

ECG of the Month



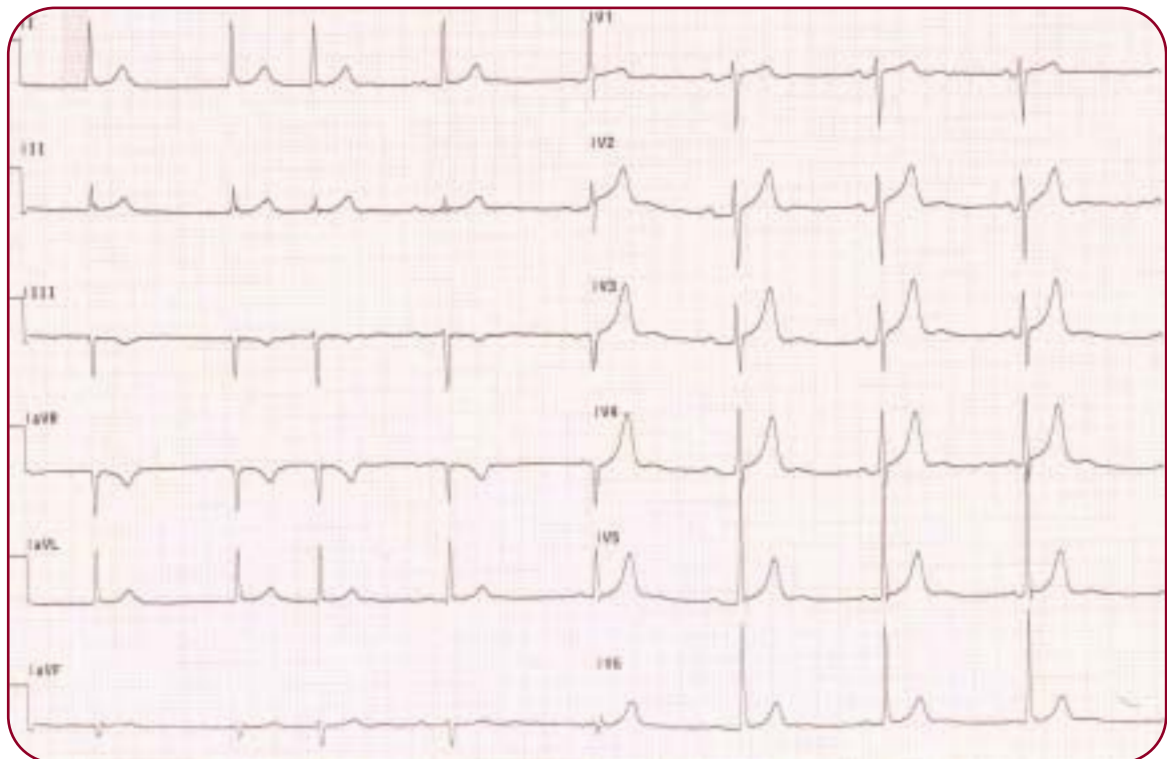
By Martin S. Green, MD, FRCPC

University of
Ottawa Heart Institute

An Interval Difference

This ECG was recorded from a 71-year-old man
presenting with a skipping heart.

What is the diagnosis?





This Month's ECG Diagnosis

This ECG shows a slightly irregular ventricular rate. There are P waves in front of all but the first two QRS complexes. The PR interval varies. In fact, towards the right side of the strip, the PR interval shortens.

Close examination of this phenomenon reveals that the first QRS complex is not preceded by a P wave. There is a P wave in the terminal portion of the T wave of the first QRS complex which does not appear to be conducted.

The second QRS complex is not preceded by a P wave, but again, there is a P wave in the terminal part of its T wave, followed by a QRS complex with a significantly shorter R-R interval. This, and the subsequent QRS complex, are of slightly different morphology than all of the others.

The fourth QRS complex is preceded by a P wave with a prolonged PR interval, but a similar morphology to the previous QRS complex. There is a shorter R-R interval here than between the first two beats.


In subsequent beats, the R-R interval is regular, but the PR interval shortens. The P-P wave intervals remain constant throughout the strip, at a rate of about 45 beats per minute.

This complex rhythm suggests competition between sinus bradycardia, with first degree atrioventricular (AV) block and an accelerated junctional rhythm at a rate slightly faster than the sinus rate. The first two beats, which are not preceded by P waves, and in which the R-R interval is shorter than the P-P interval, represent the

junctional escape rhythm. The third beat almost certainly represents conduction. Its morphology is somewhat different (best seen in leads II and III) and similar to the fourth beat, which appears to be conduction with a slightly prolonged PR interval. All subsequent beats are at the exact same R-R interval, which is shorter than the P-P

interval. This is best noted by the shortening PR interval. Such intervals suggest that these beats are not a result of AV conduction, but rather the junctional escape rhythm that happens to be slightly faster than the sinus rate.

Frequently complex rhythm interpretation can be simplified by the identification of the atrial and ventricular rhythms and their intervals. In this particular case, the shortening PR interval on the right side of the strip is clearly a product of near isorhythmic dissociation, with the R-R interval being slightly shorter than the P-P interval. The two rhythms are, in fact, unrelated.

The patient had not had syncope or presyncope and was reassured that the conduction abnormality was not serious. 

Complex rhythm interpretation can be simplified by the identification of the atrial and ventricular rhythms and their intervals.