Results: Among 18 patients, there were 6 focal (3 RA, 2 LA, 1 bi-atrial) and 14 re-entrant (5 RA, 9 LA) ATs. A prior atrial ablation procedure had occurred in 17% of focal and 50% of re-entrant cases. Concurrent ablation of another atrial arrhythmia was performed in 83% of focal and 57% of re-entrant cases. LAT histograms in focal ATs displayed a “valley-and-plateau” morphology and contained the full tachycardia cycle length (TCL) in 70% of cases, while LAT histograms in re-entrant ATs had a “peak-and-valley” pattern, including the full TCL in 93% of cases. In all instances, isochrones with fewest total points (“LAT valleys”) corresponded to areas of earliest activation and critical isthmuses in focal and re-entrant ATs, respectively (Fig 1). Ablation in these areas was acutely successful in all but 1 re-entrant AT (95%), in which vein of Marshall ETOH ablation was required for termination.

Conclusion: The LAT histogram morphology and TCL duration can help distinguish focal from re-entrant arrhythmias and guide ablation strategy. Further investigation is needed to validate its utility and role.

PO-622-06
RELATED UTILITY OF OMNIPOlar SUBSTRATE MAPPING FOR VENTRICULAR TACHYCARDIA ABLATION

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Background: EnSite Omnipolar mapping (Abbott, Abbott Park, IL, USA) is a novel method of directionally optimized, high density, bipolar electrogram creation with integrated local conduction velocity annotation. Established electroanatomic mapping techniques for substrate mapping for ventricular tachycardia (VT) ablation includes voltage mapping, isochronal late activation mapping (ILAM), and fractionation mapping. The relative utilities of these mapping techniques is unknown.

Objective: To evaluate the relative utility omniplor mapping for identification of critical sites for scar-related VT

Methods: Electro-anatomic substrate maps were created using the Advisor™HD Grid catheter (Abbott, Abbott Park, IL, USA) and retrospectively analyzed in 27 patients in whom 33 VT critical sites were identified. Critical sites were identified by termination of VT with ablation, entrainment mapping, or prolonged stim-QRS interval with matching pace-map.

Results: Both abnormal bipolar voltage voltage and omniplor voltage encompassed all critical sites and were observed over a median 66(IQR: 41.3-86) cm² and 52 (IQR 37.7-65.5) cm², respectively. ILAM deceleration zones were observed over a median 9 (IQR 5.0, 11.1) cm² and encompassed 22 (67%) critical sites, while abnormal omniplor conduction velocity (CV, <1mm/ms) was observed over 10(IQR 5.3-16.6) cm² and identified 20(61%) of critical sites, and fractionation mapping was observed over a median 4 (IQR 1.5, 7.6) cm² and encompassed 20 (61%) critical sites. A combination of ILAM + CV identified and Fractionation + CV both identified 28(85%) critical sites respectively, Figure 1. Mapping yield was greatest for Fractionation + CV (2.1 critical sites / cm²), and least for bipolar voltage mapping (0.5 critical sites / cm²). Sensitivity analysis evaluating impact of point density on CV mapping revealed 36% sensitivity for CV in maps with < 500 points, while CV sensitivity improved to 80% in maps with higher point density >1500, Figure 2.

Conclusion: ILAM, fractionation and conduction velocity mapping each identified distinct critical sites and provided a smaller area of interest than voltage mapping alone. Sensitivity of CV improved with greater point density.

PO-622-08
FIRST REAL-WORLD EXPERIENCE WITH PULMONARY VEIN ISOLATION USING PULSED FIELD ABLATION FOR PAROXYSMAL ATRIAL FIBRILLATION

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Background: Catheter ablation for AF using thermal energy can cause collateral damage. Pulsed field ablation (PFA) is a novel nonthermal energy source. Only a few small clinical studies have been published.
Objective: We report on the first ‘real-world’ experience with PVI using PFA for paroxysmal AF.

Methods: Pre and post ablation, phrenic nerve function was assessed. A high-density LA bipolar voltage map was created. All PVs were individually isolated using a steerable sheath and a pentaspline over-the-wire PFA catheter. After ablation, mapping was repeated to assess lesion formation.

Results: In 30 patients (63 years; 47% male), uncomplicated PFA was performed, with all PVs isolated. Procedure time was 116 min. PFA catheter LA dwell time was 29 min. Fluoroscopy time was 26 min. (All values are median). In 1 patient with roof dependent flutter, a roof line was intentionally created. In 2 patients, unintentional bidirectional mitral isthmus block was created. There was no phrenic nerve or esophageal damage. In 1 patient, pericardial drainage after cardiac tamponade was performed. In-hospital stay, and 30-day follow-up were uneventful. After 90 days, 97% of patients were in sinus rhythm. Conclusion: PVI using PFA for paroxysmal AF in a ‘real-world’ setting is safe and feasible. Procedure and ablation times are short. Atrial ablation lines can easily be created. Unintentional ablation of atrial tissue can occur, accurate catheter alignment to the PV ostium and PV axis should be ensured.

Figure: Postero-anterior view of a LA bipolar voltage 3D map. Left panel: pre ablation. Magenta areas in the PVs are conducting substrates- IART and FAT. Right panel: post ablation. Non-magenta (<0.5 mV) and red (<0.1 mV) areas in the PVs are ablated and electrically silent.

PO-623-02

OUTCOME OF REPEAT ABLATION FOR PREMATURE VENTRICULAR CONTRACTIONS IN PATIENTS WITH PRIOR ABLATION FAILURE: IMPACT OF ADVANCED TECHNIQUES

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Background: The utility of advanced ablation (investigational needle ablation, epicardial, and simultaneous two site unipolar radiofrequency ablation) for premature ventricular contractions (PVCs) in patients with prior ablation failure is not clear.

Objective: To evaluate long-term outcomes of advanced ablation techniques in patients who failed prior PVO ablation.

Methods: We reviewed 239 consecutive patients who underwent PVC ablation. When standard endocardial ablation with normal or half normal saline failed, we considered an advanced ablation technique. Acute success was defined as abolition of the target and 5 redo ablations. For patients with no prior intervention (21, 81%), ablation revealed cavitricuspid isthmus dependent flutter (CTI-flutter, 71%), scar-related intra-atrial reentry (IART, 57%), and focal atrial tachycardia (FAT, 9.5%) (Figure A). Patients with prior outside interventions for CTI-flutter (5, 29%) demonstrated conduction across the CTI in 3/5 (60%) cases. However, patients requiring redo ablation after an index ablation at our institution (5, 29%) demonstrated bi-directional block across the CTI and different, new arrhythmia substrates at the next procedure (80% IART, 40% FAT). Intracardiac echocardiography and electroanatomic mapping were used in all contemporary cases. A screw-in atrial lead was used in 4 procedures as a stable fiduciary reference for mapping, as the coronary sinus ostium was inaccessible. Achieving bi-directional block across the CTI often required ablation on both sides of the baffle (retroaortic access, 81%; using a baffle leak, 11.5%; trans-baffle puncture, 7.7%, or using a VSD, 3.8%). Combined approaches were necessary in 23% of patients to reach critical tissue and achieve optimal contact force (Figure B). Irrigated contact force sensing catheters were used, targeting a significant effect on the electrograms and demonstration of bi-directional CTI block (Figure C).

Conclusion: Despite the complex anatomy and atrial reconstruction, cavitricuspid isthmus flutter is still the most common arrhythmia in this population, and bi-directional block often requires additional ablation approaches to reach the target tissue on either side of the baffle. Once CTI block is achieved, further recurrences are due to different, new arrhythmia substrates- IART and FAT.