69-year-old female presents with chest pain

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Pericardial effusion
Structure of Pericardium

There are two layers to the pericardial sac:
1. Outermost fibrous pericardium
2. Inner serous pericardium

Normally 15-25mL of fluid within the pericardial sac....
“Water bottle” sign: globular enlargement of cardiopericardial silhouette

Usually indicative of ≥ 250mL of fluid
• Large fluid density surrounding the heart
• No significant compression of the chambers or flattening of the interventricular (IV) septum

Image nicely demonstrates how the pericardium surrounds the heart, *in addition* to portions of the pulmonary trunk (red arrow), vena cava (yellow arrow), as well as ascending aorta (not shown)
Pericardial effusion

- Increased fluid in the pericardial space
- May be asymptomatic, or present with chest pain or friction rub
- Cardiac tamponade may result if the rate of fluid accumulation is dramatic
- No treatment required if effusion is small
  - Hemodialysis indicated in CKD (uremia)
  - NSAIDs for acute idiopathic/viral pericarditis
  - May require percutaneous/surgical drainage, especially in cases of tamponade
Imaging findings

• Ultrasound is imaging test of choice: anechoic space between pericardial layers +/- decreased pericardial contraction
  – Cardiac swing and paradoxical motion of IV septum are useful signs

• Plain film radiograph: “water bottle” sign on frontal, “fat pad,” “Oreo cookie,” “sandwich,” or “bun” signs on lateral
Imaging findings

- **NECT:**
  - Water attenuation pericardial fluid:
    - Heart or renal failure, malignancy
  - High-attenuation pericardial fluid:
    - Hemorrhage, purulent effusion, malignancy
      - Attenuation of hemopericardium may be high initially and decrease over time
  - High sensitivity for pericardial thickening and calcification
Imaging findings

• CECT:
  – Assessment for thickening, nodules, masses
  – Pericardial enhancement/thickening from inflammation
  – Assess chambers for signs of constriction:
    • Tubular ventricles, flattened/sigmoid IV septum
  – Signs of cardiac tamponade:
    • Flattening of anterior surface of heart or right cardiac chambers, angulation/bowing of IV septum, enlarged vena cava, periportal edema, contrast reflux into IVC/azygous/hepatic/renal veins
Imaging findings

MRI:

• T1 hypointense and T2 hyperintense if uncomplicated
• Complicated effusions may demonstrate septations or debris
• Hemopericardium will demonstrate signal characteristics of blood depending on stage
• Most useful for differentiating between constrictive pericarditis (pericardial thickening >4mm) and restrictive cardiomyopathy
Follow-up Chest radiograph shows pericardial drain and pneumopericardium secondary to drainage.
References
