TCT 2025 Challenging Cases: TAVR in a Case With Calcified Right-Dominant Double Aortic Arch

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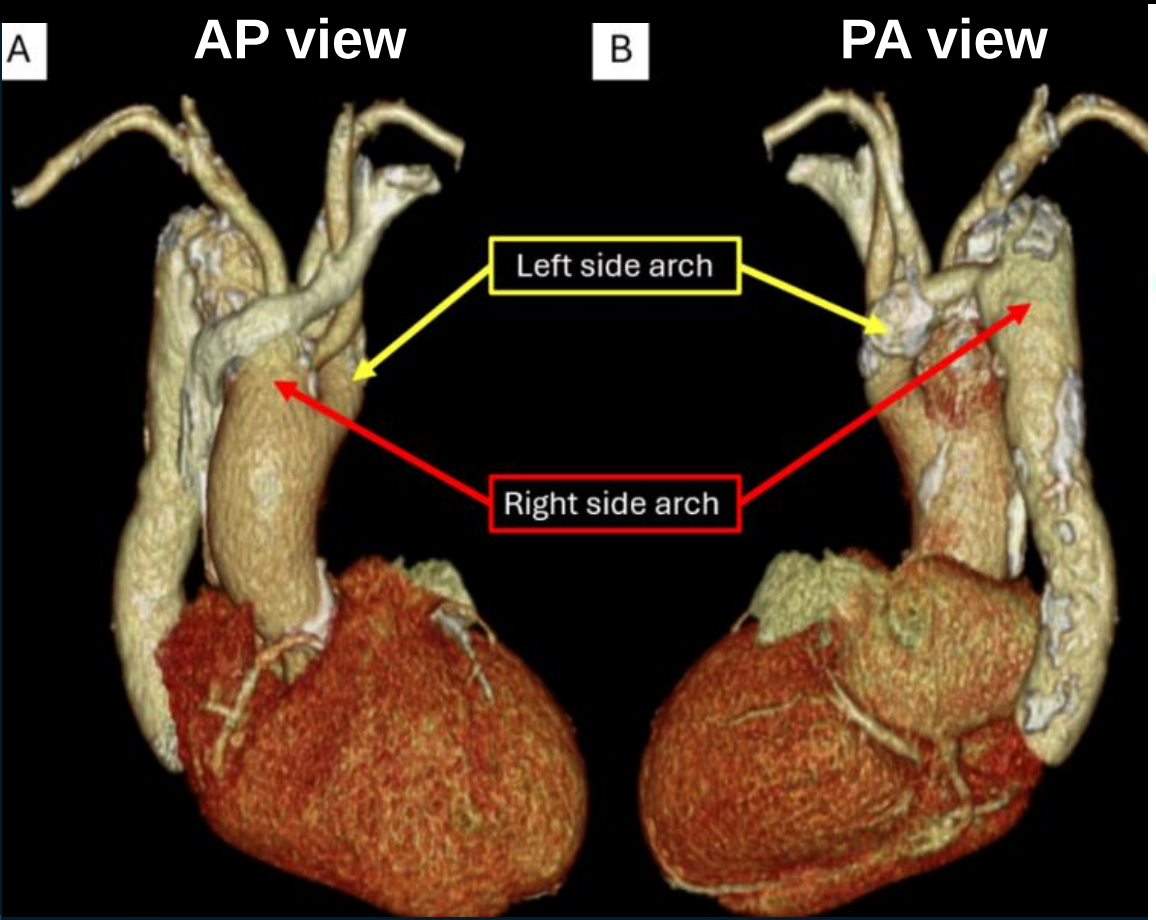
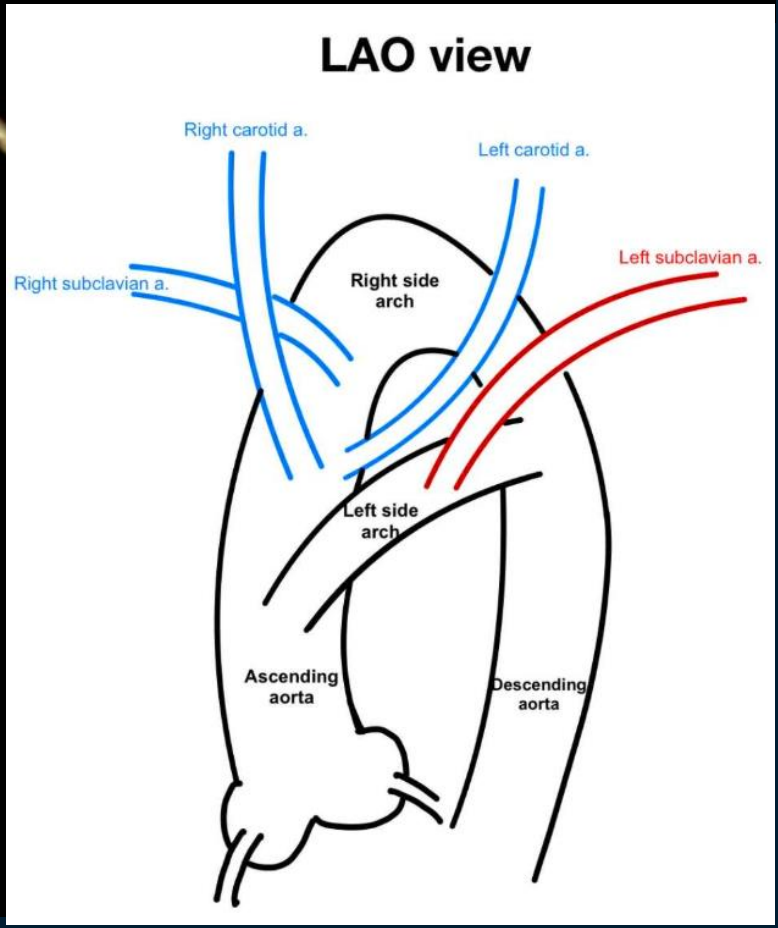
Disclosure of Relevant Financial Relationships

I, Kuan-Yu Lin DO NOT have any financial relationships to disclose.

Clinical Background

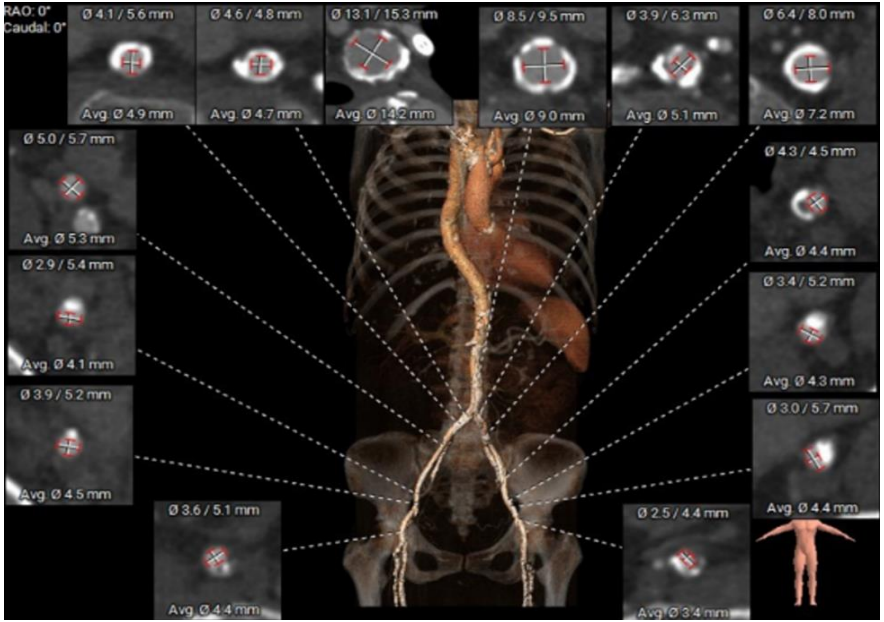
- 71 y/o woman
- Comorbidities: PAOD, ESKD, Recent ischemic stroke (2 months ago)
- Clinical presentation: Progressive dyspnea for 2 months
- Lab: NT-proBNP > 35,000 *pg/mL*
- TTE : Paradoxical low-flow low-gradient aortic stenosis
  - AVA=0.6 cm^2, mean PG= 21.6 mmHg
- High surgical risk (STS score =11.8) **+** Heart-Team discussion → **TAVR**


A
AP view
B
PA view
Left side arch
Right side arch


LAO view
Right carotid a.
Left carotid a.
Right subclavian a.
Left subclavian a.
Right side arch
Left side arch
Ascending aorta
Descending aorta

TAVR-CTA

- Valve calcium score = 642.74
- Annulus Perimeter (mm)
  = ***65.4***
- Sinus of Valsalva Diameter (L/R/N, mm)
  = ***27.8 x 26.5 x 29.0***
- Coronary Ostia Height (L/R, mm)
  = ***13.3 / 11.9***
- Peripheral vascular access (L/R, mm)
  = ***< 5.0 / 5.1 ~ 5.3***



Strategy (1) : Access route

✖ *Trans-carotid* → Recent stroke, High risk of periprocedural stroke

✖ *Trans-subclavian*

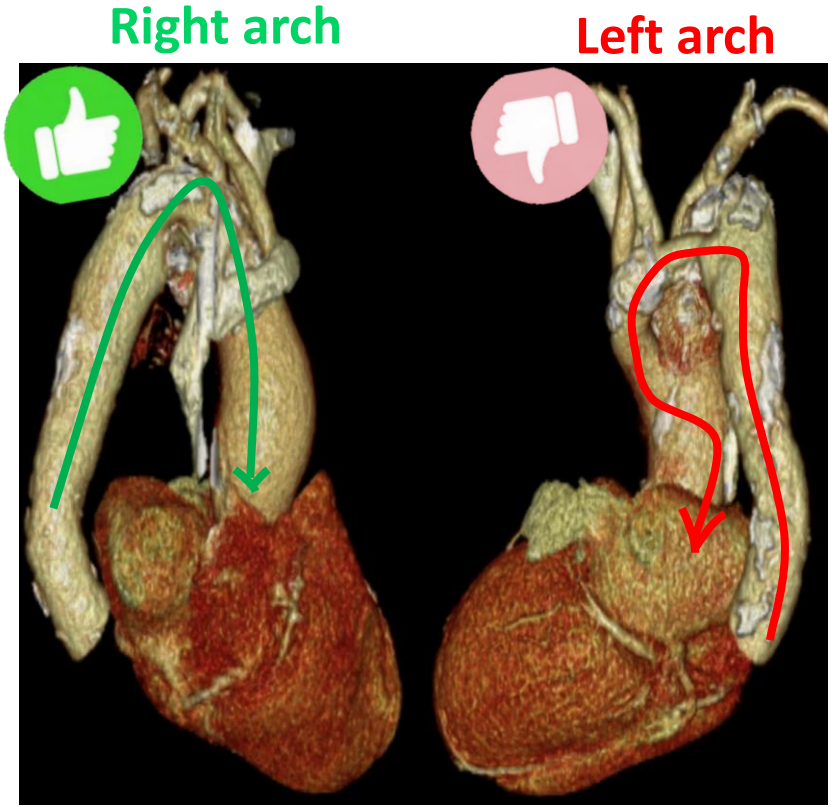
- Right → Diseased vessel
- Left → Left minor arch route to ascending aorta

✖ *Trans-caval* → Calcified abdominal aorta

✔ *Trans-femoral* → Small caliber, Calcification

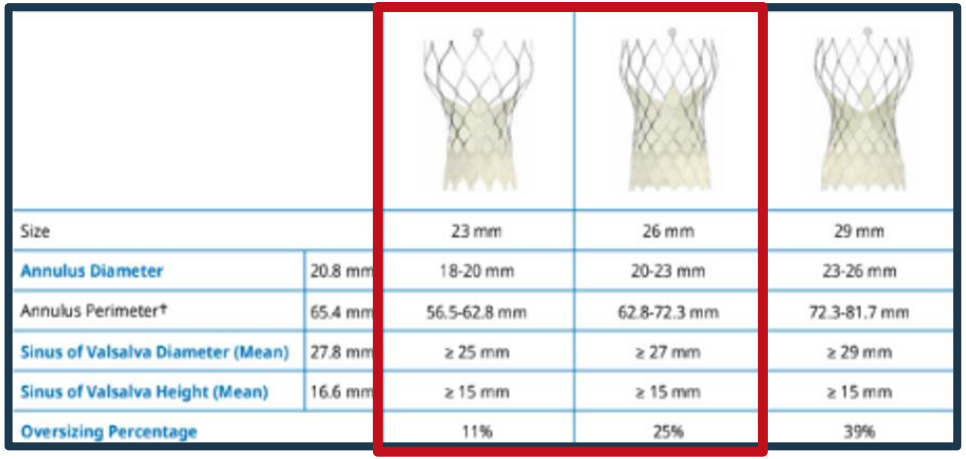
Strategy (2) : Arch selection

- *Larger diameter*
- *Less tortuosity*
- *Better device coaxiality*



Strategy (3) : THV selection

- **THV type**
  - ✗ For navigating sharp arch: BEV > SEV
  - ✓ For trans-femoral approach: SEV > BEV
- ***Evolut FX*** **size selection**
  - ✓ ***23mm*** ↓ ***Coronary obstruction***



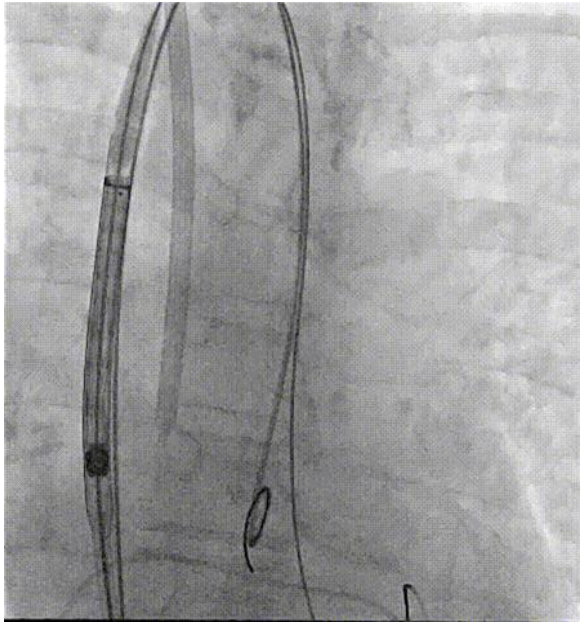
		23 mm	26 mm	29 mm
Annulus Diameter	20.8 mm	18-20 mm	20-23 mm	23-26 mm
Annulus Perimeter†	65.4 mm	56.5-62.8 mm	62.8-72.3 mm	72.3-81.7 mm
Sinus of Valsalva Diameter (Mean)	27.8 mm	≥ 25 mm	≥ 27 mm	≥ 29 mm
Sinus of Valsalva Height (Mean)	16.6 mm	≥ 15 mm	≥ 15 mm	≥ 15 mm
Oversizing Percentage		11%	25%	39%

BEV = Balloon-expandable valve ; SEV = Self- expandable valve

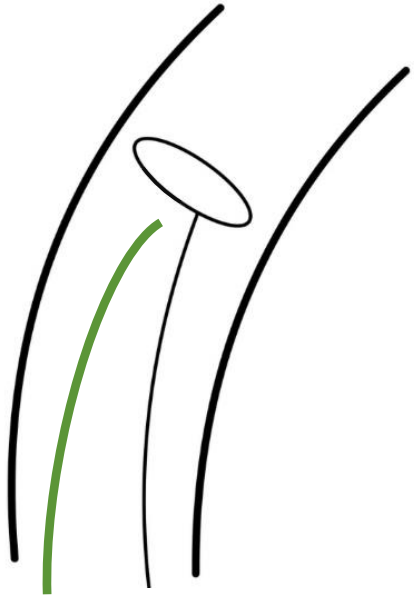
Overcome the calcified and angulated right arch

FAIL

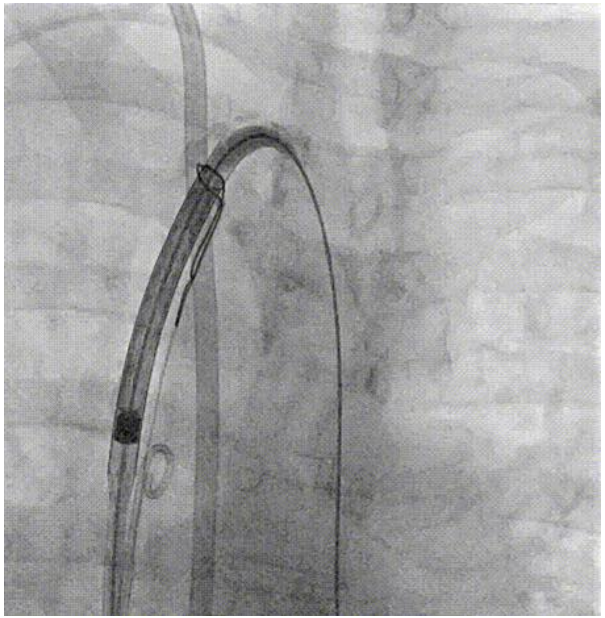
Buddy stiff wires



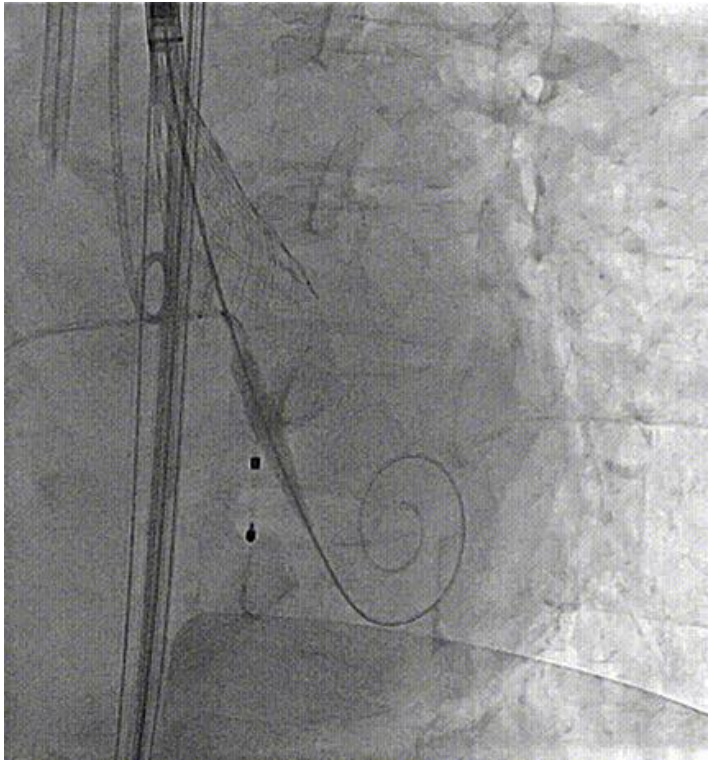
Snare-assisted THV redirection

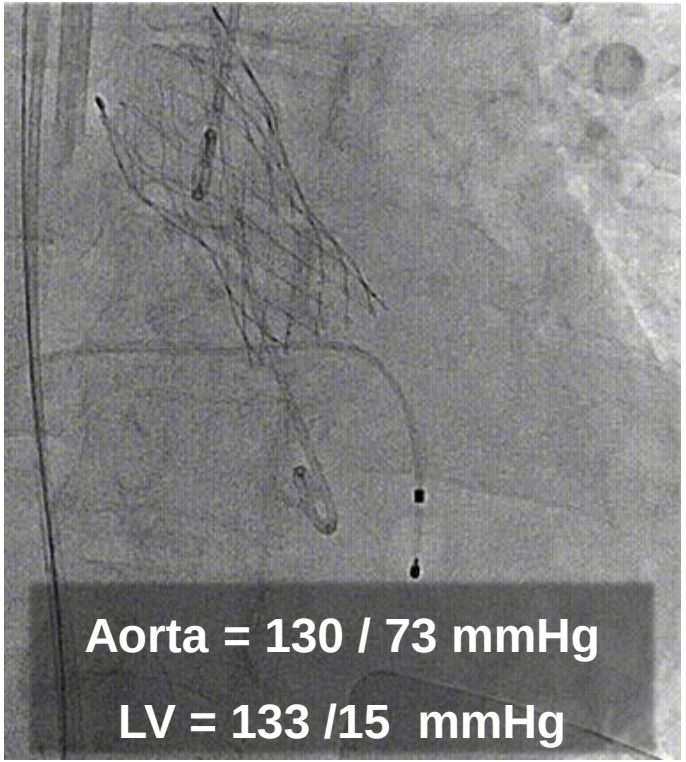


Snare



Position and Deploy THV





Take-home Message

- This was a challenging TAVR case with a right-side dominant double aortic arch and calcified vasculature.
- Comprehensive pre-TAVR imaging is essential to identify rare vascular anomalies and guide pre-procedural planning
- Balloon-expandable valves may be more favorable in overcoming sharp and calcified aortic angle.
- For self-expandable valves in this setting, navigation should be assisted by specific techniques, such as buddy stiff wire or snare-assisted redirection.