Challenges with ViV TAVR:

Role of Valve Fracture, Coronary Protection, and Leaflet Modification

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Disclosures

Institutional Research Support

- Edwards Lifesciences
- Boston Scientific
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- I-Rhythm
- JenaValve

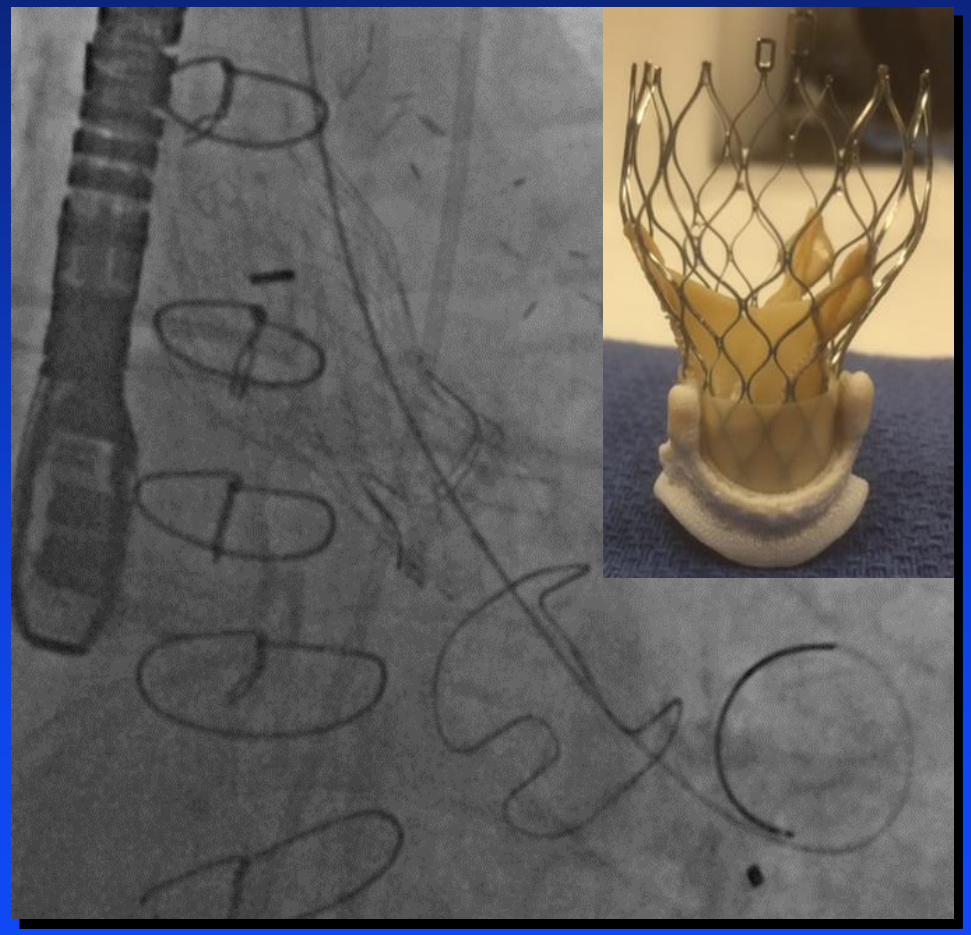
- Abbott Vascular
- Medtronic
- CathWorks
- Zoll/Therox
- JC Medical

Consulting/Advisory Boards

- Medtronic
- Boston Scientific
- HeartBeam

- Edwards Lifesciences
- Abbott Vascular

Valve-in-Valve TAVR

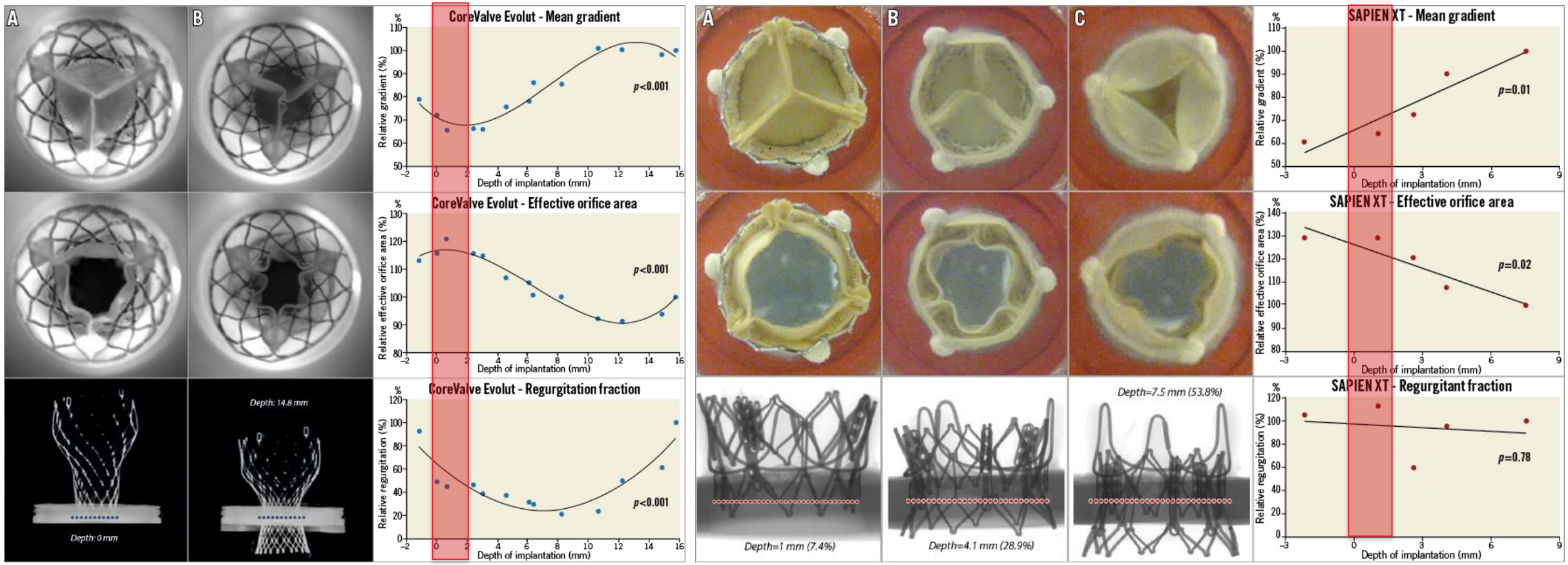


- Represents ~5% of all TAVRs in US
- At present, there are 2 major challenges in performing ViV TAVR
  - Patient-prosthesis mismatch (especially when treating small surgical valves)
  - Coronary obstruction

VIV TAVR: Tips and Tricks

- TAVR positioning
- Bioprosthetic valve fracture (BVF)
- Preventing coronary occlusion

Impact of Implantation Depth on Hemodynamics



High implant (lowest depth) optimizes hemodynamics with both SEV and BEV

Simonato, et al. EuroIntervention 2016;12:909-917

VIV TAVR: Tips and Tricks

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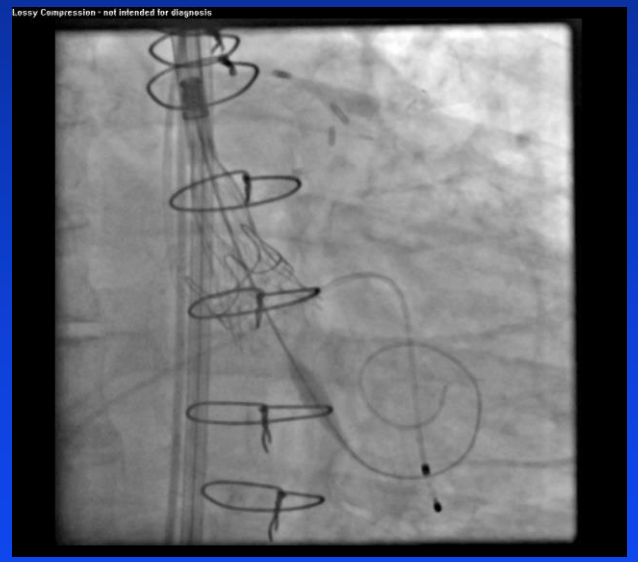
Preventing Patient-Prosthesis Mismatch

Prior 19 mm Magna (TRUE ID 17mm); VIV TAVR performed with 23 mm Evolut R

Baseline



After 26 mm EVOLUT

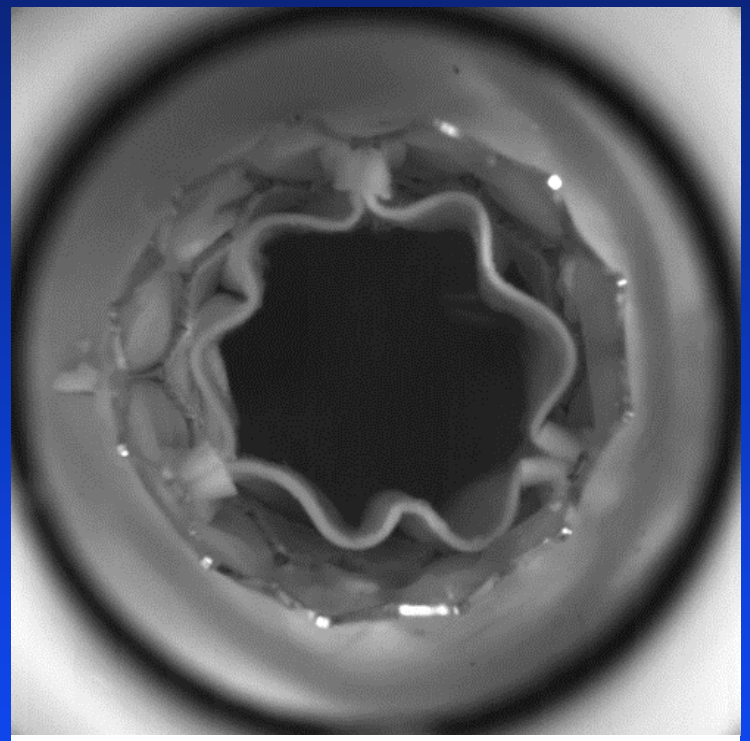
Mean gradient = 63 mmHg
AVA 0.8 cm2

Mean gradient = 44 mmHg
AVA 1.0 cm2

BVF with 20 mm True Balloon (18 atm)

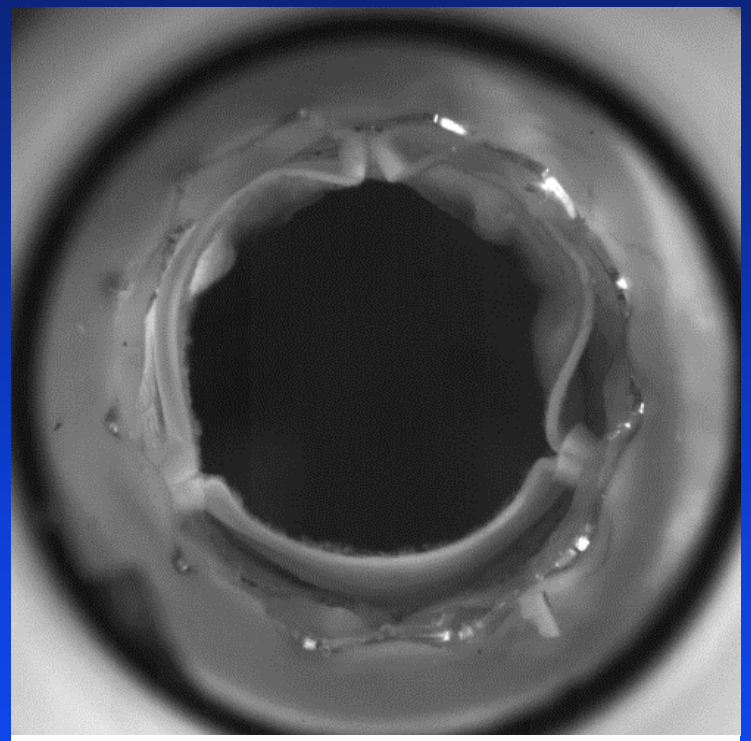
Mean gradient = 18 mmHg
AVA 1.9 cm2

Effects of THV Underexpansion



Before BVF:
"Pinwheeling"

BVF



After BVF:
No "Pinwheeling"

Courtesy of J. Sathananthan and J. Webb

Not All Valves Can Be Fractured

Valves that can be fractured
Biocor Epic
*Magna/Magna Ease
*Mitroflow
*Mosaic
*Perimount (newer generation, perforated ribbon)
*Inspiris

Chhatrwialla AK, et al. Circ Cardiovasc Interv. 2018

Not All Valves Can Be Fractured

Valves that can be fractured	Valves that can be "remodeled"
Biocor Epic	C-E Standard
Magna/Magna Ease	C-E SAV
Mitroflow	Perimount (older generation)
Mosaic	Trifecta
Perimount (newer generation, perforated ribbon)	
Inspiris	

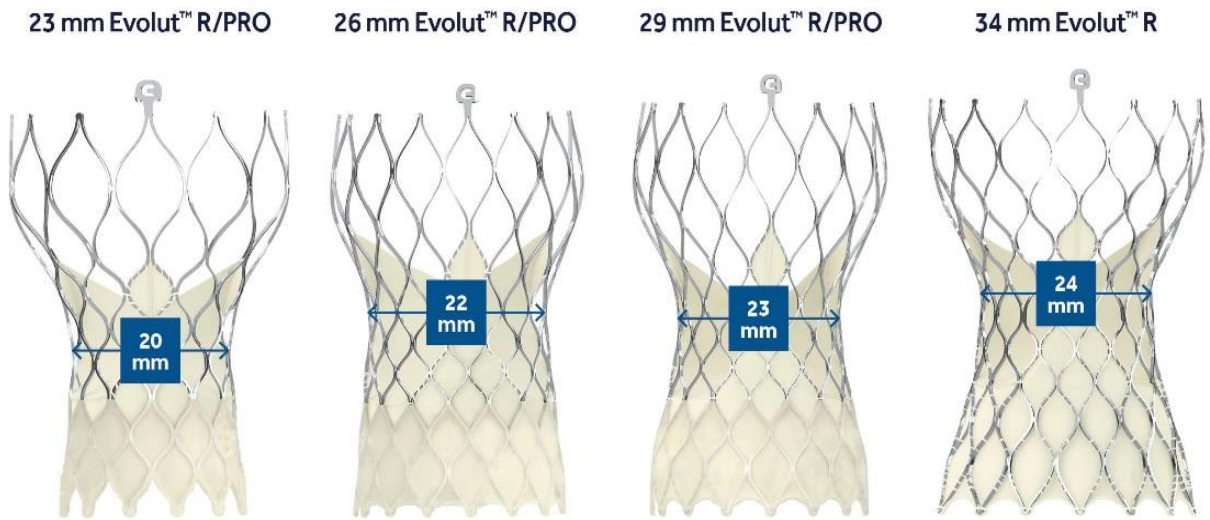
Chhatrwialla AK, et al. Circ Cardiovasc Interv. 2018

Not All Valves Can Be Fractured

Valves that can be fractured	Valves that can be "remodeled"	Neither
Biocor Epic	C-E Standard	**Avalus**
Magna/Magna Ease	C-E SAV	**Hancock II**
Mitroflow	Perimount (older generation)	
Mosaic	Trifecta	
Perimount (newer generation, perforated ribbon)		
Inspiris		

Chhatrwialla AK, et al. Circ Cardiovasc Interv. 2018

Balloon Position (and Sizing) for BVR vs. BVF



Maximum Recommended Balloon Size

BVF

- Constraint at valve ring → keep balloon low (ventricular) to fracture ring
- Can oversize if necessary

BVR

- Constraint at valve frame → balloon higher to expand frame → risk of damage to THV leaflets
- Avoid oversizing

VIV TAVR: Tips and Tricks

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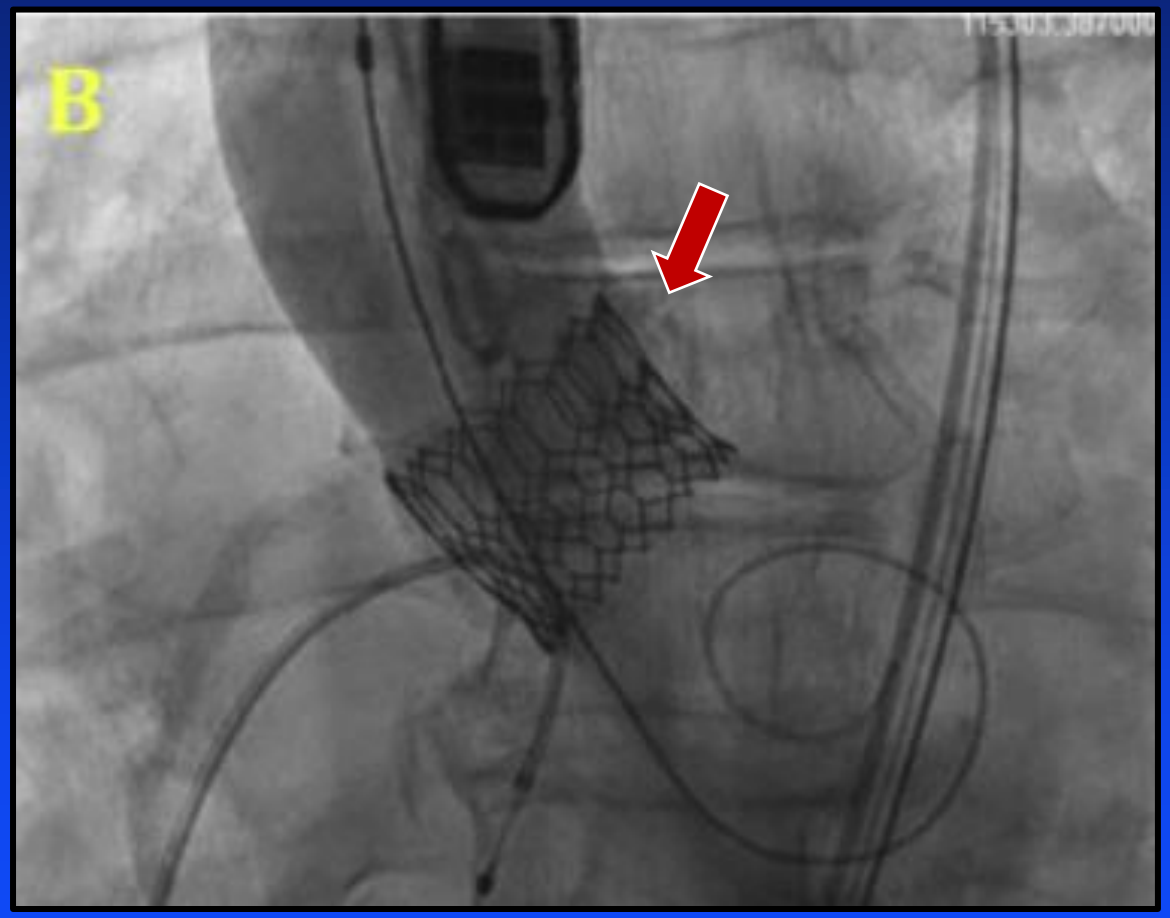
Coronary Obstruction



Spanish TAVI Registry (2009-2021)

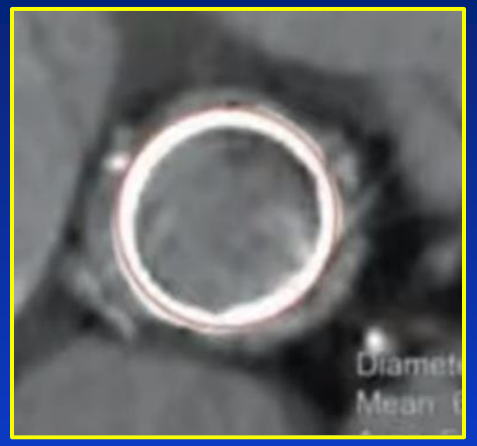
- Incidence ~5% in ViV TAVR (↑6x vs. native TAVR)
- In-hospital mortality 37%
- Most cases occur during procedure but ~15% present late (including 5% after discharge)

Ribeiro et. al. JACC Intv 2013

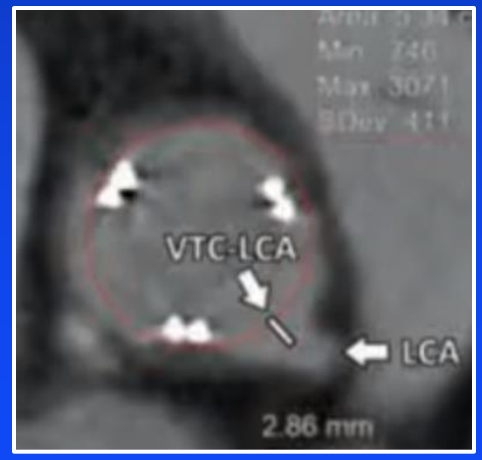
Ojeda S, et al. JACC Intv 2023

Risk Factors for Coronary Obstruction

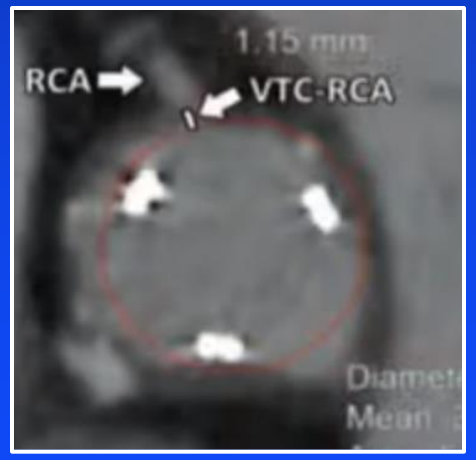
- Small/effaced sinuses of Valsalva
- Low coronary height (<10 mm)
- Valve to coronary (VTC) distance < 4 mm
- Surgical valve with leaflets mounted external to valve frame (Mitroflow, Trifecta)



- 21 mm Mitroflow
- Planned 23 mm S3 with BVF

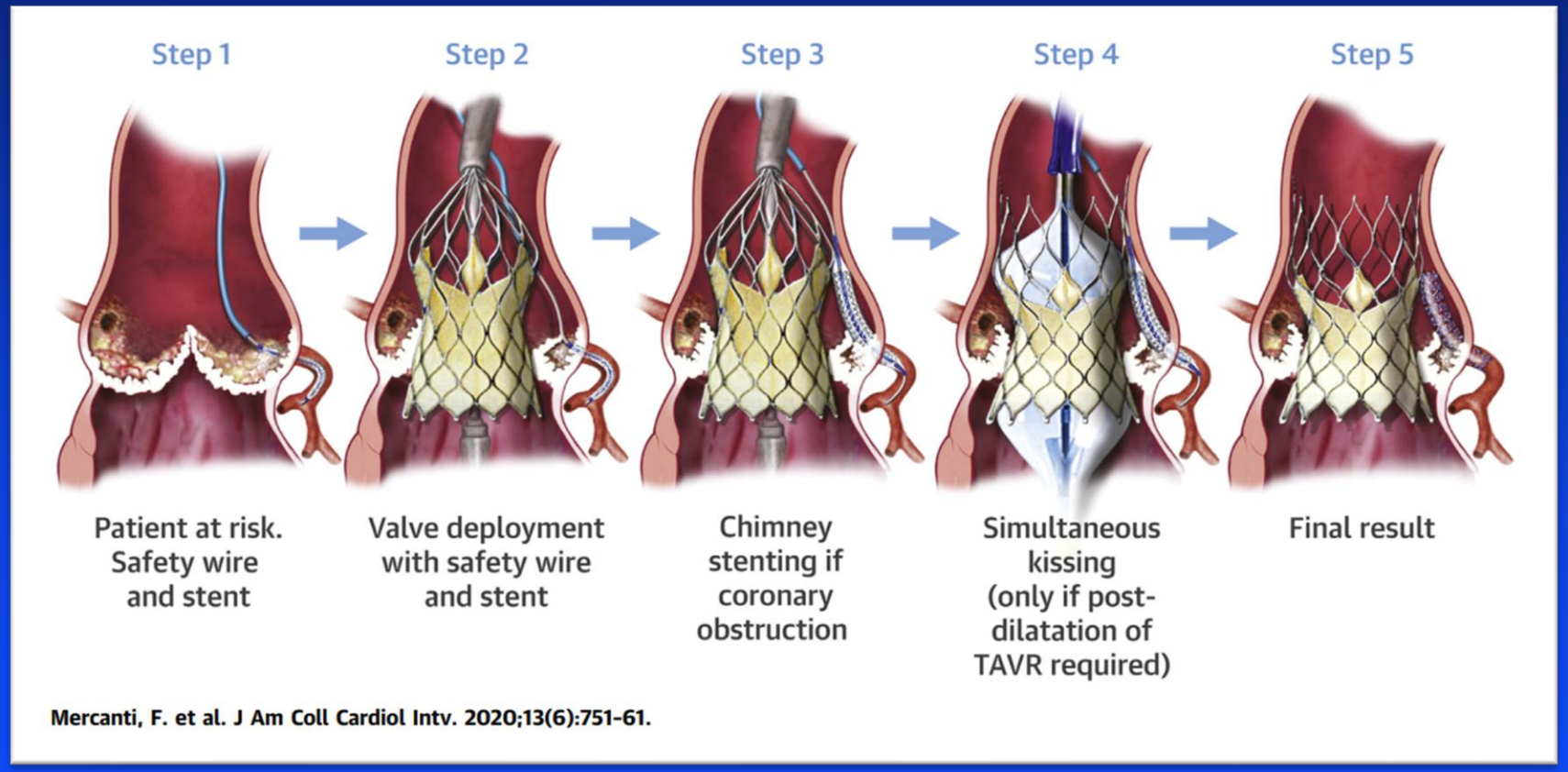


LM VTC 2.8 mm



RCA VTC 1.2 mm

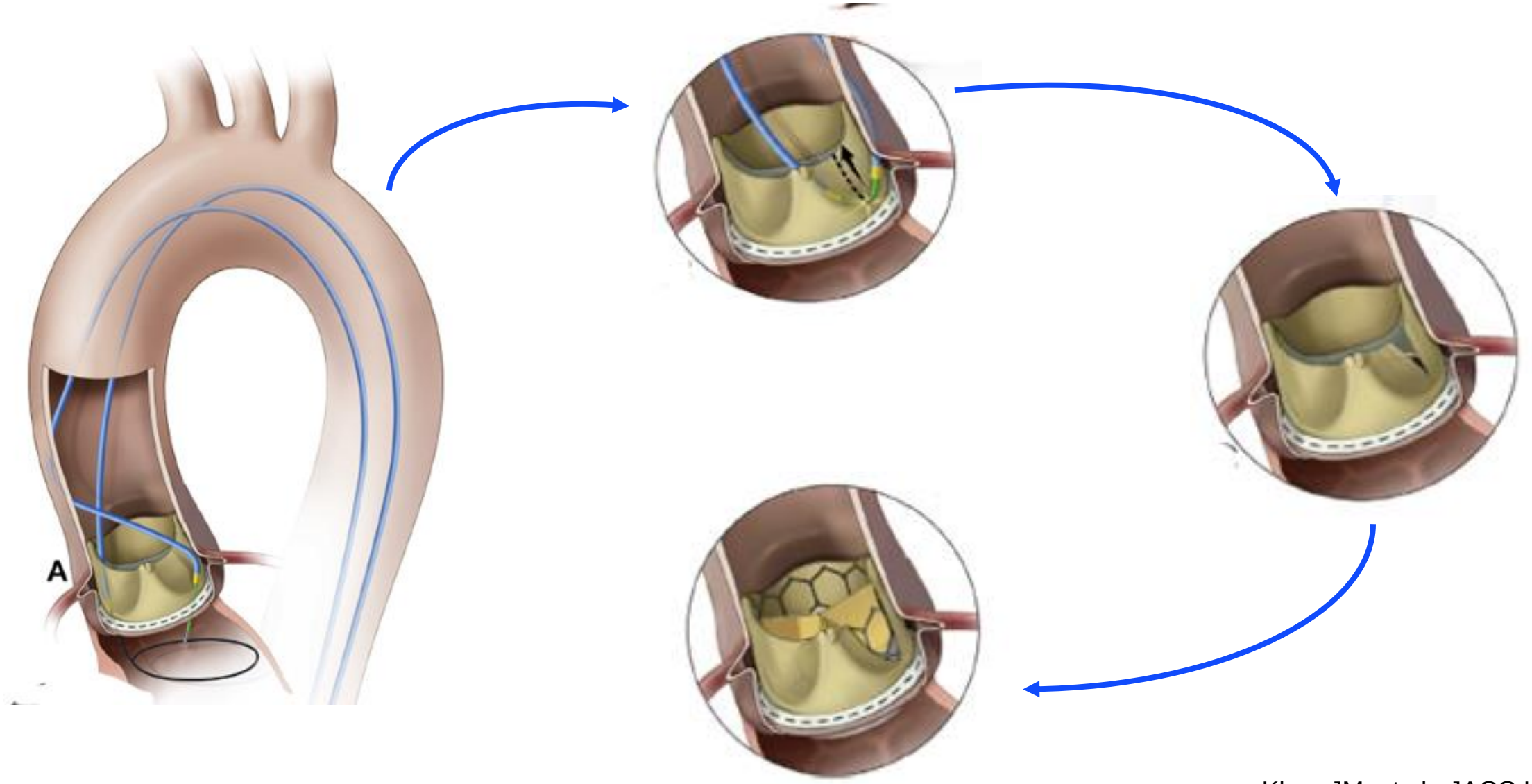
Coronary Protection/Chimney Stenting



Mercanti, F. et al. J Am Coll Cardiol Intv. 2020;13(6):751-61.

- Can consider protection with wire and guide extension catheter to avoid challenges with stent removal
- Makes future coronary reaccess very difficult or impossible

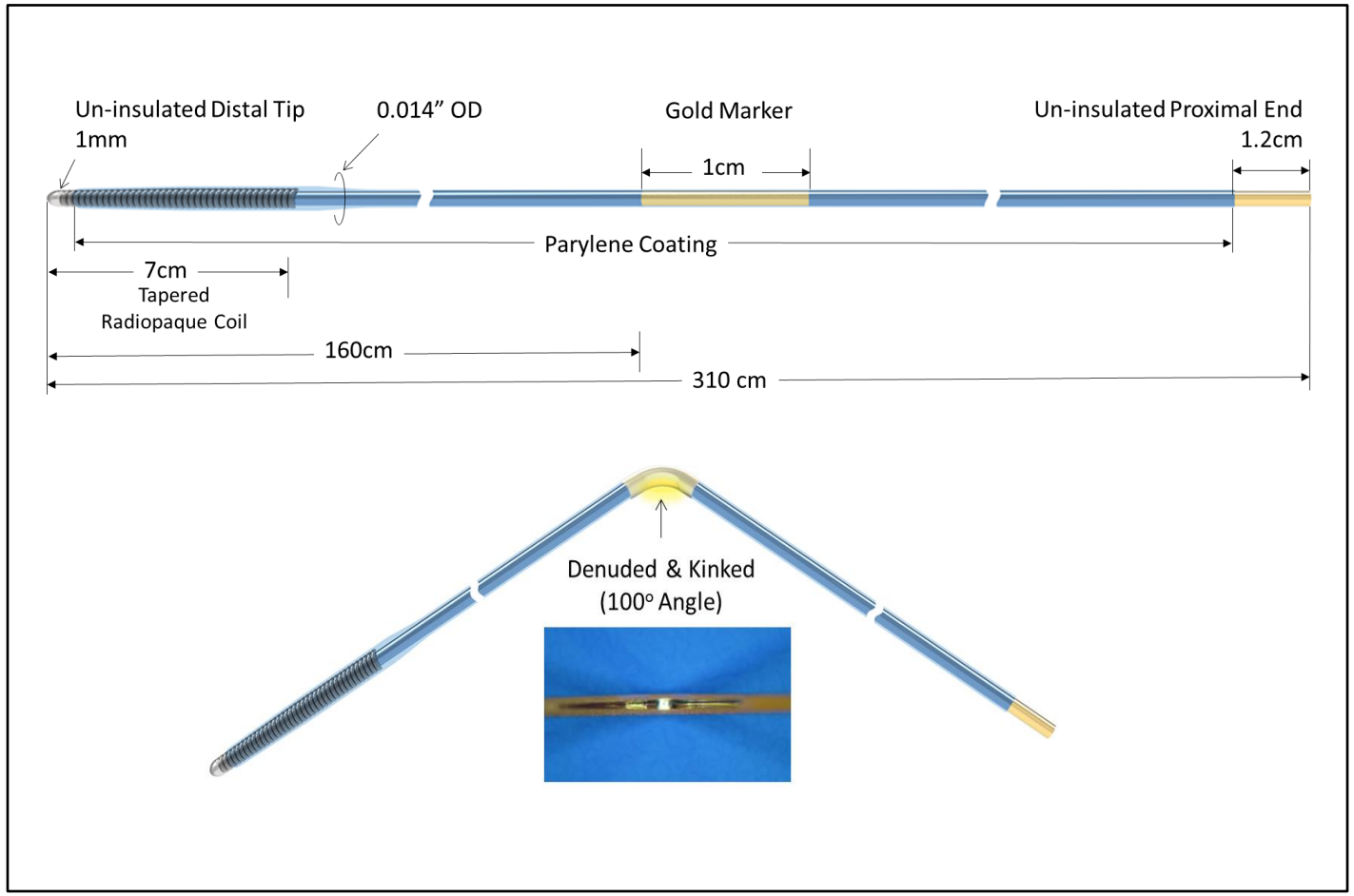
Leaflet Modification: BASILICA



Khan JM, et al. JACC Intv 2018

Can we make leaflet modification easier?

Telltale System



Summary: ViV TAVR Tips and Tricks

- ViV TAVR is an important TAVR subset that presents several unique challenges:

Patient-Prosthesis Mismatch

- In many cases, PPM can be minimized by thoughtful selection and placement of the TAVR valve
- BVF can improve short-term hemodynamics, particularly when treating small surgical valves → Long-term outcome data needed

Coronary Obstruction

- Detailed CT analysis and preparation are critical for avoidance of coronary obstruction
- In addition to coronary protection ± chimney stenting, BASILICA is a promising approach to prevention of coronary obstruction → Newer devices should facilitate uptake of these techniques