

Cardiac Tamponade

Tamponade

- Fluid in pericardial space.
- Reduced cardiac output due to impaired ventricular filling
- Clinical diagnosis

Etiology of effusion

- Pericardial inflammation
 - Viral, auto-immune, uremia
 - HIV, TB
 - Idiopathic
- Malignancy

PRESENTATION

Symptoms (from cardiopulmonary compromise):

- Dyspnea
- Chest discomfort
- Uneasiness, diaphoresis, fatigability

Physical findings:

- **Sinus tachycardia** (very sensitive)
 - Usually first sign that should raise suspicion for tamponade
 - Be mindful of beta-blockers – can suppress tachycardia
 - Can be absent in hypothyroidism
- JVD
- Pulsus paradoxus (systolic drop of 10+ mmHg during inspiration)
 - Finding in moderate to severe tamponade

EKG

- Low voltage (from the presence of pericardial fluid)
- Alternans (specific for tamponade physiology) – due to swinging of heart in fluid

Imaging

- CT chest or Echo will show presence of effusion.
- Echo may be able to further characterize cardiac hemodynamics.

PHYSIOLOGY

- Once effusion reaches maximum capacity → pericardial pressure increases → heart is forced to operate in a much smaller space
- Less space → impaired LV filling → fluid back up till pressures equalize between left and right side of heart.
- Because of pressure equalization and limited volume for heart to operate in, it becomes a zero-sum game for the ventricles → Ventricular interdependence
- Respiration related intrathoracic pressure differentials play an important role in this setting. This directly leads to pulses paradoxus.
 - Inspiration → drop in intrathoracic pressure → RV fills → impaired filling of LV → drop in systemic BP
 - Expiration → increased intrathoracic pressure → LV fills & impaired RV → improved systemic BP
 - Mnemonic: imagine – with inspiration, blood comes in -- with expiration, blood goes out.

TREATMENT

- Give lots of fluids! Avoid diuretics or nitrates.
- **Emergent** pericardiocentesis
- Pericardial window

Comparison with constrictive pericarditis

- Physiology is similar to some extent.
- Ventricular interdependence still occurs due to reduced compliance of the pericardial sack.
- However, hemodynamic variation with respiration may not be seen. This is because the intrathoracic pressure changes are usually transmitted through the pericardium. In constrictive pericarditis, the pericardium is too thick & rigid; pericardium does not transmit the pressure changes.

PEARLS

- Early recognition is key
- Patient can deteriorate very suddenly