A curious alliance: Sinus nodal dysfunction precipitating atrioventricular block

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ABSTRACT

An elderly woman presented with recurrent syncope. Sinus bradycardia and sinoatrial block were seen on the electrocardiogram; however, PR interval prolongation after sinus pauses suggested atrioventricular conduction system disease. The occurrence of complete atrioventricular block after a pause during the electrophysiological study confirmed a diagnosis of paroxysmal atrioventricular block precipitated by sinus pauses secondary to sinus nodal disease.

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1. Case report

A 60-year-old woman was referred to us because of sinus bradycardia with recurrent syncope. The electrocardiogram (ECG) recorded at presentation (Fig. 1) showed mild sinus bradycardia with varying P–P intervals and a pattern of grouped beating. Gradual shortening of the P–P interval over 3 beats followed by a long pause, which was less than twice the shortest P–P interval, suggested second-degree type 1 sinoatrial (SA) block. In addition, the PR interval was prolonged in the beats after the pause (shown by an asterisk). A prolonged PR interval after pauses was also consistently seen in the other recorded ECGs. J-point elevation was also noted in the right precordial leads; however, the T wave was upright in V2, making this a type-II Brugada ECG pattern and likely a normal variant. An electrophysiological study was performed, during which complete atrioventricular (AV) block was seen to occur after a pause following a spontaneous premature atrial complex (Fig. 2). Intracardiac recording of the His bundle electrogram showed that the AV block occurred below the His bundle (Fig. 3). The patient was implanted with a permanent pacemaker.

2. Discussion

The term paroxysmal AV block describes the abrupt occurrence of complete AV block in patients with normal AV conduction, and was first described in 1933 [1]. Although this condition can occur sometimes without any changes in cycle length, the term is typically used for a distinct entity where a prolongation in cycle length results in the onset of an AV block. The occurrence of block after a prolongation of cycle length...
Fig. 1. Twelve-lead ECG at presentation. A pattern of grouped beats is seen with gradual shortening of the PP intervals followed by a prolonged PP interval, consistent with sinoatrial Wenckebach block. The PR interval is prolonged in the beat following the long PP interval, suggesting phase 4 block.

Fig. 2. Twelve-lead ECG during the electrophysiological study. The pause after a spontaneous premature atrial beat results in the onset of complete atrioventricular (AV) block.
suggests a bradycardia-dependent block, and this is postulated to be due to diastolic depolarization in a diseased His–Purkinje system [2].

In our patient, we were able to document the occurrence of AV block below the level of the His bundle after a prolongation in sinus cycle length. Interestingly, the patient showed evidence of sinus nodal dysfunction in the form of sinus bradycardia and sinoatrial block. An interaction between these conditions was seen on the surface ECG in the form of PR interval prolongation after the pause in cycles of typical SA Wenckebach block. This paradoxical increase in PR interval after the longer PP intervals suggested a disease of the His–Purkinje system and prompted an electrophysiology study. As paroxysmal AV block represents a diseased His–Purkinje system, it has a more malignant course with syncope and the risk of sudden death. Therefore, pacemaker implantation is necessary in these patients.

3. Conflict of interest

There are no conflict of interests for any of the authors.

References