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Valve-in-Valve TAVR with Bioprosthetic Valve Fracture and Snaring Technique in Extremely Challenging Anatomy

Subtitle: VIV-TAVR in Extremely Challenging Anatomy

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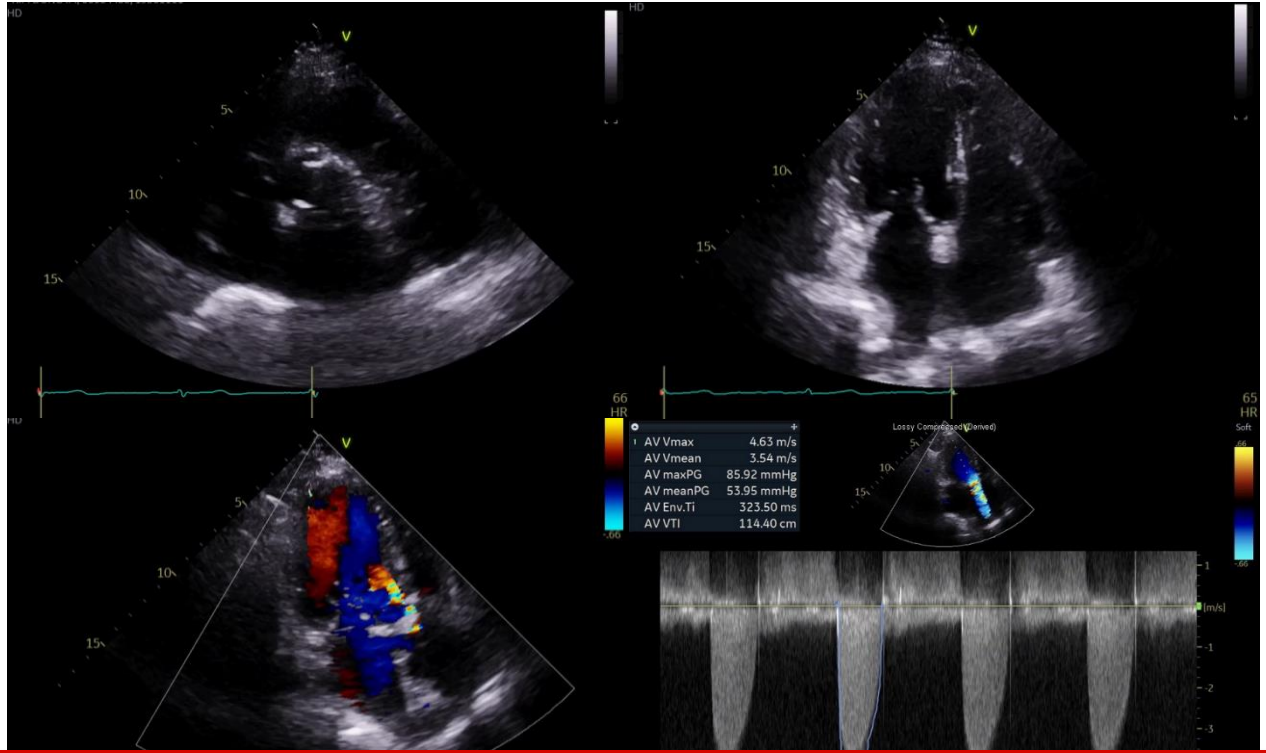
Disclosure of Relevant Financial Relationships

We, Ju Han Kim, and Seok Oh DO NOT have any financial relationships to disclose.

Case – An 88-year-old Korean woman

- Referred to valve-in-valve transcatheter aortic valve replacement (VIV-TAVR)
- Degeneration of a prior 21mm Carpentier-Edwards PERIMOUNT Magna Ease bioprosthesis
- P/H : Hypertension, previous history of AVR
- Echo :
  - S/P AVR with prosthetic valve dysfunction
  - LVEF 57.3%, severe AS, moderate AR

Pre-TAVR Echocardiogram

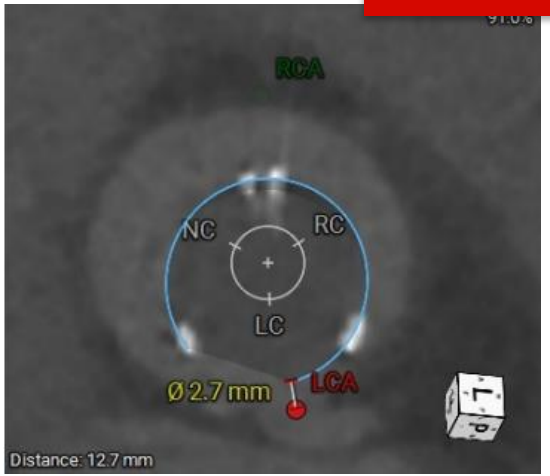


- *EOA 0.75 cm2, mean PG 54.0 mmHg, and peak AoV velocity 4.63m/s*
- *Indicating significant patient-prosthesis mismatch d/t the prior small surgical bioprosthesis.*

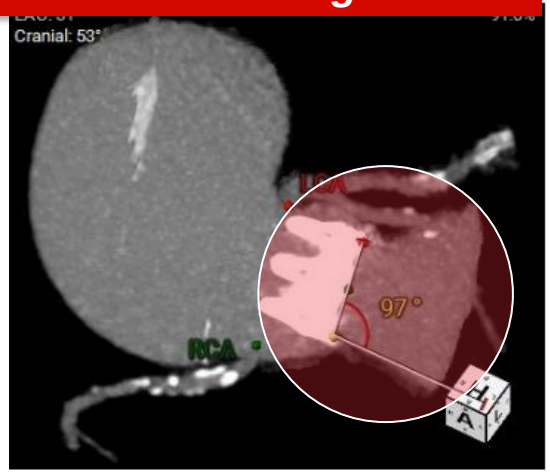
Oh and Hyun et al., Korean Circ J. 2025 Sep;55(9):855-857

Pre-TAVR CT Evaluation

1. Small annulus

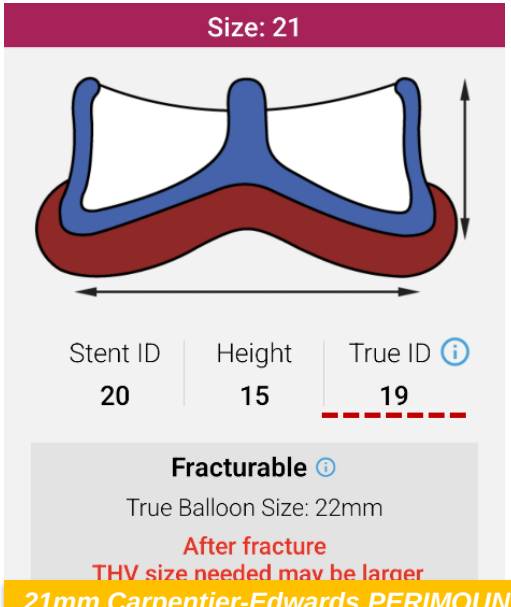


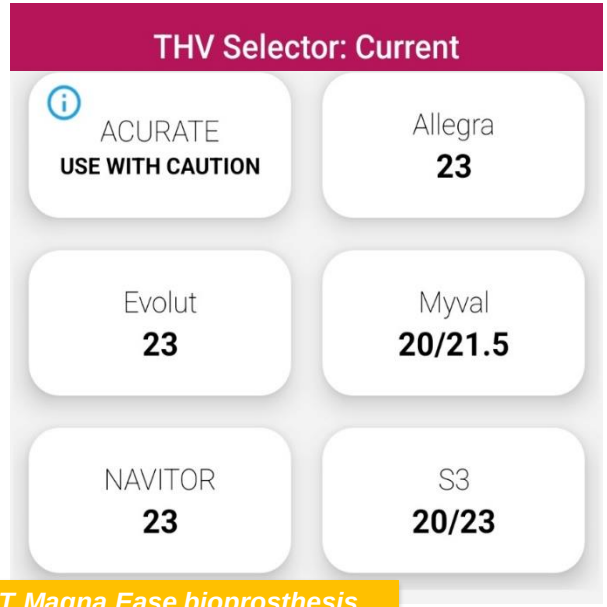
2. Extreme horizontal angulation

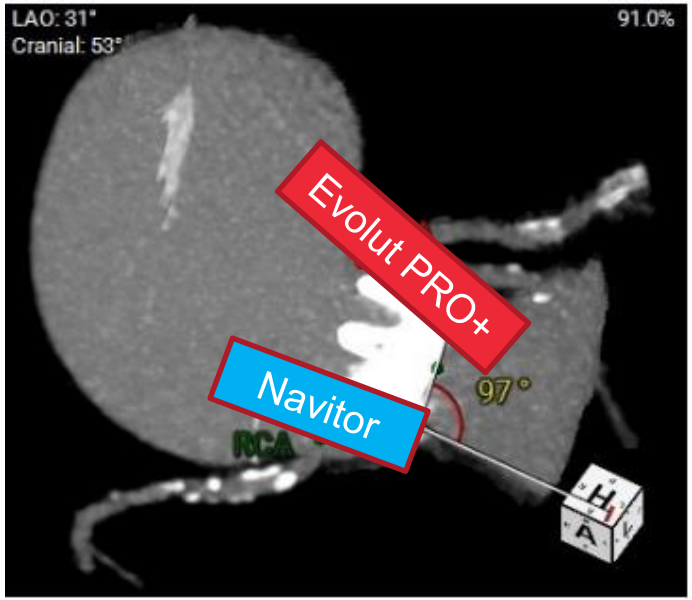


- The true inner diameter of the surgical bioprosthesis was 19.0mm based on CT scan (small annulus – 19mm)
- Also, CT scan showed the extreme horizontal angulation of the ascending aorta (extreme horizontal angulation – 97 degree)

Previously Implanted Surgical Prosthesis







21mm Carpentier-Edwards PERIMOUNT Magna Ease bioprosthesis

- While supra-annular valves are generally preferred for small annuli to achieve lower residual gradients, the patients severely angulated aorta and horizontal orientation raised significant concerned about device deliverability and alignment.
- Navitor valve (Abbott), with its flexible delivery system and low profile, was considered advantageous in this extremely tortuous anatomy.

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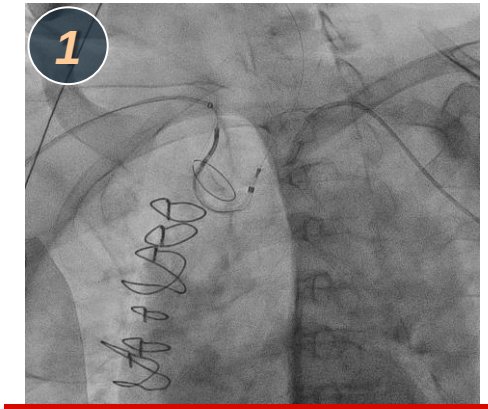
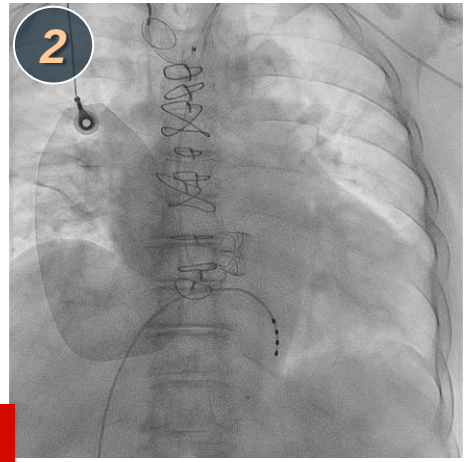
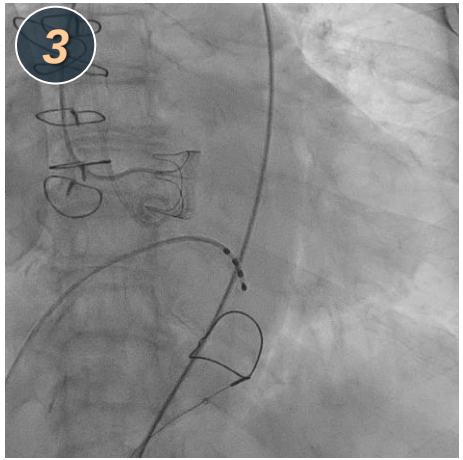
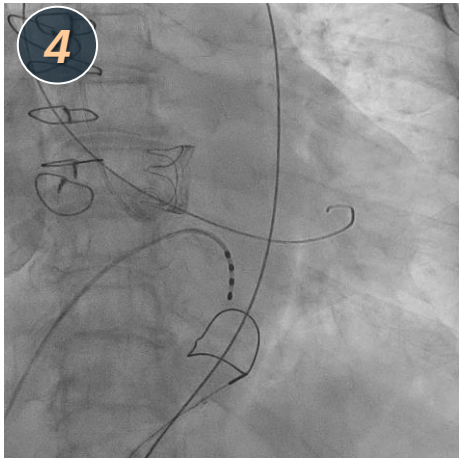
TAVR in Progress

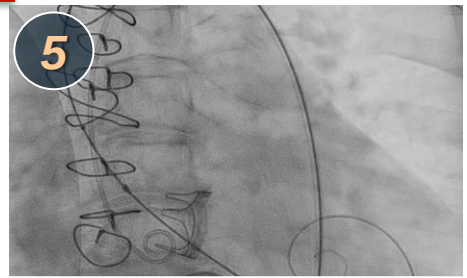


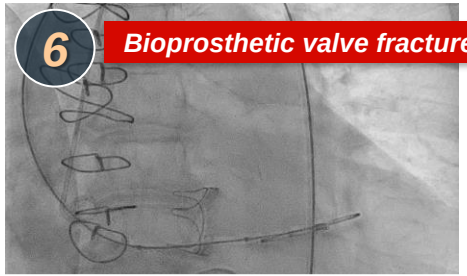






Cerebral embolic protection device (SENTINEL™, Boston Scientific)



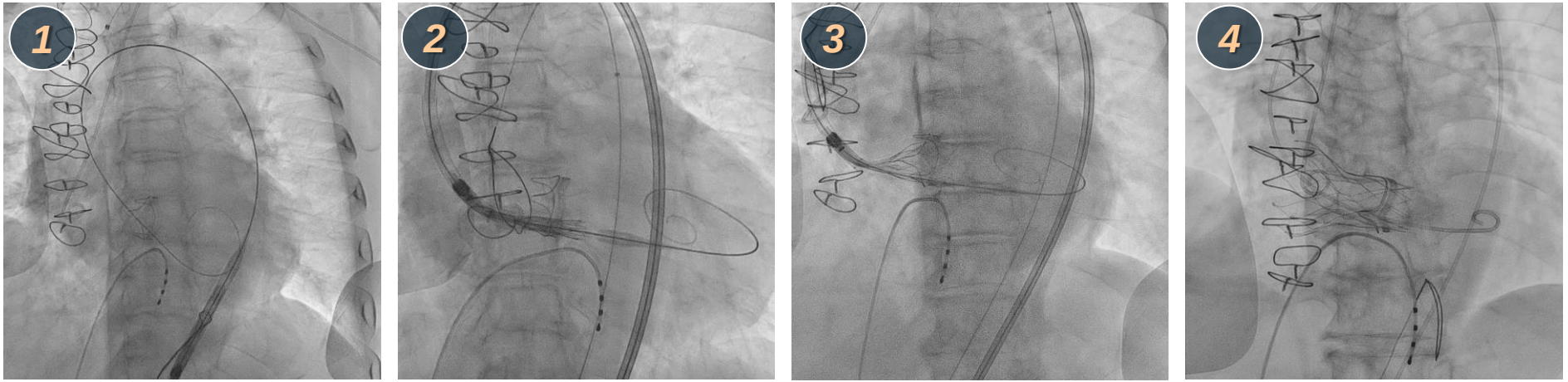


Bioprosthetic valve fracture

- To offset the hemodynamic limitation of intra-annular valves (Navitor, Abbott), optimized the orifice area, then achieve acceptable hemodynamics post-VIV-TAVR, we performed bioprosthetic valve fracture.
- Nonetheless, advancement of the Navitor valve failed due to interference from the angulated aorta and the prior valve frame.

Oh and Hyun et al., Korean Circ J. 2025 Sep;55(9):855-857

TAVR in Progress



- To overcome this point (failed advancement of the Navitor valve), an ipsilateral snare technique was employed.
- A 25-mm Amplatz Goose Neck snare (Medtronic) was pre-mounted on the FlexNav delivery system and introduced alongside the device into the ascending aorta.
- Gentle external traction enabled coaxial alignment and advancement of the prosthesis across the degenerative valve.
- The Navitor (Abbott) valve was successfully deployed without complications.

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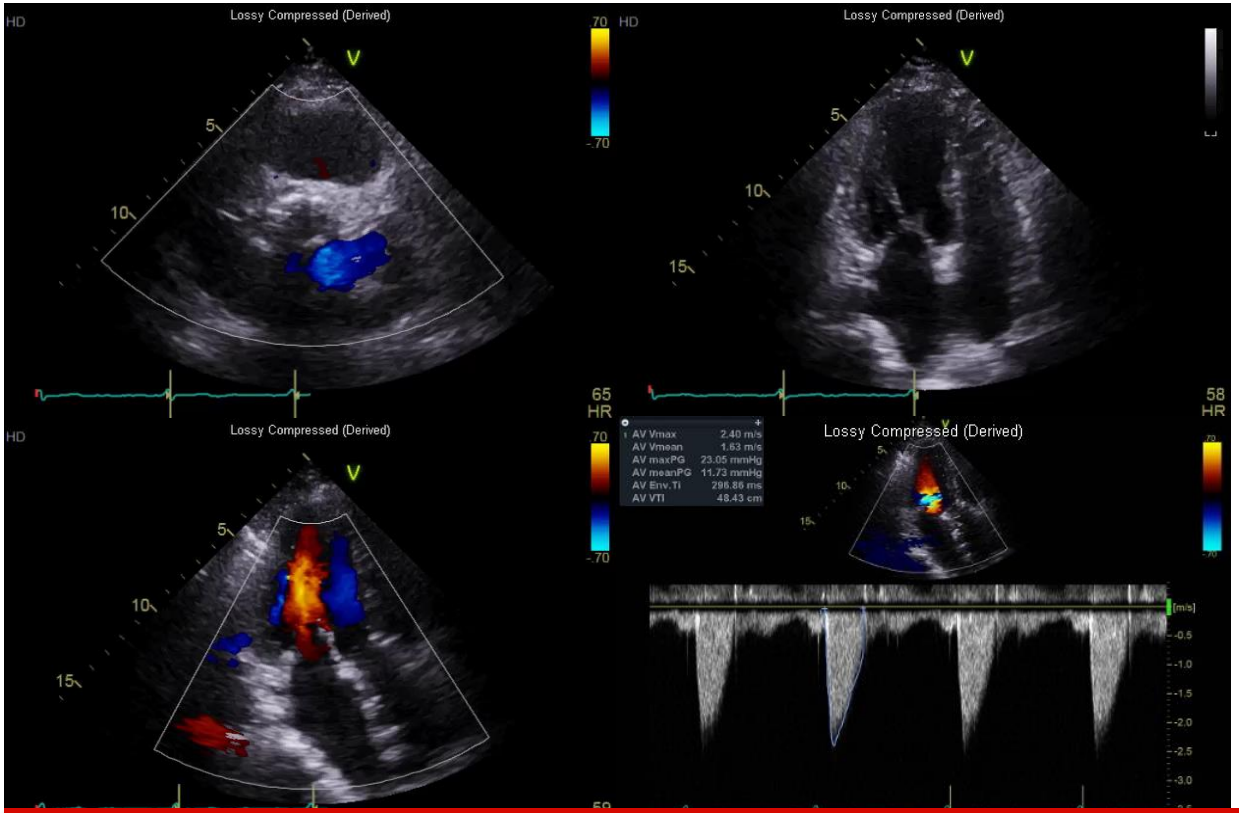
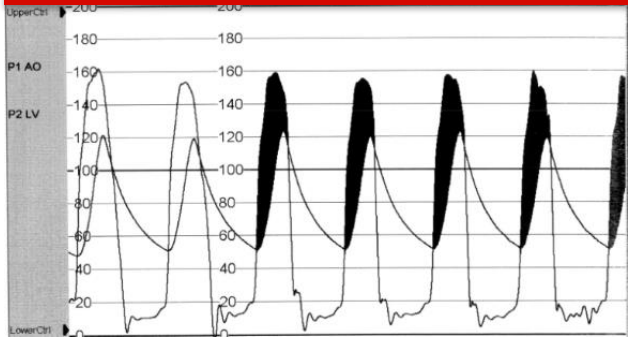
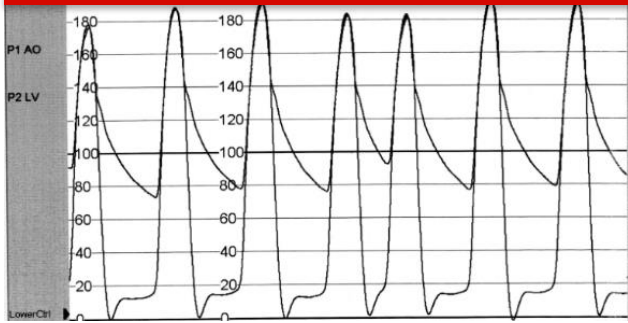
Post-TAVR Echocardiogram



Pre-TAVR peak-to-peak PG



Post-TAVR peak-to-peak PG



EOA 1.63 cm2, mean PG 11.7 mmHg, and peak AoV velocity 2.40 m/s

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Why This Case?

- A technically complex VIV-TAVR in an elderly patient with a small annulus and extreme aortic angulation
- **Valve selection: self-expanding supra-annular valve vs. infra-annular valve**
  – Supra-annular valves are generally accepted for small annuli to achieve lower residual gradients.
  – The patient's severely angulated aorta and horizontal orientation raised significant concerns about device deliverability and alignment.
  – The Navitor valve, with its flexible delivery system and low profile, was considered advantageous in this extremely tortuous anatomy.
- **Valve fracture timing: pre-TAVR vs. post-TAVR fracture**
  – Current consensus generally favors post-deployment fracture to reduce the risk of acute aortic regurgitation
  – Our team opted for pre-dilatation to ensure full expansion of the small, rigid surgical valve frame, thus improving deliverability in a severely angulated aorta.
- **Snare-assisted device system delivery**
  – To overcome this point (failed advancement of the Navitor valve), an ipsilateral snare technique was employed.

- ***Like other cases using snaring or BVF for difficult VIV-TAVR, this case demonstrates that combined BVF and snare technique may serve as a feasible bailout strategy when standard delivery fails in anatomically challenging cases.***

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