

Hybrid convergent ablation versus endocardial catheter ablation for atrial fibrillation: a systematic review and meta-analysis of randomized control trials and propensity matched studies

Introduction

Hybrid convergent ablation (HCA) combines both an epicardial approach to target the posterior left atrial wall followed by endocardial catheter ablation (ECA) to treat patients with atrial fibrillation (AF). Much of the HCA data to date other than the randomized CONVERGE Trial¹ has been derived from single center prospective and retrospective studies.^{2,3}

Methods

A systematic review and meta-analysis was conducted among 422 patients (233 who underwent HCA and 189 who underwent ECA alone) to evaluate freedom from AF, occurrence of procedural complications and post-operative survival. Studies in this analysis included patients with paroxysmal, persistent, and long-standing persistent AF.⁴ Two studies were randomized^{1,5} and two studies were propensity score-matched.^{6,7}

Access for HCA was conducted using the subxiphoid or transdiaphragmatic approaches. Patients in both cohorts were continuously monitored during follow up for AF recurrence. Three of four studies defined AF recurrences as episodes lasting more than 30 seconds (after a standard 3 month blanking period) while one study defined recurrence as AF burden greater than 1% of the time.

Results

In a pooled analysis of four studies, patients who underwent HCA as compared to ECA experienced greater freedom from AF overall [73% vs 49%; OR of 2.78 (95% CI 1.82–4.24, P<0.01)]. In addition, among three of four studies, the HCA cohort experienced greater freedom from AF off antiarrhythmic drugs [AAD, 50% vs 26%; OR of 2.75 (95% CI 1.63 – 4.65, P<0.001)]. Complications were more common in the HCA group with one death in the HCA cohort due to gastrointestinal bleeding and none in the ECA cohort.

The HCA group was less likely to require DC cardioversion but rates between the two groups were not statistically different. Further, an aggregate survival analysis favored the HCA cohort in freedom from AF at all follow-up time points of 6, 12, 18, 24 and 30 months yielding 87%, 85%, 83%, 83% and 83% versus 70%, 61%, 57%, 50%, 50% for the ECA cohort in three studies which reported this outcome.

Key Takeaways:

- This systematic review and meta-analysis of four studies which compared outcomes among patients with pre-operative diagnosis of AF who underwent HCA or ECA alone demonstrates greater freedom from AF overall, greater freedom from AF off AAD and higher freedom from AF survival through 30 months for HCA.
- Similar findings from the CONVERGE Trial¹ among patients with persistent and long-standing persistent AF showed significant improvements in:
 - Freedom from atrial arrhythmias (absent change in AAD) with HCA as compared to ECA alone (67.7% vs 50.0%, p=0.036) at 12 months
 - Freedom from atrial arrhythmias in favor of HCA off AAD (53.5% vs 32.0%, p=0.0128)

¹Delurgio, D.B. et al. 2020. *Circ Arrhythm Electrophysiol.* 13:e009288.

²Mhanna, M. et al. 2021. *J Arrhythmia.* 37:1459-1467.

³Wats, K. et al. 2020 *Arrhythm Electrophysiol Rev.* 9(2):88-96.

⁴Eranki, A. et al. 2022. *J of Cardiothoracic Surg.* 17:181.

⁵Jan, M. et al *J Cardiovasc Electrophysiol.*2018;29:1073–1080.

⁶Kress, D.C. et al. 2017. *J Am Coll Cardiol EP.* 3:341–9.

⁷Maclea, E. et al. *Int J Cardiol* 2020;303:49–53.