Editorial

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Markers for Catheter Ablation of Atrioventricular Accessory Pathways

Boyoung Joung, MD

Division of Cardiology, Yonsei University College of Medicine, Seoul, Korea

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The treatment and therapies for accessory pathway (AP)-mediated tachycardia have undergone remarkable progress in the past 40 years, from the initial surgical ablations in the 1960s to the current modern use of radiofrequency (RF) and cryoenergy delivered during cardiac catheterization. Catheter ablation is currently the first-line of therapy for symptomatic patients with AP-mediated tachycardia, and success rates are dependent on accurate localization of the APs.[1)2)] The earliest atrial (A)/ventricular (V) activation potential, or accessory pathway (AP) potential are commonly used as ablation targets for atrioventricular (AV) APs. The commonly used methods for localization of the APs are targeting the earliest A or V activation potentials, AP potentials, or retrograde A activation with the shortest ventriculoatrial (VA) interval.[3)4)] In clinical practice, the earliest local ventricular or atrial activation will identify the accessory pathway insertion site. In anterogradely conducting accessory pathways, the timing of the pre-excited local ventricular electrograms on the bipolar recording during sinus rhythm, atrial pacing, or antidromic atrioventricular reentrant tachycardia (AVRT) in reference to the earliest onset of the delta wave on the surface ECG is used to localize the ventricular insertion site of the accessory pathway accurately.[5)] At this site, the unipolar electrogram demonstrates a QS pattern indicating spread of activation from the insertion of the accessory pathway toward local ventricular tissue. In concealed accessory pathways or retrogradely conducting manifest pathways, the site of earliest atrial activation during orthodromic AVRT or ventricular pacing identifies the atrial insertion site. These measurements, however, may also be somewhat subjective and therefore inexact. Although success rates using these techniques are good, ranging from 90% for right-sided pathways and up to 97% for left-sided pathways, there is still a 3-10% failure rate for ablating WPW.[6)7)] Moreover, the local atrioventricular or ventriculoatrial intervals are insufficient parameters to predict the successful ablation site, because pathway conduction in most patients will follow an oblique course or the local activation wavefront recorded on the distal mapping electrode will vary in direction.

The local A/V amplitude ratio has been used as a reference for guiding AV APs. Current criteria recommend an A electrogram amplitude of greater than 0.4 mV or an A/V amplitude ratio of 0.1 or greater during anterograde activation mapping, and the A≥V electrogram during ablation from the A aspect of the annulus.[4)] However, these recommendations are somewhat broad, and previous studies for the A/V ratio in ablation guidance are limited.[8)] Additionally, a tachycardia state or pacing maneuver could influence the local A/V amplitude potentials. In this issue, Kim et al.[9)] reported that different A/V ratios based on activation methods (≥1.0±0.3, antegrade approach; and ≤1.0±0.3, orthodromic AVRT state) could be good adjuvant markers for targeting AV APs. The local A/V ratio could be used for judging the catheter position whether it is close to the A or V side. However, Haissaguerre et al. found no difference in the A/V ratio for manifest APs at successful vs. unsuccessful sites; nor did the A/V ratio influence the ablation results due to different A/V ratios based on the location of the APs.[10)] Therefore, local A/V ratios should be used as an adjunctive method to confirm that the ablation catheter is located in the AV groove.

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Correspondence: Boyoung Joung, MD, Division of Cardiology, Yonsei University College of Medicine, 50 Yonseiro, Seodaemun-gu, Seoul 03722, Korea
Tel: 82-2-2228-8460, Fax: 82-2-393-2041
E-mail: cby6908@yuhs.ac

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