

An Uncommon Relationship

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A 24-year old man is noted by his primary care physician to have a persistently elevated resting heart rate. He is referred to a cardiologist for further assessment; the only abnormality on cardiovascular examination is a heart rate of 120 bpm. An ECG (Figure 1) is obtained.

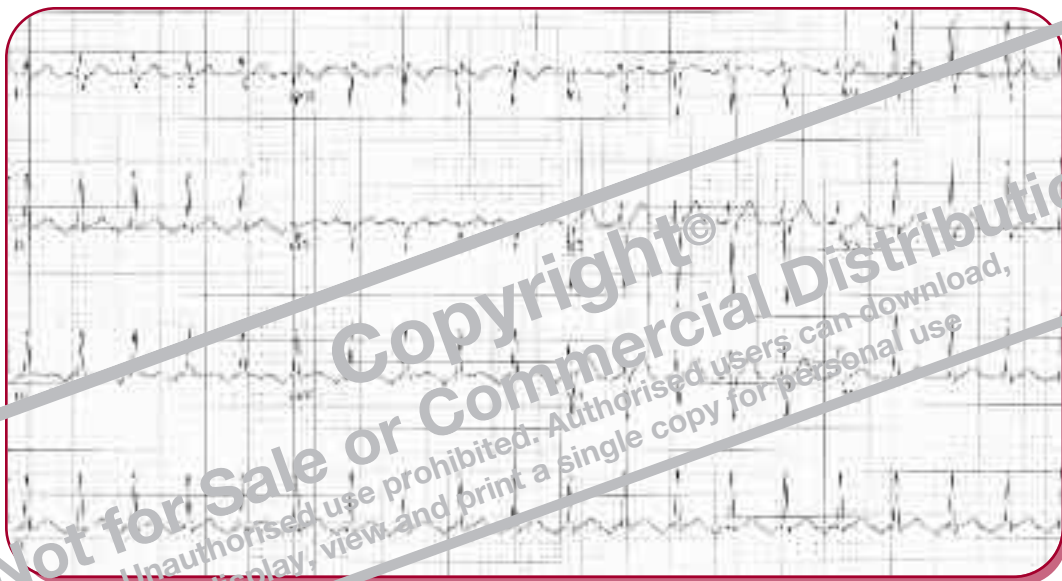


Figure 1. ECG on presentation.

1. What is the electrocardiographic diagnosis?

2. What are the clinical implications?

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This Month's ECG Diagnosis

- The ECG shows a regular narrow QRS tachycardia at a rate of 120 bpm. P waves precede each QRS complex, and superficially this might appear to be sinus tachycardia. But the P wave morphology is not consistent with an origin from the sinus node. Inverted P waves in leads II, III and aVF indicate that the atria are being depolarized in an inferior to superior direction, the opposite of what would be expected if they originated from the sinus node. Analysis of the narrow QRS tachycardia with detectable P waves requires determining if there is a one to one relationship between P waves and QRS complexes, inspecting P wave morphology for evidence of retrograde atrial activation and deciding if the P waves are closer to the preceding ("short RP") or following ("long RP")

QRS complex. This patient has a long RP interval with inverted P waves in the inferior leads consistent with retrograde atrial activation.

In the common form of supraventricular tachycardia due to AV node reentry (AVNRT) conduction is antegrade via a slow pathway and retrograde via a fast pathway, usually resulting in P waves which immediately follow the QRS. In the uncommon form of AVNRT the reverse is the case and the P wave is delayed, producing a long RP relationship. A similar pattern is seen in atrioventricular re-entrant tachycardia (AVRT) utilizing a slowly conducting accessory pathway for retrograde conduction. This latter arrhythmia is often called incessant or permanent junctional reciprocating tachycardia (PJRT). This patient's arrhythmia history is suggestive of PJRT.

Another ECG (figure 2) fortuitously showed termination and immediate recurrence of the arrhythmia. P waves of sinus node morphology immediately precede each paroxysm and the final QRS complex in each series is not followed by a retrograde P wave, indicating block in the slowly conducting retrograde limb of the pathway proximal to the atria.

- PJRT is a relatively uncommon arrhythmia which is most frequently encountered in young children. It may also be seen in adults, in whom it is less likely to manifest as an incessant tachycardia. It may cause a tachycardia-mediated cardiomyopathy which is potentially completely reversible with correction of the tachycardia. Radiofrequency catheter ablation is often highly effective in eliminating the arrhythmia, which tends to be resistant to anti-arrhythmic drugs.

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