pacemaker or subcutaneous ICD. Follow-up was performed with TEE in index hospitalization and outpatient transthoracic echocardiogram (TTE). 

Results: Fifteen patients (7 females; average age 65.6 ± 14.2) with 24 total leads met the criteria outlined above. Improvement in TR, confirmed by postoperative TEE, was achieved in the entire cohort. All patients were discharged alive. There were no major or minor complications associated with the use of TLE for the resolution of TR in our series. Follow-up between 4-8 months with TTE confirmed no significant TR.

Conclusion: Tricuspid regurgitation was successfully reversed with TLE in our cohort. Further clinical studies are needed to validate protocols.

CI-545-04

SINGLE CENTER OUTCOMES OF LEAD EXTRACTION IN PATIENTS WITH SEVERE TRICUSPID REGURGITATION

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Background: Transvenous leads can cause severe tricuspid regurgitation (TR) due to leaflet impingement; however, there is paucity of data evaluating the benefit of lead extraction for improvement in TR and what patient-specific factors might predict TR improvement after lead removal.

Objective: To investigate (1) the effect of transvenous lead extraction (LE) and change in severity of tricuspid regurgitation, and (2) identify patient characteristics that are associated with improvement in TR.

Methods: Among consecutive patients with preprocedural electrocardiogram gated CT undergoing LE between Jan 2017 and Aug 2019, patients with severe TR at the time of the procedure were identified. Assessment of severe TR and mechanism of TR was made on pre-extraction TEE. Post procedural TR assessment was done by TTE performed at a median follow up of 4.8 ± 1.3 months.

Results: 16/69 patients with native or bioprosthetic tricuspid valve and single right ventricular lead coursing through the tricuspid valve had evidence of severe TR (Table). 9 patients were referred for lead extraction for TR due to impingement of tricuspid valve. 7 patients underwent lead extraction for other reasons. 2/16 patients with RV pacing leads had improvement in TR to mild range, both of which had undergone lead extraction for tricuspid valve leaflet impingement whereas 0/7 patients undergoing lead extraction for other reasons had any improvement in TR. The only significant association with improvement in TR was average lead dwell time of 6.5 months, compared to average lead dwell time of 4.1 years for rest of the patients without improvement in TR. There was no association noted between presence of RV dysfunction/ dilatation at the time of lead extraction and improvement in TR post extraction.

Conclusion: None of the patients with leads older than 7 months had any improvement in TR. Potential etiologies include (1) progressive or irreversible leaflet fibrosis, (2) progressive tricuspid regurgitation which, when sustained, may promote further tricuspid annular dilation, reduce RV function, and worsen TR. These factors limit improvement in TR with LE unless LE is performed acutely after recognition of lead impingement. Further studies are needed to evaluate additional patient characteristics associated with TR improvement after LE.

ABSTRACT PE-565:

Advances in Adult Congenital Heart Disease

Saturday, April 30, 2022
10:30 AM - 11:30 AM

PE-565-01

PROGRAMMED VENTRICULAR STIMULATION AS AN ADDITIONAL PRIMARY PREVENTION RISK STRATIFICATION TOOL IN ARRYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY: A MULTINATIONAL STUDY

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Background: A novel risk calculator predicting sustained ventricular arrhythmias (VA) in patients (pts) with arrhythmogenic right ventricular cardiomyopathy (ARVC) was recently proposed. It is unknown if programmed ventricular stimulation (PVS) provides additional prognostic value.

Objective: To test if PVS provides additional prognostic value in pts with ARVC without previous VA at the time of diagnosis.

Methods: All pts with definite ARVC, no history of sustained VAs at diagnosis, and PVS at baseline were extracted from 7 ARVC registries. The calculator-predicted risk for sustained VA was extracted at diagnosis, and PVS at baseline were extracted from 7 ARVC registries. The calculator-predicted risk for sustained VA was assessed in all pts. Independent and combined performance of the risk calculator and PVS on sustained VA were assessed during a 5-year follow-up (f.u.).

Results: 288 pts (41.0 ± 14.5 years, 55.9% male, RVEF 42.5 ± 11.1%) were enrolled. At PVS, 137 (47.6%) pts had inducible VT. During f.u., 83 pts with a positive PVS and 37 with a negative PVS had sustained VA (p < 0.001). Inducible VT predicted clinical sustained VA during the 5-year f.u. (HR 4.21; p < 0.001) and even after accounting for the calculator-predicted risk (HR 2.97; p < 0.001). The model comprising both predictors
provided the best discrimination (C-statistic 0.75). PVS inducibility had a 76% sensitivity and 68% specificity (log-likelihood ratios of 2.4 and 0.42 for inducible and non-inducible pts). In pts with a calculator-predicted risk of VA <25% over 5 years (i.e., low/intermediate subgroup), inducible VT was associated with a 40.9% positive predictive value and a 93.0% negative predictive value.

**Conclusion:** Sustained VT inducibility by PVS significantly improved risk stratification above and beyond the calculator-predicted risk of VA in a primary prevention cohort of pts with ARVC.

**PE-565-02**

PILOT HOLE ASSISTED TRANSSEPTAL PACING TO AVOID DYSSYNCHRONY: THE PHAT PAD TECHNIQUE

Steven B. Fishberger MD, CEPS-P; Charles C. Anderson MD, CEPS-P and Richard Jensen MD

**Background:** It is recognized that right ventricular pacing results in left ventricular dysfunction, heart failure, and decreased quality of life. Biventricular pacing via the coronary sinus and His bundle pacing have been beneficial, though these methods have significant limitations. Left bundle branch pacing has emerged as an alternative for physiologic pacing, however achieving this is challenging in some patients.

**Objective:** The PHAT PAD technique describes a method to reliably pace the left bundle branch. This technique provides access to the left bundle via a transseptal approach.

**Methods:** A deflectable sheath is positioned along the midportion of the right ventricular septum. Under fluoroscopic and transesophageal guidance, a radiofrequency wire is advanced through the septum into the left ventricle. A dilator is advanced over the wire into the septum, creating a pilot hole, and removed. The wire is retained across the septum in the sheath, and a Medtronic 3830 lead is advanced through the sheath along the wire into the pilot hole. Pacing is performed to confirm left bundle transvenous pacing by the demonstration of right bundle branch block on the surface ECG. Repeat echocardiographic imaging is used to evaluate function and determine if there is any ventricular level shunt.

**Results:** The PHAT PAD technique was used to attempt left bundle venous pacing in 2 patients, ages 18 and 76 years. Both achieved right bundle branch block (RBBB) on surface ECG with a QRS duration of 120 and 125 ms. By transesophageal imaging, patients had normal left ventricular function and there was no evidence of a ventricular septal defect. At 5 month follow up for both patients, RBBB was still present and capture thresholds where < 1.0 volt at 0.4 ms.

**Conclusion:** This proof of concept study describes a technique that enhances the ability to achieve physiologic left bundle pacing. Intermediate results are encouraging, however long term follow up and a larger patient cohort is necessary.

**PE-565-03**

NON-INVASIVE IDENTIFICATION OF SLOW CONDUCTING ANATOMICAL ISTHMUSES IN PATIENTS WITH TETRALOGY OF FALLOT BY 3-DIMENSIONAL LATE GADOLINIUM ENHANCEMENT CARDIOVASCULAR MAGNETIC RESONANCE IMAGING

Yoshitaka Kimura MD, PhD; Justin Wallet MD; Nico A. Blom MD, PhD; Hildo J.J. Lamb and Katja Zeppenfeld MD, PhD

**Background:** Patients with repaired tetralogy of Fallot (rTOF) remain at risk of sudden cardiac death due to sustained monomorphic ventricular tachycardia (SMVT). The majority of SMVTs are related to slow conducting anatomical isthmuses (SCAI) in particular to SCAI3 at the outlet septum, bordered by the pulmonary annulus and the ventricular septal defect patch.

**Objective:** The study aims to evaluate whether 3D late gadolinium enhancement cardiovascular magnetic resonance (3D LGE-CMR) can identify SCAIs.

**Methods:** Consecutive patients with rTOF who underwent right ventricular (RV) EAM and 3D LGE-CMR were included. LGE-CMR-derived 3D RV reconstructions were created (ADAS 3D) and merged with RV EAM data. Mapping points were superimposed on the CMR-derived 3D reconstruction allowing for direct comparison of EAM data and local signal intensity (SI). The optimal SI cut-off to identify low bipolar voltage (LBV, BV<1.76mV) was determined. An abnormal AI on LGE-CMR was defined as AI with continuous high SI connecting AI borders.

**Results:** Forty-six rTOF patients (34±16 years, 57% male) were included. At EAM, 20 patients had normal AI, and 19 and 7 had a SCAI (<0.5m/s) or blocked AI, which was AI 3 in all. In 11 patients, 14 SMVTs could be induced, which were all related to SCAI3. A total of 8979 points were analyzed, showing a significant correlation between BV and SI (R = 0.39, P < 0.001). The optimal SI cut-off to identify LBV was 42% of the maximal SI (MSI) (AUC 0.79; sensitivity, 74%; specificity, 78%). Using this cut-off a SCAI or blocked AI3 could be correctly identified by LGE-CMR in all 26 patients and a normal AI3 could be confirmed in 13/20 patients with normal EAM findings (Figure). The sensitivity and specificity of 3D LGE-CMR for identifying SCAI or blocked AI3 were 100% and 65%, respectively. Of note, among patients with normal EAM findings, those with abnormal AI3 on LGE-CMR had lower BV of AI3 than those with normal AI3 on LGE-CMR. (2.06 [Range, 1.62-2.60] vs. 1.76mV) was determined. An abnormal AI on LGE-CMR was defined as AI with continuous high SI connecting AI borders.

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