



TAVR-in-TAVR: the NEXT Challenging Issue in Lifetime TAVR Management

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Disclosure

Nature of Financial Relationship

Grant/Research Support

Consultant Fees/Honoraria

Individual Stock(s)/Stock Options

Royalties/Patent Beneficiary

Executive Role/Ownership Interest

Other Financial Benefit

Ineligible Company

none

Abbott, Biosensors, Boston Scientific, Cordis, Edwards Lifesciences, General Electric Healthcare, Terumo

CERC (Cardiovascular European Research Center)

none

none

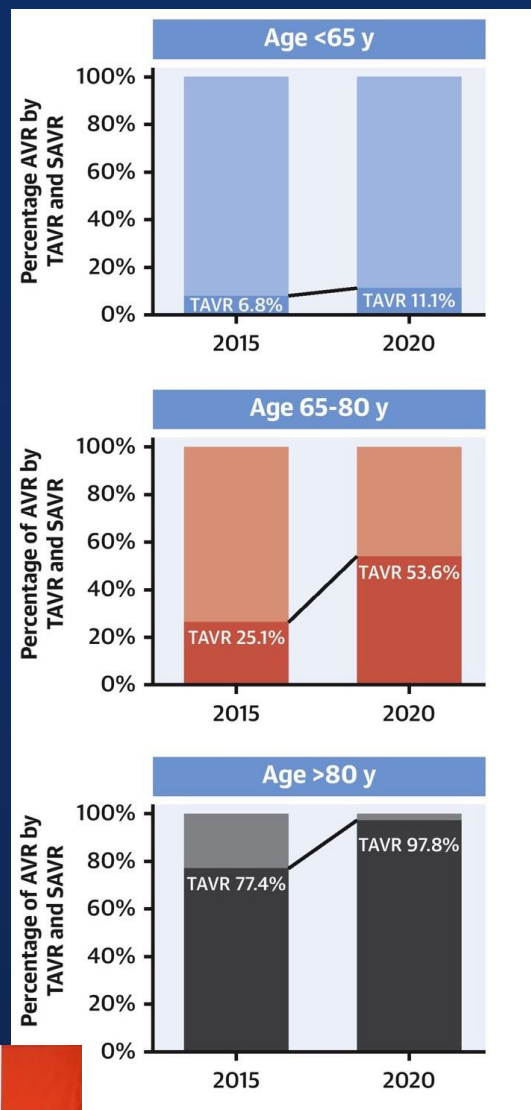
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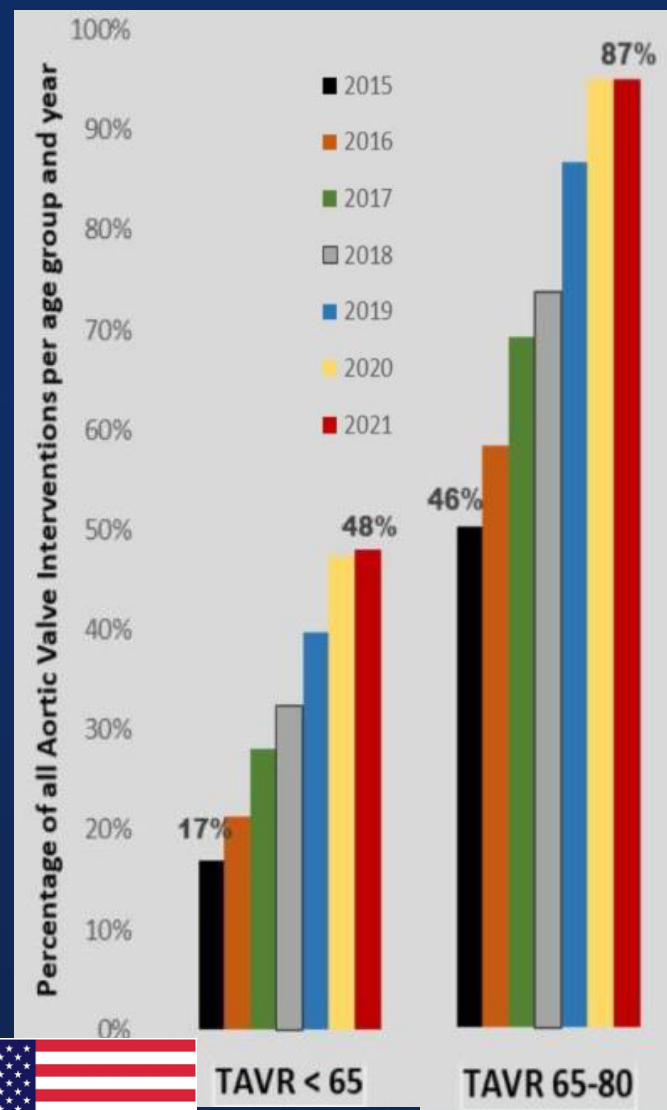
Background



THVs are expected to fail



Prosperi-Porta et al. JACC 2023

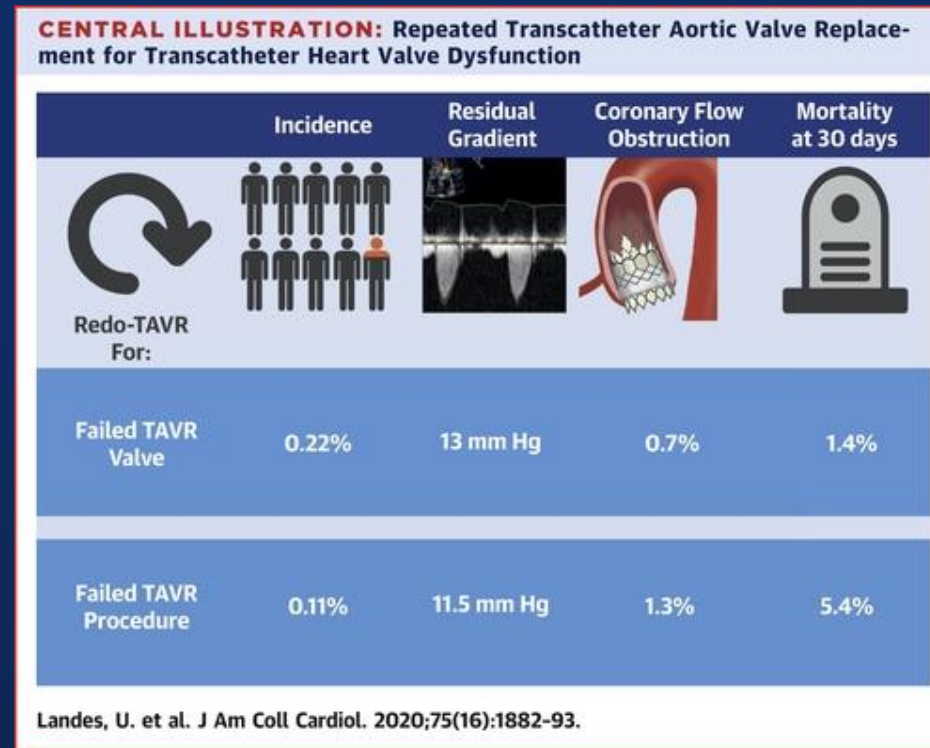
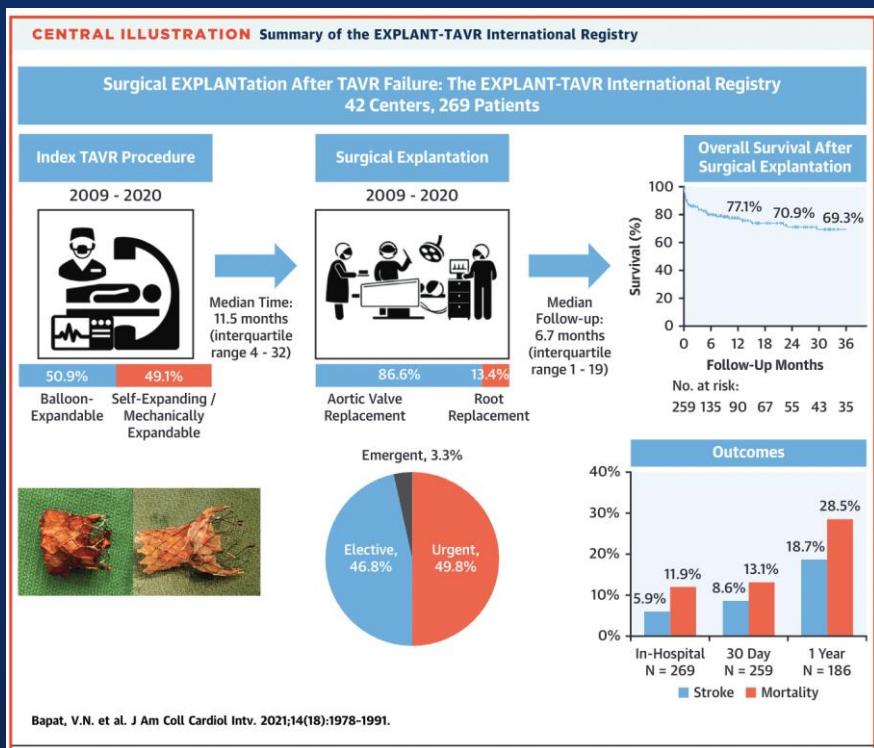


Sharma et al. JACC 2022



Considerations

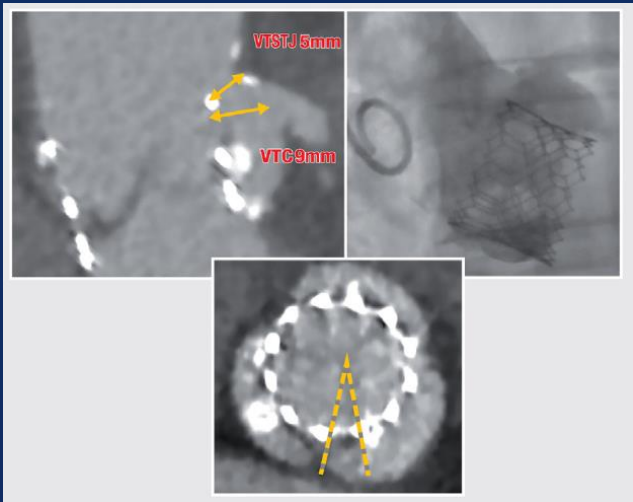
- Optimal index TAVR procedure/ optimize outcomes and durability
- Planning for the future: coronary access and treatment options in case of THV failure



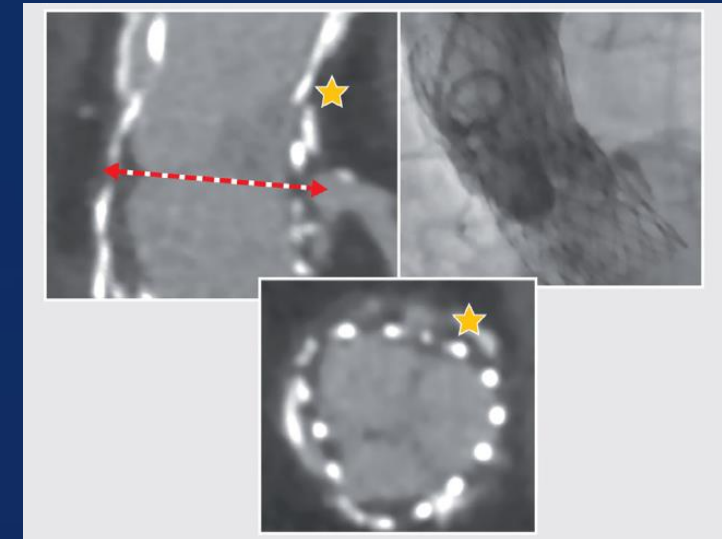


Planning for the future

Redo TAVI faisable



Redo TAVI non faisable



CENTRAL ILLUSTRATION Coronary Reaccess After TAVR

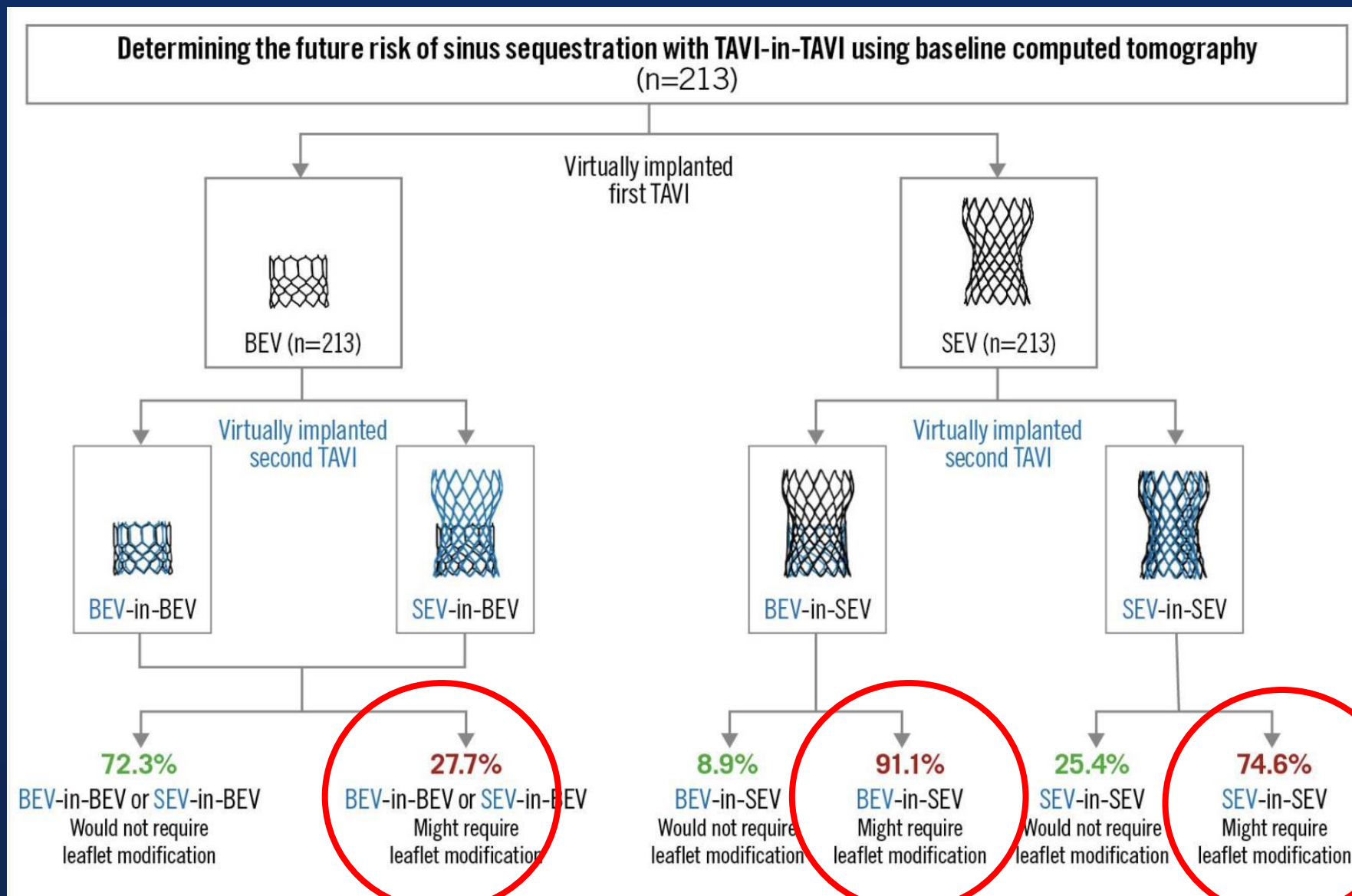
Factors Impacting Coronary Access	Imaging Evaluation
<p>Anatomical</p> <ol style="list-style-type: none">1. Sinotubular junction dimensions2. Sinus height3. Leaflet length and bulkiness4. Sinus of Valsalva width5. Coronary height	<p>Fluoroscopy</p>
<p>Device and Procedural</p> <ol style="list-style-type: none">1. Commissural tab orientation2. Sealing skirt height3. Valve implant depth	<p>MDCT</p>

Yudi, M.B. et al. J Am Coll Cardiol. 2018;71(12):1360-78.

Summary of factors impacting coronary access and imaging evaluation after TAVR. MDCT = multidetector computed tomography; TAVR = transcatheter aortic valve replacement.



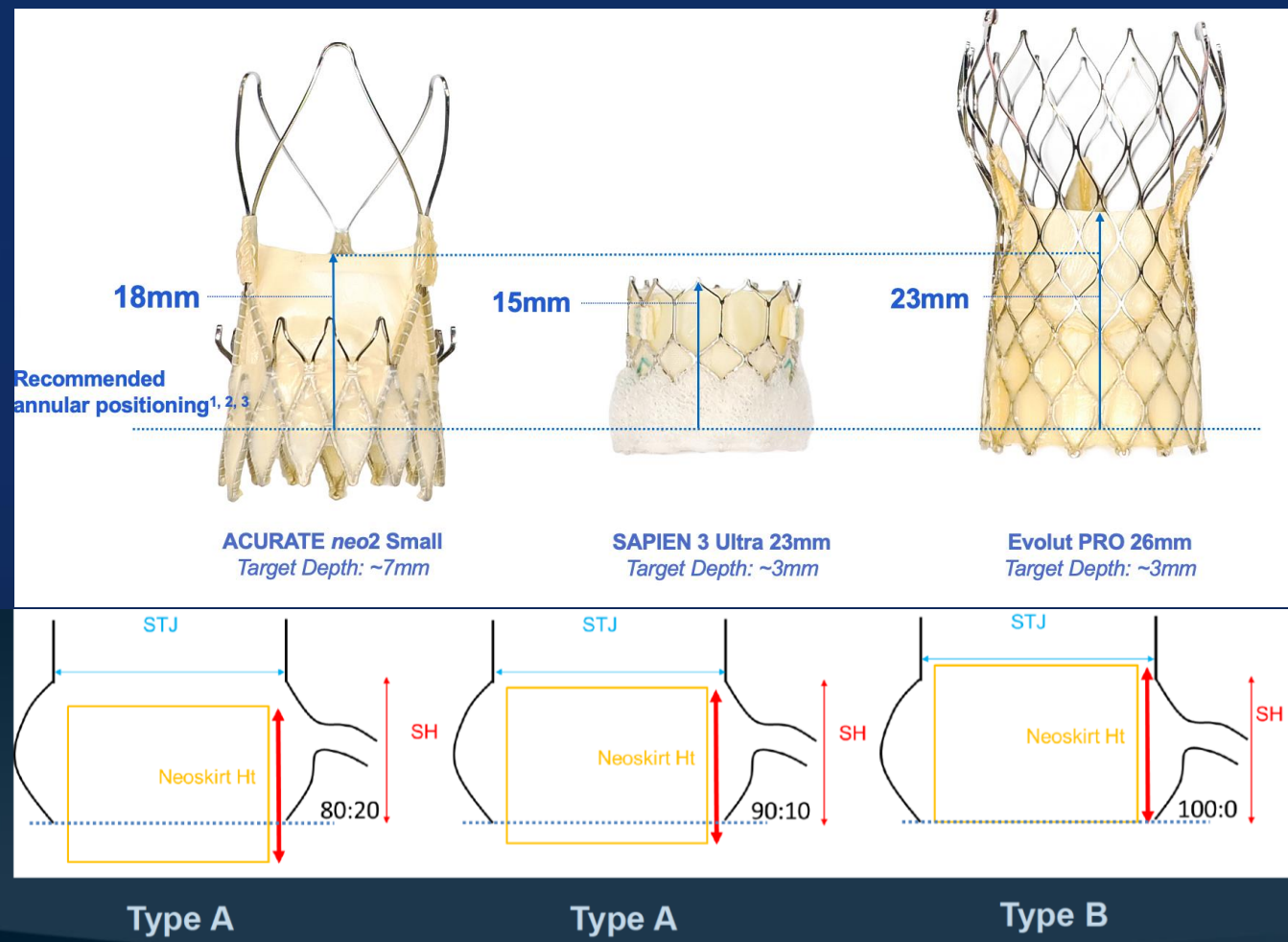
THV design/combination





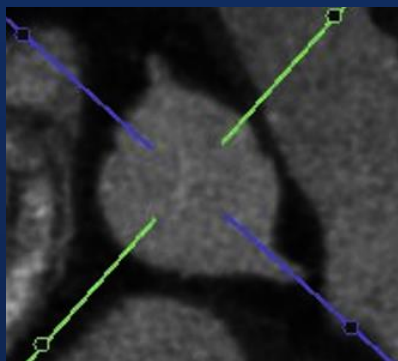
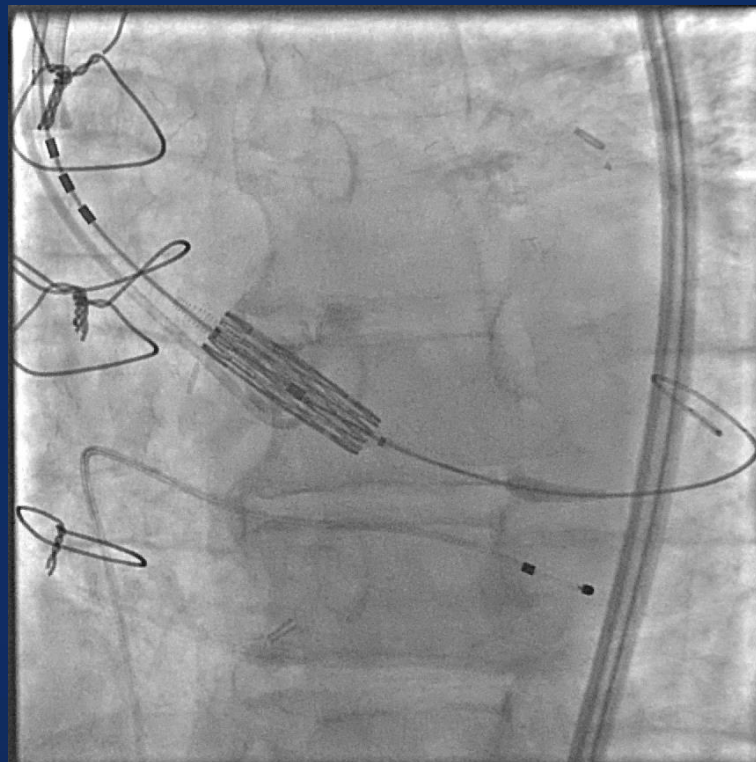
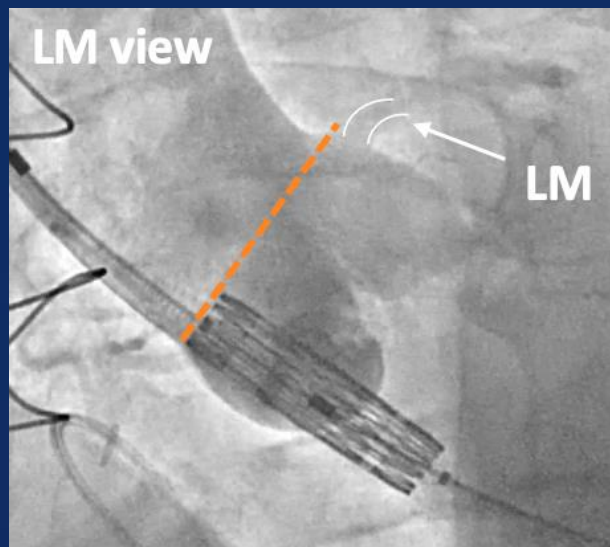
Implant depth and Neoskirt

Neoskirt and Functional Neoskirt

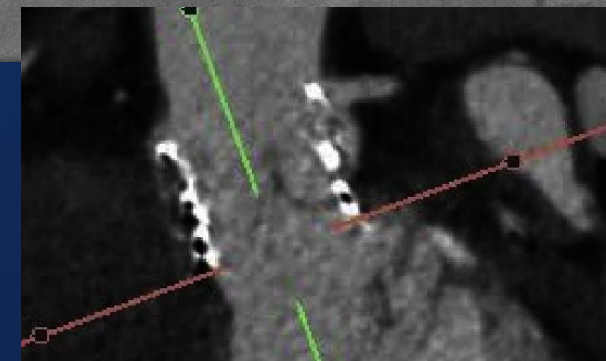




Implant depth and Neoskirt

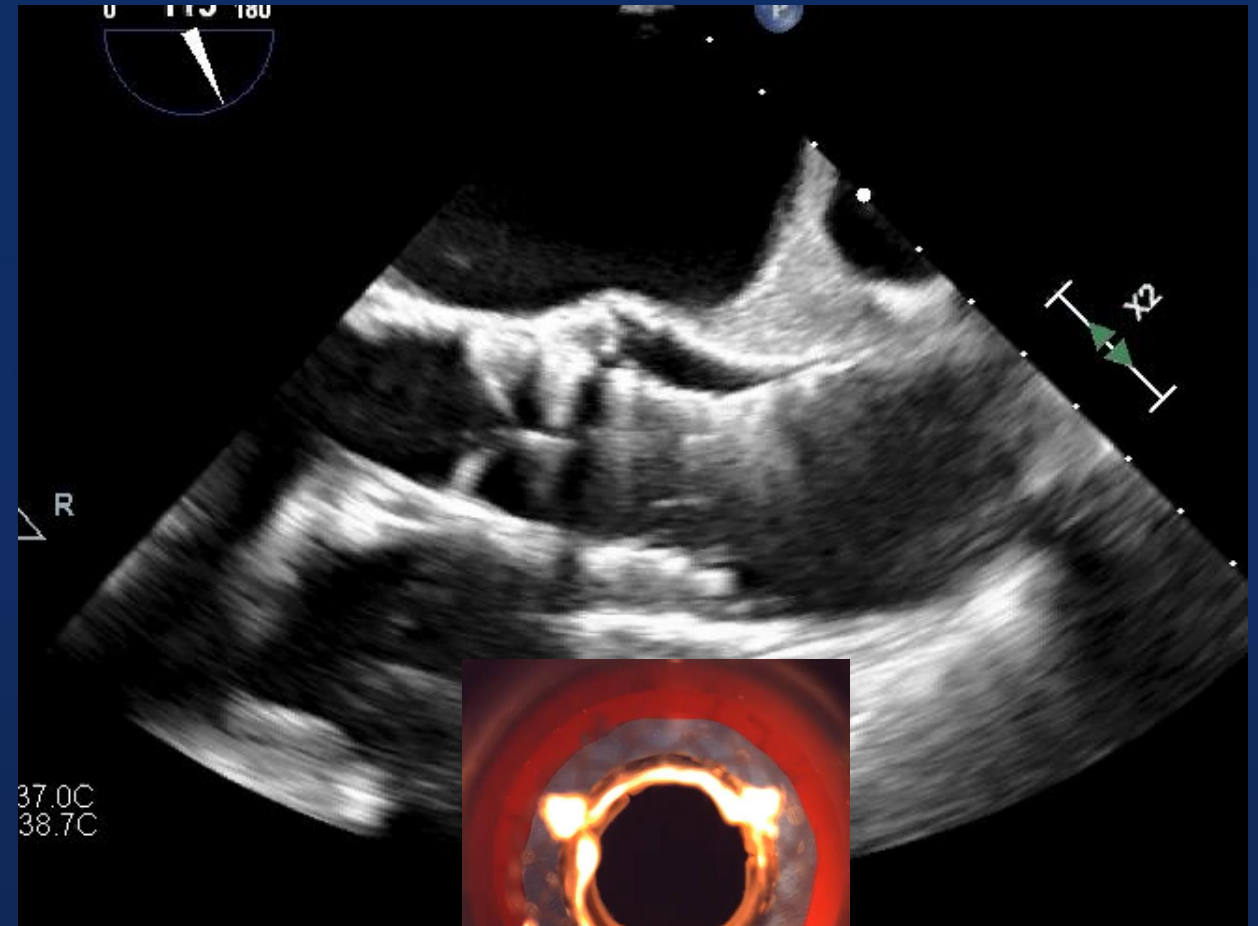


“Reasonably” high implant



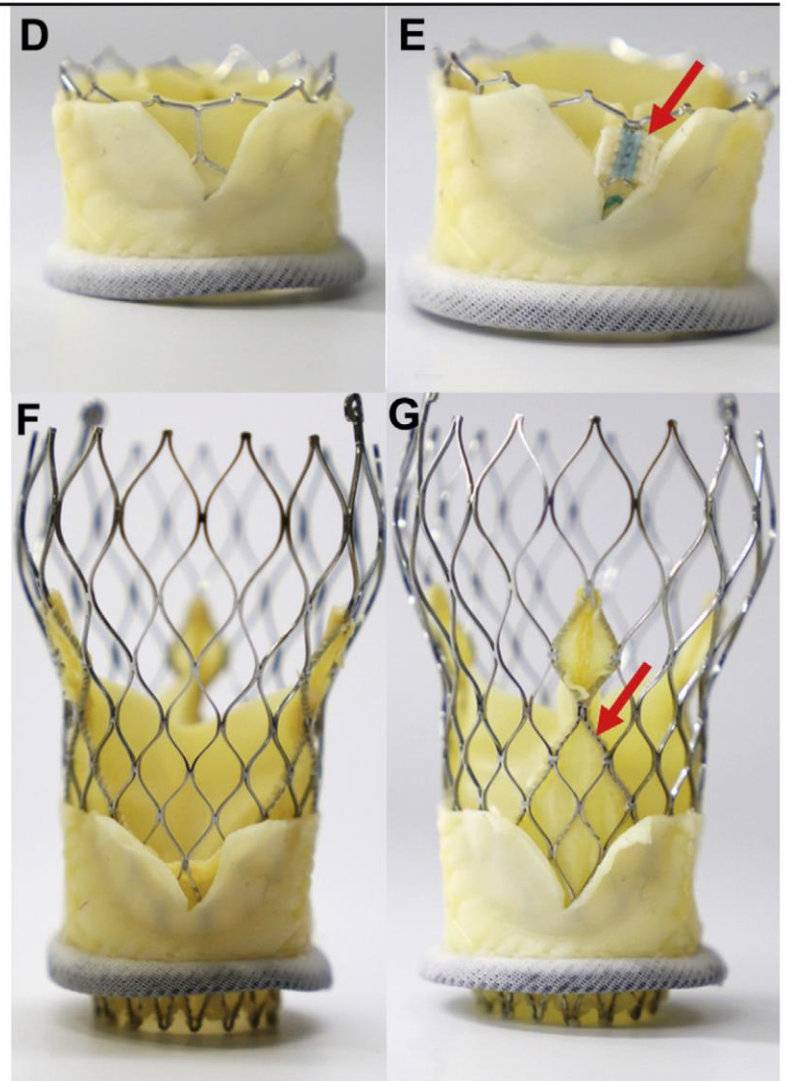
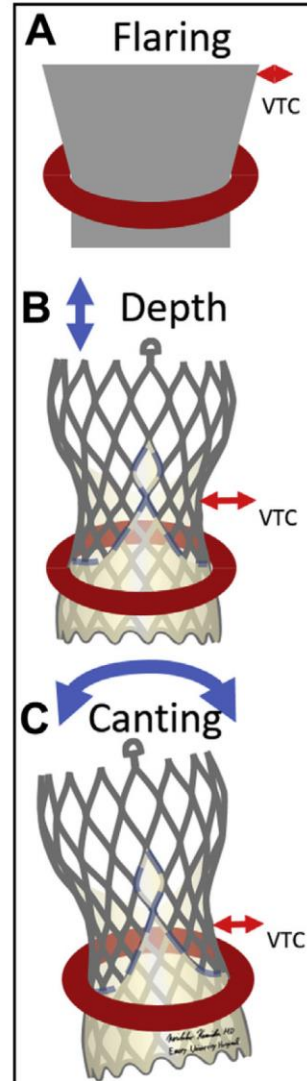
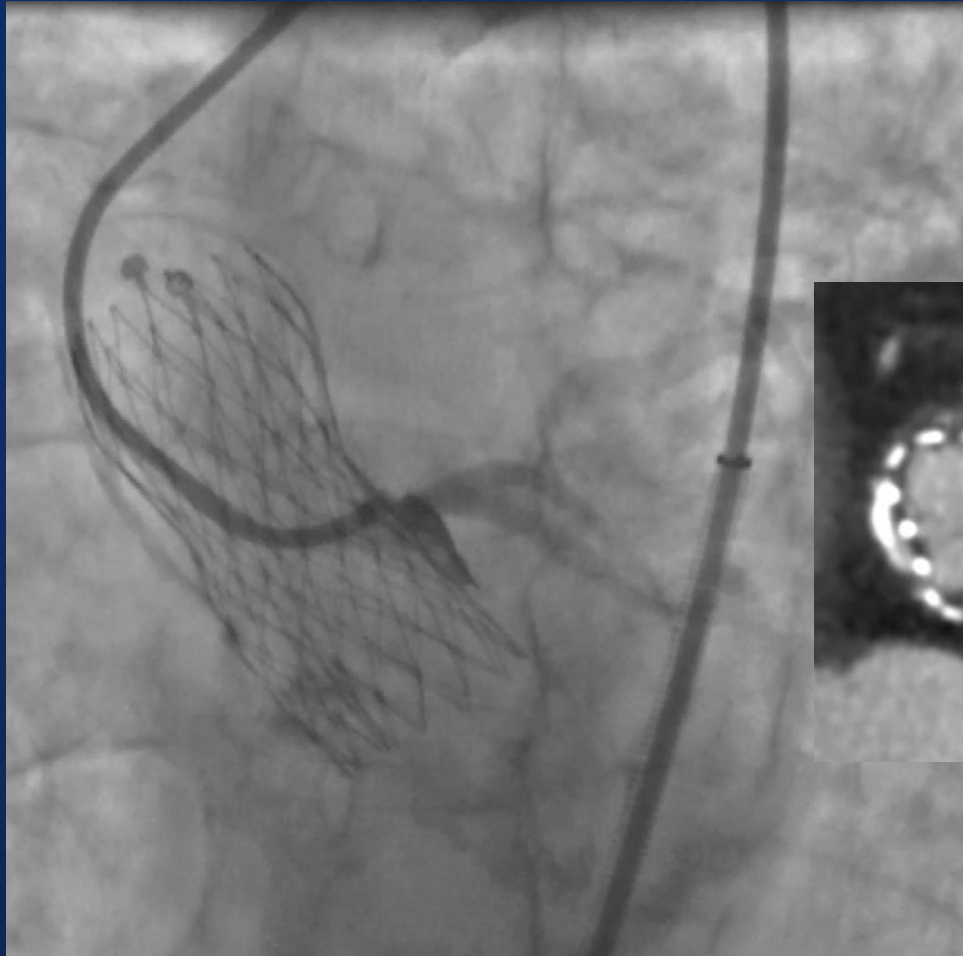


Planning for the future





Commissural alignment



Planning for the future

FIGURE 4 Factors Impacting the Risk of Coronary Obstruction and Coronary Access Impairment After Redo-TAVR

Index procedure

PREDICTING RISK OF CORONARY OBSTRUCTION FOLLOWING REDO-TAVR

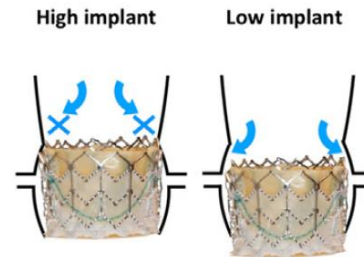
Redo procedure

Index THV design



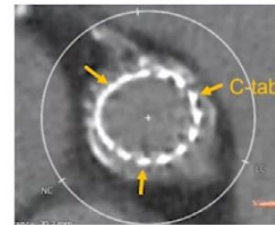
The neoskirt height can vary across different THV designs. The neoskirt height is higher in valves where the leaflets are in a supra annular position.

Implant depth of index THV



If the outflow of the index THV extends above the STJ or the THV to STJ distance is <2mm, there is the potential for coronary obstruction. If the index THV was implanted lower avoiding the STJ then this mitigates the risk of obstruction

Commissural alignment



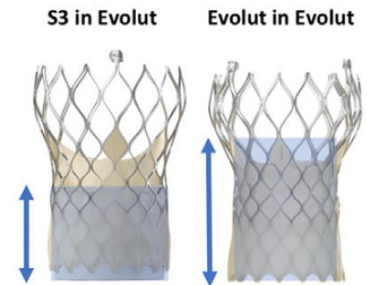
Commissural alignment of both the index THV and redo TAVR can help avoid coronary obstruction and facilitate leaflet modification technique such as BASILICA.

Expansion of index THV



The index failed THV may expand following redo-TAVR and this should be considered when determining measurements for coronary obstruction risk such as the VTC distance.

Redo-TAVR THV choice

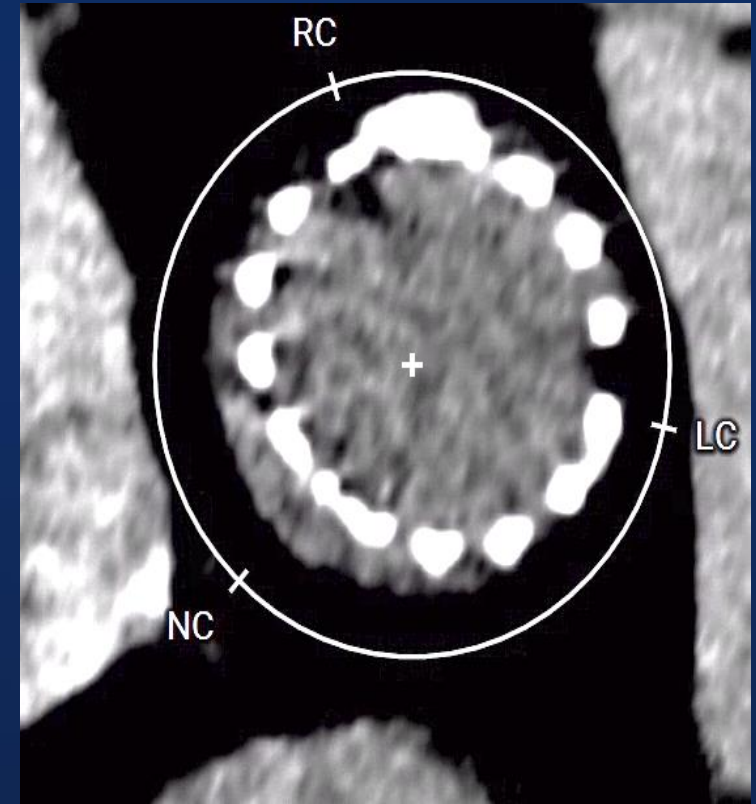
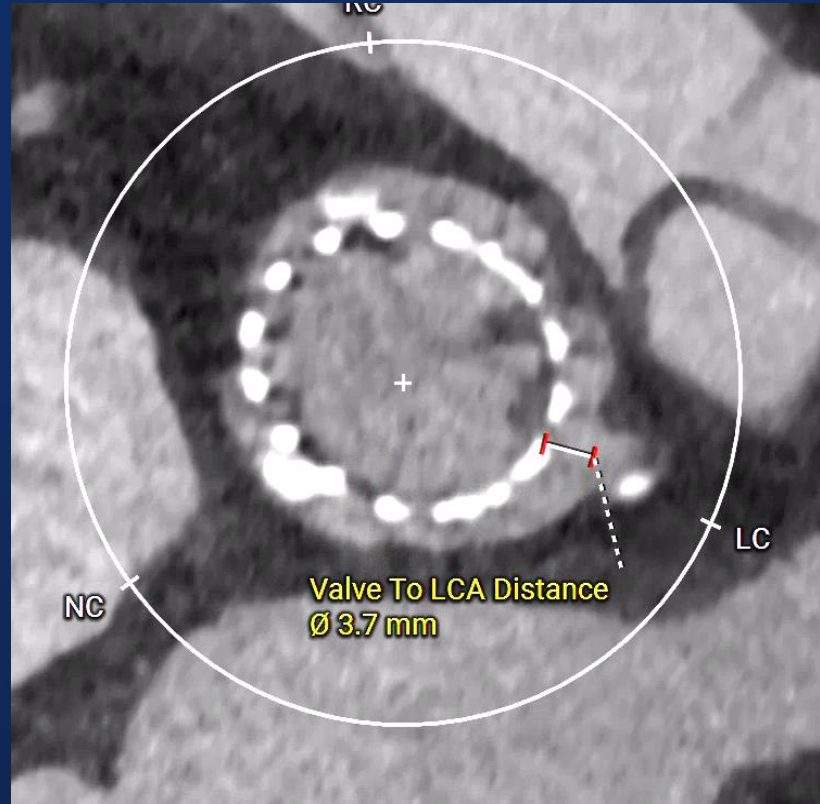


Redo-TAVR with a short frame THV in a tall frame valve can reduce the potential neoskirt and mitigate the risk of coronary obstruction

Mr L. 82 YO

Evolut R 26mm 2018
BVD regurgitation

6 Yrs

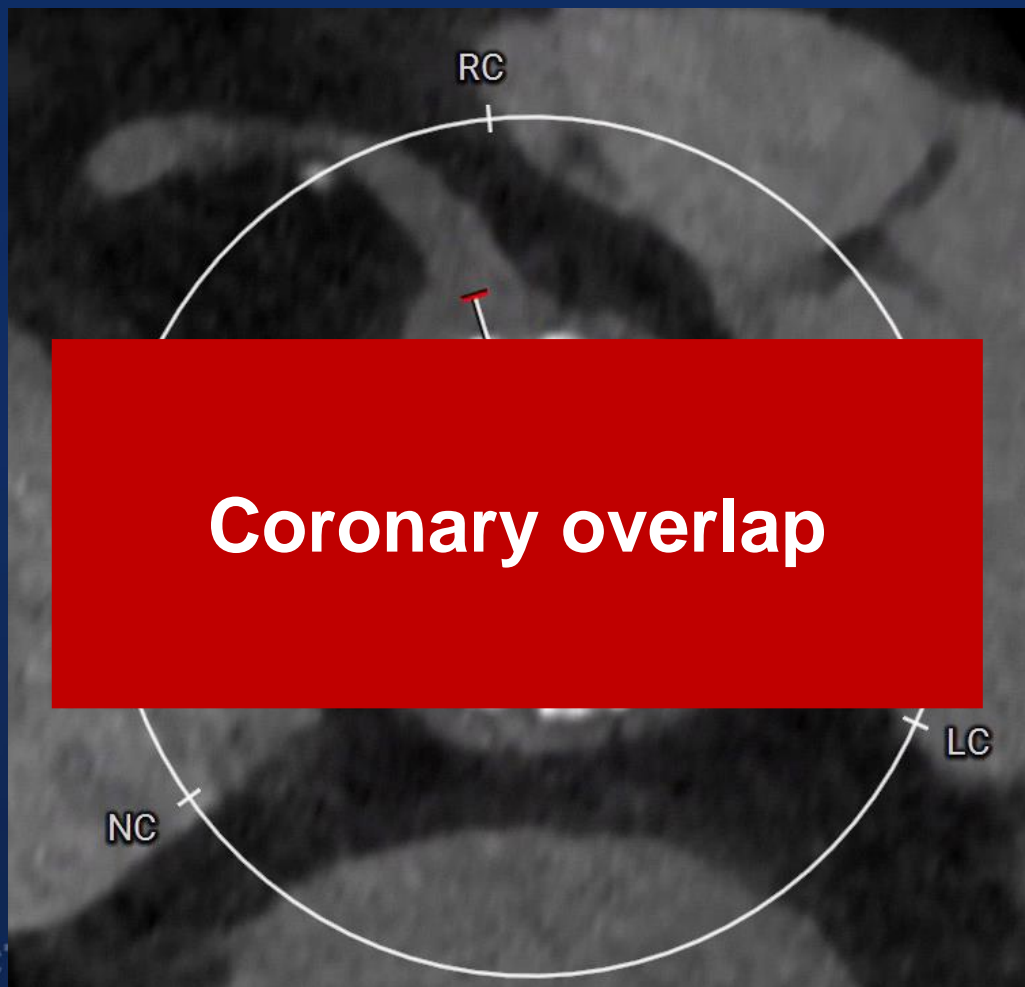


VTC RCA & LM <4mm

Virtual VT STJ

redoTAVI plan

BASILICA ?

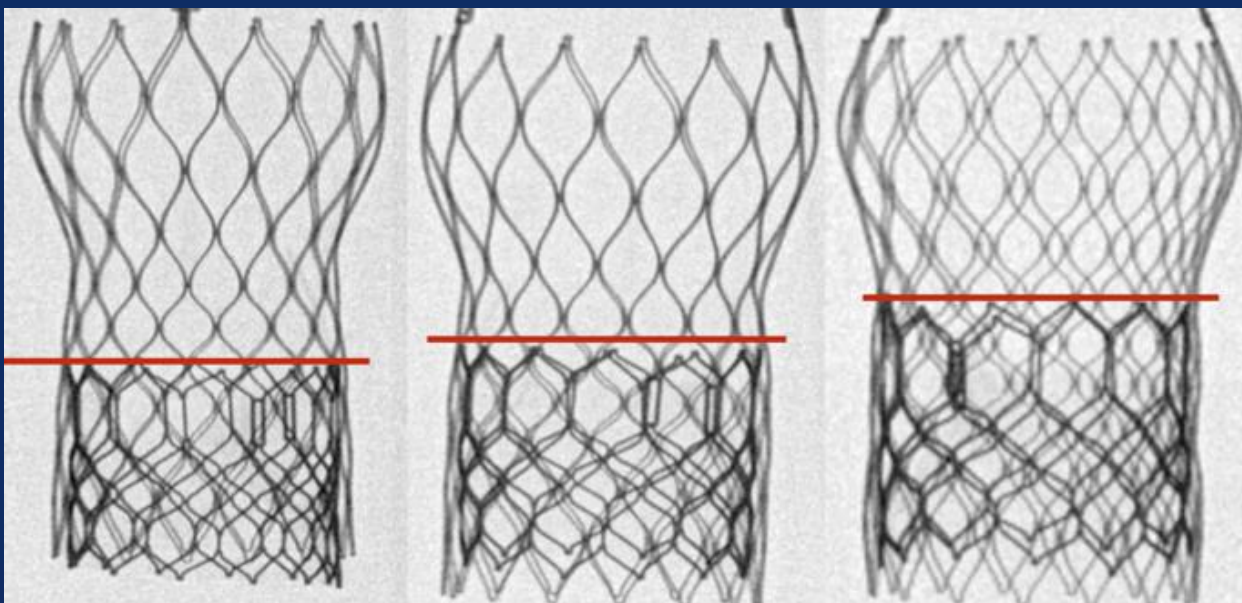


Low implant





Neoskirt and leaflet overhang



Node-4

Node-5

Node-6

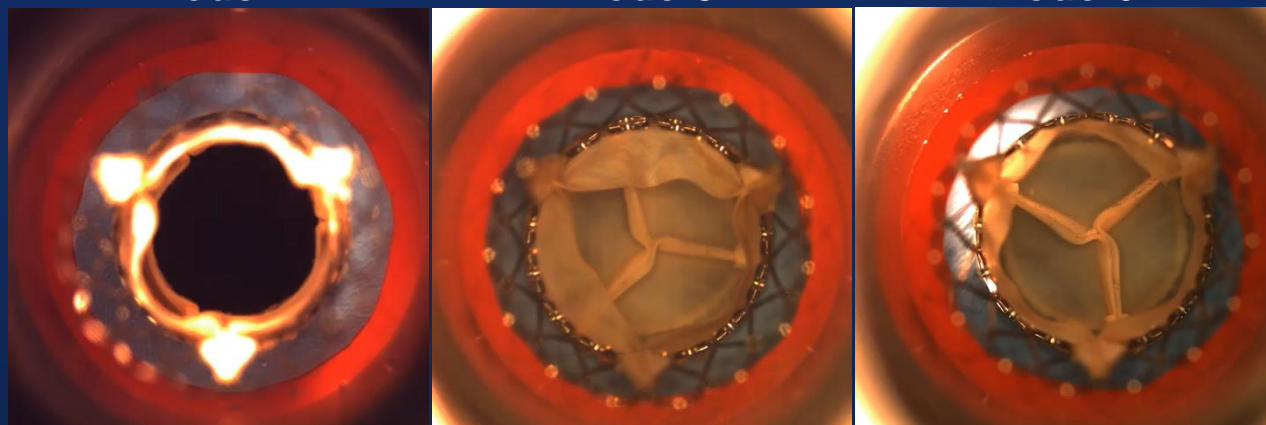


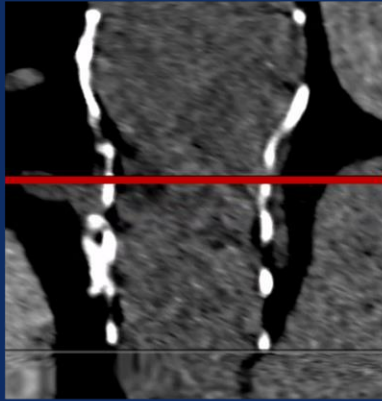
TABLE 1 Neoskirt Height and Leaflet Overhang With Variable Implant Depth

Evolut R	Sapien 3	Implant Depth (S3 Outflow)	Neoskirt Height, mm	Leaflet Overhang, %
23 mm	20 mm	Node 4	16.3	90
		Node 5	20.7	32
		Node 6	23.9	0
26 mm	23 mm	Node 4	17.1	90
		Node 5	21.0	49
		Node 6	23.4	9

Different degrees of Leaflet overhang

Plan for RedoTAVI

RCA



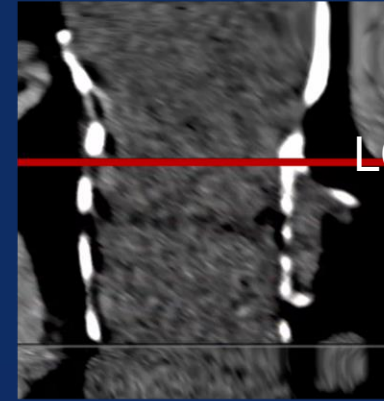
Risk plane above RCA and LCA

23.4 mm

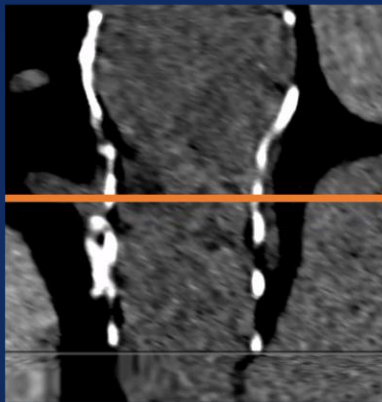


Node-6

LCA

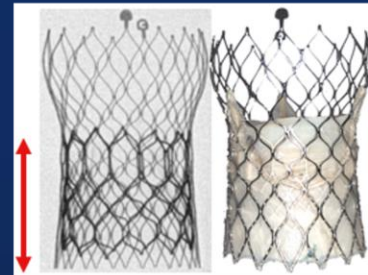


RCA



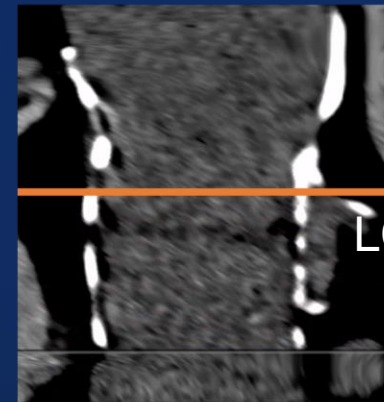
Risk plane above LCA

21 mm

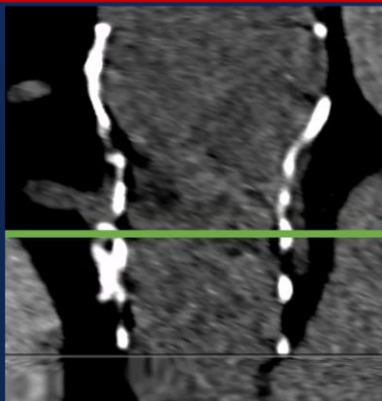


Node-5

LCA



RCA



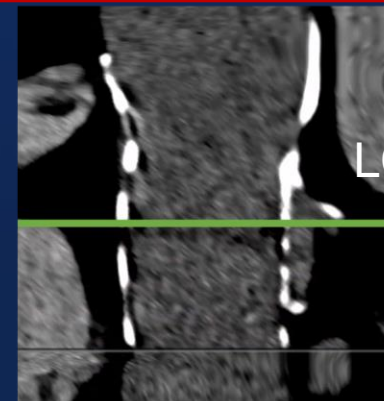
Risk plane under RCA and LCA

17.1 mm

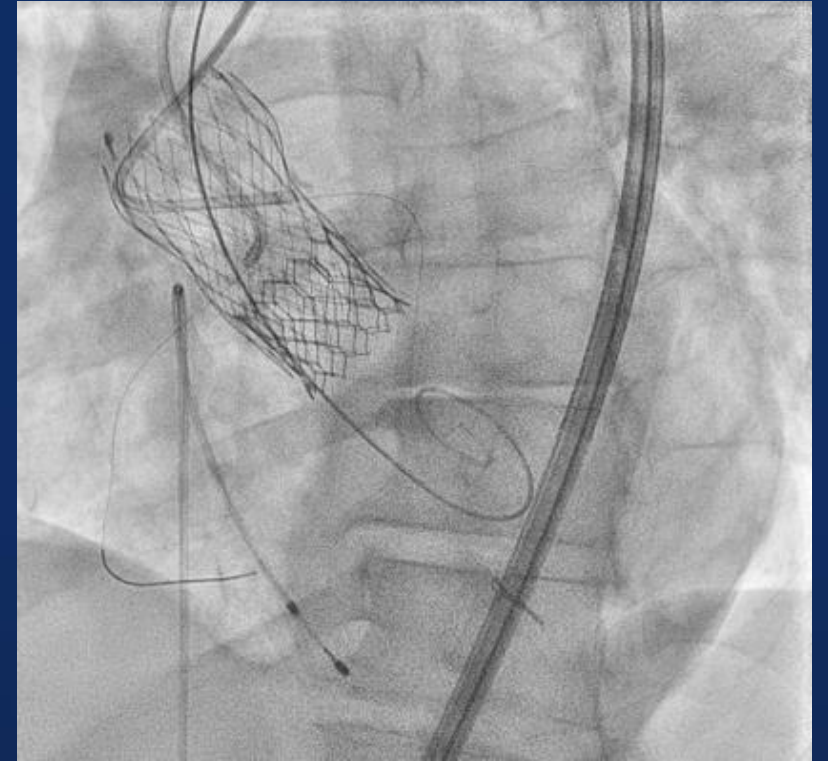
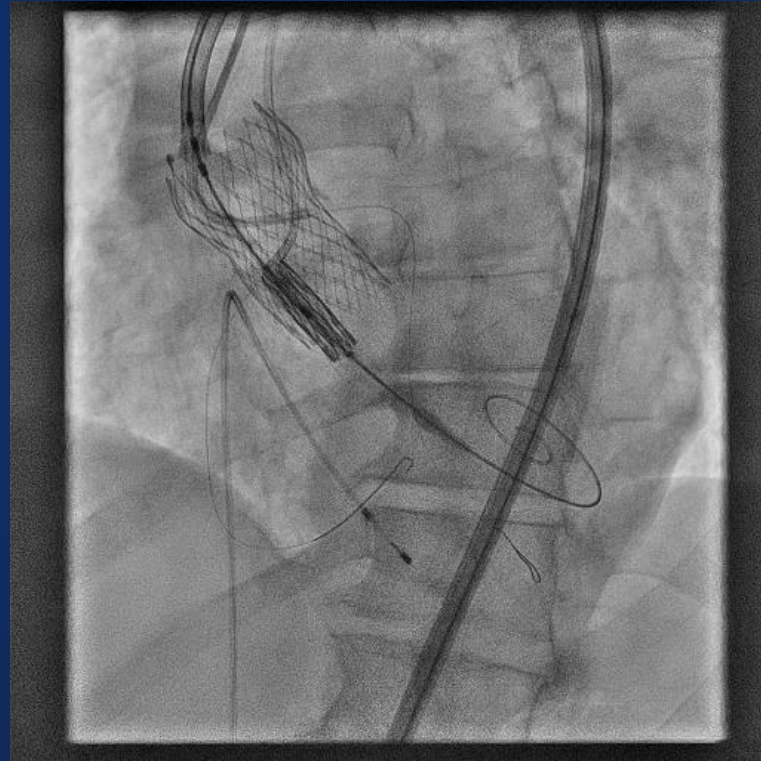
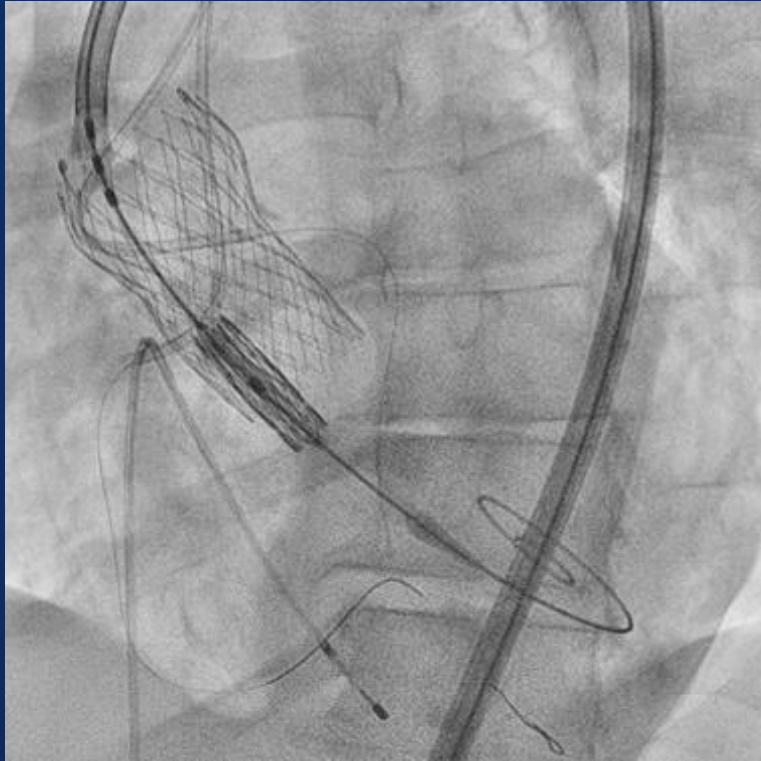


Node-4

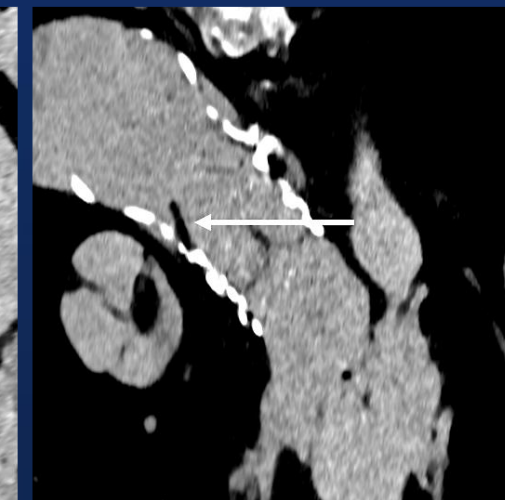
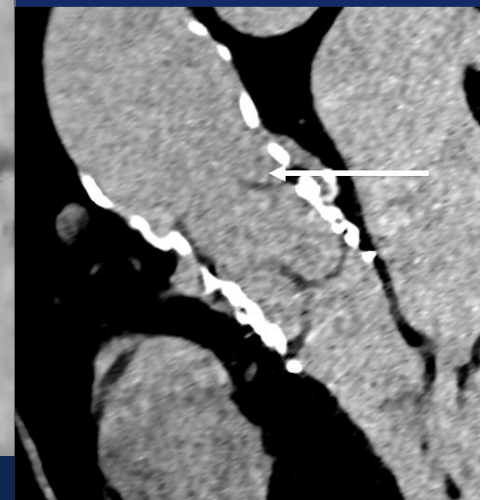
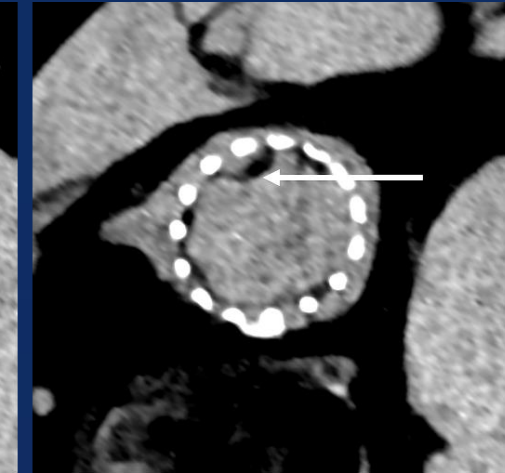
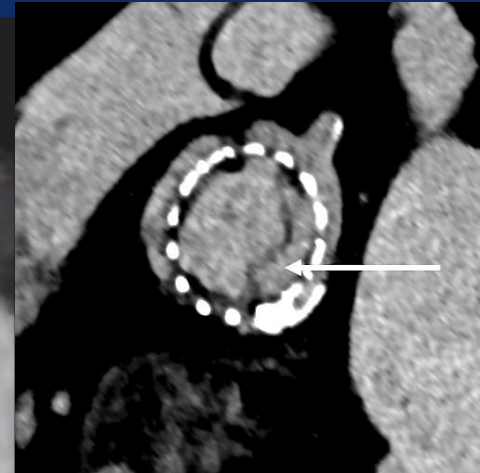
LCA



What did we do ?



Follow-up CT





RedoTAV App available*

*April 2024

CT Planning

Use this app workflow along with CT software

Index TAV and 2nd TAV combination specific

Steps

- 1 Index TAV & Measurements
- 2 Identify Coronary Risk Plane (CRP)
- 3 Select Second TAV
- 4 Choose NSP & Assess NSP/CRP
- 5 Second TAV Sizing
- 6 Coronary Risk Assessment
- 7 Summary Report
- 8 Pre-Index TAV CT Data (Optional)

CT Cardiac Phase to Use

Ideal: Mid-Diastolic (70-85%)

Alternative: End-Systolic (35-45%) or whenever least artifact

Step 1 →

CT Planning

Step 1: Index TAV & Measurements

Medtronic Evolut R 29

Height: 45
Diameter: 29
Inner Skirt Height: 14
Native Annulus Perimeter: 72.3-81.7

Reference Levels for Redo-TAV

Node 6
Node 5
Node 4
Node 3 (Nadir of leaflet)
Node 2
Node 1

Next

CT Planning

Step 1: Index TAV & Measurements

Index TAV Measurements

Index TAV Failure Mechanism: AS

Commissure Alignment

Commissure of native aortic valve	Commissure of index TAV
Aligned (0-15°)	Mild (15-30°)
Moderate (30-45°)	Severe (45-60°)

Commissure Alignment of Index TAV

Commissure: Select...

- Aligned
- Mildly Misaligned
- Moderately Misaligned
- Severely Misaligned
- N/A

Next

CT Planning

Step 3: Select Second TAV

Neoskirt Plane (NSP) for S3U in ER

Acceptable levels of NSP Node 6 to Node 4

Implant top of S3 between Node 6 (#26, 29, 34) or 5 (#23) & 4

In pure AR, lower implant may be considered

Not recommended

Higher implant (Node 7)	Lower implant (Node 3)
No hemodynamic benefit Risk of migration	Leaflet overhang Only for pure AR with coronary risk

More Info **i**

Step 4 →



Take-home message

- Optimizing the index procedure
- Planning for the future before the index TAVR: THV design/implant depth/commissural alignment
- Tailored approach
- More clinical data is needed

