Pulse Field Ablation for Pulmonary Vein Isolation: Acute Results from a Multicentric Registry

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Background: Pulsed field ablation (PFA) is a nonthermal ablative modality using a strong electrical field created around a dedicated catheter to produce pores in the cellular membrane. As the amount of energy required to produce electroporation is highly tissue dependant, the atrial myocardium can be specifically targeted while sparing adjacent tissues. Theoretically, this new ablation modality could increase the safety of pulmonary vein isolation (PVI) procedures compared to PVI using thermal energies. Real-life clinical data are still lacking regarding feasibility and safety of PFA.

Objective: To assess feasibility and safety of PVI performed using PFA.

Methods: We included all patients who underwent PVI for symptomatic atrial fibrillation (AF) using PFA in 3 hospitals (6 operators) between June and December 2021. All procedures were performed under general anaesthesia or deep sedation. After patients received IV heparin and achieved ACT > 300 s, a 12 Fr multi-electrode pentaspline PFA catheter (Farawave, Farapulse Inc.) was advanced through a 13 Fr deflectable sheath into the left atrium. The catheter was positioned so that the splines achieved circumferential contact at the PV antra. 2 applications (2.5 sec and 2 kV per application) were performed in the “basket” configuration, then the catheter was slightly rotated (30-40°) before delivery of 2 additional applications. This sequence of ablation was repeated in the “flower” configuration. This protocol was applied at each PV. PVI was assessed with the Farawave catheter.

Results: The population consisted of 80 patients (42 paroxysmal AF, 38 persistent AF < 6 months) with a mean age of 61 ± 13 yo. Left atrial dimension was normal in 42 patients (52%), and enlarged in 38 (48%). The mean procedure duration was 55 ± 23 min, and mean fluoroscopy duration was 20 ± 10 min (3.5 ± 3.1 Gy.cm2). The pulmonary vein signal completely disappeared after the first PFA application for each targeted vein and PVI was confirmed for all veins in all patients at the end of the procedure. Pericardial effusion occurred in 3 patients (3.8%), 2 requiring percutaneous drainage. No other complications were observed.

Conclusion: PVI performed with PFA is safe and feasible without compromising procedure and scopy durations. Further data are necessary regarding mid- and long-term efficacy.