POSTER PO-622:
Featured Posters: Catheter Ablation at Pod 9

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12:30 PM - 2:30 PM

PO-622-01

CHRONIC PULSED FIELD ABLATION LESIONS IN THE PORCINE LV: DOSE DEPENDENCE AND CORRELATION WITH LATE GADOLINIUM ENHANCEMENT MRI

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Background: Pulsed Field Ablation (PFA) is a promising modality for ventricular arrhythmia ablation due to its speed, apparent tissue selectivity, and the potential to create large lesions. Recent work showed that lesions in the left ventricle (LV) increase in size with number of PFA repetitions; however, the potential to create transmural lesions has not been reported.

Objective: Investigate the extent of PFA lesions created using a range of pulse trains and evaluate late gadolinium enhancement (LGE) MRI for in vivo lesion visualization.

Methods: PFA was performed in 8 swine via an 8F, 5 mm tip focal catheter setup and R-wave gated biphasic pulse trains of 1300 V (4 trains) and 1500 V (1, 4, 8, and 16 trains). After 6-7 weeks, animals were brought to a 3T MRI (GE) for imaging using LGE (TI = 500 ms, resolution = 0.03 mm×0.03 mm×0.03 mm) at 50 ms after the injection of 0.1 mmol/kg of ultrabright. PFA lesions were manually measured from corresponding MRI and excised tissue slices.

Results: PFA lesion dimensions measured using MRI and gross pathology were in strong agreement (Fig 1; R=0.88, p<0.01; bias = 0.03±2.1 mm, 95% limits of agreement=[4.0, 4.1]). Linear mixed effects models revealed significantly deeper lesions created using 1500 Vx8 trains compared to 1500 Vx1 train (Fig 2; pathology, p<0.05; MRI, p<0.01). Lesions created using 1300 Vx4 trains and 1500 Vx4 trains did not differ significantly, either from pathology or MRI. Similar trends were observed for lesion width and volume as a function of PFA trains.

Conclusion: LGE MRI at 6-7 weeks post ablation accurately visualizes chronic PFA lesions in vivo. Lesions increased in depth and width with the number of PFA trains applied. Increasing pulse voltage and trains can achieve transmurality in the porcine LV.

PO-622-02

PREDICTOR OF ATRIAL TACHYARRHYTHMIA RECURRENCE AMONG ABLATION STRATEGIES AFTER ABLATION INDEX-GUIDED ATRIAL FIBRILLATION ABLATION

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Background: Ablation index (AI)-guided atrial fibrillation (AF) ablation improved the procedural success and long-term outcome, but it remained unsatisfactory, especially in non-paroxysmal AF (non-PAF). Various ablation strategies were performed to improve the outcome. However, the strategies vary with the institutions and operators, and predictors of recurrence of atrial tachyarrhythmia (AT) among the strategies remain to be elucidated.

Objective: We analyzed the predictors of AT recurrence, focusing on high-power radiofrequency application (50W, HP), first-pass pulmonary vein (PV) isolation (FPI), and extra-PV ablation strategies such as left atrium roof linear ablation (LARLA), superior vena cava (SVC) isolation, left atrium posterior wall box isolation (POBI) and complex fractionated atrial electrogram (CFAE) ablation.

Methods: We retrospectively investigated 1384 patients undergoing the first AI-guided AF ablation from January 2018 to October 2020 (mean age, 67±10 years; female, 422 [31%]; non-PAF, 598 [43%]). HP was performed for 1074 patients (78%) undergoing ablation procedures since November 2018. SVC isolation was performed in all patients with SVC sleeve ≥20mm and the other extra-PV ablation strategies at the operator’s discretion. We performed univariate and multivariate analyses by Cox proportional hazard model to define the predictors of AT recurrence.

Results: During follow-up (mean, 371±160 days), any ATs recurred in 317 patients (24%). Univariate analysis revealed that HP (Hazard ratio [HR], 1.08 [95% confidence interval, 0.83-1.40], p=0.57), FPI in both PV sides (HR, 1.08 [0.87-1.36], p=0.49), and FPI in at least one side (HR, 0.85 [0.61-1.19], p=0.36) had no effect on AT recurrence. Multivariate analysis revealed that LARLA had a negative effect (HR, 1.86 [1.21-2.86], p=0.005) and SVC isolation had a positive effect (HR, 0.71 [0.56-0.89], p=0.003); however, POBI (HR, 1.03 [0.77-1.38], p=0.84) and CFAE ablation (HR, 1.10 [0.78-1.56], p=0.59) had no effect on AT recurrence.

Conclusion: The present analysis of a large number of AI-guided AF ablation revealed that HP, FPI, POBI, and CFAE ablation showed no effect, LARLA showed a worsening effect, and SVC isolation showed a protective effect on AT recurrence.