



EMC 451

Advanced ECG Interpretation

Unit 10: Recognizing Myocardial Infarction

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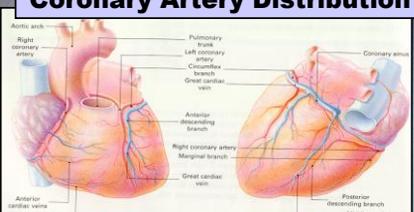


Unit Objectives

- Upon completion of this unit, you should be able to:
 - Describe the “views” of the heart and the leads that provide that view.
 - Describe the coronary artery anatomy.
 - List the EKG criteria for suspected MI.
 - Describe the evolution of MI and the associated EKG changes.
 - Define reciprocal changes.
 - List the conditions that may mimic MI on the 12 lead EKG.
 - Using the 12 lead EKG, identify and localize myocardial infarction.

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Coronary Artery Distribution

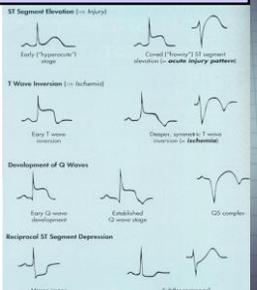


Left Coronary Arteries	Right Coronary Artery
Anterior wall of left ventricle	Lateral wall of right ventricle
Posterior wall of left ventricle	A portion of the electrical conduction system
Lateral wall of left ventricle	Posterior wall of left ventricle
Left interventricular septum	Inferior wall of left ventricle

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EKG Evolution of MI

- Hyperacute phase may precede clinical symptoms. Normal height 5 mm in limb leads and 10 mm in chest leads.
- ST segment elevation indicates injury is **presently** occurring.
- Pathologic Q wave is .04 seconds and/or > 25% height of the R wave, and indicates necrosis. May be reversible if treated promptly and Q waves disappears. Once formed, however, they may never disappear.



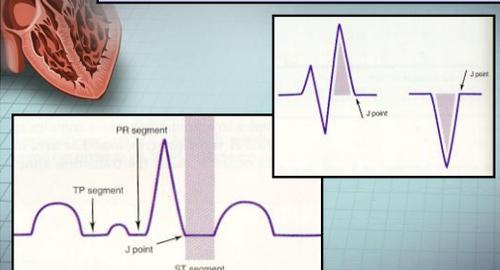
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EKG Criteria for MI

- ST segment elevation in 2 or more anatomically contiguous leads
 - elevation of 2 mm in V2 and V3 and 1 mm in all other leads (men)
 - greater than or equal to 40 years old)
 - elevation of 2.5 mm in leads V2 and V3 and 1 mm in all other leads (men < 40)
 - elevation 2.5 mm in leads V2 and V3 and 1 mm in all other leads (women)
- Precordial leads are contiguous even if the overlap our divisions of the heart (e.g., V2 and V3 septal and anterior)

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Measuring ST Segment Elevation



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Reciprocal Changes

- When a lead “sees” the infarct directly, the ST segment is elevated.
- When a lead views the infarct from the opposite side, the ST segment may be depressed.
- Not all opposing leads must demonstrate ST depression to be considered reciprocal changes.
- Reciprocal changes not necessary to presume MI, but provide strong confirming evidence when present.

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Conditions that Mimic MI

- LVH
- BBB
- Ventricular beats
- Pericarditis
- Early repolarization
- Usually do not produce reciprocal changes.
- The presence of one of these conditions does not rule out a simultaneous MI.

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Lead Placement and “Views”

V₁—4th intercostal space, right of the sternum
 V₂—4th intercostal space, left of the sternum
 V₃—4th intercostal space, halfway between V₂ and V₄
 V₄—5th intercostal space, left midclavicular line
 V₅—5th intercostal space, left anterior axillary line
 V₆—5th intercostal space, left midclavicular line
 V₇—5th intercostal space, right midclavicular line
 V₈—5th intercostal space, right anterior axillary line
 V₉—5th intercostal space, right anterior axillary line

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View of Inferior Wall

• II, III, aVF
- Left Leg

II			
III	aVF		

Inferior Wall

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Inferior Wall MI

Inferior infarct

Occlusion of right coronary artery

Significant Q waves and T wave inversions in leads II, III and aVF. With lateral damage, changes also may be seen in leads V₅ and V₆.

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Inferior Wall MI

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View of the Septum

Septal Leads V₁ V₂

Cardiac Septum

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Septal MI

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View of the Anterior Wall

Anterior Wall of Left Ventricle

V₃ V₄ V₅

Anterior Leads

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Anterior Wall MI

Localization of Myocardial Infarcts

Anterior infarct

Occlusion of proximal left anterior descending coronary artery

Significant Q waves and T wave inversions in leads I, V₂, V₃ and V₄

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Anterior Wall MI

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View of the Lateral Wall

Lateral Leads V₄ V₅ V₆

Lateral Wall of Left Ventricle

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