

Pulmonary Vein Isolation with Combination of Radiofrequency and Pulse-Field Energy Using A Novel Lattice Tip Electrode: A First-in-Human Trial

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Introduction: Catheter ablation of AF with point-by-point radiofrequency (RF) energy is effective for pulmonary vein isolation (PVI) and allows tailored linear ablation. However, it is associated with increased risk for esophageal injury. Pulsed-field (PF) ablation is a non-thermal energy that may reduce the risk of esophageal injury.

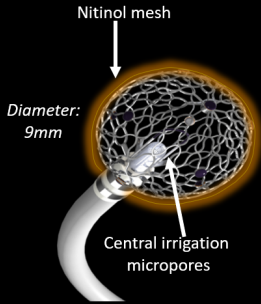
Aim: To evaluate a novel technology permitting delivery of both RF and PF from a single focal ablation catheter and generator in effort to optimize procedural safety and efficacy.

Methods: This first-in-human study enrolled patients with paroxysmal AF presenting for first time ablation. Patients underwent PVI using the Sphere-9 catheter and a compatible mapping system (Prism-1; Affera Inc.). Ablation was performed in a point-by-point fashion using RF for the anterior wall (Tmax 73°C; 5sec) and PF (3-5 sec) for the posterior wall. Bidirectional PVI was assessed after a 20 min waiting period and adenosine. Safety data included any device-related complications.

Results: A total of 22 patients (age 52.8±10.1 years; 55% man) underwent PVI; in 9 patients, cavotricuspid isthmus (CTI) ablation was also performed. PVI was achieved in all patients using the lattice catheter alone, requiring 43.0±8.1 lesions, 3.2±1.0 min of combined RF and PF energy, and transpired ablation time of only 18.0±3.6 min (Figure). PV reconnection rate was (1/45; 2.2%). CTI block was achieved in all 9 patients with 0.5±0.2 min of RF. There were no device-related complications.

Conclusions: This first-in-human study of a novel technology integrating RF and PF into one ablation platform demonstrated clinical feasibility and acute efficacy for rapid point-by-point PVI and linear ablation.

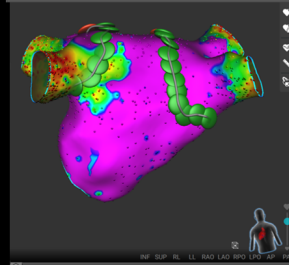
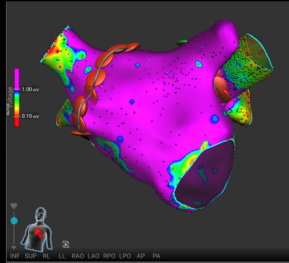
**Lattice Catheter for combined
RF and PF ablation**



RF lesions ●
Anterior wall and Septum

PF lesions ●
Anterior wall and Septum

Voltage Map pre ablation



Voltage Map post ablation

