Sinus Node Sparing Novel Hybrid Approach for Treatment of Inappropriate Sinus Tachycardia/Postural Orthostatic Sinus Tachycardia With New Electrophysiological Finding

de Asmundis, C. et al. (2019). Am J Cardiol, 124(2):224-32.

Introduction

A recent single site study led by Carlo De Asmundis (University Hospital in Brussels, Belgium) evaluated epi-endo- thoracoscopic hybrid ablation as an alternative to sinus node (SN) ablation in symptomatic drug refractory or drug-intolerant patients with inappropriate sinus tachycardia (IST) patients or postural orthostatic sinus tachycardia (POTS).[1]

Methods

A total of 50 consecutive patients (78% IST, 22% POTS) enrolled between June 2015 and December 2016 underwent a novel hybrid ablation procedure for IST or POTS. This approach involved surgical thoracoscopic video-assisted epicardial ablation combined with endocardial 3D mapping. Baseline characteristics were as follows: mean age was 23±4 years and 82% were female. The majority (96%) underwent a prior electrophysiology study without a definitive diagnosis; 84% received an implantable loop recorder (ILR) at another center, 30% were treated with an atrioventricular nodal re-entry tachycardia ablation, including 10% for typical right flutter ablation, and 2% underwent pulmonary vein isolation for atrial fibrillation. All patients were followed for a mean of 28.4±1.2 months. Rhythm monitoring for the 16% without an ILR were followed using serial 24-hour Holter monitoring every 3 months.

Results

There were no procedural complications including phrenic nerve injury or pacemaker implantation; however, post-procedure pericarditis, which occurred in 37/50 patients, was resolved in the first 3 months with medication. Symptoms of pericarditis in another 2 patients lingered through 6 months but were also resolved.

After a 6-month blanking period, all 50 patients demonstrated a significant reduction in heart rate (HR) such that normal to normal RR intervals increased from a mean of 539.30±28.72 ms to 1019.60±173.01 ms. The standard deviation of all normal RR intervals improved from 98.4 ± 15.07 ms pre-ablation to 140.49±40.61 ms post-ablation. In addition, all patients demonstrated a normal chronotropic response to exercise and stress tests improved from 50 W pre-ablation to 150 W post-ablation, based on age. All patients discontinued anti-arrhythmic medication during follow-up. None of the 11 POTS patients experienced syncopal episodes post-ablation.

Key Takeaways

- Use of a novel hybrid SN sparing ablation in IST/POTS patients demonstrated a significant reduction in HR, RR intervals, and heart rate variability which were all maintained throughout follow-up.
- The SN sparing approach offers a few key advantages over traditional ablation strategies. It is minimally invasive, offers direct tissue visualization of the structures of interest, and mitigates collateral damage to adjacent tissues like the esophagus or phrenic nerve, all while simultaneous endocardial activation mapping is conducted to allow for SN identification and precise epicardial ablation.
- The HEAL-IST Trial, currently underway, is a prospective, multi-center, single arm, Bayesian adaptive-designed trial which will evaluate the safety and effectiveness of a hybrid, sinus node-sparing ablation in up to 142 symptomatic drug refractory or drug intolerant IST patients. Freedom from IST (mean heart rate of ≤90 bpm or at least a 15% reduction in mean HR) will be evaluated at 12 months as compared with baseline in the absence of new or higher dose of previously failed medications.

Reference:

1. *de Asmundis, C. et al. (2019). Am J Cardiol, 124(2):224-32.*

Summary written by: *Stacey Neuman, PhD, Scientific Affairs*

AtriCure