Pericardial Diseases

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General Considerations

• Pericardial diseases almost always associated with diseases in other portions of the heart, surrounding structures or secondary to a systemic disorder.
• Normal: 30-50ml of thin, clear, straw-coloured fluid present in the pericardial space.
• Parietal pericardium can stretch and based on speed of fluid accumulation in pericardial space and amount of fluid, clinical signs & symptoms can appear.
• Slow accumulating fluid levels of <500ml may produce no significant clinical signs.
• Fast accumulating fluid of even 200ml may produce fatal cardiac tamponade from impaired cardiac filling (compressed, atria, ventricles and vena cavae).
Diseases of the Pericardium

- Inflammatory conditions
  - Acute pericarditis
  - Chronic pericarditis
- Non-inflammatory conditions
  - Hydropericardium
  - Haemopericardium
Non-inflammatory Conditions

- **Hydropericardium**
  - Accumulation of serous transudate in the pericardial space
- **Cause** – any condition causing systemic edema
- **Common causes include:**
  - CHF
  - Hypoproteinemia states e.g. nephrotic syndrome or chronic liver disease
Non-inflammatory Conditions

- **Haemopericardium**
- Accumulation of blood in pericardial space
- Usually caused by trauma to chest
- Postsurgical pericarditis
- Heart or aorta perforation or myocardial rapture in AMI
Inflammatory Conditions

• Acute Pericarditis
• Pericarditis – inflammation of pericardium
• Primary pericarditis is rare – if happens, viral in origin.
• Secondary causes – cardiac diseases, thoracic or systemic disorders.
• Different forms depending on characteristics of fluid.
  – Serious pericarditis
  – Fibrinous or serofibrinous pericarditis
  – Purulent or suppurative pericarditis
  – Haemorrhagic pericarditis
## Causes of Pericarditis

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Serous Pericarditis

- Usually produced by non-infectious cause of inflammation.
- Associated with immune mediated pericarditis (e.g. SLE) rheumatic fever, SLE, uremia and variety of viruses.
- Infection in nearby structures such as pleura can cause sterile serous effusion.
- Fluid – clear, straw-coloured, protein-rich exudate. Few inflammatory cells (microscopy)
Morphology – Serous Pericarditis

• Whatever the cause, there is inflammatory reaction in the epicardium & pericardial surfaces.
• Scant number of PMNs, lymphocytes & histiocytes.
• Fluid: 50-200ml, high specific gravity & rich protein content.
• Mild inflammatory infiltrate in the epicardial fat consisting of predominantly lymphocytes is termed chronic pericarditis.
• Organisation into fibrous adhesions is rare.
Fibrinous or Serofibrinous Pericarditis

• Often refers to it as “bread & butter” pericarditis.
• 2 of the most common form.
• Fluid characteristics:
• Fibrin-rich exudate – i.e. serous fluid mixed with fibrinous exudate.
• Common causes:
  – Uremic pericarditis – complication of end-stage renal failure (uremia). Caused by chemical irritation of pericardium.
  – Post-infarction (after AMI) – inflammatory response to necrosis involving the epicardium in a transmural infarct.
  – Acute rheumatic fever – immune mediated.
  – SLE, chest radiation & trauma.
Morphology – Fibrinous/Serofibrinous

• Fibrinous: dry surface with fine granular roughening.

• Serofibrinous: more thicker fluid, yellow & cloudy (increased RBCs, PMNs) or bloody.

• Fibrin may be digested or become organised.

• Clinical point: *Pericardial rub=fibrinous pericarditis.*

• Chest pain, fever & signs of HF may be present.
• Almost always signals infective process.
• Routes of entry: (1) direct extension from nearby structures (e.g. empyema, lobar pneumonia), (2) seeding from blood, (3) lymphatic extension & direct by (4) cardiac surgery.
• Fluid characteristics:
• Grossly cloudy or frankly purulent inflammatory exudate (pus).
• Common causes:
  – Bacterial infection.
Morphology – Purulent/Suppurative

- Fluid: thin to creamy pus, 400-500ml.
- Serosal surfaces are reddened, granular & coated with exudate.
- Micro: acute inflammatory reaction.
- Organisation is common resulting in constrictive pericarditis.
- Resolution is infrequent.
- Clinical symptoms maybe more marked, e.g. Spiking fevers, chills.
Haemorrhagic Pericarditis

- Exudate composed of blood mixed with fibrinous or suppurative effusion.
- Fluid characteristics:
  - Bloody inflammatory exudate
- Common causes:
  - Tumor invasion
  - TB infection
  - Other bacterial infection
  - Bleeding disorders
Caseous Pericarditis

• Rare cause of pericarditis
• Until proven otherwise, TB is the cause.
• Fungal infections may produce similar picture
• Commonly cause constrictive pericarditis if present.
Adhesive Mediastenopericarditis

- Follows supurative or caseous pericarditis, previous surgery or irradiation to the mediastenurum.
- Pericardial sac is obliterated & adherent to external aspect of parietal pericardium to surrounding structures.
- Cardiac hypertrophy & dilation can occur & may mimic DCM (increased workload for contracting heart).
Chronic (constrictive) Pericarditis

- Pericardial sac obliterated, heart surrounded by a dense, adherent layer of scar (with or without calcification) & 0.5-1.0cm thick.
  - May resemble a plaster mould – *concretio cordis*.
  - *No cardiac dilation & hypertrophy (compare with adhesive mediastenopericarditis).*

- Usually cause by TB or pyogenic staphylococcal infection
Constrictive Pericarditis

• Characteristics:
  – Thickening and scarring of the pericardium
  – Loss of elasticity of the pericardium
  – Prevents pericardium from stretching hence interferes with cardiac action & venous return
  – Mimics signs & symptoms of right sided HF, restrictive cardiomyopathy.
  – HF signs & symptoms same as adhesive mediasternopericarditis.
Constrictive Pericarditis

- Characteristics contd:
  - Proliferation of fibrous tissue
  - Occasional small foci of calcification.
Diagnosis

• Pericardiocentesis & obtain fluid
• Send fluid – microscopy, culture & sensitivity, biochemistry (?exudate ?transduate).
• Cytology of fluid if neoplasia suspected
• If non-inflammatory suspected – identify systemic illness and exclude accordingly.
• Pericardium biopsy – surgery
  – Histology
References
Robins Pathologic Basis of Disease 6th & 7th Ed

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