Approaches for Bicuspid Valve Disease

Susheel Kodali, MD

Director, Structural Heart & Valve Center

Columbia University Medical Center

New York Presbyterian Hospital

Disclosure Statement of Financial Interest

Susheel K. Kodali, MD

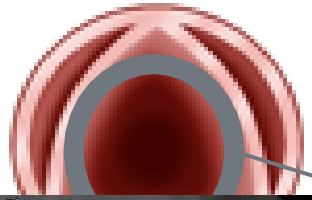
Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

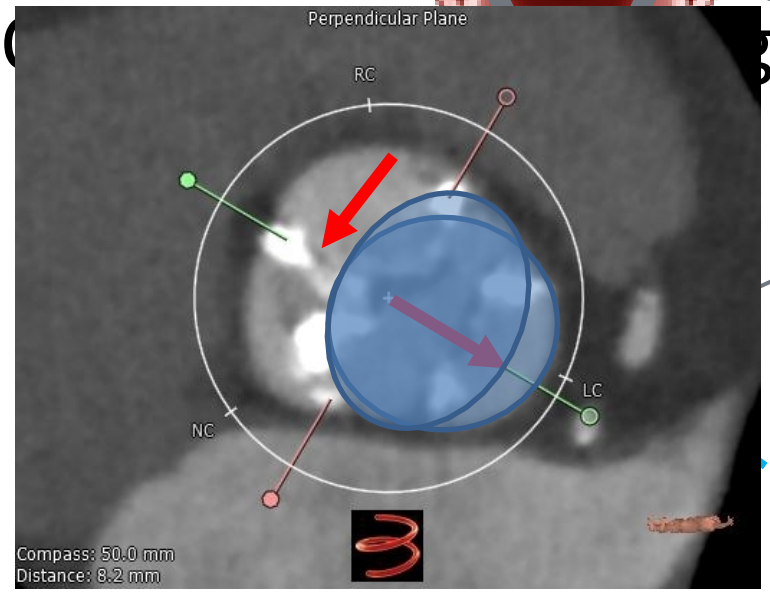
Affiliation/Financial Relationship	Company
• Consultant (Honoraria)	• Meril Lifesciences, Admedus, Jena Valve
• SAB (Equity)	• Thubrikar Aortic Valve, Inc, Dura Biotech, Supira, MID, Admedus

TAVR devices designed to treat a relatively circular annulus

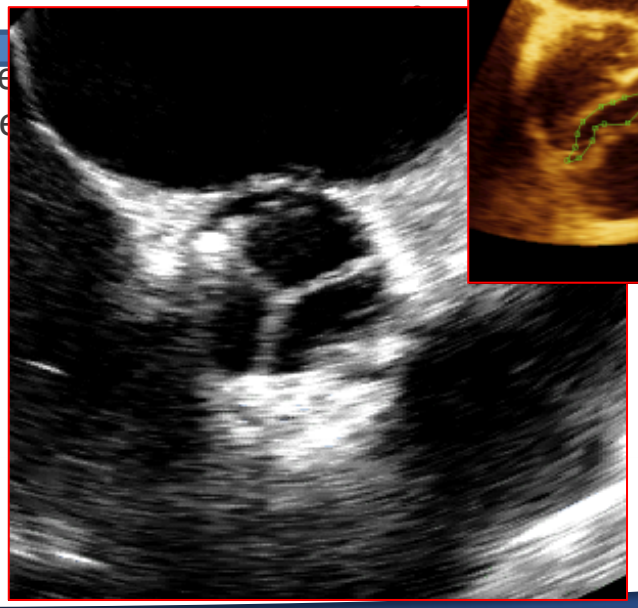
General Concerns

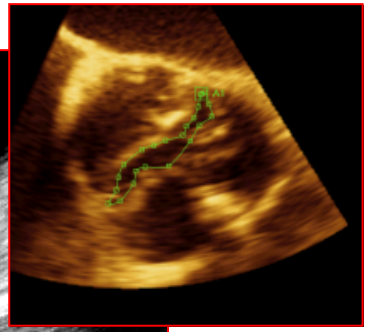
- Large asymmetric annulus → PVL
- Heavily calcified raphe → Annular rupture
- Non-circula ent → Durability
- (gy





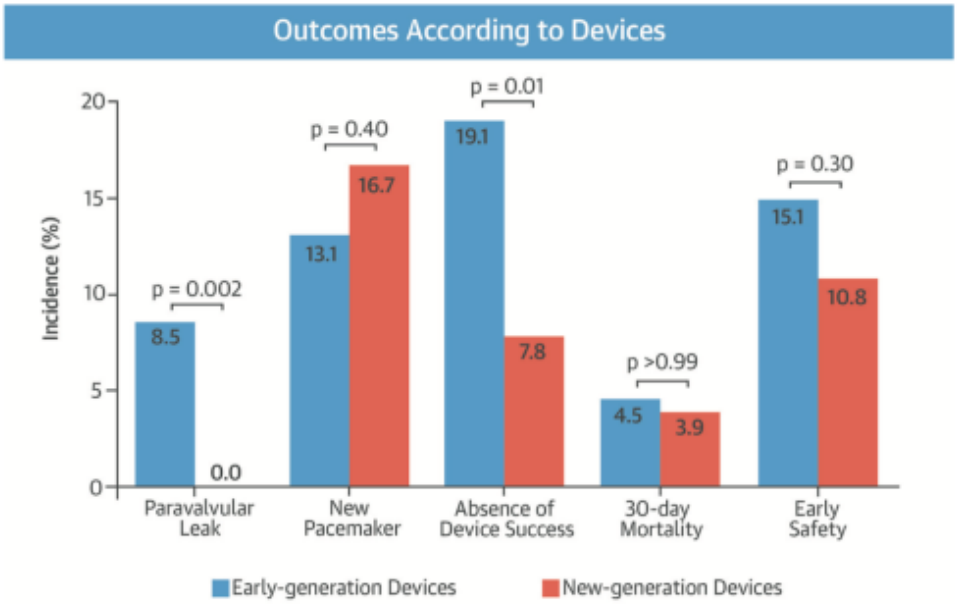
Prosthe
Valve

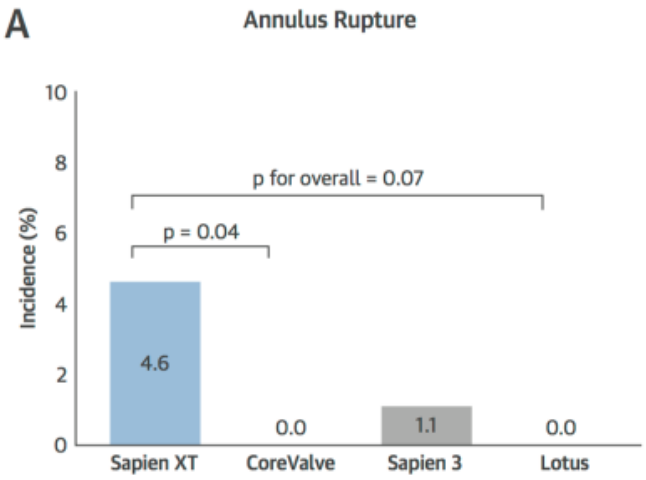


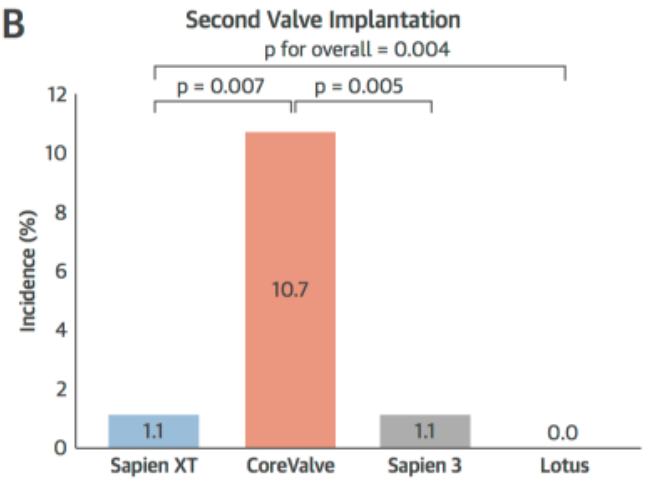


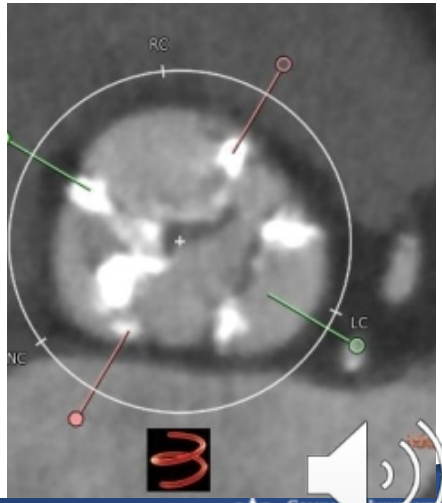
Unanswered Questions with TAVR

- Bicuspid valves
  - Does valve type matter?
  - Are procedural results comparable to tricuspid valves?
  - Is durability the same?
  - What about aortopathy?





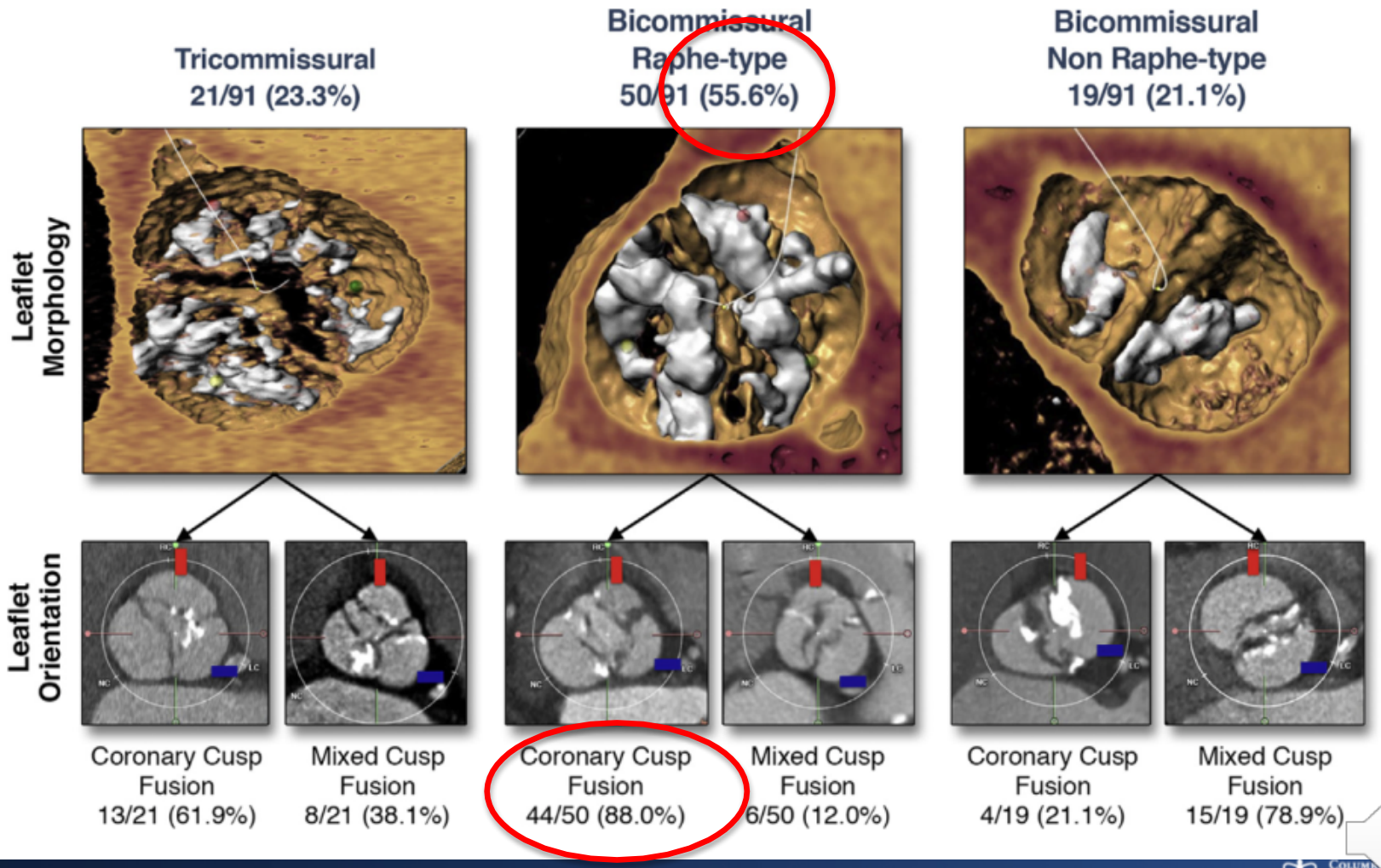




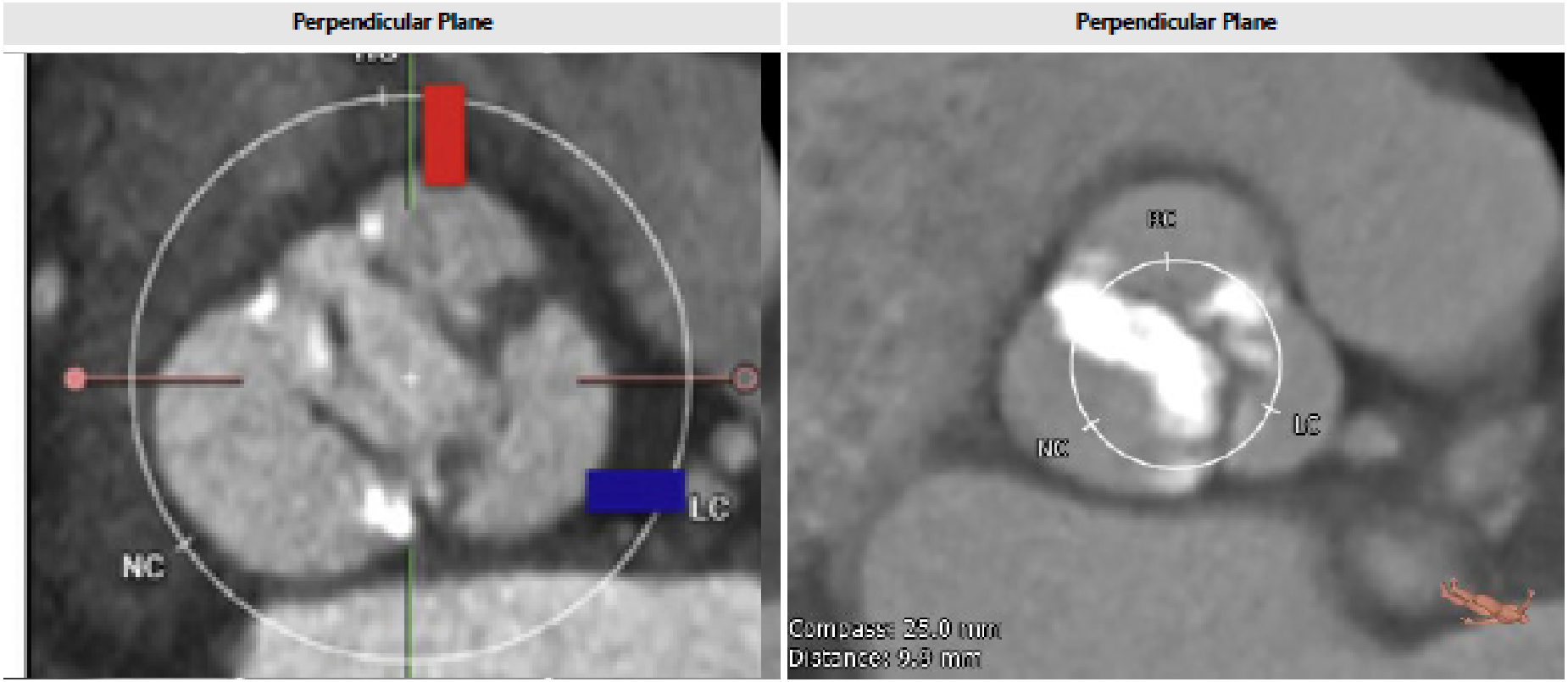
Yoon et al, JACC 2016

Bicuspid classification

FIGURE 1 Proposed TAVR-Specific BAV Classification



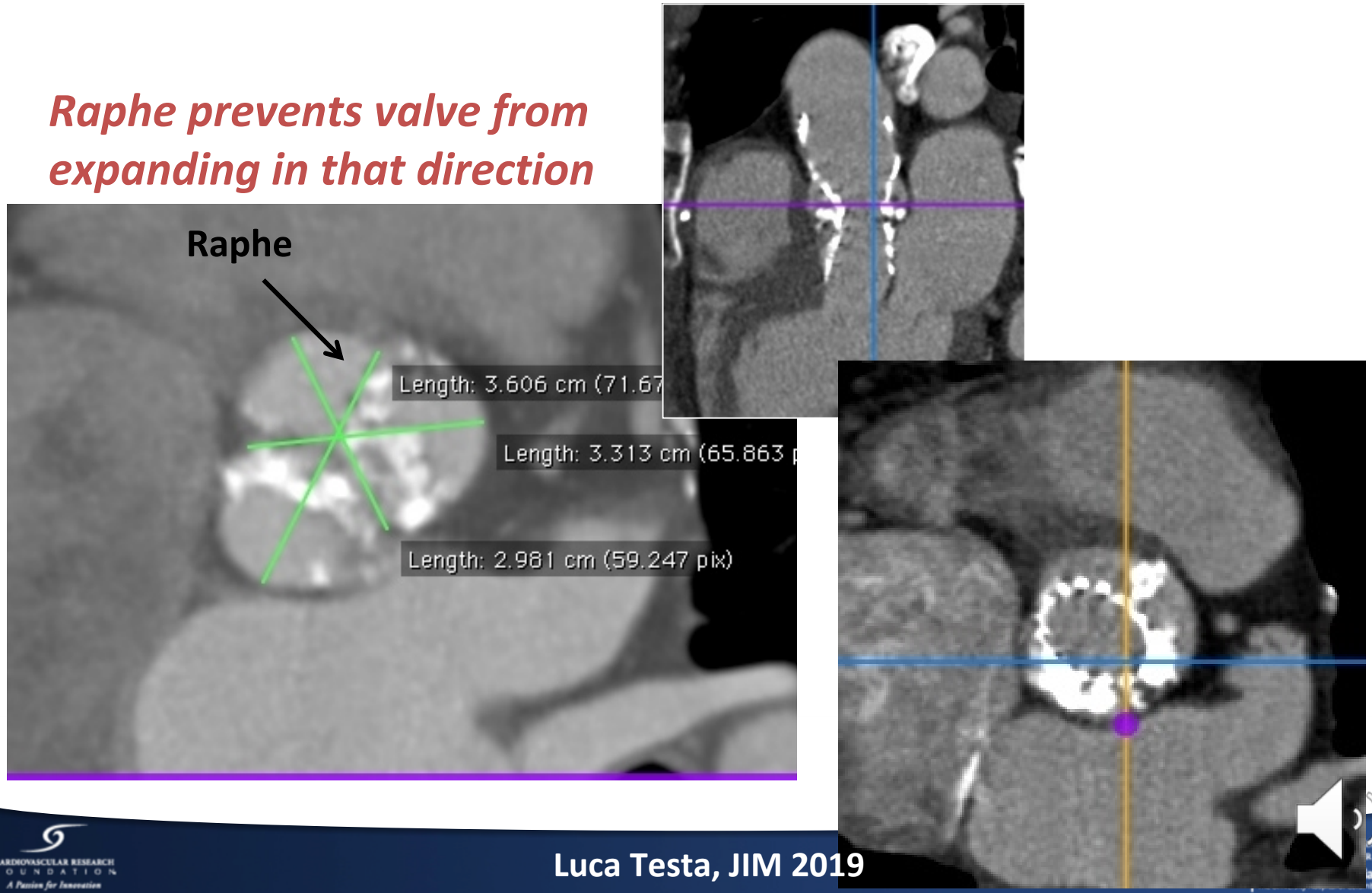
Mild vs Heavy calcifications



Why does extent and pattern of calcification matter?

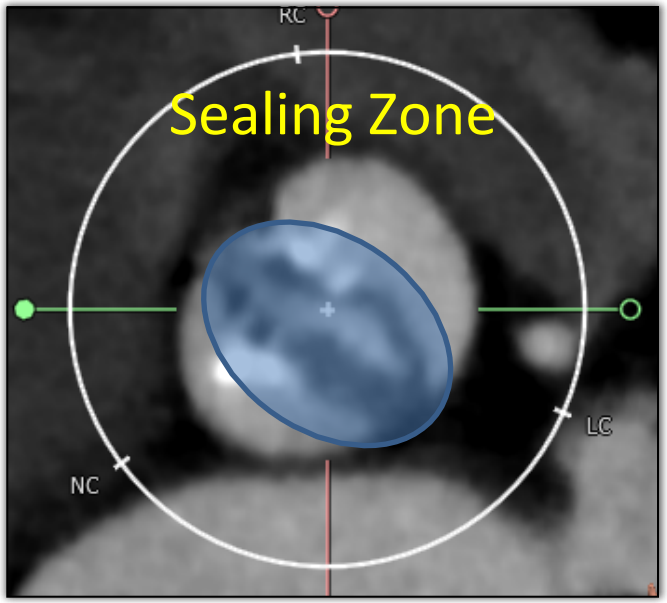
Importance of calcium at the raphe: distortion of a “standardly sized” valve

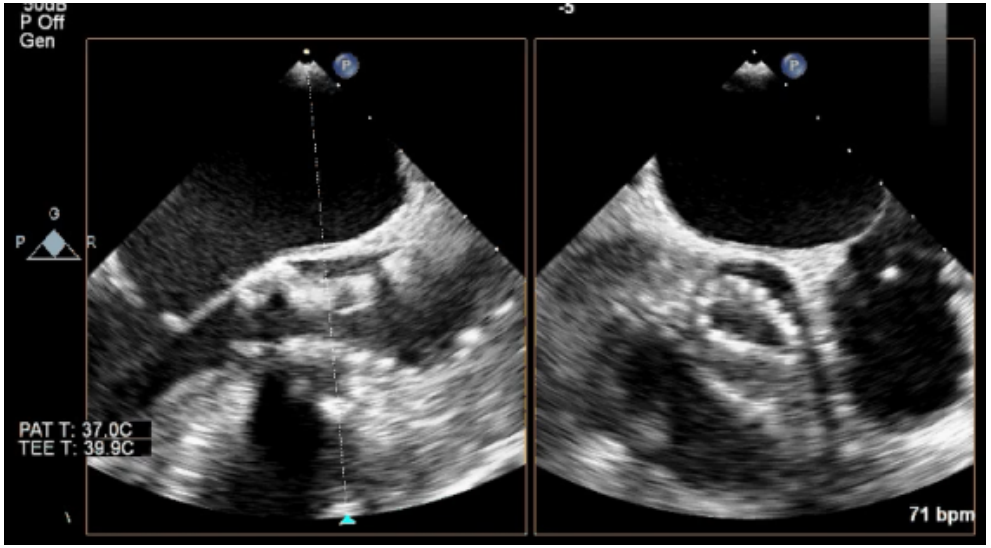
Raphe prevents valve from expanding in that direction

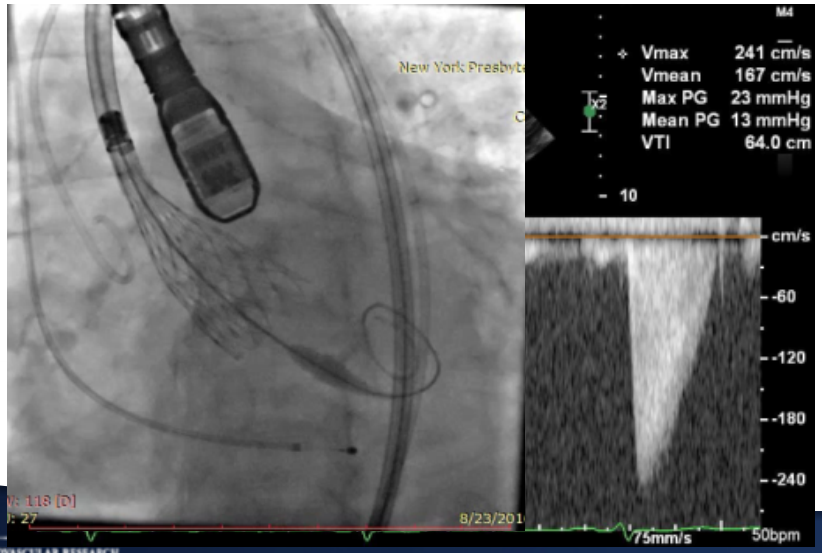


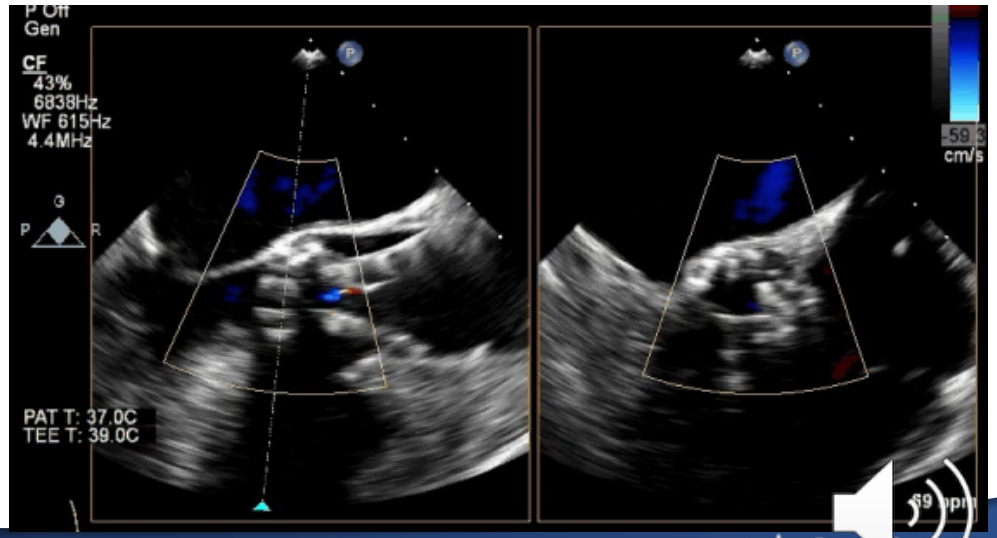
Luca Testa, JIM 2019

29 mm CoreValve EvolutR

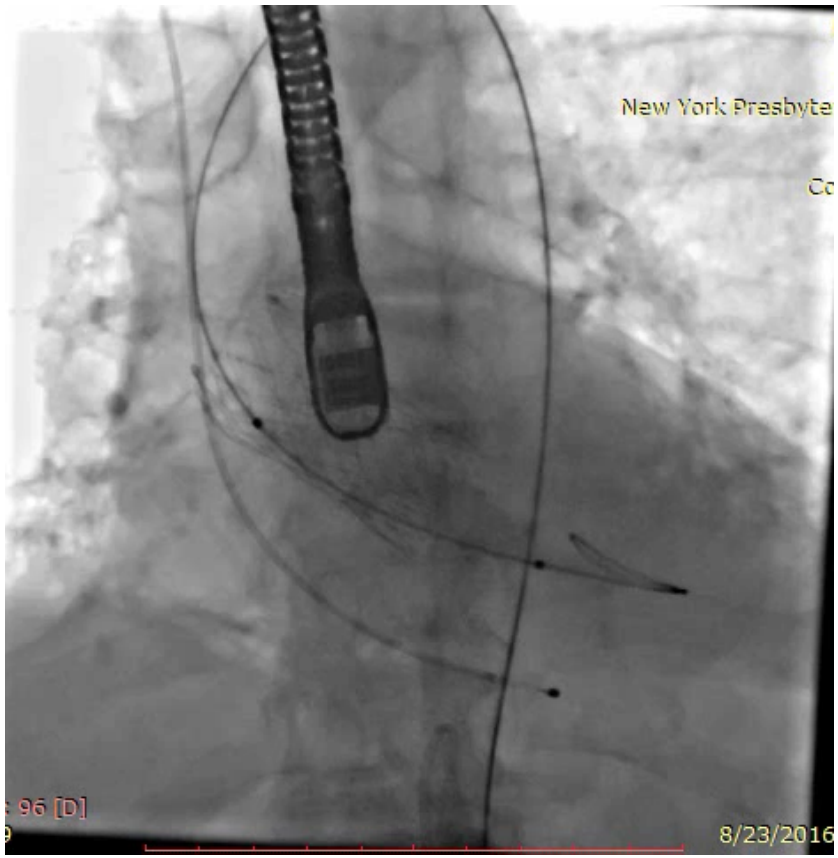


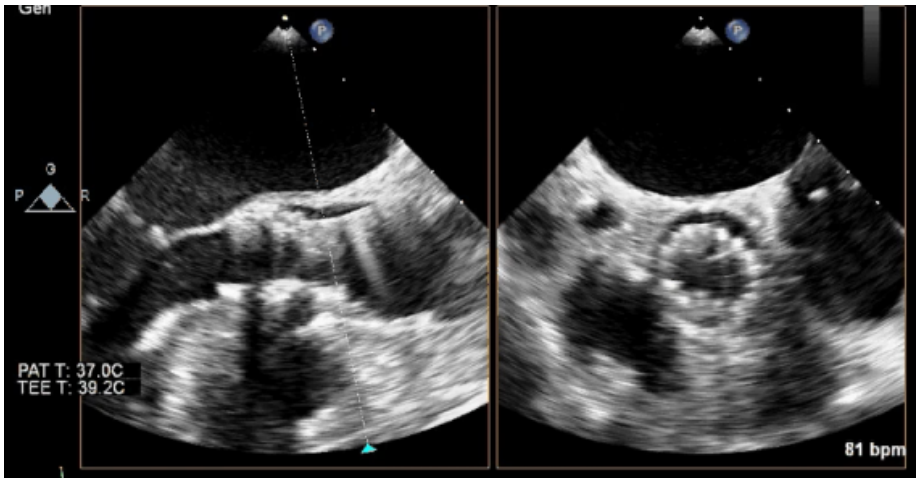


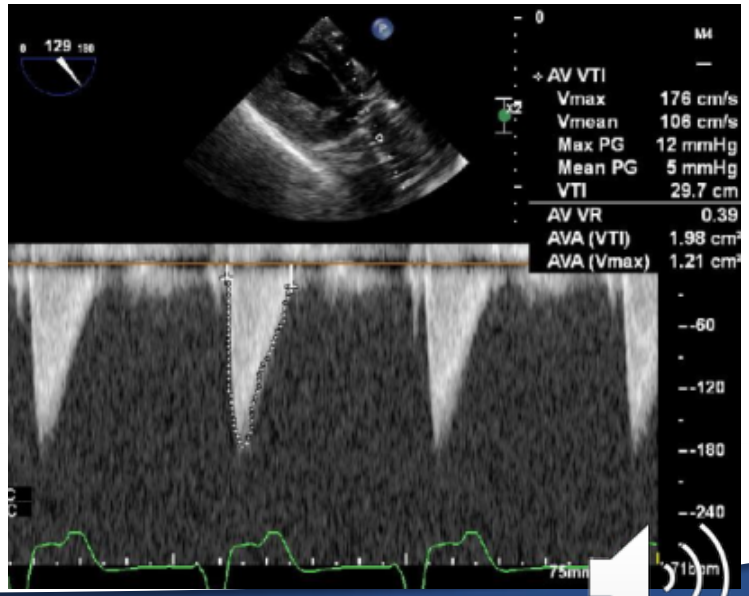




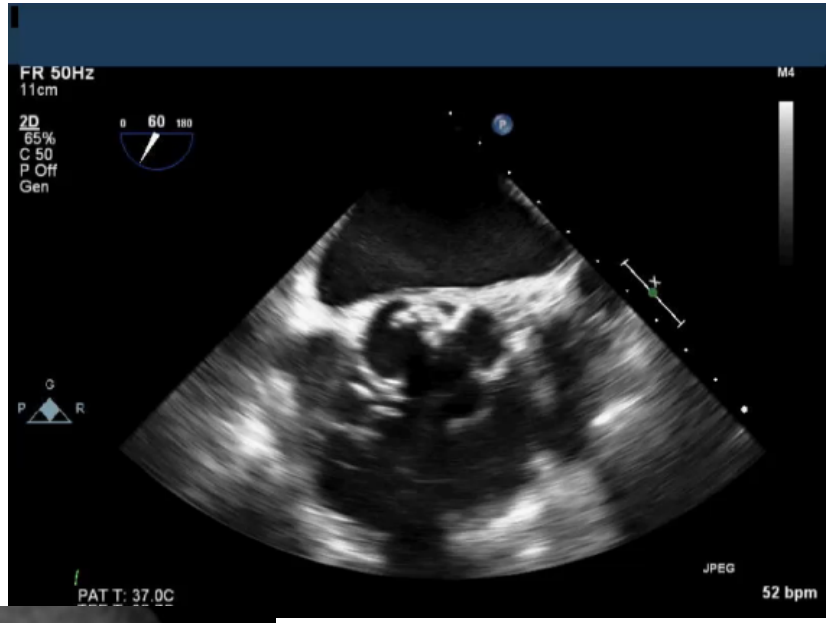
Post Dilation Zmed 20 mm



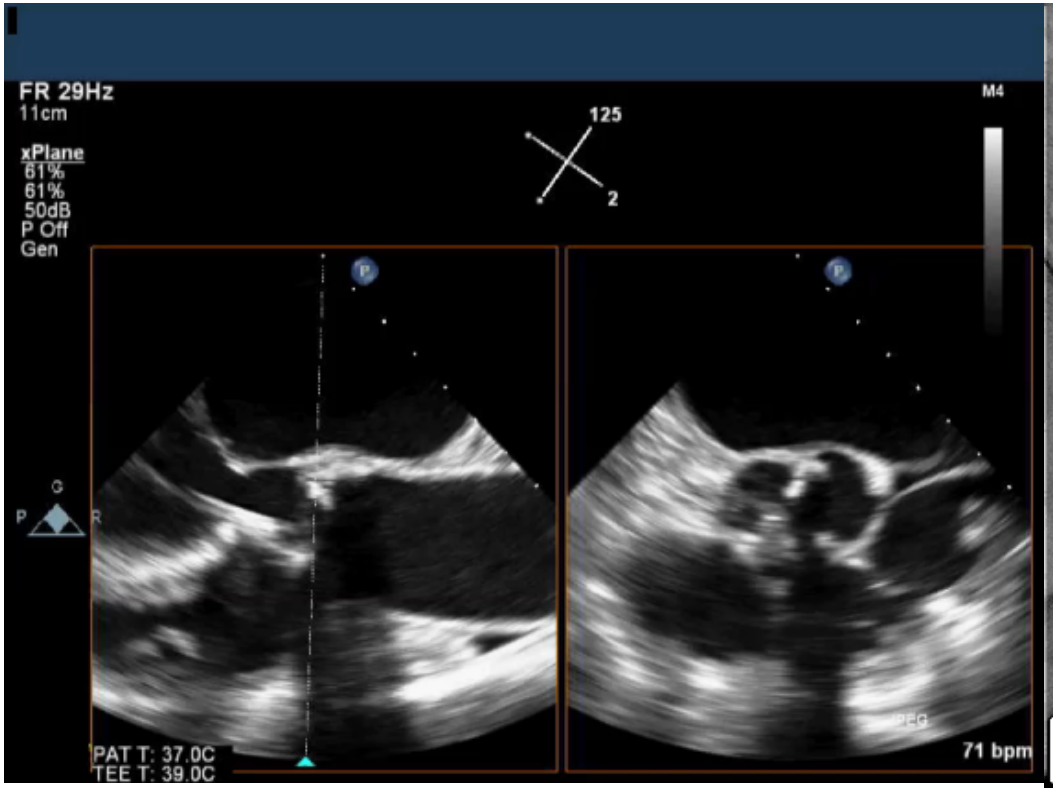


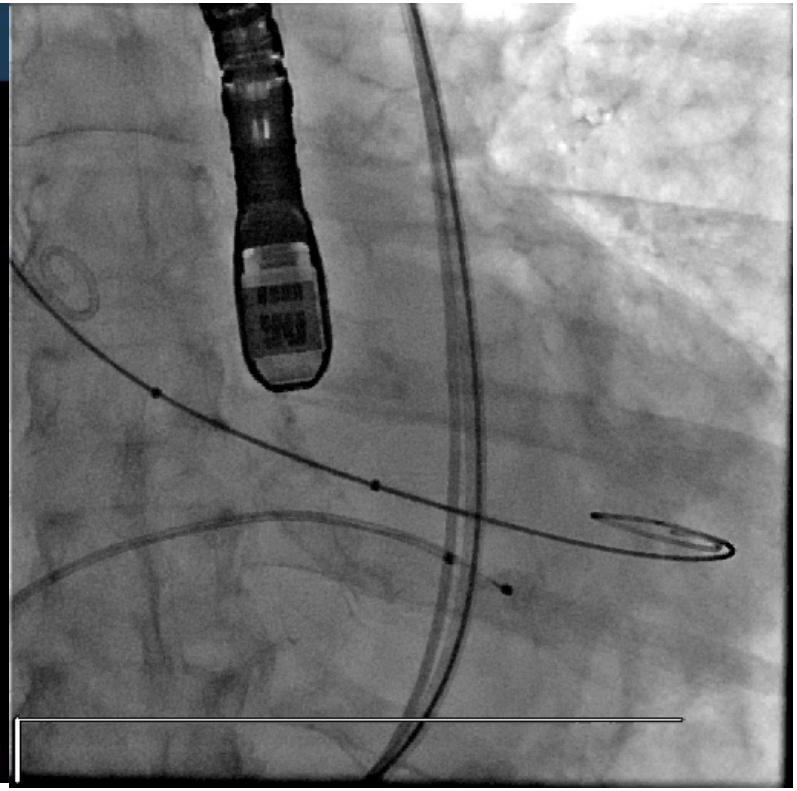


Bicuspid Valve: Minimal Calcium

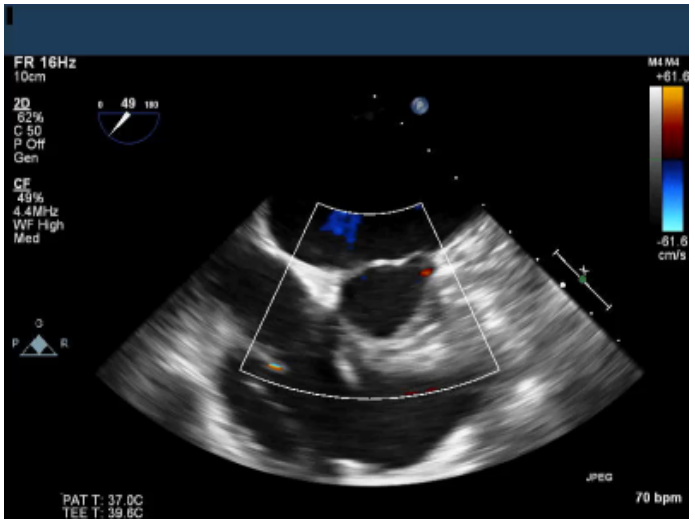


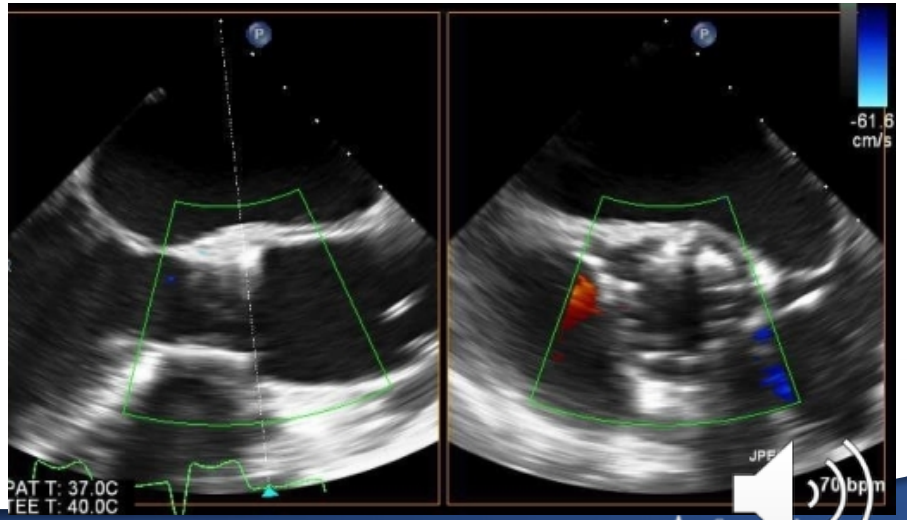
BAV – observe behavior





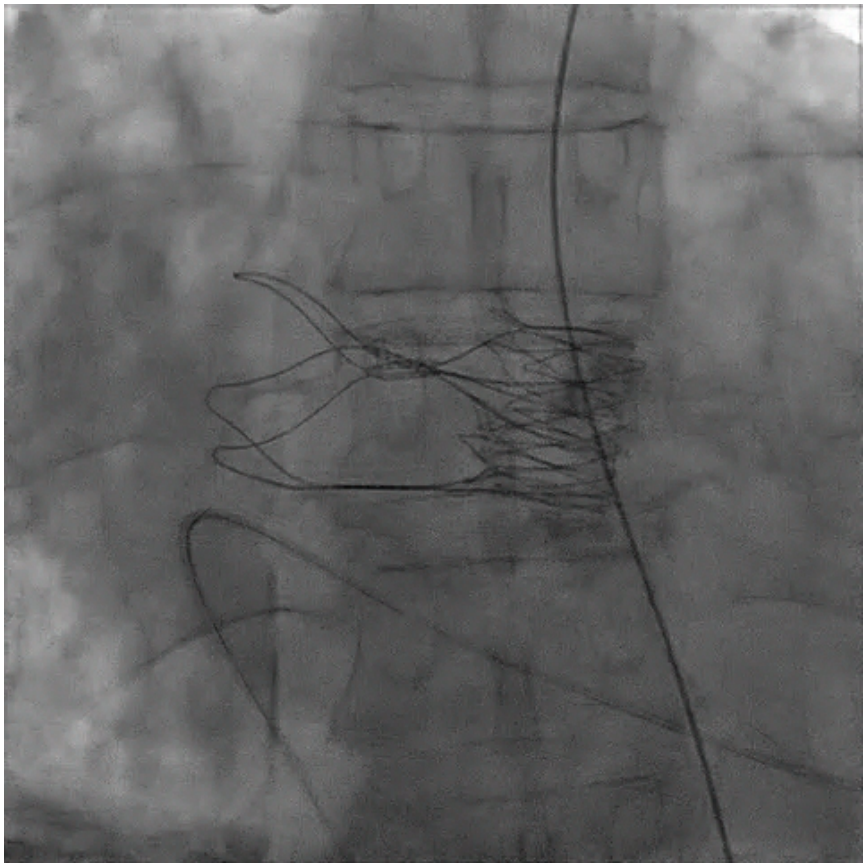
Final position and trace PVL



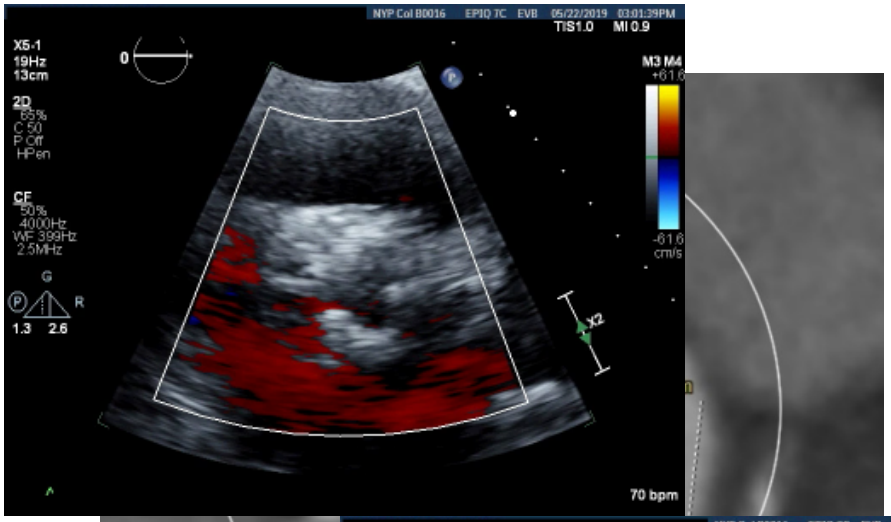


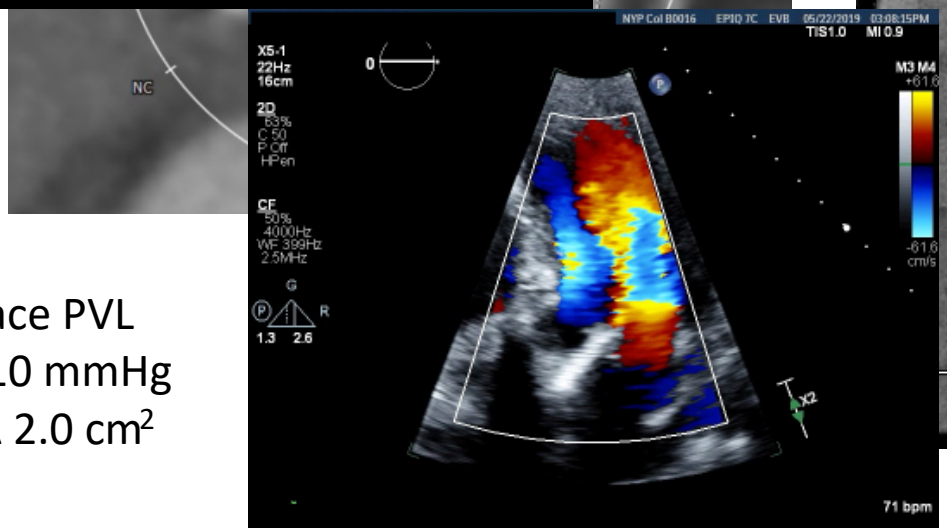
Beware of Heavy Calcium

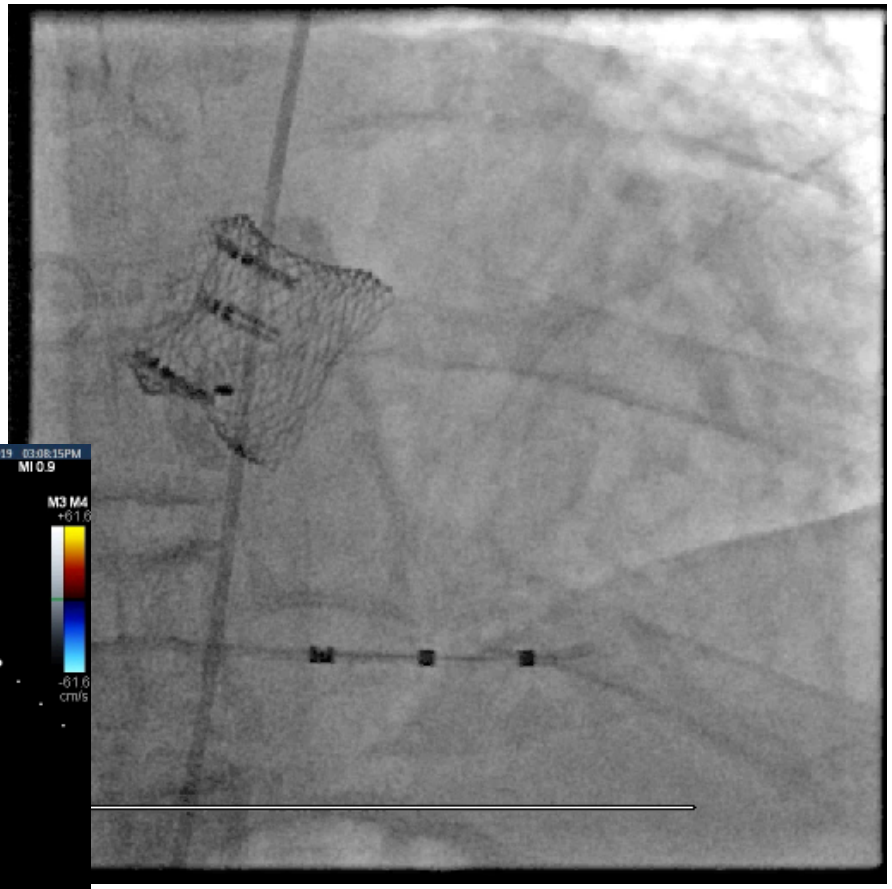
Radial Strength Matters



LOTUS Valve in Bicuspid Valve





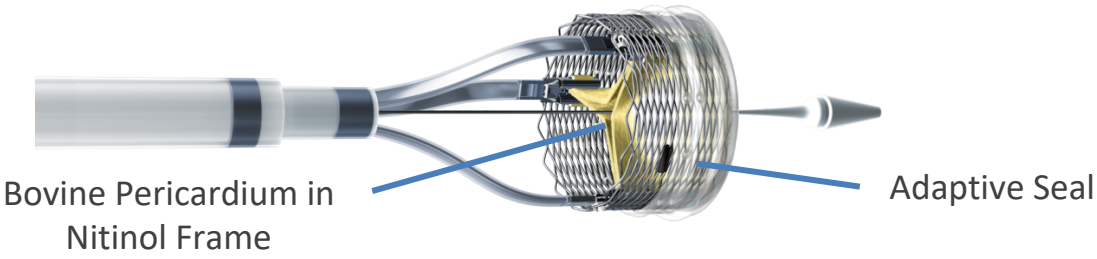


Trace PVL
MG 10 mmHg
AVA 2.0 cm^2

LOTUS Valve in Bicuspid Valve

Potential benefits in bicuspid anatomy:

- Fully retrievable and repositionable → Ensures optimal positioning with stable hemodynamics
- Deployment via gradual mechanical expansion → Low incidence of annular rupture
- Adaptive seal → Conforms to irregular anatomic surfaces
  → Designed to reduce PVL



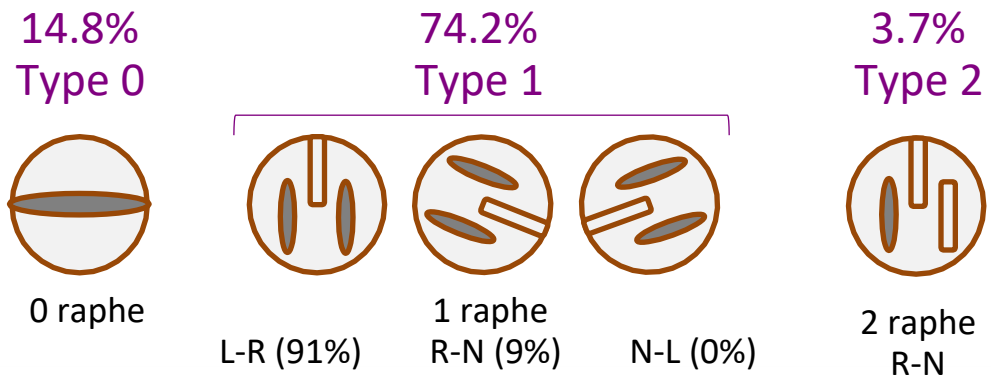
Bicuspid Aortic Valves in RESPOND

LOTUS Valve implantation N=996

Tricuspid Aortic Valve n=965 (96.9%)

Bicuspid Aortic Valve n=31 (3.1%)

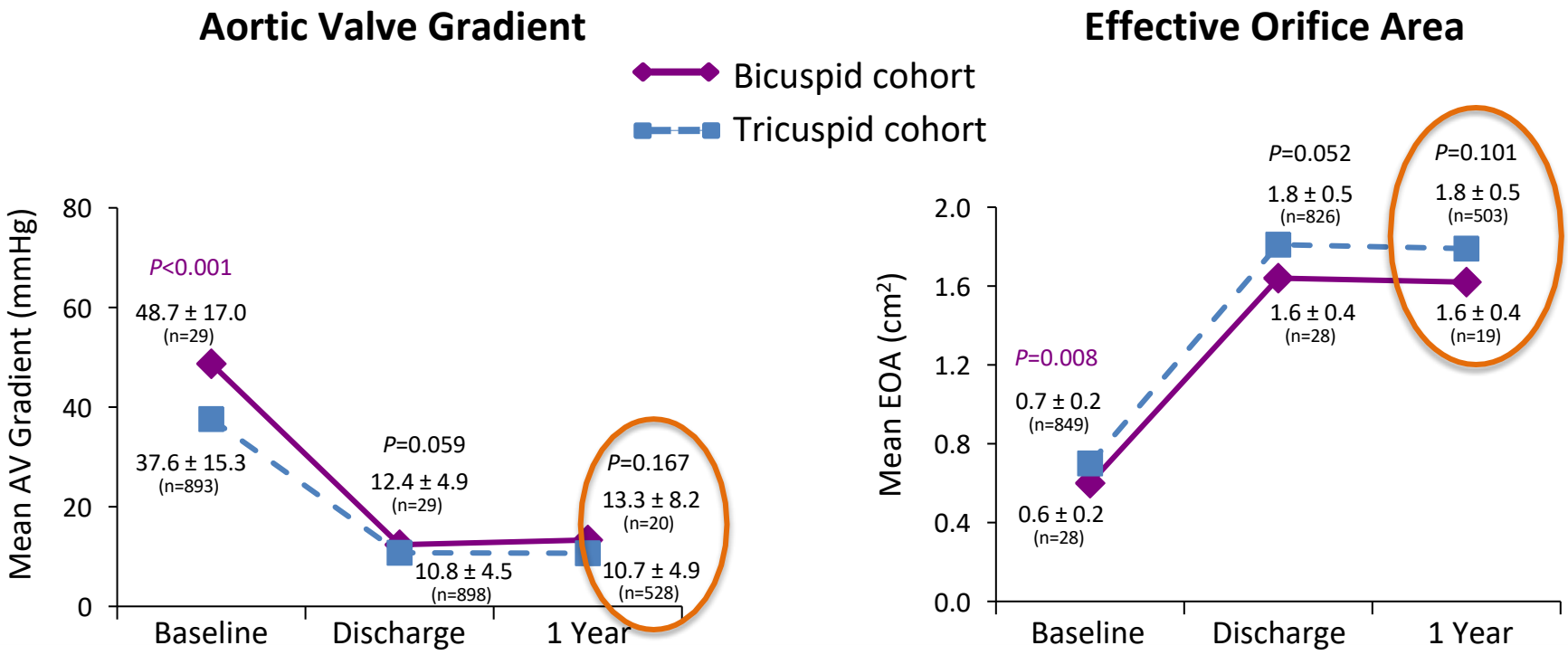
- Identified by site and confirmed by echo core lab and/or CT
- Valve sizing per operators' discretion



Valve classification schematic modified from: Sievers HH, Schnidtke C. *J Thorac Cardiovasc Surg* 2007;133:1226-33.

Hemodynamic Improvement

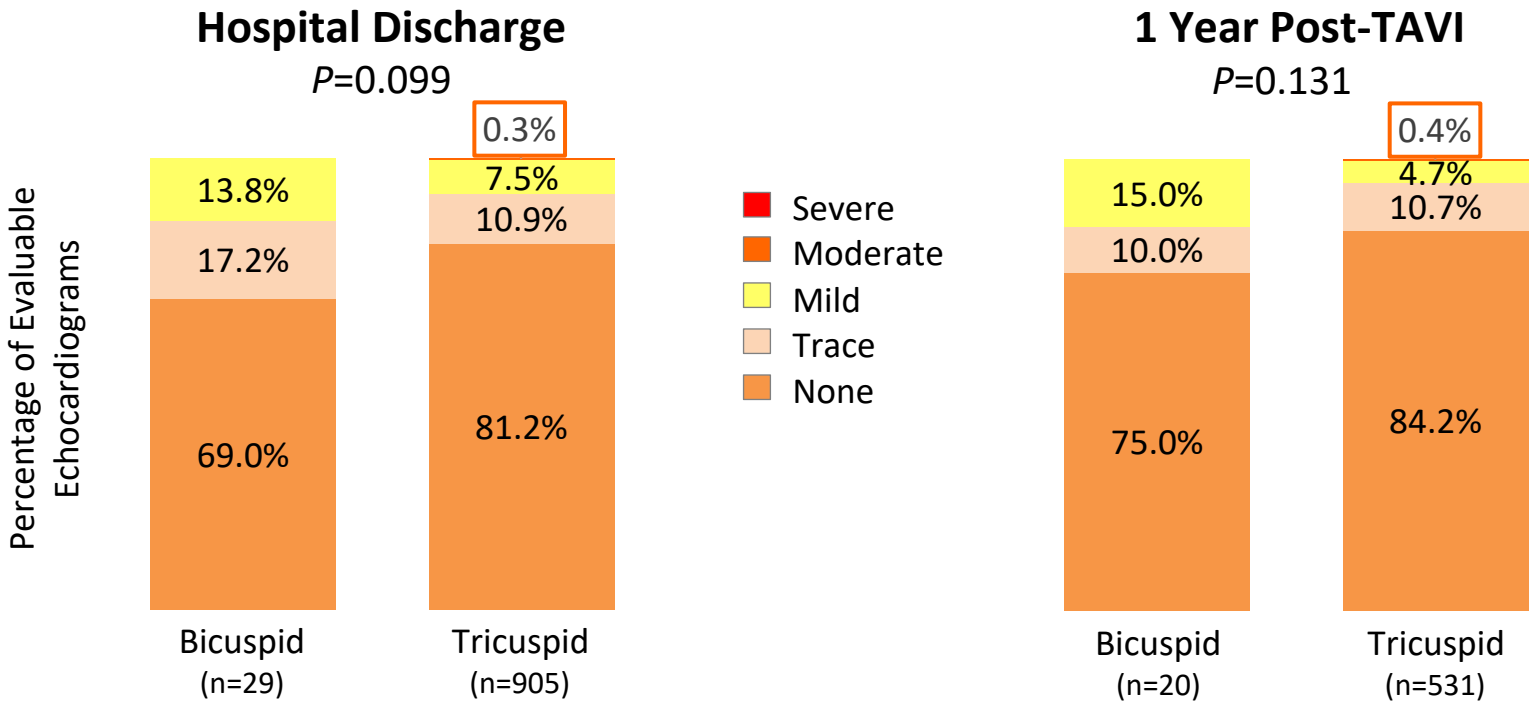
Both cohorts exhibited similar sustained improvements through 1 year



Core laboratory adjudicated data. Among patients with echocardiographic follow-up available for given time points.

Paravalvular Leak through 1 Year

PVL was low in both cohorts – No patients had severe PVL



Core laboratory adjudicated data. Among patients with echocardiographic follow-up available; data may not add to 100% due to rounding. All categorical comparisons between groups are non-significant.

Considerations in choosing THV in Bicuspid Valve Disease

- Annular size
- Presence of heavily calcified raphe
- Root size
- Type 1 vs Type 0

Bicuspids: Can they be done?

Yes… But with caution!