Sinus Node Recovery Time Can Predict Maintenance of Sinus Rhythm After Catheter Ablation for Long-Standing Atrial Fibrillation

Yasushi Imai,^{1,2} MD, Yasuhiro Yokoyama,¹ MD and Tomonori Watanabe,¹ MD

(Int Heart J 2018; 59: 460-461)

Atrial fibrillation (AF) is the most common arrhythmia in daily clinical practice and is strongly related to the high occurrence of cerebral infarction as well as heart failure. Firstly, we provide optimal anticoagulation and pharmacological rate control strategy to AF patients. However, we also consider whether we should defibrillate AF and we maintain sinus rhythm using a pharmacological approach as well as invasive strategy. Nowadays, catheter ablation including conventional radiofrequency ablation, cryoballoon ablation¹⁾ and other novel modalities are often used around the world for symptomatic patients with paroxysmal or persistent AF and the success rate and AF-free survival have been improved and are now acceptable. Of note, a recent important paper showed that AF ablation also improves the survival of patients with heart failure complicated with AF.²⁾

AF is caused and maintained by multiple factors including electrical and anatomical remodeling under pressure/volume overload, autonomic dysregulation, and various stresses. When AF persists, atrial electrical and anatomical remodeling progress leading to not only maintenance of AF but also sinus node dysfunction related to atrial fibrosis in the surrounding area of the sinus node and a decrease in the number of sinus nodal cells. Theoretically, sinus node dysfunction is thought to be associated with AF persistence and resistance to rhythm control strategy, however, there have been very few reports on this important issue.³⁾

During the follow-up period of 28.4 months, 69% of the participants experienced AF recurrence. The AF recurrence was significantly and independently associated with longer SNRT after defibrillation, although there were no significant differences in the AF duration, AF cycle length, or right and total atrial conduction times. In daily practice in many catheterization laboratories, EP doctors perform pulmonary vein isolation, the mainstay of AF ablation, under either sinus rhythm/coronary sinus distal pacing, or AF. However, ultimately many electrophysiologists prefer to defibrillate AF and to confirm electrical isolation between a pulmonary vein and left atrium under sinus rhythm. Sometimes we encounter cases who have long atrial arrest after electrical conversion and need atrial or ventricular backup pacing. Some may argue that PVI also ablates the ganglion plexus around the four pulmonary veins to some extent, which can modulate vagal tone resulting in a shortening/improvement of SNRT. In addition, post-ablation maintenance of sinus rhythm may improve sinus node function.³⁾ However, in this paper, the authors compared and evaluated SNRT in all the participants who underwent PVI in the same condition and we believe that the evidence obtained from this paper may be helpful for deciding upon a prognosis of AF ablation.

Disclosures

Conflicts of interest: None.

Article p.497

The report by Yamguchi, *et al.* in the present issue of International Heart Journal showed a relationship between AF recurrence after catheter ablation and sinus node dysfunction in long-standing persistent AF patients using the sinus node recovery time (SNRT) after defibrillation.⁴⁾ They enrolled 51 consecutive patients who underwent a first ablation for long-standing persistent AF and evaluated the power required to defibrillate, number, and SNRT after intracardiac defibrillation during the catheter ablation.

References

1. Kuck KH, Brugada J, Fürnkranz A, *et al.* FIRE AND ICE Investigators. Cryoballoon or Radiofrequency Ablation for Paroxysmal Atrial Fibrillation. *N Engl J Med* 2016; 374: 2235-45.
2. Marrouche NF, Brachmann J, Andresen D, *et al.* CASTLE-AF investigators. Catheter ablation for atrial fibrillation with heart failure. *N Engl J Med* 2018; 378: 417-27.
3. Park J, Shim J, Uhm JS, Joung B, Lee MH, Pak HN. Post-shock sinus node recovery time is an independent predictor of recurrence after catheter ablation of longstanding persistent atrial fib-

From the ¹Division of Cardiovascular Medicine, Department of Internal Medicine, Jichi Medical University, Shimotsuke, Japan and ²Division of Clinical Pharmacology, Department of Pharmacology, Jichi Medical University, Shimotsuke, Japan.

Address for correspondence: Yasushi Imai, MD, Division of Cardiovascular Medicine, Department of Internal Medicine, Jichi Medical University, 3311-1 Yakushiji, Shimotsuke, Tochigi 329-0498, Japan. E-mail: imaiymucpt@gmail.com

Received for publication April 16, 2018. Revised and accepted April 16, 2018.

doi: 10.1536/ihj.18-245

All rights reserved by the International Heart Journal Association.

- rillation. Int J Cardiol 2013; 168: 1937-42.
4. Yamaguchi N, Okumura Y, Watanabe I, *et al.* Impact of sinus node recovery time after long-standing atrial fibrillation termination on the long-term outcome of catheter ablation. Int Heart J 2018; 59: 497-502.
 5. Hocini M, Sanders P, Deisenhofer I, *et al.* Reverse remodeling of sinus node function after catheter ablation of atrial fibrillation in patients with prolonged sinus pauses. Circulation 2003; 108: 1172-5.