Hybrid Ablation of Atrial Fibrillation: A Unilateral Left-Sided Thoracoscopic Approach

van der Heijden, C.A.J. et al. (2022). J Card Surg, 37(12):4630-4638.

Introduction

A retrospective analysis led by Claudia A J van der Heijden (Maastricht University Medical Center) evaluated a single-stage unilateral left-sided thoracoscopic hybrid ablation, which is a variation to the standard bilateral thoracoscopic epicardial ablation technique with transvenous endocardial ablation and endocardial touch-ups of epicardial lesions as necessary.[1]

Methods

A total of 119 patients (29% paroxysmal, 71% persistent and long-standing persistent atrial fibrillation, LSPAF) underwent a unilateral left-sided thoracoscopic approach for the treatment of atrial fibrillation (AF). Consecutive patients (44% underwent previous catheter ablation) were enrolled between 2015 and 2018.

In brief, the unilateral left-sided thoracoscopic technique consists of left and right pulmonary vein (PV) isolation followed by ablation to the roof and inferior lines to create a box lesion. Entrance and exit block of the PVs were evaluated for arrhythmogenic foci, and touch-ups to close gaps were performed if needed. Additional ablation and lines (e.g., mitral isthmus, cavotricuspid isthmus, etc.) were made for left atrial flutter or tachycardia, mitral isthmus-dependent atrial flutter and right atrial dilatation or typical atrial flutter, as needed.

Results

Among the patient population analyzed, 81 (68%) underwent endocardial electrophysiology (EP) validation, 33 (28%) received epicardial validation while five (4%) received no EP validation. Touch-up of gaps were performed in 41% (33/81) patients mainly involving the box region including roof line and right PVs. To mitigate the impact of a learning curve with the number of touch-up ablations needed, six groups of 20 consecutive patients were evaluated. Over time, no significant difference in the number of unintended gaps between cohorts occurred (p=0.728). Concomitant to the ablation, 96% (n=115) of patients also underwent left atrial appendage (LAA) management including 90% (n=103) by the AtriClip® device, 5% (n=6) by Watchman, 4% (n=4) by Lariat and 2% (n=2) by stapler.

Overall, the peri-operative complication rate was low and included: cardiac tamponade (0.8%), myocardial infarction (0.8%), bleeding requiring reoperation (0.8%), pacemaker implantation (0.8%) and pneumothorax (0.8%), along with two late cardiac tamponades ≤ 30 days post-procedure (1.7%). There were no occurrences of mortality, stroke or conversion to sternotomy.

Freedom from atrial arrhythmia recurrence was 80% and 67% at 12 and 24 months, respectively, among patients on antiarrhythmic drugs (AAD, Table). There was no difference in the number of patients in sinus rhythm off AAD (72%) at 12 and 24 months. Among those with more advanced AF (i.e., non-paroxysmal AF), similar numbers achieved sinus rhythm on and off AAD at 12 (78% and 76%, respectively) and 24 months (65% and 76%, respectively). Furthermore, there was no significant difference in efficacy outcome among patients who underwent epicardial validation only and endocardial validation.

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Efficacy Outcomes				
	12 Months		24 Months	
	Sinus Rhythm on AAD	Sinus Rhythm off AAD	Sinus Rhythm on AAD	Sinus Rhythm off AAD
All patients	80%	72%	67%	72%
PAF	82%	62%	71%	62%
Non-PAF	78%	76%	65%	76%

AAD=anti-arrhythmic drug; PAF=paroxysmal atrial fibrillation; Non-PAF=persistent and long-standing persistent AF

Key Takeaways

- Incidence of major complications with a unilateral left-sided thoracoscopic hybrid approach were comparable to those occurring after percutaneous procedures (4% vs 5%).[1,2]
- With similar complication rates to bilateral percutaneous approaches, the benefit of limiting surgery to one side may outweigh the risk particularly in patients who achieve sinus rhythm over the longer term.
- Single-stage left-sided thoracoscopic hybrid ablation for the treatment of AF was concluded to be safe and effective, however a more robust randomized trial comparing unilateral to bilateral approaches is warranted to further substantiate these results.

References:
1. *van der Heijden, C.A.J. et al. (2022). J Card Surg, 37(12):4630-4638.*
2. *Spragg, D.D. et al. (2008). J Cardiovasc Electrophysiol, 19(6):627-631.*

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