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**Correspondence**

Demonstration of the Exact Anatomic Tachycardia Circuit in the Fast-Slow Form of Atrioventricular Nodal Reentrant Tachycardia

To the Editor:

We are responding to the recent article by Yamabe et al who concluded that a retrograde pathway extending from the His bundle (Hb) to the area below the coronary sinus os “is an integral limb of the reentry circuit in fast/slow atrioventricular nodal reentrant tachycardia (AVNRT).” In a previous report, the same area was found to be involved in antegrade activation during slow/fast AVNRT. Thus, only one limb of the reentrant circuit has been delineated in which activation moves in opposite directions for the two varieties of AVNRT.

Our recent studies of AVNRT in the rabbit heart provide evidence suggesting that the entire AVNRT circuit is located within the triangle of Koch. Specifically, in 19 of 72 AV junctional preparations, the antegrade and retrograde limbs were located in the transitional cells closest to the tricuspid annulus and those transitional cells located just below the tendon of Todaro, respectively. A well-defined, functional line of block separated these limbs.

The use of the term “perinodal atrium” as the substrate for the reentrant circuit may be misleading because the role of transitional tissues in man has been essentially ignored. In our studies of the rabbit AVNRT, the transitional tissues provided sustained AVNRT for the major portion of the circuit. On occasion, exit block to the adjacent atrium was observed even though the tachycardia continued. Thus, there are at least 3 possible, and undoubtedly more, AVNRT scenarios: (1) those in which the atrium is coupled as a bystander to a circuit involving the transitional cells and AV node (in some cases of slow/fast AVNRT, the Hb may be part of the circuit); (2) those in which the atrium is uncoupled, completely or partially, from such a circuit; and (3) those in which the circuit is truly intranodal. It would appear from the ablation data that the majority of the clinical forms of AVNRT represent the first two possibilities. We would suggest that additional mapping and resetting studies similar to those reported by Yamabe et al need to be performed within the triangle of Koch close to the tendon of Todaro to more fully delineate the anatomy of the tachycardia circuit comprising the various forms of AVNRT.

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Response

We appreciate the comments of Drs Patterson and Scherlag.

We agree that transitional tissues is important as the substrate for the atrioventricular (AV) nodal reentry circuit. In our studies of the slow-fast and fast-slow forms of atrioventricular nodal reentrant tachycardia (AVNRT), we expressed the sites at which the single extrastimulation was performed along the tricuspid annulus as “perinodal atrium.” However, this does not exclude the possibility of involvement of transitional tissues in these stimulation sites. The posterior input comprises small cells and gradually merges with atrial myocardium. The connections between the atrial and transitional cells are so gradual that no clear anatomic demarcations can be detected. Thus, it is conceivable that the captured atrial sites by single extrastimuli, which were considered to be involved in the circuit, contain the transitional cells. This was stated in our article.

Regarding the participation of atrial myocardium in AVNRT, Patterson and Scherlag demonstrated the dissociation of the atrial myocardium during tachycardia and suggested that the atrium is coupled as a bystander to a circuit involving the transitional cells and AV node. However, in our studies, it was shown that the single extrastimulus began to reset the tachycardia as soon as it was delivered during late diastole at 4 atrial sites of the AV junction extending from the His bundle site to the coronary sinus ostium (CSOS) both in slow-fast and fast-slow AVNRT. Furthermore, the following return cycles at these sites were also uniformly almost identical to the tachycardia cycle length. Therefore, it is hard to say that these atrial sites were coupled to the circuit as a bystander, although we cannot rule out the possibility that both the transitional cells and the atrial myocardium were captured simultaneous by the single extrastimuli. Recent 3-dimensional fluorescent optical mapping data obtained from isolated rabbit AV nodal preparations suggest that AV nodal reentry involves atrial and transitional cells. Furthermore, Wu et al also demonstrated recently that atrial tissue located between the fast and slow pathways was part of the reentry circuit both in fast-slow and slow-fast AV nodal reentry. These findings are consistent with our observations both in fast-slow and fast-slow AVNRT. However, as indicated by Drs Patterson and Scherlag, the anatomy of the tachycardia circuit comprising the various forms of AVNRT needs to be elucidated further.
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