



## Disorders of the Pericardium – Pericarditis, Tamponade

Sept 2014

### Pericarditis

#### Causes

**Idiopathic:** 25%

**Viral:** enterovirus (coxsackie, echovirus), adenovirus, mumps, EBV, VZV, hep B, flu, HIV

**Bacterial:** Staph aureus, pneumococci, beta-haemolytic strep, strep pneumonia, legionella, salmonella, psittacosis, military TB/direct pulmonary spread

**Ca:** 25%; adults (lung, breast, lymphoma, leukaemia, melanoma); children (Hodgkins, lymphosarcoma, leukaemia); results in tamponade in 50-85%

**MI:** transmural; within 1-5/7

**Auto-immune:** RA, SLE, Dressler's syndrome (up to 6/52 post-MI, most common cause), sarcoid

**Drugs:** hydralazine, procainamide

**Other:** Serum sickness, trauma, irradiation, cardiac surgery, severe uraemia (tamponade common)

#### High risk

T >38.5, subacute, immunosupp, recent trauma, anticoagulation, myopericarditis, large pericardial effusion

#### Symptoms

CP (relieved sitting forward; absent in 50% (esp if chronic/Ca)

Low grade fever; dysphagia; SOB; weakness; syncope

#### Examination

Pericardial rub (high pitched, best with diaphragm over L sternal border; incr on insp/sitting forward/with heart beat; transient; decr as pericardial effusion increases)

Pericardial effusion

#### Investigation

##### ECG

90% Abnormal; May be normal if uraemic/RA

Changes usually diffuse

DDx = early repolarization (usually only V1-3), MI (usually regional)

##### Phase 1 – hrs to days:

Widespread non-regional concave STE in I, II, V5-6

PR depression in 80% (most common in II; can occur in all leads except aVR, V1)

ST depression and PR elevation in aVR and V1

No distinct J point; slightly short QTc

Knuckle sign in PR segment of aVR

##### Phase 2 – days:

ST segments normalize

PR depression in 60%

Small T waves

##### Phase 3 – days to wks:

TWI in leads that prev had STE

Low voltages; sinus tachy

##### Phase 4 – 1-3 months:

Normalisation; some T wave changes may be permanent

**CXR**

Pneumonia/pleural effusions if bacterial; underlying cause  
Straightening of L heart border; globular heart (if >200ml effusion and slow onset)  
Pericardial calcification in 50% chronic  
Pericardial fat lines on lateral (high spec for pericardial effusion)

**Echo**

Pericardial effusion in 40%  
Pericardial thickening  
Localized wall motion abnormalities in 7%

**Trop I**

Incr in 50% at presentation

**Other bloods**

FBC; ESR and CRP (used to track treatment)

**Pericardial aspiration**

MC+S, AFB staining, ANF, RF

**Management**

Supportive; NSAIDs (not aspirin); relieve tamponade if needed  
Bacterial: broad spectrum ABx, pericardial aspiration, HDU/ICU  
Uraemic: dialysis  
Autoimmune: immunosupp  
Dressler's: steroids

**Pericardial Tamponade**

Accumulation of pericardial fluid - decreased chamber filling - decreased CO

**Pathophysiology**

15-60ml in pericardial space usually  
200ml required to cause tamponade (effusion depth >2cm on echo)  
Decr diastolic compliance, incr afterload, intracardial diastolic p 15-30  
Up to 2L can be tolerated if develops slowly - effect depends on rate of accumulation, pericardial compliance, intravascular volume

**Causes**

**Acute:** Ruptured heart (eg. post-MI, immediately fatal); trauma (blunt/penetrating); type A aortic dissection; post-cardiac surgery (esp valvular); coagulation disorders; constrictive is usually post pericarditis/trauma

**Chronic:** similar to cause of pericarditis

Metastatic Ca in 40%, idiopathic 15%, bacterial and TB 10%, uraemia 10%

**Assessment****History**

SOB (88% sens; most common symptom)



## Examination

Beck's triad =

- decr BP (late, when uncompensated)
- incr JVP (may be absent if hypovolaemia; prominent x and y descent)
- muffled heart sounds (occurs late; absent in constrictive)

Incr HR

Narrow pulse pressure

Pulsus paradoxicus (decr SBP > 10-20mmHg on inspiration; may also occur in PE, COPD, RV infarct, cardiogenic shock; absent in constrictive)

No pulmonary oedema, normal heart size, no significant cardiac murmurs

Loss of apex beat

Chronic if hepatosplenomegaly, ascites, peripheral oedema, pleural effusion

## Differential Diagnosis

Massive PE, tension pneumothorax, SVC obstruction, constrictive pericarditis, air embolism, RV infarct, severe CCF, cardiogenic shock

## Investigations

### ECG

Low voltages

Electrical alternans

STE and PR depression, incr HR

### CXR

90% sens (cardiomegaly = chronic)

250ml must be present for any change in cardiac shadow

Incr epicardial fat sign

### Echo

RA/RV chamber collapses at end diastole

LA collapse in 25%

Dilated IVC with lack of insp collapse

Can find cause (PE, dissection), can be done at bedside, most sens/spec lx available, can assess cardiac Fx

### CT + MRI

Sens and spec for pericardial fluid, but less good at telling whether tamponade is occurring

## Pericardiocentesis

Needle if non-traumatic, open if traumatic (due to blood clot in pericardium)

## Indications

Cardiac tamponade, large or rapidly developing pericardial effusion, fluid analysis, biopsy.

## Contraindications

Aortic dissection, coagulopathy, marked thrombocytopenia (<50,000/mm<sup>3</sup>), posterior, loculated or small effusion.

Pyopericardium - ?open proc as viscous.



## Procedure

Experienced personnel, resus equip, continuous ECG, imaging equip if being used.  
Check coagulation/platelets.  
Sit patient at 45o angle.  
Prep skin/LA.  
Connect ECG to needle or USS guidance  
Left sub-xiphoid approach and aim to L shoulder at 15–20o to abdo wall.  
If ST elevation myocardium reached so slightly withdraw.  
16-18G needle (>5cm length needed)

## Complications

Myocardial laceration/perforation  
Coronary artery/vein laceration/perforation  
Pneumothorax  
Arrhythmias (particularly bradycardia)  
Peritoneal puncture, abdominal viscera trauma  
Rare: Internal mammary artery fistula, purulent pericarditis, acute cardiac decompensation and pulmonary oedema

## Other

If uraemic, may respond to dialysis  
Dopamine if needs inotropic support (as decr SVR which may help), avoid pressors  
IVF (improves status in 50% by incr R heart filling and CO, but worsens in 35%)  
CPR is ineffective