EMC 451

Advanced ECG Interpretation

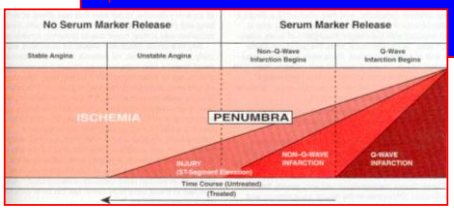
Unit 9: Acute Coronary Syndromes

Unit Objectives

- Upon completion of this unit, you should be able to:
  - Define acute coronary syndrome (ACS)
  - Describe each of the 3 ACS: unstable angina, non-Q wave infarction, Q wave infarction
  - Describe the precipitating events of ACS of plaque rupture, thrombus formation, and vasoconstriction
  - List the determining factors of infarction
  - Compare and contrast ischemia, injury, and infarction
  - Identify the EKG changes associated with ischemia, injury, and infarction.
  - Describe the clinical presentations of ACS, including atypical presentations and anginal equivalents.
  - Identify the risk factors of ACS

ACS Defined

- Sudden ischemic disorders of the heart
- Include unstable angina and acute myocardial infarction
- Represent a continuum of similar disease processes



Unstable Angina

- Acute ischemic event without tissue death.

Non-Q Wave Infarction

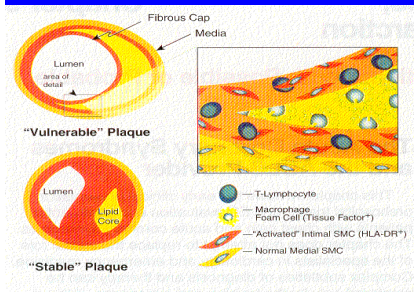
– Acute ischemic event with tissue death, no Q wave develops on the EKG.

Q Wave Infarction

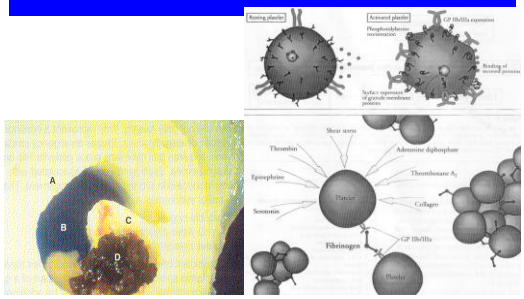
– Acute ischemic event with tissue death, development of Q waves in serial EKGs.

– Q wave infarcts tend to be larger.

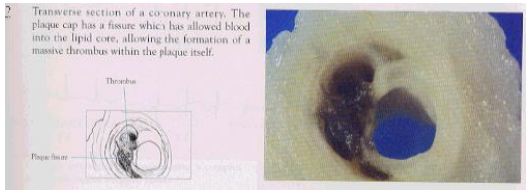
Plaque Rupture



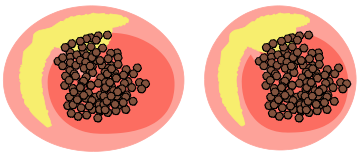
Thrombus Formation



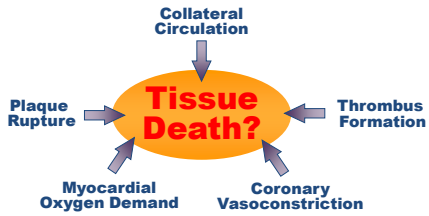
Thrombus Formation



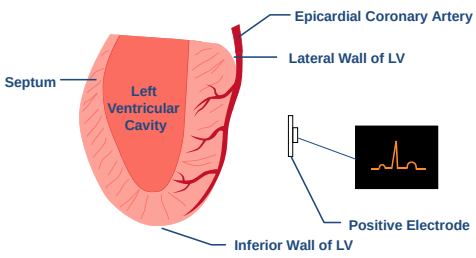
Vasoconstriction



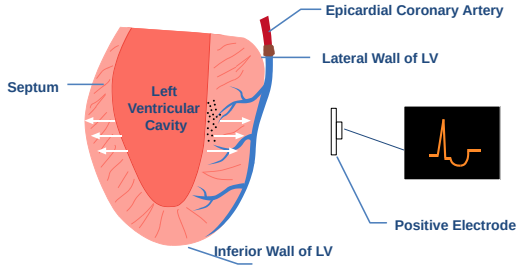
Factors of Infarction



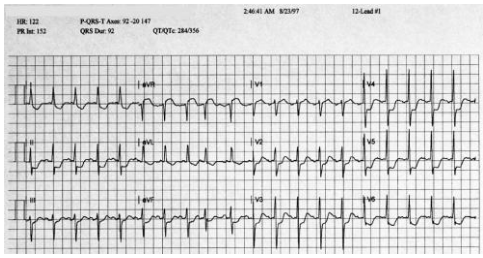
Well Perfused Myocardium



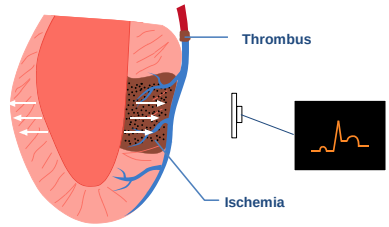
Ischemia



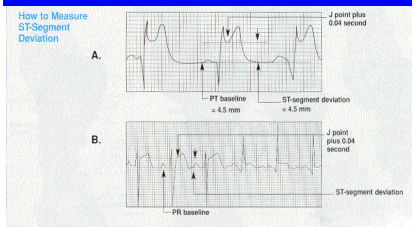
Ischemia continued



Injury

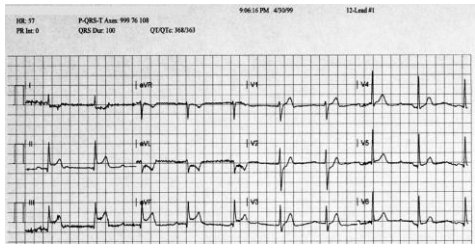


Measuring ST Segment Elevation

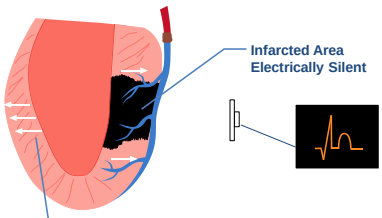


How to measure ST-segment deviation. **A**, Inferior MI with no coving. **B**, Anterior MI with coving.

Injury

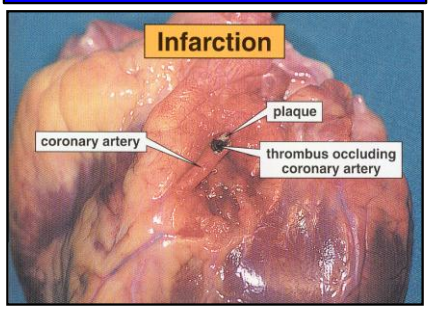


Infarction

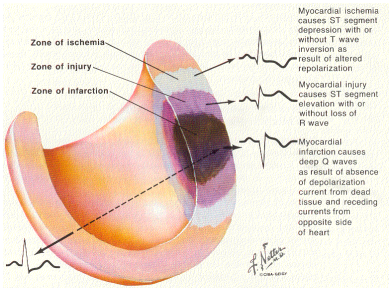


Many infarcts do not develop Q waves

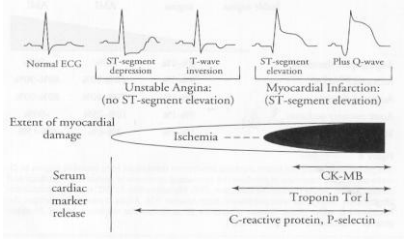
Infarction



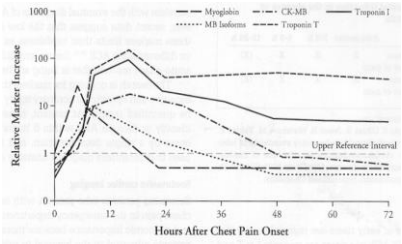
Ischemia – Injury - Infarction



ECG and Serum Markers of ACS



Serum Markers of ACS



Classical Presentation of ACS

- Central anterior chest
- Dull, fullness, pressure, tightness, crushing
- Radiates to arms, neck, back
- 30% - 55% of patients with ACS will not present with the classic pain pattern.

Atypical Chest Pain

- **Musculoskeletal, positional or pleuritic**
- **Unilateral**
- **Sharp or stabbing**
- **Epigastric**
- **Females, diabetics, elderly, HTN**

Anginal Equivalents

- Dyspnea
- Palpitations
- Syncope or pre-syncope
- General weakness
- DKA
- 40% of ACS patients present with anginal equivalents

Risk Factors of ACS

- Diabetes
- Smoking
- HTN
- Age
- Gender
- Family history
- Obesity
- Stress
- Sedentary lifestyle
- Hyperlipidemia