L01: Micro's of Myopericarditis

Inflammation of the heart
myocardium = myocarditis
pericardium = pericarditis
usually ∅ occur in isolation (occur together)
⇒ NB myopericarditis pain = positional: Lean forward = Relief
: Lying Down = worse

Myocarditis:

→ More common in young patients
Consider this Dx when:
1) Arrhythmias in presence of fever
2) cardiac failure with ∅ obvious cause
(+)
Previous symp of systemic URTI (usually viral)

Aetiology

Viral (common)
→ Enteroviruses: coxsackie → A → B1–B6
→ Adenovirus
→ Influenza A
→ Echovirus
→ HHV-6 / Human parvovirus B19

Bacterial (more rare)
→ S. pyogenes (Immuno mech = RF)
→ S. aureus (pyogenic infection – Rare)
→ C. diphtheriae (exotoxin = myocarditis)
→ Mycoplasma (Atypical)
→ Chlamydia psitacci
→ Coxiella burnetti

NB ≈ 2° Achalasia

Chronic Infections (rare bottom of DDx)
- Chagas Disease (Trypanosoma cruzi)
- Toxoplasma Gondii (Systemic disease)
  ↳ usually immune compromised pt.

→ Fungi / Amoeba / worms = rare cause of myocarditis

Pathophysiology

1+ of following:
- Direct viral cytotoxicity
  ↳ prolonged viral persistance ≈ CMO
- cytotoxicity d.t viral proteins (eg. protease)
- Directed immune response against infected cells
- Generalised immune cells – infected myocytes
  "innocent bystanders" ← – non-infected myocytes
  (both affected)
  ↳ cytotoxic T-cells
  ↳ "Heart reactive" Antibodies [Autoimmune phenomenon]

Inflammation Affects: (NB)
- Myocytes
- Vascular Elements
- Conduction sys.
- Autonomic Nerves
- Interstitium

Bacterial Myocarditis

- Myocarditis = most common COD in pt with C. diphtheriae (toxin)
- Bacteria enter blood stream & cause Metastatic foci in myocardium
  ↳ N. Meningitidis
  ↳ Salmonella sp
  ↳ Brucella
  ↳ S. aureus
  → Bacteria can enter myocardium as complication of Endocarditis (spread from valves)
  (via septic embolization from coronary aa.)
  → Myocarditis may follow as complication of Atypical bacteria infection
  ↳ Mycoplasma
  ↳ Legionella
  ↳ Chlamydia
  (most likely immunological based)

Immunecompromised

myocarditis may follow disseminated infections → Toxoplasmosis
→ Systemic Aspergillosis
→ Candidiasis
⇒ Myocarditis in HIV pts under Dx (NB)

Clinical

- **Fulminant**: sudden CVS collapse & shock
- **Acute**: → ♡ failure.
  young / Acute HF / Arrhythmia / previous URTI
- **Chronic**: DCM / Difficult to differentiate from other causes

Diagnosis

- Clinical
- Echo
- ECG
- Cardiac Enzymes
- Endomyocardial Biopsy (EMB)
  ↳ Histology
  ↳ Viral PCR
  ↳ (bacterial culture) – Rarely done

⇒ Diff. to get direct presence of virus in myocardium ∴ Dx on association of virus found elsewhere in body
⇒ serology 4x ↑ titre is suggestive
⇒ Molecular = ongoing research

Bacterial = blood culture
= MC&S of pericardial fluid + TB investigations (NB in SA)

[⇒ NB lots of non-infectious diseases that mimic infectious myocarditis]
- SLE etc. → collagen disease
- drugs
- hypersensitivities
- toxins

Treatment:

Rx cause where possible
Tetracycline – Atypicals
Penicillin / ceftriaxone – Neisseria
Cloxacillin – S. aureus
co-trimoxazole – Toxoplasma
Very few Antiviral agents
↳ supportive therapy
1° prevention
↳ Hygiene

Pericarditis

↳ under Dx condition

- clinical spectrum:

[Asymptomatic → Severe distrubance] (+ Death)

Aetiology:

Viral	Viruses infecting the heart commonly affect both the myocardium + pericardium. Difficult to detect – idiopathic pericarditis	Coxsackie A and B	Influenza
		Varicella-zoster	Echovirus
		Cytomegalovirus	Adenovirus
		Herpes simplex virus	Measles
		Hepatitis B	
Bacterial	Wide range. Occurs commonly as a complication of untreated pneumonia	[Mycobacterium tuberculosis] NB in SA setting	S. pneumoniae, Other Streptococci
		S. aureus	Mycobacterium avium-intracellulare
		N. meningitidis, N. gonorrhoeae	H. influenzae
		Brucella	Legionella pneumophila
		Enterobacteriaceae	Mycoplasma pneumoniae
		Chlamydia	Salmonella

Clinical

→ Pericarditis as a whole
= friction rub in Acute
= ECG Δ's (Diffuse ST elevation)
= Echo

- **Viral / Idiopathic**
  - Low grade fever
  - Retrosternal chest pain (radiates to neck/shoulder)
  - worse with Respiration, swallowing + supine → Lean forward = Relief
  - fever + flu symp can be present
- **Bacterial** (+ pus in pericardial space)
  - Acutely ill (fever + Dyspnoea)
  - chest pain + pericardial rub may be Absent
  - may be missed / Dx late
- **TB** → slow
  - insidious course
  - chest pain = common (vague / non-specific)
  - Low / night sweats / Dyspnoea = common

non-TB Bacterial Pericarditis:

Pre-Antibiotic era → S. pneumoniae + S. aureus
↳ S. pneumonia prevalence ↓
↳ Gram (-) ↑ prevalence

Purulent Pericarditis: → usually older pts
→ underlying conditions
↳ may occur as complication of: meningococcaemia

In Children:
S. aureus is most common
H. influenza as cause ↓ d.t vaccination (subtype b)

Other Aetiologies (bottom of DDx)
Parasites (rare) → Toxoplasma Gondii
→ Entamoeba histolytica
→ Schistosomes

Fungi (rare)
↳ the immunocompromised pt.
↳ Histoplasma capsulatum
↳ Coccidoides immitis
↳ Cryptococcus neoformans
↳ Candida
↳ Aspergillus

TB pericarditis:

Treatable cause of chronic pericardial effusion
(+) constrictive pericarditis → NB constrictive
=> More common in SA than rest of world
=> High incidence in HIV infected
=> Dx = problematic (Diff to prove)
=> High Mortality

Lab Dx

- virus isolation / detection → throat swab
→ stool
↳ as for myocarditis
- Serology → (Dx yield low)
- Pericardiocentesis (may be therapeutic)
- Pericardiotomy + Biopsy + fluid Drainage
= ↑ Dx yield
- Blood culture if purulent pericarditis is sus.

TB pericarditis Dx → know HIV status of pt.
- Microscopy (ZN / Auramine)
- culture (pericardial fluid)
- Histology
- ADA N > 40
- GeneXpert

Treatment of pericarditis:

- **Idiopathic / Viral** → NSAID's
- **Purulent** → pericardial drainage (pericardiocentesis)
→ Antimicrobials → cloxacillin ±
→ ceftriaxone
- **TB pericarditis**
Anti-TB Rx
→ No benefit of (+) corticosteroids

pericardiectomy also done in certain situations

Summary

Myocarditis → usually Viral
→ Aetiological Dx difficult.

Pericarditis → usually Viral
→ In SA + large effusion = TB esp if (+) HIV
Dx difficult (bacterial) → often missed
= ↓ outcomes