Myocarditis

Key Points:
- Myocarditis can be caused by viral, bacterial, spirochetal, fungal, or parasitic infections, drugs/toxins, and autoimmune diseases.
- EKG’s in myocarditis can have non-specific ST-T changes, atrial or ventricular arrhythmias, or ST-elevation diffusely or focally.
- Troponin I will be positive in 1/3 of cases of myocarditis.
- Treatment is supportive, including exercise avoidance

Definition/Pathology
- Inflammation of the myocardium
- Dallas Criteria for pathologic diagnosis
  - active = infiltrating lymphocytes and myocytolysis not typical of ischemia
  - borderline = infiltration without myocytolysis

Etiology
- Infection:
  - viruses: cocksackie B, echovirus, HIV, adenovirus, CMV, EBV, VZV and others
  - bacteria: dipheria (in ¼ of dipheria cases), in setting of endocarditis
  - spirochetes: lyme (Borrelia bergdorferi)
  - fungi: candida, aspergillus, histo, cocci, crypto
  - parasites: Chagas (Trypanosoma cruzi), toxocara, trichinosis
- Drugs/Toxins
  - hypersensitivity reactions: sulf, PCN, NSAIDs,
  - chemo: doxorubicin
  - others: cocaine, Li, cyclophosphamide, EtOH
- Autoimmune diseases: SLE, sarcoidosis, RA, dermatomyositis
- Other: radiation, Giant-Cell myocarditis

Clinical Presentation
- Often early systemic symptoms: fever, myalgias, muscle tenderness
- Chest pain, fatigue, dyspnea on exertion and can be fulminant biventricular failure
- In 700,000 soldiers, most common presentation mimicked acute MI w/ ST elevation, chest pain

Diagnosis
- Typically clinical diagnosis
- EKG: variable including non-specific ST-T changes, PACs, PVCs, afib, or ST elevation w/ pericardial involvement which can be focal or diffuse w/ or w/o PR changes
- Labs: Troponin positive in 1/3 of biopsy-proven myocarditis
- Echo: Can have global or regional dysfunction
- Endomyocardial biopsy: “Gold” standard but vs. autopsy, 63% specificity, 79% sensitivity

Treatment
- Non-specific supportive care: Exercise avoidance, treatment of CHF and arrhythmias
- NSAIDS are NOT effective in viral myocarditis
- Immunosuppression
  - Myocarditis Treatment Trial w/ Dallas criteria for myocarditis w/ steroids plus azathioprine or CsA vs. usual care → no difference in EF or mortality
  - May be useful if immune-mediated: SLE, sarcoid, giant-cell

Prognosis
- Variable, anywhere from 7-70% (average 17%) will develop chronic CHF