

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 rupture 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

Infective Causes	Immune-Mediated Causes	Miscellaneous
Viruses	Rheumatic fever	AMI
Pyogenic bacteria	SLE	Uremia
TB	Scleroderma	Post cardiac surgery
Fungi	Postcardiotomy	Neoplasia
Other parasites	Post AMI, Drug Reaction	Trauma & Radiation

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.

Purulent or Suppurative Pericarditis

- 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 suppurative or caseous pericarditis, previous surgery or irradiation to the mediastenum.
- 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 ?transudate).
- Cytology of fluid if neoplasia suspected
- If non-inflammatory suspected – identify systemic illness and exclude accordingly.
- Pericardium biopsy – surgery
 - Histology

END

References

Robins Pathologic Basis of Disease 6th & 7th Ed

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www.pathologyatsmhs.wordpress.com