Predicting Risk of Coronary Occlusion During TAVR Procedures

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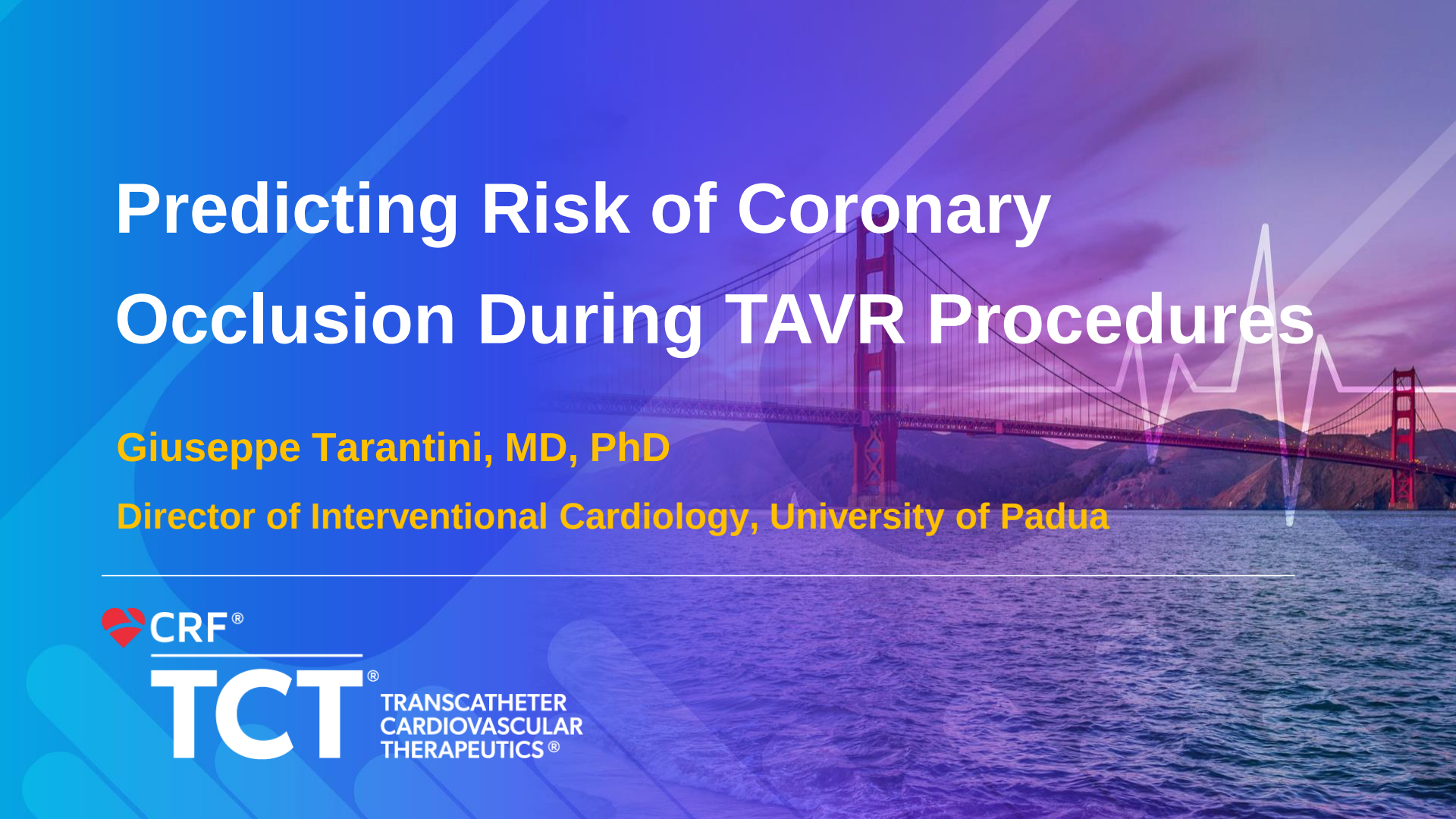
Director of Interventional Cardiology, University of Padua



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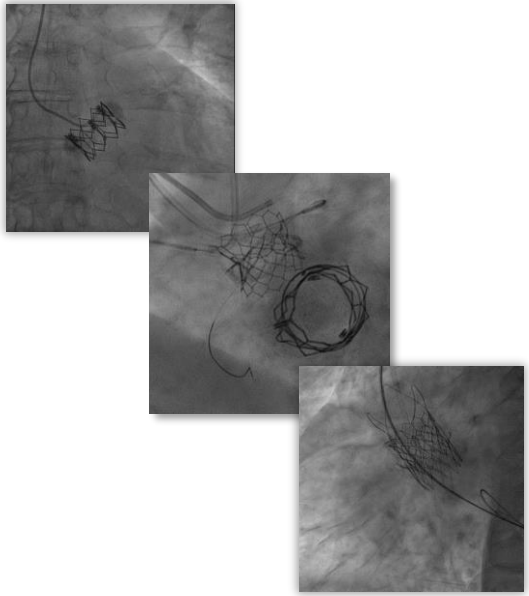
Within the prior 24 months, I have had a financial relationship with a company producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients:

Nature of Financial Relationship	Company
Consultant Fees/Honoraria	Abbott, Edwards Lifesciences, Medtronic, Abiomed, Boston Scientific, Microport, SMT

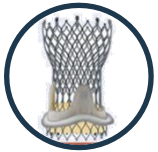
All relevant financial relationships have been mitigated.
Faculty disclosure information can be found on the app

CORONARY OCCLUSION IN TAVR

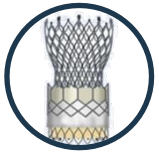
- Evidence of a ***new partial or complete obstruction of an epicardial coronary artery ostium***
- Early (< 7 days after TAVI) occlusion tipically present with severe hypotension and ECG changes



Native

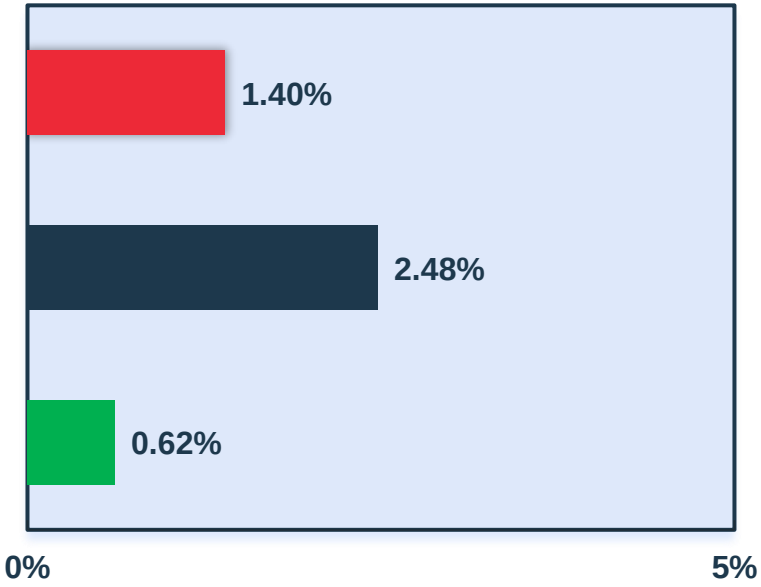


TAVR in SAVR

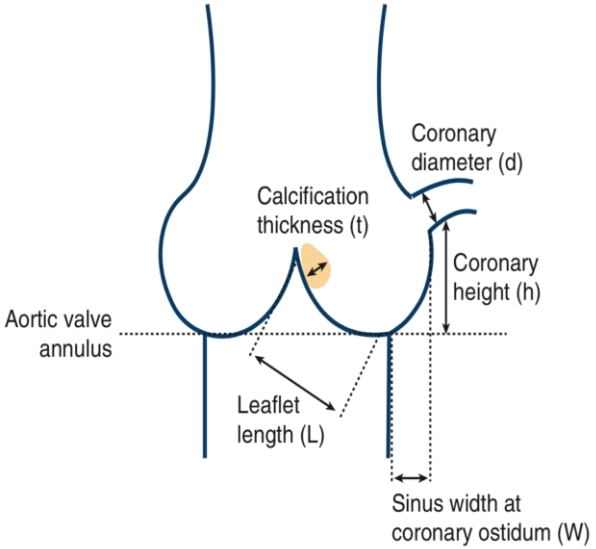


TAVR in TAVR

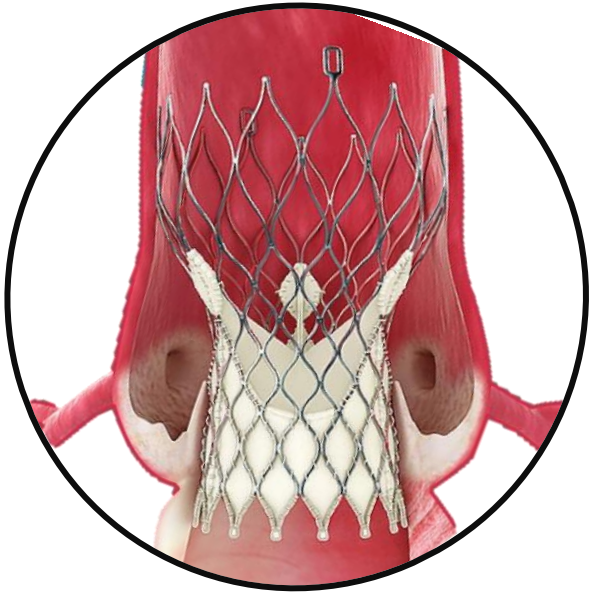
Ibrahim et al. Circ Cardiovasc Interv. 2024 Jun;17(6)



MECHANISMS OF CORONARY OBSTRUCTION



- By ***leaflet (native or prosthetic)***
- By ***calcific nodule***
- By ***sinus sequestration***
- By ***commissural post or skirt***
- By ***embolized material (thrombus or degenerative)***

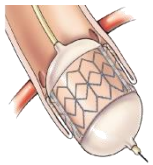


Native

Coronary Obstruction: *Risk Factors*

Anatomic Factors

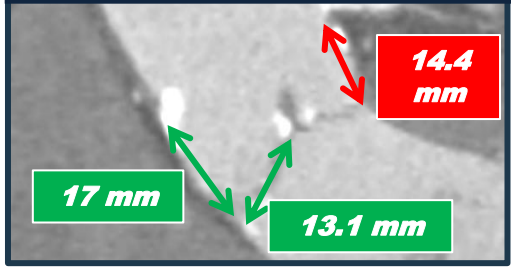
- *Low-lying coronary ostia (ostium height<leaflet lenght)*
- *Narrow STJ/low sinus height*
- *Narrow sinuses of Valsalva*
- *Heavy leaflet calcification*
- *Previous aortic root repair*



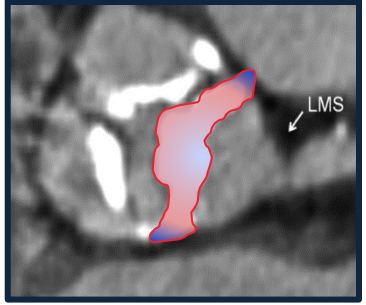
THV Factors

- *Extended sealing cuff*
- *High implantation*
- *Commissural misalignment*

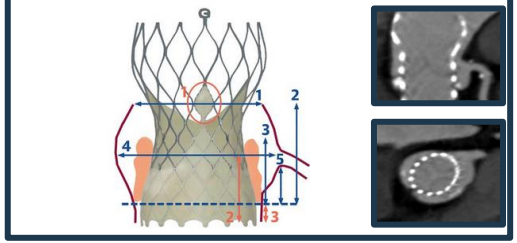
Leaflets/coronary height



Calcium



Sinus width/THV geometry



Ostial location

Tarantini et al. Eurointervention 2021; Ibrahim et al. Circ Cardiovasc Interv. 2024 Jun;17(6):e012827; Dvir et al. Circ Cardiovasc Interv. 2015 Jan;8(1):e002079.

Coronary Obstruction: *Prediction*

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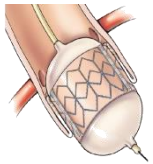

THV Factors

- *Extended sealing cuff*
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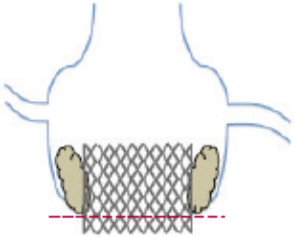
- *Commissural misalignment*

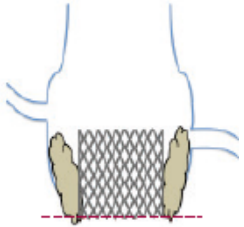
Lower probability:

Wide Aortic Root or High Coronaries

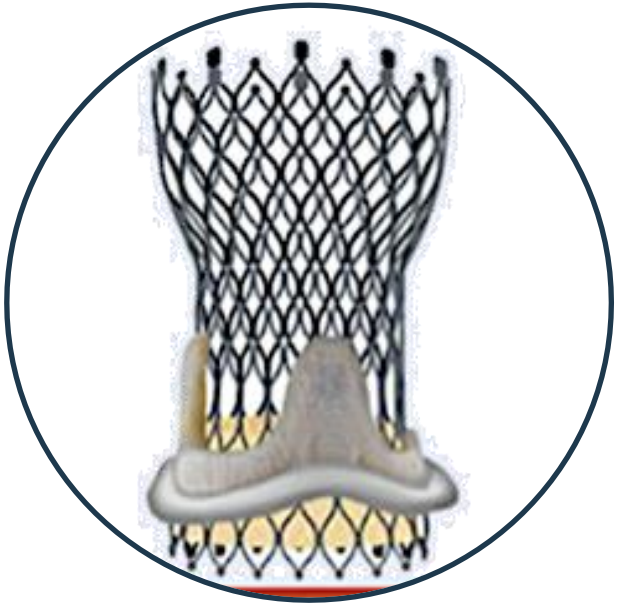


Higher probability:

Small Aortic Root or Low Coronaries

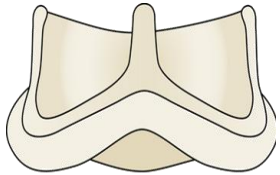


Tarantini et al. Eurointervention 2021; Ibrahim et al. Circ Cardiovasc Interv. 2024 Jun;17(6):e012827; Dvir et al. Circ Cardiovasc Interv. 2015 Jan;8(1):e002079.



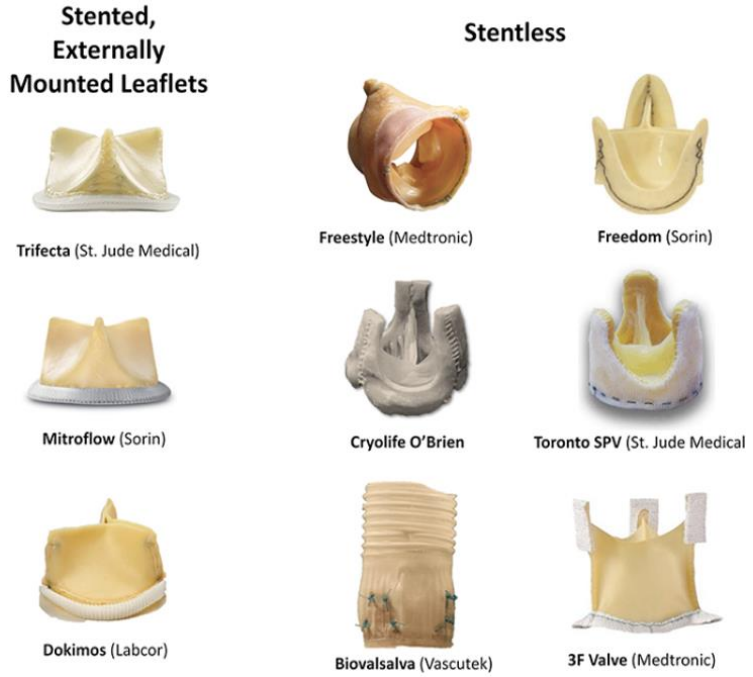
TAVR in SAVR

Coronary Obstruction: *Risk Factors*



BHV Specific Factors

- *Supra-annular position*
- *Tall leaflets*
- *External leaflets*
- *Stentless*



Internal leaflets

Coronary occlusion *0.7%*

External leaflets

Coronary occlusion *6.4%*

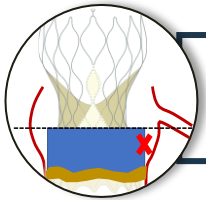
Stentless

Coronary occlusion *3.7%*

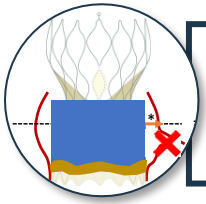
Tarantini et al. Eurointervention 2021; Ibrahim et al. Circ Cardiovasc Interv. 2024 Jun;17(6):e012827; Dvir et al. Circ Cardiovasc Interv. 2015 Jan;8(1):e002079.

Coronary Obstruction: *Prediction*

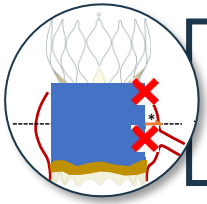
SAV leaflets



Below Coronaries



Above Coronaries Below STJ



Above Coronaries and STJ

Yes

VTC > 4 mm

Yes

VTA > 2 mm

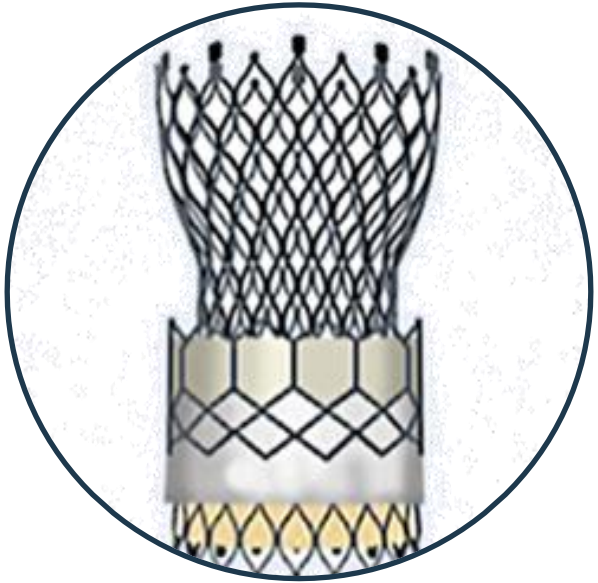
No

No

Conventional TAVR

Consider Chimney/BASILICA

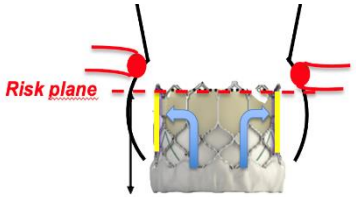
Tarantini G, Dvir D, Tang GHL. EuroInt 2021;17:709-719



TAVR in TAVR

Coronary Obstruction: *Prediction*

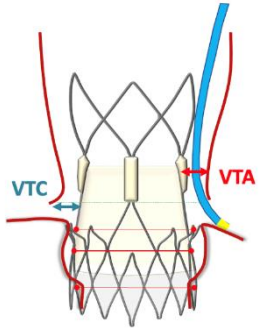
Coronary plane



Coronary ostia > RP or VTC/VTA > 4 mm

Coronary ostia < RP + VTA 2-4 mm

Coronary ostia < RP + VTA < 2 mm

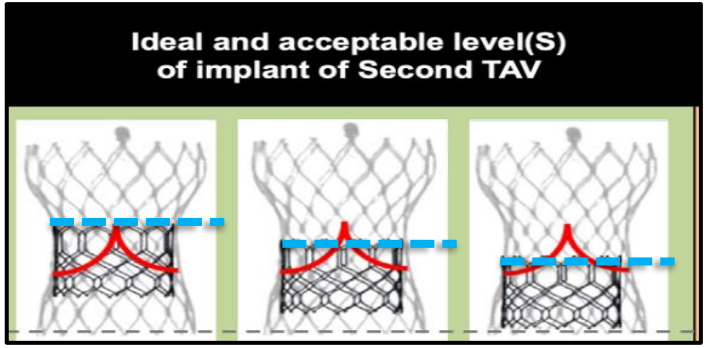


VTC/VTA Width

Tarantini G, Fabris T, Nai Fovino L – EuroIntervention 2020;16:129-132; Nai Fovino et al. JAHA 2020; Ochiai T, et al. JACC 2021; Forrestal BJ, et al. Circ Cardiovasc Int 2020

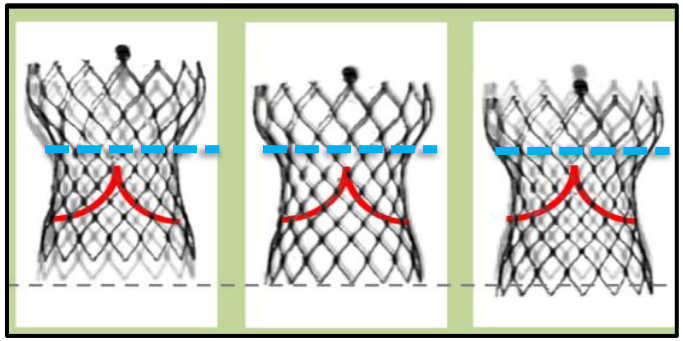
Coronary Obstruction: *Risk Reduction*

Short in Tall



Different Positioning = Different Overhang

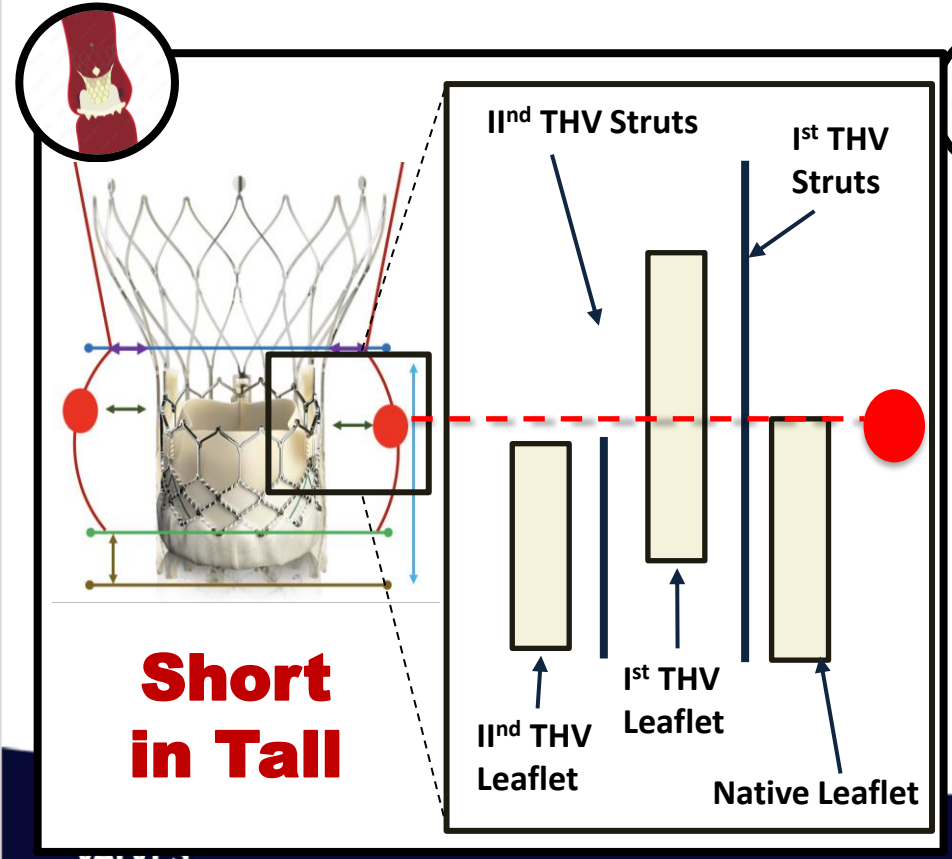
Tall in Tall

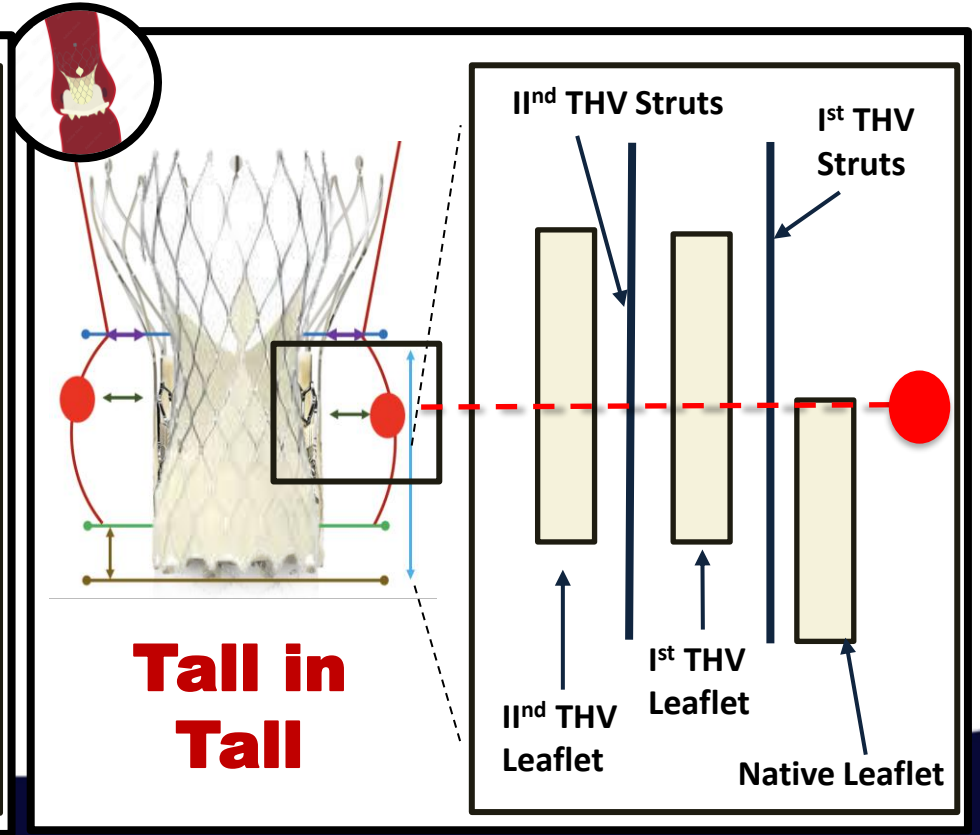


Different Positioning = No Overhang

Bapat et al. JACC Cardiovasc Interv. 2024 Jul 22;17(14):1631-1651.

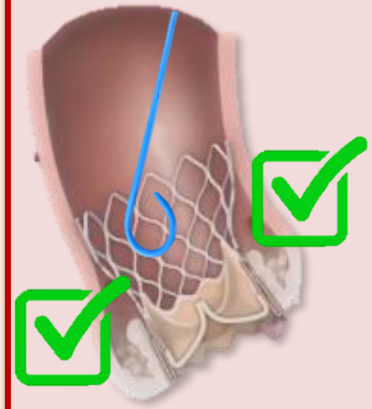
1st THV choice MATTER : *NEOSINUSES structures*





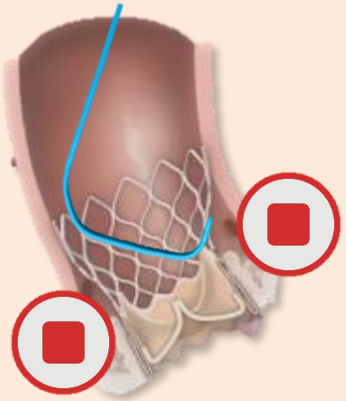
Tarantini, Nai fovino Circ Intv 2024

EVALUATION



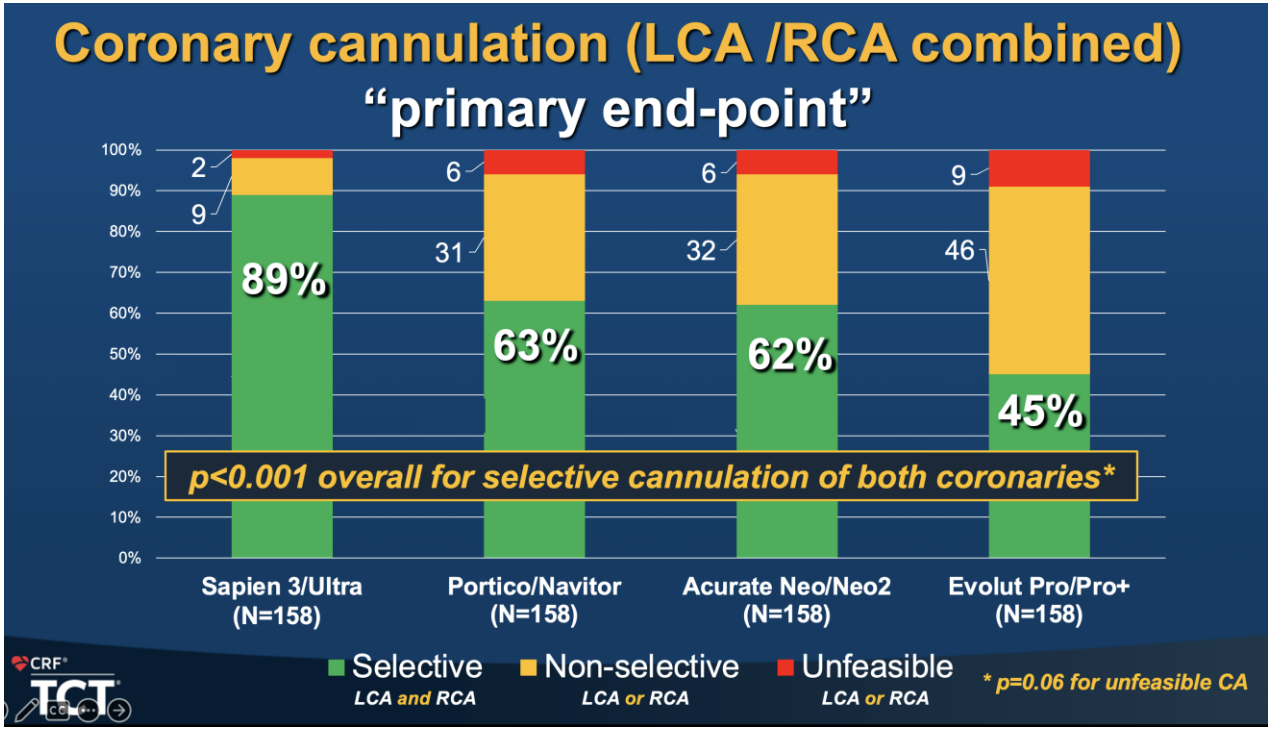
CORONARY PERFUSION

CORONARY CANNULAT.

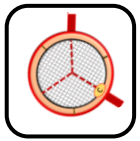


The Coronary AccEss After Tavi (CAvEAT) Registry

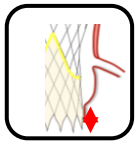
Prospective, observational, multi-center study- *632 pts* at *18 sites* (> 100 TAVI/year)
– selective cannulation *immediately after THV delivery*



Predictors of unfeasible/ non-selective CA after TAVR



Moderate/severe misalignment
(OR 5.51, p<0.001)



Implantation depth
(OR 0.83, p<0.002)

Implantation of a tall-frame THV
(OR 6.24, p<0.001)

Tarantini et al. J Am Coll Cardiol Intv. 2025 Jun, 18 (12) 1571–1583

TAKE HOME MESSAGES

- **Coronary obstruction** is a **rare but serious complication** of TAVR, requiring accurate **risk assessment and preventive planning**
- **Anatomical and procedural factors**, integrated with advanced imaging and planning tools (**CT-based analysis**, VTC/VTA measurements), enable precise risk prediction and enhance procedural safety.
- **Tailored strategies**—including optimal THV choice, alignment, and preventive maneuvers such as BASILICA—promote safer and more effective TAVR interventions.

→ ***An anatomy-driven, individualized approach remains the cornerstone of preventing coronary obstruction during TAVR.***