Characterizing Recurrence Following Hybrid Ablation in Patients with Persistent Atrial Fibrillation

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PROBLEM
Atrial fibrillation (AF) has been found to be a major contributor to stroke and mortality (1,2), and hospitalizations for AF have increased two- to threefold over the past several years (3).

BACKGROUND
It is widely accepted that AF accounts for a majority of arrhythmia recurrences in endocardial catheter AF ablation. An epicardial-endocardial approach (hybrid) has emerged as an alternative to endocardial ablation alone for the treatment of AF, yet recurrence and effect of prior ablation on hybrid outcome has not been well characterized.

OBJECTIVE
This retrospective study aimed at characterizing recurrence following hybrid ablation for patients with persistent AF.

METHODS
108 consecutive hybrid patients (mean age 61±10 years) with persistent AF received both endocardial and epicardial ablation of the posterior left atrial wall using a subpulmonary approach (fig1). Af-free survival estimate for single procedure success at 12 months was defined as no arrhythmia following the initial 3-month blanking period. To determine time to arrhythmia, if ambulatory monitoring was not used in the patient, electrocardiogram results during each follow-up visit were collected. Overall 12-month Af-free survival was calculated for a repeat procedure was defined as no recurrence following repeat atrial flutter (AF) ablation after hybrid ablation. Effect of prior ablation (n=60) on patients with persistent AF receiving the hybrid ablation was also studied.

RESULTS
Patients were followed for a mean (±SD) of 25 (14) months and antiarrhythmic drug use at follow-up was 51%. Of patients that recurred (n=62), 33% (n=33) were in AFL and 47% (n=29) were in AF (fig 4). Of those that recurred with AFL, 14 patients received repeat ablation for either left (n=11) or left/right (n=3) AFL (fig 5). Single procedure success at 12 months was 64% and median (Q1, Q3) freedom from recurrence (95% CI) was 21 (13, 27) months (fig 6A). Allowing for a repeat catheter ablation for AFL following the hybrid ablation, 12-month Af-free survival increased to 70% (fig 6B). The mean number of ablation procedures for patients with prior ablation was 1.53. Af-free survival at 12 months following the hybrid ablation was not significantly different between those who had prior ablation and those who did not (p=0.5) (fig 6A and B).

CONCLUSIONS
AFL accounts for about half of hybrid recurrences, whereas in endocardial ablation alone AFL occurs in 25% recurrences at our center. Repeat ablation for AFL increases the overall hybrid 12-month Af-free survival to 70%. Furthermore, ablation prior to the hybrid procedure did not affect Af-free survival post hybrid ablation in this study population. This suggests that hybrid ablation may be a first-line therapy for AF and a suitable alternative to endocardial ablation alone.

REFERENCES

Figure 2: A. Pre-epicardial ablation voltage map of the posterior left atrial (LA) epicardial surface. B. Post-epicardial ablation voltage map of the posterior LA epicardial surface. Both maps were created before any endocardial ablation was performed. Areas of low voltage are shown in red.

Figure 4: Mode of Recurrence Following Endocardial and Hybrid Ablation

Figure 5: Characterizing Repeat Ablation for Atrial Flutter Following the Hybrid Ablation

Figure 6: 12-Month Survival Following Hybrid Ablation in a Population With and Without Prior Ablation

Figure 7: Baseline Characteristics

Figure 8: A. Kaplan-Meier (K-M) curve of the 12-month arrhythmia-free survival for a single hybrid ablation procedure. B. KM curve of the 12-month arrhythmia-free survival allowing for 1 atrial flutter ablation.

Figure 9: Mode of recurrence following endocardial ablation alone and hybrid ablation. Of the atrial flutter hybrid ablations, there were 14 repeat ablations, all left or left/right flutter.

Figure 10: 12-Month Survival Following Hybrid Ablation in a Population With and Without Prior Ablation

Figure 11: Baseline Characteristics