ABLATION OF ATRIAL FIBRILLATION BEYOND PULMONARY VEIN ISOLATION: DO ADDITIONAL ABLATION LESIONS IMPACT LEFT ATRIAL FUNCTION?
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Background: Electrical isolation of pulmonary veins (PVI) is a cornerstone for Atrial Fibrillation (AF) ablation therapy. Elimination of non-pulmonary vein (NPV) triggers in addition to PVI was shown to decrease long-term AF recurrence. The overall effect of AF ablation on left atrial (LA) function is poorly understood and it is unknown if additional ablation lesions can affect it.

Objective: Our aim was to determine if LA function is different in patients after extensive LA ablation compared to PVI only. We hypothesized that addition of NPV ablation lesions in LA do not further deteriorate LA function compared to PVI alone.

Methods: Out of consecutive 994 patients who underwent AF ablation at our center in years 2018-2019, we included 68 patients in our retrospective analysis who had echocardiograms performed within 12 months prior to AF ablation and 1-12 months after. Redo ablations, history of mitral valve interventions were excluded. Patients were stratified into 2 groups: PVI only and PVI with additional LA ablation lesions (PVI+). Primary outcome was LA reservoir strain (LASr). We applied non-inferiority analysis with 90% CI for an overall alpha level of 0.05. Mean LASr in patients after AF ablation is reported ±9%. We used a conservative 6% to define non-inferiority as a change in LASr.

Results: Patients in our study cohort had higher rates of history of HTN, HFrEF, DM, HLD, ESRD compared to all patients who underwent AF ablation. A higher rate of paroxysmal AF in the PVI only group was noted (70% vs 30%). The PVI+ group was observed to have a slightly higher increase in LASr compared to PVI alone (5.0% vs 4.3%), with 90% CI (-4.2 to 2.9). The upper bound for the true difference of 2.9% did not cross the pre-set margin of 6% (p<0.01 for test of non-inferiority). These findings were consistent when the LASr was adjusted for age, sex, hx of CAD, HLD, paroxysmal vs persistent AF, rhythm at pre-procedure TTE in a multivariable linear regression model, 90% CI (-5.46; -2.04), p<0.01.

Conclusion: LA functional improvement evaluated by LASr is statistically non-inferior after PVI with additional LA ablation lesions compared to PVI alone. These findings were confirmed when adjusted for confounding clinical variables.
Background: The large randomized clinical trial ERADICATE-AF (JAMA 2020) demonstrated that concomitant renal artery denervation (RDN) with pulmonary vein isolation (PVI) can reduce time to first atrial fibrillation (AF) recurrence post-procedure in patients with AF and poorly controlled hypertension. RDN also resulted in improved control of systolic blood pressure (SBP) with no change in PVI only group.

Objective: To assess if AF burden is reduced when RDN is added to PVI; to determine if reduction in SBP following RDN correlates with reduction in AF burden; and to examine subgroups and their AF responses.

Methods: Patients were randomized to PVI alone (n=148) or PVI + RDN (n=154). AF burden was defined as the proportion of time in AF during 7-day Holter monitoring at 12 months post-randomization. A stratified analysis was performed based on decreased (△) in-office SBP (mm Hg) from baseline to 12-month follow-up in the RDN group.

Results: At 12 months, AF burden was 1.43 ± 3.36% in the PVI+RDN group vs 3.90 ± 8.53% in the PVI only group (p=0.0012). Relative to ASBP (mm Hg) in the RDN + PVI group, all subgroups had similar low AF burdens (p=NS): no change (n=31, 1.23 ± 3.73), △10 (n=36, 1.51 ± 3.27), △15-25 (n=59, 1.64 ± 3.81) and △>25 (n=55, 1.16 ± 2.30).

Conclusion: In this multicenter randomized trial, patients in whom RDN was added to PVI had a significantly lower AF burden at 12 months than patients with PVI alone. AF burden was similarly reduced independent of improvement in SBP after RDN suggesting that BP reduction is not responsible for antiarrhythmic response.

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Efficacy and safety of early post-operative ablation in patients with congenital heart disease

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Background: Post-operative arrhythmias are most often transient and medically treated, but refractory arrhythmias may require electrophysiology study (EPS) and ablation.

Objective: To describe the efficacy and safety of early post-operative ablation.

Methods: Retrospective case series of patients who underwent EPS within 3 months of surgery for congenital heart disease (CHD) between 2000-2020. Procedural outcome included complete or partial success, failure or empirical ablation, and complications. Long-term outcome included arrhythmia recurrence and burden according to a 12-point clinical arrhythmia severity score (documented arrhythmia, arrhythmia severity, cardioversion, antiarrhythmic medication).

Results: From 28,902 surgeries during the study period, 24 (0.1%) patients underwent EPS with ablation at a median 32 [IQR 16, 64] days after surgery (Table), which occurred prior to hospital discharge in 9 (38%). EPS was performed for arrhythmia refractory to medical management (23, 96%) and SVT in a patient with pre-operative history of ventricular fibrillation arrest. At the time of EPS, 7 (29%) patients were intubated, 5 (21%) on inotropic support and 3 (13%) on ECMO. Procedure was acutely successful in 21 (88%) patients, and one patient with IART had empiric ablation of the cavotricuspid isthmus and lateral wall due to lack of inducibility. Two patients with left atrial arrhythmia had an unsuccessful procedure; in one case decision was made not to pursue transseptal needle due to recent surgery, and EPS was aborted due to mediastinal hematoma following transseptal attempt in the other (no intervention required). There was no other complication. Recurrence of arrhythmia was documented in 10 (42%) patients during median follow-up 3.2 [IQR 1.8, 6] years, although the burden was significantly reduced (figure).

Conclusion: A minority of patients require early post-operative EPS and ablation for refractory or life-threatening arrhythmia. For those, the procedure can be performed with reasonable acute success and manageable morbidity even in critically ill patients with complex surgical anatomy.