Disorders of the Pericardium

Acute pericarditis Inflammation of the pericardium – primary or 2° to systemic disease

Causes of Acute Pericarditis:

- Infection:
  - Viruses - Enteroviruses (Coxsackie, Echovirus), influenza, adenovirus, EBV, mumps, HBV, varicella, HIV
  - Bacteria - S.aureus, pneumococcus, strep, legionella, salmonella, psittacosis, TB
  - Fungi – histoplasmosis
- Autoimmune - Rheumatoid arthritis, SLE
- Drugs - Procainamide; hydralazine
- Dressler's syndrome – autoimmune, up to 6/52 post MI
- Post transmural MI – in first 5 days
- Malignancy
- Surgery – common post cardiac ops
- Trauma
- Radiotherapy
- Severe uraemia
- Myxoedema

Clinical features: Central chest pain ± radiation to left neck/shoulder, pleuritic or worse lying flat ± relief sitting forwards, friction rub may be heard. Fever. Muffled S1/S2 if effusion. Check for tamponade. May have dyspnoea, weakness, underlying disease symptoms.

Investigations:

- *ECG:* reflects epimyocarditis & classically has 4 stages: (1) concave ↑ST in all but aVR & V1, ST/T ratio in V6≥0.25 ± PR depression (2) transiently N (3) after days/weeks ↓T (4) resolution in mths.
  ↑HR & ↓QTc. Low voltage if effusion. Electrical alternans if sig effusion or tamponade. May be normal (esp uraemia, RA) or non-specific (up to 30%). DDx: STEMI, BER
- *Blood tests:* FBC, ESR, U&E, Trop (↑in 50%), viral serology, blood cultures and, if indicated, autoantibodies, fungal precipitins, TFTs, culture any pericardial aspirate.
- *CXR:* Globular cardiomegaly - ?pericardial effusion. Pericardial calcification if chronic.
- *Echo:* for effusion, pericardial thickening, wall motion abnormalities.

Treatment: Rest, NSAIDs, e.g. ibuprofen 400mg/8h PO with food. Sit upright. Relieve tamponade. Cardiac monitoring if ↑Trop. Treat the cause. Consider colchicine before steroids/immunosuppressants if relapse or continuing symptoms occur.

Prognosis: 15–40% recur.

Constrictive pericarditis The heart is encased in a rigid pericardium.

Causes: Often unknown (UK; elsewhere, TB); or after *any* pericarditis as above.

Clinical features: These are mainly of right heart failure with ↑JVP (with prominent *x* and *y* descents); Kussmaul's sign (JVP rising paradoxically with inspiration); soft, diffuse apex beat; quiet heart sounds; S3; diastolic pericardial knock, HSM, ascites and oedema.

NB pulsus paradoxus and muffled heart sounds are absent in constrictive pericarditis

Tests: CXR: small heart ± pericardial calcification (if none, CT/MRI is helps distinguishing from other cardiomyopathies). Echo; cardiac catheterization.

Management: Surgical excision.

Pericardial effusion Collection of fluid (exudate, transudate, blood, chylus) in pericardial sac.
Causes: Any cause of pericarditis (see above).
Clinical features: Dyspnoea, ↑JVP (with prominent *x* descent), bronchial breathing at L base (Ewart's sign: large effusion compressing left lower lobe). Look for cardiac tamponade.
Diagnosis: *CXR* shows an enlarged, globular heart. *ECG* shows low voltage QRS complexes and alternating QRS morphologies (electrical alternans). *Echocardiography* shows an echo-free zone surrounding the heart.
Management: Treat the cause. Pericardiocentesis may be *diagnostic* (suspected bacterial pericarditis) or *therapeutic* (cardiac tamponade). Perform guided pericardiocentesis and send pericardial fluid for culture, ZN stain/TB culture, and cytology.

Cardiac tamponade Accumulation of pericardial fluid (usually>200ml acute or 2L chronically) raises intrapericardial pressure, hence poor diastolic cardiac filling and fall in CO.
Causes: Any pericarditis; type A aortic dissection; haemodialysis; warfarin; trauma, transeptal puncture at cardiac catheterisation; post cardiac biopsy, cardiac surgery.
Signs: *Beck's triad:* ↓BP; ↑JVP; muffled HS. PEA arrest. ↑HR, pulsus paradoxus, Kussmaul's sign (↑JVP on inspiration).
Diagnosis: *CXR:* big globular heart (if >250mL fluid). ECG: low voltage QRS ± electrical alternans. *Echo* is diagnostic: echo-free zone (>2cm, or >1cm if acute) around the heart ± diastolic collapse of RA & RV. *CT/MRI* if Echo not avail.
Management: O_2, (fluid/inotropes may be briefly temporising), needle pericardiocentesis or open pericardiotomy or thoracotomy (penetrating trauma – myocardial damage & clot more likely). Monitor ECG, G&H. Send fluid if non-traumatic for culture, ZN stain/TB culture & cytology. CPR ineffective in tamponade.

Pericardiocentesis *(aka cardioparacentesis, pericardial tap.)* The drainage of pericardial space fluid. Therapeutic or diagnostic procedure. Performed blind (if arrest), or under echo, fluoroscopic or CT guidance, all with ECG monitoring
Indications: Cardiac tamponade, large or rapidly developing pericardial effusion, fluid aspiration for analysis, Pericardioscopy, epicardial or pericardial biopsy.
Contraindications: Aortic dissection, coagulopathy, marked thrombocytopenia (<50,000/mm^3), 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. Left sub-xiphoid approach and aim to L shoulder at 15–20° to abdo wall. If ST elevation myocardium reached so slightly withdraw. When in pericardial space, aspirate (continuous flow = in ventricle) and feed cannula (over needle or wire depending on equip) if continuous drainage required.
Cannula may be left in-situ for 24 hrs under vacuum to drain large effusions. Get CXR/Echo.
Complications: Myocardial laceration/perforation, coronary artery/vein laceration/perforation, pneumothorax, arrhythmias (particularly bradycardia), peritoneal puncture, abdominal viscera trauma, internal mammary artery fistula (rare), purulent pericarditis (rare), acute cardiac decompensation and pulmonary oedema (rare)
Outcome Use of echo guidance: reduces morbidity from ~50%→<1% & mort. from ~10%→0%.