Limited Cardio-neural Ablation of the Superior Vena Cava-Aorta and Right Superior Ganglionated Plexi As an Adjunct to Pulmonary Vein Isolation for Tachy-brady Syndrome

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Background: Use of negative chronotropic agents in atrial fibrillation (AF) can cause symptomatic sinus bradycardia (tachy-brady syndrome), often leading to pacemaker implantation. Limited cardioneural ablation (CNA) of ganglionated plexi (GPs) immediately following radiofrequency ablation (RFA) for AF can increase heart rate (HR) by modifying autonomic tone, which may help avoid device implantation.

Objective: To explore limited CNA for sinus HR augmentation as an adjunct to RFA for AF in patients with tachy-brady syndrome and to determine if increases in sinus HR are sustained.

Methods: We performed CNA of the right superior and superior vena cava (SVC)-aorta GPs in 11 patients following RFA for AF. All patients had resting sinus bradycardia (HR<60 bpm). Ten patients were male, age 62 ± 11 years (all data mean ± SD), paroxysmal AF in 5 cases, repeat AF procedure in 3 cases, posterior wall isolation / additional lines in 9 cases. All procedures were performed under general anesthesia with jet ventilation. GPs were identified by fractionated electrograms in typical anatomic locations with HR increase during ablation. Intra-procedural HR was obtained following AF ablation immediately before and after CNA. Ambulatory sinus HR was collected from 12 lead ECGs before ablation and at 2 week and 2 month post-procedure visits.

Results: Intra-procedural HR increased immediately following CNA from 48 ± 10 bpm to 78 ± 15 bpm, p<0.001, median increase 36 bpm. Compared to pre-procedure ambulatory HR (53 ± 7 bpm), post-procedure HR increased to 65 ± 9 bpm at 2 week and 73 ± 11 bpm at 2 month follow-up visits (p<0.05). One patient developed post-procedure bradycardia due to suspected sinus node artery injury requiring temporary dopamine infusion but no permanent pacing. In 2 cases, antiarrhythmic drugs were stopped during follow-up, but beta blockers were continued unchanged in all patients.

Conclusion: Limited CNA of the SVC-aorta and right superior GPs as an adjunct to AF ablation resulted in an immediate HR increase that was sustained over 2 months of follow-up. This strategy may be useful in augmenting sinus rates in patients with tachy-brady syndrome.
FIRST-IN-HUMAN CLINICAL EXPERIENCE OF A NOVEL CONFORMABLE "SINGLE-SHOT" PULSED FIELD ABLATION CATHETER FOR PULMONARY VEIN ISOLATION

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Background: Pulsed field ablation (PFA) has safety and procedural workflow advantages over conventional thermal ablation. Most "single-shot" PFA catheter technologies are either not linked to electroanatomical mapping systems, require serial re-positioning or cannot easily accommodate varying PV anatomies. Recently, a novel 8-Fr single-shot large lattice PFA catheter (SpherePVI; Affera Inc) has been developed.

Objective: To assess the acute safety and efficacy of PV isolation (PVI) using this single-shot PFA catheter.

Methods: The 8Fr PFA catheter (SpherePVI; Affera Inc) has a large compressible/conformable lattice framework (expandable up to 34 mm diameter), and consists of 6 sections that are independently and sequentially energized for ablation. Under general anesthesia and after ICE-guided transseptal puncture, an 8.5 Fr deflectable sheath (Agilis, Abbott Inc) was used in concert with the PFA catheter and custom mapping system (Prism-1, Affera Inc) to quickly render the PV anatomy. Then the catheter was serially positioned at the ostium of each PV, and a PFA generator (HexaPULSE; Affera Inc) delivered biphasic pulse trains (5 sec per application; 1.3-2.0 kV [±]); goal of 1-3 lesions per PV. Post-procedure endoscopy (EGD) and brain MRI occurred within 24-72 hours.

Results: At 3 centers (5 operators), a total of 30 pts (age 57.6 ± 9.3 yrs; M/F = 15/15) underwent PVI. Mapping time to render the LA-PV anatomy was 5.7 ± 3.2 min (range 1.3 - 13.1). PVI was acutely successful in all 30 pts: 122 of 122 (100%) PVs were acutely isolated using 2.4 ± 0.4 applications/vein (10.0 ± 1.6 applications/pt). The PVI duration time (transpired from 1st to last lesion) was 8.2 ± 5.5 min (range 3.3 - 29.8). The total LA catheter dwell time for the PFA catheter was 12.9 ± 7.6 min (range 5.0 - 36.0). Fluoroscopy time was 4.8 ± 4.1 min. There were no serious adverse events - including no esophageal fistula, stroke/TIA, phrenic injury or tamponade. EGD in 18 pts revealed no thermal lesions, and brain MRI revealed acute lesions in 2 of 21 (9.5%) pts.

Conclusion: PVI using the conformable “single-shot” PFA catheter was acutely successful and safe. Further studies should assess lesion durability and large multicenter clinical outcomes.

POSTER PO-624:
Featured Posters: Catheter Ablation at Pod 11

Friday, April 29, 2022
12:30 PM - 2:30 PM

PO-624-01
FIRST-IN-HUMAN CLINICAL EXPERIENCE OF A "SINGLE-SHOT" MAP-AND-ABLATE MULTIELECTRODE SPHERICAL ARRAY PULSED FIELD ABLATION CATHETER TO ISOLATE PULMONARY VEINS

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Background: Pulsed field ablation (PFA) has safety and procedural workflow advantages over conventional thermal ablation modalities. Most "single-shot" PFA catheter technologies are either not linked to electroanatomical mapping systems, require serial re-positioning or cannot easily accommodate varying pulmonary vein (PV) anatomical sizes / shapes. Recently, a multielectrode spherical array catheter (Globe, Kardium Inc, Canada) capable of single-shot “mapping and ablation”, previously capable of radiofrequency (RF) ablation, has now been enhanced to also deliver PFA.

Objective: To assess the acute safety and efficacy of PV isolation (PVI) using this spherical array PFA catheter.