

Strategy for TAVI Implantation in Bicuspid aortic valve



LOS ROBLES
HEALTH SYSTEM



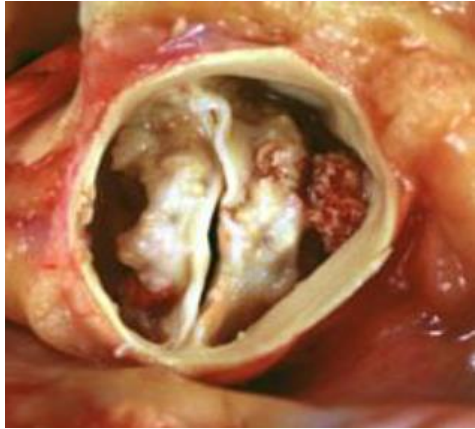
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Bicuspid aortic valves



- Heterogeneous cusp and sinus morphology
- Heavy and asymmetric calcifications
- Long commissural distance



- Aortic root angulation (horizontal aorta)
- Aortopathy
- Coarctation of aorta

Bicuspid aortic valves

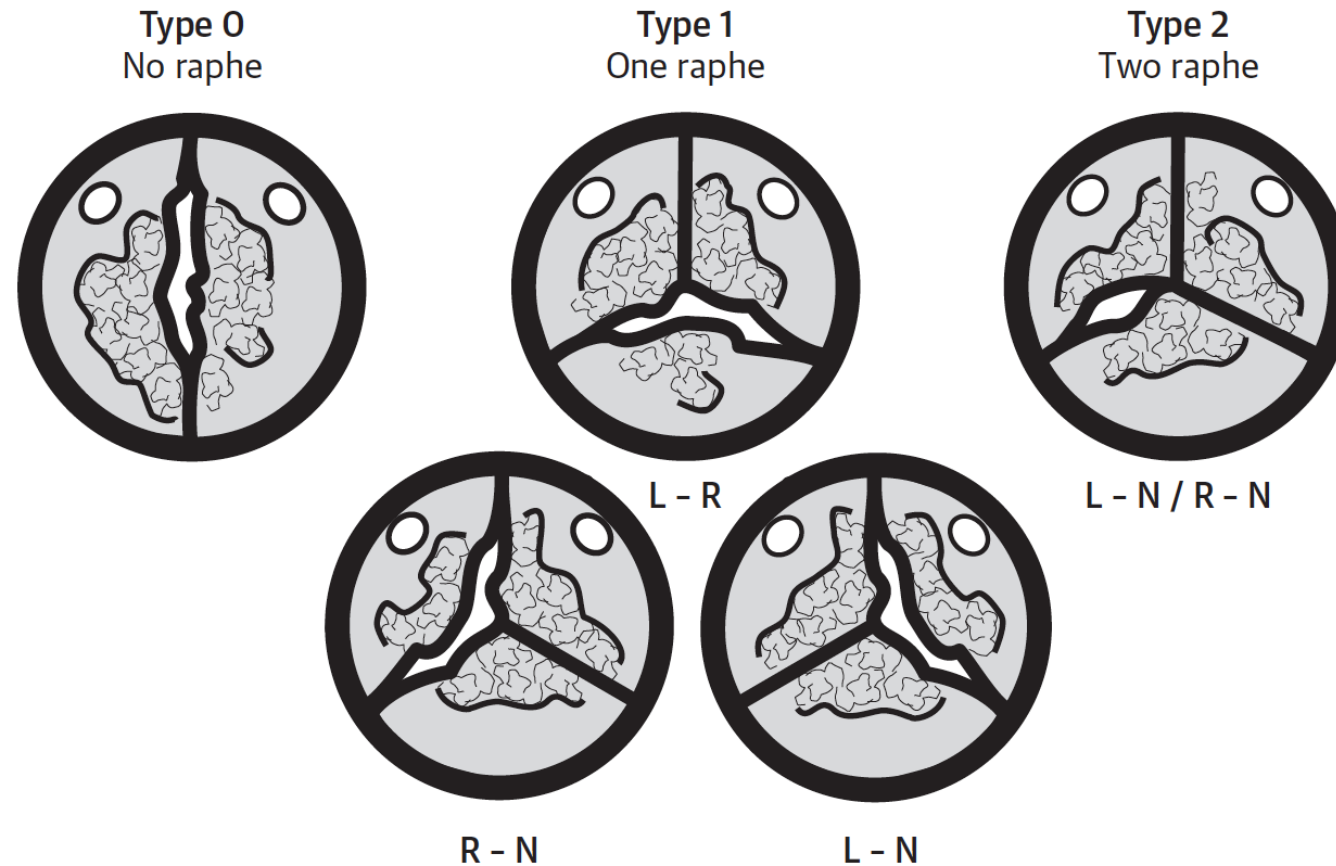


- Heterogeneous cusps morphology
- Heavy and asymmetric cusps
- Long coronary aortic distance

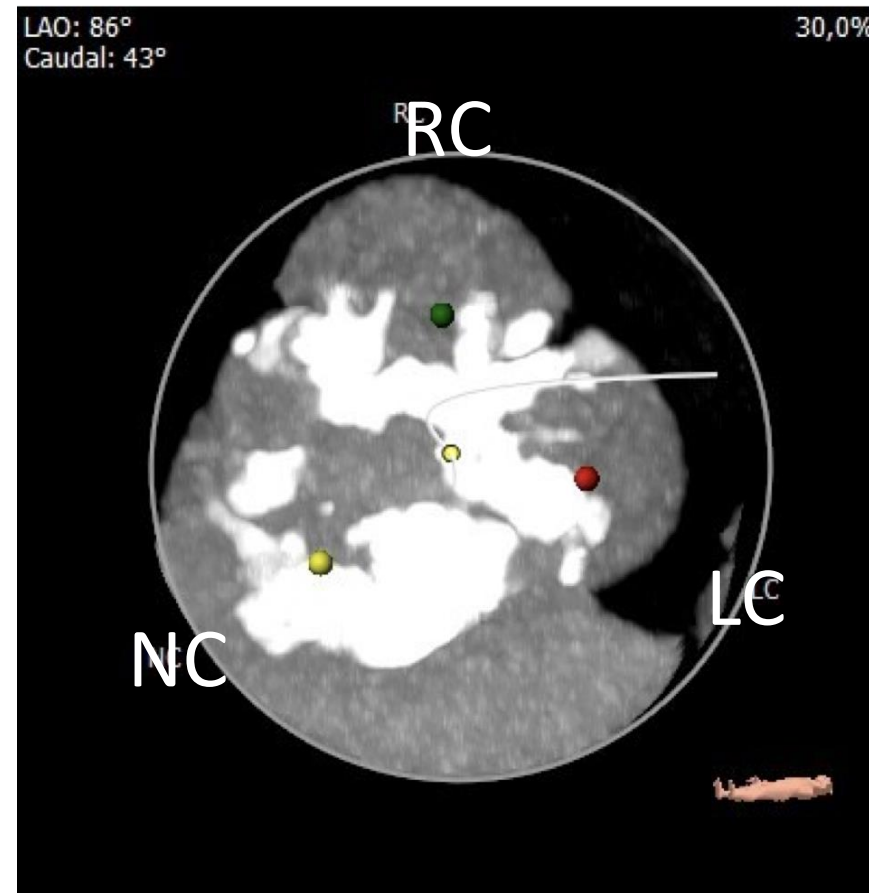
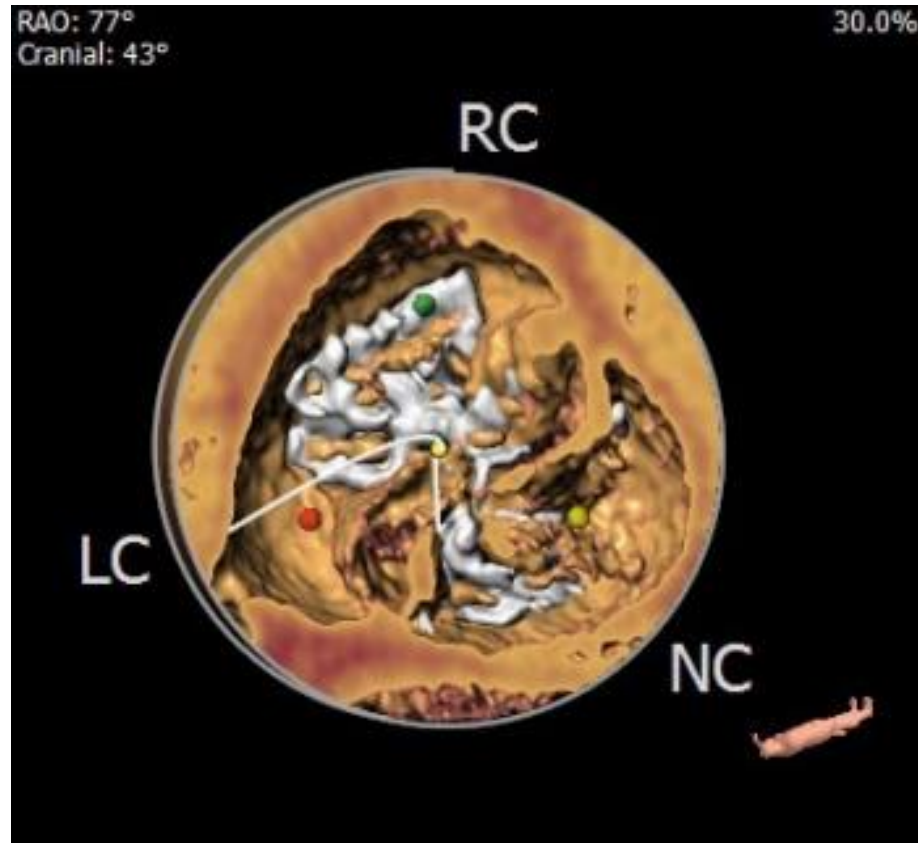
Bicuspid aortic valves have been excluded from all RCT between TAVI and SAVR!

- Aortic angulation (horizontal aorta)
- Aortic aneurysm
- Aortic dissection
- Aortic regurgitation
- Coarctation of aorta

Sub-classification *based on spatial position of raphe*



Both are Type 1, but are the same



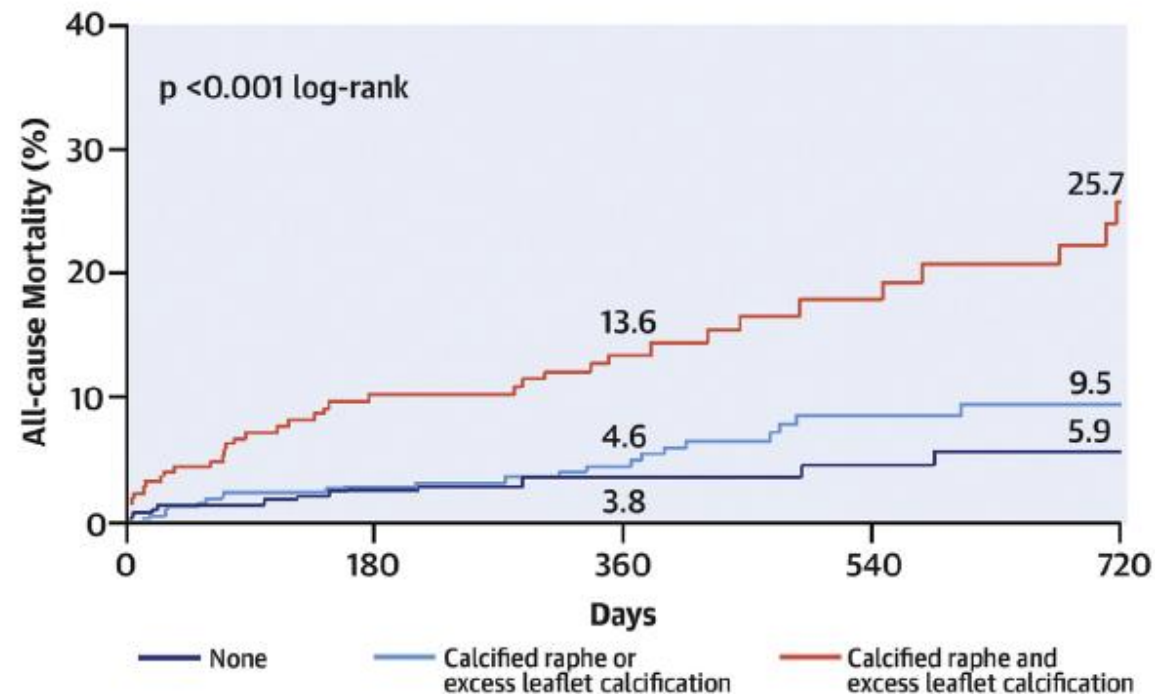
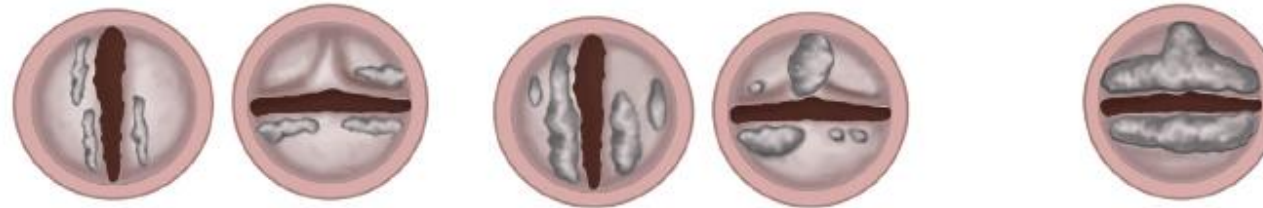
Phenotype and calcification are important in bicuspid aortic valves



No Calcified Raphe or
Excess Leaflet
Calcification
(31.3%)

Calcified Raphe or
Excess Leaflet
Calcification
(42.6 %)

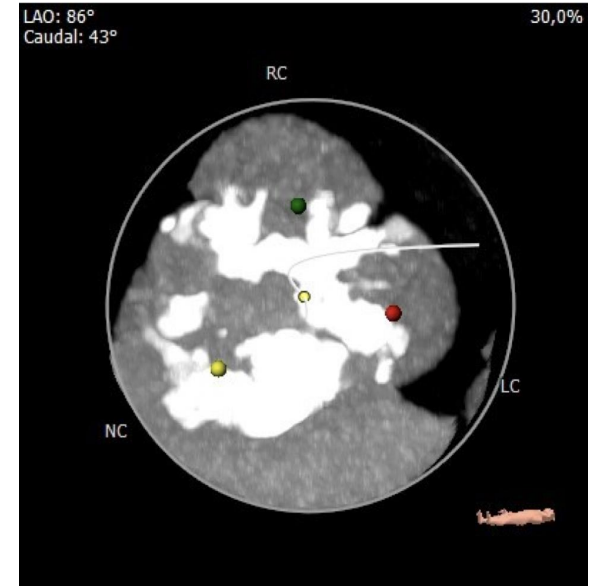
Calcified Raphe Plus
Excess Leaflet
Calcification
(26.0 %)



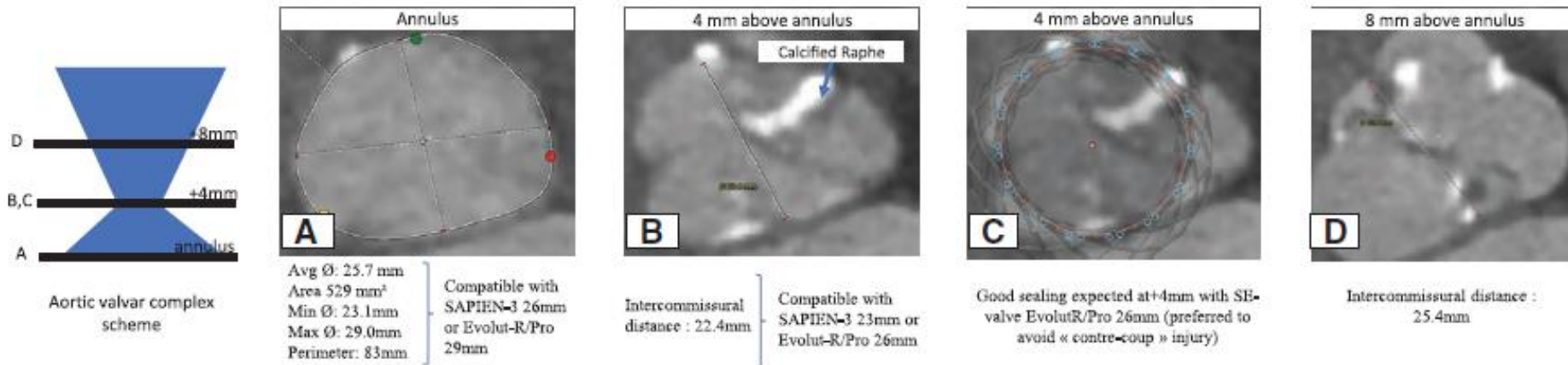
Challenges of TAVR in Bicuspid Aortic valve disease



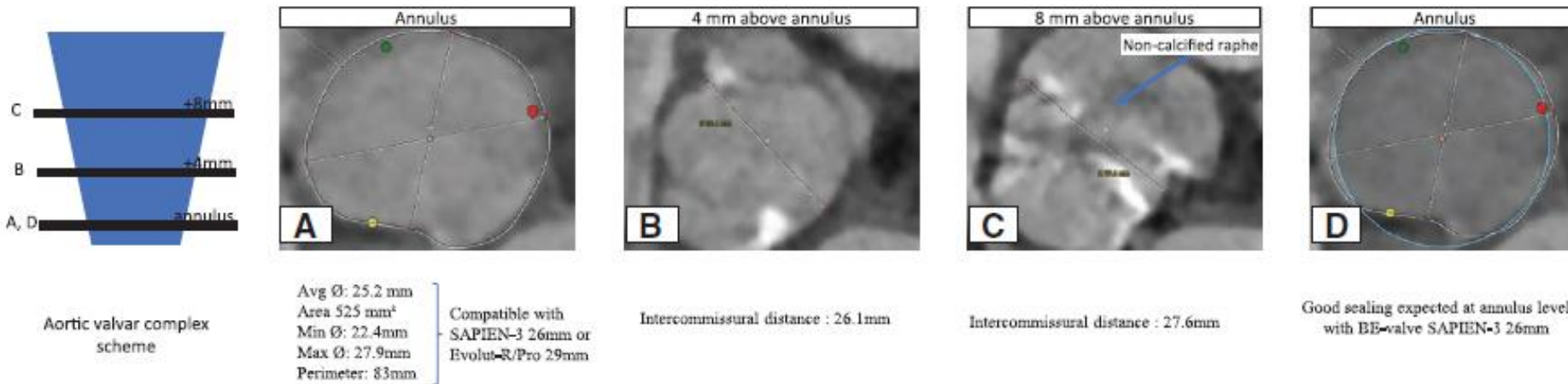
- Large Aortic valve complex
- Heavily calcified valves
 - Valve distortion
 - Annular rupture
 - Asymmetrical expansion of valve: Complete heart block
 - Embolization of ca particle: Stroke
- Aorta
 - Often can be horizontal
 - Associated aortopathy



Challenges in sizing using CT



Type 1 LR : Flared anatomy



TAVR in Bicuspid Aortic Valve



What we know

- Feasible and safe
- One-year mortality similar to surgery and TAV
- Better results with newest generation of THV
- A CT Scan is mandatory for procedure planning
- Calcified raphe + highly calcified leaflets associated with poor outcomes



Warning

- Low but higher risk of stroke than TAV
- Higher risk of pacemaker implantation than surgery
- Low but higher risk of annulus rupture than TAV (BE-valve)
- Higher risk of 2mild PVR than TAV or surgery



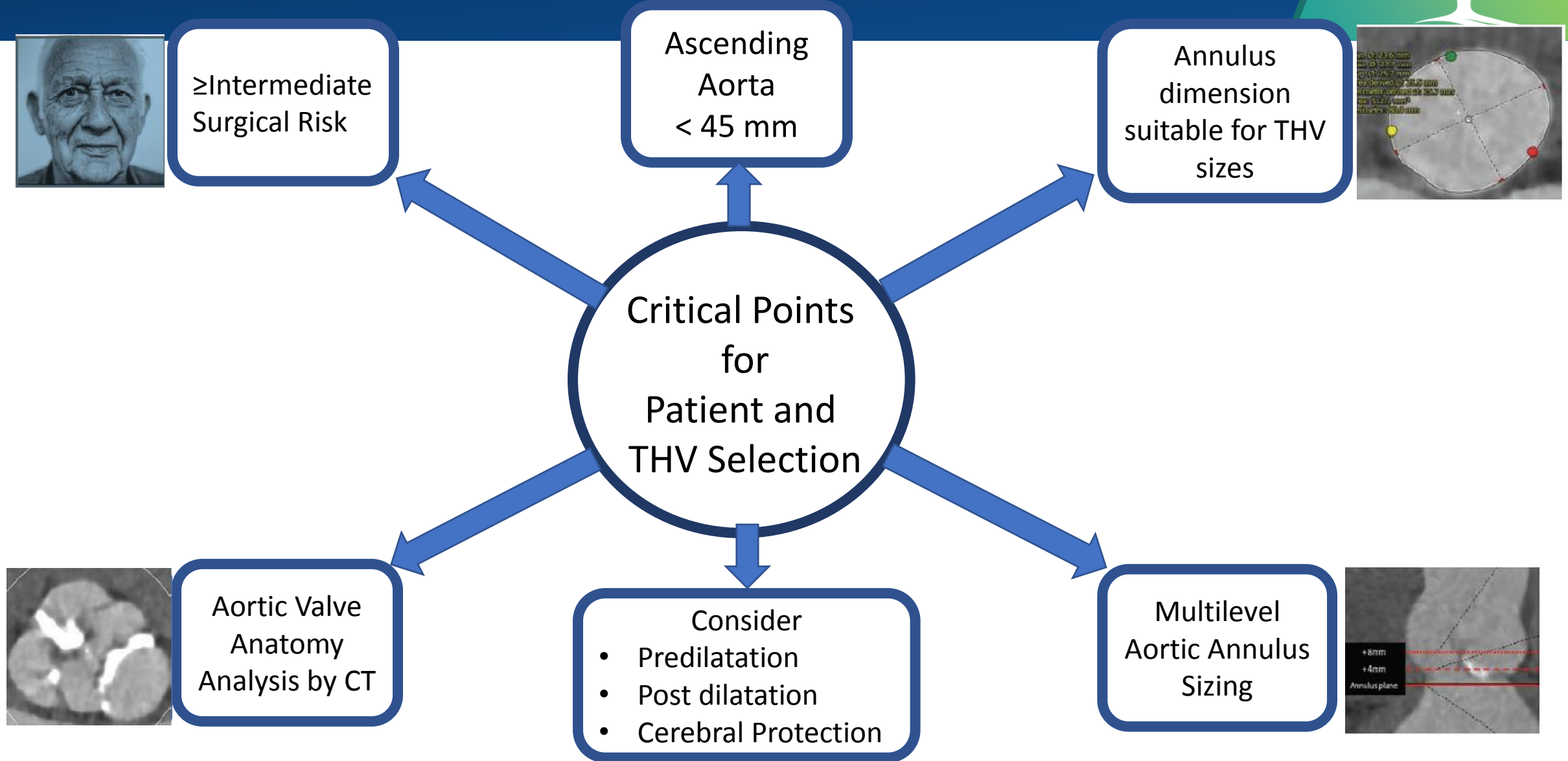
Remaining questions

- Anatomical features favorable/unfavorable for TAVR
- Optimal CT scan sizing methods for THV selection
- Type of valve based on anatomy
- Prosthetic valve durability
- Prosthetic valve thrombosis
- Evolution of the aortopathy after TAVR

Need for randomized trial of TAVR vs. SAVR and larger cohorts with long-term follow-up in patients with BAV after TAVR

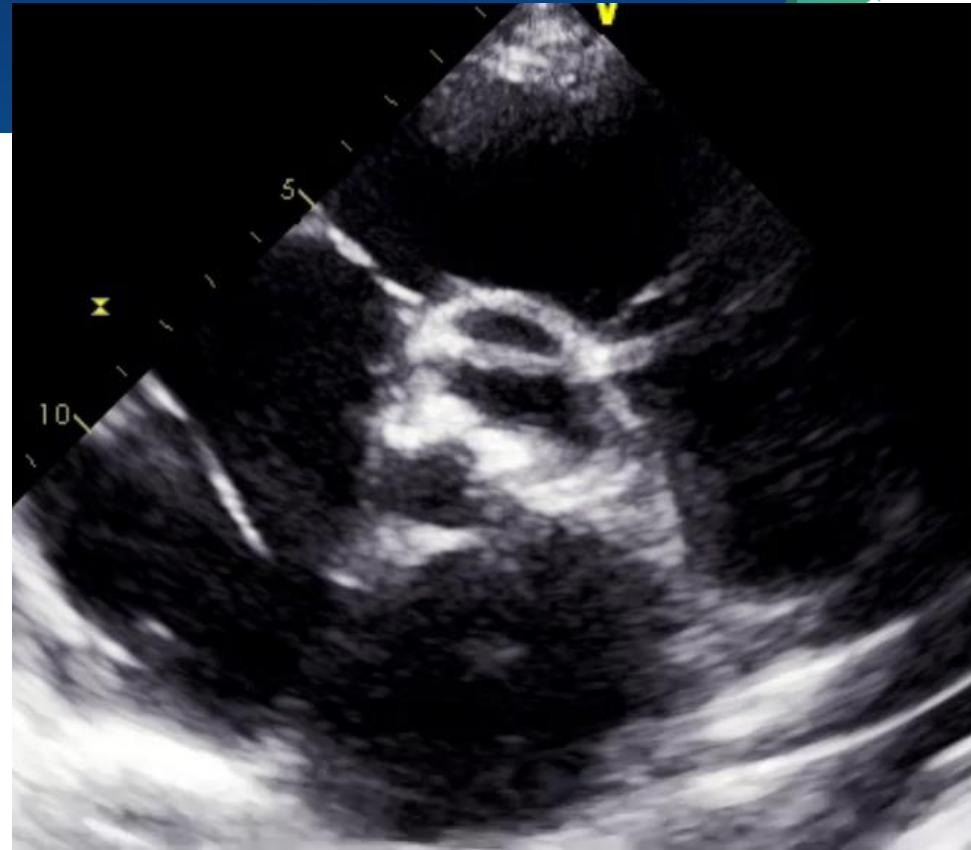


Key screening steps when consider TAVR for bicuspid aortic valve



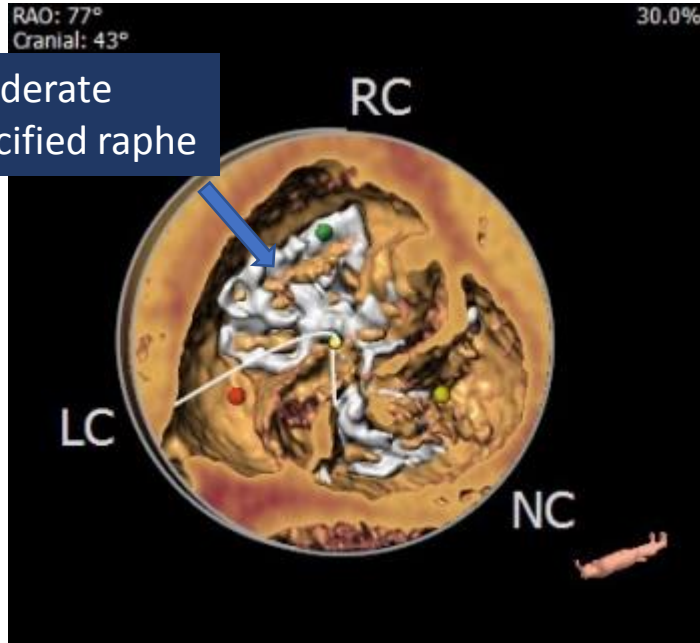
87 year old lady

- Progressive shortness of breath for several months
- Paroxysmal atrial fibrillation s/p LAA closure in 2015
- Chronic Type B Dissection of aorta
- Hypertension
- History of Pacer 2011
- STS score 5.2%



- Mean Aortic valve gradient 30 mm Hg
- Dimensional index 0.20
- Calculated valve area = 0.5 sq cm
- LV ejection fraction = 55%
- Severe tricuspid valve regurgitation

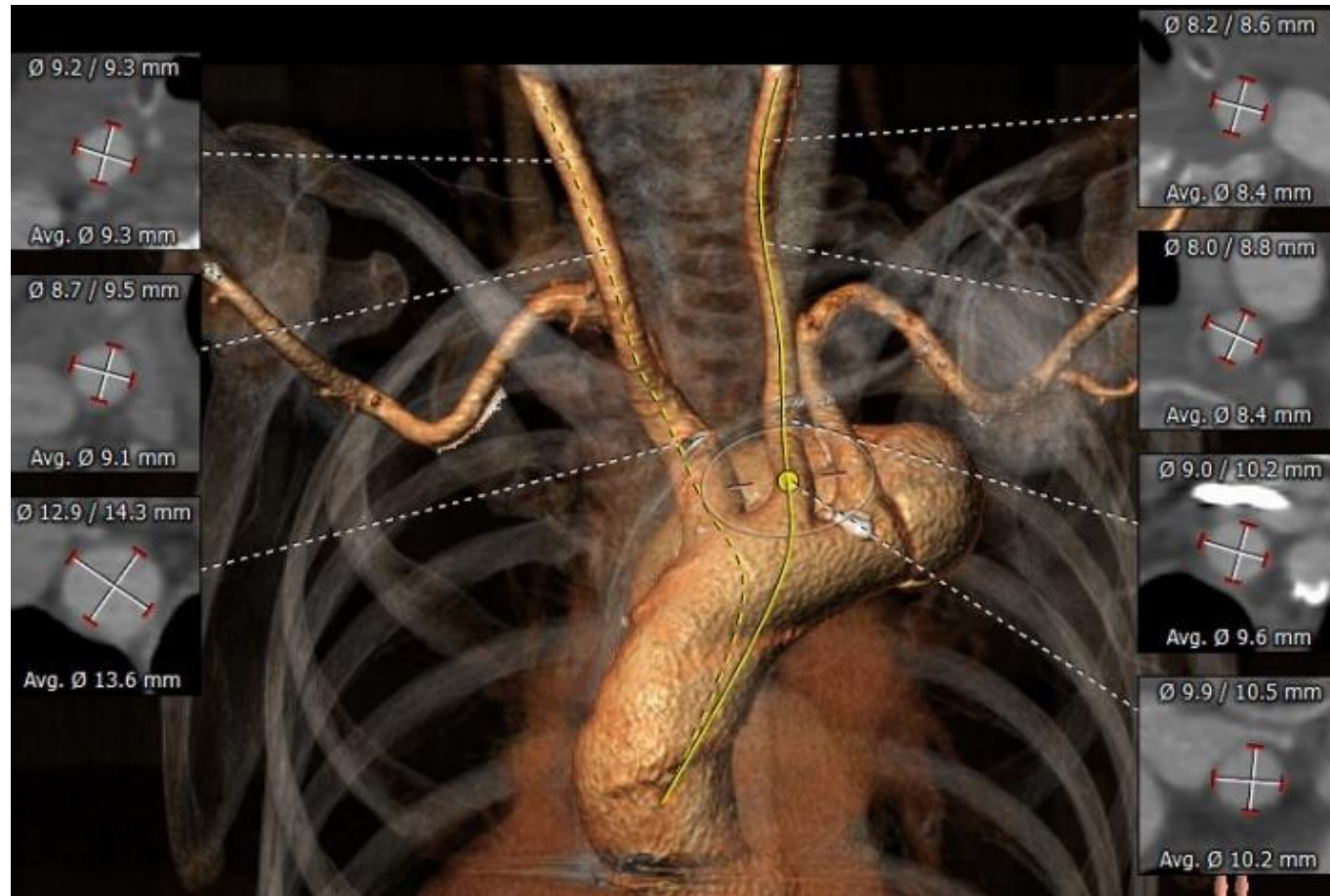
CT scan : Chest abdomen pelvis



- Annulus area = 483 mm²
- Annulus perimeter 79 mm
- Mean sinus Valsalva diameter 36 mm
- Left coronary height 14 mm
- Right coronary height 17 mm



CT carotids and subclavian artery



Our approach

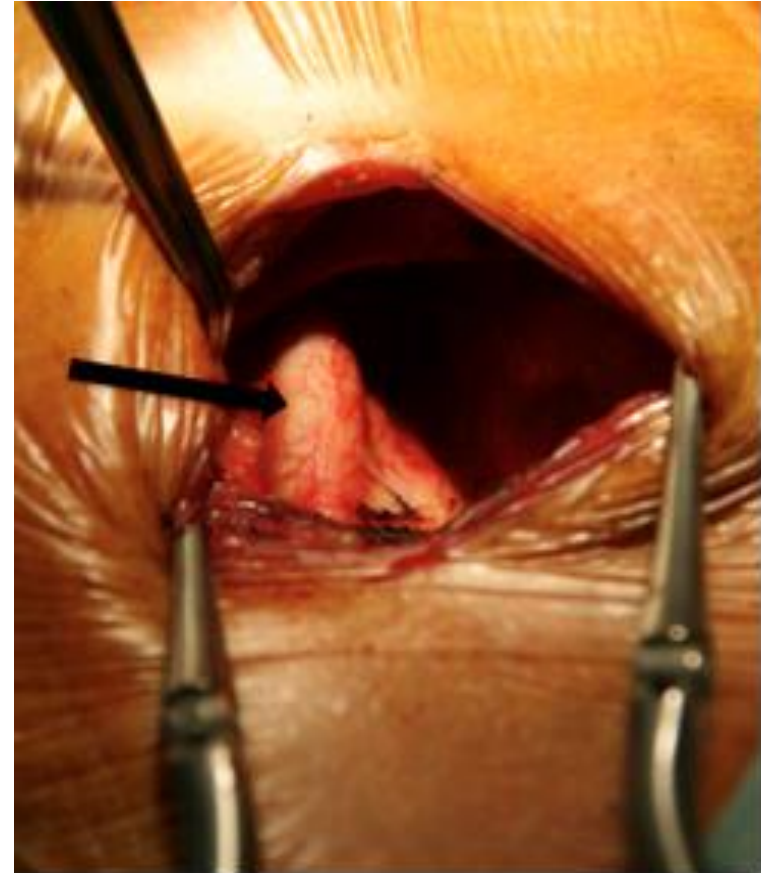


- TAVR : patient is high for surgery, and valve anatomy is acceptable
- Left transcarotid approach
- Right radial artery access; Aortic root angio and coronary angiogram
- Right femoral vein for pacing wire
- Cerebral protection could not be used since transcarotid approach
- Pre-dilatation using a 20 mm Zmed balloon
- 29 mm Evolut Pro valve

Alternative vascular access: carotid approach



- Left carotid is often free of disease
- It has direct access to the aorta
- Small incision
- Recovery is very rapid



Courtesy : Dr Gregory Fontana

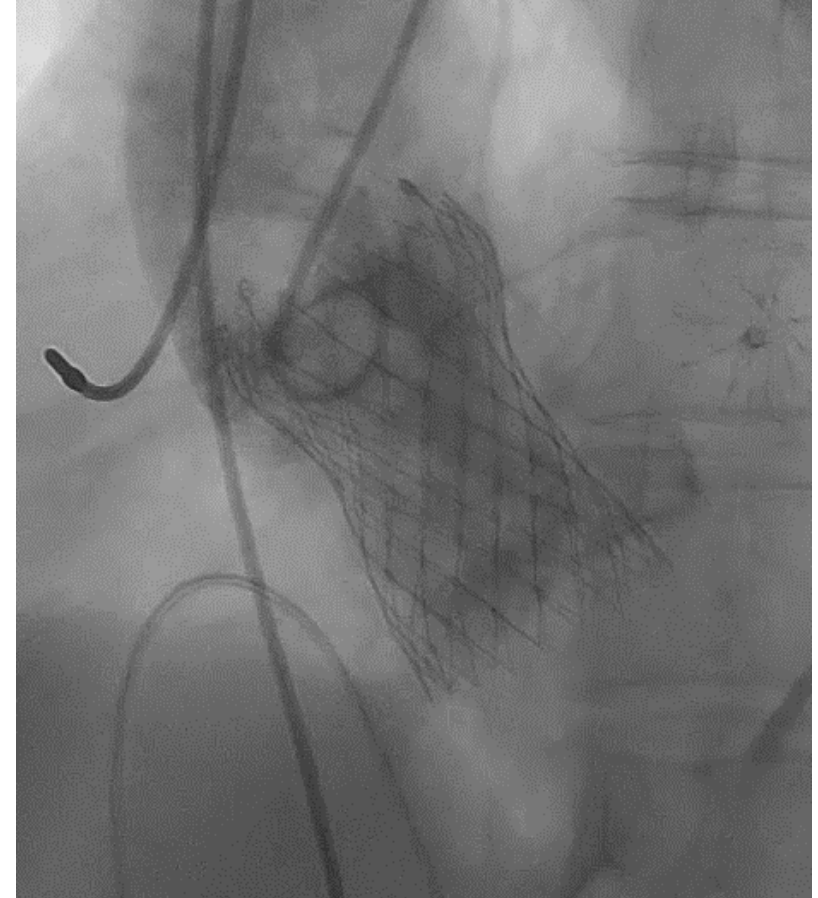
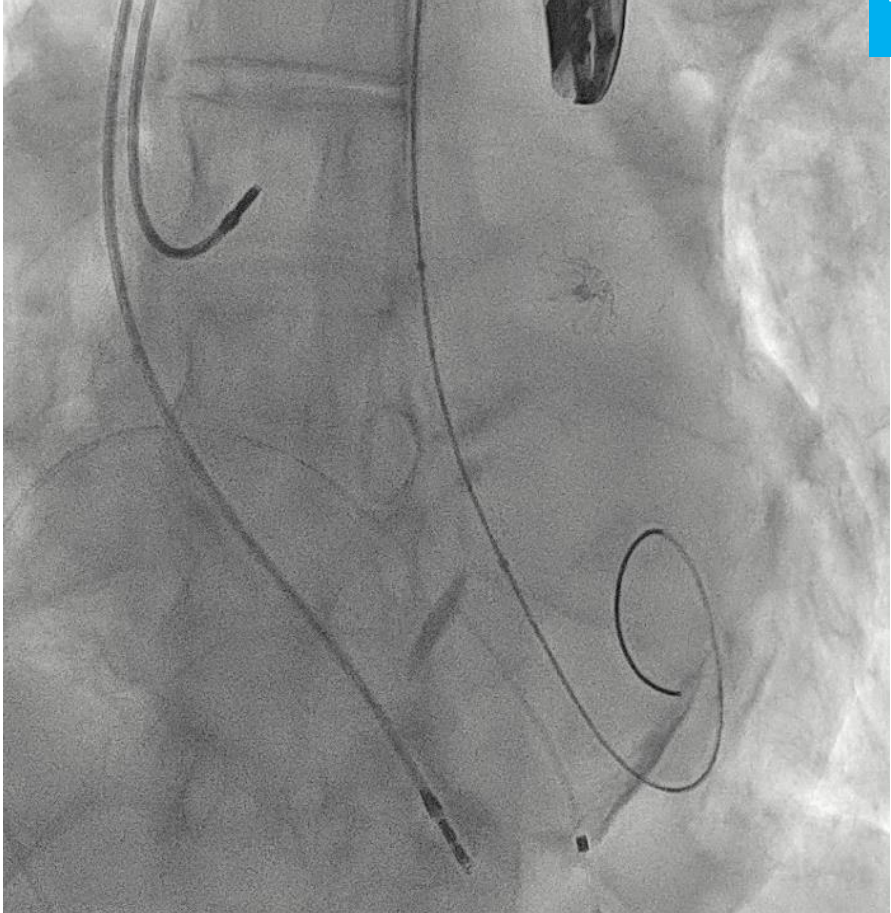
Steps of the procedure



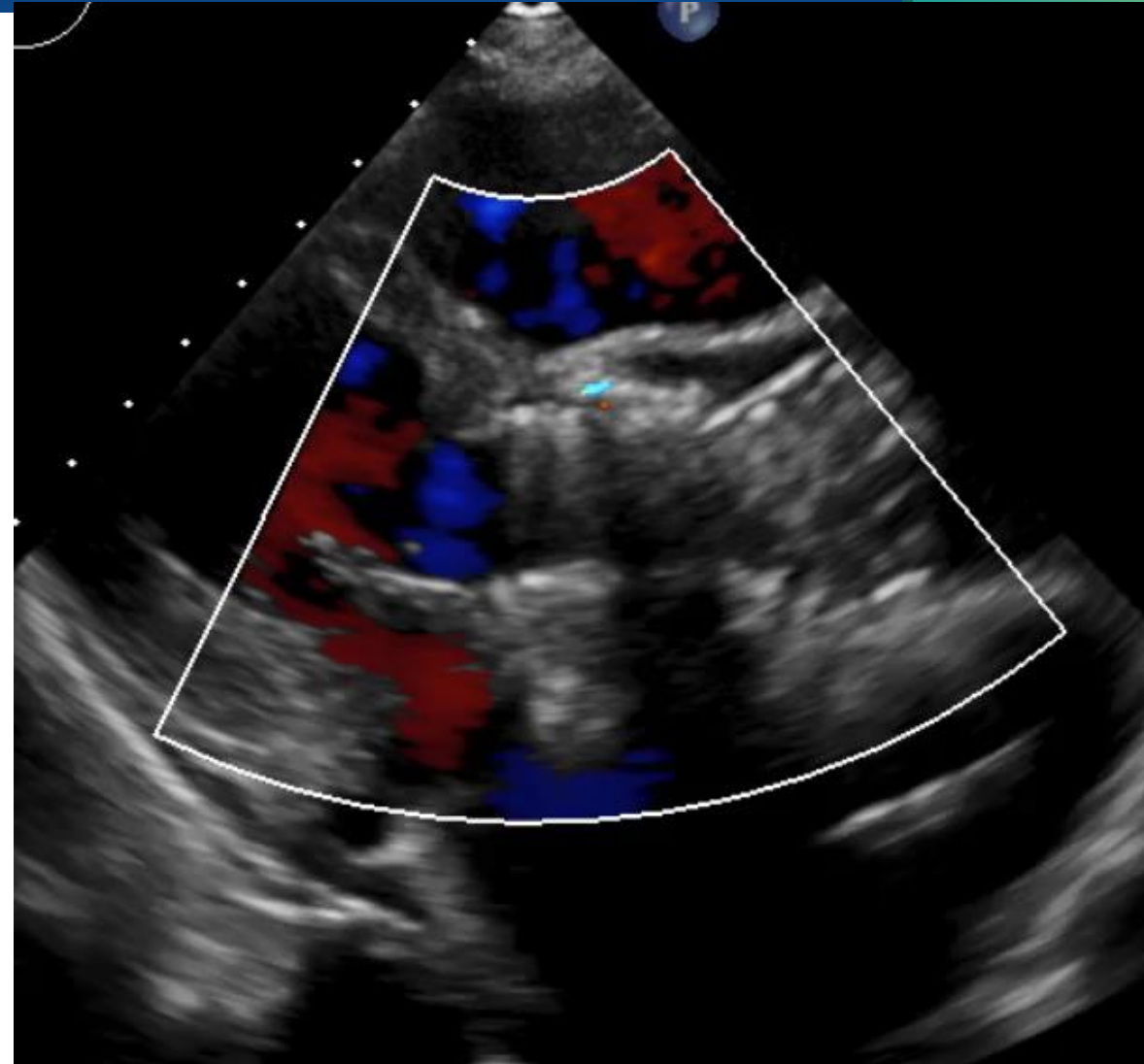
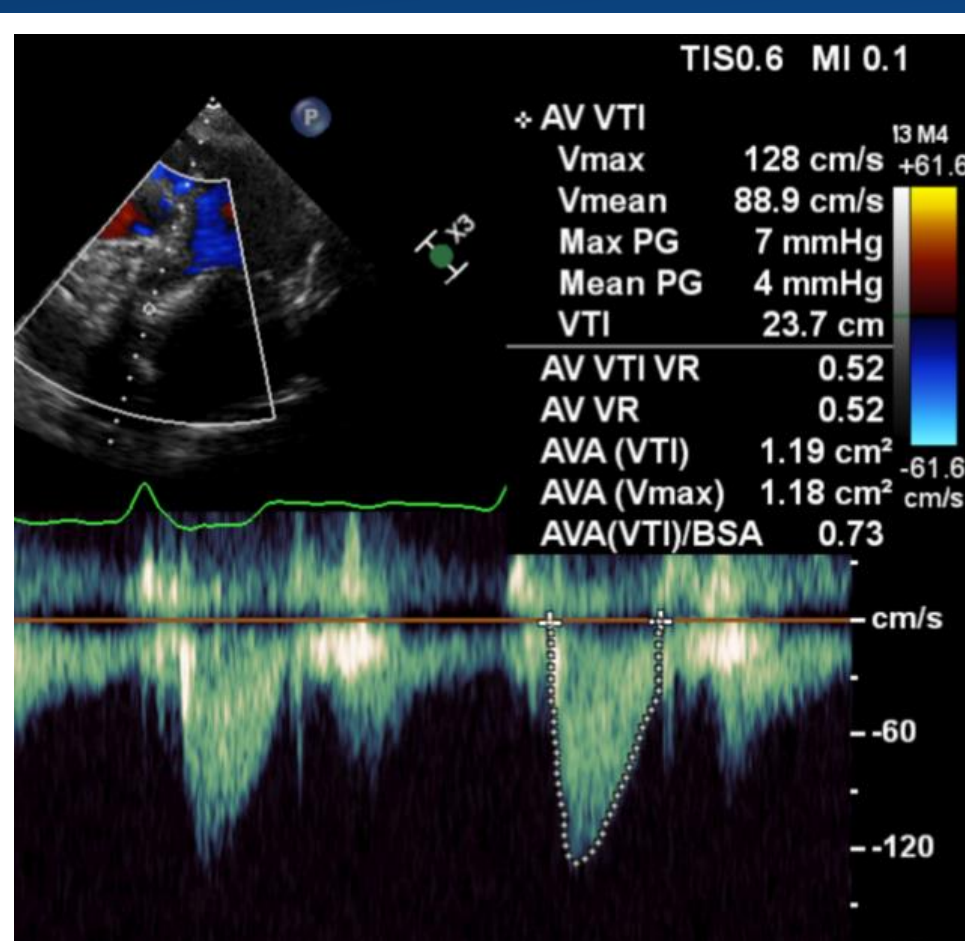
Pre-dilatation: 20 mm Zmed Balloon

Deployment using Cusp Overlap Technique

Final aortic root angio, shows no AI



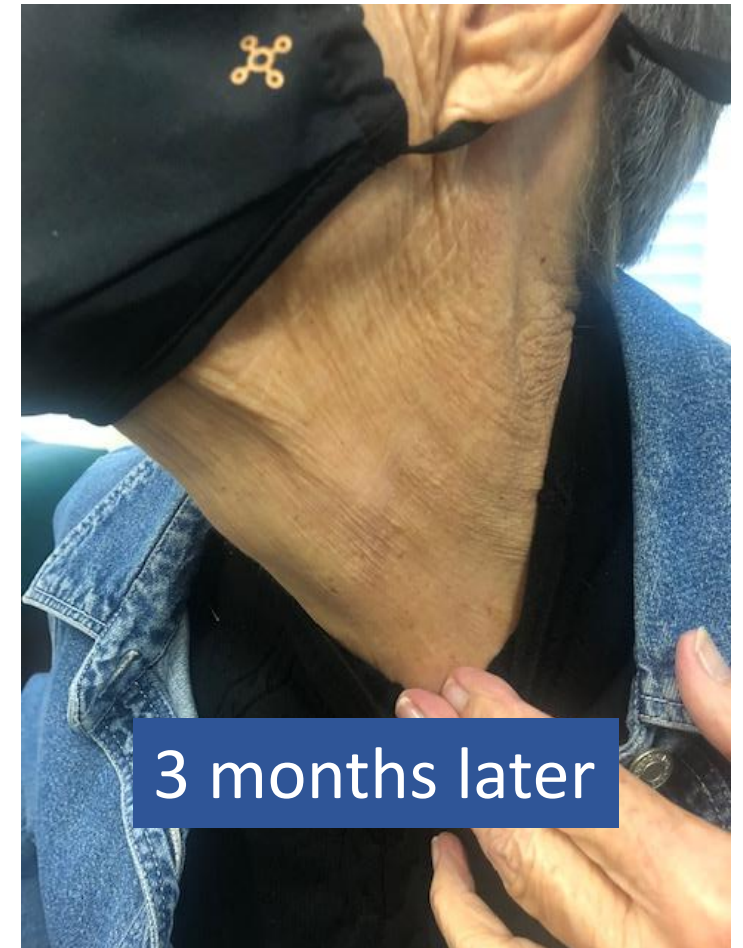
Echo at one year: Mean gradient 4 mm Hg, No perivalvular leak



Alternate access

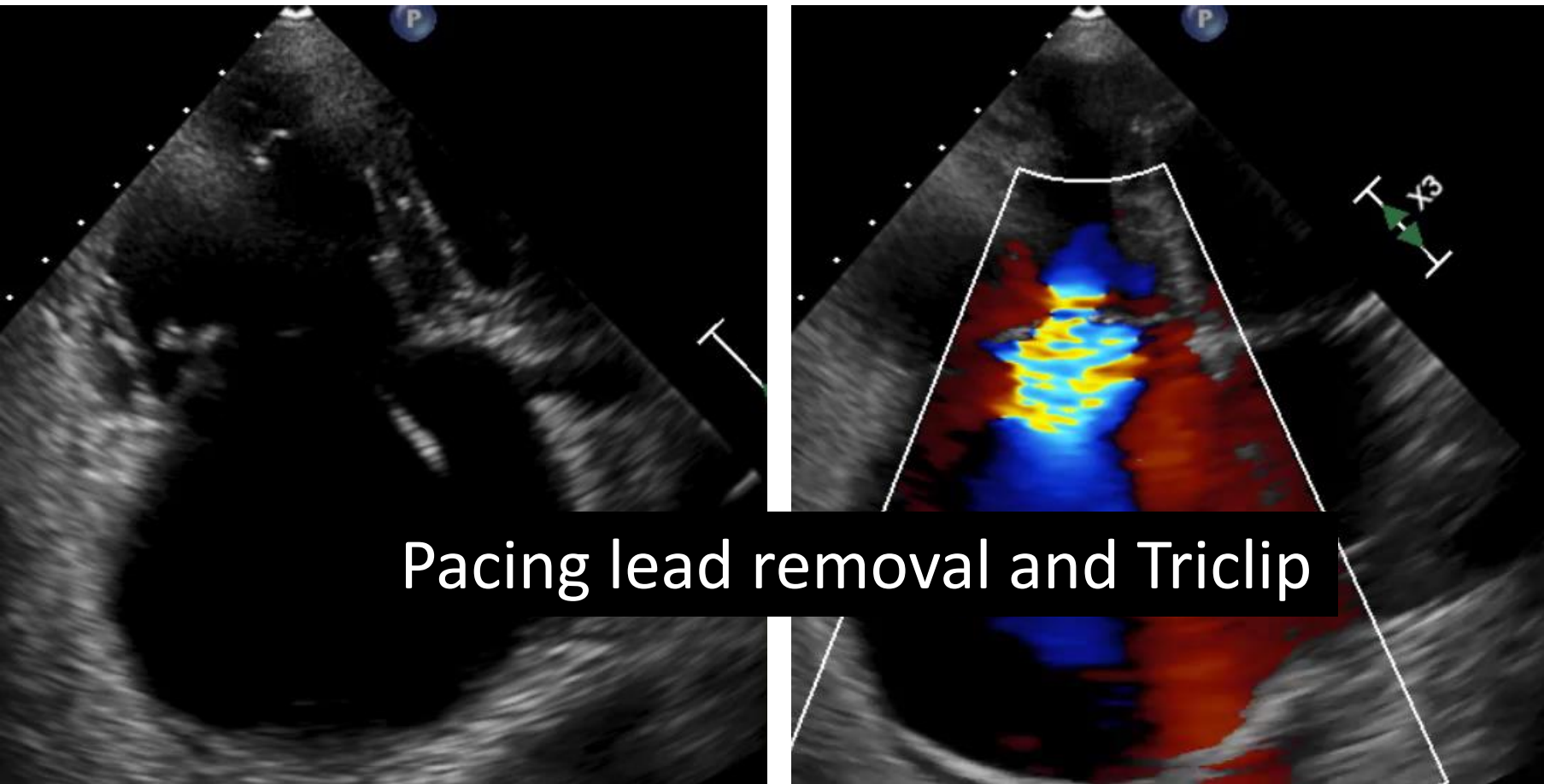


- Consideration of alternate access is not a failure
- It is good judgement
- If you are concerned about transfemoral
 - Then it likely not a good idea



Courtesy Dr Fontana

Whats is next for this bionic women



- TR ERO = 0.7 sq cm
- TAPSE = 18 mm
- Pacing lead across
- Tricuspid valve

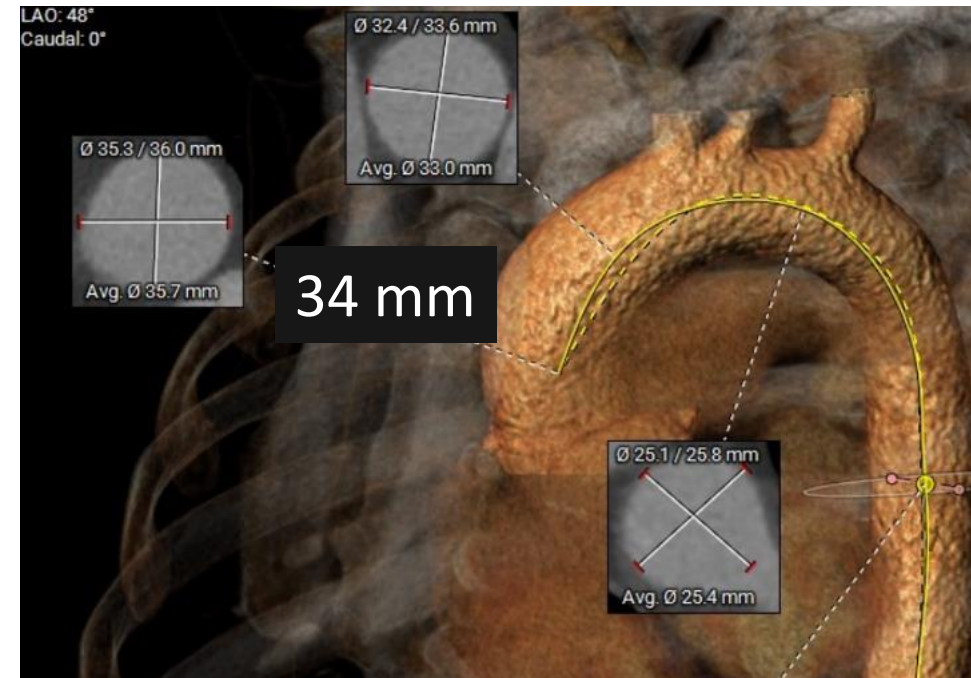
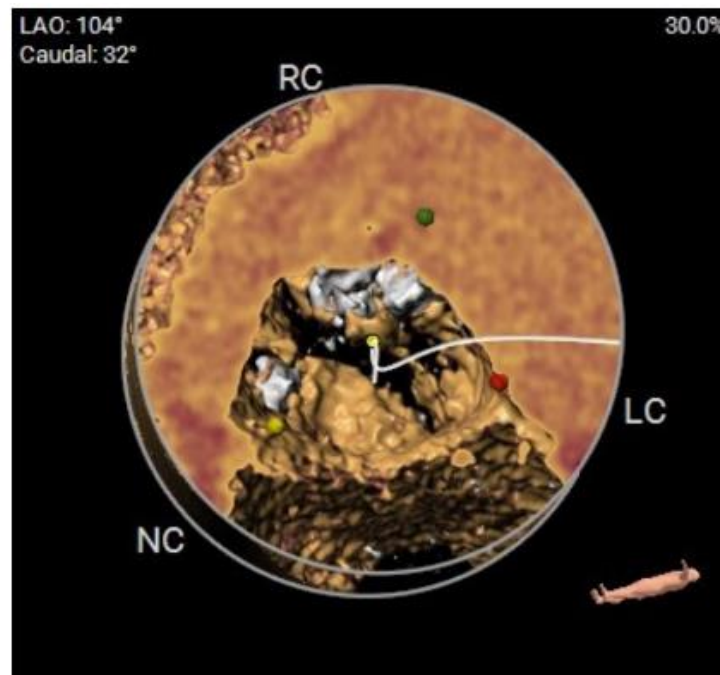
58 yr old male: one episode of chest pressure



- Mean gradient = 36 m Hg, Calculated Valve area = 1.04 sq cm, normal ejection fraction
- Normal coronaries
- BNP level 20 ng/ml (normal)



CT TAVR protocol



What do we do



- TAVR with new Balloon expandable or self expanding valve
- Surgical valve replacement
- Wait and watch and assess clinically every 6 months and Echo every 6 to 12 months

Summary



- Bicuspid aortic valve disease is quite different from tricuspid valve stenosis
- The phenotype, including calcification, and aortopathy helps guide treatment
- Low but higher risk of stroke, peri-device leak, heart block, and aortic root rupture compared to TAVR for tricuspid valve stenosis
- Case planning includes, surgical assessment, comprehensive CT analysis, and planned use of cerebral protection, and use of pre and post dilatation