Pericardial disease

Usually secondary to systemic or other cardiac diseases

• Pericardial fluid accumulations
• Pericarditis
Pericardial Anatomy

• Two major components
  – visceral pericardium
    mesothelial monolayer
    facilitate fluid and ion exchange
  – parietal pericardium
    fibrocollagenous tissue

• Pericardial Fluid
  – 15 - 50 ml of clear plasma ultrafiltrate
Pericardial Physiology

• Physiologic functions
  – limit cardiac dilatation
  – maintain normal ventricular compliance
  – reduce friction to cardiac movement
  – barrier to inflammation
  – limit cardiac displacement
Pericardial effusion & hemopericardium

• Pericardial effusion: ↑ fluid due to non-inflammatory causes
  - slow accumulation of 1000 ml can be accommodated
  - rapidly developing distension 200-300 ml causes compression of thin walled atria, ventricles → cardiac tamponade

• Hemopericardium: blood
  - rupture of myocardial infarct
  - rupture of dissecting aneurysm
  - bleeding diathesis
  - trauma
Pericarditis

- Acute
  - serous
  - fibrinous
  - purulent
  - hemorrhagic
- Chronic
  - tubercular
  - chronic adhesive
  - chronic constrictive
Serous pericarditis

• Serous effusion- 50-200ml, ↑ protein, high sp gravity
• Causes
  - Viral
  - Rh fever
  - Rheumatoid arthritis
  - SLE
• M/E: infiltration by some neutro, lymhos.
  - fluid usually resorbs with resolution of underlying disease
Fibrinous pericarditis

- Most common type, mixture of serous fluid and fibrinous exudate
- Causes
  - MI
  - Uremia
  - Rh fever
- Clinically- friction rub
- Morphology: normal transparent and glistening pericardium is turned into a dull, opaque, “sandy” sac
  - cardiac surface covered by dry or moist, shaggy fibrinous exudate- bread & butter appearance
- Complete resorption or healing by organisation
Purulent pericarditis

- Causes: pyogenic bacteria
- Spread
  - Contiguous spread: lungs, pleura, mediastinal lymph nodes, myocardium
  - Hematogenous spread: septicemia, toxins, neoplasm
  - Lymphatic spread
  - Traumatic or irradiation
- Gross: thick creamy pus coating the pericardial surfaces
- M/E: dense infiltration by neutrophils
- Does not resolve, heals by organisation
Acute pericarditis – diagnostic clues

• History: sudden onset of anterior chest pain
  – more likely to be sharp and pleuritic
  – ↑ with coughing, inspiration, swallowing
  – worse by lying supine, relieved by sitting and leaning forward

• Physical exam: presence of rub
The pumping action of the heart is restricted by the pericardial sac.

The space around the heart is filled with fluid or hardens.
Heart

Pericardium

Normal pericardium

Inflamed pericardium
Tuberculous pericarditis

- Incidence of pericarditis in patients with pulmonary TB ranges from 1-8%
- Occurs by either direct extension from an adjacent focus or by lymphatic spread
- Physical findings: fever, pericardial friction rub
- TB skin test usually positive
- Fluid smear for TB often negative
- Pericardial biopsy more definitive: granulomas in pericardial wall
- Heal by fibrosis & calcification
Chronic adhesive pericarditis

- Stage of organisation by fibrous adhesions
- Formation of granulation tissue & neovascularisation
- Adhesive mediastinopericarditis
- Heart function remains normal, cardiac hypertrophy & dilatation may occur
Constrictive pericarditis

• Rare, dense fibrous or fibrocalcific thickening of pericardium → heart fails to dilate during diastole, decreased cardiac output
• Results from preceding causes- tubercular, purulent, hemopericardium
• Idiopathic, radiotherapy, cardiac surgery, connective tissue disorders
• Morphology: heart encased in .5- 1cm thick & dense collagenous scar
  - heart size normal
Dignostic evaluation

• Chest x-ray
  – usually requires > 200 ml of fluid
  – cannot distinguish between pericardial effusion and cardiomegaly

• Echocardiography
  – standard for diagnosing pericardial effusion
  – convenient, highly reliable, cost effective
Tumors of Heart

• Primary tumors < Secondary tumors
• Benign tumors:
  myxoma, lipoma, fibroelastoma, rhabdomyoma, hemangioma
• Malignant:
  rhabdomyosarcoma, angiosarcoma, malignant mesothelioma
Myxoma

- M/C primary tumor of heart (50%)
- Gross: 90% occur in left atrium
  - usually single, may be multiple
  - 1-10 cms D, polypoid, pedunculated, soft, hemorrhagic, resemble organised mural thrombus
Micro: abundant mucoid intercellular stroma
  - low cellularity with stellate shaped cells
  - numerous capillary sized bld vs
  - lymphocytes, plasma cells and foci of hemorrhages
Clinical effects:
• Ball-valve obstruction, damage to valve leaflets
• Embolization
• Constitutional symptoms of fever d/t IL6 release
• Part of Carneys syndrome
Secondary tumors

- Hematogenous or lymphatic spread from lung, breast, lymphoma, leukemia, melanoma
- Direct extension from intrathoracic tumor
Pathology of CV interventions

- Balloon angioplasty: dilation of stenosis of artery by a percutaneously inserted balloon catheter e.g. percutaneous transluminal coronary angioplasty (PTCA)
  - Causes fracture of plaque, medial dissection, stretching of media of dissected segment
- Endovascular stents- are expandable tubes of mesh to preserve lumen patency: provide larger lumen, prevent mechanical vasospasm, dissections
- Vascular replacements- synthetic or autologous grafts that replace a segment of vessel or bypass diseased arteries
• Coronary artery bypass graft surgery
  - Aorto coronary bypass: autologous grafts using reversed saphenous vein or internal mammary artery
  - Failure due to rethrombosis, intimal fibrous hyperplasia, atherosclerosis
• Cardiac transplantation