

# An unusual cause of a relatively narrow, wide complex tachycardia



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## Case presentation

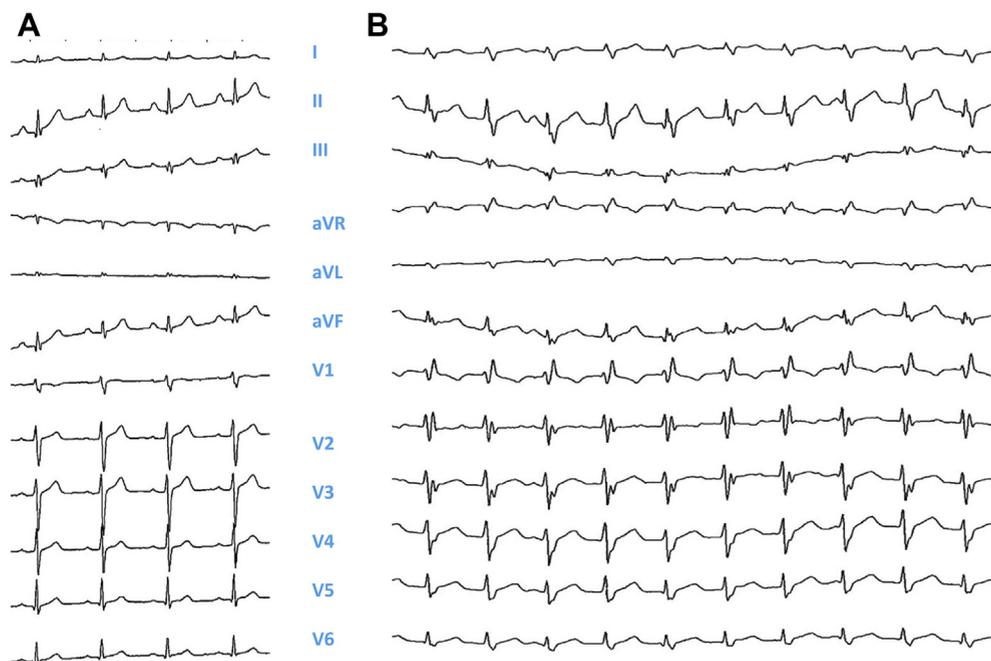
An 11-year-old boy presented with palpitations but no evidence of any cardiac disease. The baseline electrocardiogram (ECG) recorded during sinus rhythm is shown in **Figure 1A** and the tachycardia in **Figure 1B**. What are the differential diagnoses of this arrhythmia?

ECG analysis of the baseline ECG in sinus rhythm is normal (**Figure 1A**). **Figure 1B** shows the tachycardia with

a relatively narrow QRS with normal frontal axis; also note atrioventricular (AV) dissociation.

## Discussion

The findings of relative narrow QRS with a typical right bundle branch block (RBBB) pattern is most compatible with supraventricular tachycardia with aberration. The presence of AV dissociation immediately excludes atrial tachy-

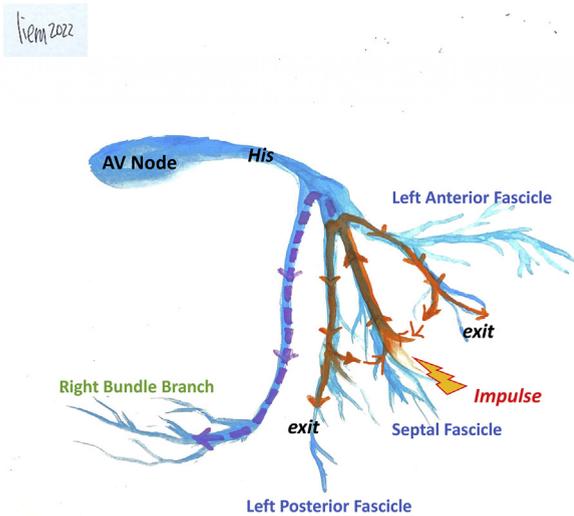


**Figure 1** A: Normal sinus rhythm. B: Tachycardia with relatively narrow QRS and atrioventricular dissociation.

**KEYWORDS** Fascicular tachycardia; Nodofascicular tachycardia; Nodoventricular tachycardia; Ventricular tachycardia; Wide complex tachycardia (Heart Rhythm 2022;19:1910–1911)

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cardia or an accessory pathway–mediated tachycardia. Of note, AV dissociation does not exclude nodoventricular (N-V) or nodo-fascicular (N-F) pathways. Therefore, these diagnoses are included after review of the ECG. Other likely possibilities include atrioventricular nodal reentrant tachycardia (AVNRT) with upper common pathway block to the atrium or junctional tachycardia. The patient underwent electrophysiological study, which revealed a negative H-V interval. A left heart examination showed that recordings from the proximal left posterior fascicle (LPF) preceded changes in



**Figure 2** Left upper septal type ventricular tachycardia demonstrating simultaneous activation of the fascicular system and slow activation of the right bunch branch. AV = atrioventricular.

ventricular response. In addition, during sinus rhythm, the left bundle branch potential proceeded that from the LPF; however, this relationship reversed during tachycardia. These findings prove that the tachycardia emanated from the fascicular system and excluded AVNRT and junctional tachycardia. The findings of electrophysiological study serve to exclude a concealed N-F or N-V pathway as well as a manifest right N-F pathway. However, in theory, this can be explained by a left-sided N-F pathway, which seems to

be much less likely than the upper septal fascicular explanation. These diagnoses are clearly excluded by inscription of the negative H-V. Therefore, the most likely mechanism is upper septal fascicular tachycardia, which involves retrograde conduction over the septal fascicle and near simultaneous activation of the left anterior and posterior fascicles with slight delay in reaching the right bundle branch (Figure 2) accounting for the pattern of a relatively narrow QRS with an RBBB configuration. In this Case, efforts to map the left fascicular system resulted in bump conversion of the tachycardia, which rendered the tachycardia noninducible. The patient was treated with a calcium channel blocker.

Three types of fascicular tachycardias are recognized. The most common by far involves the LPF and manifests as a monomorphic wide complex tachycardia with RBBB and superior axis. Less common are fascicular tachycardias from the left anterior fascicle presenting as an RBBB pattern with right-axis deviation. Very uncommon are the upper septal fascicular tachycardias as described in our Case. These reentrant fascicular tachycardias often are responsive to calcium channel blockers.<sup>1</sup>

In summary, we present a very unusual cause of tachycardia that masquerades as a supraventricular tachycardia but actually emanates from the left ventricular fascicles.

## Reference

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