Should Catheter Ablation of Atrial Fibrillation Be a First-Line Therapy in the Young?

David N. Edwards, MD, PhD; Hugh Calkins, MD

During the past decade, catheter ablation of atrial fibrillation (AF) has emerged as an important treatment option for patients with symptomatic AF. It is now widely accepted that catheter ablation of AF is indicated for treatment of symptomatic AF refractory to at least one class 1 or 3 antiarrhythmic drug. The body of literature that has defined the safety and effectiveness of AF ablation comprises single-center experiences, registry data, metaanalyses, and a number of prospective multicenter randomized clinical trials. The patients enrolled in these clinical trials were predominantly white, otherwise healthy men aged 50 to 65 years with paroxysmal AF. Much remains to be learned about the long-term effectiveness of AF ablation and the safety and effectiveness of AF ablation in those populations of patients who were not well represented in these prior clinical trials.

In this issue of Circulation: Arrhythmia and Electrophysiology, Leong-Sit et al contribute to the discussion by asking whether younger patients may benefit more than older patients from AF ablation. The authors report outcomes from 2038 AF ablation procedures in 1548 consecutive patients performed over an 8-year period. This single-center observational experience compares effectiveness and complication rates among the following groups of patients stratified by age: group 1, <45 years (n=232); group 2, 45 to 54 years (n=438); group 3, 55 to 64 years (n=570); and group 4, >65 years (n=308). The primary outcome measure of “AF control” includes patients with “rare AF,” which is defined as 6 or fewer AF episodes over the prior 12 months on or off antiarrhythmic medications after 1 or more ablation procedures. Major complications are defined as stroke or transient ischemic attack, significant pulmonary vein stenosis, pericardial tamponade, atrioesophageal fistula, death, phrenic nerve injury, retroperitoneal bleeding, or severe anaphylaxis. Other complications were large hematomas (>10 cm or requiring transfusion), femoral arteriovenous fistula or pseudoaneurysm requiring surgical repair, and asymptomatic >70% pulmonary vein stenosis. Routine follow-up included routine CT or MRI at 3 months and regular transtelephonic rhythm monitoring at 3, 6, and 12 months. After the 12 months, follow-up was less frequent and at times, based on telephone calls alone. Patients had an 8-week blanking period following the procedure before assessment of AF control began, and overall assessment of success occurred 12 months or later following the last procedure. Patients with recurrence were offered repeat procedures.

There was no difference in the overall end point of AF control in the 4 groups. AF control in group 1 was 87%; in group 2, 88%; in group 3, 88%; and in group 4, 82%. Further analysis revealed that age did not predict successful AF control; rather, only the type of AF (paroxysmal versus persistent) was a predictor of success. There was a significant difference in repeat procedures: 25% of patients in group 1 and 30% in group 3, but only 21% in group 2 and 19% in group 4. The rate of complications varied significantly among groups. No major complications were reported in group 1; group 2 had a rate of 1.7%, group 3 had a rate of 2.0%, and group 4 had a rate of 2.6%. The authors conclude that AF ablation is as efficacious in patients aged <45 years but results in fewer complications than in patients aged >45 years, and they suggest that AF ablation should be reconsidered as a first-line therapy in this younger population.

This study is a welcome addition to the literature on AF ablation, and we commend the authors for the considerable effort required to complete this ambitious report. In writing this editorial, we are charged with helping to interpret the results of this study in the context of both our experience with catheter ablation and the considerable body of previously published literature on AF ablation. We would like to offer the following thoughts for consideration.

With the caveats noted by the authors regarding observational single-center trials, it is intriguing to consider that there may be a group of patients with AF in whom the effectiveness of the procedure is sufficiently high and the risks sufficiently low that it would be appropriate to offer AF ablation as first-line therapy. Few trials have attempted to address the outcomes and risks of AF ablation in younger patients. Notably, a very small series of adolescent patients from 2004 had similar outcomes to those reported by these authors, including no adverse events.3

Several weaknesses of this new report unnecessarily magnify the limitations of interpreting data from a single center. First, the authors do not reveal the average age or age range of the patients within the groups. Were adolescent patients included, or are these data only relevant to patients aged >35 years? Most of the same authors were involved in a similarly structured outcome study of AF ablation in elderly patients in...
which average age was reported. Indeed, it would have been helpful in the discussion to reveal why age 45 was chosen rather than other age as a cutoff for youthfulness in the setting of AF ablation. We know from this group’s prior work in the elderly, which used the exact measures as in the present study, that patients averaging 52 years of age (range, 16 to 64 years) had similar outcomes and complication rates to older patients. Second, the authors do not report the number of procedures needed to achieve these results. It is unclear how many patients had more than one AF ablation procedure. Third, no detailed follow-up information is presented on these patients, including the mean±SD and median duration of follow-up. There is growing interest in long-term outcomes of AF ablation, not just in the 1-year outcomes. Fourth, impressive goals of follow-up are detailed in the Methods section, including multiple transtelephonic recording sessions at 3, 6, and 12 months and follow-up imaging to screen for pulmonary vein stenosis in all patients. Despite these ambitious follow-up goals, the degree of patient compliance with follow-up and the results of these investigations are not reported. Taken together, these deficiencies make interpretation of the overall outcomes difficult because we are not sure who the patient populations were, how many repeat ablation procedures were performed, or whether the patients were followed effectively much beyond 12 months. An even more difficult question arises when one considers that patients needing multiple ablations may have vanished from the analysis if their follow-up ended during the postablation blanking period or if their last ablation occurred within 12 months of the end of the study.

One of the purposes of the 2007 Heart Rhythm Society “Expert Consensus Statement on Catheter and Surgical Ablation of Atrial Fibrillation” was to provide guidelines for ongoing studies to prevent the need to compare apples to oranges. There was consensus on what constituted a valid end point, a major complication, and even the definition of AF. The effort was intended to enhance the ability to interpret and compare data originating from various centers. The authors of the present study cite the consensus statement as the source for the recommendation that catheter ablation be second-line therapy in all age groups. However, beyond this reference, the authors have ignored virtually all the recommendations concerning the reporting of outcomes of AF ablation. The ignored recommendations were (1) the definition of success, (2) the requirement to present single-procedure safety and effectiveness, (3) the duration of the postablation blanking period, (4) the definition of major complications, and (5) the definition of permanent AF. The authors use their own rather novel definition of a major complication, which notably excludes some of the most common serious complications associated with AF ablation, including major vascular complications such as large hematomas requiring transfusion, femoral arteriovenous fistula, and pseudoaneurysms requiring surgical repair. These complications are classified as “other complications.” Although the reported 1.7% incidence of major complications is impressive, the overall 4.3% incidence of major and other complications is in keeping with our own experience.

Most centers now adhere to the consensus statement recommendations and report their success in terms of a single-procedure success off all antiarrhythmic medications at 12-month follow-up, but in the present study, the authors use a new definition of success termed AF control. This term is not clearly defined but includes patients with rare AF, which is defined as 6 or fewer AF episodes over the prior 12 months on or off antiarrhythmic medications after 1 or more ablation procedures. The remarkably high success rate reported in this study and similarly low complication rate should therefore not come as a surprise. A very recent multicenter trial (that included the University of Pennsylvania) compared AF ablation in symptomatic paroxysmal AF to antiarrhythmic drug therapy, reporting an ablation success rate of 66% and a complication rate of 4.9% in a very favorable population.

Another new study looked at ablations in older patients with similar conservative outcomes. The findings from these 2 studies are aligned with historically expected outcomes. We find it very difficult to interpret the results of this study in the context of previously published literature on AF ablation because Leong-Sit et al have ignored consensus recommendations for definitions of success and complications as well as other metrics for reporting outcomes.

We are not convinced that these data are sufficient to suggest that younger patients would be better served by undergoing ablation as first-line therapy for AF than by first undergoing a trial of medical management. If a patient’s AF responds to a well-tolerated antiarrhythmic medication, catheter ablation can be deferred. It is important to recognize that the outcomes of AF ablation continue to improve over time as operators gain more experience and as new and better tools and techniques appear. It is notable that in this series, 1 patient died of a complication of AF ablation. If this procedure had been performed as first-line therapy in a young person, many would wonder whether the patient’s AF may have responded to a class 1 or 3 antiarrhythmic medication. Those involved in this field are grateful to Leong-Sit et al for their considerable effort in presenting their data for discussion. We also are grateful that they have raised a very important question: Is there a group of patients in whom the effectiveness of AF ablation is so high and the risk so low that AF ablation should be routinely considered a first-line alternative to medical therapy similar to the approach used for patients with paroxysmal supraventricular tachycardia? In our minds, the answer is still no.

Sources of Funding
The Johns Hopkins Atrial Fibrillation Program is supported by the Dr. Francis P. Chiaramonte Foundation and The Norbert and Louise Grunwald Cardiac Arrhythmia Research Fund.

Disclosures
Dr Calkins is a consultant to Biosense Webster, Sanofi-Aventis, and Medtronic. He has received honoraria for speaking from Medtronic, Boston Scientific, and Biosense Webster and has received research support and participated in clinical trials with Biosense Webster.

References


Key Words: Editorials  ablation  arrhythmia  atrial fibrillation  atrial flutter  electrophysiology
Should Catheter Ablation of Atrial Fibrillation Be a First-Line Therapy in the Young?
David N. Edwards and Hugh Calkins

Circ Arrhythm Electrophysiol. 2010;3:425-427
doi: 10.1161/CIRCEP.110.959031
Circulation: Arrhythmia and Electrophysiology is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2010 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-3149. Online ISSN: 1941-3084

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circep.ahajournals.org/content/3/5/425

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Arrhythmia and Electrophysiology can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Arrhythmia and Electrophysiology is online at:
http://circep.ahajournals.org/subscriptions/