Effectiveness of catheter ablation of atrial fibrillation

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Online publish-ahead-of-print 18 November 2005

This editorial refers to 'Catheter ablation treatment in patients with drug-refractory atrial fibrillation: a prospective, multi-centre, randomized controlled study (Catheter Ablation for the Cure of Atrial Fibrillation Study)†' by G. Stabile et al., on page 216

Catheter ablation of atrial fibrillation (AF) has become increasingly popular in multiple centres worldwide as more studies have reported favourable success rates in preventing AF recurrences using various ablation techniques. Different strategies for ablating AF range from physiological approaches aimed at electrical segmental pulmonary vein (PV) isolation to anatomical circumferential PV ablation with or without the addition of linear ablation lines in the posterior left atrium and in the mitral isthmus. Recent randomized studies comparing these approaches have yielded conflicting results concerning the relative merits of segmental PV isolation vs. circumferential PV ablation. Despite numerous studies reporting results of different ablation techniques and more recent studies randomizing different techniques, surprisingly little data have been published comparing ablative therapy with medical therapy for AF. Catheter ablation of AF has been associated with major complications in 6% of patients; these include complications of vascular access, cardiac tamponade, stroke, PV stenosis, and rare but potentially fatal atrio-oesophageal fistulae. Given the risk of complications associated with AF ablation, randomized studies comparing ablation with medical therapy are necessary to guide physicians and patients in selecting optimal management strategies under different circumstances.

Stabile et al. report the results of a randomized study of catheter ablation for AF. Their study demonstrates that in patients with paroxysmal or permanent AF having failed at least two anti-arrhythmic drugs, ablation of atrial fibrillation significantly decreases recurrences of atrial arrhythmias. The ablation strategy used was circumferential PV ablation with an endpoint of peak-to-peak bipolar potentials (>0.1 mV) inside the lines encircling each of the PVs. An additional ablation line was performed from the mitral valve to the left inferior PV with an endpoint of double potentials separated by 80 ms along the ablation line achieved in 30.8% of patients. Although both groups received anti-arrhythmic drugs for the first 13 months, the study was not designed to demonstrate that ablation alone is superior to anti-arrhythmic drugs; it only suggests that addition of ablation to anti-arrhythmic drugs decreases arrhythmia recurrence. Consistent with prior studies, ablation was associated with complications in 4.4% of patients; one patient had a stroke (and died of a brain haemorrhage 9 months later), one had transient phrenic paralysis, and one had a pericardial effusion requiring pericardiocentesis. During 1 year of follow-up, there was no significant difference between groups in the mean per-patient number of hospitalizations, including that required for ablation.

There is only one other published randomized study of catheter ablation of AF. The study included 70 patients with symptomatic AF for at least 3 months who had not received treatment with anti-arrhythmic drugs. Patients were randomized to either catheter ablation or anti-arrhythmic drugs. The ablation strategy used was PV isolation with an electrophysiological endpoint defined by the absence or the dissociation of PV potentials recorded from a circumferential catheter placed within the antrum of each PV. In the group of patients treated with anti-arrhythmic drugs, 77% initially received flecainide and 23% received sotalol. Amiodarone was reserved for patients who failed two prior drug trials. Patients treated with ablation had improved quality of life at 6 months of follow-up and significantly decreased symptomatic AF recurrences and hospitalizations at 1 year of follow-up. Asymptomatic mild or moderate PV stenosis occurred in 6% of the ablation group. There were no strokes or deaths in either group.

Although the results of the two randomized studies described earlier are encouraging concerning the effectiveness of AF ablation in reducing AF recurrence, it is important to note that neither was powered to detect differences in hard endpoints such as stroke and death. The only study that reported a reduction in morbidity and mortality was a non-randomized comparison of 589 patients with symptomatic AF treated with circumferential PV ablation and 582 patients with symptomatic AF treated with anti-arrhythmic drugs. Over 3 years of follow-up, patients in the ablation group had lower rates of AF recurrence, morbidity (mostly heart failure and stroke), and mortality. However, given the non-randomized nature of this study, confirmation of these findings with a large randomized study is needed.
Concurrent with the evolution and ongoing refinement of catheter ablative techniques for management of AF, a number of randomized studies have been published suggesting that a rhythm control strategy (using current anti-arrhythmic drugs) does not improve morbidity or mortality when compared with a rate control strategy. In a recent meta-analysis of such trials, a rate control strategy was associated with a reduced combined endpoint of death and thrombo-embolic stroke. However, there are two important caveats to consider. First, success at maintenance of sinus rhythm in these studies was not much better in the rhythm control group than in the rate control group, because anti-arrhythmic drugs are only moderately effective and are often poorly tolerated due to side effects. The two recent randomized studies discussed earlier provide evidence that significantly greater success at maintaining sinus rhythm is achievable with catheter ablation (with or without concurrent use of anti-arrhythmic drugs). The results of prior studies of rhythm control, therefore, do not apply to AF ablation; it remains to be seen whether rhythm control using ablative strategies results in decreased morbidity and mortality when compared with rate control. The second important point is that patients with highly symptomatic AF were not represented in the studies comparing rhythm control with rate control. For highly symptomatic patients, AF ablation can be effective at significantly improving symptoms and is reasonable to consider, particularly in patients who have already failed therapy with anti-arrhythmic medication.

In conclusion, much-awaited preliminary randomized studies of catheter ablation of AF provide evidence that ablation (with or without concurrent anti-arrhythmic drug use) effectively improves maintenance of sinus rhythm when compared with current anti-arrhythmic drugs. Ongoing research on ablative techniques is necessary to determine the optimal ablative strategies to maximize success rates while minimizing complications. Large randomized studies are needed to evaluate whether catheter ablation of AF improves morbidity and mortality in selected patients.

Acknowledgement

V.E. is the recipient of a Clinician Scientist Award from the Canadian Institutes of Health Research (CIHR).

Conflict of interest: none.

References


