Incessant Palpitations and Narrow Complex Tachycardia

Frederick T. Han, MD, FHRS

KEYWORDS

• Supraventricular tachycardia • AV dissociation • Junctional tachycardia

KEY POINTS

- Junctional tachycardia (JT) is rare cause of supraventricular tachycardia.
- The intracardiac activation sequence is similar to atrioventricular nodal reentrant tachycardia (AVNRT).
- Premature atrial contractions inserted during tachycardia can help distinguish JT from AVNRT.
- As noted in this case, slow pathway ablation for JT may not always be effective for termination of JT.
- Activation mapping during JT identified a low-amplitude potential in the region of the coronary sinus ostium and the inferior margin of the triangle of Koch that marked the successful ablation site for JT.

CLINICAL PRESENTATION

A 48-year-old woman presented for evaluation and management of daily palpitations, lasting for hours. The palpitations started when the patient was in her 20s, but gradually progressed, such that in the months before presentation the palpitations occurred for up to 8 hours a day on a daily basis. The palpitations occurred irrespective of whether the patient was at rest or exercising. Physical examination, laboratory studies, and echocardiogram were normal. Ambulatory monitoring identified multiple episodes of palpitations correlating with a narrow complex tachycardia occurring throughout the day (Fig. 1). The patient was subsequently referred for electrophysiology study and catheter ablation.

ELECTROPHYSIOLOGY STUDY

Tachycardia Induction

Quadripolar electrode catheters were positioned in the high right atrium, right ventricular apex, and the His bundle region. A decapolar electrode catheter was placed in the coronary sinus. Normal atrial-His and His-ventricular intervals were recorded in sinus rhythm. Ventricular-atrial conduction was present with ventricular pacing; there was a concentric retrograde atrial activation pattern. A sustained A on V narrow QRS complex tachycardia at a cycle length of 386 to 573 milliseconds was induced with ventricular overdrive pacing (VOD), single ventricular extrastimulus testing, and atrial overdrive pacing from the coronary sinus on and off isoproterenol infusion up to 10 μg/min (Fig. 2). Significant cycle length variation was observed with variations in isoproterenol dosing. Spontaneous variations in the His-His interval preceded changes in the atrial-atrial and ventricular-ventricular intervals during tachycardia (Fig. 3).

QUESTION

What is the differential diagnosis for a narrow QRS complex tachycardia? How can the tachycardia mechanism be established?

Section of Cardiac Electrophysiology, Division of Cardiovascular Medicine, University of Utah Health Sciences Center, 30 North 1900 East, Room 4A-100 SOM, Salt Lake City, UT 84132, USA
E-mail address: frederick.han@hsc.utah.edu

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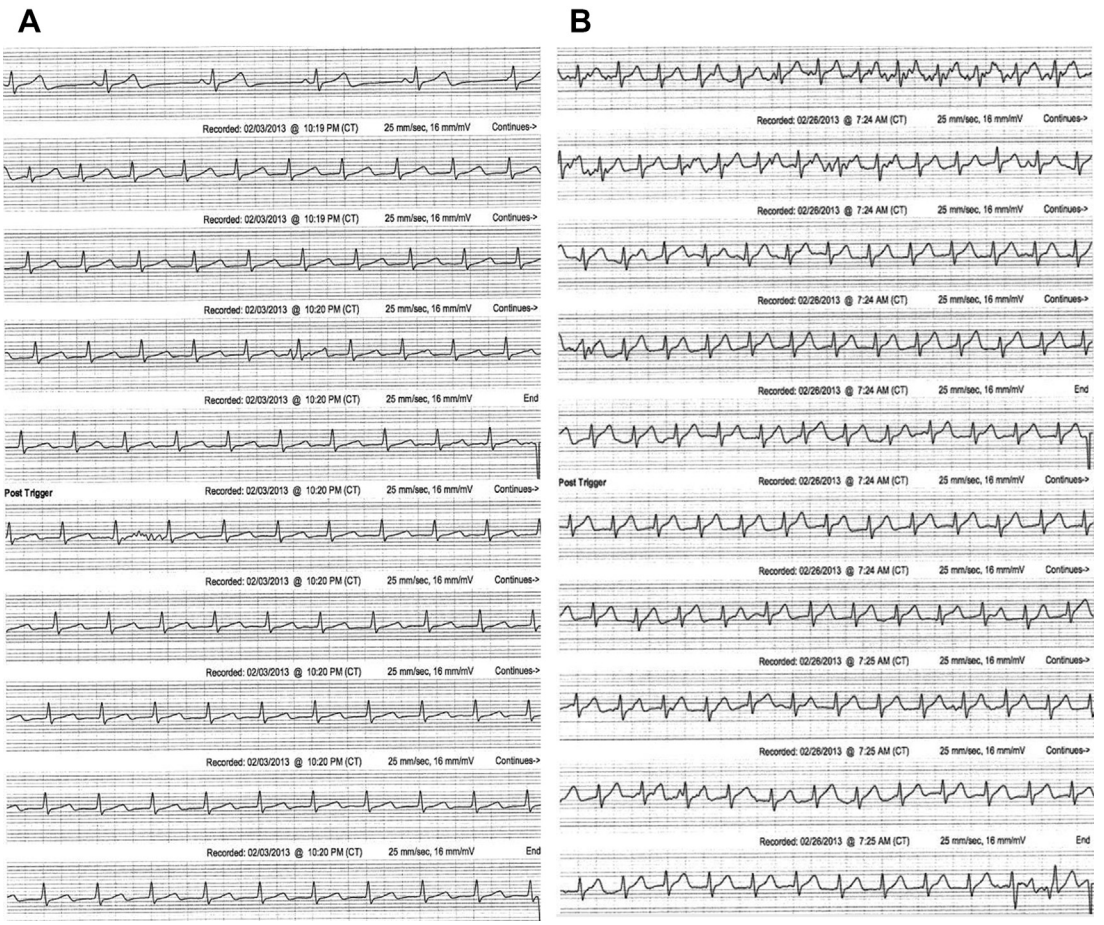

Fig. 1. (*A*) Tachycardia initiation on ambulatory monitor. (*B*) Tachycardia with atrioventricular dissociation.

MANEUVERS DURING TACHYCARDIA

The differential diagnosis of a narrow QRS complex tachycardia with a ventricular-atrial (VA) interval of 0 milliseconds includes atrioventricular nodal reentrant tachycardia (AVNRT), junctional tachycardia (JT), and circus movement tachycardia using a concealed nodofascicular (NF) accessory pathway.[1]

VOD during tachycardia entrained the tachycardia and produced a VAHV (Ventricle-Atrial-His-Ventricle) response, ruling out atrial tachycardia. His refractory premature ventricular contractions during the tachycardia did not affect the subsequent A within the confines of wobble noted in tachycardia.[2] This finding argues against concealed NF accessory pathway–mediated tachycardia.

Single early programmed atrial extrastimuli advanced the subsequent QRS via conduction down the fast atrioventricular nodal pathway with continuation of tachycardia (**Fig. 4**). Late premature atrial contractions (PACs) did not delay or terminate the tachycardia via the slow pathway.[3,4] With AVNRT, late premature atrial contractions are expected to advance the tachycardia via conduction down the slow pathway; early premature atrial contractions that conduct down the fast pathway should terminate tachycardia.

MAPPING AND ABLATION

A 4-mm quadripolar radiofrequency ablation catheter was used for mapping and ablation. All lesions were delivered in the temperature-controlled mode at 50 W with a 60°C temperature limit for up to 60 seconds. For ablation of the JT, we decided to proceed with a stepwise approach with inducibility testing after each series of ablations. First, we targeted the slow pathway during sinus rhythm. Two radiofrequency lesions were in the slow pathway region with junctional beats observed during ablation. The JT remained inducible (the 2 red lesions in **Fig. 5**).

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