Para-Hisian pacing: The eyes see what the mind knows

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A young male presented with pre-excited atrial fibrillation. During an electrophysiology study, preexcitation suggestive of a pathway in posteroseptal location was confirmed but no tachycardia was inducible. Para-Hisian pacing was done during sinus rhythm (Figure 1). Is there retrograde conduction through the accessory pathway (AP)? Para-Hisian pacing is helpful in identifying the routes of retrograde conduction. This can be an AP or atrioventricular (AV) nodal pathway or both. Anatomically, para-Hisian region is close to the atrium but electrically it is distant as pacing impulse has to enter the His-Purkinje system to reach the atrium. In a patient with septal AP,
pacing impulse can reach the atrium through AP, thus bypassing the His-Purkinje system and AV node.

During para-Hisian pacing, two types of paced beats are compared, wide with only myocardial capture and narrow with both myocardial and His bundle capture. First step is to look for retrograde atrial activation sequence (RAAS). If RAAS is different with and without His bundle capture, it suggests the presence of more than one retrograde conduction route. If RAAS is same, it suggests that conduction is going through either AV node or AP. Second step is to look for stimulus-atrial (SA) local ventriculoatrial (VA) and His-atrial intervals. Similar RAAS with similar SA interval with or without His bundle capture suggests conduction through AP while increase in SA interval with loss of His capture suggests conduction through AV node.

In Figure 1, RAAS is same during wide and narrow beats and there is no change in SA interval between these two beats. At first glance, it looks like retrograde conduction through AP. But here, the narrow beat has a clear isoelectric interval and in the pacing channel, local ventricular activation can be seen separate from the pacing spike (marked as * in Figure 2A). These findings suggest that the narrow beat represents pure His bundle capture while the wide beat is due to both His bundle and myocardial capture. No change in SA interval with loss of myocardial capture suggests conduction through AV node. With pacing at a different location, beats with and without His capture were obtained (Figure 2B) and prolongation of SA interval with loss of His capture during para-Hisian pacing confirms nodal conduction.

During para-Hisian pacing, intermittent loss of myocardial capture with pure His bundle capture can also occur. In this condition, both His bundle and myocardial capture result in relatively wide beats as compared to pure His bundle capture. Similar to the classic para-Hisian pacing, different RAAS with and without myocardial capture suggests the presence of more than one retrograde conduction route while similar RAAS suggests conduction through either AV node or AP. Similar RAAS with similar SA with or without myocardial capture suggests conduction through AV node while increase in SA interval with loss of myocardial capture suggests conduction through AP (opposite of what seen with classic para-Hisian pacing).\(^1\,^2\)
These findings suggest that either there is no retrograde conduction through AP or it is very poor or decremental. Due to the short RR intervals during preexcited AF, decision was taken to ablate the AP. Mapping was done with atrial pacing and the pathway was successfully ablated.

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**CONFLICT OF INTEREST**
None for any of the authors.

**PATIENT CONSENT STATEMENT**
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**ETHICS APPROVAL STATEMENT**
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**CLINICAL TRIAL REGISTRATION**
Not applicable.

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