KEYS TO ACCURATE ASSESSMENT
EDWARDS SAPIEN VALVE

TAVR TTE INTERROGATION
BY ALAN MATTHEWS

3 PHASES OF TAVR TTE
• Evaluation (Qualifying)
• Placement (Intraoperative)
• Follow-up (Post-Op)

GOALS
• High quality TTE to qualify for TAVR
• Thorough Intraoperative assessment
• Reproducible post-op assessment
“You go to a different Dr. and achieve the goal of your life”

QUALIFYING PARAMETERS
(SEVERE STENOSIS)

1) Aortic Jet Velocity > 4.0 m/s
2) Mean Aortic Gradient > 40 mmHg
3) AVA (Continuity Equation) < 1.0 cm²
4) Velocity Ratio < 0.25

KEYS TO PROPER PARAMETER ASSESSMENT
LVOT DIAMETER

• Zoom 2D PLAX in mid-systole
• Native Valve: Annulus
• Measure 3 times
• Show extent & location of AV/LVOT (Calcium location Correlates with PVL)
SPECTRAL DOPPLER PW & CW

• Baseline and scale should be adjusted so the signal size is 1/2 to 2/3 the size of the vertical axis (accurate VTI)
• Intercept angle as parallel to flow as possible (angle within 15 degrees of parallel will have less than 5% underestimation of velocity)
• Fine linear signals at the peak should not be included
• Trace the outer edge of the dark signal

KEYS TO PROPER PARAMETER ASSESSMENT

LVOT VELOCITY

• Pulsed-wave Doppler
• Move sample volume from LV side of valve and move into LVOT along the septum (5 or 3 chamber)
• Laminar flow curve with well defined peak
• Low filter setting (Visualize signal to the baseline)
LVOT VELOCITY

KEYS TO PROPER PARAMETER ASSESSMENT
AORTIC VALVE VELOCITY

- Continuous-wave Doppler (combined imaging transducer)
- Multiple acoustic windows (5C, ALAX)
- Use color Doppler prior to placement of cursor (ensures flow through the valve)
- Positioning (Parallel alignment, supine for 5C)

KEYS TO PROPER PARAMETER ASSESSMENT
CONTRAST ENHANCED DOPPLER

- Microbubble Contrast can be used to give a fuller aortic valve velocity signal for tracing
- The use of contrast will create more noise with spectral Doppler
- Gain and reject should be adjusted to reduce the increase of noise from contrast
KEYS TO PROPER PARAMETER ASSESSMENT
AORTIC VALVE VELOCITY

- Dedicated transducer (Pedof probe)
- Multiple windows (Apical, SSN, RSB)
- Positioning: Apical (LLD), SSN (Supine), RSB (RLD)
TAVR INTRAOPERATIVE TTE
BASELINE IMAGING
- Done just prior to Valve placement in the OR
- Assess:
  - LV function
  - AI & MR
  - Pericardial effusion if present

TAVR INTRAOPERATIVE TTE
POST DEPLOYMENT
- Assess:
  - Paravalvular leak (PVL)
  - Pericardial Effusion
  - LVOT Diameter (Pre-Stent)
  - LVOT & Aortic valve gradients
  - LV function
  - AI & MR

TAVR TTE PARAVALVULAR LEAK (PVL)
POST DEPLOYMENT
- Causes
  - Heavy calcification between tissue & prosthesis
    - Degree of calcification correlates with degree of PVL
  - Underexpansion of the valve
  - Aortic root rupture
TAVR TTE PARAVALVULAR LEAK (PVL) POST DEPLOYMENT

- Intraoperative
  - Multiple images with varying angulation
  - Multiple Windows PLAX, PSAX, 5C, ALAX
  - Balloon Valvuloplasty may be performed to eliminate PVL
  - Stent is cylindrical and extends further into the LVOT than a conventional surgical sewing ring
  - Occurs outside the circumference of the stent
TAVR TTE LVOT DIAMETER POST DEPLOYMENT

- Measure proximal to the stent in the PLAX (Pre-stent)
- Increases reproducibility for follow-up studies

SEWING RING / TAVR VALVE
TAVR TTE LVOT VTI
POST DEPLOYMENT

- Flow acceleration at 3 different levels of the valve
  - Pre-Stent (Lowest Velocity)
  - In-stent Pre-cusp
  - In-stent Post-cusp (Highest Velocity)

TAVR TTE LVOT VTI
POST DEPLOYMENT

- Pulse Wave Doppler
  - Sample volume Pre-Stent same location as LVOT diameter
    - Place sample volume with Full Screen 2D image before switching to pulse wave Doppler.
    - Inadvisable to move sample volume from LV side of valve and move into LVOT
    - Can result in In-stent sampling, will overestimate LVOT VTI
**TAVR TTE LVOT VTI POST DEPLOYMENT**

**TAVR TTE FOLLOW-UP**

- Paravalvular leak (PVL), AI & MR
- LVOT Diameter (Pre-Stent)
- LVOT VTI Pre-stent
- In-stent pre-cusp PW Assess Calcification

**REFERENCES**