Posterior Wall Isolation Improves Outcomes for Persistent AF with Rapid Posterior Wall Activity: A CAPLA Sub-study

Segan L et al. 2023. JACC: Clinical Electrophysiology. https://doi.org/10.1016/j.jacep.2023.08.018

Introduction

The aim of a sub-analysis of the randomized controlled CAPLA trial conducted by Louise Segan and colleagues (Alfred Hospital, Melbourne, Australia) sought to determine if specific electrical characteristics of the pulmonary veins (PV) and posterior wall (PW) could be identified in patients who underwent ablation for atrial fibrillation (AF) with PW isolation (PWI).[1]

Methods

A total of 151 patients with persistent AF (18% long-standing persistent AF, mean left atrial volume index of 52±16ml/m^2, median AF duration of 5 months [interquartile range of 2-10 months]), blinded to the treatment assignment, were included in this sub-analysis, for which 75 and 76 patients underwent PVI alone or PVI+PWI, respectively.

The primary endpoint was freedom from any documented atrial arrhythmia (AA) of > 30 sec excluding an initial 3-month blanking period. Only some patients were continuously monitored with a pacemaker, implantable cardioverter defibrillator or implantable loop recorder. Those without implantables underwent Holter monitoring at 3, 6, 9, and 12 months.

Patients in AF at the time of the procedure underwent PV and PW cycle length (CL) assessment and voltage mapping prior to AF ablation. Cardioversion was then performed to complete the voltage map during coronary sinus pacing and to restore sinus rhythm.

Electrogram Analysis

A multipolar catheter was used in each PV, left atrial appendage (LAA) and along the PW for 60 sec per site. Average PV CL, PW CL and LAA CL defined as a mean of 100 consecutive CLs were measured with calipers where the predominant wavefront was detected by viewing all EGMs. All recordings were analyzed by an independent core lab.

Results

Baseline patient and electro-anatomical characteristics were similar between groups. All 151 patients completed 12 months of follow-up. A total of 50% of patients required additional ablation within the box to achieve PWI.

- Freedom from AF off antiarrhythmic drugs was not different between groups at 12 months.
- AA free survival was greater among patients with rapid PW activity (PWCL <140 ms) who underwent PVI+PWI vs PVI alone (56.4% vs 38.6%, p=0.030). However, there was no difference in AA free survival between groups with slower PW activity.
- Overall, rapid PW activity (CL <140 ms) was associated with an increased risk of AF recurrence after endocardial catheter ablation and was the only independent predictor of AF recurrence after multivariable analysis.
- Regardless of ablation strategy, those with slower PW activity had an increased AA-free survival compared to those with rapid PW activity (53.5% vs 44.7%, p=0.036).
- Patients who underwent PVI alone with detected rapid PW activity had a greater incidence of AF recurrence at 12 months compared to PVI-only patients with slower PW activity (55.3% vs 46.5%, p=0.036).
- There was no difference between groups for mean 4-vein PVCL, LAA CL, PV to LAA CL ratio, incidence of rapid PV or PW activation, or low voltage zone activity.

AtriCure

Key Takeaways

- Those who underwent PWI+PVI with rapid PW activity were associated with a significant reduction in arrhythmia recurrence at 12 months and improved arrhythmia free survival compared to PVI alone.
- The presence of rapid PW activity may represent a select group of AF patients who likely benefit from the addition of PWI in persistent AF.

Author Commentary

This sub-analysis is the first to evaluate both PV and PW CL characteristics on arrhythmia outcomes following PVI vs PVI+PWI in PersAF. The subgroup of patients with identified rapid PW activity may increase the likelihood for AF recurrence following PVI and thus may experience an improved outcome with the addition of a PW ablation strategy.

Limitations

- Few patients with LSPAF were included in the main CAPLA trial[2] and current sub-analysis.[1]
- PV and PW recordings performed over 100 consecutive cycles may not be enough time to detect rapid PV or PW activity and thus a longer time period may be warranted.
- Manual CL analysis may have introduced inter-observer variability.

References:

1. *Segan L et al. 2023. JACC: Clinical Electrophysiology. https://doi.org/10.1016/j.jacep.2023.08.018*
2. *Kistler P et al. 2023. JAMA. 329(2):127-135. doi: 10.1001/jama.2022.23722*

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