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A Lattice Tip Pulsed Field Ablation For Pulmonary Vein Isolation: Biophysical Characterization, Lesion Durability And Safety Evaluation

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Abstract:

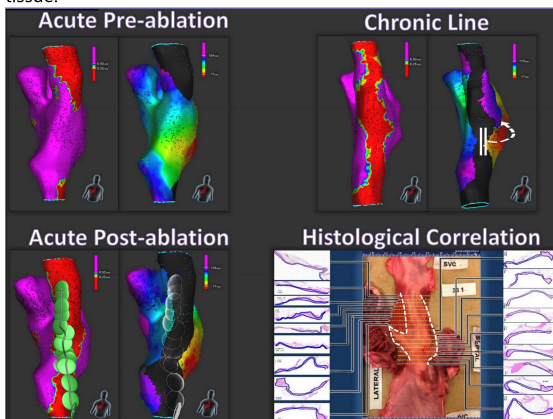
Background: Pulsed-field is a non-thermal energy that induces cellular death by destabilizing cell membranes. It may be advantageous for atrial ablation by avoiding thermal injury to neighboring structures. Presently there is no technology allowing pulsed-field ablation (PFA) in a point-by-point fashion for tailored ablation.

Objective: Characterize the biophysical parameters, lesion durability and safety of a novel technology allowing point-by-point PFA.

Methods: In a swine model of right atrial line, PFA with a lattice-tip catheter (Sphere9™; Affera Inc.) was evaluated in 3 steps. Step 1 examined the acute effect of different PFA doses on lesion transmural and extracardiac tissue. Step 2 examined the chronic effect of PFA at the selected dose on linear durability. It also evaluated the effect of PFA on the phrenic nerve by intentional high-dose ablation. Step 3 analyzed histopathology of cardiac and extracardiac structures.

Results: In step 1 (13 swine), PFA dose of 24Amp resulted in acute linear block without extracardiac injury. In step 2 (7 swine), following 29 ± 9 survival days, the selected PFA dose produced durable block in 6/7 (85.7%) lines as evaluated by voltage and activation. The number of applications per line was 18 ± 4 and PFA time was 2.2 ± 0.5 minutes. Histological analysis showed that 98.6% of lesions were transmural with a width of 18.4 ± 5.6 mm, corresponding to a voltage amplitude of 0.25mV Figure). The phrenic nerve was not affected by PFA (4 ± 3 applications) as assessed by pacing and histology.

Conclusion: This novel lattice-tip catheter showed feasibility for creating a durable atrial line using PFA at a dose that appears to be selective to cardiac tissue.



Author Disclosure Information:

H. Yavin: Nothing relevant to disclose.

Category (Complete): Ablation Techniques

Keywords (Complete): A -> Ablation - catheter ; A -> Atrial fibrillation

Additional Information (Complete):

Proof of Concept/Innovation : True

At the conclusion of this presentation, attendees will be able to: (Maximum character limit 250)

***Learning Objective:** : To identify new ablation energy method for A fib. ablation.

Abstract Awards (Complete):

Fellow with the Highest Scoring Abstract Award : True

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