Disorders of the Pericardium – Pericarditis, Tamponade

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 Ix 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/mm3), 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 45° angle.
Prep skin/LA.
Connect ECG to needle or USS guidance
Left sub-xiphoid approach and aim to L shoulder at 15–20° 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