A Novel Concept in AVNRT
The Reentrant Circuit with a Superior Slow Pathway

Tomonori Watanabe, MD and Yasushi Imai, MD

(Int Heart J 2020; 61: 199-200)

The mechanism of typical atrioventricular reentrant tachycardia (AVNRT) is known to involve a reentrant circuit consisting of dual slow and fast nodal pathways. The reentrant circuit of typical AVNRT is assumed to be a circuit around the coronary sinus ostium. Posterior inferior extensions as a part of the atrioventricular node connecting to the His bundle area could be a slow conduction pathway which would contribute to the known reentry circuit of AVNRT.\(^1\)

The conduction time over each pathway may be used to classify it as a fast, slow, or intermediate pathway. The various forms of reentrant circuits in AVNRT are assumed to depend on the conduction time and the earliest atrial activation sites. Multiple forms of AVNRT have recently been also reported.

Several cases of atypical AVNRT with retrograde earliest atrial activation superior to the His bundle area have been reported.\(^2,3\) However, the existence of a superior slow pathway contributing to the AVNRT circuit has not been confirmed. In a previous study, atypical AVNRT with a reentrant circuit between the antegrade fast pathway and retrograde superior slow pathway with the earliest atrial activation site above the His bundle area along with a longer V-A interval have been confirmed.\(^4\) The optimal ablation target for the retrograde superior slow pathway is the area above the His bundle and/or the site below the aortic cusp, and there are also several cases which require ablation in the non-coronary aortic cusp.

In detailed anatomical evaluations around the septal atrioventricular junction, the existence of superior extensions has been also demonstrated.\(^5,6\)

---

Kaneko, \textit{et al} presented a case of atypical slow-slow AVNRT with a reentrant circuit between the antegrade slow pathway over the right inferior extension and retrograde superior slow pathway.\(^7\)

This case demonstrated that an ablation strategy targeting the antegrade slow pathway around the right inferior septum could be the optimal approach for atypical slow-superior slow AVNRT, particularly since this strategy is already established.

We usually perform a conventional electrophysiolog-ical study for supraventricular tachycardia by positioning the electrode catheter in the right atrium, right ventricle, and His bundle area and inside the coronary sinus. However, when EPS indicates several earliest sites and/or conduction properties, a 3-dimensional mapping system could help us to identify each of the earliest activation sites in the atrium.\(^8\)

A detailed mechanism of AVNRT which could provide a link between the electrophysiological and anatomical findings has not been elucidated. In recent years, as the accuracy of 3-dimensional mapping systems has improved, detailed high resolution mapping has become possible and could help us to clarify the mechanism of any type of AVNRT. In addition, the safety and efficacy of cryoablation in AVNRT have been demonstrated.\(^9\) Safe cryo-mapping to determine the locality of conduction pathways may provide new information that could help to clarify the mechanism of AVNRT.

Further investigation is needed to establish an optimal ablation strategy from the viewpoint of electrophysiological findings and anatomical characteristics in atypical AVNRT.

---

\textbf{Disclosure}

\textbf{Conflicts of interest:} None.

\section*{References}


