Commentary: The issue of pacemaker implantation after surgical ablation for atrial fibrillation

Niv Ad, MD

In recent years the issue of permanent pacemaker implantation (PPMI) after surgical ablation for atrial fibrillation (AF), and the Cox maze procedure in particular, is readily discussed and debated. Although this topic is of significance, I find that the current discussion often lacks the granularity required to improve our understanding.

In general, PPMI after cardiac surgical procedures is not a rare event with documented rates at 1 year varying from 4.5% for mitral valve repair to 13.3% for combined aortic and mitral valve replacement.1 The reported rate of PPMI in the report by Kakuta and colleagues2 is 1.6% for in-hospital implantation and 7.3% for PPMI during follow-up. I find it important that this study reports findings similar to our previous publication, which showed that PPMI did not affect long-term mortality, stroke rates, or recurrence of AF with most patients having sick sinus syndrome as the PPMI indication.3 As expected, preoperative AF duration and older age were reported to be associated with PPMI.2

My experience has taught me that there are several key points that should be mentioned and discussed:

1. Standardized preoperative risk assessment for PPMI should be implemented involving the referring cardiologist and electrophysiologist, including diagnosis of sick sinus syndrome, other conduction abnormalities, and the potential indications and timing of PPMI after the procedure. Often the appropriate postoperative evaluation and steps are not taking place resulting in premature PPMI and higher rates of in-hospital PPMI. One prime example is the rarity of postoperative atrial electrocardiogram tests to assess recovery of atrial activity and thus early PPMI on day 2 or 3 after the procedure, which is very rare in my practice. We should remember that sinus node dysfunction, temporary or not, is often directly related to AF and also the chronic use of antiarrhythmic drugs and sinoatrial node remodeling secondary to long-standing AF.

2. Some patients are more prone to postoperative fluid retention and atrial stretch and therefore routine use of diuretics and spironolactone might be beneficial in facilitating the return of normal atrial activity.4

3. Surgical technique and careful assessment of the appropriate application of lesions is important, especially regarding the right atrium.

a. Atrioventricular block should not be the outcome of an appropriately performed Cox maze procedure. As an example, if a cavo-isthmus line is added to the Cox maze procedure (“flutter line”) higher rates of atrioventricular conduction delays are going to be found resulting in PPMI.5

From the Division of Cardiac Surgery, University of Maryland School of Medicine, Baltimore, Md; and Adventist White Oak Medical Center, Silver Spring, Md.

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Address for reprints: Niv Ad, MD, Division of Cardiac Surgery, University of Maryland School of Medicine, 110 S Paca St, 7th Floor, Baltimore, MD 21201 (E-mail: nivadmd14@gmail.com).

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b. Familiarity with the conduction system and various phenomena of right atrial tissue pacing capacity ("heart rate regions") when applying right atrial lesions is essential. We should avoid lesions through those areas and handle the right atrial tissue with extreme caution.

4. There is an association between success rate and postoperative slow nodal rhythm and PPMI rates. Therefore, the higher the success rate the higher the rate of PPMI. In patients with significant atrial remodeling and longstanding persistent AF (chronic) a correctly performed Cox maze procedure will likely be most effective as opposed to a less extensive lesion set and intrinsic rhythm would less likely be AF or atrial flutter. In these instances, patients should be assessed daily for progression of sinus node recovery before rushing in, if clinically stable.

In their summary, the report by Kakuta and colleagues presents the high quality of work expected from centers performing the procedure. Successful treatment of AF at the time of surgery is a unique opportunity that is given to us and the appropriate lesion set and ablative technology should be used routinely.

References