PC-577-03
SUCCESSFUL MAPPING AND ABLATION OF VENTRICULAR FIBRILLATION USING STORED ELECTROGRAMS RECORDED FROM A SUBCUTANEOUS IMPLANTABLE CARDIAC DEFIBRILLATOR

Uyanga Batnyam MD; Kenneth Quadros Quadros MBBS; Esseim Sharma MD; David Chang MD and William H. Sauer MD, FHRS, CCDS

Background: Unifocal premature ventricular contractions (PVCs) can be a common trigger of ventricular fibrillation (VF); however, reliable documentation for clinical PVCs triggering VF is often unavailable. Stored intracardiac electrograms (EGMs) from an implantable cardiac defibrillator (ICD) can provide valuable information and have been shown to successfully guide PMVT/VF ablation. We describe a case of successful VF ablation using a similar, but previously unreported strategy examining stored EGMs from a subcutaneous ICD.

Objective: To describe the utility of stored SICD EGMs to guide ablation of VF.

Methods: n/a

Results: A 29 year old man with non-ischemic dilated cardiomyopathy, history of sudden cardiac death with a secondary prevention SICD presented with frequent (11) appropriate therapies for VF while on guideline directed medical therapy. An analysis of the subcutaneous EGM (sensing electrode proximal ring electrode to can - Primary Vector) demonstrated unifocal morphology PVC preceding each episode (Figure 1, Panel A). There was no 12 lead EKG documentation of clinical PVC available to guide ablation but given his high VF burden we proceeded with ablation. Dobutamine infusion during EP study induced 2 PVC morphologies, one of which matched the clinical PVC using simultaneous real time SICD EGM recordings (Figure 1, Panel B-C). The PVC was pace-mapped at posteromedial papillary muscle of the LV and RF application in this region triggered VF and eventually elimination of the PVC at the end of case. Although the patient had an excellent short-term result, a repeat ablation targeting the same PVC using the same strategy was required leading to successful control of PVCs and VF.

Conclusion: Utilization of stored EGMs from an SICD can successfully guide VF ablation.

PC-577-04
ANTEROSEPTAL ACCESSORY PATHWAY: KILLING ONE BIRD WITH TWO STONES

Elsheikh Abdelrahim MBBS and Waddah Maskoun MD, FHRS

Background: 21 year old healthcare worker with frequent palpitations leading to frequent hospitalizations with elevated heart rates up to 210 bpm noted on her watch with pre-excitation on ECG consistent with anteroseptal accessory pathway (AS AP).

Objective: Describe a case of achieving antegrade conduction block in the AS AP with retrograde ablation approach and achieving retrograde conduction block with antegrade ablation approach.

Methods: N/A

Results: Electrophysiological maneuvers were performed including parahisian pacing, apical/basal pacing confirming an AS AP with antegrade and retrograde conduction. Orthodromic reentrant tachycardia (ORT) was easily inducible with burst A pacing. Due to close proximity of the earliest site to the HIS using antegrade approach, decision was made to use the retrograde approach which showed an early site without HIS signal in the non coronary cusp (NCC). Ablation in the NCC resulted in antegrade conduction block after 1.4 seconds and was no longer seen until the end of the case (Fig A&B). Repeating the prior maneuvers showed persistent retrograde conduction and patient was still easily inducible for ORT. Additional ablation in the NCC did not terminate retrograde conduction. Antegrade approach was used for further ablation opposite the NCC at the earliest retrograde A during ORT which resulted in termination of ORT after 0.5 seconds (Figure D). Repeat maneuvers showed no evidence of pathway conduction and the patient was non inducible for ORT. No events at six month follow up.

Conclusion: AS AP with successful ablation of antegrade conduction from a retrograde approach and successful ablation of retrograde conduction from an antegrade approach.
Background: Optimal stereotactic body radiation therapy (SBRT) planning methods for VT ablation are yet to be defined.

Objective: To evaluate a multimodal approach for SBRT planning.

Methods: Across 7 international centers, patients with drug- and catheter ablation-refractory VT underwent cardiac CT MRI imaging prior to SBRT. The inHEART technology was used to create image-based 3D models of substrate, cardiac anatomy, and organs at risk (coronaries, phrenic nerve, gastrointestinal tract, AV node, ICD leads). In MUSIC software (IHU Liryc-Inria), 3D models were fused with prior EP maps, and SBRT targets were interactively drawn in 3D by the referring EP cardiologist. Transmural target volumes and organs at risk were fused with a 4D planning CT and used to plan SBRT in Eclipse software (Varian). Therapy was delivered using either Truebeam or Edge systems (Varian).

Results: 30 patients were included (age 70±10 years, 90% men, LVEF 26±9%, 67% ICM, 47% NICM or mixed, 1.7±1.2 prior catheter ablations). SBRT was delivered on median planning treatment volumes of 96 [Q1-Q3: 63-149] mL, at a total dose of 25 Gy over 1 single session. Over a median follow-up of 4 [Q1-Q3: 2-8] months, death occurred in 11 (37%) patients, due to arrhythmia recurrence in 4 (13%). Follow-up at 6 months was available in 14 patients. In these, the median numbers of VT episodes and ICD shocks over the 6 months preceding SBRT were 20 [Q1-Q3: 9-27] and 8 [Q1-Q3: 5-15], respectively. In the 6 months following SBRT, these decreased to 0 [Q1-Q3: 0-30] and 0 [Q1-Q3: 0-0], respectively (P<0.001 for both). 8/14 (57%) patients were free from any VT recurrence, and 11/14 (79%) were free from any ICD shock. In the total cohort, complications attributed to SBRT were observed in 2/30 (7%), none of which were fatal (heart failure and pneumonitis, both managed with steroids).

Conclusion: In patients with severe drug- and catheter ablation-refractory VT, SBRT planning based on 3D image-based models fused with prior EP maps is feasible, and associated with favorable efficacy and safety profiles.

CA-533-02

STANDARD CARDIAC RADIOABLATION DOSE (25 GRAY) DOES NOT CAUSE MYOCYTE INJURY OR NEW FIBROSIS

Shiyang Zhang MD; Kaitlin Moore BS; Pamela Woodard; Stacey Rentschler MD, PhD; Cliff Robinson MD and Phillip Cuculich MD

Background: Noninvasive cardiac radioablation (CRA) is an emerging therapy for refractory ventricular tachycardia (VT). Focused radiation to the heart is expected to cause local myocardial destruction with replacement fibrosis (ablation effect). The extent this effect in humans is unknown.

Objective: To measure the CRA ablation effect with serial serum biomarkers and late gadolinium enhanced cardiac MRI (LGE-CMR).

Methods: Single-center, IRB-approved case series of patients with refractory VT (ENCORE-VT NCT02919618). Patients without contraindication underwent LGE-CMR and blood draws at three timepoints: before treatment, 3 days, and 3 months after treatment. Left ventricle (LV) scar burden was assessed using semi-automatic contouring (Medis, Netherlands), blinded to location of radioablation. Global and segmental scar burden (%) was compared across timepoints. Segments targeted for radioablation (25 Gray) were compared to surrounding and off-target segments. Blood samples were analyzed for high-sensitivity troponin-I (Tn-I, marker of myocyte injury) and galectin-3 (Ga3, marker of fibroblast activation and fibrosis).

Results: 7 patients were included for analysis: mean age 64 years, 14% female, 57% nonischemic cardiomyopathy, 86% with history of VT storm, mean LVEF 32% (range 19-58%). Mean number of cardiac segments targeted for radioablation was 4 (range 3-8), resulting in mean cardiac treatment volume (CTV) 29 cm³ and planning treatment volume (PTV) 114 cm³. Mean scar burden at baseline was 49% (range 29-68%). Changes in scar burden at 3 days and 3 months were -0.4% (IQR 5.5%) and 3.3% (IQR 3%). Segment-by-segment analysis (Figure 1) showed no significant scar progression in segments targeted for radioablation (range 3-8), resulting in mean cardiac treatment volume (CTV) 29 cm³ and planning treatment volume (PTV) 114 cm³. Mean scar burden at baseline was 49% (range 29-68%). Changes in scar burden at 3 days and 3 months were -0.4% (IQR = 5.5%) and 3.3% (IQR = 3%). Segment-by-segment analysis (Figure 1) showed no significant scar progression in segments targeted for radioablation (mean 68% to 68% to 71%), segments surrounding the target (43% to 44% to 47%), or off-target segments (44% to 42% to 46%). Serum Tn-I and Ga3 were not significantly increased.