Country cardiograms case 62: Answer

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Irregular narrow-complex tachycardia is present, with a mean rate of 157 per minute. The QRS duration is 0.085 seconds. Some form of atrial activity may be present but cannot reliably be identified. The axis, QRS morphology, ST segments and T waves are within normal limits. In this situation, atrial fibrillation might indeed be the first rhythm that comes to mind, but a closer examination of the tracing reveals that this cannot be the case.

Atrial fibrillation is an irregularly irregular rhythm in which there is no pattern and it is impossible to predict when the next QRS complex will occur. (There is 1 exception to this, when, at slow rates, the ventricular response becomes regular: this represents a high degree of atrioventricular block and the emergence of a junctional or ventricular escape rhythm.) In this case, although the rhythm is irregular, a predictable pattern is clear: repeatedly, a short R–R interval (0.34 s) is followed by a longer R–R interval (0.42 s). The QRS complexes following the shorter R–R interval are subtly different, likely representing a mild degree of the Ashman phenomenon.

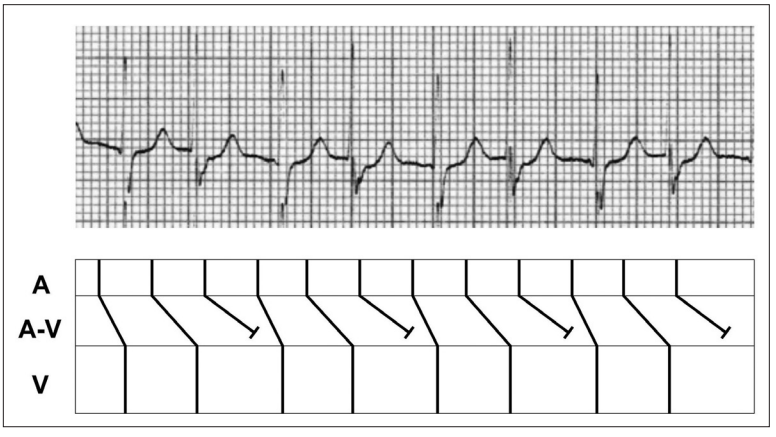

Fig. 1. Ladder diagram showing atrial rate of 236 per minute, 3:2 Wenckebach block in atrioventricular node and resulting ventricular rate of 157 per minute.

This pattern indicates that some form of organized atrial activity is present and that atrial fibrillation can be excluded. Sinus tachycardia with premature atrial complexes in a bigeminal pattern is very unlikely because of the absence of normal P waves, as well as the history of abrupt termination with vagal manoeuvres. Atrial flutter must be considered and perhaps cannot be fully excluded but is very unlikely given the absence of any discernible flutter waves. Far more likely is supraventricular tachycardia, and the patient's experience of being able to terminate these episodes with vagal manoeuvres supports this rhythm diagnosis.

Why, then, the alternating long and short R–R intervals, giving rise to paired complexes?

We can note that the long R–R intervals are less than twice the length of the short R–R intervals, which is one of the "footprints" of Wenckebach block. Indeed, Wenckebach block, with 3:2 atrioventricular conduction as the impulse travels down through the atrioventricular node, may be the likeliest explanation of this pattern (Fig. 1). This can be considered a protective brake rather than an abnormality, as, without it, the ventricular rate would be just under 240 per minute.

In this case, the arrhythmia again terminated spontaneously soon after the electrocardiogram (ECG) was recorded. Had it not, adenosine would have been the preferred drug. The follow-up ECG showed a PR interval of 0.13 seconds, toward the lower limit of normal (Fig. 2).

The perils of mistakenly diagnosing paroxysmal atrial fibrillation in this case include unnecessary treatment with anticoagulants or other medica-

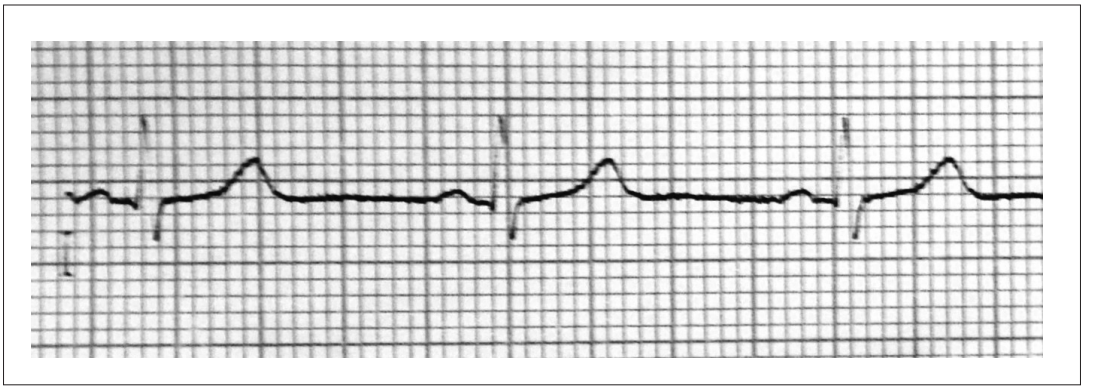

Fig. 2. Follow-up electrocardiogram showing PR interval of 0.13 seconds, toward lower limit of normal.

tions with potential adverse effects, as well as missing an opportunity for definitive treatment. Once the potential options were explained to the patient, she readily agreed to referral to an electrophysiology laboratory for testing, in the hope that an ablation procedure might be feasible.

In summary, not everything that at first glance looks like atrial fibrillation *is* atrial fibrillation. In this case, supraventricular tachycardia with Wenckebach block is the most likely diagnosis. Making the distinction has important consequences for management.

For the question, see page 51.

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