

## Country cardiograms case 57: Answer

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**A**n initial glance at the rhythm strip at the bottom of the tracing shows a recurring pattern of 4 QRS complexes of high amplitude, separated by a QRS complex of lower amplitude. Closer inspection reveals the following.

The ventricular rate is 140 beats/min. QRS complexes are narrow, with a duration of 0.07 seconds. Atrioventricular dissociation is present, with an atrial rate of 118 beats/min. Every fourth P wave is conducted to the ventricles, with a PR interval of 0.20 seconds. These are capture beats.

Simple logic dictates that this tachycardia must be originating in the atrioventricular junction. Because the QRS complexes are narrow, they cannot originate in the ventricles. The dissociated atrial rhythm implies that the tachycardia cannot originate in the atria. This rhythm is therefore a junctional tachycardia, most likely junctional ectopic tachycardia. Atrioventricular dissociation and capture beats are commonly encountered with this arrhythmia.

Such episodes can be short-lived or can be refractory to treatment, as in this case.  $\beta$ -blockade appeared to reduce the rate but did not terminate the arrhythmia, and referral to an electrophysiology facility for urgent consideration of ablation was necessary.

Why are the QRS complexes of the junctional beats different from those of the capture beats? Logically, they should look the same, as they should use the same conduction pathway to the ventricles, and rate-related aberrancy seems unlikely. Practically, however, junctional beats often appear subtly different from sinus beats.

This relatively uncommon supraventricular arrhythmia contains a caveat. Imagine that right bundle branch block or left bundle branch block were present. A wide complex tachycardia would result. The atrioventricular dissociation and capture beats would then strongly suggest ventricular tachycardia, which would be an incorrect diagnosis.

This case serves as a reminder that when one is confronted by a wide complex tachycardia and is trying to establish from the electrocardiogram whether it is ventricular or supraventricular, only fusion beats provide 100% certainty of a ventricular origin. Atrioventricular dissociation and capture beats may strongly suggest it, but as this case makes clear, they do not exclude a junctional origin.

**For the question, see page 112.**

**Competing interests:** None declared.

“Country cardiograms” is a regular feature of *CJRM*. We present an electrocardiogram and discuss the case in a rural context. Please submit cases to Suzanne Kingsmill, *CJRM*, 45 Overlea Blvd., P.O. Box 22016, Toronto ON M4H 1N9; manedcjr@gmail.com.