Aortic Valve Evaluation and Treatment including TAVR

William Oellerich, MD, Ph.D., FACC
Disclosures

No financial disclosures
Objectives

Aortic valve disease: anatomy, pathology, evaluation
Treatment of aortic stenosis
Transcatheter aortic valve replacement
Aortic Valve Anatomy
Aortic Valve Pathology

- Congenital: unicuspid, bicuspid, quadracuspid
- Infectious: endocarditis (bacterial or fungal), rheumatic fever, syphilitic
- Radiation
- Degenerative: Age related
- Aortic dissection: Marfan syndrome, trauma
Clinical Evaluation

• **History**
  – Valve problem, murmur
  – Asymptomatic
  – Dyspnea or fatigue

• **PE**
  – Heart murmur
  – Carotid arteries
Timing of Echocardiography

Class I

1. TTE is recommended in the initial evaluation of patients with known or suspected VHD
2. TTE in patients with known VHD with any change in symptoms or physical examination findings.
3. Periodic monitoring with TTE in asymptomatic patients with known VHD at intervals depending on valve lesion, severity, ventricular size, and ventricular function.
F/U Echocardiography

- Mild: 3-5 years
- Moderate: 1-2 years
- Severe: 6-12 months
Considerations for Referral

• Moderate-to-severe or severe valve Dz
• Patients with symptoms thought to be related to valvular disease
• Consider earlier referral for patients with unexplained dyspnea and/or fatigue, LV dysfunction, LV or RV chamber enlargement
Bicuspid Aortic Valve

• 1-2 % of population
• Some genetic component
• AS or AI
• Associated with coarctation and ascending aortic aneurysms
  – Serial testing for aorta > 4 cm
  – Annual testing for aorta >4.5 cm
Aortic Insufficiency

• May be caused by malfunction of the leaflets or by dilation of the aortic root.

• PE:
  • diastolic murmur,
  • pronounced carotid upstroke,
  • wide pulse pressure

• Volume overload » LV enlargement

• CHF symptoms
Aortic Stenosis

- Age related (senile calcific) degenerative
  - 25% >65yr sclerosis
  - 7% >65yr Mod-Severe AS
- Congenital Bicuspid valve
- Normal AVA 3-4 cm$^2$
- Severe AS $\leq 1$ cm$^2$
Aortic Stenosis - Presentation

• Murmur
• Symptoms:
  o Angina
  o Dyspnea, CHF
  o Syncope
• Pressure overload » Hypertrophy
• Progressive \( \sim 0.1 \text{cm}^2 \) decline in AVA/year
• 50% Mortality if untreated 2-3 years
Treatment

Indication Severe, symptomatic AS

• Open AVR or SAVR
  • Operative mortality estimators
    • STS risk estimator
    • Euroscore
  These do not take into account procedure specific problems (Porcelain aorta chest wall radiation) nor Frailty
Treatment

• Surgical AVR
• TAVR (Transcatheter Aortic Valve Replacement)

How do we decide?

“The risk of the procedure and intermediate-term mortality must be weighed against the benefits of the procedure in altering the natural history of the disease and acknowledging the long-term consequences of the intervention.”
Operative risk

- Predicted risk of mortality
  - <4% Low risk
  - 4 - 8% Intermediate risk
  - 8 - 15% High Risk
  - >15% Extreme Risk
Decisions

• The Heart Valve Team
  • Multidisciplinary, collaborative group of caregivers, including interventional cardiologists, cardiovascular imaging specialists, cardiovascular surgeons, nurses, case managers, and physical therapist.

• Team evaluates patient to recommend treatment.
Pre-screening Review of Records

Clinical Evaluation

Gated CTA (Chest / Abdomen / Pelvis)

RHC / LHC Coronary Angiography

Functional Status Assessment (Cognitive Function, Frailty, etc.)

STS Score Calculation

Treatment Plan
TAVR Timeline

2007
PARTNER Trial begins (n=1057)

9/2010
PARTNER B results

11/2011
SAPIEN FDA approval

10/2012
High risk FDA approval

1/2014
CoreValve FDA approval

6/2014
XT FDA approval

6/2015
S3, Evolut FDA approval

4/2016
S3 Intermediate risk trial results

2016
Low risk trials start

+ Lotus, Direct Flow, Portico studies ongoing
TAVR procedure
CHI Experience

• Initial in 12/2011
• Total patients 262
  • Aortic 256
  • Mitral 8
• Age range 32 – 97, Average – 79
Minimalist Approach

• Propofol anesthesia (MAC)
• Procedure time ~90 min
• No Foley
• Awake in OR
• Fast Track: SSU 5th hour
• Average LOS 1.3 days
• 95% Discharged to Home
Take Home Points

• If there is a question about heart valve problems, get an echo.
• Repeat echo as indicated.
• Refer earlier rather than later, symptoms not needed.
• Call if there is a question.

Valve Coordinator 495-4327 (Heart)