ECGs - Back to the Basics
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Quick Quiz #1

A. 

B. 

Which rhythm strip shows

1. A Premature Atrial Complex (PAC)
2. A Premature Ventricular Complex (PVC)

Answer:

Rhythm strip A shows sinus rhythm with a premature atrial complex (PAC). Here you see an unusual looking P wave, followed by a normal, narrow QRS complex. The P wave appears different than the P waves from the sinus beats because it originates from an ectopic site within the atria and not from the sinus node. Rhythm strip B shows sinus rhythm with a premature ventricular complex (PVC). PVCs are early beats that originate from an ectopic site within the ventricles. Because it does not follow the normal pathway through the bundles, the impulse is slow and appears wide and bizarre-looking.

Quick Quiz #2

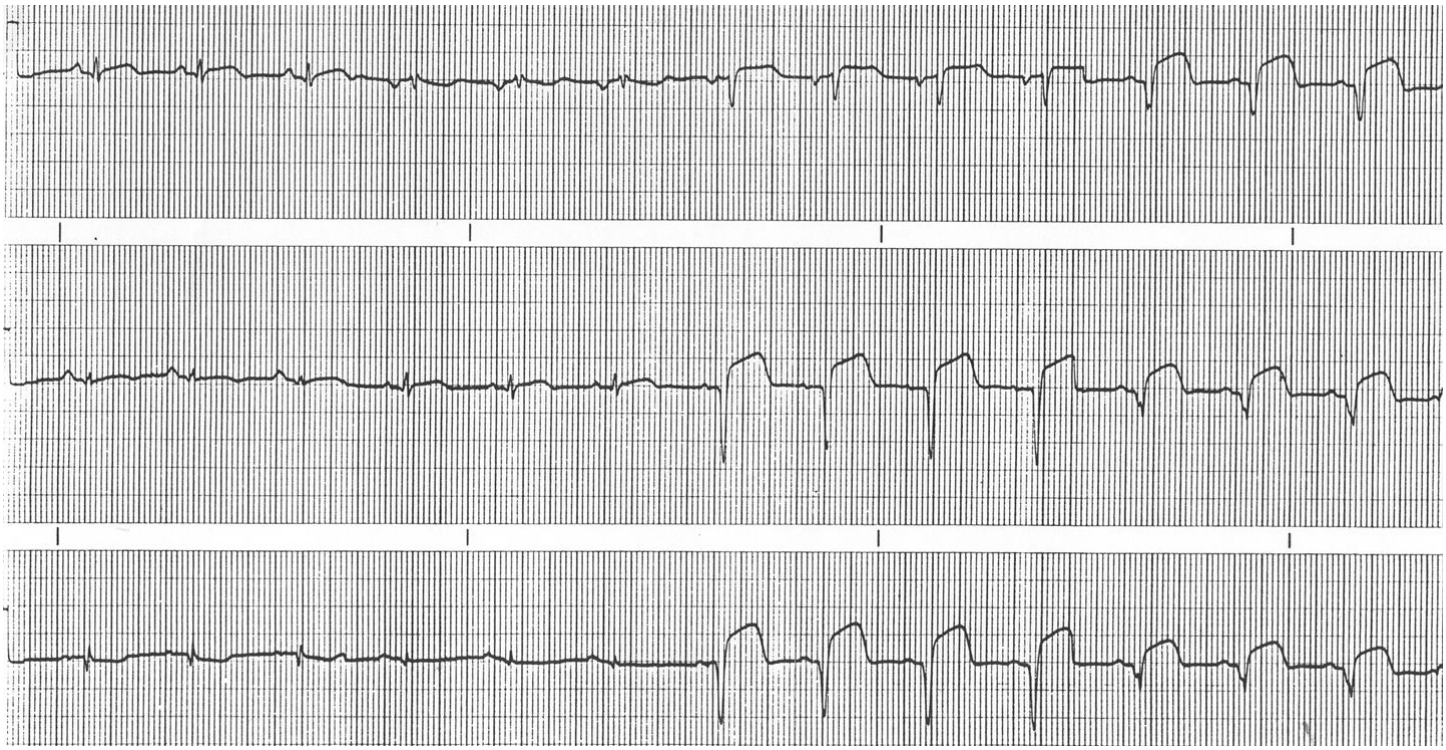
Does this ECG show an inferior wall myocardial infarction (MI)?

Answer:

Yes. An inferior wall MI is defined by seeing Q waves in 2 or more contiguous inferior leads (Leads 2, 3, and aVF). Remember that the age of the MI is defined by the ST and T waves. In this case, there are significant Q waves (Q waves > 0.04 seconds wide, and > ¼ the height of the R wave) in leads 3, and aVF. This MI is age undetermined because the ST segments are normal, but the T waves are abnormal (in this case the T waves are flat).

Quick Quiz #3

Does this ECG show a myocardial infarction (MI)?

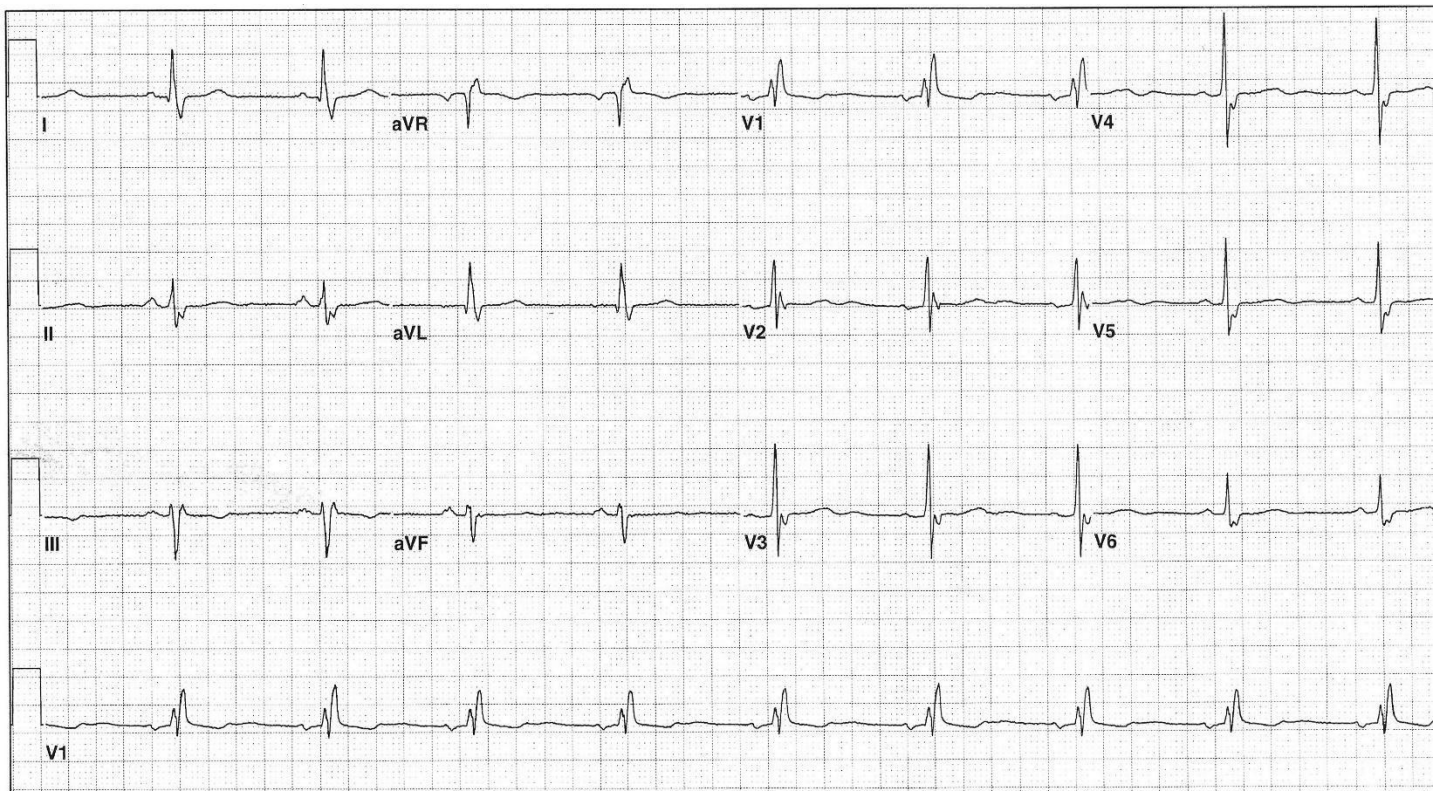


Answer:

Yes. This ECG shows an acute anterolateral MI. Significant Q waves are seen in leads V1 through V6 (anterior and lateral leads). This is an acute MI since the Q waves are accompanied by ST and T wave elevation.

Quick Quiz #4

Name the conduction abnormality

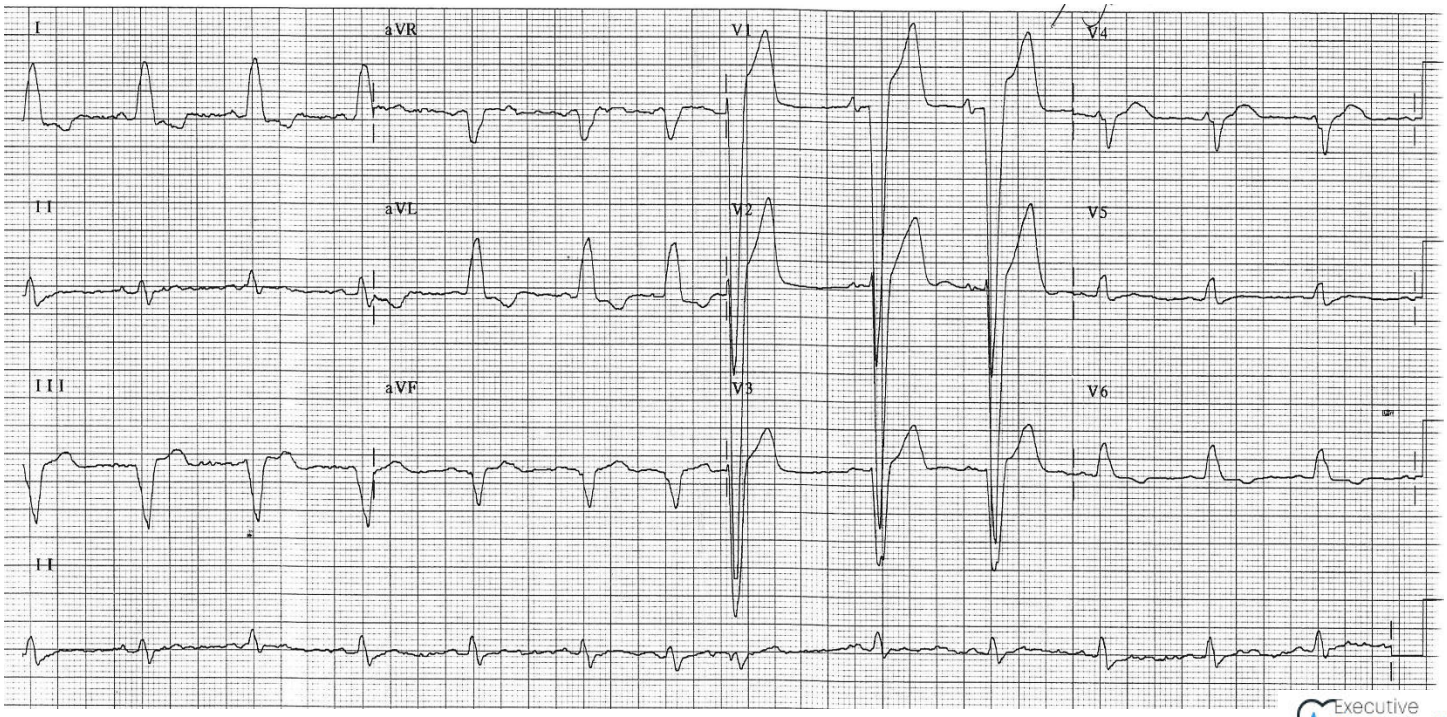


Answer:

This ECG shows normal sinus rhythm and a right bundle branch block (RBBB). First, the QRS complexes are wide (>0.12 seconds [>3 small boxes]) indicating a conduction delay within the ventricles. Second, the terminal portion of the QRS complex is upright in lead V1, which is typical for a RBBB.

Quick Quiz #5

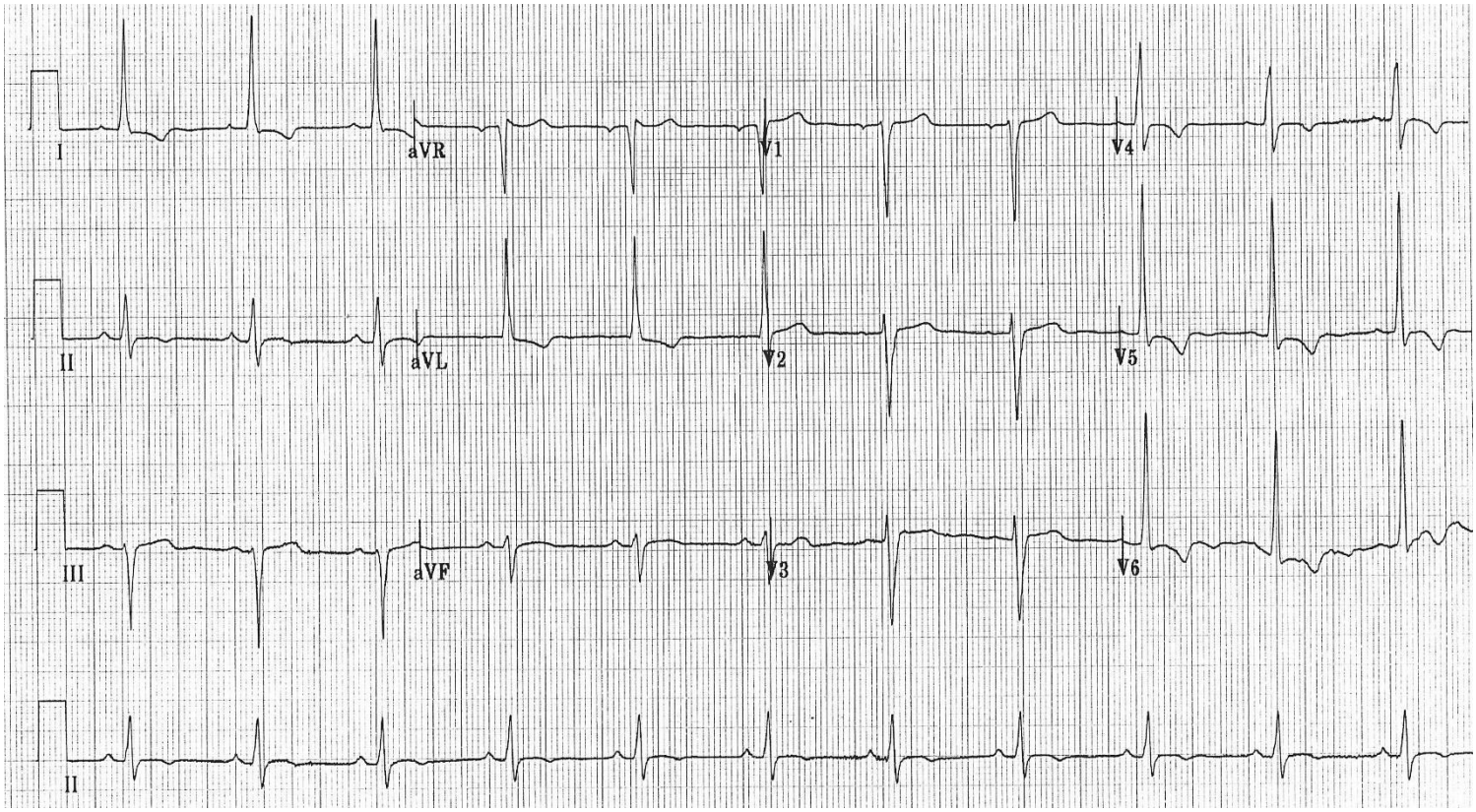
Name the conduction abnormality



Answer:

This ECG shows normal sinus rhythm, and a left bundle branch block (LBBB). The characteristics of a LBBB are 1. A QRS complex > 0.12 seconds [> 3 small boxes]); 2. Down going QRS complexes in leads V1 and V2; 3. Upward QRS complexes in the lateral leads (V5, V6, 1, and/or aVL).

Practice ECG #1



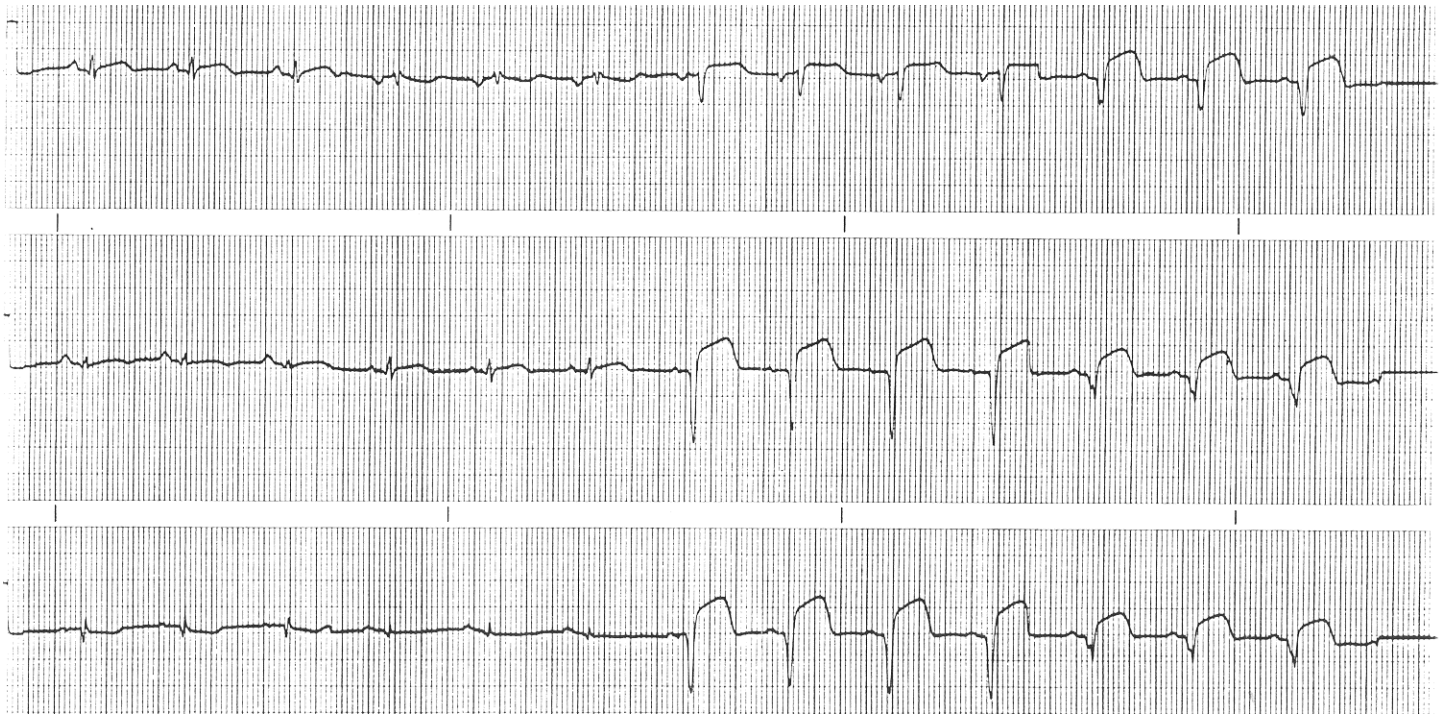
Rate: 66 bpm
Rhythm: Normal sinus rhythm
Axes:
- P wave axis: +60° (normal 0- to 90°)
- QRS axis: -15° (normal -30 to 90°)
- T wave axis: +150° (normal -30 to 90° or within 45° of the QRS axis) - in this case the T wave axis is opposite to the QRS axis (~180°).

Intervals:
- PR interval: 0.14 seconds (normal 0.12 to 0.20 seconds)
- QRS interval: 0.08 seconds (normal 0.08 to 0.12seconds)
- QT interval: 0.36 seconds
- RR interval: 0.92 seconds
- √RR interval: 0.96
- QTc interval: 0.38 seconds (normal 0.36 to 0.45)

Waveforms:
- P waves: No left or right atrial abnormlities
- Q waves: No significant contiguous Q waves
- QRS complex: Left ventricular hypertrophy (LVH)
- ST & T waves: Secondary changes due to LVH; cannot exclude lateral ischemia

ECG Diagnoses: Normal sinus rhythm
Left ventricular hypertrophy with secondary ST & T wave changes
Cannot exclude lateral ischemia
Clinical Diagnoses: Left ventricular hypertrophy

Practice ECG #2 (Same ECG as in Quick Quiz #3)



Rate: 78 bpm
Rhythm: Normal sinus rhythm
Axes:
- P wave axis: +30° (normal 0- to 90°)
- QRS axis: +45° (normal -30 to 90°)
- T wave axis: 0° (normal -30 to 90° or within 45° of the QRS axis)

Intervals:
- PR interval: 0.12 seconds (normal 0.12 to 0.20 seconds)
- QRS interval: 0.08 seconds (normal 0.08 to 0.12seconds)
- QT interval: 0.36 seconds
- RR interval: 0.76 seconds
- √RR interval: 0.87
- QTc interval: 0.41 seconds (normal 0.36 to 0.45)

Waveforms:
- P waves: No left or right atrial abnormlities
- Q waves: Significant Q waves in V1 through V6 (anterolateral myocardial infarction (MI)). Here, the ST and T waves are elevated consistent with an acute anterolateral MI
- QRS complex: Low QRS voltage
- ST & T waves: ST segment elvation in leads 1 and aVL consistent with high lateral myocardial injury from the acute anterolateral MI; nonspecific T wave changes in the inferior leads

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ECG Diagnoses: Normal sinus rhythm
Acute anterolateral MI
Low QRS votage

Clinical Diagnoses: Myocardial infarction
Coronary artery disease
Consider problems associated with low QRS voltage (e.g. extensive MI, pericardial effusion and cardiac tamponade associated with myocardial rupture from the MI)