

Valve-in-Valve TAVR in a 21mm Surgical Valve

*Addressing Patient-Prostheses Mismatch With
Sapien 3 Ultra*

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Disclosure of Relevant Financial Relationships

I, Hamza Alkowatli DO NOT have any financial relationships to disclose.

Acknowledgement

Co-Authors

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Background

- Structural valve degeneration (SVD) occurs in 20-30% of surgical bioprostheses at 10-15 yrs
- Redo-SAVR carries higher risk in frail, multi-morbid patients
- Valve-in-Valve TAVR increasingly favored for high-risk patients with failed surgical valves
- Challenge in small (≤ 21 mm) valves: ↑ residual gradients & patient-prosthesis mismatch (PPM)

Case Presentation

74-year-old male

- Prior 21 mm SAVR (2021), CABG, PAD, chronic lymphedema
- Presented with progressive dyspnea, edema, functional decline
- Frailty: Katz ADL 4, KCCQ 18
- On arrival: O₂ sat 92% on 3 L NC, BP 149/68 mmHg, irregular HR 70 bpm
- Exam: 3/6 systolic murmur, foul-smelling leg wounds
- STS-PROM 5.2% → high surgical risk

Investigations

Echocardiography

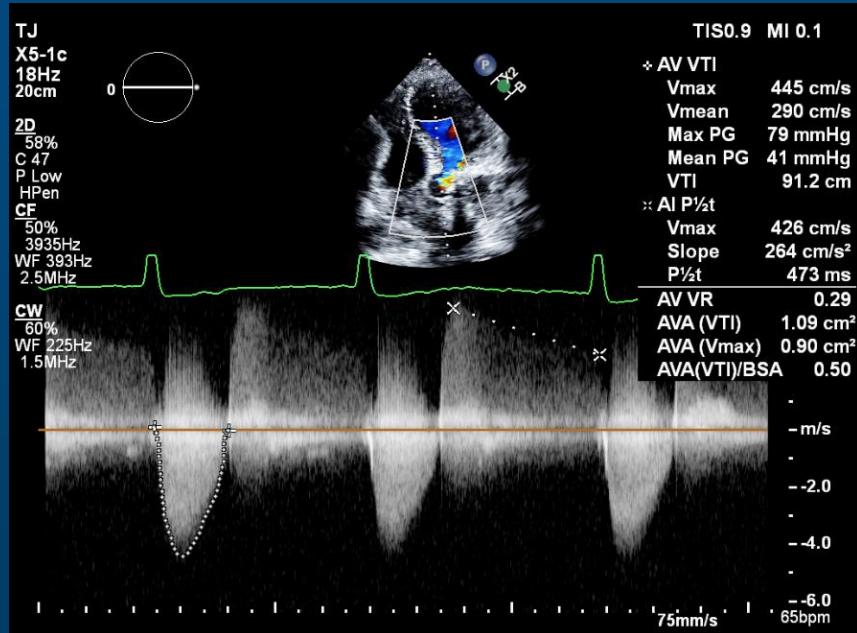
- Severe prosthetic AS: mean grad 40 mmHg, Vmax 4.15 m/s, AVA 1.2 cm²
- Moderate-severe central AI
- LVEF 45–55%

RHC: mPAP 23 mmHg, PCWP 19 mmHg, CO 5.7 L/min

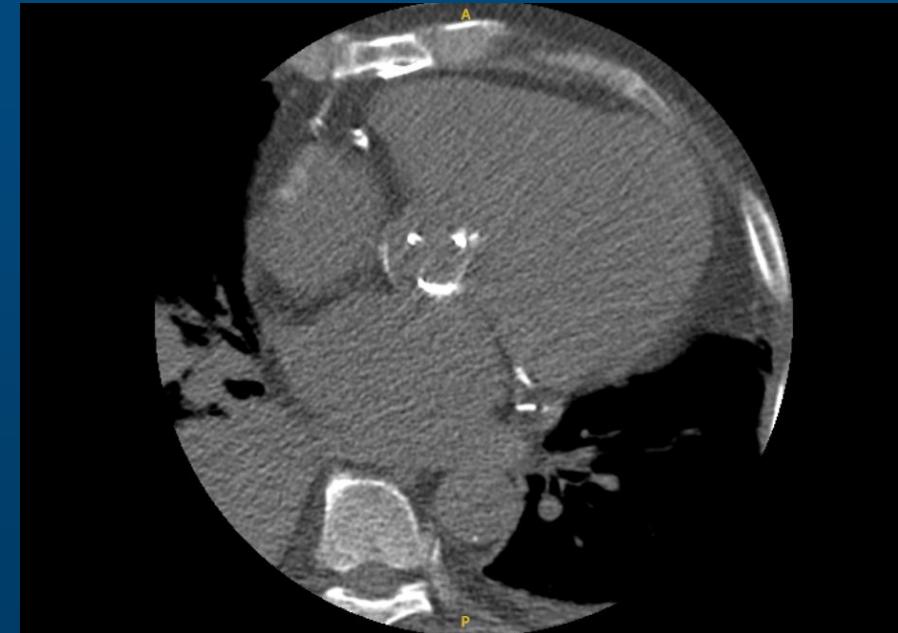
CTA: Suitable annulus & ilio-femoral access

Coronary angiography: patent grafts

Investigations



Transesophageal Echocardiography (ME LAX, 120°): Restricted Leaflet Motion with Severe AS and Moderate-to-Severe Central AI



ECG-gated CT, short-axis view at aortic annulus showing 21 mm surgical ring prior to planned ViV

Procedural Details

Approach: Transfemoral, under monitored anesthesia

Pre-dilatation: Balloon valvuloplasty

Valve: 23 + 2 mm balloon-expandable

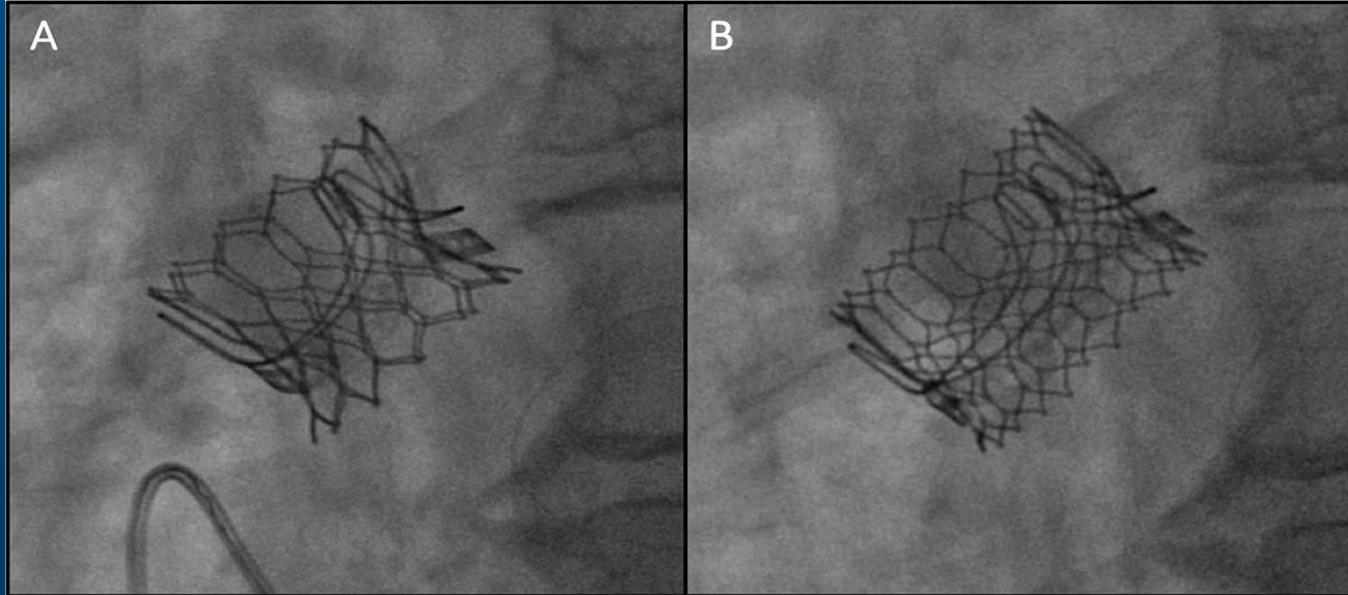
Deployment: Rapid ventricular pacing

Result: Valve well-seated, no PVL

Closure: Percutaneous, uneventful

Post-TAVR: ICU overnight; hemodynamically stable

Procedure



Fluoroscopic images of pre- and post-bioprosthetic valve fracture to facilitate valve-in-valve transcatheter aortic valve replacement. Failed 21 mm surgical valve underwent VIV TAVR with a 23 mm Sapien 3 valve (a). A 23 mm dilatation balloon was used to achieve fracture of the surgical valve, leading to improved expansion of the implanted transcatheter valve (b).

Discussion

Small surgical valves → ↑ risk of high residual gradient & PPM

Pre-procedural imaging + pre-dilatation enabled optimal expansion

No BVF required: annulus compliant, good result with 23 + 2 mm balloon-expandable

Comparable literature:

- Allen KB et al. Circ CV Interv 2017 – BVF technique
- Arai T et al. JACC Intv 2022 – ViV-TAVR in small annuli w/o BVF
- Tanaka M et al. Circ J 2023 – Japanese registry of small-annulus ViV-TAVR

Demonstrates feasibility & safety with modern ViV-TAVR platforms

Conclusion

Marked symptomatic improvement → discharged on dual antiplatelet therapy

Ongoing follow-up with TTE

Key lessons:

- Careful annular sizing & procedural planning are critical
- ViV-TAVR is a safe & effective alternative to redo-SAVR in selected high-risk pts
- In small bioprostheses, good outcomes achievable without BVF when anatomy favorable