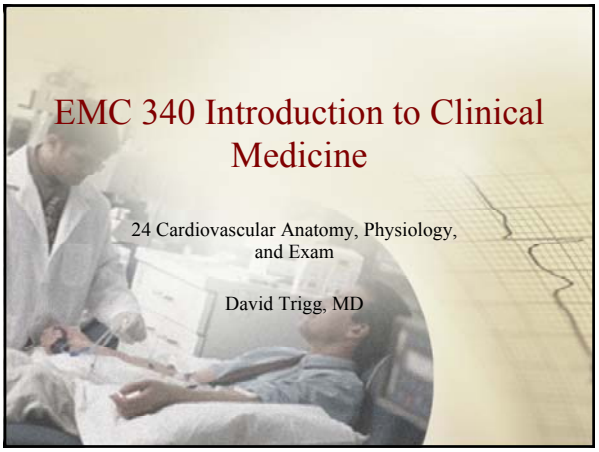
EMC 340 Introduction to Clinical Medicine



24 Cardiovascular Anatomy, Physiology, and Exam

David Trigg, MD

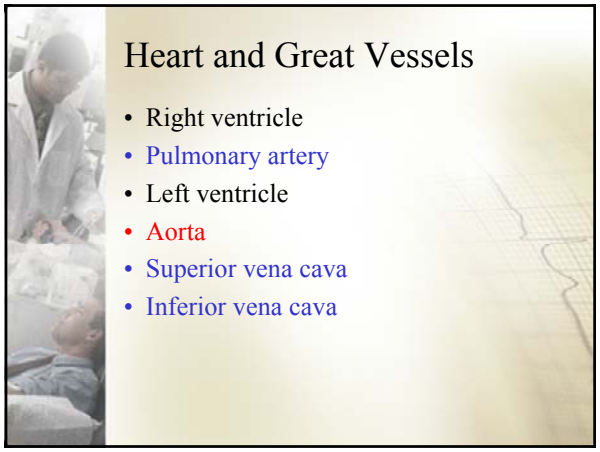
Outcomes

At the end of this lecture, the learner will be able to:

- Describe the clinical anatomy and physiology of the heart and great vessels.
- Described the events in hearts chambers, valves, great vessels, and the conduction system during the normal cardiac cycle.

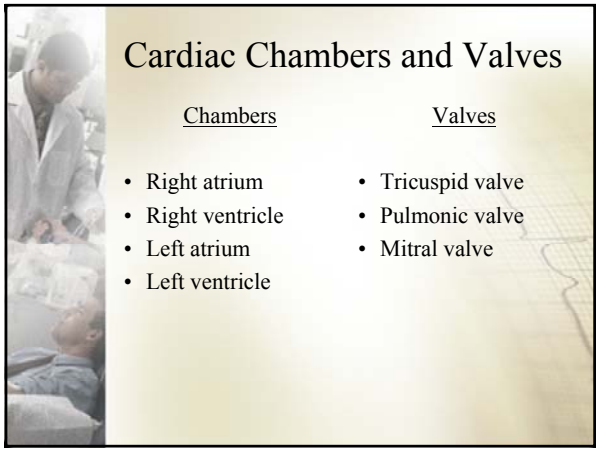
Outcomes, continued

- Correlate the events in the cardiac cycle with pressure events, mechanical events and electrical events, and findings on auscultation
- Explain the pathophysiology, significance and auscultation findings of the murmur of acute mitral regurgitation in the setting of acute myocardial infarction



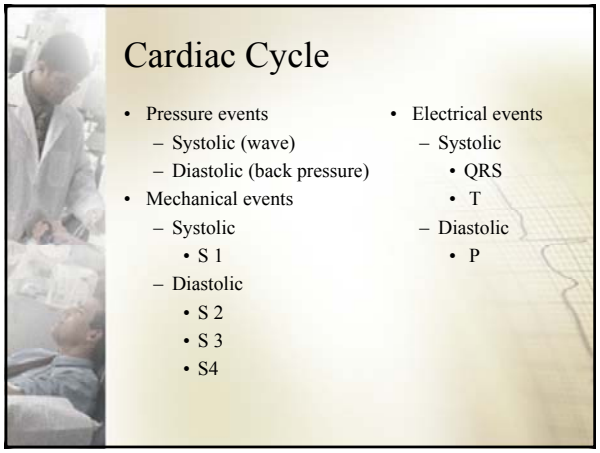
Heart and Great Vessels

- Right ventricle
- Pulmonary artery
- Left ventricle
- Aorta
- Superior vena cava
- Inferior vena cava



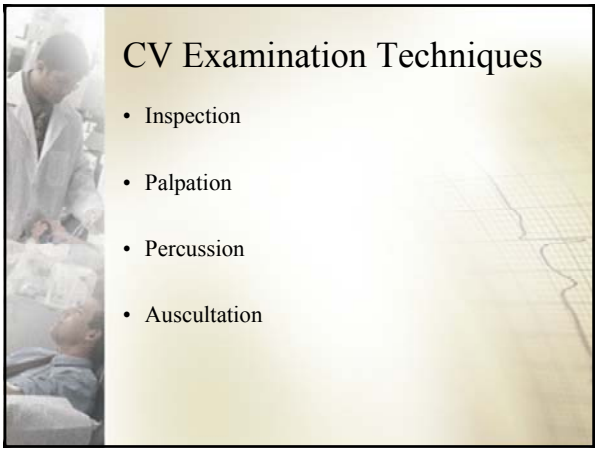
Cardiac Chambers and Valves

Chambers	Valves
• Right atrium	• Tricuspid valve
• Right ventricle	• Pulmonic valve
• Left atrium	• Mitral valve
• Left ventricle	



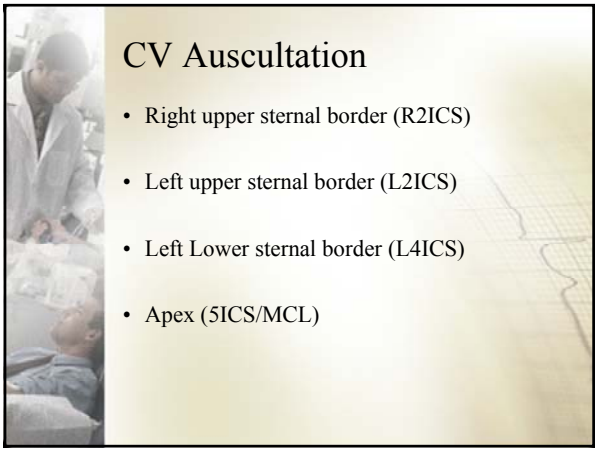
Cardiac Cycle

- Pressure events
  - Systolic (wave)
  - Diastolic (back pressure)
- Mechanical events
  - Systolic
    - S 1
  - Diastolic
    - S 2
    - S 3
    - S4
- Electrical events
  - Systolic
    - QRS
    - T
  - Diastolic
    - P



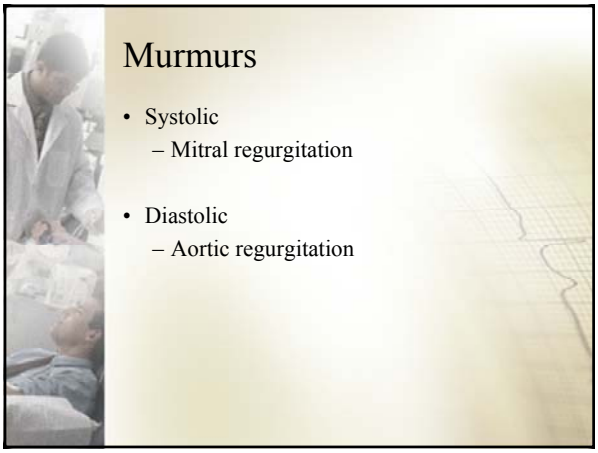
CV Examination Techniques

- Inspection
- Palpation
- Percussion
- Auscultation



CV Auscultation

- Right upper sternal border (R2ICS)
- Left upper sternal border (L2ICS)
- Left Lower sternal border (L4ICS)
- Apex (5ICS/MCL)



Murmurs

- Systolic
  - Mitral regurgitation
- Diastolic
  - Aortic regurgitation

Auscultation of Murmurs

- "PISTOL"
  - Pitch
    - High or low
  - Intensity
    - Heard by paramedic : 3/6
  - Shape
    - Crescendo / decrescendo / both (diamond)
  - Timing
    - Systolic / diastolic
  - Other qualities
    - Become a mechanical / musical
  - Location
    - A / P / T / M
    - Radiation

Aortic Regurgitation

- Diastolic
- Decrescendo
- Wide pulse pressure

Mitral Regurgitation / MI

- Significance: MI mortality increases by a factor of seven in some who develop this murmur
- Everyone
  - P: Dull
  - I: 3-4 with /6
  - S: Diamond
  - T: In mid-and late systole
  - O: "Cooing"(seagull-like)
  - L: Best heard at act the apex with radiation to the axillary or to the RUSB

Summary

We have discussed:

- The clinical anatomy and physiology of the great vessels, heart chambers and valves
- The conduction system in the cardiac cycle

Summary, continued

- The correlation of the events in the cardiac cycle with pressure, mechanical and electrical events and findings on auscultation
- The pathophysiology, significance and auscultation findings of the murmur of acute mitral regurgitation in the setting of acute myocardial infarction