

**B-PO01-047**

**PULSED FIELD ABLATION AND HEAT GENERATION: ELECTRODE-TISSUE TEMPERATURE ANALYSIS FROM THE PULSED AF TRIAL**

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**Background:** Pulsed Field Ablation (PFA) is an emerging alternative energy source to thermal-based ablation. PULSED AF is a first-in-human study evaluating the safety and efficacy of PFA for pulmonary vein (PV) isolation, but the thermal effects of PFA on human myocardial tissue are unknown.

**Objective:** Quantify the electrode temperature rise following PFA energy application in PULSED AF patients.

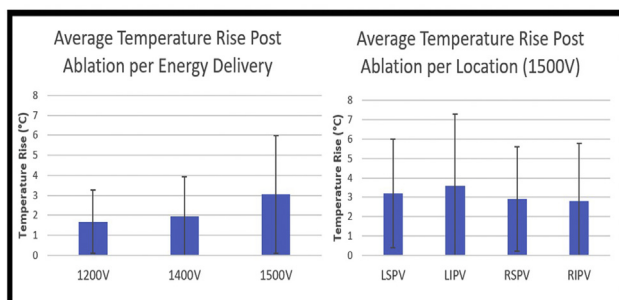
**Methods**

Patients (n=20) undergoing first-time PV isolation were treated with PFA using a circular, over-the-wire catheter. Electrode temperature was recorded from all 9 electrodes for 1 second following each PFA application. Thermocouples were located on the tissue side of the gold electrodes to provide tissue-interface temperatures.

**Results:** Acute PV isolation was achieved in 100% of PVs without PFA system related serious adverse events. Different PFA levels showed the following temperature rises:

1.7 ± 1.6°C (1200 V), 1.9 ± 2.0°C (1400 V) and 3.0 ± 3.0°C (1500 V) (r<sup>2</sup>=0.9). Electrode temperature rise at the 1500 V varied slightly across all four veins with temperature rises of 3.2 ± 2.8°C (LSPV) 3.6 ± 3.7°C (LIPV) 2.9 ± 2.7°C (RSPV) 2.8 ± 3.0°C (RIPV). In patients with esophageal temperature monitoring, no appreciable changes were observed (n=8).

**Conclusion:** This is the first electrode temperature analysis associated with PFA. PFA only causes a limited temperature rise following delivery confirming the primarily non-thermal nature of lesion creation.



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**ECG-I PHENOTYPING OF PERSISTENT AF BASED ON DRIVER BURDEN AND DISTRIBUTION TO PREDICT RESPONSE TO PULMONARY VEIN ISOLATION (PHENOTYPE-AF)**

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**Background:** It remains unclear which patients with persistent AF will benefit from pulmonary vein Isolation (PVI).

**Objective:** To prospectively phenotype persistent AF based on AF mechanisms utilising ECGI mapping to determine whether this would predict long term freedom from arrhythmia after pulmonary vein isolation (PVI) through a prospective clinical trial.

**Methods:** Patients with persistent AF of < 2 years duration underwent cryoballoon PVI. Contact mapping was recorded from the left atrial appendage (LAA), right atrial appendage (RAA), proximal CS and PVs. ECGI mapping was performed prior to PVI to determine potential drivers (PDs) defined as rotational activations completing ≥ 1.5 revolutions or focal activations. The co-primary end point was the association between (1) PD burden (defined as the number of PD occurrences) and (2) PD distribution (defined as the number of segments on an 18 segment model of the atria harbouring PDs) with freedom from arrhythmia at 1 year follow up.

**Results:** Of 100 patients, 97 completed follow up and 53 (54.6%) remained in sinus rhythm off antiarrhythmic drugs. Neither PD burden nor PD distribution predicted freedom from arrhythmia (HR 1.01, 95% CI 0.99 - 1.03, p = 0.164; and HR 1.04, 95% CI 0.91 - 1.17, p = 0.591 respectively). On secondary analyses, there was a trend towards the burden of focal PDs predicting freedom from arrhythmia (HR 1.04, 95% CI 1.00 - 1.09, p = 0.076). Otherwise, the burden of rotational PDs, rotational stability, the burden of PDs occurring at the pulmonary veins and posterior wall, and the burden and distribution of drivers following PVI all failed to predict arrhythmia recurrence (all p > 0.10). ROC analysis performed revealed shorter LAA (AUC, 0.632, 95% CI, 0.514 - 0.750, p = 0.031) and mean PV CL (AUC, 0.627, 95% CI, 0.512 - 0.742, p = 0.037) on contact electrograms were weakly predictive of AF recurrence at 1 year. Of clinical factors, only increasing left atrial diameter but not time in persistent AF (within the 2 year recruitment period) predicted arrhythmia recurrence (p = 0.048 and 0.941 respectively).

**Conclusion:** AF mechanisms as determined using ECGI mapping do not predict outcome after PVI for persistent AF. Further studies using different methodologies to characterise AF mechanisms are warranted. (NCT03394404)

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**LOW LEFT ATRIAL VOLTAGE PREDICTS IMPROVEMENT IN SYSTOLIC FUNCTION POST ATRIAL FIBRILLATION ABLATION IN PATIENTS WITH SYSTOLIC HEART FAILURE**

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**Background:** Catheter Ablation of Atrial Fibrillation (AF) in patients with heart failure with reduced ejection fraction (HFrEF) is associated with decrease in all-cause mortality, and improvement in left ventricular ejection fraction (EF). Predictors of EF improvement post-AF ablation is not known.

**Objective:** To explore predictors of EF improvement post AF ablation in patients with HFrEF.