



The EHRA Book of Interventional Electrophysiology: Case-based learning with multiple choice questions

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Narrow versus wide QRS

Chapter: Narrow versus wide QRS

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Introduction to the case



Case 3 is regarding a 35-year-old woman with a history of recurrent palpitations. She had no prior history of syncope and has a structurally normal heart on echocardiography. A 4-wire electrophysiological study was performed and during an antegrade curve (S1 400ms, S2 260ms), the following tachycardia was induced (Figure 3.1). The VA intervals are outlined on the coronary sinus (CS) channel. During tachycardia, the following phenomenon is observed.

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Figure 3.1

Surface leads I, aVF, V1, and V4, and intracardiac recordings from the distal and proximal bipoles of the His bundle (His), the proximal to distal bipoles of the coronary sinus (CS), and the right ventricular apex (RV)

Question



What is the mechanism of tachycardia?

- A AVNRT with intermittent bundle branch block
- B AVRT with intermittent pre-excitation
- C AT with intermittent LBBB
- D Orthodromic AVRT using a left lateral pathway
- E AT with intermittent pre-excitation

Answer



D Orthodromic AVRT using a left lateral pathway

Explanation



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This tracing demonstrates an eccentric atrial activation sequence which would be consistent with a left AT or the presence of a left lateral accessory pathway. There is one diagnostic feature which proves that the left lateral accessory pathway is a critical part of the circuit—there is intermittent LBBB with VA prolongation during the LBBB beats. This phenomenon of VA prolongation during orthodromic tachycardia using an accessory pathway ipsilateral to the bundle branch block was originally described by Coumel. Often it prolongs the tachycardia cycle length (TCL) as the re-entrant wavefront is forced to take a longer route via the contralateral bundle branch (right bundle in this case). However, the cycle length may remain the same despite ipsilateral bundle branch block if the AH interval shortens to compensate (or, in other words, no cycle

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length prolongation does not exclude an ipsilateral accessory pathway). Hence, it is crucial to measure the VA interval (from the onset of the QRS complex to the earliest atrial electrogram) to make the diagnosis, and not just the TCL.¹ VA prolongation by ≥ 40 ms provides strong evidence of a free wall AP in ipsilateral bundle branch block in the absence of a pre-existing underlying fascicular block.

References

1. Yang Y, Cheng J, Glatter K, Dorostkar P, Modin GW, Scheinman MM. Quantitative effects of functional bundle branch block in patients with atrioventricular reentrant tachycardia. *Am J Cardiol* 2000; **85**: 826-31.