RedoTAVR coronary obstruction risk in small annuli

A post-TAVR CT study

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Disclosure of Relevant Financial Relationships

I, Gaetano Liccardo, DO NOT have any financial relationships to disclose.

Background

- TAVR is a well-established treatment for severe AS.
- *Small aortic annuli* -> risk of PPM.
- SEVs in *small annuli:*
  - Superior hemodynamic performance/ less PPM.
  - Similar clinical outcomes.

TAVI is recommended in patients ≥70 years of age with tricuspid AV stenosis, if the anatomy is suitable.[d] 1–4,389–397,465,485,486	I	A

  - The need for redoTAVR procedures is expected to grow in the coming years.

Sá MP, et al. Impact of Prosthesis-Patient Mismatch After Transcatheter Aortic Valve Replacement: Meta-Analysis of Kaplan-Meier–Derived Individual Patient Data. J Am Coll Cardiol Img. 2023 Mar, 16 (3) 298–310.

Herrmann HC, et al. Self-Expanding or Balloon-Expandable TAVR in Patients with a Small Aortic Annulus. N Engl J Med. 2024 Jun 6;390(21):1959-1971.

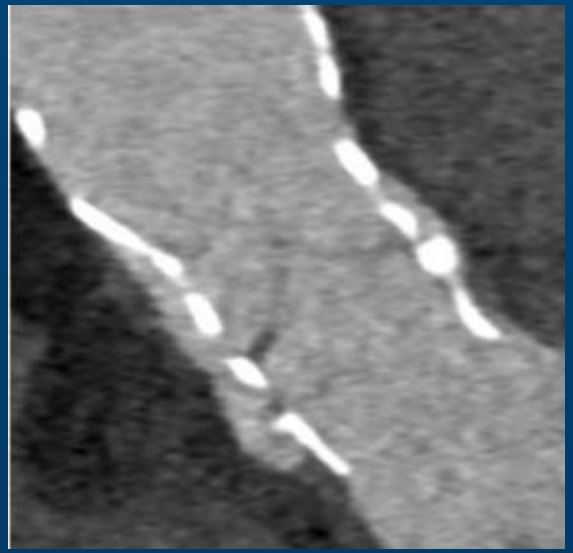
Background - CO risk mechanism

An important consideration when planning a *redoTAVR* procedure is that the leaflets of the first THV will be displaced by the second prothesis, forming a neoskirt-covered stent.

* Akodad M, et al. Balloon-Expandable Valve for Treatment of Evolut Valve Failure: Implications on Neoskirt Height and Leaflet Overhang. JACC Cardiovasc Interv. 2022 Feb 28;15(4):368-377.

Aim

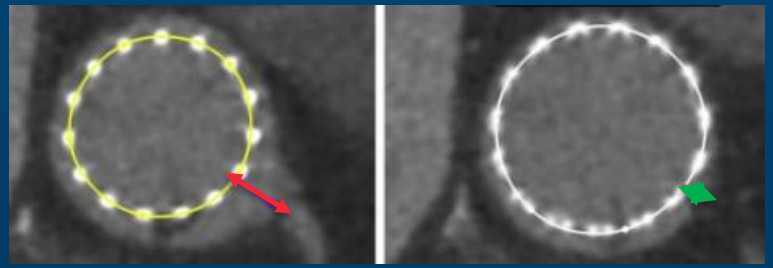
To evaluate CO risk in case of redoTAVR in patients with *small vs. non-small* aortic annuli.



Methods-CT analysis

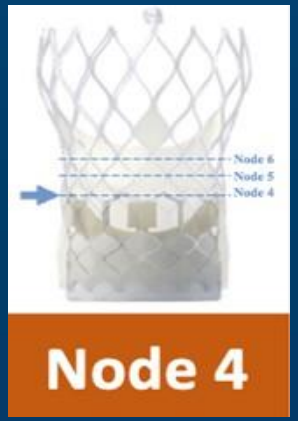
- 167 post-TAVR CT scans were analyzed. Patients were stratified into small annuli (≤430 mm^2) and non-small annuli groups (>430 mm^2).

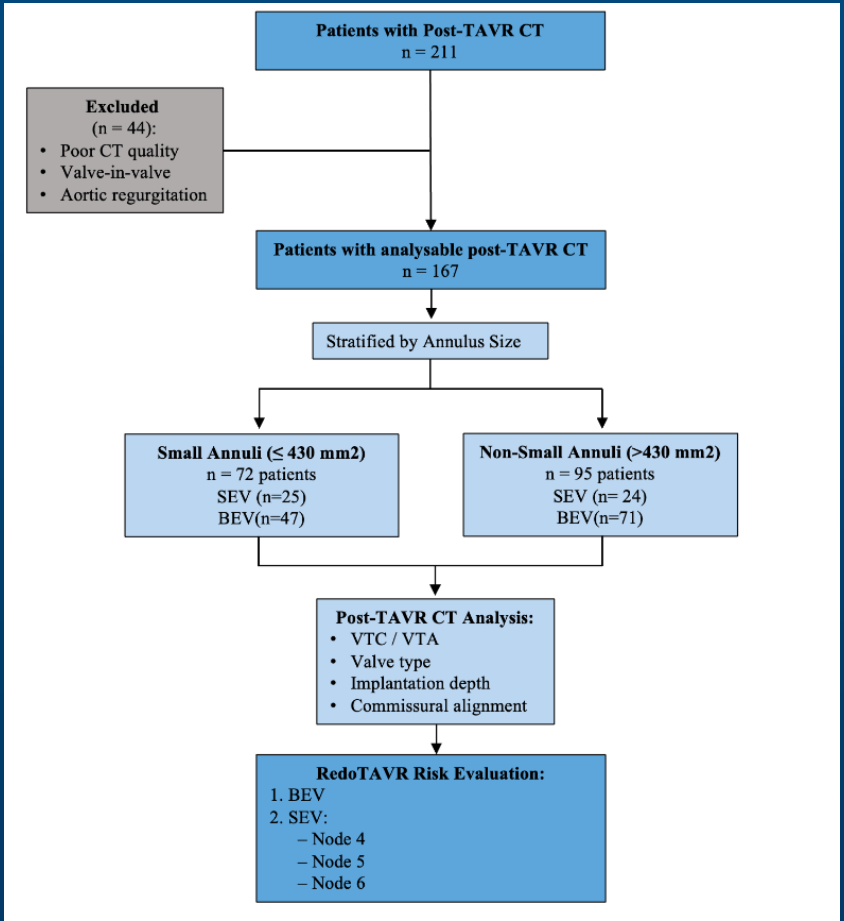
- VTC and VTA were measured.



Methods-CT analysis

- RedoTAVR CO risk evaluated at different risk planes. For SEVs, these planes corresponded to nodes 4, 5, and 6 on the valve frame. For BEVs, risk plane was placed at the outflow level of the device.
- High risk of CO when VTC < 4 mm or VTA < 2 mm (below the risk plane).




Patients with Post-TAVR CT
n = 211
Excluded
(n = 44):
• Poor CT quality
• Valve-in-valve
• Aortic regurgitation
Patients with analysable post-TAVR CT
n = 167
Stratified by Annulus Size
Small Annuli (≤ 430 mm2)
n = 72 patients
SEV (n=25)
BEV(n=47)
Non-Small Annuli (>430 mm2)
n = 95 patients
SEV (n= 24)
BEV(n=71)
Post-TAVR CT Analysis:
• VTC / VTA
• Valve type
• Implantation depth
• Commissural alignment
RedoTAVR Risk Evaluation:
1. BEV
2. SEV:
– Node 4
– Node 5
– Node 6

THVs across the two groups

THV	Small Annuli (n, %)	Non-Small Annuli (n, %)
Sapien 3 Ultra 23 mm	42 (58.3%)	3 (3.2%)
Sapien 3 Ultra 26 mm	5 (6.9%)	49 (51.6%)
Sapien 3 29 mm	-	19 (20.0%)
Evolut Pro Plus 23 mm	3 (4.2%)	-
Evolut R/Pro Plus 26 mm	15 (20.8%)	1 (1.1%)
Evolut R/ Pro Plus 29 mm	7 (9.8%)	12 (12.6%)
Evolut Pro Plus 34 mm	-	11 (11.5%)

There was no significant association between annulus size and SEV use (χ^2[1, N=167]=1.77; p=0.184).

CO risk evaluation

Predicted CO risk at redoTAVR: overall and by annulus size

88/167 patients (53%) of the overall study population were considered at high of CO risk in case of redoTAVR, with no differences *between small or non-small annuli* (OR = 1.65, 95% CI: 0.89–3.06, p = 0.112).

CO risk: SEVs Node 6 vs BEVs

Compared to patients having received BEVs, those treated with a SEV had a higher post-redoTAVR risk of CO if they had a small (OR = 15.52, 95 % CI: 3.28-73.6, p < 0.001), but not if they had a non-small (OR = 1.44, 95 % CI: 0.57-3.65, p = 0.441) annulus.

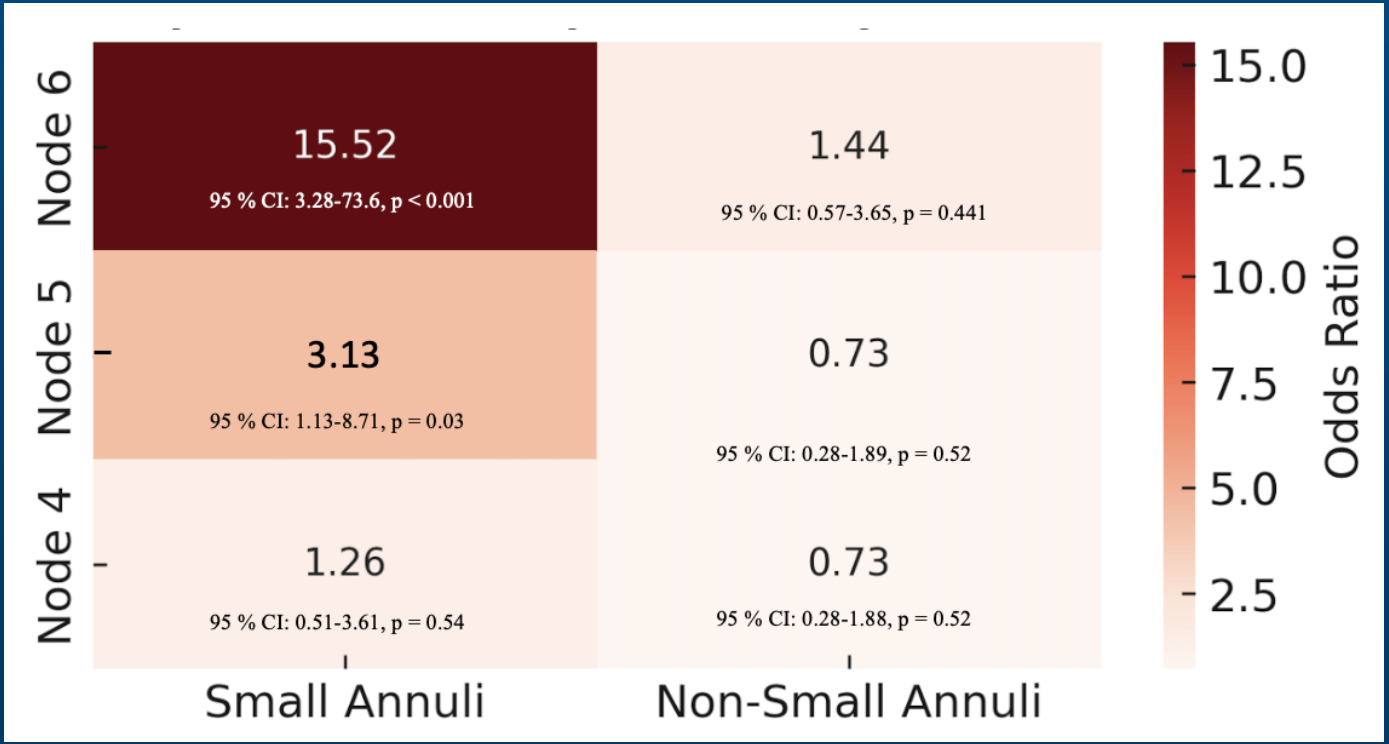
CO risk: SEVs Node 5 vs BEVs

Compared to patients having received BEVs, those treated with a SEV had a higher post-redoTAVR risk of CO if they had a small (OR = 3.13, 95 % CI: 1.13-8.71, p = 0.03), but not if they had a non-small (OR = 0.73, 95 % CI: 0.28-1.89, p = 0.52) annulus.

CO risk: SEVs Node 4 vs BEVs

When the SEV risk plane was at node 4, SEVs were not associated with a higher post-redoTAVR risk of CO compared to BEVs in both patients with small (OR = 1.26, 95 % CI: 0.51-3.61, p = 0.54) or non-small (OR = 0.73, 95 % CI: 0.28-1.88, p = 0.52) annuli.

CO risk: SEVs vs BEVs across the two groups



Take Home Messages

- As the population undergoing TAVR has expanded to younger and lower-risk patients, the need for redoTAVR procedures is expected to grow in the coming years.
- RedoTAVR is frequently associated with predicted CO risk.
- In small annuli, a SEV as the index valve is particularly unfavorable when the redo plane is high. These findings support careful index and redo procedure planning and execution.