ABSTRACT PC-578: Challenging Cases for the Electrophysiologist

Sunday, May 1, 2022
10:00 AM - 11:00 AM

PC-578-01

BIPOLAR ABLATION OF INTRAMURAL SEPTAL VENTRICULAR ECTOPY USING THE CORONARY VENOUS SYSTEM

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Background: Ablation of intramural ventricular arrhythmias (VA) is challenging and associated with high failure rates.
Objective: To describe a novel technique of bipolar septal ablation using the septal coronary venous branches.
Methods: N/A
Results: A 50-year-old man with frequent symptomatic monomorphic ventricular ectopy (VE), 30% burden, refractory to antiarrhythmics, was referred after two failed ablation attempts. VE had a left bundle branch block morphology, QS in V1, R/S transition in V3, isodiphasic RS in lead I and inferior axis. Echocardiogram was normal. EP study was performed under conscious sedation and rhythm was ventricular bigeminy. We mapped the right and left ventricular outflow tracts (RVOT and LVOT), aortic sinuses and the coronary venous system (CVS) was mapped with a Baylis 2 Fr EPstar octopolar catheter. The earliest ventricular activation was on the anteroseptal endocardial LVOT, on time with the EPstar in a septal branch of the anterior interventricular vein (26 ms before surface QRS). The bipolar electrograms on EPstar 1,2 and 3,4 had opposite configurations, indicating likely source between electrodes 2 and 3 (Figure A). Unipolar ablation at both early sites caused brief suppression of VE with early recurrence. We then used a bipolar configuration with the ablation catheter in the anteroseptal LVOT endocardium and EPstar 2,3 in the septal coronary venous branch as a ground electrode, at a 9 mm distance from the ablation catheter. Left coronary angiography confirmed no coronary artery between the electrodes (Figure B). One bipolar ablation lesion at 15 W was delivered for 60 seconds and immediately abolished the VE in less than 1 second (Figure C).
Conclusion: Bipolar ablation from the ventricular endocardium using a small 2 Fr catheter in the septal coronary veins as a ground electrode is feasible, effective and safe for ablation of difficult intramural septal VA.

PC-578-02

JUNCTIONAL TACHYCARDIA

Chaitra Mohan MD; Raul D. Mitani MD, FHRS, CCDS and Jeffrey J. Goldberger MBA, MD

Background: Junctional ectopic tachycardia (JET) is a rare tachyarrhythmia in adults. The precise site of origin within the AV junction is unknown.
Objective: N/A
Methods: N/A
Results: A 71-year-old male presented with dyspnea on exertion and recently diagnosed tachycardia in March 2021. He had a history of diabetes mellitus, obesity, hypertension, obstructive sleep apnea, and COVID-19 in 2020. A 14-day monitor demonstrated 43% supraventricular ectopy SVE burden and short runs of SVT. He presented for an electrophysiology (EP) study. He presented to the EP lab in sinus rhythm with frequent SVE. Multipolar catheters were placed in the His bundle region, right atrium, coronary sinus, and right ventricle. The SVE beats had the same QRS morphology, and an identical HV interval and His-right bundle activation sequence as in sinus rhythm and no retrograde conduction, consistent with premature junctional complexes (PJC). Occasional short bursts of junctional tachycardia were noted. Isoproterenol was titrated to a maximum dose of 8 mcg/min. No other SVT was inducible with atrial overdrive pacing or programmed stimulation or with isoproterenol infusion. A 6 mm tip cryoablation catheter was advanced to the right atrium to the anatomical location of the slow pathway in the inferior triangle of Koch using an electroanatomic mapping system (EnSite NavX). Signals immediately prior to ablation (Figure 1) were notable for a pre-potential 26 ms prior to the HIs with PJC. Cryoablation was performed at this site (Figure 2) with resolution of the PJC.

Figure 1. Surface ECG and intracardiac electrograms prior to cryoablation in the inferior portion of the triangle of Koch. The inset (right) shows the circled electrogram at high gain demonstrating the broad, low amplitude pre-potential with the junctional ectopic beat. ABL-ablation catheter, CS—coronary sinus

Figure 2. RAO and LAO 3D electroanatomic map showing position of the ABL recording in figure 1(red dots – ABL catheter, blue dots – HS cloud). Bottom panel shows the disappearance of junctional ectopic beats at the onset of cryoablation.
at the onset of the freeze. After thawing, a second freeze was administered. No further PJCs were noted at baseline or with isoproterenol infusion.

**Conclusion:** JET could originate from anywhere within the AV node or proximal His bundle. The application of cryoablation at a typical AV nodal slow pathway location with a preceding pre-potential and immediate obliteration of PJCs suggests that the origin in this case was from this region rather than a true His bundle extrasystole. Identification of pre-potentials to the junctional ectopy can guide safe ablation of this dysrhythmia.

**PC-578-03**

**RIGHT ATRIAL ATYPICAL FLUTTER WITH 2:1 INTRA-ATRIAL BLOCK MIMICKING LEFT ATRIAL FOCAL AND LOCALISED REENTRANT TACHYCARDIA**

David T. Boothe MD; Steven Song MD; Steven Leung MD, MHA; Andrew A. Zadeh MD; Ivan C. Ho MD, FHRS and Junaid A.B. Zaman MA, MD, PhD, CCDS

**Background:** Atrial-level blocks are known confounders for diagnosis of SVTs and commonly occur after previous linear ablation lesions.

**Objective:** 1. To demonstrate importance of recognition of atrial-level block in SVT diagnosis and treatment. 2. To review underlying assumptions in using entrainment to localize SVT origins. 3. To discuss the importance of thorough biatrial mapping in determination of unclear SVT mechanisms.

**Methods:** N/A

**Results:** A 74y M with a history of bioprosthetic MV replacement, atypical RA flutter ablation (2018), and permanent pacemaker (2020) for sick sinus syndrome presented with fatigue and 76% AF/AT burden. For index RA ablation, both an intercaval line using bridging scar near the atriotomy site anterior to the appendage and a cavotricuspid isthmus line were made. Tachycardia was induced via burst pacing. Initial entrainment from CS suggested a L-sided tachycardia. A Pentaray map of the tachycardia showed LA anteroseptal reentry with entrainment at the site giving a PPI-TCL\textsubscript{30ms}. PVI and anteroseptal line were performed which changed cycle length but not CS activation. LA re-mapping demonstrated focal breakout near RIPV; ablation lengthened cycle length to 290ms without rhythm cessation. After PVI confirmation, mapping of the RA showed 2:1 intra-atrial conduction in the lateral RA with 1:1 conduction in the septal RA (fig A). Mapping 1:1 areas of RA conduction showed a gap in previous IVC line with intact CTI block with the majority of the cycle length at the posteroseptal floor (fig B), immediately opposite the site of initial LA anteroseptal reentry (fig C). During ablation of IVC line gap, progressive lengthening of the TCL was noted followed by termination of rhythm without inducibility (fig D).

**Conclusion:** Response to entrainment assumes 1:1 conduction through the entire circuit, and contributed to the appearance of a left sided tachycardia upon initial CS entrainment. The finding of a LA RIPV tachycardia upon remapping the LA after PVI is consistent with a separate focal tachycardia but could represent epicardial connections from the CS to the posterior LA.

**PC-578-04**

**TRANSHEPATIC PERMANENT PACEMAKER LEAD PLACEMENT**

Kamal Preet Cheema; Dan Sorajja MD, FHRS and Sailendra Naidu

**Background:** Limited or compromised systemic venous access poses a significant challenge in patients who require a permanent cardiac pacemaker. Case reports of transhepatic access have been described in the congenital population.

**Objective:** We describe a case of symptomatic sinus node dysfunction in which the standard transvenous approach was not possible.

**Methods:** N/A

**Results:** A 44-year-old woman with fibrosing mediastinitis and occlusion of the superior vena cava developed symptomatic sinus node dysfunction and left bundle branch block. Given her anatomy the decision was made to proceed with surgical pacemaker implantation via a right thoracotomy approach, as she did not want leads placed via the femoral route. The right atrial (RA) and right ventricular leads were implanted into their respective chambers through purse-string sutures in the right atrium, with the device placed in right axilla. At the 6-week post-implant device interrogation, the RA lead impedance had increased from 693 ohms to 1045 ohms and the lead was detecting both atrial and ventricular signals. Chest x-ray confirmed RA lead dislodgement (Figure 1). She was brought to the EP lab for attempted RA lead revision, which ultimately was unsuccessful. The RA lead was then revised using a transhepatic approach. Percutaneous right hepatic vein access was performed by interventional radiology using ultrasound and fluoroscopic guidance. Through a 7-French sheath, the RA lead was positioned in the right atrial appendage, and slack was given to this lead to accommodate respiratory motion (Figure 2). The lead was secured at the access site with the suture sleeve, and...