Endocarditis

Definition: a bacterial or fungal infection of the interior of the heart, valves > surface

Predisposing factors – all related to structurally abnormal cardiac valves

- Rheumatic or congenital heart disease
- Mitral valve prolapse w/ valve leaflet redundancy
- Heart with an audible murmur
- Heart with a prosthetic heart valve
- History of endocarditis

Etiology – infectious organism dependent on host factors and ability of org. to adhere

- IVDU – *S. aureus* via needles
- Dental patients – dental flora like *S. viridans*
- Bacteremic GU infections – *Enterococci*
- Prosthetic valves – *S. epidermidis* or *S. aureus* or fungi

Pathogenesis – dependent upon hemodynamics

- Requires a high velocity jet stream to → turbulent flow
- Requires flow from a HI → LO pressure chamber; lesions form on valve in lower pressure chamber
  - On the ventricular surface of abnormal aortic valve in regurgitation
  - On atrial surface of abnormal mitral valve in regurgitation
- Requires a narrow orifice between chambers to → pressure gradient
  1. Damaged endothelium → deposition of fibrin and platelets → sterile vegetations
  2. Bacteremia → deposition of microorgs onto sterile vegetations
  3. Vegetations grow as more fibrin and platelets are deposited → defense from host immune system
4. Both humoral and cellular immune systems activated by persistent bacteremia attempt to respond → immune complex formation, increased RF, and nonspecific hypergammaglobulinemia

5. Immune complex deposition in renal glomerular BM → glomerulonephritis → renal failure

Diagnostic Criteria – THE DUKE CRITERIA
- is 80% specific if 2 Major, or 1 Major + 3 Minor, or 5 Minor criteria are met

MAJOR CRITERIA:
- + blood cultures x 2 of common org
- + echocardiogram (TEE better than TTE, which is only 50-60% sensitive) or new murmur

MINOR CRITERIA:
- presence of predisposing condition (valve abnormality)
- fever > 38C or 100.4F
- vascular phenomena = embolic disease (splenic, renal, hepatic, cerebral), conjunctival hemorrhage, Janeway lesions
- immunologic phenomena = Osler’s nodes, Roth’s spots, glomerulonephritis, RF
- + blood culture x 1 or rare orgs cultured

What about “culture negative” cases?
- 5-15% of patients with endocarditis have no growth from blood cultures
  o 50% were treated with antibiotics prior
  o 50% have the “hard to culture” HACEK orgs

More on Clinical Manifestations –
- symptoms can be acute, subacute, or chronic
  o hemodynamic changes noted due to valvular damage
  o end organ sx from septic emboli (right side → lungs; left side → brain, spleen, kidney, GI, extremities)
  o end organ sx from immune complex deposition
  o persistent bacteremia w/ distal seeding of infection → abscess or septic joints
What about arterial emboli?
- present in 50% of patients and can travel to almost any site
  - greatest risk in first week of therapy
  - most likely source of vegetations is mitral valve
  - most likely vegetations involved are >10mm on TEE

- symptoms can be visible on the skin or in eyes
  - Janeway lesions = painless hemorrhagic macules on hands and soles
    - Splinter hemorrhages in nail beds
    - Subconjunctival petechiae
    - Papilledema
  - Petechiae
  - Osler’s nodes = painful nodules
  - Roth spots on funduscopic exam

Lab Values:
- Anemia in 70-90%
- Leukocytosis in 20-30%
- Microscopic hematuria in 30-50%
- ESR elevation in >90%
- Rheumatoid factor in 50%
- Circulating immune complexes in 65-100%
- Decreased serum complement in 5-40% (likely due to activation by CRP and role in opsonization of bacteria)

Medical Treatment:
- Prolonged administration of antibiotics needed to penetrate the walled-off vegetation
- Bactericidal antibiotics required since bacteriostatic won’t penetrate

Surgical Treatment:
- Consider valve replacement if intracardiac or CNS complications occur
- Consider in congestive heart failure