risk emergent radiofrequency ablation in an unstable patient on ECMO support could be avoided.

Disclosure: Nothing to disclose

O47

Coronary thrombotic microangiopathy and endotheliitis presenting as acute cardiogenic shock in a patient with COVID-19

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Introduction: Coronavirus disease 2019 (COVID-19) primarily affects the respiratory tract but serious cardiovascular complications have also been described. While the physiopathology of myocardial injury is probably multifactorial, coronary endothelial inflammation may play an important role in that regard.

Case summary: We present here a 52 year-old woman without significant past medical history who developed acute cardiogenic shock with severely reduced left ventricular ejection fraction (LVEF) at 25% 3 days after being diagnosed for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. Coronary angiography was normal and endomyocardial biopsy demonstrated coronary endotheliitis with microvascular thrombosis. Histology did

not display any inflammatory infiltration. The patient was implanted with a short-term left ventricular assist device (Impella CP®) and treated with dexamethasone and therapeutic anticoagulation. Clinical outcome was favorable with weaning of the Impella device after 6 days and full recovery of LVEF after 30 days. Cardiac magnetic resonance performed at day 30 did not show any evidence of myocarditis or myocardial scar.

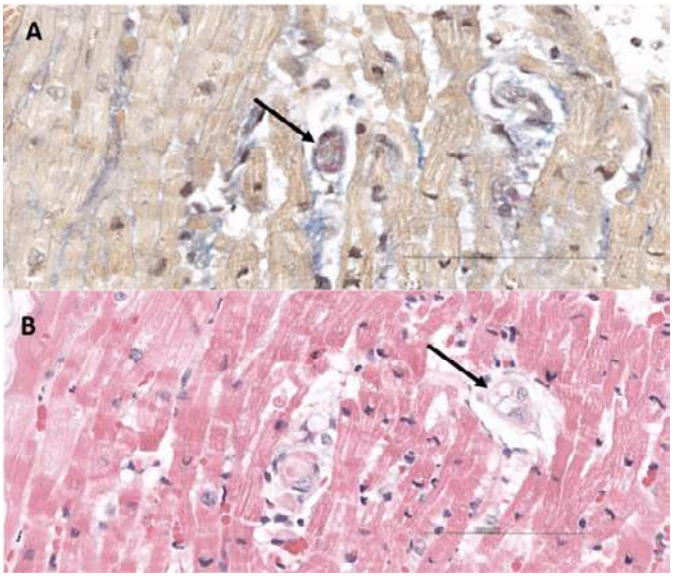
Discussion: The microangiopathy and alveolar capillary microthrombi are now well described and are distinctive feature of lung damages in patients with COVID-19 (1). Our case suggests that endotheliitis in the coronary microcirculation could lead to acute heart failure and cardiogenic shock. Endothelial activation will lead to capillaries thrombosis and cells apoptosis as found in our myocardial biopsy. Endothelial activation seems to be trigger either by direct viral toxicity or by the cytokines storm.

To our knowledge, coronary endotheliitis due to COVID-19 has been rarely described and this case highlights one possible pathophysiological mechanism by which SARS-CoV2 infection could induce myocardial injury.

Conclusion: It appears that myocardial damages induced by SARS-CoV2 are related to various mechanisms; rare direct lymphocytic myocarditis, indirect myocardial injury secondary to cytokine storm and severe respiratory failure or coronary endotheliitis.

This case describes one of these mechanism with microvascular dysfunction and thrombosis mainly localized to the heart inducing acute cardiogenic shock without lymphocytic myocarditis.

References: 1. Ackermann M et al. Pulmonary Vascular Endothelialitis, Thrombosis, and Angiogenesis in Covid-19. N Engl J Med. 2020;383(2):120-8.



[RV endomyocardial biopsy with acid fuchsin-Orange G stain (A) and haematoxylin/eosin strain (B)]

Disclosure: Nothing to disclose

O48

Catastrophic bone cement implantation syndrome treated with venoarterial extracorporeal membrane oxygenation: a case report

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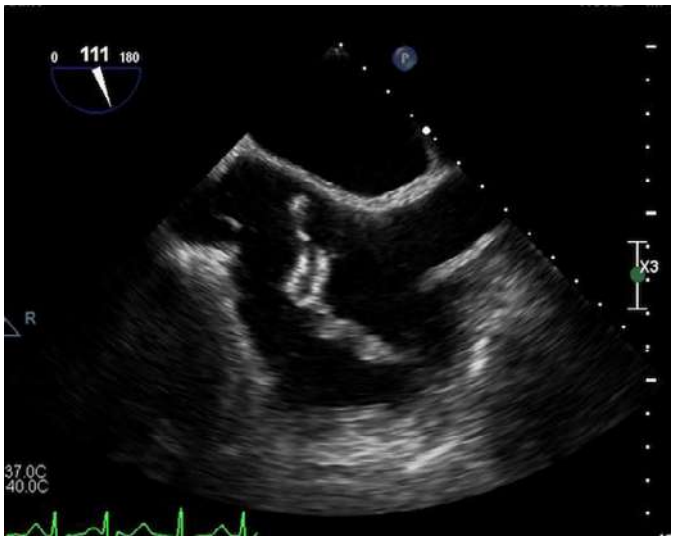
Bone cement implantation syndrome (BCIS) is a rare and feared complication of orthopedic surgery using cement to hold prothesis in place. It is characterized by sudden hypoxia, hypotension, circulatory collapse or unexpected loss of consciousness around the time of cementation, prosthesis insertion, reduction of the joint or, occasionally, limb tourniquet deflation in a patient undergoing cemented bone surgery.

We report the case of a 77-year-old lady with atrial fibrillation, a history of hypertrophic obstructive cardiomyopathy and pulmonary hypertension, who was hospitalized due to a fall on her left hip. A Garden IV fracture was diagnosed and total hip replacement was scheduled. During the cementation of the prothesis, the patient presented a sudden cardiac arrest. A transesophageal echocardiography (TEE) showed a large (4-5cm) hyperechoic mobile mass in the right atrium (**Image 1**). The left ventricle was hyperdynamic with a preserved function but the right ventricle was dilated with a severely impaired function. Despite successful cardiac resuscitation, she remained unstable and it was decided to implant a cardio-pulmonary mechanical support with a V-A ECMO. At the end of the procedure, the echoic mass was trapped around the venous canula in the right atrium. 7 days later, repeat TEE showed regression of the mass under therapeutic anticoagulation and an improvement of right ventricular function. The patient was successfully weaned from V-A ECMO and the right atrial mass was still present albeit smaller in size. The hemodynamic of the patient remained stable but unfortunately, she didn't show any signs of favorable neurological outcomes. 4 days later, she died from a pulmonary septic shock.

The exact prevalence of BCIS remains unknown as it is a rare condition. It is suggested that neck of femur fractures, pre-existing cardiopulmonary dysfunction, old age and pulmonary hypertension are risk factors of developing BCIS, all present in our patient.

The physiopathology is poorly understood but it is suspected that high intramedullary pressure during cementation leads to embolization of mixed contents (fat, air, marrow, aggregates of fibrin or cement particles) in the pulmonary vasculature resulting in decreased cardiac output. Our echocardiography findings with hyperechoic contents is highly suggestive of this mechanism. We report the first case of severe BCIS during hip hemiarthroplasty treated with percutaneous V-A ECMO.



[Large hyperechoic mobile mass in the right atrium]

Disclosure: Nothing to disclose

O49

Cardiac surgery as a cure for intractable gastrointestinal bleeding

B. Santos Lopes[1], F. Bonassin Tempesta[1], M. Frank[1], R. Prêtre[2], P.R. Vogt[3], C. Gubler[4], M. Greutmann[1]

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Introduction: Chronic systemic venous hypertension occurs in a number of different cardiac conditions, including constrictive pericarditis and after Fontan-palliation for univentricular hearts. Apart from congestive liver disease, gastrointestinal bleeding is a feared complication that may be difficult to control. Herein we report three cases of intractable gastrointestinal bleeding, successfully controlled by cardiac surgery.

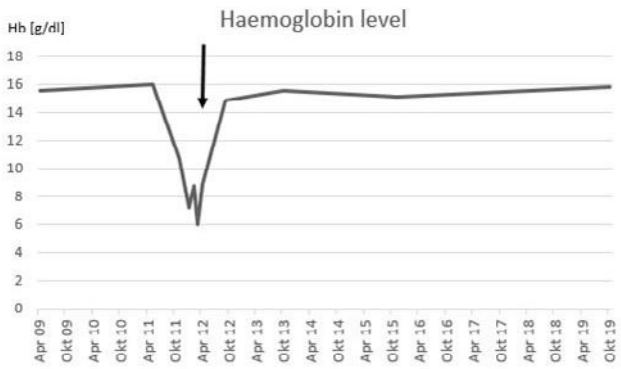
Case reports:

Case one: A 27-year-old male with constrictive pericarditis with predominant right ventricular involvement was referred for recurrent gastrointestinal bleeding since the age of 18 years, culminating in haemorrhagic shock. Extensive investigations, including laparotomy with intraoperative enteroscopy of the entire small bowel, never identified the source of bleeding. After complete surgical pericardiectomy anaemia subsided immediately and no further bleeding occurred in the following eight years.

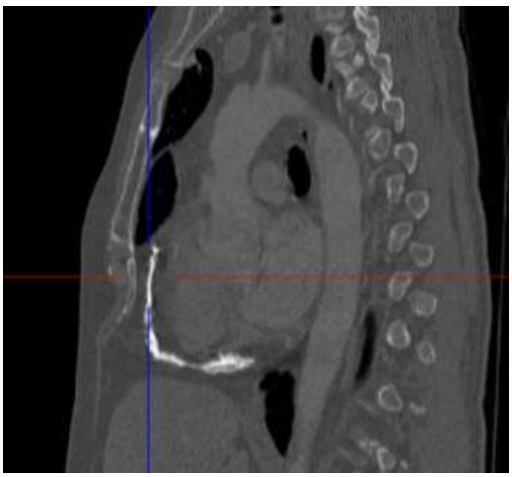
Case two: A 69-year-old male patient with oligosymptomatic constrictive pericarditis developed gastrointestinal bleeding with melaena and severe anaemia, after he was started on oral anticoagulation with edoxaban for atrial fibrillation. An extensive work-up including enteroscopy revealed no source of bleeding. After cessation of edoxaban, his bleeding stopped but re-occurred on low dose aspirin. He underwent surgical pericardiectomy and subsequently was started on vitamin K antagonist without recurrence of bleeding.

Case three: A 29-year-old male patient with failing Fontan physiology, high systemic venous filling pressures and severe chronic protein-losing enteropathy presented with increasingly frequent severe gastrointestinal bleeding and high need for erythrocyte transfusion. Again, extensive work-up revealed no source of bleeding. He was ultimately listed for urgent cardiac transplantation. Although three months after cardiac transplantation, protein loosing enteropathy had not fully resolved yet, he did not experience further overt gastrointestinal bleeding and never required transfusion.

Conclusion: In cardiac conditions with elevated systemic venous pressures and profuse gastrointestinal bleeding, the only effective treatment is surgical relief of the underlying cause. Surgery should not be delayed for fears of perioperative bleeding complications.



[Haemoglobin (Hb) over time with marked improvement after cardiac surgery (arrow) in patient 1]



[CT scan with extensive pericardial calcification in patient 2]

Disclosure: Nothing to disclose

O50

Clinical and echocardiographic response after his-bundle-pacing for symptomatic left bundle branch block

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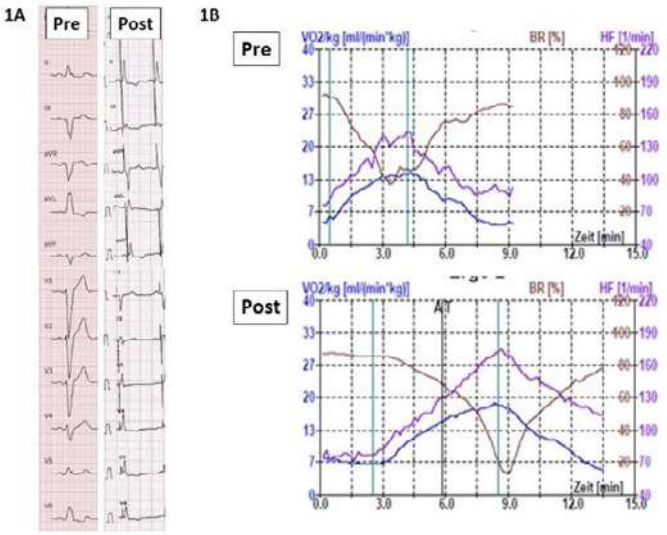
Introduction: Painful left bundle branch syndrome is a clinical entity combining exertional angina and rate-dependent left bundle branch block (LBBB) without cardiac ischemia.

Methods: We report the case of a 45-year-old female patient with exercise-dependent LBBB who underwent implantation of a His-bundle-pacing device to overcome the above mentioned conduction problem.

Results: A 45-year-old woman was referred to our institution for evaluation of progressive exercise intolerance due to crushing thoracic pain and breathlessness. Previous medical work-up revealed no pulmonary abnormalities, while cardiac evaluation only documented an intermittent left bundle branch block (LBBB) during exercise with normal echocardiographic and MRI evaluation at rest. CT angiography presented no coronary artery disease. Holter-monitoring revealed rate-dependent LBBB coinciding with the patient's symptoms starting at a heart rate of 75/min. Exercise test demonstrated reduced exercise capacity (76W = 60% of age and sex adjusted mean, VO2 max 14.4ml/min*kg = 52% of age and sex adjusted mean) with a reduced maximal O2-pulse of 7 ml/beat (=64% of age and sex adjusted mean). As a last treatment option, the patient underwent successful dual-chamber His-bundle-pacemaker (HBP) implantation, even though experience with this type of treatment is limited an no guidelines exist for implanting a pacemaker in symptomatic patient with left bundle branch block and normal cardiac function. The procedure could be performed without complications and a final His-lead position that captured non-selectively the conduction system with LBBB correction at a unipolar threshold of 0.9V @ 1.0ms could be achieved (Figure 1A). At 3 months follow up, she reported significant reduction of symptoms which by that time no longer affected her daily activities. Device parameters remained stable compared to those measured at implantation. Repeat exercise test demonstrated substantially improved exercise capacity (110W=89% versus 76W=60% pre-implantation of age and sex adjusted mean) and improved peak oxygen uptake (VO2 max 18.4 ml/min*kg versus 14.4ml/min*kg) (Figure 1B).

Conclusion: This case report demonstrates that correction of LBBB in a patient without other obvious cardiac pathologies can offer a treatment option to overcome the delirious effects of this conduction issue.



[Figure 1]

Disclosure: No relevant conflict of interest with the reported abstract is present.

ePoster

Valvular heart disease

P01

Chimney grafts for coronary perfusion during transcatheter Aortic Root Replacement (TARR). Preliminary results in a 3D model with pulsatile flow

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[1]Cardiocentro Ticino Institute | Cardiac Surgery, Lugano, [2]CHUV, Lausanne, Switzerland

Objective: Transcatheter aortic root replacement (TARR) can become a clinical option for high-risk patients in a near future. However, some important concerns exist about coronary perfusion strategies and aortic valve management in a complex anatomy. The concept of using chimney grafts for the coronary artery perfusion is a possible step towards the development of valid TARR technologies. We present a preliminary feasibility in-vitro test.

Methods: A 3D-aortic model based on a modified pre-operative CT-scans of patient is placed in a pulsatile circuit with water and glycerol (mimicking blood viscosity) at 37 degrees. The tests are based on 3 aortic pressure sets at 80bpm: 100/60, 120/80 and 140/100mmHg. After calibration with given coronary resistances and a Sapien transcatheter valve in aortic position, the custom-made TARR model is inserted in the root and coronary flows are measured at different pressure levels. Measurements were performed 3 times for 10 minutes for each pressure level without (control) and with (TARR) the model.

Results: At aortic pressure levels of 100/60mmHg (mean aortic flow of 4.8L/min), the control and TARR model showed mean coronary blood flows of 0.2 and 0.17 L/min on the left, and 0.13 and 0.13 L/min on the right coronary artery, respectively. At 120/80mmHg (mean aortic flow of 4.5L/min), mean coronary flows were 0.24 and 0.21 L/min on the left, and 0.15 and 0.15 L/min on the right coronary artery, respectively. At 140/100mmHg of pressure (mean aortic flow of 4.1L/min), mean flows were 0.27 and 0.25 L/min on the left, and 0.17 and 0.17 L/min on the right coronary artery, respectively. The model didn´t displaced during the tests showing a good sealing of the main aortic endoprosthesis.

Conclusions: This preliminary report shows that the TARR technique guarantees an adequate coronary flow in a 3D-aorta model with dilated aortic root and by using chimney grafts for coronary canulation and perfusion.

Disclosure: Nothing to disclose

P02

An in-vitro model of stiffened aortic valves to develop an iso-stiffness-lines graph for severity evaluation aortic stenosis

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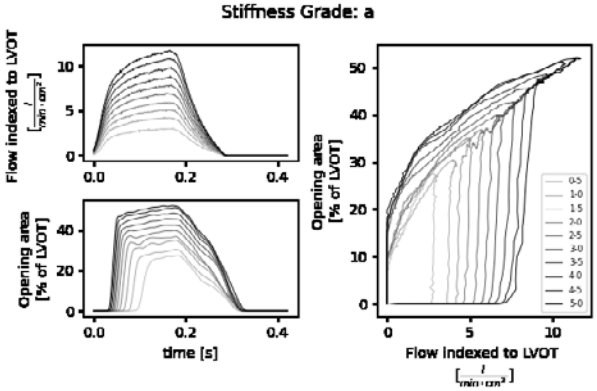
Introduction: The echocardiographic diagnosis of aortic stenosis (AS) is established by assessing the maximal opening area (OA) of the aortic valve. The behavior of OA depends on valve stiffness (e.g. due to calcification) and on transvalvular flow which can be low such as the situation of patients with low-flow, low-gradient AS. However, current guidelines for the assessment of AS do not consider flow but rather the stroke volume. We designed an experiment to measure OA versus flow for various valve stiffness values to create a graphical representation of iso-stiffness lines which can be used for AS diagnosis.

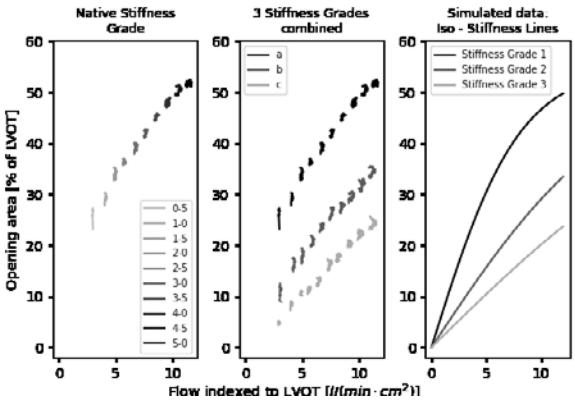
Methods: We filmed harvested porcine aortic valves mounted in a pulsatile flow loop during the ejection time with a high speed camera (2000Hz), measured OA for each time point and determined the instantaneous flow through the aortic valve at 10 different mean flow rates (ranging from 0.5 to 5.0 liters/min) and divided OA and flow by the area of left ventricular outflow tract (LVOT) to account for different valve sizes. We plotted each OA against its corresponding flow after correcting the data for the intersignal delay. Only the data points corresponding to the 5% highest instantaneous flow rates were included due to a time lag between flow onset and the valve opening caused by a ballooning of the valve. The valves were progressively stiffened by treatment with a protein cross-linking agent (formaldehyde) to yield a total of three stiffness grades (**a**, **b**, **c**). The experimental procedure was repeated for each of those grades.

Results: We generally observed an asymptotic appearance of the flow-OA relationship as well as a flattening of this relationship with increasing valve stiffening. This visually matches well simulated data generated with a sigmoid model.

Conclusions: We could obtain all flow/OA pairs at different stiffness grades allowing to fit a sigmoid function which captures the flow-OA relationship for each stiffness grade and yields iso-stiffness lines that will allow classifying valve stenosis grade irrespective of the flow and the size of the valve in one single graph. This could help to simplify the grading system of aortic stenosis, especially for patient with low-flow, low-gradient AS.



[Left: OA and instantaneous transvalvular Flow over time. Right: OA over flow]



[OA for one Stiffness Grade - OA for Three Stiffness Grades - Data simulation with Sigmoid Function]

Disclosure: There are no conflicts of interest. This work was supported by the Bern Center for Precision Medicine (BCPM)

P03

Conservative treatment of prosthetic valve endocarditis: experience on 10 patients

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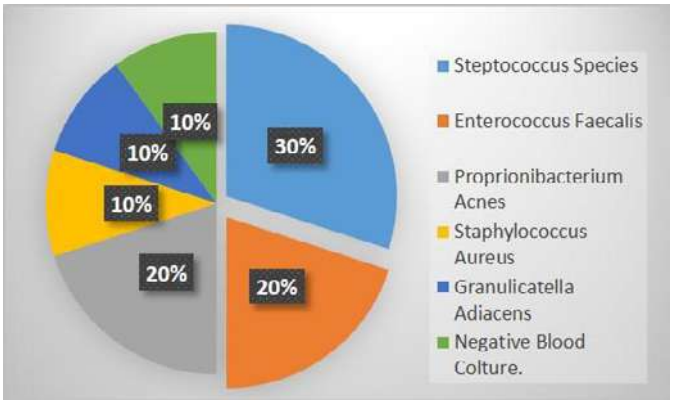
Introduction: Prosthetic valve endocarditis (PVE) may result in re-operation, especially when large vegetations or local uncontrolled infection are present. However the surgical risk may occasionally be very high and conservative treatment is chosen. Outcome data of conservative treatment are limited.

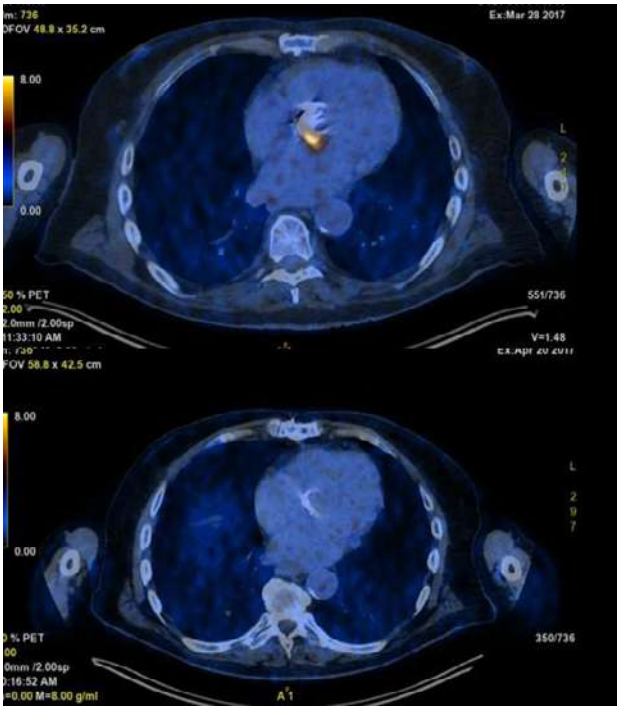
Methods: Consecutive Patients with conservatively treated PVE from 2003 to 2020 were reviewed. Initial findings and complications, length of antibiotic treatment, outcome and echocardiographic findings were reported.

Results: We identified 10 patients with PVE, age at diagnosis 73±19y. PVE occurred 56±61 months after last valve surgery and occurred most frequently in aortic (1 mechanical and 8 bioprothesis) than mitral (1 bioprothesis) prosthesis. Etiology of infection is shown in figure 1. Length of antibiotic treatment was 23±17 weeks in 7 patients; in 3 patients treatment is still ongoing (currently 10, 89 and 59 weeks respectively). Length of antibiotic treatment was supported by PET/CT findings in 4 patients (Example in Figure 2). No patient died during the acute phase, one patient died 10 years later of unknown cause during follow-up. Prosthetic valve function remained normal in 9 patients and only 1 had significant regurgitation. Abscess formation by echo or CT was found in 2 patients. Peripheral embolization occurred in 6 patients (4 strokes, 3 spleen embolizations, 1 embolization in peripheral arterial vessels, 1 spondylodiscitis, 1 soft tissue embolization). Acute transient renal failure occurred in 6 patients (during antibiotic treatment). One patient had severe allergic reaction to antibiotic therapy.

Conclusion: Conservative treatment of PVE is possible but the risk of complication is high. Therefore this strategy should be carefully discussed in the heart team. PET CT can be useful to recognize local complication and guide the duration of antibiotic treatment.



[Figure 1: Etiology of Endocarditis]



[Figure 2: PET/CT of aortic PVE before and after 1month of antibiotic treatment]

Disclosure: Nothing to disclose

P04

Feasibility and safety of cerebral embolic protection device insertion during aortic valve implantation in normal and bovine arch anatomy

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Background: Cerebral embolic protection devices (CEPDs) based on flexible filter systems have emerged as a mechanical barrier to prevent debris from reaching the cerebral vasculature, potentially reducing stroke incidence. Bovine aortic arch (BAA) is the most common arch variant and represents challenge anatomy for CEPD insertion during transcatheter aortic valve replacement (TAVR).

Methods: This cohort study is reporting the SentinelTM Cerebral Protection System insertion's feasibility and safety in 165 adult patients submitted to a transfemoral TAVR procedure from April 2019 to April 2020. The device is delivered from the right radial artery, first filter is exposed with the truncus brachiocephalicus followed by probing the left carotid and advancing the second filter within. After the procedure is finished, the system is recaptured vice versa. Patients were divided into 2 groups: (1) BAA; (2) non-BAA.

Results: Median age, EuroScore II, and STS score were 79 years (74-84), 2.9% (1.7-6.2), and 2.2% (1.6-3.2), respectively. BAA was present in 12% of cases. Successful two-filter insertion was 86.6% (89% non-BAA vs. 65% BAA; p = 0.002), and debris was captured in 95% (94% non-BAA vs. 95% BAA; p = 0.594). No procedural or vascular complications associated with Sentinel insertion and no intraprocedural strokes were reported. There were two postprocedural non-disabling strokes, both in non-BAA.

Conclusion: This study demonstrated Sentinel insertion feasibility and safety in BAA. No procedural and access complications related to Sentinel deployment were reported. Being aware of the bovine arch prevalence and having the techniques to navigatethrough it allows operators to successfully use CEPDs in this anatomy.

Disclosure: Nothing to disclose

P05

In vitro estimation of the energy loss through turbulence in a porcine aortic valve stenosis model and silicone ascending aorta phantom using backlight particle tracking velocimetry

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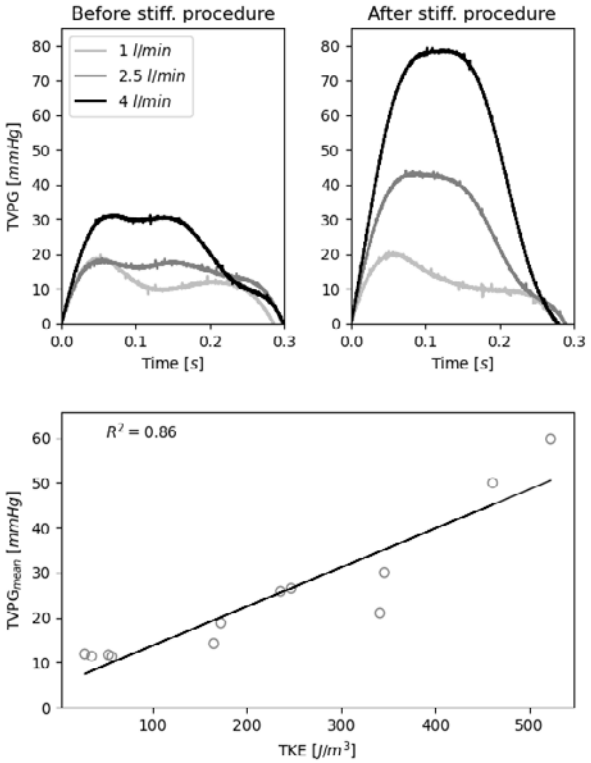
Introduction: Patients suffering from low-flow, low-gradient aortic stenosis present a decreased stroke volume due to decreased contraction or relaxation function of the left ventricle. As a low stroke volume tends to cause a low transvalvular flow, transvalvular pressure gradient (TVPG) and effective orifice area, the clinician cannot rely on those parameters with confidence for the evaluation of aortic stenosis severity. Hence new diagnostic parameters have to be developed. Energy loss through turbulence associated with aortic stenosis represented the wasted left ventricle work. Currently, echocardiographic measurement of the turbulence intensity is not validated for clinical evaluations of aortic stenosis.

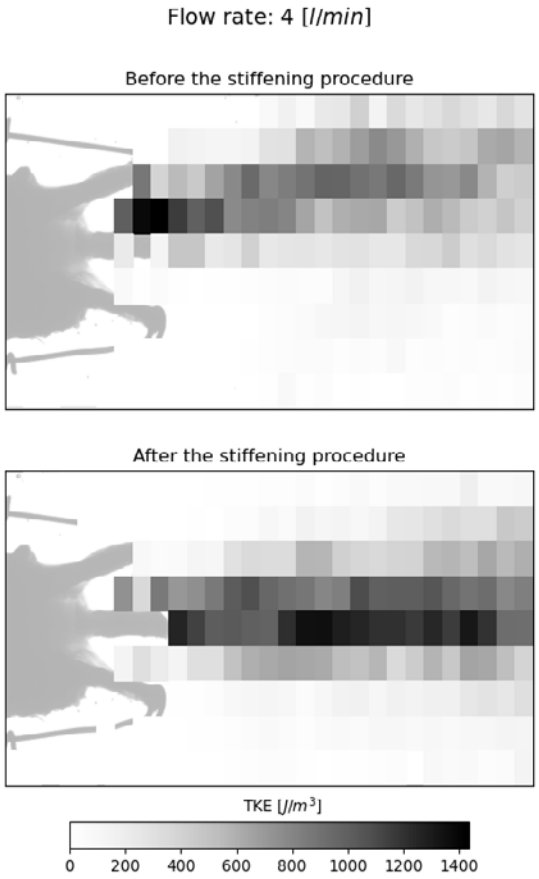
Methods: Two porcine aortic valves were harvested and inserted in a flow loop that replicates the pulsatile flow of the heart. A stiffening of the valves was achieved by treating them with formaldehyde. The stiffening was externally confirmed by a custom-made force-displacement device quantifying the rigidity of the leaflet yielding two stiffness grades per valve. Each valve was tested under three different mean flow rates (1, 2.5, and 4 l/min) at each of the two stiffness grades. Moreover the pressure in the left ventricle chamber and in the aortic chamber was recorded to calculate the TVPG. Particle tracking velocimetry measurements into the transparent silicone ascending aorta phantom allowed the computation of the turbulent kinetic energy (TKE), to evaluate the energy loss due to turbulence.

Results: We could confirm the enhanced rigidity of the valve leaflets with our custom device (data not shown) and measure a consistent increase in TVPG across all mean flow rates between the two stiffness grades. Moreover, an explicit increase of the TKE in the aortic phantom could be measured after the stiffening process (73.1% under 1 l/min, and 43% under both 2.5 and 4 l/min). In addition, a good correlation ($R^2 = 0.86$) between the mean TVPG and the TKE was found.

Conclusions: This project demonstrated the possibility of quantifying the energy loss attributed to turbulence for porcine valves in vitro for native and added stiffness grade. This project lays the foundation for the development of a new diagnostic tool for the assessment of stenosis severity in patients with low-flow, low-gradient aortic stenosis in cardiac imaging tool such as echocardiography.



[Positive TVPG before and after the stiffening procedure (top graphs). Linear regression between the mean TVPG and the TKE (bottom graph).]



[Color graphs of the TKE in the silicone ascending aorta with the valve on the left-hand side. The blood mimicking fluid flows from left to right.]

Disclosure: Nothing to disclose

P06

Hemodynamic characteristics of patients presenting with pulmonary hypertension after valve replacement for severe aortic stenosis

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Introduction: The presence of pulmonary hypertension (PH) in patients who previously underwent aortic valve replacement (AVR) for severe aortic stenosis (AS) carries a poor prognosis. However, the determinants of post-AVR PH, particularly the exact invasive hemodynamic constellation before AVR, are unknown. We aimed to assess the pre-AVR hemodynamic characteristics of patients with post-AVR PH.

Methods: We studied 205 patients (mean age 75 ± 10 years) with severe AS (indexed aortic valve area 0.40±0.11 cm^2/m^2, left ventricular ejection fraction 58±11%) undergoing right heart catheterization (RHC) prior to surgical (70%) or transcatheter (30%) AVR. Echocardiography to assess post-AVR PH, defined as estimated systolic pulmonary artery pressure >45 mmHg, was performed after a median follow-up of 15 (12-18) months.

Results: There were 83/205 (40%) patients with pre-AVR PH [defined as mean pulmonary artery pressure (mPAP) ≥25 mmHg by RHC], and 24/205 patients (12%) had post-AVR PH (by echocardiography). Among patients with post-AVR PH, 21/24 (88%) already had had pre-AVR PH (isolated post-capillary PH: n=10, combined pre- and post-capillary PH: n=11). Prior to AVR, indexed aortic valve area had been similar in patients with and without post-AVR PH (Table). However, patients with post-AVR PH were older (81±6 vs. 74±10 years; p=0.001), more likely to be female (75 vs. 47%; p=0.01), and had had higher right atrial pressure, mPAP, mean pulmonary artery wedge pressure (mPAWP) and pulmonary vascular resistance (PVR) and lower stroke volume index and pulmonary capacitance in the pre-AVR RHC than patients without post-AVR PH (Table).

Conclusions: Severe AS patients who undergo AVR and present with PH (by echocardiography) roughly one year post-AVR already had had a significantly worse hemodynamic profile in the pre-AVR RHC compared to patients without post-AVR PH that was characterized by higher mPAP, mPAWP, and PVR despite similar AS severity. This underscores the importance of the pre-AVR RHC.

	All patients (n=205)	Post-AVR PH (n=24)	No post-AVR PH (n=181)	P value
Indexed aortic valve area (cm2/m2)	0.40±0.11	0.40±0.11	0.40±0.11	0.86
Left ventricular ejection fraction (%)	58±11	54±12	58±11	0.05
Mean right atrial pressure (mmHg)	6±4	8±5	6±4	0.009
mPAP (mmHg)	25±10	34±8	24±10	<0.001
mPAWP (mmHg)	16±8	22±7	15±8	<0.001
Pulmonary vascular resistance (Wood units)	2.1±1.3	3.1±1.3	2.0±1.2	<0.001
Pulmonary artery compliance (ml/mmHg)	3.4±2.0	1.9±0.9	3.6±2.1	<0.001
Left ventricular end-diastolic pressure (mmHg)	21±8	23±7	21±8	0.41
Stroke volume index (ml/m2)	36±11	30±9	36±11	0.007

[Table]

Disclosure: Nothing to disclose

P07

Transfemoral-only transcatheter aortic valve implantation: a single center experience from 250 consecutive patients

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Background: In transcatheter aortic valve implantation (TAVI), transfemoral (TF) access offers several advantages over alternative access sites. Advances in sheaths and valve delivery technology have catalyzed the feasibility of TF-TAVI even in challenging anatomies. We report the feasibility, challenges and mid-term outcomes of a TF-only TAVI program.

Methods: Between October 2018 and October 2020, 250 consecutive patients underwent TAVI via the TF access. No alternative access route was used during this time period and no patient was denied TAVI on grounds of a challenging iliofemoral anatomy. Equipment required to establish TF access in challenging cases included different low-profile sheaths, dilatators, peripheral balloons and stents, covered stents and intravascular lithotripsy.

Results: Mean age was 80±6 years, 39% female. A total of 24 patients had an iliofemoral minimal lumen diameter (MLD)< 5.0mm, the remaining had an MLD≥5.0mm. Patients with an MLD< 5mm presented not only with narrower iliofemoral arteries, but also with more comorbidities.

Access was successfully achieved in all patients, but peripheral interventions were more common in the MLD< 5.0mm group: planned PTA (to facilitate access) 25.0% vs 0.9% (p< 0.001), unplanned PTA 8.3% vs 1.0% (p=0.1), intravascular lithotripsy 8.7% vs. 0% (p=0.01), covered stents 4.2% vs 1.8%(p=0.4).

There were no differences in 30-days clinical outcomes, but patients in the MLD< 5mm group had a higher rate of minor and major vascular complications (29% vs 5%, p< 0.001) and bleeding complications (25% vs4%, p< 0.0001). Surgical repair was required in 1 patient in each group. In multivariable analysis MLD< 5.0mm remained the only predictor of vascular complications.

Conclusion: This early experience suggests that it is possible to run a 100% TF-TAVI program. However, peripheral interventions were frequently required and the rate of vascular and bleeding complications in patients with very narrow iliofemoral arteries was high, similar to the complication rate observed with alternative access TAVI.

Disclosure: ST is a proctor and consultant for Boston Scientific, Abbott Vascular and New Valve Technology/ Biosensors, has received speaker honoraria from Medtronic, institutional research grants from Boston Scientific and Fumedica and is a board member of and holds equity in Hi-D Imaging. RK has received institutional grants from Abbott, Biosense-Webster, Biotronik, Boston Scientific, Medtronic and SIS Medical.

P08

Fungal infective endocarditis: clinical characteristics, evolution and prognosis

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Introduction: Fugal endocarditis represent a rare entity with high mortality rate .

Our aim were to explore the clinical characteristics, in hospital evolution and outcomes of the patients with fungal infective endocarditis.

Methods: An observational study was conducted at our hospital a total of 114 patients with the definite IE diagnosis met the Duke criteria. In 9 patients a fungal organism was isolated. Their overall characteristics, treatments, complications and outcomes were analyzed.

Results: The mean age at presentation was 49 years , a masculine predominene was noted with a sex ratio of 2 : 1.

Among them, 8 cases of infective endocarditis were related to an health-care associated infection (invasive devices) and 1 patient was an intravenous drug user. Patients with a previous prosthetic valve replacement surgery represented 55 % of fungal IE , and patients with chronic kidney disease under Hemodialysis 22%.

Aortic valve (55.5%) was most commonly affected and it was followed by mitral valve (33.3 %) , then the tricuspide valve (11.1%) The most common etiological agent was Candida (77.7%), followed by Aspergillus (22.2%). Major complications during the acute infective phase were uncontrolled infections despite treatement , acute congestive heart failure, renal dysfunction and abcess formation . The overall hospital mortality rate was 44.4%. Valve replacement surgery was indicated in third of the patients . Most patients recieved Fluconazole as antifungal therapy A better outcome was observed in patients on a combined regimen of medical and surgical therapies versus medical therapy alone . Mean inhospital stay was 40 days .

Conclusion: Fungal endocarditis is associated with invasive interventions and nosocomial infection. The incidence of embolic events and in-hospital mortality is still high in patients with fungal endocarditis, and the larger vegetation is more common. Heart failure, sepsis and repeated arterial embolization are the most common cause of death.

Disclosure: Nothing to disclose

P09

Characteristics and outcomes of patients with normal flow, low gradient aortic stenosis referred for aortic valve replacement

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Introduction: Aortic stenosis (AS) is considered severe with valve area (AVA) < 1cm2 and mean trans-aortic gradient (MG) >40 mmHg. However, patients with low gradient severe AS may also benefit from aortic valve replacement (AVR). We aimed to compare the characteristics and outcomes of patients with AS referred to our center for AVR.

Methods: Patients referred for surgical AVR or TAVI after heart team evaluation were prospectively considered. Three groups were compared: high gradient AS (HGAS, MG >40 mmHg), low flow, low gradient AS (LFLG, MG< 40 mmHg, stroke volume index < 35 ml/m2) and normal flow, low gradient AS (NFLG, MG< 40 mmHg, SVi>35 ml/m2).

Results: 101 patients were included (mean age 82 years , 44 women, 69 TAVI): 55 had HGAS, 31 LFLG, and 15 NFLG. Age, gender and type of intervention were similar but significant differences were found in Euroscore II (3.5[2.2-5.4] vs 5.5[3.2-9.8] vs 6.2[3.4-10.5]; p=0.001). HGAS and LFLG had more severe AS compared to NFLG by AVA (0.6[0.5-0.8] vs 0.6[0.5-0.8] vs 0.9[0.9-1.0]; p=0.0001), dimensionless index (0.18[0.16-0.22] vs 0.21[0.19-0.25] vs 0.28[0.25-0.31]; p=0.0001), energy loss index (0.37[0.31-0.44] vs 0.39[0.34-0.46] vs 0.61[0.53-0.68]; p=0.0001), and valvulo-arterial impedance (5.3[4.4-6.5] vs 6.2[5.3-7.2] vs 3.9[3.4-4.2]; p=0.0001). Post-operative increase in AVA was largest in HGAS (0.9cm^2[0.7-1.2] vs 0.7[0.5-1] vs 0.6[0.3-0.9]; p=0.04). After 3 years follow-up, mortality and cardiovascular rehospitalization rates were 31.6% and 51%, respectively, without significant difference between the 3 groups (26.9 vs 38.7 vs 33.3%; p=0.53 and 46.2 vs 48.1 vs 53.3%; p=0.57, respectively).

Conclusions: AS severity was lower and global cardiac risk higher in NFLG compared to LFLG and HGAS. Nevertheless, NFLG patients also had significant improvement in AVA after AVR and their long-term prognosis was similar to HGAS and LFLG patients, suggesting benefit from AVR even in this group.

Disclosure: Nothing to disclose

P10

Trifecta bioprostheses evaluation versus Perimount Magna in aortic position: differences in clinical outcome and hemodynamic performance

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Introduction: To evaluate clinical outcomes and hemodynamics of two of the most frequently used surgical bovine pericardial bioprostheses, the Trifecta and the Perimount aortic valve bioprostheses.

Methods: We retrospectively reviewed the medical records of patients who had undergone aortic valve replacement with Trifecta or Perimount bioprostheses between April 2015 and December 2019. Adverse events, outcomes, and valve hemodynamics were evaluated.

Results: A total of 168 patients underwent aortic valve replacement (86 Trifecta, 82 Perimount). Haemodynamic variables were evaluated on discharge and during follow-up (minimum 6 months, maximum 36 months). There were no significant differences in early or late outcomes between the Trifecta and Perimount groups. In the early postoperative period, mean (±SD) pressure gradient was significantly better for Trifecta across all valve sizes (7.91±3.24 vs. 12.09±4.76; p < 0.001), but the difference did not persist during the follow-up (8.16±3.66 for Trifecta, 8.88±3.61 for Perimount; p 0.224). There were no significant differences for the indexed effective orifice area on discharge (1.24±0.36 for Trifecta, 1.25±0.34 for Perimount; p 0.826) and during follow up (1.20±0.26 for Trifecta, 0.95±0.09 for Perimount; p 0.166) between the 2 groups. Similar statistically significant differences were found when patients were matched for preoperative characteristics: body surface area, ejection fraction, mean gradients and valve size.

Conclusions: Postoperative outcomes were similar for both valves. An early better hemodynamic performance was detected for the Trifecta valve across all conventional prostheses sizes but did not persist.

Disclosure: Nothing to disclose

Basic Science with a pinch of rhythmology & valves

P12

An exosomal-carried short periostin isoform induces cardiomyocyte proliferation

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Introduction: Although a small number of cardiomyocytes may reenter the cell cycle after injury, the adult mammalian heart is incapable of a robust cardiomyocyte proliferation. A function for periostin as a regulator of cardiomyocyte proliferation has been proposed but remains controversial. Alternative splicing of the human periostin gene results in seven isoforms lacking sequences between exons 17 and 21. We previously reported that Exosomes (Exo) secreted by human cardiac explant-derived progenitor cells (CPC) express periostin. Here, we investigate whether these vesicles stimulate cardiomyocyte cycling.

Methods: Exo were isolated from CPC conditioned medium by Size Exclusion Chromatography. Exo fractions were analyzed by Western blot for the presence of POSTN as well as specific Exo markers (TSG101, Syntenin, Alix). POSTN-depleted Exo (ExoCPC_SiPOSTN) were obtained by transfecting CPC with specific siRNA. In vitro active DNA synthesis was assessed on primary cell culture of rat neonatal CM and hiPS-CM. In vivo CM proliferation was evaluate in both, newborn animals intraperitoneal injected by Exo and myocardial infarction (MI) adult model.

Results: Proteomic analysis show that CPC exosome carry a short periostin isoform. ExoCPC, but not ExoCPC_SiPOSTN, were able to induce cardiomyocyte proliferation in vitro and in vivo. Periostin carried by CPC promoted phosphorylation of focal adhesion kinase (FAK), actin polymerization, and nuclear translocation of Yes-associated protein (YAP) in cardiomyocytes. Knocking down of periostin or YAP, or PF-573228-mediated blockade of FAK phosphorylation nullified Exo-induced proliferation.

Conclusions: In conclusion here we showed, for the first time, that CPC-secreted Exo promote cardiomyocyte cell cycle-reentry through a short periostin isoform, while the full-length periostin was inert. Finally, this data are the first step to understand the isoform-specific mechanisms of periostin role in myocardial regeneration.

Disclosure: Nothing to disclose

P13

Target organ damage and diagnosis of ST-segment elevation myocardial infarction influence extracellular vesicle surface signature

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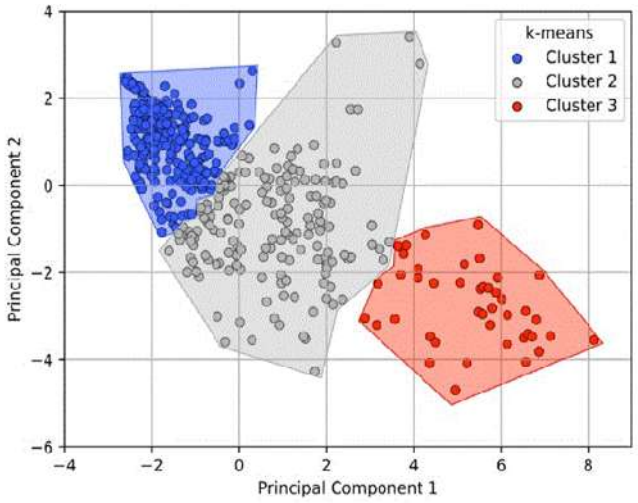
Introduction: Secreted extracellular vesicles (EV) are membrane-bound nanoparticle naturally released from living cells. EV have the potential as biomarkers, since their content, might provide useful information about the pathophysiology of specific diseases. We have previously shown that ST-segment elevation myocardial infarction (STEMI) significantly affects surface profile of EV. Here we aimed at dissecting specific EV signature that may define organ damage versus STEMI.

Methods: Fifty-two patients with a diagnosis of STEMI and 404 subjects without cardiovascular events were included in the analysis. Serum EV were isolated and analyzed for the expression of 37 EV surface antigens by flow cytometry. Unsupervised learning algorithm (k-mean clustering) was applied for clustering patients on the basis of EV signature.

Results: Based on the fluorescence intensity of EV-surface antigens, the k-means algorithm classified patients in three clusters (cluster I, 254 patients; cluster II, 157 patients; cluster III, 45 patients). Prevalence of microalbuminuria (MA), left ventricular hypertrophy (LVH), and target organ damage (TOD, defined as presence of MA and/or LVH) progressively increases from cluster I to cluster III with an average 6.2-fold increases. Patients with a diagnosis of STEMI were distributed as follow: 8.5%, 25.2% and 35.4% in clusters I, II and III, respectively. Markers from activated platelets (CD41b, CD42a, CD62P), leucocytes (CD20, CD25, CD40, CD44) as well as from endothelial cells (CD31, CD105) were highly expressed onto circulating EV from patients of cluster III. EV specific signature obtained by unsupervised learning allowed the accurate classification of patients according to an increasing prevalence of TOD or diagnosis of STEMI.

Conclusions: Our preliminary data showed that analysis of EV surface antigens, obtainable from minimally invasive blood sampling, may mirror the presence of TOD or STEMI, thus displaying a potential role as biomarker in the context of cardiovascular disease.



[Principal component analysis was used to visualize patient clustering according to k-means algorithm]

Disclosure: Nothing to disclose

P14

Relationship between atrial electrical activity and left atrial mechanics

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Introduction: Prolonged P-wave duration (PWD) is indicative of delayed intra and/or interatrial conduction and is associated with higher risk of atrial fibrillation. Recently, left atrial (LA) strain measured by speckle-tracking echocardiography has been used to evaluate LA mechanics. The aim is to evaluate the relation between atrial electrical activity (P-wave duration) on a surface electrocardiogram (ECG) and LA mechanics.

Methods: A subset of participants from the population-based SKIPOGH II study underwent a standard 12 lead surface ECG as well as a complete transthoracic echocardiographic study. Peak atrial longitudinal strain (PALS, LA reservoir function measure) and peak atrial contraction strain (PACS, LA pump function marker) were measured. P-wave duration was assessed by automated analysis of the ECG.

Results: A total of 303 participants with complete ECG and strain data were identified. Mean age was 49 years and 54% were women. Mean BMI was 25.6kg/m2. Additional comorbidities were: hypertension (28%), diabetes (3%), hypercholesterolemia (12%), and smoking (28%). CHA_2DS_2-VASc Score was ≥2 in 25%. In univariate analysis, PWD was strongly correlated to both PALS (P< 0.001) and PACS (P=0.004). In multivariate analysis, the association with PWD remained significant for PALS (p< 0.001) and PACS (p=0.003) after adjustment for body surface area, LA volume, CHA_2DS_2-VASc Score and familial clustering (Table).

Conclusion: In the general adult population, LA function was associated to atrial electrical remodeling. Longitudinal studies are needed to assess, whether LA function may serve as a risk marker for atrial arrhythmias.

Relation to p-wave duration	Coef	95%-Confidence Interval	p
PALS (%)	-0.45	-0.71 — -0.20	<0.001
PACS (%)	0.69	0.23 —1.15	0.003
CHA2DS2-Vasc Score	3.02	0.90 — 5.14	0.005
LA volume (ml)	0.14	0.014 — 0.26	0.03
Body surface area (m2)	9.51	-1.73 — 20.8	0.1

[Table]

Disclosure: Nothing to disclose

Rhythm disorders

P15

Screw-in attempts and implantation success in permanent His-Bundle lead implantation

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Introduction: Right ventricular apico-septal pacing is effective and safe, but results in dyssynchronous ventricular activation and may be associated with an increased risk of heart failure. Permanent His-bundle pacing may provide more physiological electrical activation of the ventricles. Successful His-bundle lead implantation is challenging due to the small anatomical target area and technical limitations of the available implantation tools. Multiple screw-in attempts may be required and prolong procedure duration. As His-bundle capture may not be achievable in all patients, we aimed at evaluating the number of total screw-in attempts warranting to abandon His-lead implantation during implantation procedure.

Methods: We prospectively collected data of all His-bundle implantation attempts at our centre from 08/2018 to 12/2020. The first 50 of all implantation attempts were excluded to account for operator learning curve. A minimum of 13 His-Bundle implantation attempts were performed by an individual operator. Successful His-lead implantation was defined as physiological stimulation of the ventricles at acutely acceptable thresholds (< 2.0 V/ 1.0ms, < 1.5 V/ 1.0ms in pacing dependent patients). The number of screw-in attempts and the decision to abandon His-bundle pacing strategy was at the operator's discretion.

Results: 38 unselected patients (median age 70 years [interquartile range 61-76], 33% female) with a perceived high pacing proportion in the ventricles were included in the analysis. Median count of screw-in attempts in successful and failed interventions was 2 (range 1-8) and 6 (range 3-13), respectively. After 5 and 6 unsuccessful attempts, successful His-bundle capture was achieved with additional attempts in only 11% and 4% of cases. Intervention duration was positively correlated with the number of screw-in attempts (p = 0.003; Spearman's correlation coefficient 0.544).

Conclusion: To balance implantation success with procedure duration, the number of screw-in attempts during permanent His-bundle pacing implantation may be limited to 5-6 with consideration of an alternative pacing strategy thereafter.

Disclosure: Nothing to disclose

P16

Efficacy and safety of a high power short duration ablation-index guided protocol for pulmonary vein isolation using a single catheter

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Background: Catheter ablation for atrial fibrillation (AF) is the most common performed electrophysiological procedure. The cost of this procedure remains high. To improve health care utilization, we aimed to compare the efficacy and safety of a minimalistic, streamlined single catheter ablation approach using high power short duration ablation-index guided protocol (HPSD) vs. a standard single catheter protocol.

Methods: A circular mapping catheter free PVI with a single transseptal puncture was performed in 91 patients. A CARTO map was performed with the ablation catheter. Pacing maneuvers were used to confirm exit block. Procedural characteristics and success rates were compared using HPSD- vs. a standard ablation-protocol. Freedom from recurrence was defined as a 1-year absence of AF episodes > 30 s, beyond the 3-month-blanking-period.

Results: Using the HPSD-protocol the median procedure, map and RF ablation time were significantly shorter in the HPSD group compared to the standard group, 84 (IQR 76-100)vs. 118 minutes (IQR 104-141), 12 (IQR 10-16) vs. 18 minutes (IQR 15-21) and 1036 (898-1184) vs. 1949 seconds (IQR 1693-2261), respectively, P < .001 for all. First-pass-PVI was achieved using the HPSD-protocol in 23 patients (74%) and the standard-protocol in 30 patients (53%), p=0.08. The residual gap was identified using the ablation catheter only in all patients. No procedural complication were observed. At 12 months follow-up, 60 (89.6%) patients remained free from AF with no differences between groups.

Conclusions: A minimalistic, CMC-free HPSD-guided PVI approach is very efficient, safe, likely cost-saving, and associated with excellent clinical outcomes at 1 year.

Disclosure: Nothing to disclose

P18

MANual vs. automatIC Local Activation time annotation for guiding Premature Ventricular Complex ablation procedures (MANIaC-PVC study)

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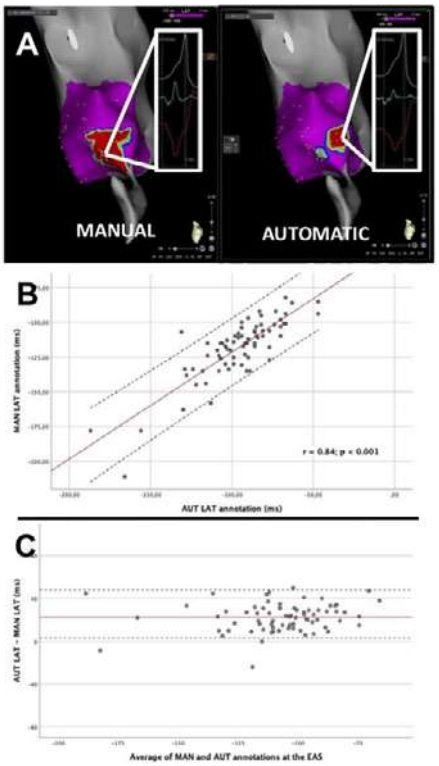
Aims: To assess potential benefits of a local activation time (LAT) automatic acquisition protocol using wavefront annotation plus an ECG pattern matching algorithm during PVC ablation procedures.

Methods: Prospective, randomized, controlled and international multicenter study (NCT03340922). 100 consecutive patients with indication for PVC ablation were enrolled and randomized to automatic AUT (n=50) or manual MAN (n=50) LAT annotation protocols using the CARTO3 navigation system. The primary endpoint was mapping success. Clinical success was defined as a PVC-burden reduction of ≥ 80% in the 24-h Holter within 6 months after the procedure.

Results: Mean age was 56±14 years, 54% men. The mean baseline PVC burden was 25±13%, and mean LVEF 55±11%. Baseline characteristics were similar between the groups. The most frequent PVC-SOO were RVOT (41%), LV (25%), and LVOT (17%), without differences between groups. RF time and number of RF applications were similar for both groups. Mapping and procedure times were significantly shorter in the AUT-arm (25.5±14.3 min vs. 32.8±12.6 min, p=0.009; and 54.8±24.8 min vs. 67.4±25.2, p=0.014, respectively), while more mapping points were acquired [136 (94-222) AUT vs. 79 (52-111) MAN; p< 0.001]. Mapping and clinical success were similar in both groups. There were no procedure-related complications. Figure A) comparison between manual (left) and automatic (right) annotation for one case. B) Correlation in LAT annotation at the EAS between the AUT and MAN-methods. C) Bland-Altman plot showing agreement between automatic and manual LAT annotations at the EAS identified.

Conclusion: The use of a completely automatic protocol for LAT annotation during PVC ablation procedures allows to achieve similar clinical endpoints with higher procedural efficiency when compared to conventional, manual annotation carried out by expert operators.



[Example of Manual vs. automatic annotation. Graphics of agreement measures between methods.]

Disclosure: David Soto-Iglesias is an employee of Biosense Webster, Inc. Dr. Berruezo has received research funding and lecturing honoraria from Biosense Webster, Inc. The other authors have no other relevant affiliations or financial involvement with any organization or entity with a financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed. Dr Teres was funded by the Swiss Heart Rhythm Fountation research fellowship grant.

P19

Arrhythmic outcome of patients with inflammatory cardiomyopathies implanted with cardiac defibrillators: a single centre experience

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Introduction: Arrhythmia management remains a challenge in patients (pts) with inflammatory cardiomyopathies and little is known about the clinical characteristics affecting the arrhythmia burden on the long term. We aim to identify clinical predictors of ICD therapies among pts with inflammatory cardiomyopathies (CMP).

Methods: We included consecutive ICD pts implanted in our centre over the last 10 years in a context of an inflammatory CMP. Data from implant, device checks and clinical follow-ups were retrospectively collected.

Results: A total of 16 pts were identified (11 males, age 50±13 years, LVEF 48.4±15.9%). Based on the revised 2019 Japanese Circulation Society criteria, a diagnosis of cardiac sarcoidosis was established in all cases. Secondary prevention of sudden cardiac death (SCD) was the indication for ICD implant in 50% of the pts. In 5 (31%) cases a CRT-D device was implanted because of concomitant LV systolic dysfunction and a high-grade AV block.

During a median follow-up of 5 (0.9—6.6) years, 9 pts (56%) received ≥ 1 appropriate ICD treatment for ventricular tachycardia (VT) episodes (ATP only in 3 cases, ATP and shocks in 6 cases) with a median time lag from implant of 65.5 (57.0—314.8) days. Of these 9 pts, 6 were initially implanted for secondary prevention of SCD. At the time of ICD therapies, 8 pts were under immunosuppressive treatment and 3 under antiarrhythmic drugs. Seven pts underwent a cardiac ^{18}F-FDG PET scan (median time lag from ICD therapies -66 [-68.5—35.5] days) and an abnormal FDG uptake indicative of an active inflammation was documented in all cases. After optimisation of antiarrhythmic drugs, a VT ablation procedure was performed in 3 pts during the first 6 months following the ICD treatment because of recurrent VT. In another 3 pts a VT ablation was performed 2-5 years after the first ICD treatment and required stereotactic radioablation using a Cyberknife facility to achieve VT control.

Conclusion: In our series, pts affected by an inflammatory CMP and implanted with an ICD for secondary prevention of SCD appear to be at high risk of ICD treatment especially during the first months after implantation. This could be the consequence of a more aggressive underlying inflammatory substrate especially during the first phase of the disease, whereas the occurrence of VT episodes at later stage is suggestive of a scar-related mechanism. However, further studies on larger populations are required to confirm these observations.

Disclosure: Nothing to disclose

P20

Early experience with the programming challenges of novel leadless VDD pacemakers

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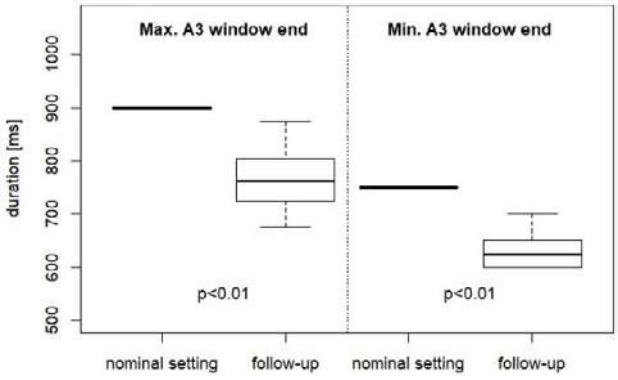
Introduction: Leadless pacemakers (PMs) overcome key limitations of conventional pacemakers. The latest generation of leadless PMs allows programming atrio-ventricular (AV) sequential stimulation of the ventricle in a VDD mode. Using an accelerometer, the mechanical atrial contraction is sensed as the atrial activity. This unique way of atrial tracking poses unfamiliar programming challenges. The aim of our study was to analyse the early performance of leadless VDD systems and to identify programming pitfalls.

Methods: We analysed the performance of all Micra AV PMs (Medtronic, United States) implanted at our centre. All procedures and follow-ups were carried out by trained electrophysiologists. Within one month after implantation, patients had a long-term ECG and an exercise stress test whenever feasible. Patient follow-ups took place at our outpatient clinic, and programming parameters were adjusted according to the patient's needs and manufacturer guidelines.

Results: 14 patients (50% females, median age 79 years) underwent leadless VDD PM implantation between 07/2020 and 12/2020. All patients were in sinus rhythm. Two patients (14%) had permanent complete AV block. Programming deviations from nominal parameters were necessary in all patients to improve AV synchronous pacing. In particular, the range of the A3 window end required shortening. Moreover, the median sensed AV delay during follow-up was increased to 40ms (IQR 23-58ms), differing from the nominal settings (20ms, p=0.02) to improve residual intrinsic AV conduction. In contrast, the A4 sensitivity had to be adapted in two patients only. After a median follow-up of 2 months (interquartile range [IQR] 2-3 months), 81% (IQR 76-84%) of all beats were considered AV synchronous.



[Nominal and optimal A3 window size]

Conclusions: This novel leadless VDD system achieves AV synchronous pacing in ~80% of time in selected patients. Our data warrants careful patient-specific adjustment of atrial sensing parameters. Larger studies are needed to identify critical programming parameters and strategies.

Disclosure: Andreas Haeberlin has received travel grants from Medtronic outside the submitted study. Fabian Noti has received travel grants and speaker honoraria from Medtronic outside the submitted study. Tobias Reichlin is a consultant for Medtronic and has received travel grants and institutional support outside the submitted study. The other authors have nothing to declare relevant to this study.

P21

Outcomes of catheter ablation of structural ventricular tachycardia: impact of underlying cardiomyopathy and left ventricular ejection fraction

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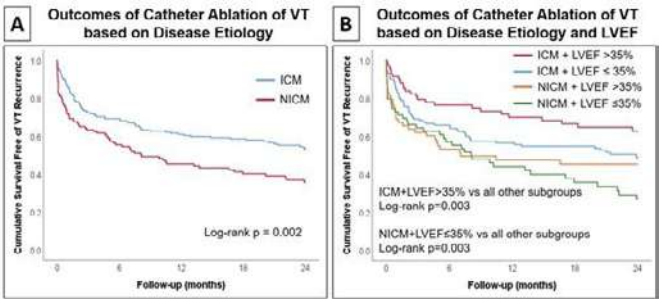
Introduction: Determining the rate of recurrence after catheter ablation of ventricular tachycardia (VT) in patients with structural heart disease is critical for risk stratification and patient counseling but there is paucity of clinical predictors. This study assessed the impact of the underlying etiology and of left ventricular ejection fraction (LVEF) on outcomes of structural VT ablation.

Methods: Data of patients referred for catheter ablation of structural VT between 2013 and 2019 at two tertiary referral centers was retrospectively analyzed. VT ablation was performed using a 3D electroanatomic mapping system. All inducible VT morphologies were targeted by ablation, and additional substrate modification was performed at the discretion of the operator. The primary outcome was recurrence of sustained VT during follow-up.

Results: Overall, 322 patients (median age 69 [IQR 61-75] years; 12% women, LVEF 35% [25-43%], 59% with LVEF ≤35%), including 202 (63%) with ischemic cardiomyopathy (ICM) and 122 (37%) with non-ischemic cardiomyopathy (NICM) were enrolled. A history of prior VT ablation was present in 96 (30%) patients. Overall, freedom from VT at 24 months was observed in 50%. In multivariate analysis, underlying disease (NICM vs ICM hazard ratio (HR): 1.76 (95% confidence interval [CI] 1.28-2.41), p< 0.001) and LVEF (HR: 0.98 (95%CI 0.97-0.99); p=0.007) were the only predictors of VT recurrence. Freedom from VT was higher in ICM than in NICM patients (57% vs 39%, log rank p=0.002, Figure panel A). Binary analysis according to LVEF showed a trend for freedom from VT recurrence at 24 months in patients with LVEF ≤35% vs >35% (46% vs 57%, log rank p=0.079). In analysis based on both disease etiology and LVEF, ICM patients with LVEF >35% had the highest freedom (66%, log-rank p=0.003), whereas NICM patients with LVEF ≤35% had the lowest freedom from VT recurrence at 24 months (32%, log-rank p=0.003, Figure panel B).

Conclusion: In patients with structural heart disease undergoing VT ablation, disease etiology determines ablation outcome. LVEF helps to stratify further the risk for VT recurrence in etiological subgroups by identifying highest and lowest risk patients.



[Figure. Outcomes of Catheter Ablation of Structural Ventricular Tachycardia]

Disclosure: The spouse of Dr. Seiler is an employee of Boston Scientific; there is no perceived conflict of interest.

P22

Relationship between the posterior atrial wall and the esophagus: pre- and Intra-procedural three-dimensional multimodality imaging for esophageal position

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Introduction: Pulmonary vein isolation (PVI) may result in severe esophageal complications. Stability of the esophageal position at the level of the posterior atrial wall was analyzed from one procedure to another and during a single procedure.

Methods: First, multidetector computerized tomography (MDCTs) of the first PVI and the redo intervention (Redo group) were segmented with ADAS3D to compare the esophageal position (Figure A). Second, three imaging modalities were compared for the same procedure (multi-image group):

i) preprocedural MDCT;

ii) intraprocedural fluoroscopy obtained with theTEE probe in place with CARTOUNIVU™; and

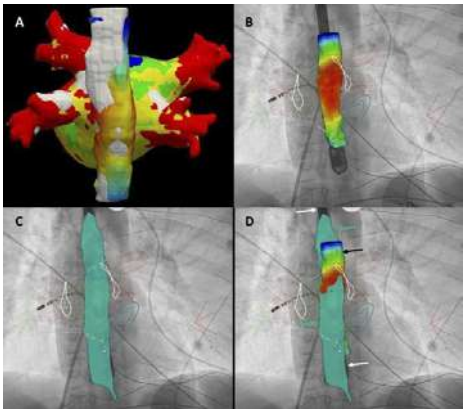
iii) esophageal fast-anatomical map (FAM) obtained at the end of the procedure (Figure D).

Ablation procedures were performed under general anesthesia. The 3D correlation of the esophageal position acquired with different techniques, was computed in Matlab by semiautomatic segmentation analysis.

Results: 35 patients were analyzed for the Redo group. Mean age 61±10 years, mean LVEF 57±7%, mean LA diameter 43±5 mm, median time since previous ablation (and therefore between MDCT acquisitions) was 6 months (IQR 3-9). Mean atrio-esophageal distance

for both MDCTs was 1.2 ± 0.6 mm. The esophageal trajectory as related to the atrial posterior wall was left for 20 (57%) patients, central for 6 (18%) patients, and right for 3 (9%) patients, left-central for 4 (11%) patients, and right-central for 2 (5%) patients. There was a 91 ± 5% correlation on the esophageal position between the first procedure and the redo procedure MDCT. In 3 cases the position was clearly different with a correlation of only 40 ± 22%. The multi-imaging group was composed of 100 patients, mean age 61±10 years, mean LVEF 56±7%, mean LA diameter 39±6 mm. The esophageal trajectory as related to the LA posterior wall was left for 55 (55%) patients, central for 23 (23%) patients, and right for 9 (9%) patients, left-central for 8 (8%) patients, and right-central for 5 (5%) patients. The correlation between MDCT and CARTOUNIVU™ was 82 ± 10% (Figure B); between MDCT and ESOFAM 80 ± 12% (Figure B); and between ESOFAM and CARTOUNIVU™ 83 ± 15% (Figure C).

Conclusions: There is a high stability of the esophageal position between procedures and from the beginning to the end of the procedure. This observation needs to be tested for its clinical utility by designing studies (AWESOME Trial, NCT04394923) that take into account the esophagus distance print to modulate RF delivery.



[Multimodality imaging esophageal position comparison (see text for reference)]

Disclosure: Dr. Berruezo is stockholder of ADAS 3D Medical. Dr. Soto-Iglesias is an employee of Biosense Webster. The other authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

P23

Sex-specific differences in adverse outcome events among patients with atrial fibrillation

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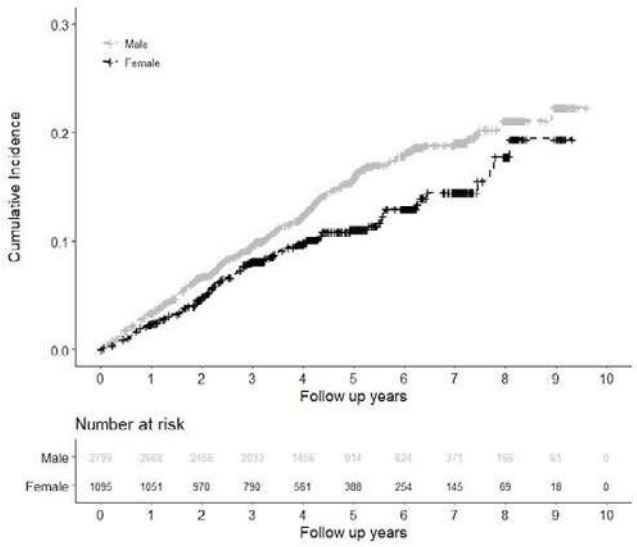
Introduction: Controversial data have been published about whether during long-term follow-up women with atrial fibrillation (AF) have a higher risk of adverse events than men.

Methods: We prospectively followed 3894 patients (28% women) with previously documented AF for a median of 4.02 (3.00; 5.83) years. The primary outcome was a composite of ischemic stroke, myocardial infarction, and cardiovascular death. Secondary outcomes included the individual components of the composite outcome, hospitalization for heart failure, major and clinically relevant non-major bleedings, stroke or systemic embolism and non-cardiovascular death. We used Cox proportional-hazards models to compare outcomes between men and women, and to adjust for differences in comorbidities and risk factors.

Results: Mean age was 73.1 years in women versus 70.8 years in men. Men more often had a history of coronary artery disease (32% versus 15%), heart failure (25% versus 21%) and diabetes mellitus (18% versus 11%), while woman had more AF-related symptoms (78% versus 62%). The incidence per 100 patient-years of the primary outcome was 2.46 in women vs. 3.24 in men (adjusted Hazard Ratio (aHR) 0.74; CI 95%, 0.58-0.94, p=0.01). Women died less frequently from cardiovascular (aHR 0.57; CI 95%, 0.41-0.78, p< 0.001) and non-cardiovascular causes (aHR 0.68; CI 95%, 0.47-0.98, p=0.04). There were no sex-specific differences in stroke (incidence 1.05 in women versus 1.00 in men; aHR 1.02; CI 95%, 0.70-1.49, p=0.93), myocardial infarction (incidence 0.67 versus 0.72; aHR 0.98; CI 95%, 0.61-1.57, p=0.94), major and clinically relevant non-major bleeding (incidence 4.51 versus 4.34; aHR 0.95; CI 95%,0.79-1.15, p=0.63), and heart failure hospitalization (incidence 3.28 versus 3.07; aHR 1.06; CI 95%, 0.85-1.32, p=0.60).

Conclusion: While in our cohort women had a lower risk of death than men, there was no significant difference in stroke and other cardiovascular outcomes.



[Cumulative incidence of the primary composite outcome stratified by sex]

Disclosure: Nothing to disclose. The other authors have received support outside of submitted work

P24

Sex differences of vascular brain lesions in patients with atrial fibrillation

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Introduction: Sex differences of vascular brain lesions in patients with atrial fibrillation (AF) have not been thoroughly investigated but identification may help better understand AF management.

Methods: We included 1'743 patients (27% female) with known AF from the multicenter SWISS-AF study in Switzerland who had

brain MRI at inclusion. We compared large noncortical or cortical infarcts (LNCCIs), small noncortical infarcts (SNCIs), microbleeds (MB) and white matter lesions (WML, defined as Fazekas score ≥ 2 for moderate or severe degree) between men and women. Lesion maps of 1716 patients were co-registered to an age-specific template to compute voxel-based probability maps.

Results: Mean age was 72±9 years in men and 74±8 years in women. Overall, 20% of women and 24% of men had LNCCIs, 21% and 23% SNCIs, 21% and 23% MBs, and 59% and 52% moderate or severe WML, respectively. In multivariable logistic regression analyses, evidence for an association of female sex was not strong enough regarding the prevalence of LNCCI (odds ratio (OR) 0.86, 95% CI 0.64-1.13; p=0.28), SNCI (OR 0.82, 95% CI 0.62-1.09; p=0.18), LNCCI and SNCI (OR 0.86, 95% CI 0.67-1.09; p=0.21), MB (OR 0.91, 95% CI 0.68-1.21, p=0.51) and WML Fazekas score ≥ 2 (OR 1.15, 95% CI 0.9-1.48, p=0.27). However, data suggests that WML volume may be larger for females (β = 0.17, 95% CI 0.04-0.31; p=0.01). Lesion probability maps showed a right hemispheric preponderance of infarcts in both men and women, while WML were distributed symmetrically.

Conclusion: In our cohort women had greater volumes of white matter lesions than men, while volumes and prevalence for the other lesions did not seem to differ, as with WML prevalence. Our findings may emphasize the necessity to specifically target risk factors for cerebral small vessel disease in women with AF.

Table: Association between female sex and the log-transformed volume of brain lesions

	Univariable	Age adjusted model	Multivariable adjusted model
Volume (log – transformed)	β-coefficient (95% CI)	β-coefficient (95% CI)	β-coefficient (95% CI)
Large noncortical and cortical infarcts	-0.04 (-0.50; 0.43), p=0.88)	-0.04 (-0.51; 0.42, p=0.86)	-0.06 (-0.57; 0.44, p=0.80)
Small noncortical infarcts	-0.02 (-0.29; 0.25, p=0.89)	-0.02 (-0.29; 0.25, p=0.89)	0.13 (-0.16; 0.41, p=0.38)
Ischemic lesions (LNCCI and SNCI)	-0.16 (-0.56; 0.24, p=0.43)	-0.16 (-0.56; 0.24, p=0.44)	-0.06 (-0.48; 0.36, p=0.78)
White matter lesions, total	0.28 (0.14; 0.42, p<0.001)	0.13 (0.01; 0.26, p=0.04)	0.17 (0.04; 0.31, p=0.01)

Data are presented as β-coefficient and 95% confidence interval; Only patients with the respective brain lesion were taken into account for this analysis; Predictor of interest: Female sex; Multivariable adjusted model was adjusted for age, body mass index, smoking status, AF type (paroxysmal vs non-paroxysmal), systolic blood pressure, hypertension, diabetes mellitus, heart failure, coronary heart disease, sleep apnea, statin therapy, antihypertensive medication, oral anticoagulation, antiplatelet therapy. Missing values multivariable adjusted models: LNCCI n=3; SNCI n=2; Ischemic lesions n=4; WML n=16. LNCCI = large noncortical and cortical infarcts (including acute lesions); SNCI = small noncortical infarcts (including acute lesions); CI = Confidence interval.

[Table: Association between female sex and the log transformed volume of brain lesions]

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P25

Intracardiac dominant frequency, but not bipolar electrogram voltage, correlates with ablation outcomes in persistent atrial fibrillation

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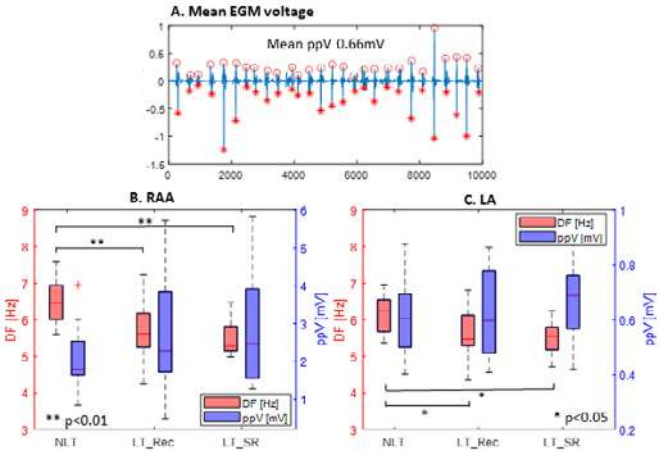
Introduction: Electrical remodelling (ER) in persistent atrial fibrillation (peAF) is associated with poor ablation outcomes. Dominant frequency (DF) and amplitude of intracardiac electrograms (EGMs) are surrogates of ER. We previously showed that peAF unresponsive to ablation displayed advanced ER as shown by high bi-atrial DF values. Here, we sought to determine whether the mean peak-to-peak voltage (ppV) measured during AF correlates with procedural AF termination and maintenance of sinus rhythm (SR).

Methods: 40 pts (61±8 y, sustained AF 19±11 m) underwent pulmonary vein isolation and left atrium (LA) ablation until peAF termination or cardioversion. 10-s bipolar EGMs were sequentially recorded before ablation at 13 LA sites using a 20-pole Lasso® catheter (Biosense Webster®) and at the right atrial appendage (RAA) using a 4-pole catheter (Supreme St Jude Medical®). The maximum ppV per AF cycle length was detected and mean value was computed as average of all detections across the 10-s window (Panel A). DF was defined as the highest peak within the power spectrum. LA DF and ppV are presented as average of all 13 LA sites.

Results: peAF was terminated within the LA in 28 pts (LT), while 12 pts (NLT) were not. Over a mean follow-up of 34±14 months, all NLT pts had a recurrence (Rec), while 20 LT pts presented a Rec (LT_Rec) and 8 pts remained in SR (LT_SR). RAA and LA DF displayed good predictive value for procedural AF termination (AUC 0.85 and 0.74 respectively, $p < 0.05$), whereas RAA and LA ppV were similar between subgroups (Panel B and C; p = ns)

Conclusion: Intracardiac DF, but not bipolar EGM voltage, correlates with procedural AF termination and maintenance of SR on the long term.



[Intracardiac dominant frequency and peak-to-peak electrogram voltage]

Disclosure: Nothing to disclose

P26

Nurse-led implant of cardiac monitors: first-year experience at a Swiss tertiary care center

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Introduction: Implantation of cardiac monitors (ICM) is a simple and straightforward procedure. However, with a growing demand for implants, workload significantly increases. In January 2020, we established a completely nurse-led ICM implantation service (N-IMPLANT) with a strict standard operating procedure. The present study aimed to analyze the safety, efficacy, and patient satisfaction of N-IMPLANT compared to physician-led implantation (P-IMPLANT).

Method: Consenting patients implanted with an ICM were included in a prospective registry, which collects patient characteristics, procedural and remote monitoring data. All patients were followed-up by phone interview four weeks after ICM implantation and a standardized questionnaire was completed.

Results: Of 99 patients implanted with an ICM (median age 71 years; 31% female), 73 (74%) were N-IMPLANT. Significantly more N-IMPLANT were performed in the outpatient clinic compared to P-IMPLANT (96% vs. 31%; p< 0.001). For wound closure, N-IMPLANT used wound glue in 25 (34%) and a single subcutaneous stitch in 48 patients (66%). Two N-IMPLANT patients experienced vaso-vagal reaction during implantation, yet no other adverse events occurred during N-IMPLANTs. Ninety patients (91%) completed the questionnaire. We found no difference between N-IMPLANTs and P-IMPLANTs regarding pain after implant, duration of pain, analgesic use, and presence and size of hematoma (see Table). All N-IMPLANT patients (100%) indicated to be satisfied with the implant procedure, whereas one P-IMPLANT patient expressed dissatisfaction because of too numerous staff present during the procedure. All patients in both groups described complete wound closure after two weeks. No device infection occurred in any group during follow-up and all devices adequately worked in remote monitoring.

Conclusion: Nurse-led implantation of cardiac monitors is effective without compromising patient safety and has excellent patient satisfaction. N-IMPLANT is a suitable model to reduce the workload of physicians.

	N-Implant	P-IMPLANT	P-Value
Age, years	72 (62, 78)	65 (60, 74)	0.11
Pain after implant	15 (23%)	5 (20%)	0.85
VAS (1-10))	3.0 (2.0, 4.75)	4.0 (3.0, 6.0)	0.63
Duration of pain, days	3.0 (2.0, 6.0)	8.0 (1.75, 18.00)	0.57
Analgesic	-	2 (40%)	0.053
Hematoma	25 (38%)	9 (37%)	0.97
Minor	22 (88%)	7 (78%)	
Medium	3 (12%)	2 (22%)	
Satisfied with implant	66 (100%)	23 (96%)	0.27

[Shown are numbers with percentages in parentheses or medians with interquartile ranges, as appropriate. VAS: visual analog scale.]

Disclosure: Disclosures: The spouse of Dr Seiler is an employee of Boston Scientific; there is no perceived conflict of interest.

P27

High burden of inappropriate alarms by the wearable cardioverter-defibrillator in obese patients - findings from the Swiss WCD Registry

B. Kovacs[1], H. Burri[2], A. Buehler[1], S. Reek[3], C. Sticherling[4], A. Linka[5], P. Ammann[6], A.S. Mueller[7], O. Dzemali[7], R. Kobza[8], M. Schindler[1], L. Haegeli[9], K. Mayer[10], U. Eriksson[11], J. Schlaepfer[12], T. Reichlin[13], J. Steffel[1], A.M. Saguner[1], F. Duru[1]

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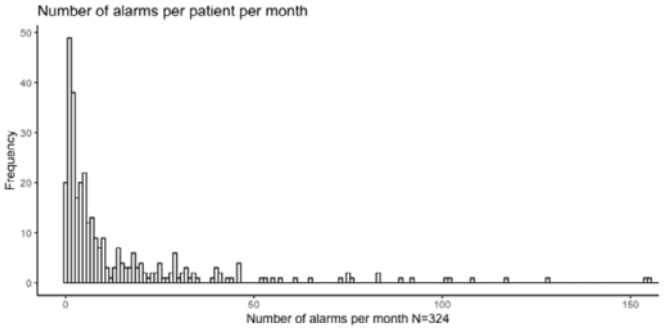
Introduction: The wearable cardioverter-defibrillator (WCD) uses surface electrodes built into the vest to detect underlying arrhythmia before initiating a treatment sequence. Before a shock is administered a series of alarms are emitted to warn the patient. Some patients frequently experience alarms. The aim of this study is to assess the alarm burden in patients and its possible impact on outcome.

Method: The Swiss WCD Registry is a nationwide retrospective observational registry including patients with a history of WCD use. Patients were included since 2011 until February 2018. Baseline characteristics and data on WCD usage were analysed. Recordings ≥30s of length were analysed and categorized as ventricular tachycardia or fibrillation (VT/VF), atrial fibrillation, supraventricular tachycardia and artefact. Shorter recordings were deemed inappropriate due to the detection algorithm of the WCD.

Results: A total of 10'653 alarms were documented in the total registry including 456 patients over a mean WCD wear-time of 2 months (±1.6). One hundred and thirty-two patients (28.9%) had zero alarms. A recording with a length ≥30 s was present in 2996. One hundred and eleven (3.7%) of these were VT/VF episodes. The remaining recordings were inappropriate arrhythmia detections: 2736 artefacts (91%), 117 atrial fibrillation episodes (3.7%) and 48 supraventricular tachycardia episodes (1.6%). Two-hundred and seven patients(45%) had ≥3 alarms per months, and 49 patients (10.7%) had ≥1 alarm per day. BMI ≥30kg/m^2 was significantly associated with ≥3 alarms per month (p=0.002), and increasing BMI correlated with increasing total number of alarms (p< 0.001). ≥3 alarms were not associated with a lower average daily wear time (20.8 vs 20.7 hours, p=0.785) or a decreased ICD implantation rate after stopping WCD use (48 vs 47.3%, p=0.156).

Conclusion: Inappropriate alarms emitted by the WCD are frequent and significantly associated with obesity. They did not lead to a decreased adherence to WCD therapy.



[Distribution of alarm burden in patients with at least one alarm per month (n=324). Cutoff at 150/month]

Disclosure: Nothing to disclose

P28

Diabetes is associated with atrial fibrillation phenotype, cardiac and neurological comorbidities: insights from the Swiss-AF study

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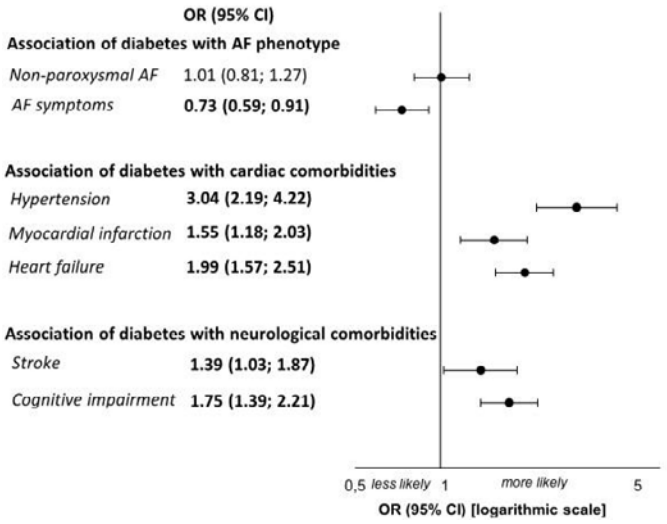
Introduction: Diabetes mellitus is a major risk factor for atrial fibrillation (AF). However, it remains unclear whether individual AF phenotype and related comorbidities differ between AF patients with and without diabetes. We therefore investigated the association of diabetes with AF phenotype, cardiac and neurological comorbidities in patients with documented AF.

Methods: Participants of the multicenter Swiss-AF study with available data on diabetes and AF phenotype were eligible. The primary outcomes were parameters of AF phenotype, including AF type (paroxysmal vs non-paroxysmal), AF symptoms (yes vs no), and quality of life (assessed by EQ-5D score). The secondary outcomes were cardiac (ie, history of hypertension, myocardial infarction, heart failure) and neurological comorbidities (ie, history of stroke, cognitive impairment). The cross-sectional association of diabetes with these outcomes was assessed using logistic and linear regression. Results were adjusted for age, sex, and cardiovascular risk factors.

Results: We included 2411 AF patients (27.4% women; median age, 73.6 years). Diabetes was not associated with non-paroxysmal AF (odds ratio [OR]=1.01; 95% confidence interval [CI]=0.81 to 1.27). Patients with diabetes less often perceived AF symptoms (OR=0.73; CI=0.59 to 0.91), but had worse quality of life (predicted mean difference in EQ-5D score: β=-4.54; CI=-6.40 to -2.68) than those without diabetes. Patients with diabetes were more likely to have cardiac comorbidities [history of hypertension (OR=3.04; CI=2.19 to 4.22), myocardial infarction (OR=1.55; CI=1.18 to 2.03), heart failure (OR=1.99; CI=1.57 to 2.51)] and neurological comorbidities [history of stroke (OR=1.39; CI=1.03 to 1.87), cognitive impairment (OR=1.75; CI=1.39 to 2.21)].

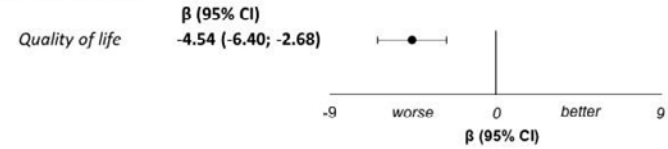
Conclusions: AF patients with diabetes less often perceive AF symptoms, but have worse quality of life, more cardiac and neurological comorbidities than those without diabetes. Patients with concomitant AF and diabetes may thus deserve more attentive care. Our findings further raise the question whether patients with diabetes should be systematically screened for silent AF.

Figure 1a. Multivariate adjusted OR and 95% CI are derived based on logistic regression. The vertical line represents an odds ratio of 1. Abbreviations: OR, odds ratio; CI, confidence interval; AF, atrial fibrillation.



[Fig. 1a: Association of diabetes mellitus with AF phenotype, cardiac and neurological comorbidities]

Figure 1b. Multivariate adjusted β and 95% CI are derived based on linear regression. The vertical line represents a β of 0. The quality of life score ranges from 0 to 100, with higher values indicating better quality of life. Abbreviations: β, beta regression coefficient; CI, confidence interval.



[Figure 1b: Association of diabetes mellitus with quality of life]

Disclosure: Nothing to disclose

P29

Distinctive characteristics of his bundle potentials in patients with atrioventricular nodal reentrant tachycardia

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Introduction: This study aimed to determine the signal characteristics of the HB potentials in atrioventricular nodal reentrant tachycardia (AVNRT) patients, and elucidate if these provide clues for identification of patients with slow pathway (SP), an electrical prerequisite for the develop ment of AVNRT.

Methods: We prospectively studied the electrophysiological findings of 162 consecutive patients with symptomatic AVNRT or atrioventricular reentry tachycardia (AVRT) due to an accessory pathway at the University Heart Center Zurich. All electrophysiological studies were performed in patients of both groups. The shortest conduction time of the slow pathway (A2H2) was defined as the first premature extrastimulus coupling interval after an AH jump. After diagnosis and before ablation of AVNRT or AVRT, HB potentials were extensively searched and tagged point-by-point using the CARTO 3-D electroanatomical mapping to determine the His cloud during sinus rhythm with the ablation catheter. The HB signal with maximal amplitude was labeled as HBmax. Three-dimensional mapping hallmarks of HBmax, center point of the coronary sinus (CS) ostium, and SP ablation location (ABL) in the standard right anterior oblique view (RAO 30°) were annotated for distance identification. The amplitude and duration of HBmax between the two groups were measured using endocardial tracings.

Results: The HBmax was 0.29±0.10 mV in AVNRT patients, whereas it was 0.17±0.05 mV in the AVRT group ($p < 0.0001$). Likewise, the HBmax duration was 22±5 ms in the AVNRT group and 16±3 ms in the AVRT group ($p < 0.0001$). The optimal HBmax cut-off to predict AVNRT was ≥0.22 mV with a sensitivity of 0.78 and specificity of 0.84. The distance between HBmax and CS ostium was correlated with the distance between HBmax and the successful ablation site (r^2=0.7174, 95% confidence interval 0.6101 to 0.7989, P=0.0004). The HBmax distance from the successful ablation site was positively correlated with SP conduction time (A2H2) (r^2=0.3368, 95% confidence interval 0.1515 to 0.4993, P< 0.00001).

Conclusions: HBmax amplitudes are higher and HBmax durations are longer in patients with AVNRT, as compared to those with AVRT. Moreover, the distance between HBmax and successful ablation site was positively correlated with the SP conduction time and with the distance from HBmax to the CS ostium.

Disclosure: Nothing to disclose

Heart failure

P30

Bloody transplants! Impact of prior sternotomy on transfusion rate in heart transplantation

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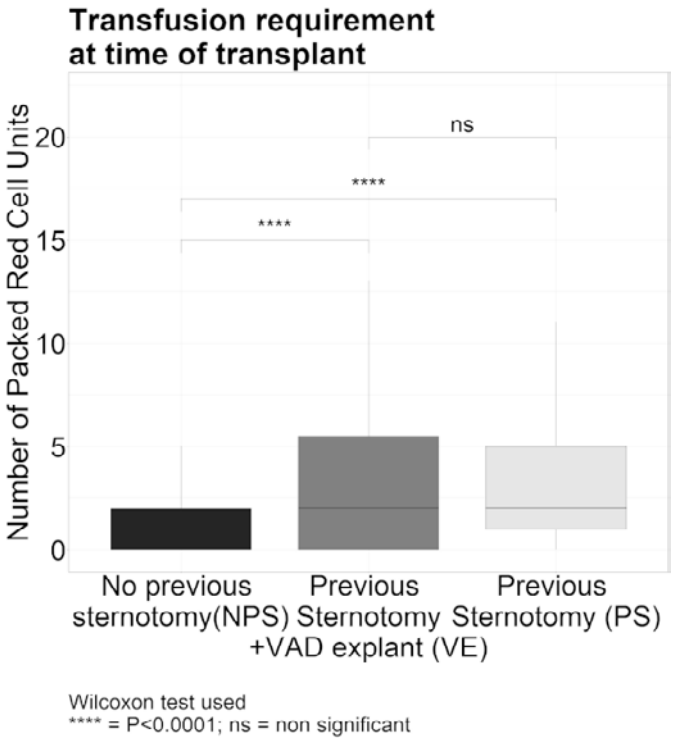
Introduction: Ventricular Assist device (VAD) patients are at higher risk of bleeding at the time of heart transplant. Moreover, the quantity of packed red cells (RBC) received during the first 24 hours postoperatively corelates with increased mortality. Whether this is related to surgical issues or due to the anticoagulation associated with VADs is unknown.

Methods: Operative transfusion requirements and demographics data was obtained from our hospital cardiothoracic database for all patients who underwent heart transplantation between 2006 and 2020. Patients were divided into three groups - No previous sternotomy (NPS), VAD explant (VE) and Previous (non-VAD) Sternotomy (PS). Biventricular VAD, total artificial heart explants and multi-organ transplants were excluded.

Results: 428 patients were included in the analysis. Median age was 54 years (IQR 43-61), 131 patients were female (31%), median eGFR was 78ml/min/1.73m2 (IQR 54-95). 236 patients (54.2%) were in the NPS group, 133 (31.1%) in the VE group and 62 patients (14.6%) in the PS group. There was a strong association between blood transfusion and re-do sternotomy (both VE and PS groups) (p< 0.001), but no difference between the VE and PS groups. A lower mean eGFR (< 78ml/min/1.73m2) was associated with higher transfusion requirement (P< 0.001).

Conclusion: Sternotomy patients (with or without VAD explant) demonstrated a higher RBC transfusion requirement compared to clean skin, and these patients tended to have a lower renal function post-operatively. The lack of difference in RBC requirement between VE and PS patients, suggest that anticoagulated VAD patients who have received Vitamin K do not necessarily have higher bleeding risk than other re-do sternotomy patients.



[Median transfusions requierment per procedure]

Disclosure: Nothing to disclose

P31

Release the pressure! Does Jugular venous pressure predict rejection in cardiac biopsy?

B. Schnegg[1,2], R. Deveza[2], F. Koppe[2], P. Macdonald[2], C. Hayward[2]

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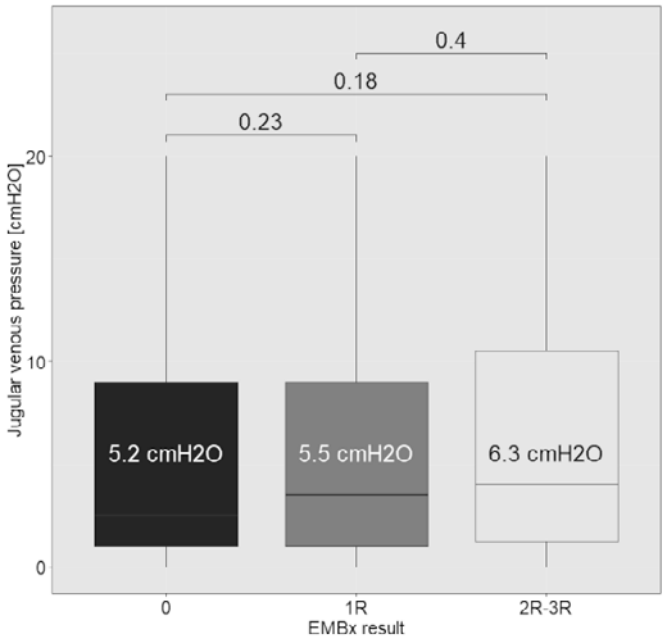
Introduction: Rejection in heart transplant recipients is often diagnosed by surveillance biopsies as most patients are asymptomatic. Nevertheless, rejection, if left untreated, can produce progressive diastolic dysfunction followed by systolic heart failure. This in turn will cause an increase in central venous pressure due to decreased ventricular compliance. With this in mind we sought out to determine if elevated central venous pressures measured invasively at the time of the biopsy correlate with the presence of rejection.

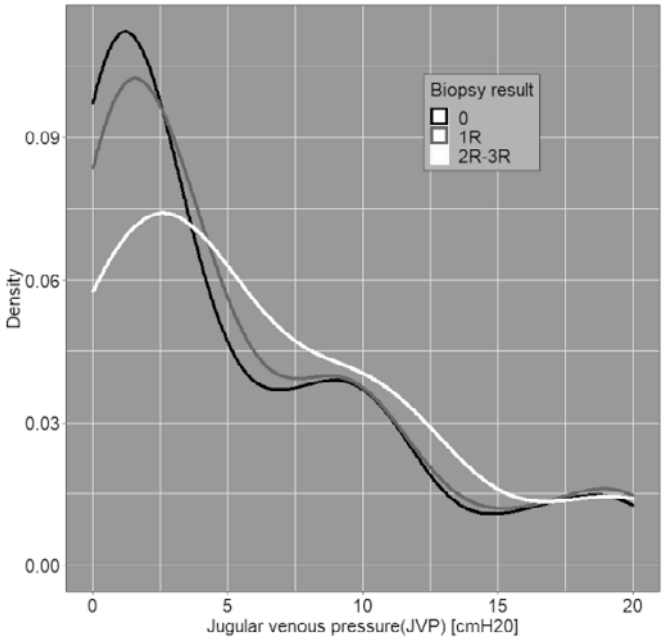
Methods: Patients undergoing endomyocardial biopsy between June and October 2020 were included. The invasive JVP was measured before and after the procedure by measuring the height of the blood column in the side port of the sheath when open to the atmospheric pressure. The biopsy results were reported according to the 2004 ISHLT revision. Differences in median JVP for each biopsy result group (0, 1R, 2R, 3R) were compared using a Mann-Whitney test. The histogram density for each biopsy group was graphed using a Kernel density plot.

Results: Eighty-four patients underwent one or more endomyocardial biopsies, with a total of 374 biopsies performed. Of all procedures, 187 were grade 0 for rejection, 168 were grade 1R and 18 were grade 2R. One patient had Grade 3R rejection (not shown in illustration) The median JVP was not statistically different between the three groups and the numerical difference was not clinically meaningful (figure 1). The Kernel density plot (figure 2) demonstrates the similarities between the groups.

Conclusion: In our dataset, there was no clinical or statistical difference in median invasive JVP and rejection grade between the biopsy result groups. One limitation is that we only had one patient with severe rejection (3R). Overall, our findings enforce the need for surveillance biopsies.



[Figure 1: Comparison of JVP by by EMBx result]



[Figure2: Kernel density plot of JVP by EMBx result]

Disclosure: Nothing to disclose

P32

Point of care with serial NT-proBNP measurement in patients with acute decompensated heart failure as a tool for therapy monitoring during hospitalization: the POC-HF study

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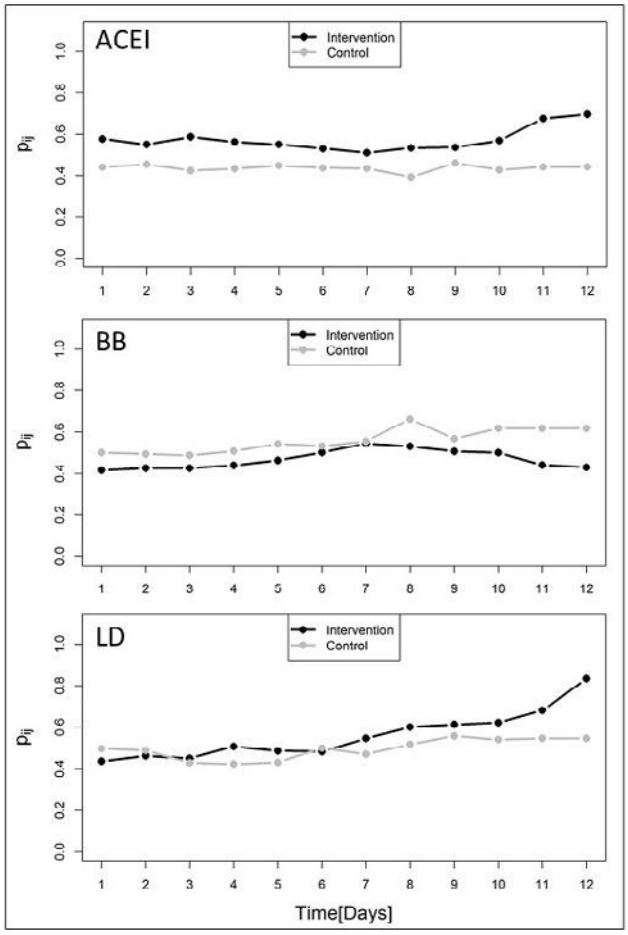
Introduction: Therapy guidance in heart failure (HF) is mainly based on clinical symptoms. Although the predictive value of N-terminal pro B-type natriuretic peptide (NT-proBNP) for morbidity and mortality in patients with HF was proven repeatedly, only few data are available on the efficacy of serial NT-proBNP measurement as a tool for therapy monitoring. Therefore, this pilot study's objective was to investigate the influence of serial NT-proBNP measurements on treatment decisions and outcome in patients hospitalized for acute decompensated HF (ADHF).

Methods: This randomized controlled pilot trial with 52 patients hospitalized for ADHF was conducted at the Cantonal Hospital Baselland, Switzerland. In the intervention group, NT-pro BNP was measured every second day during hospitalization and values were provided to the treating physician, while no serial measurements were done in the control group. HF therapy was left at the treating physicians' discretion. The primary endpoint consisted of dose adjustments made to HF medication during hospitalization, evaluated by longitudinal data analysis.

Results: Intervention and control group consisted of 26 patients each (mean age 80.1 vs. 79.6 years, male 73.1% vs. 53.8%, median NT-proBNP 6074 vs. 4666 pg/ml, mean NYHA class 2.6 vs. 2.7). Dosages of angiotensin converting enzyme inhibitors (ACEI), beta-blockers (BB), and loop diuretics (LD) showed strong group-time relationships (p=0.007, p=0.002, p=0.005), relative effects p_{ij} are shown in Figure 1. Thiazide diuretics were up-titrated in the intervention and down-titrated in the control group (+1.61 vs. -1.25mg metolazon equivalent, p=0.027). NT-proBNP decrease was more pronounced in the intervention than in the control group, although not statistically significant (-1650 vs. -898 pg/ml, p=0.338).



[Relative effects of group-time relationships derived by longitudinal analysis.]

Conclusion: Compared to solely symptom-guided management, serial NT-proBNP measurement may induce stronger up-titration of prognostically relevant HF medication and more frequent application of sequential nephron blockade in patients hospitalized for ADHF, demonstrating its potential as a tool for HF therapy optimization.

Disclosure: Nothing to disclose

P33

ICD-VAD compatibility, could you end up with a deaf ICD after VAD implantation?

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[1]Cardiology, Inselspital, Bern, Switzerland, [2]Cardiology, St-Vincent Hospital, Darlinghurst, NSW, Australia

Purpose: Most heart failure patients undergoing ventricular assist device (VAD) implantation are managed with guideline-based therapy including the implantation of defibrillation capable device (ICD). Prior to surgery, aggressive programming allowing therapy with lower threshold could be lifesaving, after surgery and haemodynamic stabilisation, the defibrillator should be reprogrammed to protect the patient against painful, unnecessary shocks.

Difficulties in interrogation of ICD in patients with both HeartMate-II (HM2) and HeartMate3 (HM3) devices have been previously reported, related to the VAD-produced electromagnetic interference (EMI).This interaction could lead to pacemaker inhibition or inappropriate shocks, but most cases result in a problem of communication between the ICD and the corresponding interrogating console.

Methods: An electronic search was performed (Medline, Embase, Ovide journal Google Scholar) to identify all articles and abstracts published on the topic until July 2019. Data pertaining to ICD/CRT device make and model and the VAD type were collected.

Results: We identified 473 publications. After removing duplicates, 182 publications were screened and 23 met inclusion criteria. After reading the full-texts, 14 publications were ultimately included and nine excluded. This data described 22 patients with device interrogation issues post VAD implantation, with the oldest publication from 2006. Two patients out of 22 (9%) were from HM3 patients. To regain control of the device complete replacement of the ICD/CRT/PM was performed in 10 patients, and in one the implantation side was changed. In eleven cases a shielding technique was successfully utilized.

Conclusion: Given the reported VAD-associated EMI interaction with ICD interrogation due to interruption of the handshake-signal to initiate ICD interrogation, it is likely all the variants of one specific ICD (1 lead, 2 lead, CRT) will also suffer from the same problem. More ex-vivo research is needed to better understand the phenomenon.

VAD type	ICD/PM/CRT brand and name
HM2	Abbott(SJM): Photon, Epic, Atlas, Atlas +,Frontier, Anthem
HM2	LivaNova(Sorin): Ovatio DR, Alto 2
HM3	LivaNova(Sorin): Paradym
HM3	Boitronic: Ilesto, Iforia, Lumax,

[VAD-ICD interaction]

Disclosure: Nothing to disclose

Coronary artery disease & acute cardiac care

P34

Determinants of career development in cardiology - results from a Swiss National Survey

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[1]Cardiology, University Hospital Bern, Bern, Switzerland, [2]Medical Sociology and Rehabilitation Science, Charité-University Hospital Berlin, Berlin, Germany, [3]Sitem Center for Translational Medicine and Biomedical Entrepreneurship, University of Bern, Bern, Switzerland, [4]Gender in Medicine, Charité-University Hospital Berlin, Berlin, Germany, [5]University Hospital Zurich, Zurich, Switzerland

Introduction: Despite the rising proportion of female medical students and specialized female doctors in Switzerland, the field of cardiology remains one of the most male-dominated. The goal of this study was to identify determinants and obstacles of career development for cardiologists with special regard to an academic and interventional career.

Method: Under the direction of the Swiss working group Women in Cardiology (IG-WIC) and in cooperation with the Charité University (Berlin, Germany), an online survey was conducted among Swiss cardiologists and cardiologists in training.

Results: 140 participants (43.6% female, 56.4% male; median age 45.0) were included. Women were more often single (27.9% vs. 10.1%, p=0.013) and less likely to have children (52.5% vs. 70.9%, p=0.034). If they had children, they were more likely to provide childcare themselves (37.5% vs. 10.7%, p=0.006) or to have interrupted their work in favour of parenting (40.6% vs. 8.9%, p< 0.001). A majority of women indicated a negative impact of their gender on their career development (78.7%), and 36.3% reported sexual harassment at their workplace. Women felt less supported in their professional training, especially concerning research activities. As a hindrance for pursuit of a career in academic medicine, both sexes stated lack of compatibility of work and family (44.6%) and the competitive work environment (55.4%) being most important. Women identified gender-specific disadvantages as one of the main reasons for not choosing an academic or interventional career.

Conclusions: Our study shows a high overall satisfaction among Swiss cardiologists and cardiologists in training with a high-quality training in health care, a good working atmosphere and finding joy in their work. However, the compatibility of work and family as well as training structure including mentoring systems and curricula could be improved. Moreover, several gender-specific aspects deserve to be addressed to eventually reach a higher gender balance in the field of cardiology.

Disclosure: Prof. Dr. Tanner has received educational grants from Biosense Webster, as well as a travel grant from Abbott, outside the submitted work. PD Dr. Dr. Haeberlin has received travel grants from Medtronic and research funding from Novartis, outside the submitted work. He was a consultant for Cairdac, co-founder and head of Act-Inno. The other authors have no potential conflict of interest to declare.

P35

CMR for post-myocardial infarct scar quantification: performance of human observers vs machine-learning-based algorithms in a large multi-national registry

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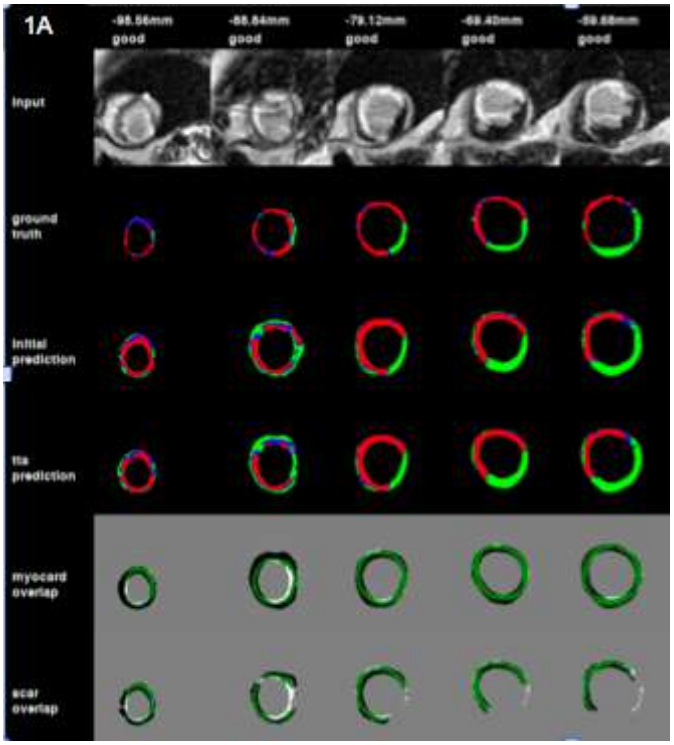
Background: Myocardial infarctions (MI) account for up to 30% of all deaths in industrialized countries and MI-related scars are recognized as the major predictor of pump failure and ventricular arrhythmias. Currently, late-gadolinium-enhancement (LGE) scar quantification is observer-dependent and time consuming. Machine learning (ML) now offers the potential to solve this problem.

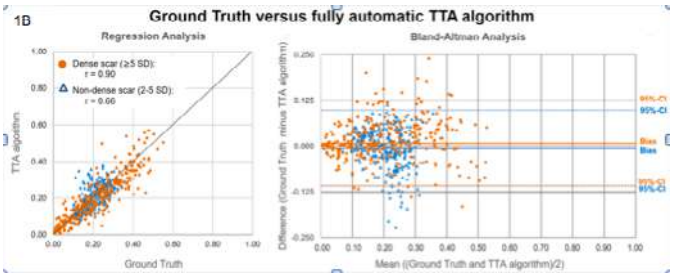
Methods: The prospective, international Derivate Registry collected demographics and CMR data of 20 European and US centers. A sub-set of 573 post-infarct subjects image quality of the LGE short-axis breath-hold images was determined (good, acceptable, sufficient, borderline, poor, excluded) and ground truth (GT) data was produced (endo-epicardial contours, 2 remote reference regions, artifact elimination) to determine non-infarcted myocardial mass and mass of dense (≥5SD above mean-remote) and non-dense scar (>2SD to < 5SD above mean-remote). Data were then divided up into training (n=284) and test data (n=289). A Ternaus-network and several modifications, including test time augmentation (TTA), were tested with the GT labels. Algorithms performances were evaluated by dice metrics, Bland-Altman, and correlation analyses.

Results: An example is given in Figure 1A. In the test data, i.e. in the data not used for training, the GT for dense and non-dense scar were 21.8±13.3% and 20.2±6.0% of LV mass, respectively, vs the TTA-network with 20.1±12.8% (p< 0.0001) and 20.5±6-8% (p=0.36), respectively, Figure 1B. The TTA-network yielded the best results for 5SD and 2SD scar quantification with a SD of the differences vs GT of 6.0 and 5.3 percentage points (n=289), respectively. In the poor quality group, differences vs GT were 6.5 and 5.3 percentage points (n=28), respectively.

Conclusions: The presented ML-based algorithm can analyse multicenter CMR scar data fully automatically yielding scar mass that correlate with human-generated GT. Such a tool could facilitate scar quantification in clinical routine cardiology as it eliminates human observer variability and can handle large data sets.



[Figure 1A: Example. green: remote, red/blue: dense/non-dense scar. Overlap green=match]



[Figure 1B: Regressions and Bland-Altman plots for 5SD (brown dots) and 2SD (blue triangles) scars.]

Disclosure: Juerg Schwitter receives research support by Bayer Schweiz AG.

P36

Influence of adenosine and regadenoson on left ventricular ejection fraction, myocardial blood flow and hemodynamics in vasodilator ^{82}Rubidium PET

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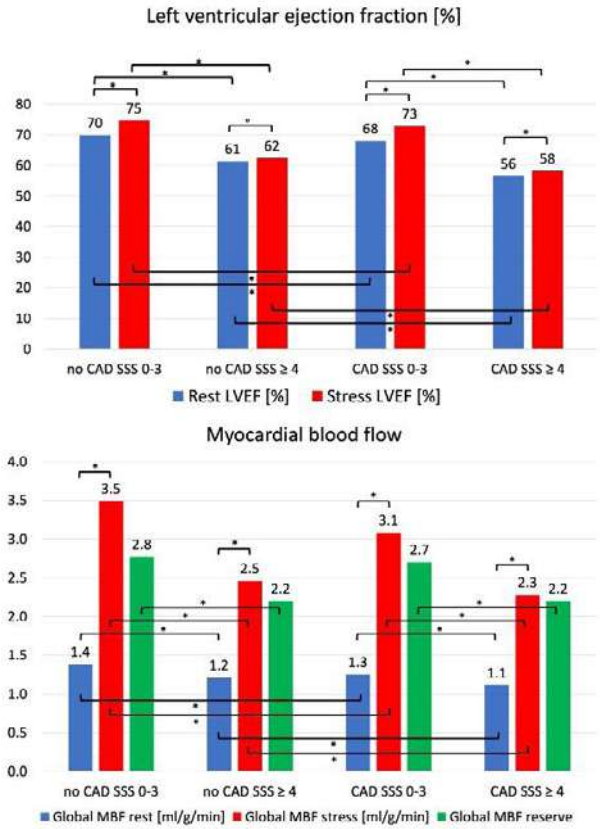
Introduction: Most ^{82}Rubidium-(Rb)-Positron emission tomography (PET) studies for myocardial perfusion, dipyridamole was used as vasodilator. Less data is available for adenosine and regadenoson. Therefore, the aim was to evaluate the influence of adenosine and regadenoson on left ventricular ejection fraction (LVEF), myocardial blood flow (MBF) and hemodynamics in vasodilator ^{82}Rb-PET.

Methods: Consecutive patients (n=2299) with suspected or known coronary artery disease (CAD) undergoing ^{82}Rb-PET were studied and compared according to CAD status and normal/abnormal PET (abnormal defined as summed stress score ≥4). Differences between stress and rest values (LVEF, MBF, hemodynamics) were calculated. The threshold of stress LVEF able to exclude a relevant ischemia (as defined by ≥10% myocardium ischemic based on SDS score) was assessed.

Results: Rest and stress LVEF differed significantly depending on CAD status and scan results. In patients with suspected CAD, rest/stress LVEF were 68±12% and 73±12% (p< 0.001), in patients with prior CAD 60±14% and 63±15% (p< 0.001). LVEF during stress increased 5±6% in normal compared to 1±8% in abnormal PET (p< 0.001). Global rest MBF (rMBF), stress MBF (sMBF) and myocardial flow reserve (sMBF/rMBF) were significantly higher in suspected CAD patients compared to prior CAD patients (1.3±0.5, 3.3±0.9, 2.6±0.8 and 1.2±0.4, 2.6±0.8, 2.4±0.8 ml/g/min, respectively, p< 0.001), and in normal versus abnormal scans, irrespective of CAD status (no CAD: 1.4±0.5, 3.5±0.8, 2.8±0.8 and 1.2±0.8, 2.5±0.8, 2.2±0.7; known CAD: 1.3±0.4, 3.1±0.8, 2.7±0.8 and 1.1±0.4, 2.3±0.7, 2.2±0.7 ml/g/min, respectively, p< 0.001). LVEF and hemodynamic values were similar for adenosine and regadenoson stress. Stress LVEF ≥70% excluded relevant ischemia with a negative predictive value (NPV) of 94% (CI 92-95%).



[Figure 1: Left ventricular ejection fraction and myocardial blood flow values stratified by different groups]

Conclusions: Rest/stress LVEF, LVEF reserve and MBF values are lower in abnormal compared with normal scans. Adenosine and regadenoson seem to have similar effect on stress LVEF, MBF and hemodynamics. A stress LVEF ≥70% has a high NPV to exclude relevant ischemia.

Disclosure: Nothing to disclose

P37

Feasibility and prognostic value of adenosine stress-perfusion cardiovascular magnetic resonance in patient with MR-conditional pacemakers

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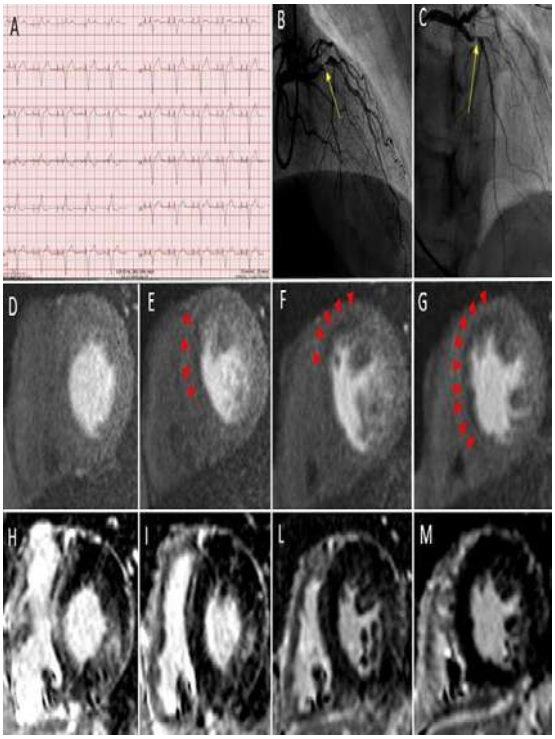
Background: The use of stress perfusion-CMR remains limited in patients with implantable devices even if MR-conditional due to the perceived risk of artefacts or of adenosine induced arythmia. The aim of the study was to assess the global feasibility and the prognostic value of stress perfusion CMR in patients with implanted pacemakers (PM).

Materials and methods: We conducted a single-center longitudinal study of consecutive patients with an implantable device referred for stress CMR using a 1.5 T unit (Siemens Healthcare, MAGNETOM Aera, Erlangen-Germany). The CMR protocol was performed according current guidelines and devices were set to MR-mode. Cardiac follow-up was obtained from medical records and by direct contacts with the referring physicians. All patients gave written informed consent before study participation.

Results: A of 44 patients were identified of whom, 34 were PM-dependent. In these, the PM was set to DOO and VOO mode in 14 (32%) and 20 (45%) patients, respectively. Median follow-up was 4.6 years (range: 6months-7 years). No device damage or malfunctioning was present during and after CMR and no competitive atrial or ventricular stimulation was observed during examination. No adenosine induced arrythmia have been detected. On a visual scale, image quality was good in 95% of cases. 26% of cases had a perfusion deficit related to scar tissue, while 12% of patients had an ischemia-positive stress test (all of them with continuous pacing during stress test). In all ischemia-positive patients, significant coronary stenoses were confirmed by coronary angiography. In patients without inducible ischemia, 2 patients experienced a non-ST-elevation myocardial infarction after 6 months and 2 years, respectively, while no other cardiac complications or cardiac hospitalisations were recorded during follow up.

Conclusion: Adenosine stress-CMR is feasible and safe in PM-dependent patients. It provided good image quality with reliable ischemia detection and long term prognostic value in the short and long term. No device malfunctions were observed.



[Figure 1- positive Stress test in a patient PM-dependent]

Disclosure: Nothing to disclose

P38

Minimally invasive coronary artery bypass surgery: is this the treatment of choice for lone revascularization of the left anterior descending artery?

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Introduction: Coronary artery bypass surgery over a left thoracotomy is a minimally invasive alternative to sternotomy. Even though minimally invasive and advantageous on the long-term over percutaneous coronary interventions, there is a low uptake of this technique from the surgical community. Aim of this study is to assess the postoperative in-hospital outcomes including patency rate after minimally invasive coronary artery bypass surgery with the left internal thoracic artery on the left anterior descending artery.

Methods: We performed a retrospective analysis of the data of 39 patients undergoing minimally invasive coronary artery bypass surgery over a left thoracotomy in a single center in the period 2016-2020. Intraoperative bypass graft flow was assessed with transit time flow measurement and postoperative graft patency with computed tomography.

Results: Mean patient age was 61.7 years and 35 (89.7%) patients were male. 37 patients underwent single bypass grafting with the left internal thoracic on the left anterior descending artery and 2 patients underwent an additional bypass grafting with a sequential anastomosis of the left internal thoracic artery to the diagonal branch. There was no in-hospital mortality, postoperative myocardial infarction, cerebrovascular insult and reexploration for bleeding or cardiac tamponade. 2 (5.1%) patients required conversion to sternotomy. Median intraoperative graft flow was 27ml/min and median pulsatility index was 2.1. Postoperative computed tomography revealed patent bypass grafts in 37 (94.9%) patients. Reoperation was required in 2 (5.1%) patients with occluded grafts in postoperative computed tomography.

Conclusions: Minimally invasive coronary artery bypass surgery is associated with low perioperative morbidity and mortality, low incidence of conversion to sternotomy, and high graft patency rate. Minimally invasive coronary artery bypass surgery should be considered as the treatment of choice for lone revascularisation of the left anterior descending artery either as a standalone or as part of a hybrid procedure.

Disclosure: Nothing to disclose

P39

Early experience with the AMDS hybrid stent in the treatment of type A aortic dissection

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Surgical standard of care for type A aortic dissection remains ascending aorta and hemi-arch replacement with anterograde cerebral perfusion. Supra-aortic trunk ostia, distal arch and descending thoracic aorta are generally left untouched.
Recently, a new hybrid stent (AMDS Stent, Ascyrus Medical LLC) was approved as an adjunct to open treatment of type A aortic dissection. It is composed of an uncovered nitinol stent attached to a short Polytetrafluoroethylene (PTFE) felt ring. It is designed to be deployed in the aortic arch and descending aorta with the PTFE taken into the distal anastomosis.
Its goals include helping seal the distal anastomotic entry tear and stabilize the true lumen, thus reducing malperfusion and favoring positive remodeling of the arch and the descending aorta.
Three consecutive male patients with a mean age of 49±7 years and acute type A aortic dissection were operated on using the AMDS stent.
Double arterial canulation (femoral artery and supra-aortic trunks) was used in all patients. Aortic root was repaired during the cooling period followed by proximal graft anastomosis. Under systemic circulatory arrest, anterograde cerebral perfusion (10 ml/kg) and moderate hypothermia (27° celsius), the distal aorta was transected 15mm proximal to the supra-aortic trunks and the stent deployed. Distal reinforcement was performed by suturing the aorta layers between the stent PTFE ring and a band of Teflon felt. Distal anastomosis was completed with sutures passing through all the layers.
The stents could be delivered safely, without injury to the aorta or its branches.
All patients survived the operation without any malperfusion or embolic complications. Mean hospital stay was 11±3 days. One patient presented with late cardiac tamponade needing surgical drainage. Postoperative CT-Scans showed obliteration of the false lumen in the arch in all patients.
The use of the AMDS stent in the surgical treatment of type A aortic dissection is safe and seems promising. Follow-up studies are needed to assess the longer term effect of the procedure.

Disclosure: Nothing to disclose

P40

Safety and implications of deferred stent optimization in patients with acute ST-Elevation myocardial infarction

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Introduction: Distal embolization leading to no-reflow is a feared complication (1-30%) of primary percutaneous coronary intervention (PPCI) in patients with acute ST-elevation myocardial infarction (STEMI). It has detrimental impact on myocardial function and patients' prognosis. We sought to assess if an approach avoiding stent-optimization is safe and mitigates the risk for no-reflow.

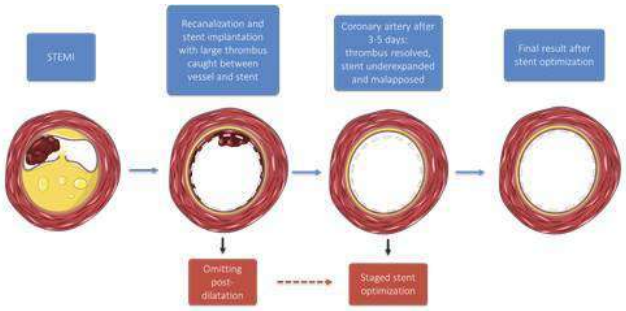
Methods: From the OPTIMISER registry, we analyzed 70 patients with acute STEMI and evidence of large thrombus burden. Deferred stent optimization in primary PCI was considered as an approach of stent implantation at low pressure and avoidance of post-dilatation if feasible. All patients underwent stent-optimization as part of a staged PCI procedure. We assessed peri-procedural, 30- and 180 days outcomes.

Results: Our cohort´s mean age was 60±12 years and 17.1% were female. The majority of patient´s presented with an inferior STEMI (34 patients, 48.57%) and 10 patients (14.3%) had a cardiogenic shock. TIMI flow 0 was found in 60 patients (85.7%) and 20 patients (28.57%) had a bifurcation lesion, thrombus aspiration was performed in 21 patients (30%) and median stent length was 37 mm (IQR 27-50). Angiographic final slow-flow (TIMI 2) was encountered in 5 (7.14%) patients and no patients had final TIMI 1 or 0 flow. Deferred stent-optimization was performed after 4 days (IQR 2-5). The OCT findings are displayed in Table 1. Regarding clinical outcomes, one patient (1.4%) with final TIMI 2 flow had a non-fatal repeat myocardial infarction caused by early stent thrombosis after 25 days. No other major cardiac adverse events occurred at 30 and 180 days. At 30-days follow-up echocardiogram, the mean LVEF was 49±9%.

Conclusions: Deferring stent optimization (Central Figure) in STEMI patients appears to be safe and may reflect a promising strategy to circumvent no-reflow phenomenon. By involving intravascular imaging for staged stent-optimization, one may additionally avoid unnecessary stent-implantation and thus improve long-term treatment results of STEMI patients. However, this approach needs to be validated in a dedicated trial.

OCT findings	Pre-Optimization	Post-Optimization
Thrombus in native vessel (n (%))	6 (8.57%)	1 (1.43%)
Thrombus in stent (n (%))	15 (21.43%)	11 (15.71%)
Underexpanded stent (n (%))	55 (78.57%)	0 (0.00%)
Edge dissection (n (%))	3 (4.29%)	2 (2.86%)
Minimal surface area – MSA (mm^2, mean ± SD)	5.91±1.69	8.47±2.45
Mean final stent expansion (%)	71.00±14.07	91.74±10.45
Malapposition (n (%))		N = 64
no (0-200 um)	-	56 (87.50%)
minor (200-300 um)	-	8 (12.50%)
major (>300 um)	-	-
Dissection		N = 67
no (n (%))	-	51 (76.12%)
minor (n (%))	-	15 (22.39%)
major (n (%))	-	1 (1.49%)
Plaque or thrombus protrusion		N = 67
no (n (%))	-	46 (68.66%)
minor (n (%))	-	21 (31.34%)
major (n (%))	-	0 (0.00%)
Intramural hematoma (n (%))	-	0 (0.00%)

[Table 1 - OCT Findings]



[Central Figure]

Disclosure: RK has received institutional grant support from Abbott, Biotronik, Biosense Webster, Boston, Medtronic, and SIS Medical. MB received consulting and speaker fees from Astra Zeneca, Amgen, and Bayer, as well as travel grants from Pfizer and Vifor SA. FC has received speaker fees and research grants from Abbott Vascular and SIS Medical. ST has been a proctor for Boston Scientific, Medtronic, Biosensors/New Valve Technology, and Abbott Vascular; has been a consultant for Carag, Medira, Boston Scientific, Medtronic, Biosensors/New Valve Technology, and Abbott Vascular; has received institutional research grants from Boston Scientific and Fumedica; and holds equity in Hi-D Imaging. The rest of the authors have no conflicts of interest to disclose.

P41

Procedural safety and mid-term clinical outcomes after treatment of in-stent restenosis with a super-high pressure balloon

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Introduction: Despite considerable technical progress, treatment of in-stent restenosis (ISR) remains challenging. Stent under-expansion and the presence of highly calcified neoatherosclerotic tissue can be an obstacle in achieving maximal luminal gain, which is essential for a favorable long-term clinical outcome. Highly non-compliant balloons have been previously described to overcome undilatable lesions, but there is no data available in the setting of ISR. We aim to describe our experience with the super-high pressure OPN balloon (SIS Medical, Frauenfeld, Switzerland) for treatment of ISR.

Methods: Retrospective analysis of patients with ISR treated between 2017 and 2020 at the Heart Centre Lucerne. We describe procedural safety outcomes defined as coronary perforation and dissection, no reflow, abrupt vessel closure or death. Additionally, we are reporting mid-term rates of major adverse cardiac events (MACE) including target lesion failure (TLF), acute myocardial infarction (MI), stent thrombosis (ST) and cardiovascular and all-cause death.

Results: In total, 208 ISR were treated in 188 patients (mean age 67.9 ± 13.1 years, 77.9% male). The majority of patients (50.3%) presented with acute coronary syndrome. 147 patients (77.8%) had a history of MI, 34 patients (18.1%) had prior bypass surgery, 56 patients (29.8%) had diabetes, and 134 (71.3%) had hypertension.

Mean pre- and postdilatation pressure was 33.07 ± 6.2 atm and 32 ± 6.48 atm, respectively. 54.8% were treated with a drug-eluting stent (DES), 27.7% with a drug-eluting balloon (DEB), 11.2% with DES and DEB in combination and 6.3% with an OPN NC balloon alone. Coronary perforation occurred in 2 patients (1.06%), dissection in 9 (4.79%), no-reflow in 4 (2.1%). Median follow-up was 469 days. MACE rate was 37.3%, all-cause mortality was 5.6%, cardiovascular mortality 4.97% and TLF occurred in 27.95% with a median time-to-failure of 477 days. 18 patients (11.18%) suffered from acute MI (5.6% due to TLF), and 1 patient (0.62%) presented with ST.

Conclusions: Our data suggest that treatment of ISR with the OPN balloon is safe and feasible. Further randomized controlled studies are needed to prove the clinical impact for a widespread use.

Disclosure: No extramural funding was used to support this work. The authors are solely responsible for the design and conduct of this study. Disclosures: M. Bossard received consultant fees from Astra Zeneca. F. Cuculi received consultant and speakers fees from Abbott Vascular.

P42

Long-term outcomes after treatment of clinically relevant in-stent restenosis using the everolimus-eluting bioresorbable scaffold Absorb®

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Introduction: Treatment of in-stent restenosis (ISR) using additional stents may lead to increased luminal loss due to the so called "onion-skin" phenomenon. The use of a bioresorbable scaffold (BRS) for treatment of ISR has the advantage of providing radial strength in the acute phase and can serve as a good carrier for anti-proliferative drugs. Early results from registries of ISR patients treated with the BRS Absorb® suggested promising outcomes, however long-term results are missing. Hereby we report long-term follow-up data of patients treated with Absorb for ISR.

Methods: We analysed long-term outcomes of all patients from the L-CAD registry who were treated for ISR with the BRS Absorb® between September 2013 and December 2016 at the Luzerner Kantonsspital. The primary outcome was target vessel failure (TVF), defined as a composite of cardiac death, target vessel myocardial infarction (TV-MI) and target vessel revascularization (TVR).

Results: Overall, 118 ISR lesions were treated in 89 patients. The patients´ mean age was 66.0±9.8years, 78 (88%) were male and 31 (35%) had presented with an acute coronary syndrome (ACS) at index procedure. The median follow-up time was 66.3 months (IQR: [52.3; 77]). Most of the lesions 60 (51%) were located in the right coronary artery (RCA) and the majority of the ISR were proliferative and diffuse, which represented 47 (40%) of the total lesions. More details about baseline and lesion characteristics can be found in Table 1 and Table 2, TVF occurred in 27% of the patients at 2 years and in 40% of the patients at 5 years as depicted in Figure.1. Furthermore, scaffold thrombosis (ScT) occurred in 5 patients (7%), TV-MI in 15 patients (21%) and all-cause death in 14 patients (20%) at 5 years.

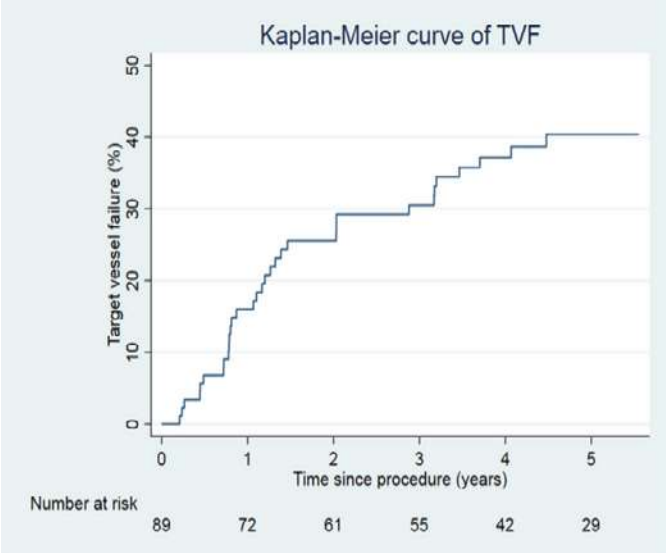
Conclusions: Treatment of ISR in a high risk population using the everolimus-eluting BRS Absorb® resulted in a near linear increase of TVF between 1 year and 5 years after scaffold implantation. While results up to 1 year post treatment were acceptable, the continuous increase of TVF after 1 year is worrying. BRS should be restrictively used for the treatment of ISR.

Sex (male; n (%))	78 (88%)
Follow-up time (months;median, IQR)	66.3 (52.3;77)
Stable angina (n (%))	58 (65%)
Unstable angina (n (%))	15 (17%)
Non-ST elevation myocardial infarction (n (%))	15 (17%)
ST-elevation myocardial infarction (n (%))	1 (1%)
Diabetes (n (%))	24 (27%)
Previous MI (n (%))	42 (47%)
Previous CABG (n (%))	9 (10%)

[Baseline characteristics of the study population]

Culprit vessel left anterior descending artery (n (%))	31 (26%)
Culprit vessel left circumflex artery (n (%))	27 (23%)
Culprit vessel right coronary artery (n (%))	60 (51%)
Focal ISR (n (%))	32 (27%)
Diffuse ISR (n (%))	39 (33%)
Proliferative ISR (n (%))	28 (24%)
Occlusive (n (%))	19 (16%)
Moderate to severe calcifications (n (%))	61 (52%)
Chronic total occlusion (CTO) (n (%))	21 (18%)
Optical coherence tomography guidance (n (%))	32 (27%)

[Lesions characteristics of the study population]



[Kaplan-Meier curve of the outcome TVF]

Disclosure: M Madanchi, GM Cioffi, A Attinger-Toller, F Moccetti, P Burkart, M Wolfrum, S Toggweiler, R Kobza report no conflicts of interest. M Bossard has received consulting and speaker fees from Amgen, Astra Zeneca, Bayer and Mundipharma. F Cuculi has received consulting and speaker fees from SIS Medical and Abbott Vascular.

P43

Unusual presentation of type A aortic dissection: a painless incidental discovery

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A 70-year old man, known for untreated hypertension, was admitted to the emergency department with a two weeks history of worsening abdominal pain without chest pain. The patient appeared uncomfortable with abdomen tenderness and guarding. Laboratory results showed several abnormalities: hemoglobin 88 g/L, creatinine 980 mmol/L, potassium 7 mmol/L and ultra-sensitive cardiac troponins T 123 ng/L. Electrocardiogram was normal.
An abdominal computed tomography scan without contrast showed urinary retention with a large bladder globe, dilated pyelocaliceal cavities and ruptured fornix of the left kidney, explaining the origin of abdominal pain. Furthermore the study suspected dilatation of the aortic root.

Transthoracic echocardiography showed a large aneurysm of the ascending aorta (diameter 8 cm) starting 1.5 cm above the sinotubular junction (STJ) with a parietal thrombus, an intimal flap and a moderate aortic regurgitation. Because of initial patient refusal surgery had to be postponed. In the mean time the patient underwent dialysis. An aortic computed tomographic angiography confirmed the large aneurysm with type A aortic dissection and the patient was referred for surgery. Twenty four hours later, aortic replacement, with a prosthetic graft from STJ to proximal aortic arch, was performed successfully.

Painless aortic dissection is a rare diagnosis (approximately 5% of AD)[1-3], considering the high mortality of this pathology with a lethality rate of 1 to 2% per hour after onset of symptoms in untreated patient[1-3]. This case highlights that even incidental asymptomatic findings may be lethal and require emergency management.

Disclosure: Nothing to disclose

Congenital and Pediatric Cardiology

P44

The impact of the coronavirus disease 2019 pandemic among adult congenital heart disease patients in Switzerland

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Introduction: Patients with acquired cardiovascular disease are considered to be at risk in case of coronavirus disease 2019 (COVID-19). However, outcomes among adults with congenital heart disease (ACHD) have not yet been studied.

Methods: We collected all reported COVID-19 cases among ACHD patients followed at the university hospitals of Basel, Bern, Geneva, Lausanne and Zurich between March 27,' 2020 and January 25, 2021. Patient characteristics related to demographics, heart defect complexity, medical history, cardiac defect-related problems, date of diagnosis, clinical course of the disease and outcome were recorded. COVID-19 cases were stratified according to the date of diagnosis into the first vs. second COVID-19 wave (cut-off date October 21, 2020). The composite endpoint was COVID-19-related hospitalization or death.

Results: From 144 reported cases, 139 with known date of COVID-19 diagnosis (48 corresponding to first wave and 91 to the second) were included in the analysis. Nineteen patients reached the composite endpoint. Between waves, there were no statistically significant differences related to gender, age, body mass index, heart defect complexity and defect-related residuae. The proportion of patients with ≥ 2 comorbidities and those being hospitalized for or dying of COVID-19 was also similar among both groups. A detailed comparison of the above-reported characteristics is depicted in table 1. Multivariable adjusted odds ratios (95% confidence interval) for the combined endpoint were 1.1 (1.03-1.1), p= 0.01 for age; 13 (2.4-70.6), p= 0.003 for cyanotic heart disease and 4.1 (1.2-15.4), p= 0.04 for having ≥ 2 comorbidities. Having had COVID-19 in the first vs. the second wave had no predictive value for the combined endpoint.

Conclusion: Patient of both waves did not significantly differ regarding demographics, heart defect complexity, comorbidities, defect-related problems and outcomes. Independent risk factors for COVID-19-related hospitalization or death were increasing age, cyanotic heart disease and having ≥ 2 comorbidities.

n = 139 patients	First wave (n= 48)	Second wave (n=91)	p
Female gender (%)	20 (42)	50 (55)	0.1
Age (years)	31 (23-42)	34 (28-44)	0.2
BMI >25	18 (38)	39 (43)	0.5
≥ 2 comorbidities	4 (8)	14 (15)	0.2
Cardiac defect complexity (severe)	9 (19)	29 (32)	0.1
Defect-related problems (yes)*	27 (56)	51 (56)	0.98
Hospitalizations	6 (13)	13 (15)	0.7
Deaths	1 (2)	2 (2)	0.9

Data are median (interquartile range) or number (percentage). BMI= body mass index (in kg/m2) * Defined as main defect-related problem problem among valvular, arrhythmia, pulmonary hypertension or heart failure

[Patient characteristics stratified by COVID-19 wave]

Disclosure: Nothing to disclose

P45

Prevalence of pericardial late gadolinium enhancement in patients after cardiac surgery: clinical and histological correlation

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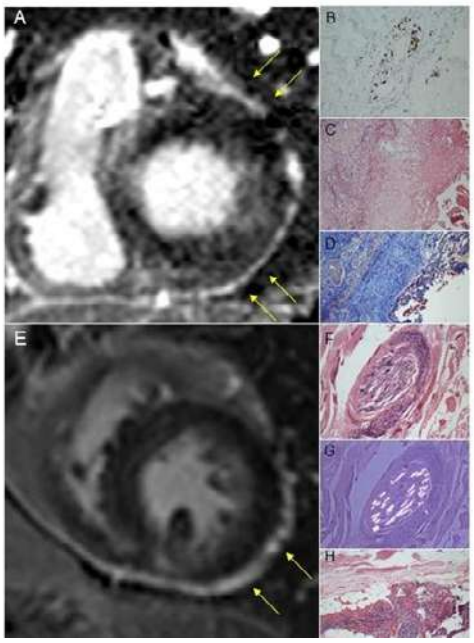
Background: Opening of the pericardial sack during cardiac surgery induce usually, a mild inflammatory reaction. Late gadolinium enhancement of the pericardium (pLGE) still has been observed on cardiovascular magnetic resonance (CMR) in patients even long-time after cardiac surgery suggesting ongoing pericardial inflammation. Clinical relevance and histological correlation are unknown. We present a study evaluating the prevalence of pLGE and correlating it to clinical and histological findings.

Materials and methods: 185 patients after cardiac surgery underwent CMR on a 1.5 or 3.0 T system. Presence (LGE+) or absence (LGE-) of pLGE was rated by 2 independent operators blinded to clinical characteristics. In case of discordance a third observer served as referee. Information on clinical symptoms were obtained at the time of CMR or from medical records. A pericardial biopsy was performed in 4 patients who underwent a second cardiac surgical intervention after CMR.

Results: Mean time between CMR and cardiac surgery was 158 ± 110 months. Pericardial LGE was observed in 83 patients (38%), two independent observers agreed in 73 (89%). The presence of LGE was not significant correlated to the type (p=0.812) or duration of surgery (p=0.734), nor the use of intrapericardial foreign material (p=0.534). Two biopsies in LGE+ patients showed mild inflammation and calcification, one biopsy in a LGE + patient showed the presence of fibrosis without inflammation while one biopsy in a LGE- patient was negative for inflammation. None of patients presented clinical signs for an active pericarditis.

Discussion: Presence of pericardial LGE is frequent in patient after cardiac surgery, however without clinical features of pericarditis. The CMR findings appear to be histologically correlated to the presence of fibrosis or mild chronic inflammation which remains to be confirmed in a larger patient population.



[Figure 1]

Basal ventricular short axis view in LGE sequences showing the presence of LGE in the pericardium (Panel A, yellow arrows) compatible with mild inflammation present in histological findings, shown by the presence of T lymphocytes CD3+ (Panel B) and the presence of fibrin (Panel C and D). Mid-ventricular short axis view in LGE sequences showing the presence of LGE in the pericardium (Panel E, yellow arrows), which is compatible with the presence of granulomatous inflammation in a fibrinous pericardium (Panel F, H and G).

Disclosure: Nothing to disclose

P46

Safety and feasibility of ambulatory cardiac catheterization intervention in children

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Introduction: Nowadays, percutaneous cardiac intervention in children with congenital heart disease offers many possibilities: from the closure of shunts to stent implantation. Most of these interventions are performed in children under general anesthesia. In our institution, percutaneous intervention is performed on an ambulatory mode, allowing shortening the hospital stay for patients and family. The scope of this study was to analyze if ambulatory catheterization is feasible without particular risks in children.

Method: Retrospective, monocentric study. Children with a planned elective ambulatory cardiac intervention under general anesthesia were included. Outcomes were hospitalization or consultation during the seven following days of the planned intervention.

Results: One hundred ninety-three patients included with a median age of 4.5 [2.2-9.2] years (range three months-16 years old), a median weight of 17 [11-27] kg. Balloon vascular angioplasty (37%) and shunt closure (36%) were the main type of interventions. Ninety (48%) patients had only venous access, 36 (19%) arterial access, and 64 (33%) both. The median intervention duration was 73 [52-94] min. Overall, 23 (12%) patients have to stay at the hospital the night after the intervention: eleven (5.6%) because the time allowed for post-intervention observation was insufficient for the type of vascular access, five (2.5%) for a complication related to the intervention itself, and seven (3.5%) for conditions related to the anesthesia. Only one patient (0.5%) had a consultation at the emergency department of another hospital not related to the intervention.

Conclusion: Ambulatory care for interventional cardiac catheterization is feasible in children. After the intervention, the monitoring protocol allows to identify patients with complications related to the intervention or the anesthesia, and a majority of them can go back home without particular risks.

Disclosure: Nothing to disclose

P47

Hybrid-bailout pulmonary valve replacement in a challenging 7th re-do setting

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Introduction: Pulmonary valve replacement (PVR) presents a frequent procedure in ACHD patients and is considered to be a rather simple interventional or surgical procedure associated with a low perioperative risk. We present the case of a patient undergoing hybrid management for PVR as a bailout procedure due to a complex and technically challenging situation.

Method: A 34-year old man with transposition of the great arteries and previous Rastelli procedure presented with severe right ventricular outflow tract obstruction and signs of refractory right heart failure. Since the Rastelli repair, the patient had had 2 episodes of infective endocarditis, 5 replacement of cardiac conduits and 2 Melody valve implantations. His last re-do surgery was complicated by severe dense mediastinal adhesions and an extremely calcified RVOT forcing the surgeon to perform PVR with a biological valve prosthesis into a distal heterotopic position. During follow-up a persistent high RV pressure gradient was found. CT imaging revealed a large retrosternal hematoma and a significant supravalvular pulmonary stenosis due to a sharp angle between the pulmonary bioprosthesis and subsequent bifurcation. Following interdisciplinary discussion, the patient underwent hybrid, beating heart PVR. The pulmonary valve prosthesis was removed, a tailored patchplasty for pre-stenting and "straightening" of the RVOT was performed, and a 22 mm Melody valve prostheses was implanted under direct vision (video provided). Invasive pressure measurement demonstrated a residual RV/PA gradient of 12 mmHg. The patient was extubated same day and had an uneventful postoperative course.

Result: At 12-months follow-up demonstrated a well-functioning Melody valve prosthesis with a mild to moderate paravalvular insufficieny and a transvalvular gradient of 22 mmHg.

Conclusion: Hybrid-management in this complex setting of RVOT replacement demonstrated to be a technically rather simple and well functioning procedure and might present an interesting bailout solution.

Disclosure: Nothing to disclose

Prevention, rehabilitation, sportscardiology and clinical cases

P48

Do PROCAM based Swiss risk tools (AGLA and HerzCheck ®) predict cardiovascular events? A classification using cardiovascular outcome data from the Swiss / German ARCO study

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Background: For the purpose of this study, we tested the predicting ability of AGLA and HerzCheck using the ARCO cohort study observations and calculated calibration factors for various outcomes.

Methods: We performed a cohort outcome study and compared PROCAM derived AGLA and HerzCheck to SCORE and TPA for calibration, discrimination and survival.

Results: In 2 842 subjects (age 50±8, 38% women) 154 (5.4%) cardiovascular events occurred (ASCVD: 41 myocardial infarctions, 16 strokes or TIA, 21 CABG, 41 PTCA, 35 coronary artery disease defined by invasive angiography) during a mean follow-up time of 5.9 (1-12) years. AGLA CHD risk was well calibrated (15% underreported risk), but was poorly calibrated for CVD (like stroke, CABG, PTCA or CAD) with underreported risk up to 345%. Substantial misclassifications occurred with AGLA and HerzCheck compared to SCORE. Discrimination was comparable for all risk calculators, but TPA outperformed risk calculators for survival using Cox proportional survival functions. Net reclassification improvement (NRI) for PROCAM and SCORE using TPA tertiles or AA age groups increased significantly between 30% to 48%.

Conclusions: PROCAM derived risk calculators are well calibrated for the risk of myocardial infarction (CHD). For CVD, important underestimation occurs. Labeling AGLA and HerzCheck as CVD risk calculators is regulated in the Medical Product Act. Mislabeling should be avoided.

Disclosure: Nothing to disclose

P49

Changes in exercise capacity and ventricular function in arrhythmogenic right ventricular cardiomyopathy: the impact of sports restriction during follow-up

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Introduction: Physical exercise has been suggested to promote disease progression in patients with arrhythmogenic right ventricular cardiomyopathy (ARVC). Yet, data on exercise capacity and ventricular function of these patients during follow-up is scarce. We aimed to investigate the exercise performance and ventricular function of ARVC patients during follow-up, while taking into account their adherence to exercise restriction recommendations.

Methods: This retrospective study included 49 patients (33 male, 67%) who had an exercise test at baseline and after 4.2 1.6 years. Thirty-two of these patients (65%) were athletes, while 17 (35%) were sedentary. Of the athletes, 27 (84%) continued regular sports activity against clinical recommendations. The maximum workload in Watts (W), percentage of the target workload (W%), and double product (DP) factor were measured for all patients.

Results: The athletes had higher physical performance and ventricular function initially, but had a significant decrease in physical performance (W at baseline vs. follow-up, p=0.044; W% at baseline vs. follow-up, p = 0.093; DP-factor at baseline vs. follow-up, p=0.061) and left ventricular (LV) function (LV ejection fraction at baseline vs. follow-up, p=0.008) over time, while the performance of the sedentary cohort remained at a similar level.

Conclusions: Athletes with ARVC have a significantly higher physical performance and LV function as compared to sedentary patients at baseline. However, if these patients do not interrupt sports activity, their exercise capacity and ventricular function are likely to significantly deteriorate during follow-up. Thus, all patients with ARVC should adhere to the recommendation to cease sports activity.

Disclosure: Nothing to disclose

P50

De-airing techniques during open-heart surgery: survey report

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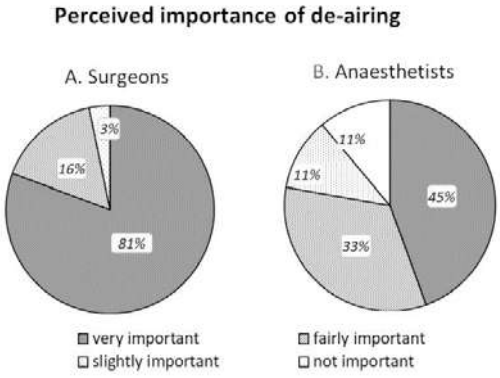
Introduction: De-airing is a crucial part of open-heart surgeries to avoid air emboli, but it is also considered a routine part that is secondary to the main therapy. Consequently, little information and experience are exchanged about this topic and there is no framework to collectively improve the knowledge on the effectiveness of specific techniques.

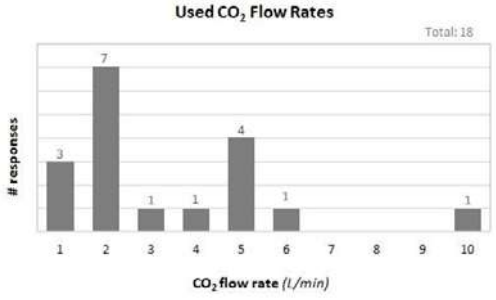
Methods: To create an overview of the variation of applied de-airing techniques and their observed importance, an online survey was created as part of the author's medical studies at the ETH Zurich and distributed to Swiss and German cardiothoracic surgeons and anaesthetists. The survey was based on a Japanese survey from 2016. Furthermore, the usage of carbon dioxide (CO_2) as a prevention technique was enquired.

Results: The response rate for the survey was 17% (31/180) for surgeons and 14% (9/65) for anaesthetists. Even though neuroprotection is perceived as the most critical, cardiac events are observed far more frequently (65-67%). Anaesthetists seem to observe air-related events more often than surgeons. Most routinely performed methods are air removal via the aortic root vent and the left ventricle vent. Field-flooding with CO_2 is performed by 85% of the responding surgeons, mostly at low flow rates of 1-2 l/min. The most used (54%) delivery device is a multi-perforated drainage tube, despite several studies showing this as a less effective method. However, quite a few surgeons (10/30) are sceptical as to whether CO_2 field-flooding is an effective prevention method.

Conclusion: There is variation in the use of de-airing methods in addition to venting. Perceived importance of de-airing and CO_2 field-flooding varies considerably. Several participants indicated the need for further research to clarify and standardise the use of CO_2 as a prevention method, but specific sentinel questions indicated that already published findings are not implemented.



[Value attributed to de-airing techniques.]



[Different CO2 flow rates used by surgeons.]

Disclosure: Nothing to disclose

Clinical case reports

P51

Rupture of superior vena cava causing contained hemorrhage and acute SVC syndrome during transcutaneous lead extraction

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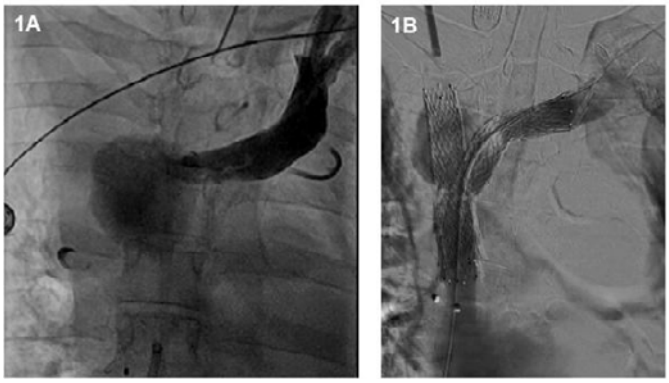
Introduction: Lead extraction in infected devices has a class I indication. Even though success rate is high for successful extraction, relevant complication including vascular tear may occur.

Methods: We report a case of a 47-year-old male patient with a St. aureus lead infection of his CRT who underwent lead extraction.

Results: A 47-year-old man was referred to our institution due to St. aureus sepsis. He was suffering from dilated cardiomyopathy with a left ventricular ejection fraction of 20 % and underwent transvenous CRT-D implantation 2006. Transthoracic and transesophageal echocardiography confirmed the presence of a 25 mm large vegetation attached to the leads at the level of the right atrium. The patient underwent transvenous lead extraction using mechanical powered sheath as well as transcutaneous vegetation aspiration via a right internal jugular approach. Despite successful vegetation aspiration and complete lead extraction, the patient started to develop signs of an acute obstructive superior vena cava syndrome. Contrast dye injection confirmed venous obstruction at the level of the junction between the superior vena cava and left brachiocephalic vein due to a hematoma surrounding the veins at this level as a result of venous laceration and a covered rupture (Figure 1). Since no active bleeding was present, it was decided to try to re-open venous drainage via a femoral approach. From the right femoral vein, it was possible to advance a wire through the obstruction into the right jugular vein and the left brachiocephalic vein. Via a kissing stent technique, two stents with a diameter of 14 mm could be implanted and venous drainage recovered (Figure 2). No signs of active bleeding were present after the intervention. The patient was transferred to the intensive care unit and recovered fully from the intervention.

Conclusion: Venous laceration is a rare, but known complication of transvenous lead extraction. If no active bleeding is present and venous obstruction is the leading problem, a transfemoral approach to treat the obstruction may be a feasible option.



[Figure 1]

Disclosure: No relevant conflict of interests exists with the reported abstract.

P52

Dilated right ventricle - a patient journey

M. Wieser[1], C. Eigenmann Seiler[2], Y. Banz[3], J. Seiler[1], A. Schaller[4], H. Tanner[1], L. Hunziker Munsch[1], K. Wustmann[1]

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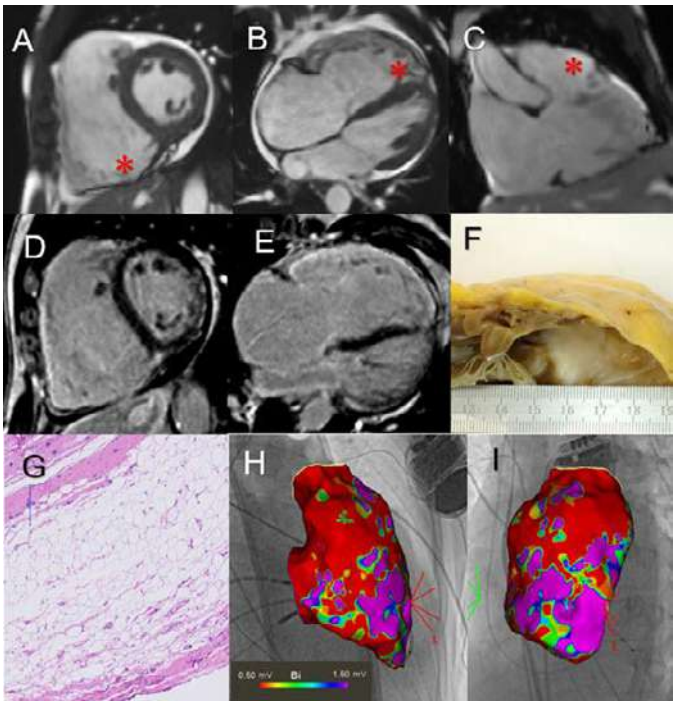
Introduction: Several pathologies can lead to right ventricular (RV) dilatation and dysfunction, most of them due to congenital heart disease, pulmonary hypertension or arrhythmogenic RV cardiomyopathy (ARVC).

Methods: A 41-year old lorry driver with progressive breathlessness, transient pedal oedema, but no palpitations was referred to our hospital after transthoracic echocardiography revealed a dilated RV and right atrium with moderate/severe tricuspid regurgitation and a NT-proBNP of 1227pg/ml. CT scan excluded pulmonary embolism and central pulmonary arteries were normal sized. A cardiac magnetic resonance (CMR) with question for shunt lesions was performed.

Results: By CMR, atrial shunts and anomalous pulmonary venous drainage were excluded (Qp/Qs 1.05). CMR showed a severely dilated RV (RVEDV 415ml, RVEDV indexed 216ml/m^2), RVEF 26%, chemical shift and multiple aneurysms in the RVOT, RV-apex and basal inferior (figure A, B, C), inferolateral hypokinesia in the LV with LVEF 43% and late gadolinium enhancement in these regions (figure D, E). 24-hour ECG showed non-sustained VT`s (max. 6 beats) and signal-averaged late potentials. Five months later, the patient suffered from palpitations while lorry driving in France due to VT (175/min), which was electrically cardioverted and an ICD was implanted. Again, five months later, re-entry VTs of RV origin were successfully ablated after electrical storm (figure H, I: RV endocardial bipolar voltage mapping, red coloured: < 0.5mV, indicating scar). Extraction of the conventional ICD system because of development of severe tricuspid regurgitation and implantation of a subcutaneous ICD did not alter the clinical course. Genetic testing was negative for ARVC-gene panel. Due to progressive right-sided decompensations, the patient underwent heart transplantation 20 months after diagnosis. Pathologic examination revealed fibrofatty myocardial displacement of the RV free wall as well as parts of the LV consistent with ARVC (figure F, G).

Conclusion: Although ARVC presents mostly with arrhythmic disturbances like VT or VF as first symptom, some ARVC patients present with predominant RV dysfunction, which can further lead to RV failure and necessity for cardiac transplantation. Typical CMR features and electrophysiologic changes lead the way to the right diagnosis even when genetic testing is negative for currently known ARVC mutations.



[Figure]

Disclosure: Nothing to disclose

P53

Early impressive degeneration of tricuspid valve porcine Hancock II bioprosthesis in Ebstein anomaly despite intensive anticoagulation with aspirin and phenprocoumon

L. Meier[1], C. Attenhofer Jost[2], F. Bonassin Tempesta[3], B. Santos Lopes[3], D. Babic[3], M. Greutmann[4]

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Background: In Ebstein anomaly (EA), significant tricuspid valve regurgitation (TR) is one of the main complications often needing intervention. TV replacement with a porcine bioprosthesis (BP) has better long-term outcome due to improved mortality, less bleeding and lower long-term mortality than with a mechanical prosthesis. However, there is still a considerable risk of bioprosthetic degeneration and risk reoperation even early after surgery, especially in young patients.

Case reports: Patient 1 is 21 year old patient with severe EA and severe tricuspid valve disease. Due to the severity of TR he underwent an attempt at Cone repair which failed and thus resulted in tricuspid valve replacement with Hancock II 33mm prosthesis at age 18 years. Postoperative control 6 months after surgery revealed only mild TR. One year postoperatively severe TR was present with shrinkage of all leaflets (Figure 1). This occurred during anticoagulation with phenprocoumon. Aspirin had been added intermittently with no positive effect. Also the INR was kept at 3.0 for 2 months, with no change. There is severely diminished right ventricular function. Since, the findings have not changed, there is persistent severe TR, however as the patient remains asymptomatic, no repeat intervention was attempted so far.

Patient 2 is a 48 year old femaie with TV dysplasia/EA and severe TR. She underwent unsuccessful attempt at TV repair and TV annuloplasty. Nine days later she was reoperated for residual TR and had TV replacement with Hancock II 31mm BP. Right ventricular function is preserved. Within 9 months she developed severe TR despite intensive anticoagulation with aspirin and phenprocoumon. One of the TV leaflets had shrunk (Figure 2). Then she had successful percutaneous TV replacement with 29mm Sapien 3 valve (valve-in-valve).

Conclusion: Despite acceptable results of TV replacement in EA with porcine bioprothesis, we observed 2 failures of Hancock II prosthesis not preventable by intensive anticoagulation. This rises the concern of unfavourable hemodynamics of the bioprosthesis in tricuspid position in patients with EA or a yet unkown immunologic process. In both patients there are no signs of carcinoid disease.

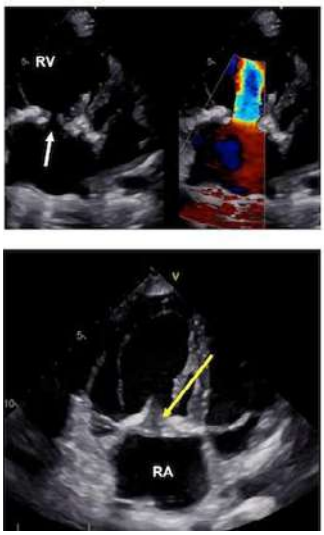

Figure 1 showing the shrinkage, thickening of the porcine BP (white arrows)
leaflets with thrombosis at the BP edge (C, yellow arrow)
RA=right atrium; RV=right ventricle

[Figure 1]

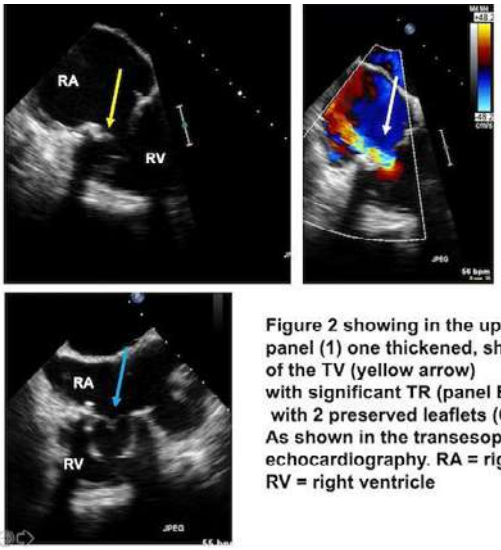

Figure 2 showing in the upper left panel (1) one thickened, shrunk leaflet of the TV (yellow arrow) with significant TR (panel B, white arrow) with 2 preserved leaflets (C, green arrow) As shown in the transesophageal echocardiography. RA = right atrium; RV = right ventricle

[Figure 2]

Disclosure: Nothing to disclose

P54

«Pseudocoarctation» caused by the aortic dissection membrane in familial aortopathies: a typical cause of malperfusion syndrome observed in 2 patients

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Background: Malperfusion in patients (pt) can occur in 20-30% with aortic dissection (AD), involving all regions including spinal cord, visceral, renal and extremity arteries and develop acutely or in the long-term. Malperfusion is caused by static or dynamic obstruction by the dissection membrane. Typical malperfusion symptoms include treatment resistant hypertension, decreasing renal function, stroke or claudication.

Case records: Patient 1 is a female who had type B AD during the first pregnancy in the 40th week. Molecular testing revealed a pathogenic ACTA2 variant (c.116G>A), subsequently confirmed in other family members. A second pregnancy against medical advice was overall uneventful. However, she subsequently developed intermittent claudication and abdominal angina while exercising (age 30 years). Evaluation revealed pseudocoarctation caused by tubular dissection membrane at the aortic isthmus in the setting of progressive dilatation of the descending aorta and progressive thrombosis of the true aortic lumen. The maximal systolic gradient measured by echocardiography was 26mmHg (Figure 1). So far, flap fenestration or stenting was not thought necessary and follow-up for another 2 years was uneventful.

Patient 2 (male) with familial aortopathy (father with aortic aneurysm) developed type A AD at the age of 43 years and underwent supracoronary replacement of the ascending aortic and hemiarch replacement as well as aortic valve repair. The dissection membrane was seen throughout the iliac arteries including carotid arteries. He developed symptomatic pseudocoarctation (Figure 2) and severe aortic regurgitation. Membrane fenestration was not feasible, thus he went reoperation with resection of the obstructing membrane in the aortic arch as well as mechanical aortic valve replacement. No residual obstruction is seen during a 2 year follow-up.

Conclusion: Malperfusion syndromes after aortic dissection can occur during short- and long-term follow-up after type A or type B AD and should be an important part of the standard evaluation after AD. Pseudocoarctation is a rare malperfusion syndrome not to be forgotten, as potentially treatable. Interdisciplinary management is recommended and can include fenestration, stenting, reoperation or conservative management.

Figure 1 Transthoracic echocardiography: showing the descending aorta with pseudocoarctation at level of the aortic dissection origin (A) and the significant Doppler gradient across the stenosis (B, yellow arrow). The MRI of the descending aortic shows the type B dissection with the tiny contrast filled true lumen (C, blue arrow).

[Figure 1]

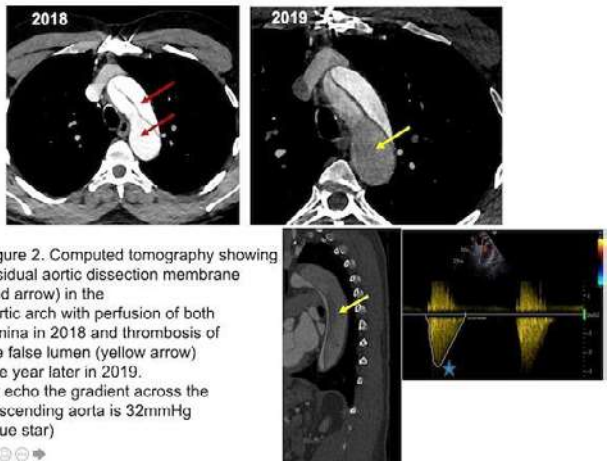

Figure 2. Computed tomography showing residual aortic dissection membrane (red arrow) in the aortic arch with perfusion of both lumina in 2018 and thrombosis of the false lumen (yellow arrow) one year later in 2019. By echo the gradient across the descending aorta is 32mmHg (blue star)

[Figure 2]

Disclosure: Nothing to disclose

P55

Novel heterozygous TRPM4 variant in a family with cardiomyopathy, conduction disorders and sudden cardiac death

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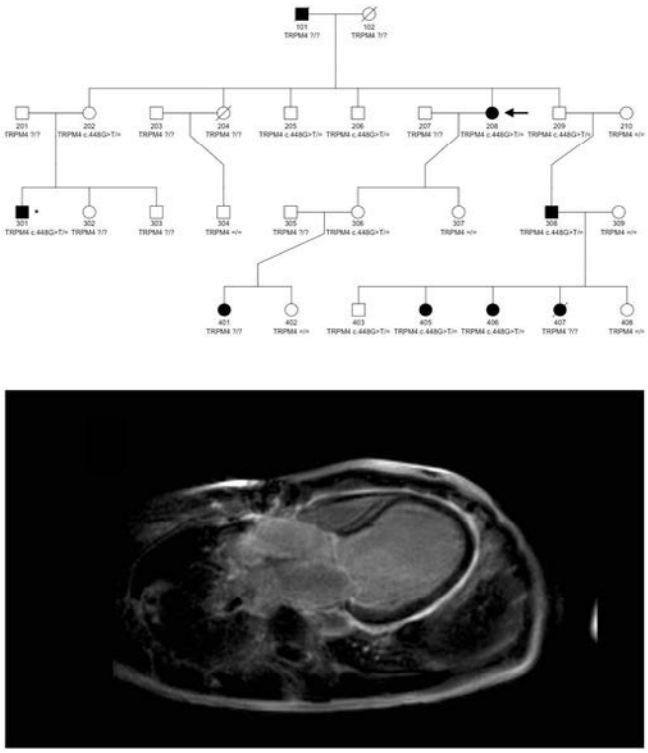
[1]Department of Cardiology, University Hospital of Zurich, Zürich, [2]Swiss DNAnalysis, Duebendorf, Switzerland, [3]Praxis für Humangenetik & CeGaT GmbH, Tübingen, Germany

Introduction: Transient Receptor Melastatin 4 channel (TRPM4) encodes a calcium-activated, non-selective cation channel that mediates membrane potential depolarization of cardiomyocytes. Loss-of-function models were associated with conduction abnormalities and left ventricular dilation. Human gene variants in this gene have been associated with cardiomyopathy and conduction disease. We report a novel pathogenic heterozygous stop variant in TRPM4 in a family with sudden cardiac death (SCD), conduction disease, and cardiomyopathy.

Methods: We performed clinical and genetic characterization of the family of a 40-year old male patient, who was newly diagnosed with non-ischemic dilated cardiomyopathy with severely reduced left-ventricular ejection fraction and a complete left bundle branch block (LBBB). He had received chemotherapy (including doxorubicin) for Hodgkin lymphoma seven months prior. A 12-lead ECG prior to initiation of chemotherapy had already shown a complete LBBB indicating pre-existing cardiopathy.

Results: Family history and cardiac and genetic cascade screening of family members over four generations revealed SCD, conduction disease and/or cardiomyopathy associated with a novel heterozygous variant in TRPM4 (c.448G>T; p.Gly150*) co-segregating with the phenotype in this family suggesting a autosomal-dominant inheritance with variable penetrance. Genetic cascade screening detected this variant in our patient as well. In silico analysis of this novel TRPM4 variant predicted the loss of a neighboring splice site, resulting in aberrant transcript splicing, leading to a truncated protein or nonsense-mediated mRNA-decay. Current guidelines suggest likely pathogenicity (class IV) of this variant. We hypothesize that the presence of this novel TRPM4 variant may have increased the susceptibility of our patient to aggravate DCM after potentially cardiotoxic chemotherapy.

Conclusion: A novel likely pathogenic heterozygous point variant in TRPM4 was detected in a patient with DCM and in his family presenting with SCD, cardiac conduction disease, and cardiomyopathy. Co-segregation analysis suggested autosomal-dominant inheritance with a variable penetrance and phenotypic expression.



[Cardiac magnetic resonance and family tree of patient]

Disclosure: Nothing to disclose

P56

Takotsubo syndrome spares no one: the case of an adult patient with hypoplastic left heart syndrome and Takotsubo syndrome

B. Santos Lopes[1], L. Meier[1], S.F. Stämpfli[2], E. Holy[1], H. Schneider[1], A. Gotschy[1], A. Oxenius[1,3], M. Greutmann[1]

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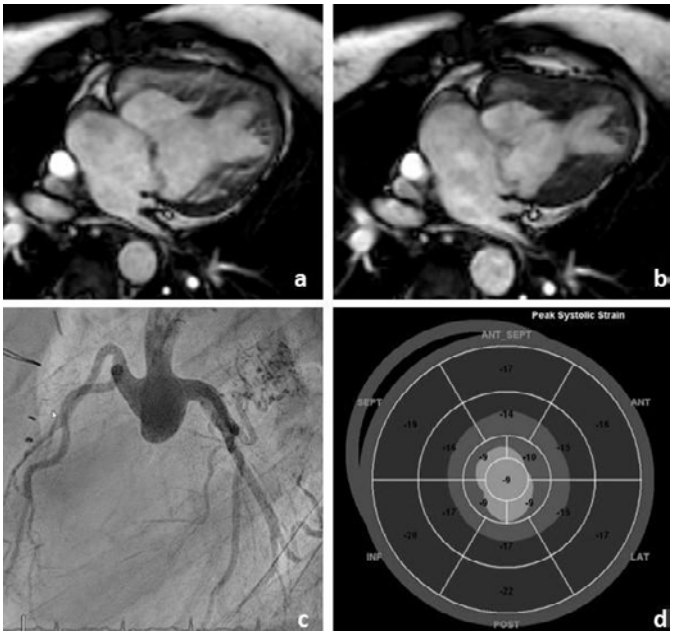
Introduction: Subtypes of Takotsubo syndrome include isolated right ventricular forms. Its incidence may have been underestimated as little attention has been paid to the right ventricle. There is some evidence suggesting a different recovery pattern and outcome in this Takotsubo subtype. Except for one, there are no other described examples of Takotsubo syndrome in single ventricular physiology.

Case report: A 22-year-old female patient known for hypoplastic left heart syndrome (HLHS) after staged Norwood palliation and Fontan completion presented with sudden onset of nausea, recurrent vomiting and transient minor atypical chest pain. On admission she was haemodynamically stable, apyrexial and with an ox-

ygen saturation within her usual range. The ECG showed dynamic T-wave inversions. Compared to her baseline, NT-proBNP was tenfold increased at 1791 ng/l, whereas there was only mild elevation of high-sensitive troponin T. On transthoracic echocardiogram, a new apical akinesia was seen and confirmed by ventriculography and MRI. The global longitudinal strain was particularly reduced in the affected segments. Cardiac catheterization demonstrated a widely patent Damus-Kaye-Stansel anastomosis and normal coronary arteries. No late gadolinium enhancement was identified on MRI, making an acute myocarditis unlikely. Hence, we assumed a Takotsubo syndrome as the most probable diagnosis despite not having identified any emotional trigger. The patient was started on an ACE inhibitor. The initial symptoms subsided, cardiac biomarkers went back to baseline, no arrhythmias occurred and at four weeks follow-up apical contractility improved.

Conclusion: To our knowledge, this is the first case of Takotsubo syndrome in HLHS, which seems to occur regardless of the underlying cardiac anatomy and needs therefore to be considered as a differential diagnosis even in patients with congenital heart disease. The natural course and outcome of Takotsubo syndrome with right ventricular involvement is still not clear, let alone in the context of single ventricular physiology and HLHS.



[MRI showing apical ballooning. Angiogram with normal coronary arteries. Reduced apical GLPS]

Disclosure: Nothing to disclose

P57

Spontaneous premature atrial contractions facilitate diagnosis in a patient with typical atrioventricular nodal reentrant tachycardia

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Introduction: His refractory atrial extrastimulus can help for differential diagnosis between AVNRT and junctional tachycardia. In the present patient, spontaneous PACs occured at junctional depolarization, i.e. His refractoriness. Furthermore, the PACs did not influence the immediate beat with no change on the following H-H interval. These observations demonstrated the electrophysiological mechanisms of AVNRT, with the exclusion of junctional tachycardia.

Methods: An 80-year-old woman with a 4-months history of frequent palpitations was admitted to our center. Palpitation had abrupt onset and termination. 72-hour ECG recorded eight episodes of narrow complex SVT, with mildly varying RR intervals. Since beta-blockers and verapamil could not control the tachycardia, we performed an electrophysiologic study(EPS).In the EP laboratory, the patient showed spontaneous, narrow QRS complex tachycardia resembling the clinical tachycardia. Frequent premature atrial complexes (PAC) during tachycardia were identified after placement of the CS catheter, resulting in varying RR intervals. EPS demonstrates resetting the tachycardia following His refractory PAC suggests slow pathway engagement and AVNRT as the tachycardia mechanism.

Results: The tachycardia was terminated by overdrive pacing, a programmed stimulation was performed during sinus rhythm before ablation. It showed that the AVNRT was induced by AH jump and following echo beat. Ventricular entrainment was also performed during tachycardia, and a V-A-V response with PPI-TCL 134 ms was achieved. As a result, slow pathway ablation was carried out, and sustained slow junctional rhythm was obtained during ablation. No tachycardia was induced after that.

Conclusions: Frequent spontaneous PACs during episodes of AVNRT can be misleading on surface ECG because of the mildly varying RR intervals. When spontaneous PACs engaged in and maintained the AVNRT, spontaneous PACs´ coincidence at His refractoriness is worthy of attention. Endocardial documentation of this timely PAC´s effect on the next His activation is a clue for a positive diagnosis of typical AVNRT for an ongoing tachycardia.

Disclosure: Nothing to disclose

P58

Aortic tattoo - medial or sub-adventitial spreading

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Objective: Intramural hematoma of the ascending aorta is a rare iatrogenic complication (0,05%) of percutaneous coronary interventions (PCI). Emergency surgery is often performed. We present our experience with three cases of iatrogenic IMH treated conservatively with good outcome.

Methods: A 56-year-old man presented with pericardial effusion after elective PCI. CT -scan performed showed IMH extending from ascending aorta to the arch without intimal tear or mobile flap on echocardiography. The patient underwent uneventful surgical pericardiocentesis with drainage of bloody fluid. CT- scan on first postoperative day revealed stability of images.

The second patient, a 58-year-old gentleman presented with IMH after an elective percutaneous transluminal coronary angioplasty (PTCA) of the right coronary artery (RCA). IMH was limited to the right coronary sinus. Similar was the case of third of our patients, a 82-years-old woman, with IMH after RCA angioplasty. Images on the 1st day showed diminution of the size of the hematoma in the two last cases.

Results: Complete regression of hematoma was confirmed by CT-scan in all patients one week after the event. Subsequently, all three patients recovered, were discharged home, and remain well at follow-up.

Conclusion: The absence of typical images of aortic dissections comforted us in choosing a conservative option, even in the presence of pericardial effusion. Close follow up with frequent CT scan is mandatory to monitor the early and late evolution. The described pathogenesis of classical aortic dissection includes intimal tear and cleavage of an already weakened media. High-pressure mechanical contrast injection during PCI (300-400 psi) can certainly badly injure the aortic wall and trigger true aortic dissection. However, in those three cases our impression was that the injection did not cleave the media but rather resulted in aortic wall collections in a different plane, possibly sub-adventitial. Only histopathological study in an operated case could maybe answer the question.

Disclosure: Nothing to disclose

P59

Right atrial mass arising from the Eustachian valve

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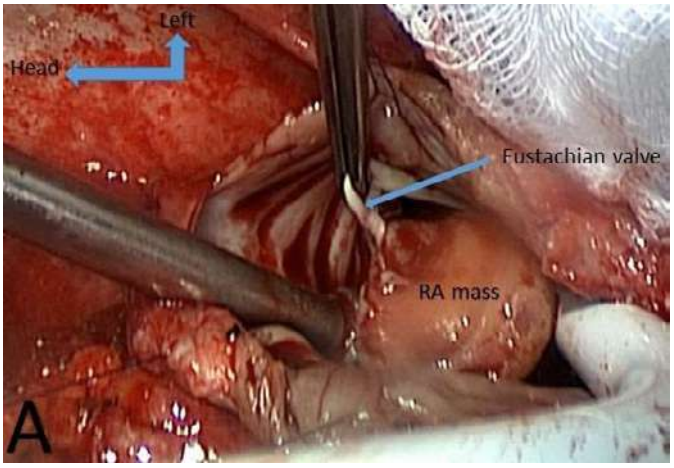
A mass in the right atrium (RA) is an unusual finding that deserves further investigation. We report the case of a 72-year-old male patient who underwent a Bentall operation with a biological composite graft and closure of patent foramen ovale 18 months prior to his presentation with an incidental new mass in RA during follow-up echo. A trans-esophageal-echocardiography and thoracic-CT-angiography confirmed the right atrial mass attached to the Eustachian-valve and additionally revealed a non-occlusive-pulmonary-embolism in the left-inferior-lobe-pulmonary artery. Despite 2 months of anticoagulation treatment, the size of the mass did not decrease. Further MRI imaging showed a central mass enhancement which raised concerns about a tumoral lesion. Following Heart-Team discussion, repeat surgical treatment was decided. The intraoperative findings revealed a 2.5x2.1cm mass arising from Eustachian valve as well as a non-diagnosed Chiari network in RA. Both were resected and sent to frozen section procedure which excluded a malignancy. Final histo-pathological analysis described fibrotic tissues compatible with an-old-organized-thrombus. The patient was discharged at 7th postoperative day without any complication.
Although imaging studies are useful for initial and differential diagnosis of RA masses, it is not always possible to get the final diagnosis without surgery. In case of suspicion of a potentially malignant pathology surgical exploration and resection are indicated.



[A- Intraoperative findings of the right atrial mass which is attached to the Eustachian valve]

Disclosure: Nothing to disclose

P60

Right anterolateral minithoracotomy for redo valve surgery; is it feasible?

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Background: Right anterolateral mini-thoracotomy represents the standard approach for aortic as well mitral and/or tricuspid valve surgery for primary procedures in our institution. In the current report we present three cases of redo valve surgery through this minimal-invasive access way.

Methods: Once exposition of aortic and mitral / tricuspid valve performed via the third and fifth intercostal space (ICS) respectively for the access of all these valves in redo scenario the fourth ICS has been selected. Basic surgical steps consisted of 5 cm right-sided anterolateral incision, insertion of two trocars (10.5 mm) in the front axillary line (4. and 6. ICS respectively). Arterial cannulation carried out directly via the distal ascending aorta and in case of severe adhesions in the upper mediastinum percutaneously through the groin. Superior vena cava cannulation performed directly via the surgical access way once a second venous cannula was inserted percutaneously through the groin.

Results: In the first case a 79 year old male patient underwent redo aortic valve replacement following endocarditis of a transfemoral placed transcatheter aortic valve implantation. The second case (52 year old male) underwent tricuspid valve replacement with biological prosthesis in beating heart technic. The initial procedure included mechanical composite-graft and single coronary artery bypass (RIMA-RCA), following by palliative clipping of the tricuspid valve via MitraClip. The last case (39 year old male) underwent mitral valve reconstruction following mechanical aortic valve replacement and mitral repair due to double-valve-endocarditis. Mean aortic clamp and cardiopulmonary bypass time were 72 ± 35 and 72 ± 11 min respectively. Mortality and incidence of neurological complications were absent in our series were mean ICU and hospital stay were 2 ± 1.7 and 12.6 ± 5.5 days.

Conclusion: Right-sided anterolateral thoracotomy can be considered as a further access-way for the approach of aortic, mitral and tricuspid valve in a redo scenario.

Disclosure: Nothing to disclose

P61

Giant teratoma as a cause of cardiac tamponade

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Introduction: Mature teratomas are the most common type of mediastinal germ cell tumors, slow growing, occur in adolescence or early adulthood, remain asymptomatic in most cases and are often an incidental finding on a routine chest radiograph. Symptoms are as a result of compression

of adjacent structures. We present the case of a huge mature teratoma with an atypical clinical presentation.

Case report: A 47 years old patient presented with tachycardia at 170/min. He had a mild cough, dyspnea associated with fever for 4 days and an episode of nausea with vomiting. Clinical status and paraclinical examinations showed an acute alithiasic cholecystitis.

An echocardiography showed a tamponade on an abundant circumferential pericardial effusion and a cystic-like mass of 18 by 15cm in contact with the right atrium.

Thoracic CT scan and MRI revealed a well-delimited cystic lesion with a compression effect on the right atrium, mediastinal main vessels and the airways.

Pericardial drainage by a sub-xiphoid approach under local anesthesia performed to relieve the persistent tachycardia.

Serum tumor markers (FP , hCG) were all-negative.

The mass removed through a right hemi-clamshell incision. The patient prepped for ECMO in case of cardiovascular collapse during anesthesia induction. The right phrenic nerve entrapped in the mass and damaged during dissection.

The postoperative course marked by pain requiring epidural analgesia and intensive physiotherapy. The anatomopathologic examination showed a mature teratoma with one main cyst, several small secondary cysts with sebaceous content and different types of epithelial coatings.

Conclusion: The resection of a such voluminous mass requires a multidisciplinary approach. The surgical incision must be tailored to the size of the mass and its extension. Complete surgical resection is the treatment for all mature teratomas with an excellent prognosis, as they rarely invade locally.

Disclosure: Nothing to disclose

Index

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