Demonstration of dual AV nodal physiology - More than one way to skin a cat?

In this issue of the journal, Bayraktarova et al. compare abrupt increase in AH interval during burst pacing with the same finding during programmed atrial stimulation [1]. In line with previous studies, they find that the classically described AH jump with atrial extrastimuli was seen only in 78% of patients with a dual AV nodal physiology. However, an abrupt increase of AH interval during burst pacing was seen in another 17.8% of patients. This could, therefore, provide another method to identify dual AV nodal physiology.

The identification of functionally different pathways in the atrioventricular node depends on discontinuity in the antegrade conduction characteristics seen during pacing maneuvers. While discontinuity is classically described during programmed stimulation with extrastimuli, it may also be seen with burst pacing. An abrupt increase in AH interval may be seen as a marker of dual AV nodal physiology as described in this study, typically happening because of Wenckebach block in the fast pathway with change to slow pathway conduction. Another finding that may be seen during burst pacing is extreme prolongation of the PR interval such that PR interval exceeds the RR interval. Baker et al. reported finding a PR/RR ratio exceeding 1 in the majority of patients with AVNRT [2] and in a retrospective analysis, we noted this finding in 84% of patients with AVNRT (unpublished data). However, the authors Bayraktarova et al. report that they saw this finding only rarely in the patients in this study.

The most likely reason for this difference is the method of burst pacing used. Burst pacing can be done as a single continuous series of paced beats with increase in paced rate every few beats (ramp method) or as bursts of pacing at progressively faster rates with a pause between bursts (stepwise incremental method). The ramp method is faster to perform and may be better tolerated by patients. The stepwise incremental method allows for assessment of sinus node recovery time at different cycle lengths, but may be less well tolerated by patients because of the abrupt increase in rate at the start of each burst.

It has been reported that the AV conduction characteristics elicited by the two methods are broadly comparable [3]. The AV node exhibits the property of accommodation which results in fluctuations in the AH interval at the onset of pacing, especially when pacing at faster rates [4]. This produces loss of 1:1 conduction earlier when using the stepwise incremental method [5]. Therefore, 1:1 conduction through the slow pathway with a PR/RR ratio more than 1 may be seen less often with the stepwise incremental method than with the ramp method. Baker et al. used the ramp method in their study which we also use in our lab, while Bayraktarova et al. use the stepwise incremental method.

So which method of pacing should we use and which method of identifying dual AV nodal physiology is more helpful? As mentioned, the ramp method is quicker to perform and is better tolerated by patients. But it also makes it more likely that a PR interval exceeding RR interval will be seen. There is a strong suggestion that compared to other markers of dual AV nodal physiology, the presence of a PR interval exceeding RR interval also indicates the ability of the slow pathway to sustain tachycardia. Therefore elimination of this finding can serve as a surrogate endpoint for ablation when tachycardia is not inducible. This makes a strong case for the ramp method as the method of burst pacing in the atrium in patients with supraventricular tachycardia.

Disclosures

None.

References

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