

# Longitudinal Changes in Ascending Aortic Size After TAVR in Bicuspid Valves: The Role of Valve Morphology and Imaging Modality

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# Disclosure of Relevant Financial Relationships

I, Iad Alhallak DO NOT have any financial relationships to disclose.

# Background

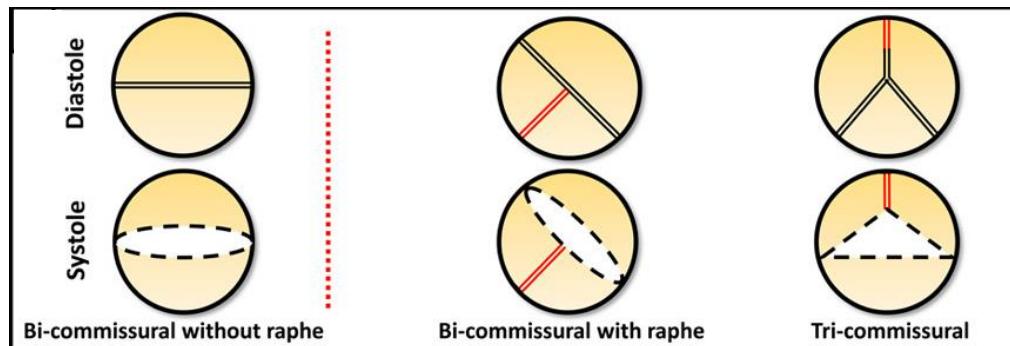
- We recently showed that in size of the dilated AA remains stable after TAVR in all-comer AS patients.
- Bicuspid aortic valve (BAV) morphology is the most common congenital cardiac anomaly affecting ~2% of the population
- As BAV is also associated with aortopathy, the consequences of TAVR on this population are important to understand.
- Limited data exists on monitoring this population's ascending aorta (AA) following a TAVR

# Methods

- We retrospectively analyzed data from 296 consecutive patients with BAV who underwent TAVR at a single institution between 2014 and 2024
- Post TAVR imaging:
  - 54 patients had thoracic CT
  - 147 had TTE
- Median follow-up post-TAVR was ~3 years

# Baseline Characteristics

- Mean Age 73 years; 57% were male
- NYHA Class III or IV symptoms 72%
- Median STS score 4.3%
- Distribution of BAV morphology
  - 13% bicommissural without raphe
  - 66% bicommissural with raphe
  - 21% tricommissural



# Post TAVR Imaging

- Baseline AA size:
  - $37.7 \pm 5.4$  mm on CT
  - $33.3 \pm 7.3$  mm on echocardiography
- Post-TAVR imaging:
  - 147 patients had TTE with an average follow-up of **2.5** years
  - 54 patients had CT with an average follow-up of **3.7** years

# Results

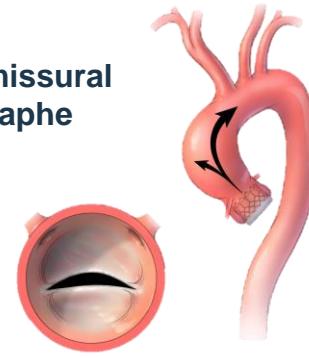
- Mean AA growth was modest:
  - 1.6 mm on TTE during 2.5 years of follow-up
  - $1.5 \pm 2.0$  mm on CT during 3.7 years of follow-up
- Baseline dilated AA ( $\geq 40$  mm) remained stable (CT:  $1.3 \pm 1.4$  mm; echo: 0.0 mm [IQR -3.0–1.3])
- Non-dilated AA ( $< 40$  mm) showed a small, but measurable growth (CT:  $1.9 \pm 2.6$  mm; echo: 2.0 mm [IQR 0–8.0]).

# BAV Morphological Classification

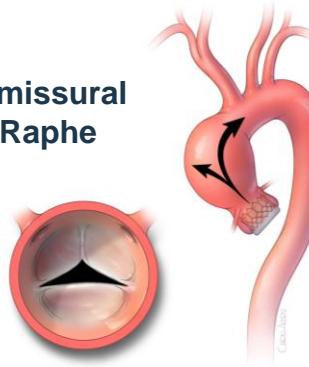
100-Day Index	CT (n=54)
Bicommissural No Raphe	0.15 mm IQR (0.05-0.23)
Bicommissural with Raphe	0.19 mm IQR (0.06-0.56)
Tricommissural with Raphe	0.70 mm IQR (0.41-9.03) <i>p=0.031</i>

CT demonstrated significant morphology-related differences: tricommissural BAV showed greater growth vs bicommissural without raphe ( $p=0.031$ ).

Bicommissural  
No Raphe



Tricommissural  
With Raphe



# Results

- Since the follow-up time varied per patient, we calculated a **100-day index** per patient.
- For the CT follow-up ( $n=54$ ), the median change in AA diameter was 0.19 mm per 100 days IQR (0.06 mm-0.55 mm), with no significant difference when stratified by pre-TAVR AA size.

100-Day Index	CT ( $n=54$ )
Overall	0.19 IQR (0.06-0.55)
Non-dilated AA (<40mm)	0.38 IQR (0.07-1.19)
Dilated AA ( $\geq 40\text{mm}$ )	0.18 IQR (0.06-0.33) ( $p=0.161$ )

# Discussion and Limitations

- The proposed mechanism of stabilization of aortopathy post-TAVR is the reduction of peak shear stress on the aortic wall
- Differences between the imaging modalities may reflect differences in measurement precision or due to a smaller sample size in our cohort
- This study is limited by its single-center design and modest CT sample size
- Follow-up CT and echo imaging was not protocolized

# Conclusion

- In BAV patients undergoing TAVR, AA dimensions exhibit **minimal to no progression** in dilated aortas
- The slow rate of AA change underscores **continued surveillance**, particularly in non-dilated AA and tricommissural morphologies

# Acknowledgement

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