Characterizing fast pathway in typical and atypical atrioventricular nodal re-entrant tachycardia by atrial-His and His-atrial: more to consider

We read with interest the paper by Katritsis et al. published in *European Heart Journal*. In this study, the authors sought to assess the prevalence, electrophysiological characteristics, and mechanism underlying atypical atrioventricular nodal re-entrant tachycardia (AVNRT), which is not clinically well-defined. It was shown that the atrial-His (AH) interval in atypical ‘fast-slow’ (F-S) AVNRT is longer than His-atrial (HA) interval in typical ‘slow-fast’ (S-F) AVNRT, implying that different fast conduction pathways are utilized in these two types of tachycardia. However, we are holding the following interpretations:

First of all, we noticed that the earliest retrograde atrial activities were obviously different between F-S AVNRT and S-F AVNRT patients. In F-S patients, the earliest atrial activities were mostly (~60%) at proximal coronary sinus (pCS), while the earliest atrial activities in S-F patients were predominantly (~85%) at the His region. It has been previously shown that different fibre connections exist between atria and AVN in typical S-F AVNRT resulting in a different retrograde atrial activation of the fast pathway. The different patterns of atrial activation may cause an alternate conduction time from AVN to atrium, and such a difference will potentially bring in more variable atrial intervals within each group that could influence interpreting the comparison of AH and HA interval further. Furthermore, it is also necessary to understand whether those patients with a similar atrial activity sequence are utilizing the same fast pathway during tachycardia. Hence, we are wondering whether it would be worthy to analyse the patients with an identical atrial activity in these two types of tachycardia separately, in other words, comparing the F-S and S-F types of patients with the earliest pCS atrial activity as well as comparing those with earliest His regional atrial activity.

Secondly, the authors made the assumption that the conduction velocity over the fast pathway is similar in the anterograde and retrograde directions. However, it has previously been shown that the anterograde and retrograde conduction time of the AVN are different, which means that the $F_{ant}$ and $F_{ret}$ would differ from each other even if they were using the same fast pathway. This could make the interpretation of the results more complicated, impacting both the estimated prevalence and mechanistic characterization of atypical AVNRT.

Further challenges in characterizing atypical AVNRT remain, including difficulties associated with detailing the small area of Triangle of Koch and the direct recording of conduction or activity in the AVN. Nevertheless, the present study has provided new insight into the prevalence and mechanistic basis of atypical AVNRT which will be invaluable for its clinical interpretation moving forward.

References


Conduction over and around the atrioventricular node: author’s reply

We are grateful to Sun et al. for their interest in our study, and their kind words. The authors raise two important issues.

First, retrograde atrial activation patterns during atrioventricular nodal re-entrant tachycardia (AVNRT). We believe that following the seminal study of Anselme et al., heterogeneity of both fast and slow conduction patterns has been well described, and all forms of AVNRT may display anterior, posterior, and middle retrograde activation patterns. There has also been evidence that were left septal His recordings routinely performed in patients with AVNRT, the proportion of left-sided retrograde fast pathways might be considerably higher than previously reported. More important, according to our experience, retrograde activation sequence may even change during the arrhythmia in the same patient. Thus, in our view, retrograde activation patterns are of limited value. Having said that, further elucidation of the nature of ‘fast’ conduction in AVNRT, as suggested by Sun et al., is badly needed. We have attempted to handle the issue by means of comparing intervals in the same patient with both typical and atypical AVNRT types. Our data indicated that the notion of ‘fast-slow’ AVNRT is meaningless. ‘Fast pathway’ conduction is not the same in all AVNRT forms.

Second, regarding our working hypothesis in our first study about anterograde and retrograde fast pathway conduction, this was based on the evidence on accessory pathways, indicating similar conduction velocity in both directions. If the histologically proven multiple superior atrial inputs to the AV node facilitate fast conduction, as proposed by the anatomical model, this should be a legitimate assumption.