Aortic Stenosis

Podrid, Philip. “Pathophysiology and clinical manifestations of valvarular aortic stenosis in adults.” UpToDate v11.3.

Key Points:
- Symptoms indicate higher mortality and indication for surgery
- Change in symptoms or exam indicate need to repeat echocardiography to assess progression of disease
- Use caution using traditional CAD and heart failure medications in patients with severe aortic stenosis

Epidemiology, causes, and associations
- Most common valve lesion in U.S. due to congenital bicuspid and aging population
  - Bicuspid valve (1-2%)
- Other causes / associations
  - Degenerative
  - Rheumatic
  - Endocarditis
  - Hypercholesterolemia
  - Pseudoxanthoma elasticum
  - Hyperparathyroidism, Paget’s, calciphylaxis
  - Gaucher, Fabry’s, alkaptonuria
  - Drug induced
  - Carcinoid heart disease
- Other associated phenomenon
  - Heyde’s: gastrointestinal angiodysplasia leading to GI bleeding now thought due to …
  - Type 2A von Willebrand syndrome: shear forces lead to structural changes in vWF, rendering it more sensitive to cleavage by protease (ADAMTS-13)

Physical exam – beyond the murmur
- Carotid parvus et tardus
- Sustained PMI – displaced only later in disease with heart failure
- Palpable S4
- S2 soft and single (A2 delayed)
- Later peaking with more severe stenosis

Severity
- Numerical estimates of severity
  - Valve area: normal 3-4cm2, mild >1.5cm2, moderate 1.0-1.5 cm2, severe <1.0cm2, critical <0.5cm2
  - Gradient: moderate >20mmHg, severe >50mmHg
  - Aortic-jet velocity >4m/sec on Doppler echocardiography
- Following patients with mild to moderate aortic stenosis
  - Repeat echocardiography with change in symptoms or exam
- Symptoms: classic triad and mortality risk without replacement
  - Angina (35% on presentation): 50% die in 5 years
  - Syncope (15% on presentation): 50% die in 3 years
  - Dyspnea (50% on presentation): 50% die within 2 years
Asymptomatic: generally good prognosis
- 1-2% with sudden death or rapid rate of progression

- **Valve replacement**
  - With replacement – 10-year age corrected rates of survival approach normal population
  - Risks:
    - Surgical mortality: at best 1% (hospital volume predicts short-term outcome)
    - Valve-related complications: 1% per year
      - Thromboembolism, bleeding from anticoagulation, endocarditis, re-operation
  - Indications
    - Symptomatic severe aortic stenosis
      - Need to ensure that symptoms are related to aortic stenosis (if symptoms are beyond expected for valve area or gradient, need to r/o other causes)
    - Severe aortic stenosis who are undergoing CABG or other surgery on aorta / heart valves
      - Possible indication if moderate aortic stenosis
    - Asymptomatic with severe stenosis:
      - Possible if reduced EF (<50%), hemodynamic instability during exercise, pronounced LVH, or VT
      - Uncertain benefit to exercise testing
  - Coronary angiography: perform prior to AVR to determine need for CABG

- **Low-gradient aortic stenosis:** either due to severe stenosis with LV dysfunction or pseudostenosis with other cardiomyopathy
  - Reduced EF and gradient >40mmHg may still benefit
  - Reduced EF and gradient <30mmHg have high operative risk: 50% survival at 3-4 years
  - Pseudostenosis: with inotropic testing, recalculated valve area appears higher – unlikely to benefit from AVR

- **Percutaneous balloon valvotomy – generally not useful**
  - High risk for stroke, aortic regurgitation, and other complications
  - High risk for restenosis

- **Medical management**
  - Statins: possible role for calcific / atherosclerotic valves
  - Potentially dangerous: preload reduction (diuretics or nitrates), afterload reduction