Treating Acute Coronary Syndromes and Stable CAD After TAVR: Operator Tips and Tricks

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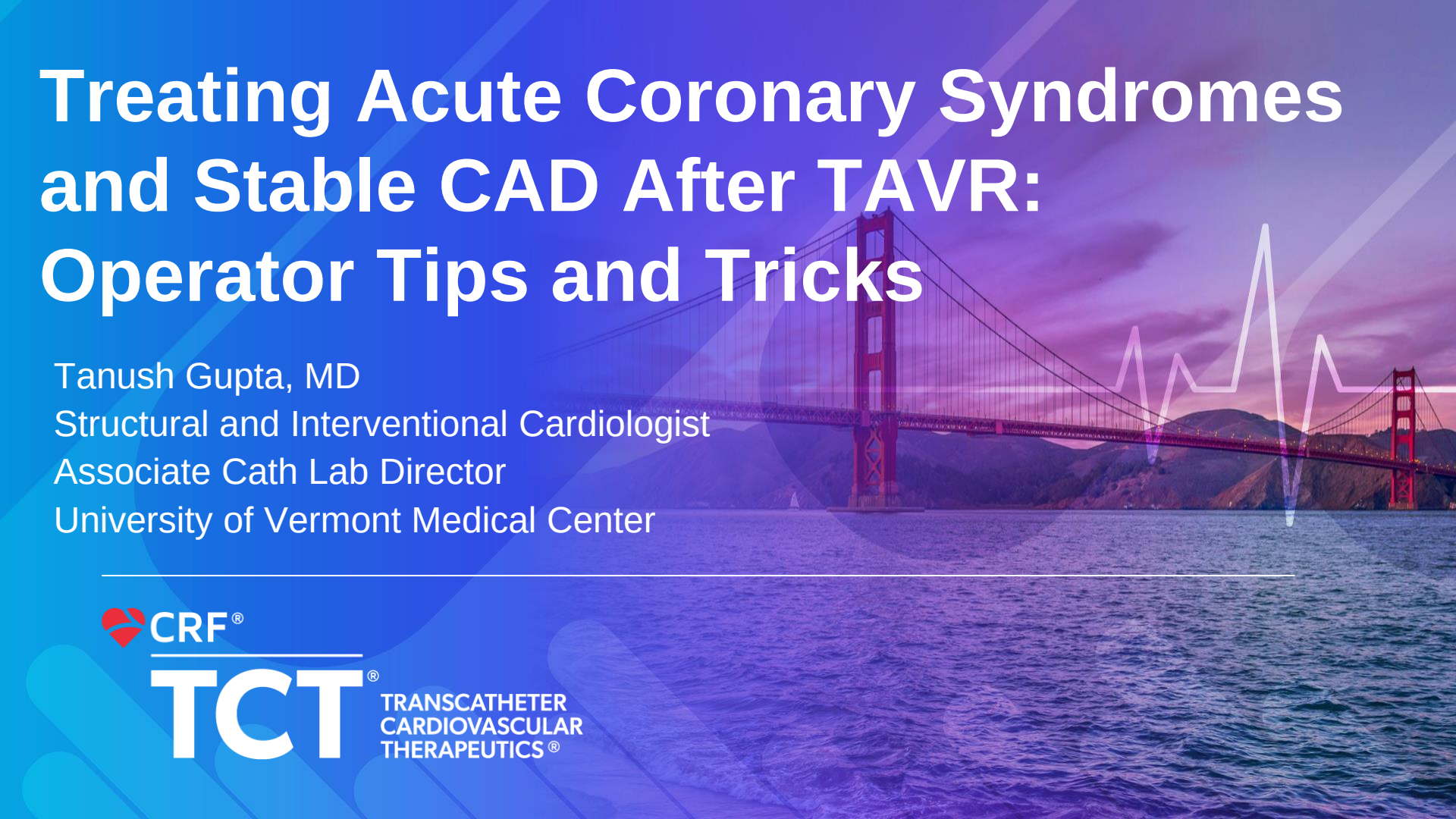

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Nature of Financial Relationship	Ineligible Company
Grant/Research Support	Edwards Lifesciences
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Individual Stock(s)/Stock Options	Anteris Technologies
Royalties/Patent Beneficiary	N/A
Executive Role/Ownership Interest	N/A
Other Financial Benefit	N/A

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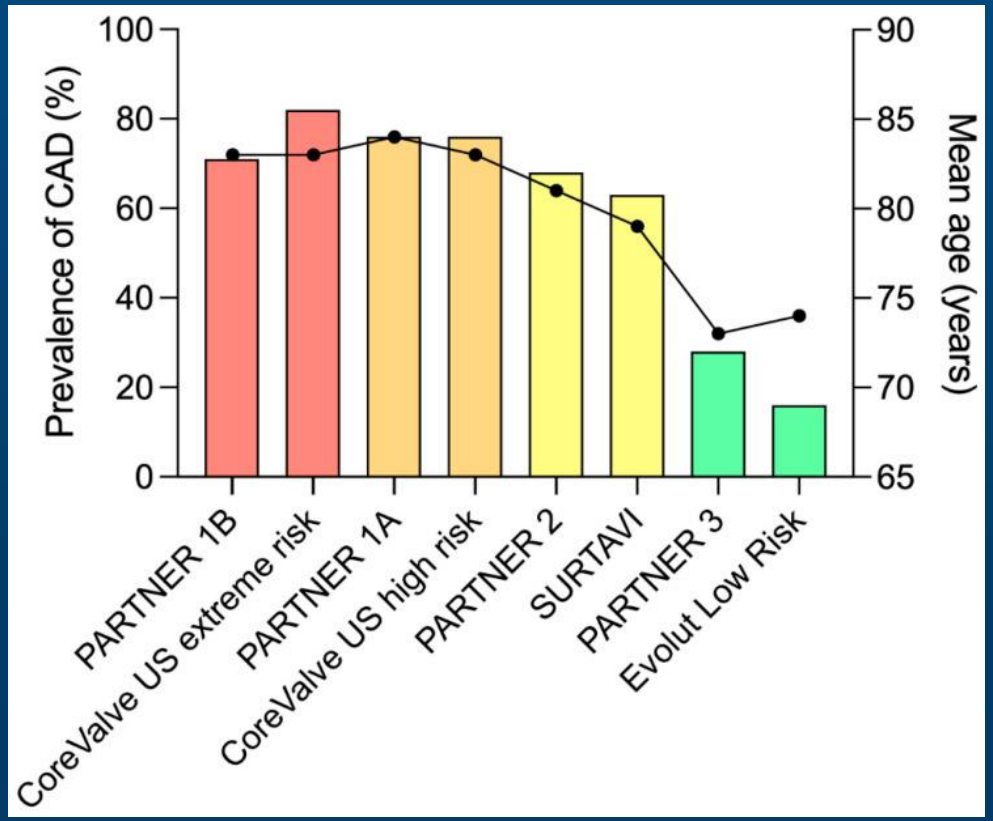
Prevalence of CAD in TAVR

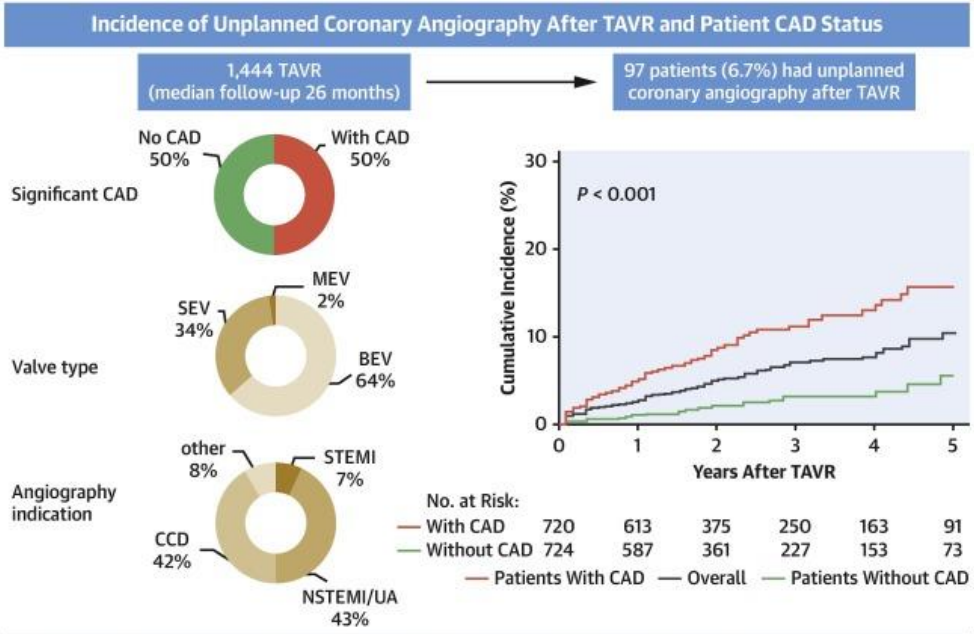


CAD is common in TAVR patients and prevalence depends on "patient risk"

Faroux et al. JACC 2019.

Unplanned Coronary Access Post TAVR is Infrequent

CENTRAL ILLUSTRATION: Unplanned Angiography After TAVR



- Patients with coronary artery disease have a 3-fold higher rate of unplanned angiography
- Acute coronary syndrome is the most common indication of angiography performed
- Predictors for a 5-year risk of unpanned angiography included coronary artery disease, young age, low aortic gradient, and dialysis

Phichaphop A, et al. JACC Cardiovasc Interv. 2025;18(2):217-225.

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Frequency of AMI after TAVR

CENTRAL ILLUSTRATION: Acute Myocardial Infarction After TAVR

STEMI and NSTEMI in U.S. Patients With and Without Prior TAVR, 2016 to 2022

Occurrence of STEMI and NSTEMI After TAVR

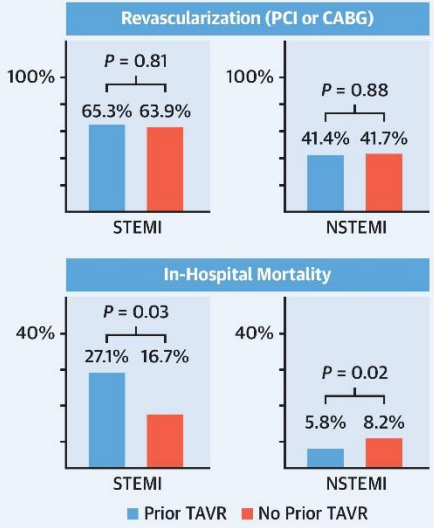
TAVR
N = 206,229

STEMI
N = 144
(25 events per 100,000 person-years)

Median Follow-Up 925 days
(428 to 1,530 days)

NSTEMI
N = 1,321
(229 events per 100,000 person-years)

Propensity-Matched Cohort of MI Patients With vs Without Prior TAVR



- AMI after TAVR is infrequent, with the median time from TAVR to MI being >1 year
- Coronary revascularization rates for STEMI or NSTEMI were similar in patients with prior TAVR and propensity-matched patients without prior TAVR
- In-hospital mortality rate was higher in post-TAVR STEMI patients than in non-TAVR STEMI patients
- In-hospital mortality rate and bleeding complications were lower in NSTEMI patients with prior TAVR than in non-TAVR NSTEMI patients

Gupta T, et al. J Am Coll Cardiol Intv. 2024;17(10):1267-1276.

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Technical Success of PCI Post-TAVR

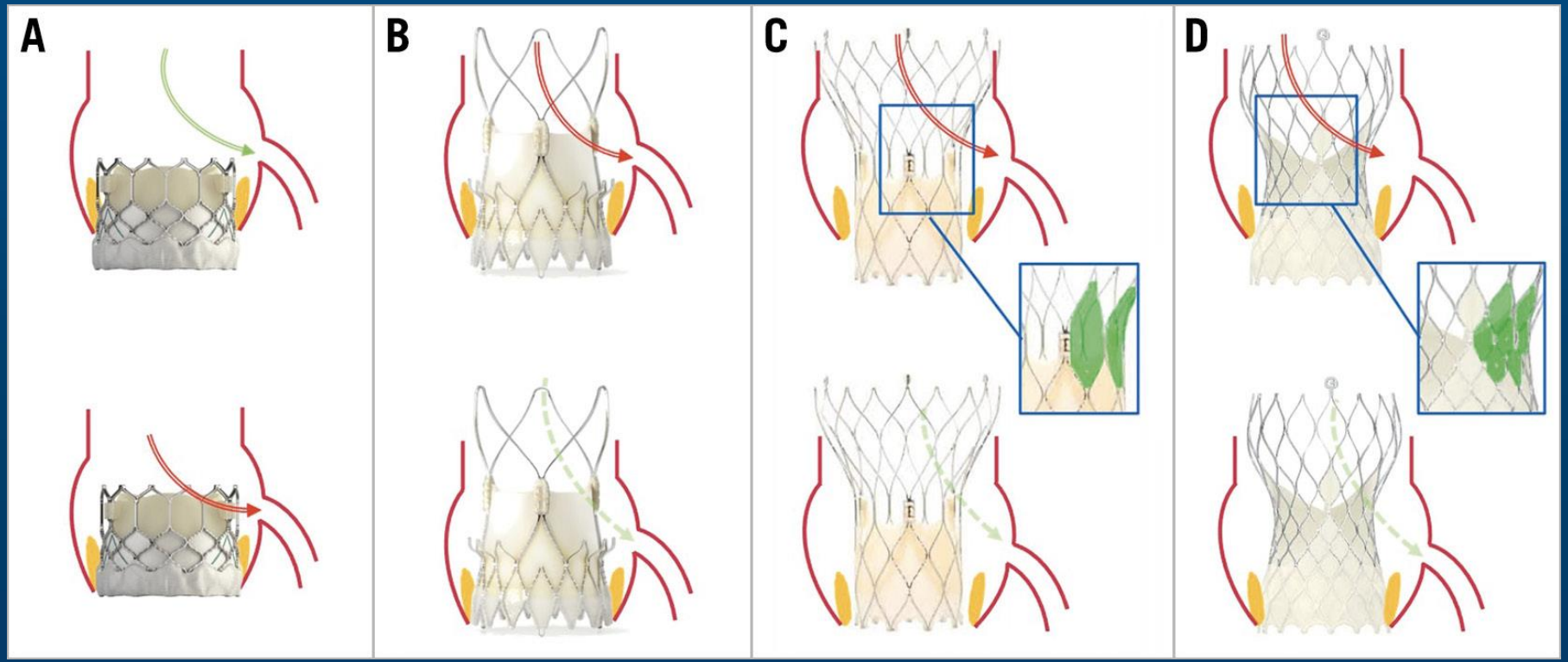
Clinical data show that coronary access post-TAVR is technically feasible

Source	TAVs	PCI Success Rate**
Tanaka, et al. Cardiovascular Revasc Med, 2019[1]	37 CoreValve 4 Evolut R	28/30 **(93.3%)**
Kleiman, et al. Presentation at CRT, 2019[2]	20 CoreValve	30/33 **(90.9%)**
Htun et al., Catheter Cardiovasc Inter, 2018[3]	28 CoreValve	29/29 **(100%)**
Zivelonghi et al., Am J Cardiol, 2017[4]	41 SAPIEN 3 * 25 Evolut R	17/17 **(100%)**
Chetcuti et al., TCT, 2016[5]	169 CoreValve	103/113 **(91.2%)**
Allali et al. Cardiovasc Revasc Med, 2016[6]	24 CoreValve	23/24 **(95.8%)**
Blumenstein et al., Clin Res Cardiol, 2015[7]	19 SAPIEN * 10 CoreValve 4 Symetis * 1 Portico * 1 Jena Valve *	10/10 **(100%)**

Average PCI Success Rate[1-7]**

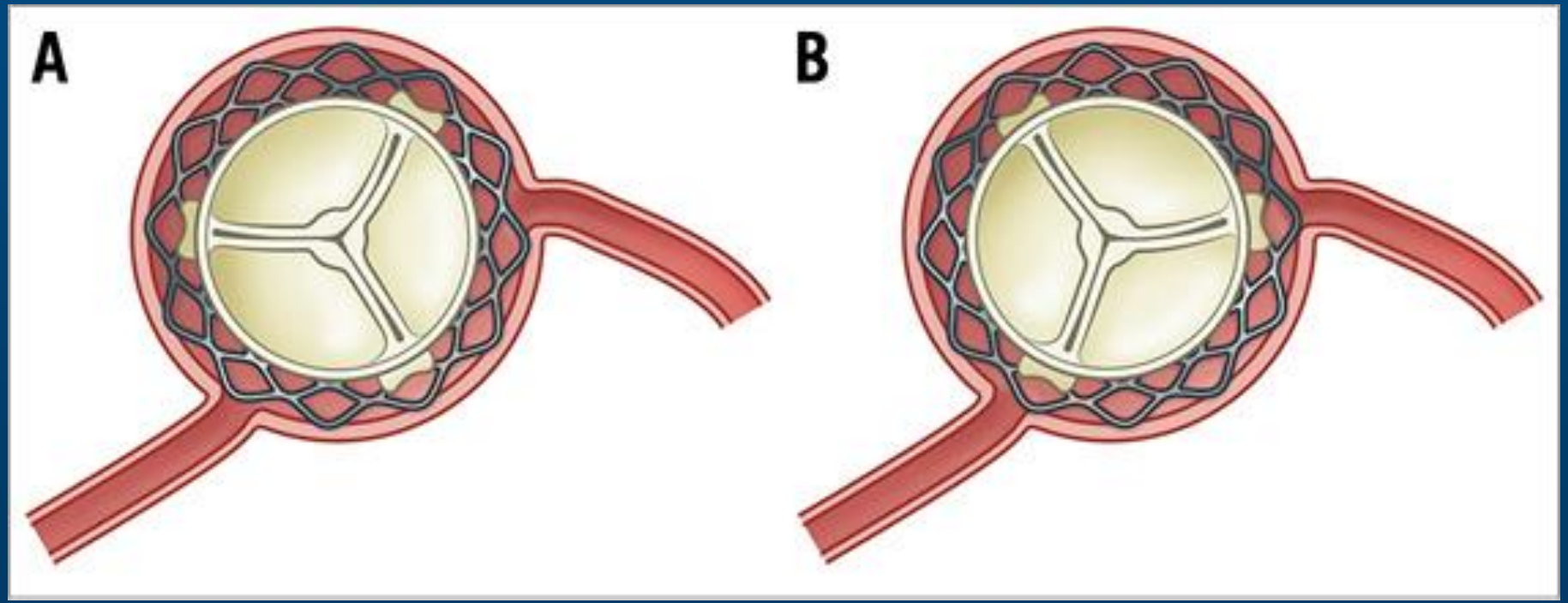
93.8%

Coronary Access by Valve Design and Depth



Tarantini et al. EuroIntervention 2023

Commissural Alignment and Coronary Access



Sondengaard L, et al. EuroIntervention 2018

Tips and Tricks: Balloon-expandable Valves

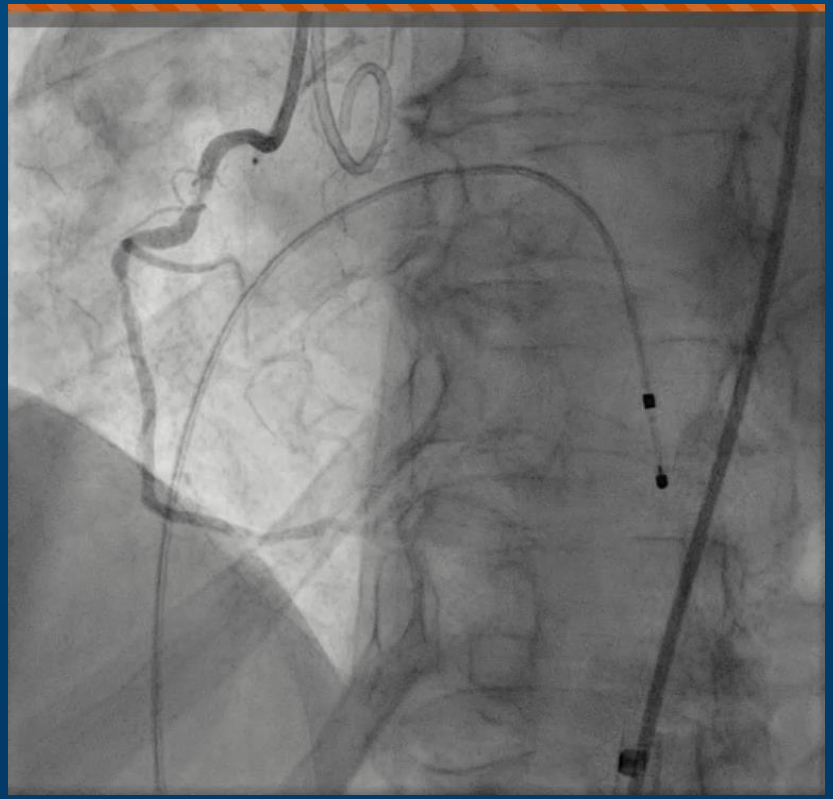
- Standard diagnostic (JL4/JL 3.5 for LCA; JR4 for RCA) and guide catheters (EBU 3.5/XB 3.5 for LCA and FR4/AL 0.75/AR1 for RCA).

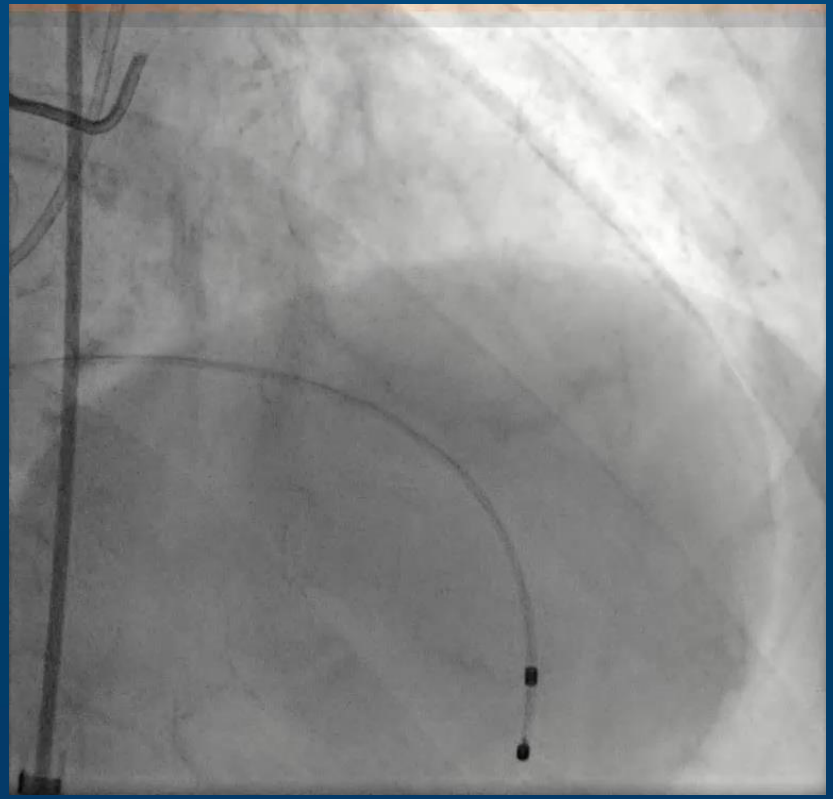
- If coronary ostia above top of SAPIEN frame, engagement should be easy.

- If coronary ostia below top of the frame, attempt to engage through top row of open cells directly facing the ostium.

- If commissural post in front of ostia →
  - Attempt to engage from adjacent cell
  - If unable, non-selective wiring and rail guide ± balloon support ± guide extension catheters.

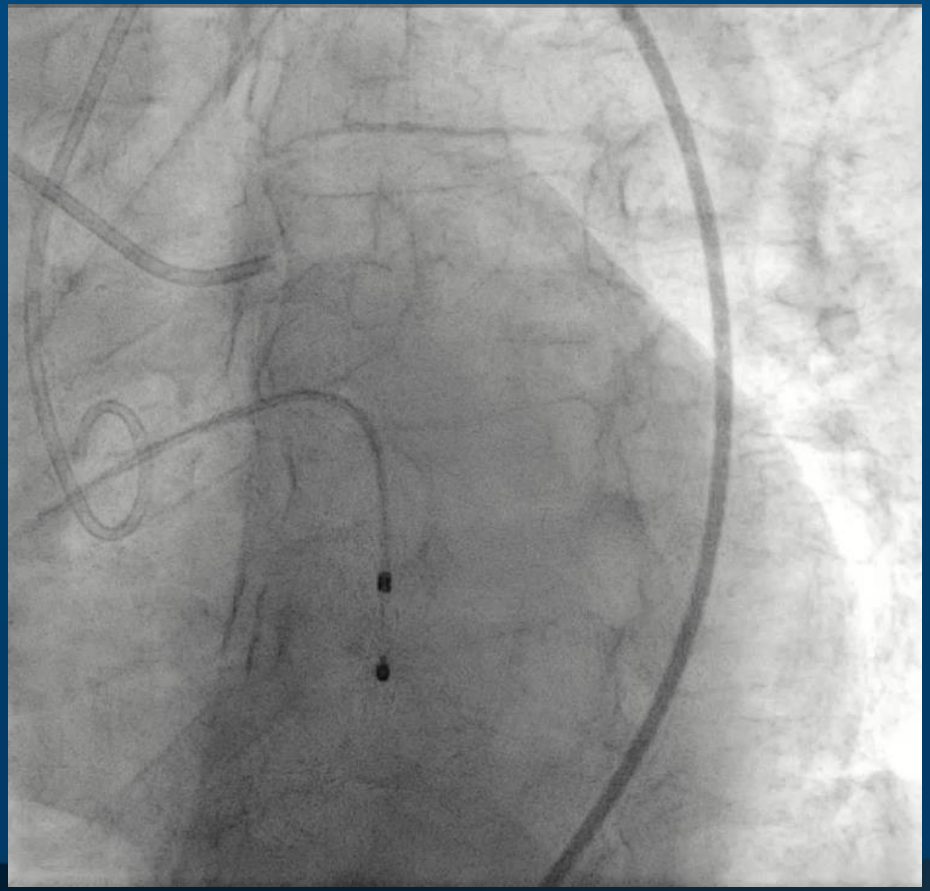
Case Example 1: 77 y/o M with severe AS and NYHA II HF



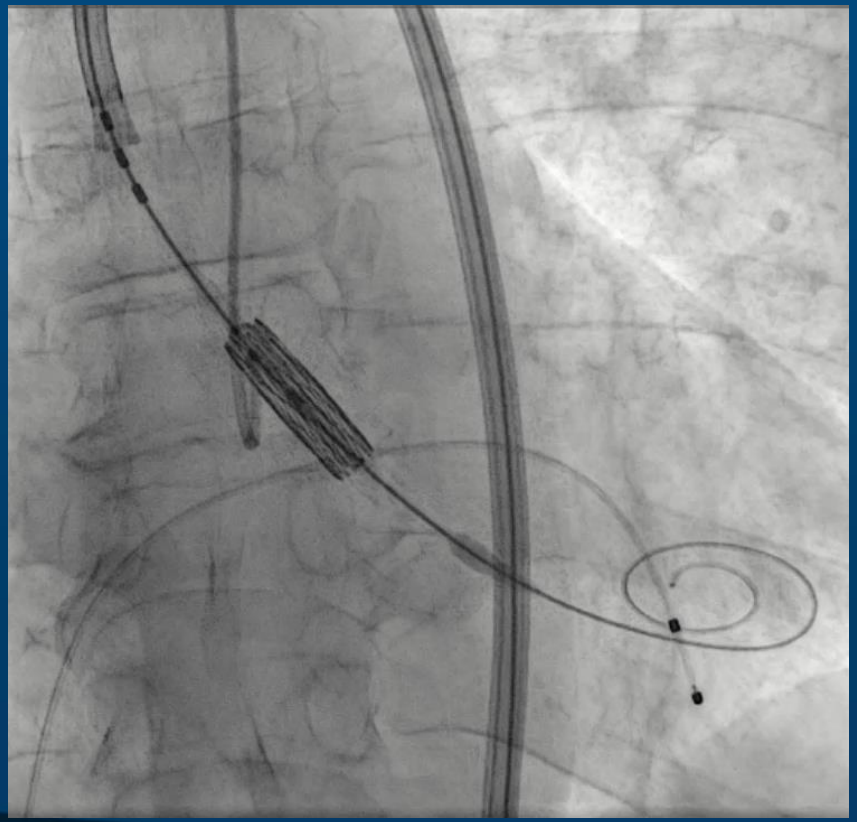


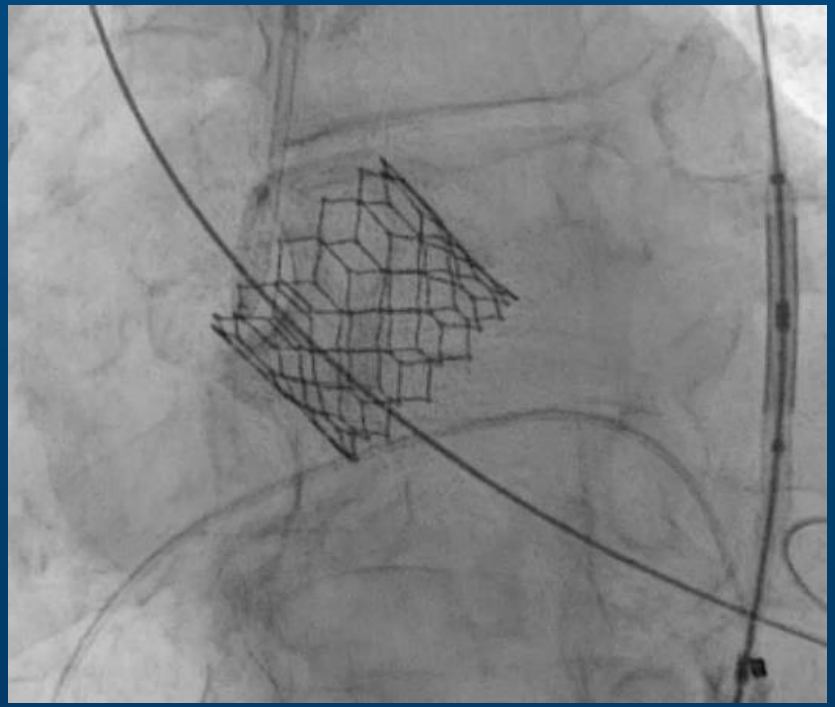
Coronary angiography at time of TAVR procedure

Coronary angiography (contd.)



26 mm SAPIEN S3





SYMPTOMATIC AS PATIENTS with at least 1 coronary artery lesion in a native segment that is **≥ 2.5 mm** in diameter with a **≥ 70%** visual angiographic* stenosis AND Heart Team Consensus they are suitable for transfemoral TAVR and would receive a bypass if they were undergoing elective SAVR

*CT, Echo, Hemodynamic, and Angiographic Core Labs

COMPLETE TAVR

SUCCESSFUL TF TAVR WITH A BALLOON EXPANDABLE THV
STANDARDIZED INVASIVE HEMODYNAMICS (SIH) WITH ON-TABLE TTE

RANDOMIZATION within 96 hours
and Stratified for Intended Timing of PCI and Requirement for OAC:

COMPLETE REVASCULARIZATION	**MEDICAL THERAPY**
Staged PCI of all lesions (1 – 45 days post TAVR) Goal of complete revascularization of all qualifying lesions N=2000	Guideline-directed medical therapy alone No revascularization N=2000
Antithrombotic Therapy	
DAPT for 1-6 months (ASA + clopidogrel preferred), then SAPT lifelong (ASA preferred)	SAPT lifelong (ASA preferred)
If Requirement for OAC (usually AF)	
Guideline-directed DOAC † + SAPT for 1-6 months then guideline-directed DOAC therapy alone lifelong	Guideline-directed DOAC therapy † lifelong

†See supplementary antithrombotic guidance document

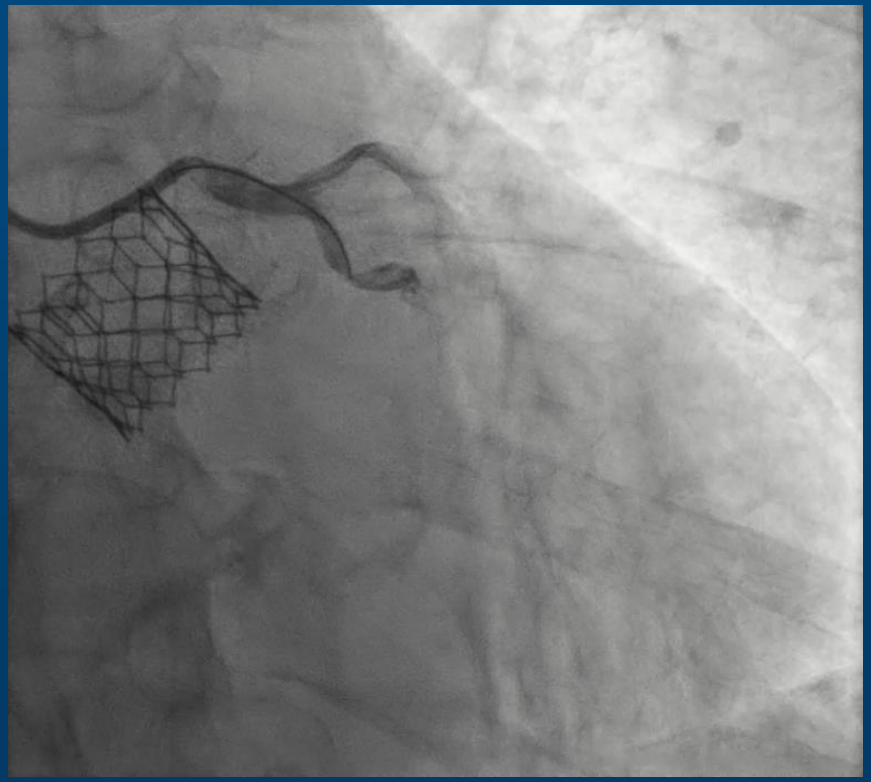
MEDIAN FOLLOW-UP: 3.5 YEARS
(REPEAT SIH WITH ON-TABLE TTE IF ≥ MODERATE VARC-3 HEMODYNAMIC VALVE DETERIORATION **OR** MG ≥ 20 MMHG ON ANY FOLLOW-UP TTE > 1 MONTH POST TAVR

PRIMARY OUTCOME: Composite of CV Death, New MI, Ischemia-Driven Revascularization, or Hospitalization for Unstable Angina or for Heart Failure
KEY SECONDARY OUTCOMES: CV death or new MI, transaortic gradient post TAVR (echocardiographically-derived vs. direct invasive measurement)
SECONDARY OUTCOMES: Hemodynamic variables obtained with SIH and TTE, Each component of the primary outcome, Angina Status, All-cause Mortality, Stroke, Cost-effectiveness, QOL, Bleeding, Contrast Associated Acute Kidney Injury, Fluoroscopic Time/Contrast Utilization for Staged PCI

PCI (4 weeks after TAVR) – Right radial, 6 Fr.

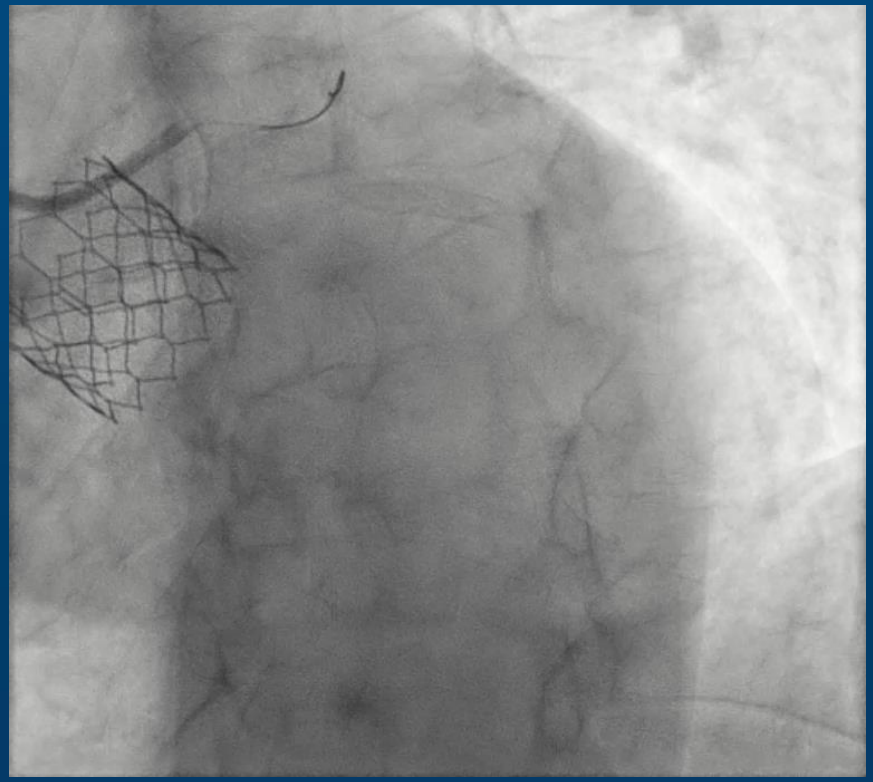
Two overlapping 3.0 X 26 mm and 2.75 X 12 mm DES with IVUS guidance

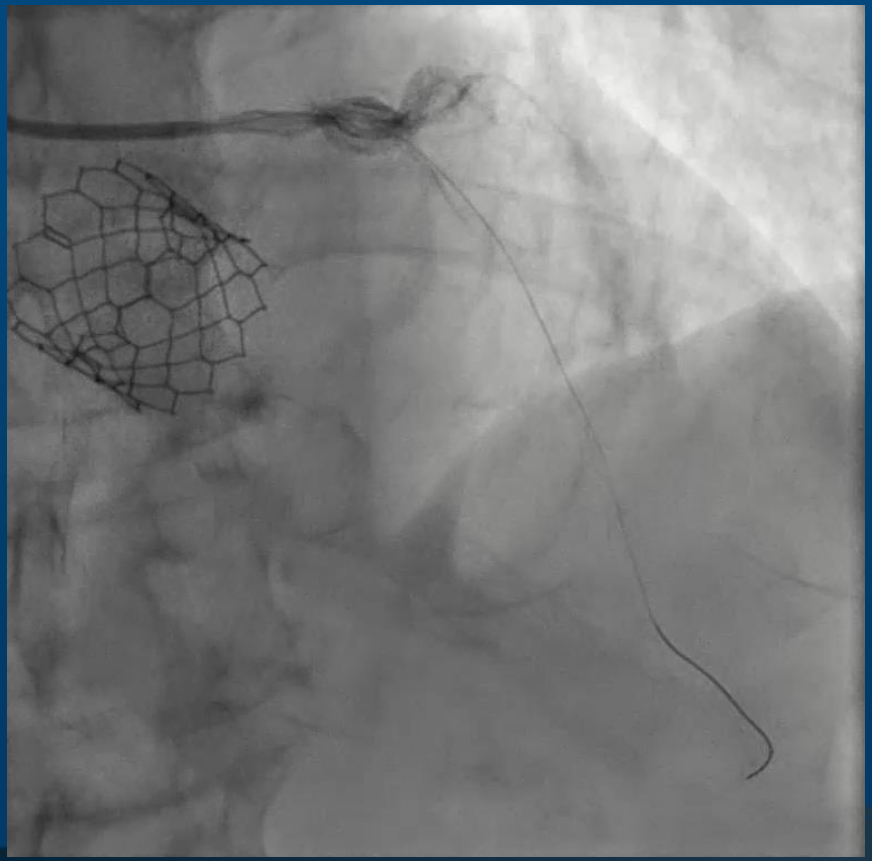
PCI (contd.)



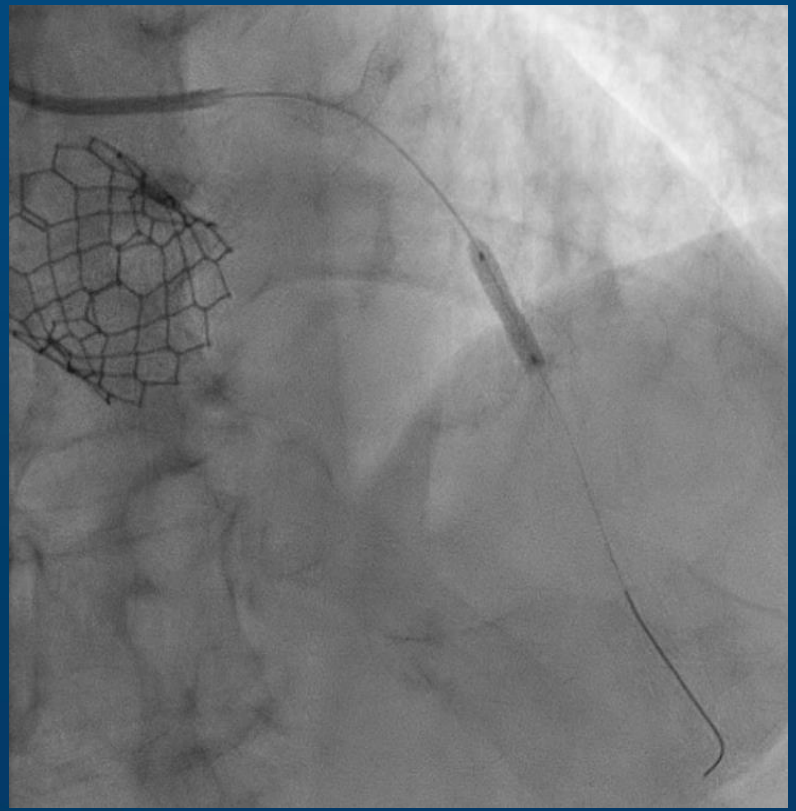
3.0 X 22 mm DES in proximal CX, post-dilated w/ 3.75 mm NC with IVUS guidance

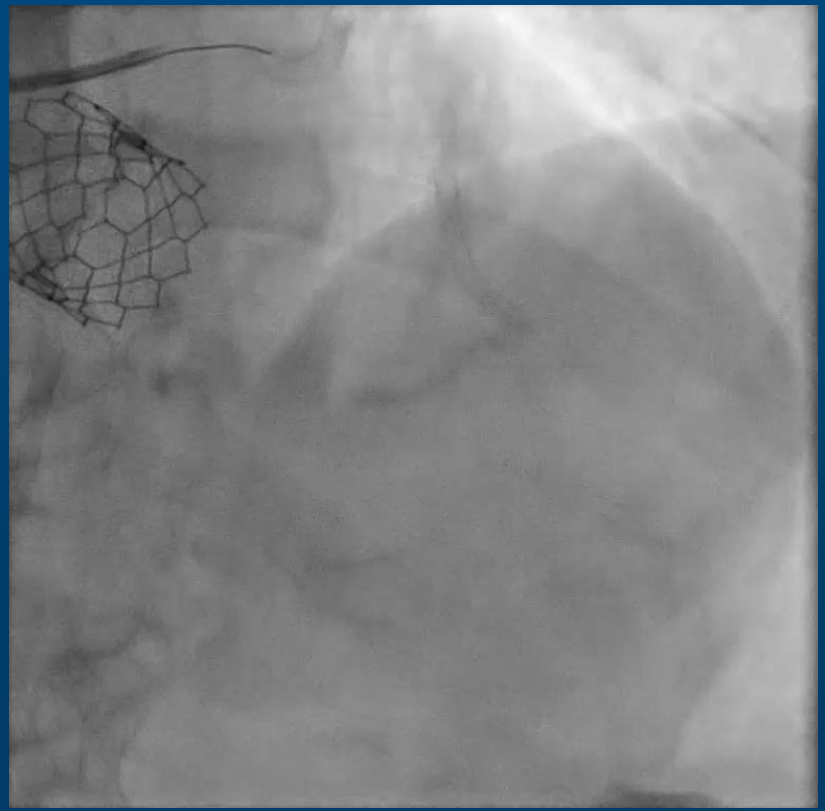
PCI (contd.)





PCI (contd.)



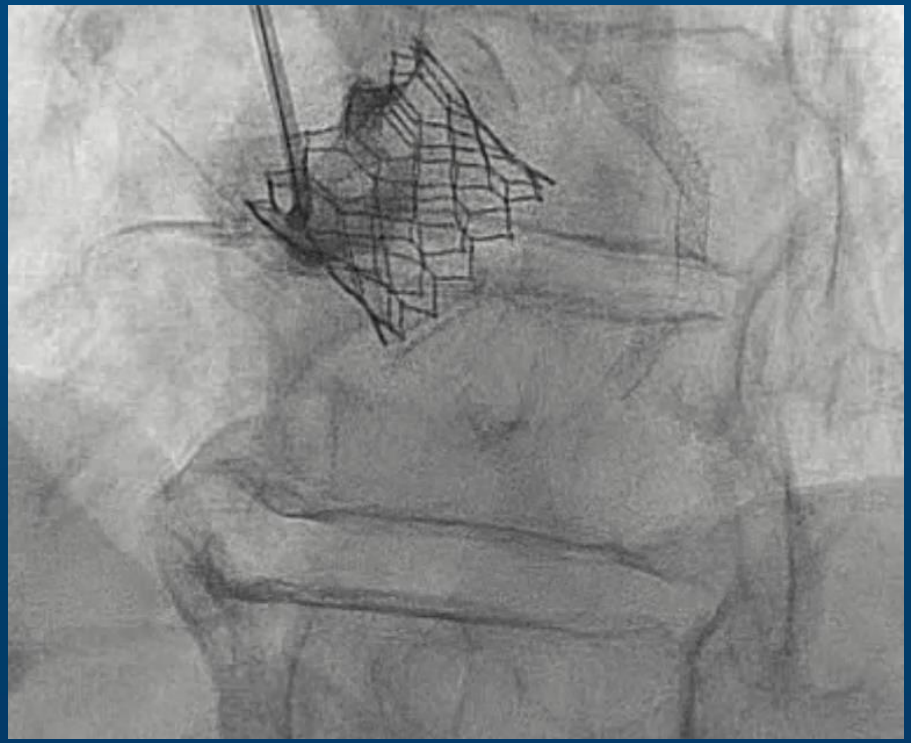


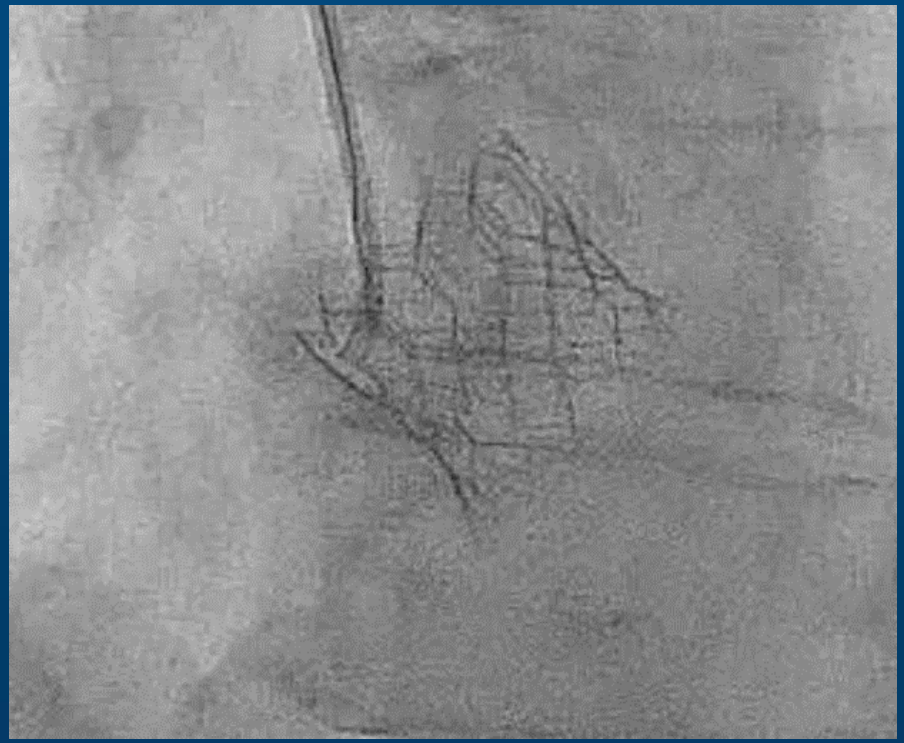
Two overlapping 3.0 X 24 and 3.0 X 22 mm DES with IVUS guidance
Post-dilation with 3.5 mm NC balloon

Case Example 2: 83 y/o F with severe AS and CCS II Angina

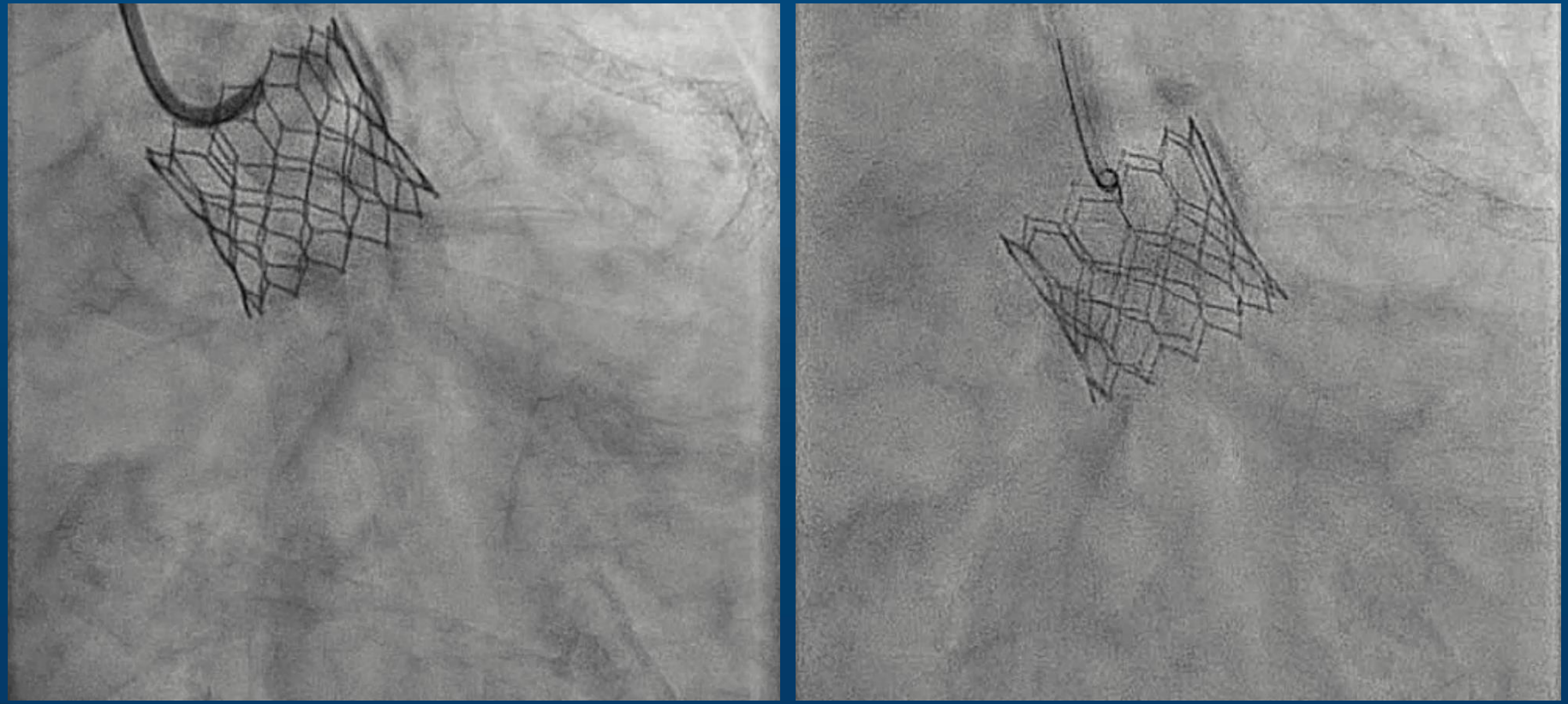
Declined COMPLETE TAVR participation
Opted for medical Rx

Persistent angina at 30-d post TAVR f/u visit

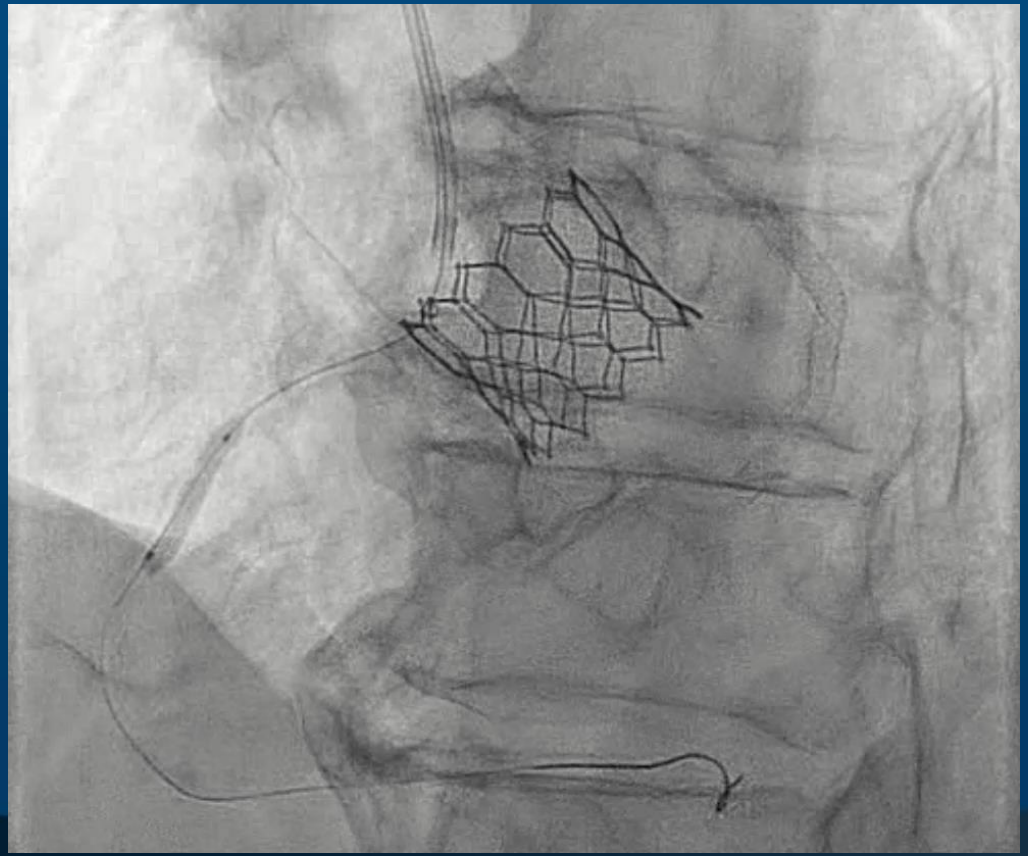




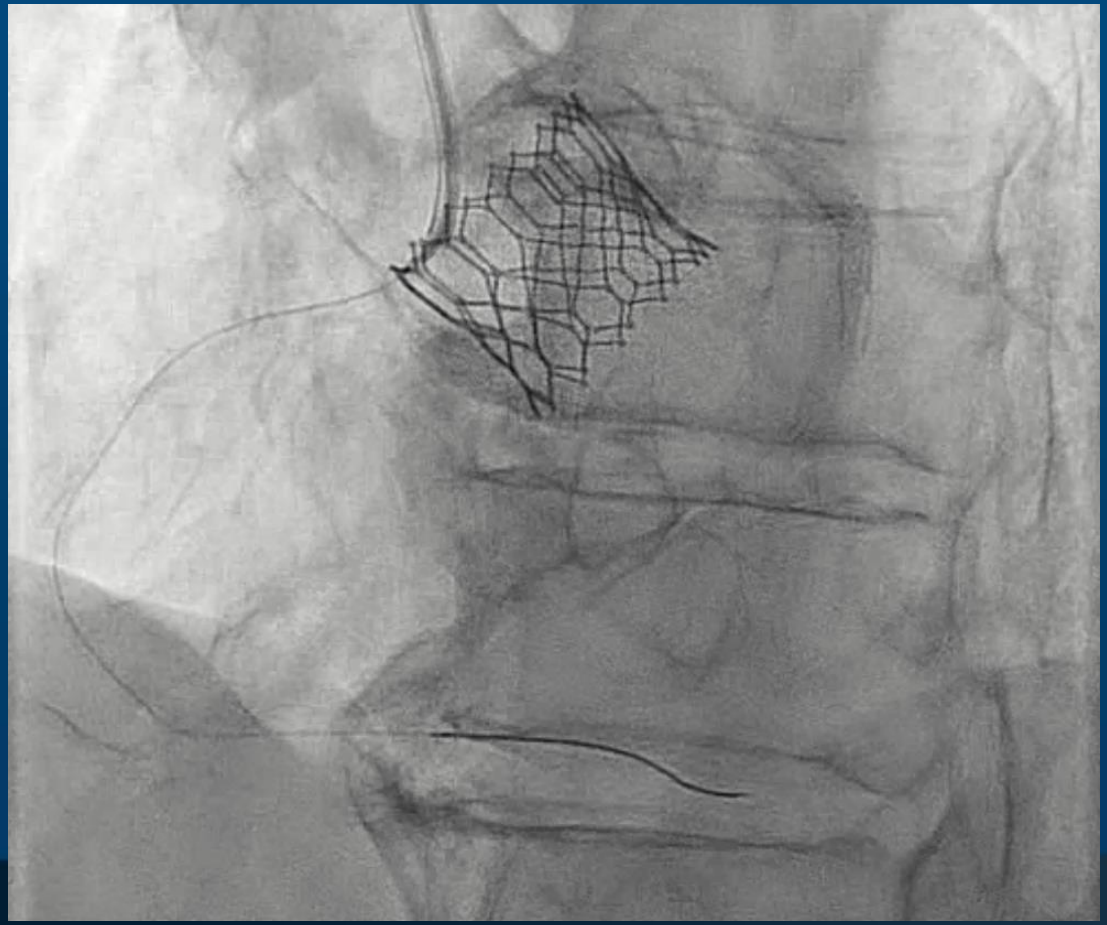
RCA PCI



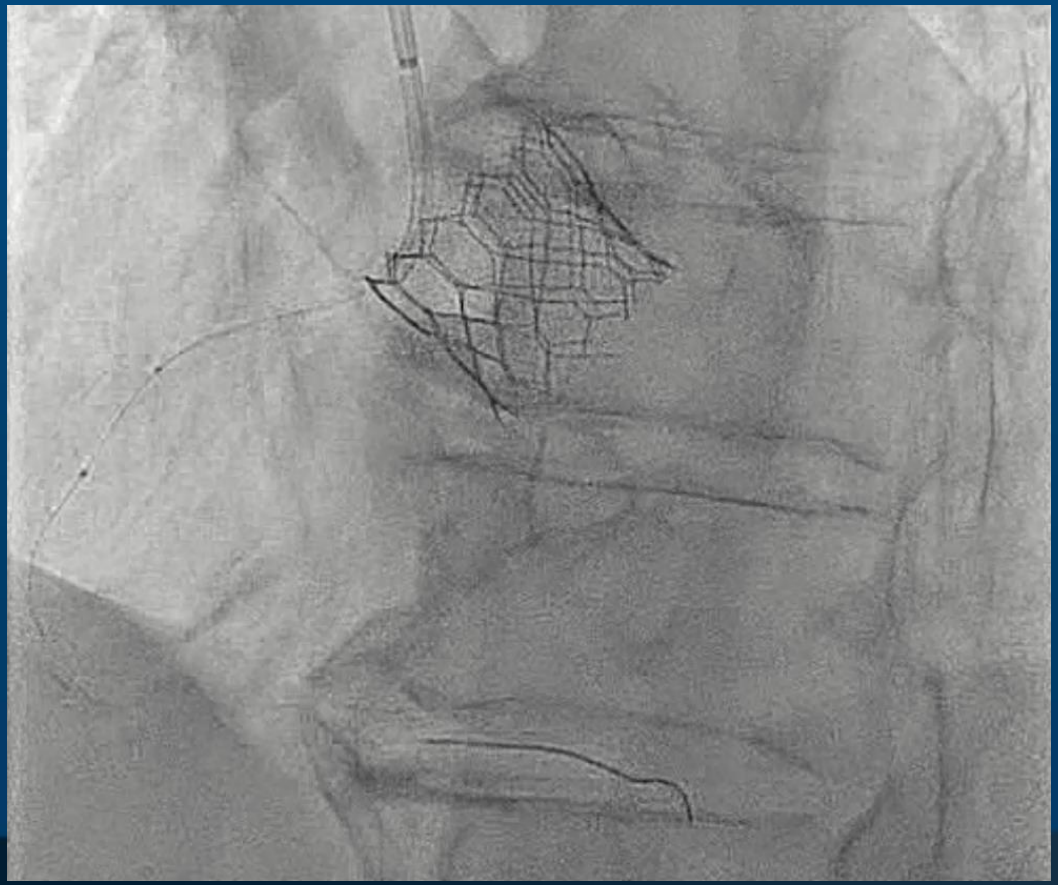
Attempted balloon anchoring of 6 Fr. Guideliner



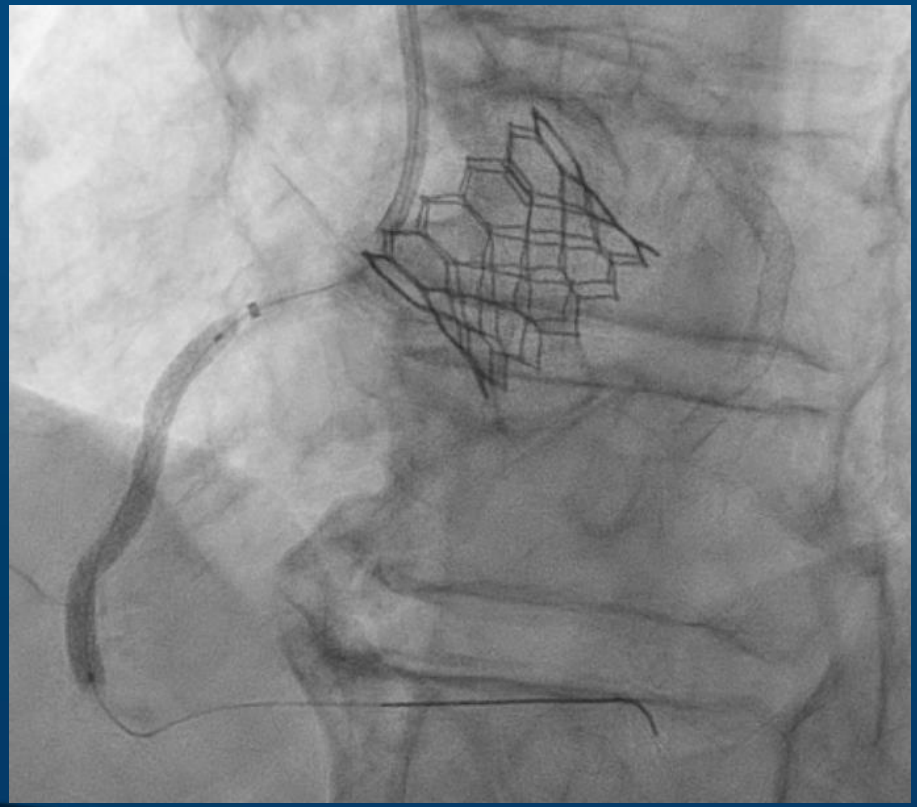
Attempted Stent Delivery

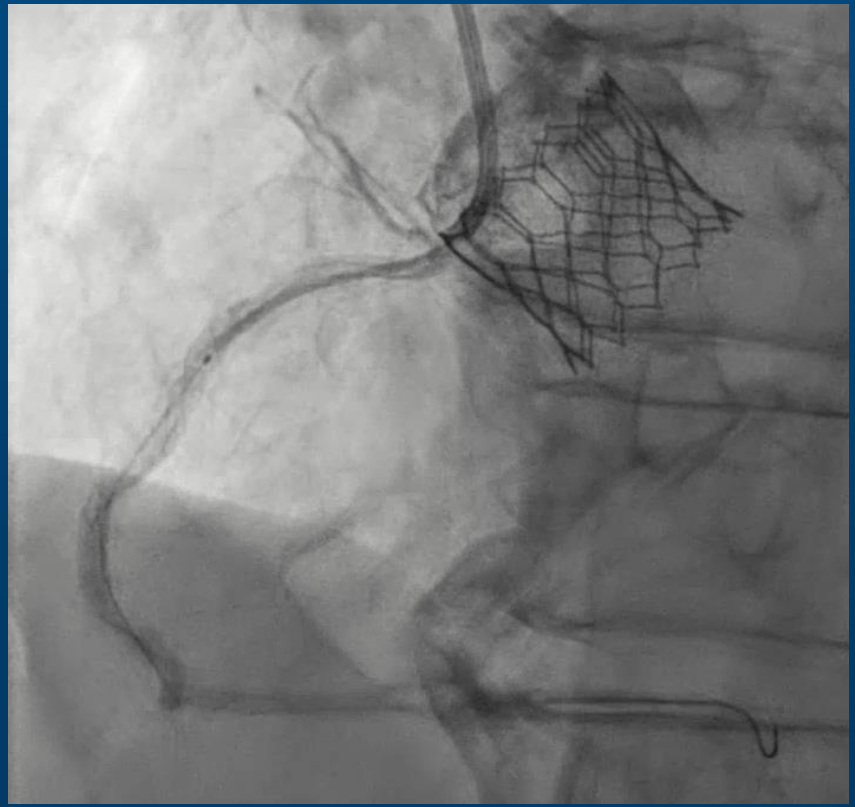


Balloon-assisted tracking of 5.5 Guideliner coast



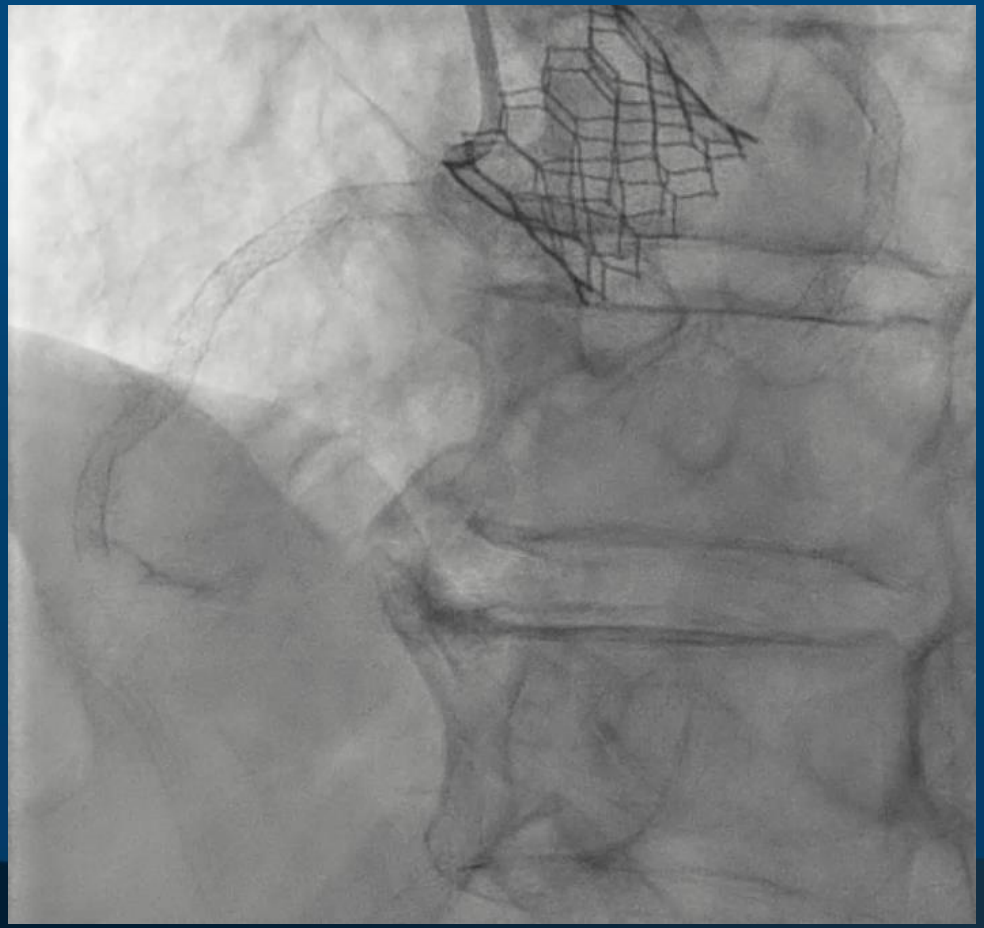
PCI





Two overlapping 3.0 X 38 mm and 3.0 X 26 mm DES
Post-dilation with 3.5 mm NC balloon

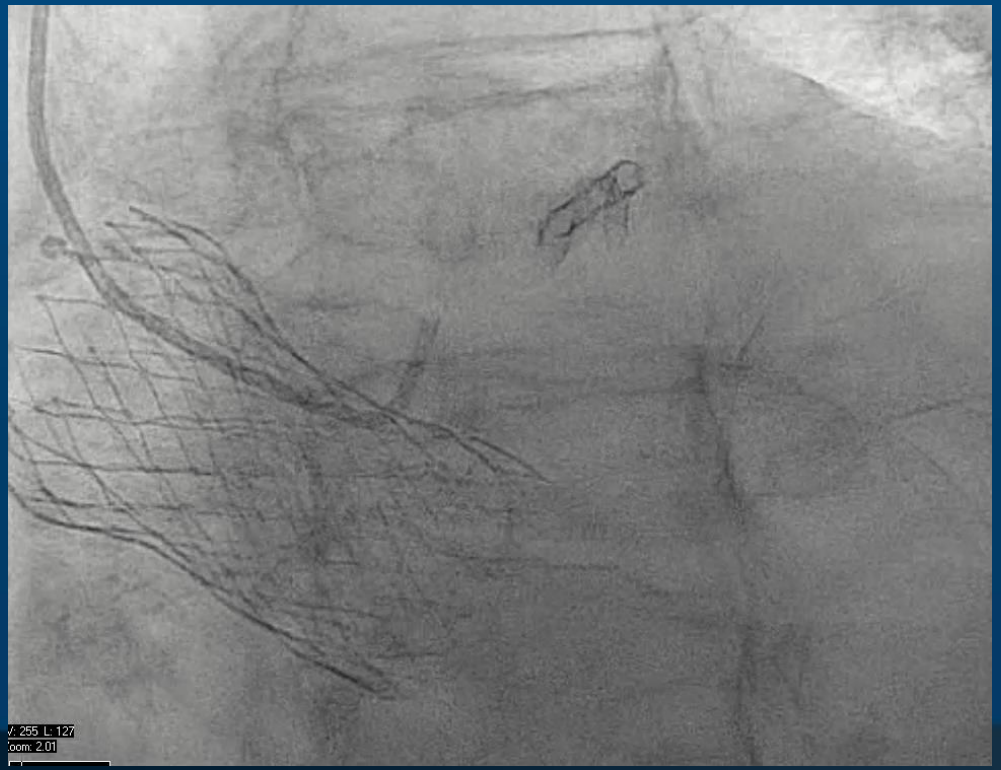
Final Result



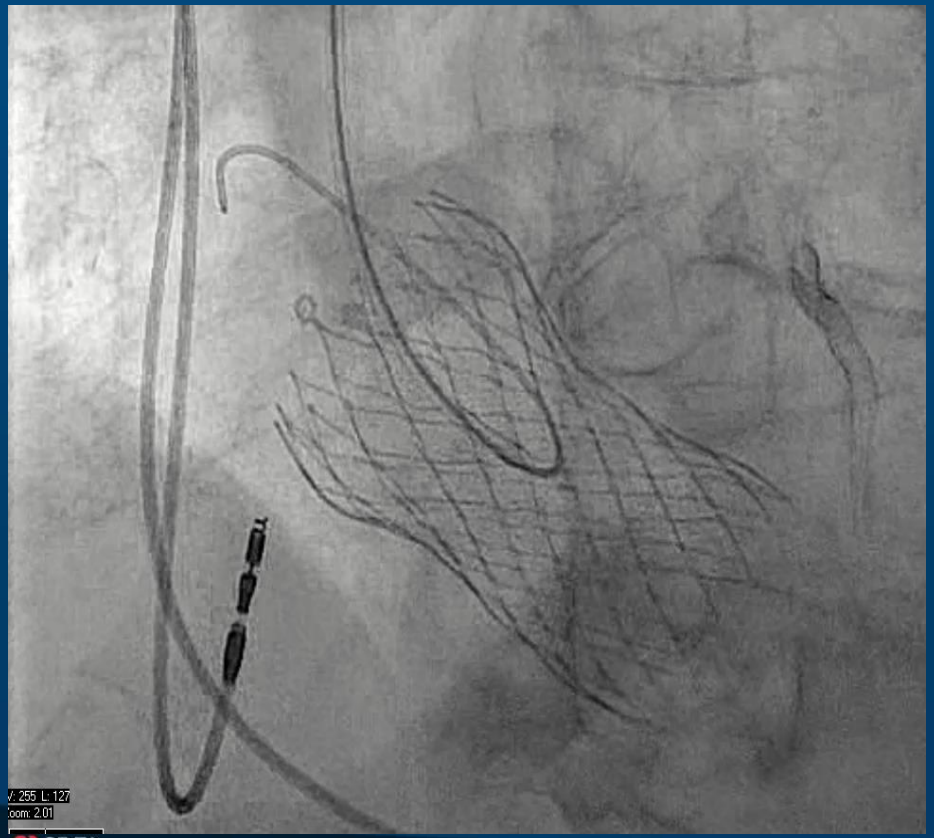
Tips and Tricks: Self-expandable Valves

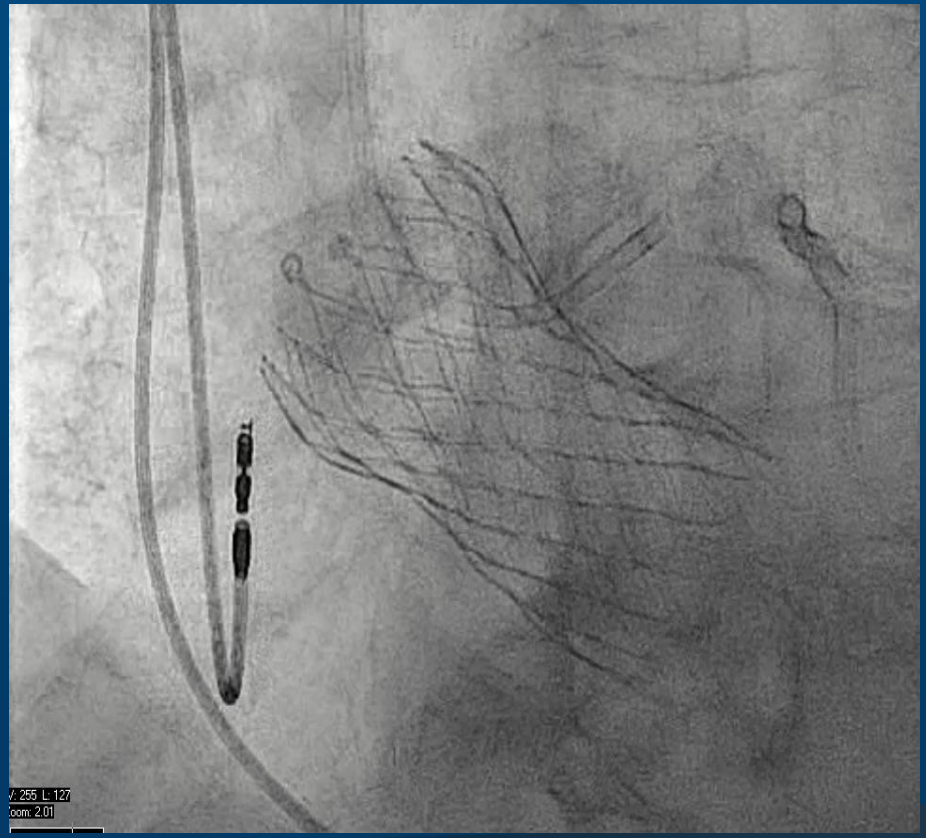
- Choose C-Arm Angle with Orthogonal view of the coronary ostium of interest and adjust cranial/caudal to remove frame parallax.
- Consider aortography to understand relationship of coronary ostium and valve frame.
- Frame is smaller than aorta: consider downsizing by 0.5 mm (EBU/XB 3.0 or FL 3.0 for LCA and JR 3.5 for RCA).
- Use J-wire to enter frame cell co-axial to coronary take-off. If difficulty, try adjacent cell or one cell above/below.
- Cannulate from top down instead of bottom up.
- Do not spend too much time trying selective cannulation.
- **Non-selective wiring of coronary artery** and liberal use of guide extension catheters ± balloon anchoring.
- Disengage catheters safely over a guidewire.

Case example 3: 80 y/o M, TAVR w/ 34 mm Evolut Pro+, CAD with prior LAD and CX PCI, presentation with NSTEMI

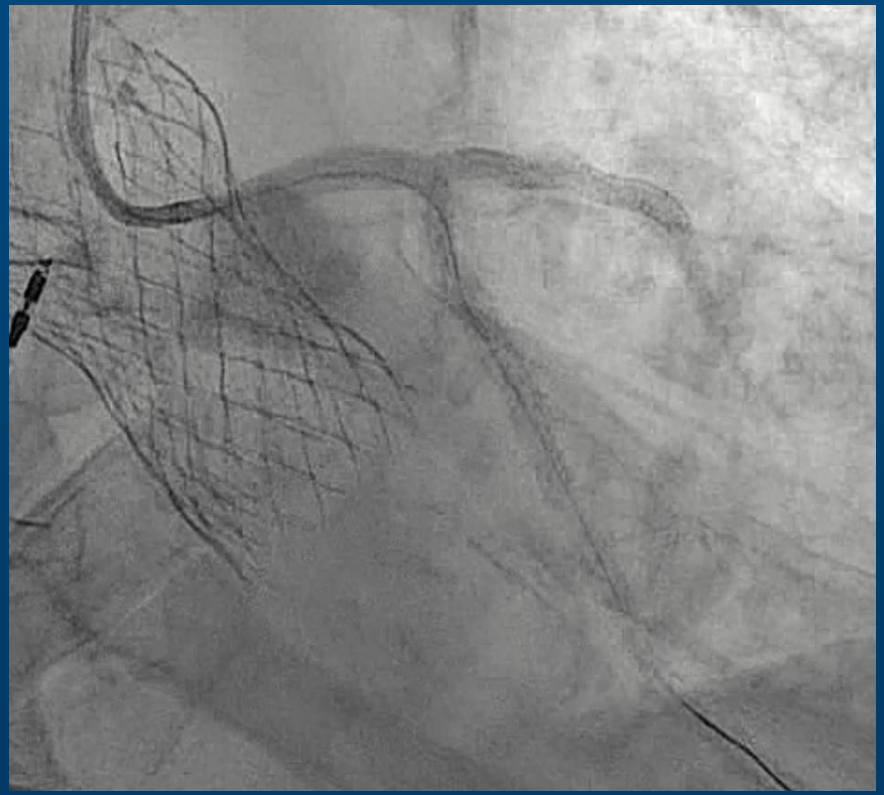


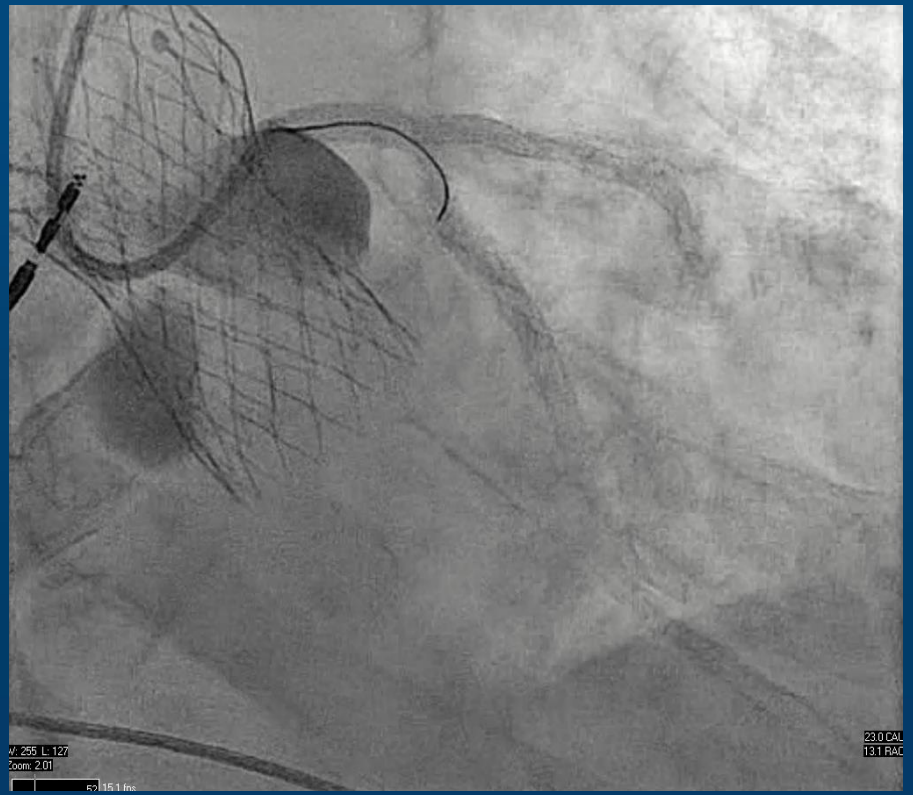
LM engagement: radial approach, EBU 3.0 guide





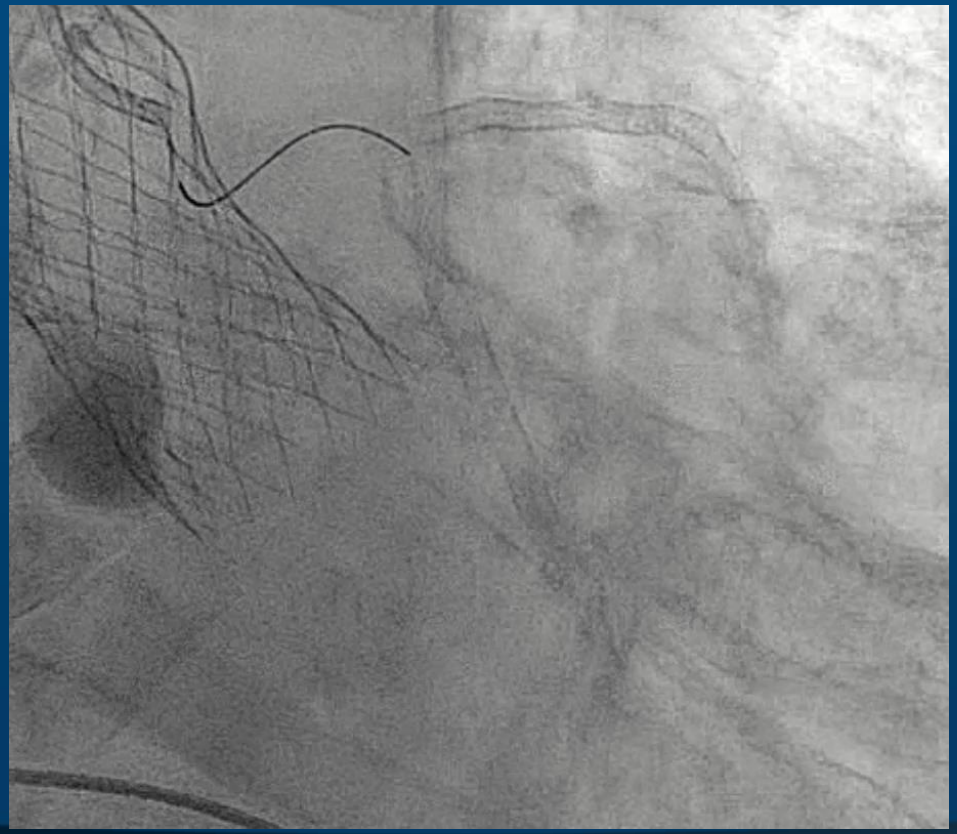
PCI



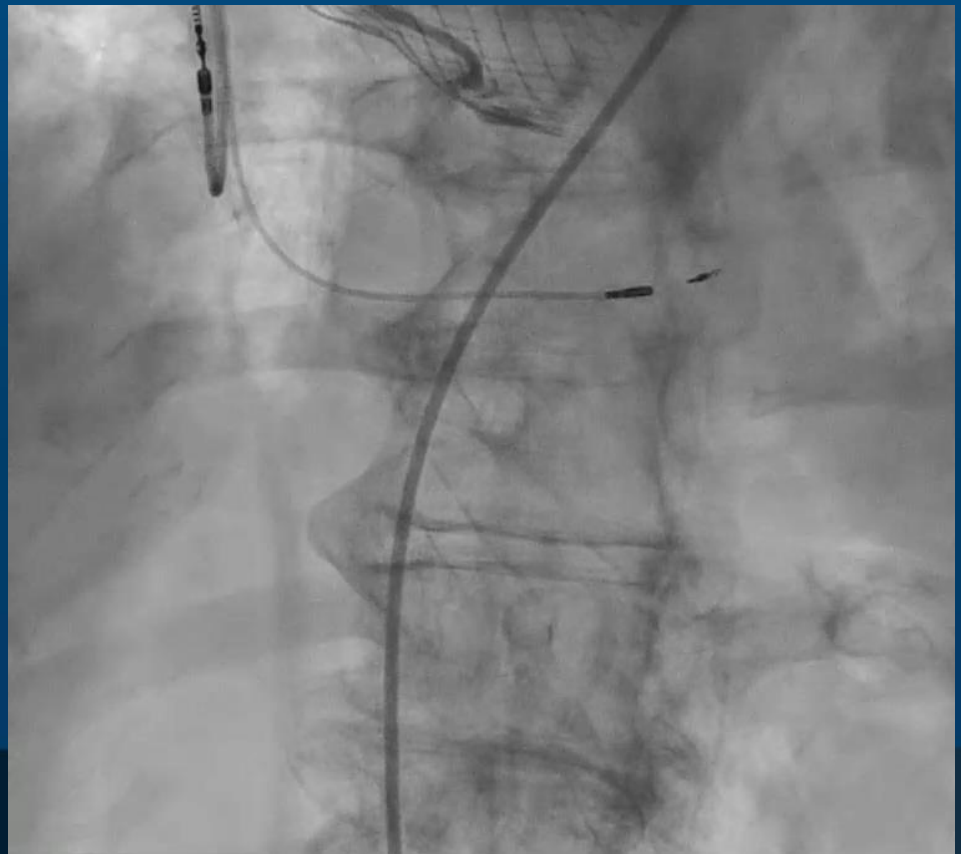


IVUS showed neo-intimal hyperplasia as mechanism of ISR; pre-dilation with 3.0 Wolverine, 3.0 X 12 mm DES (2nd layer)

Disengagement over wire

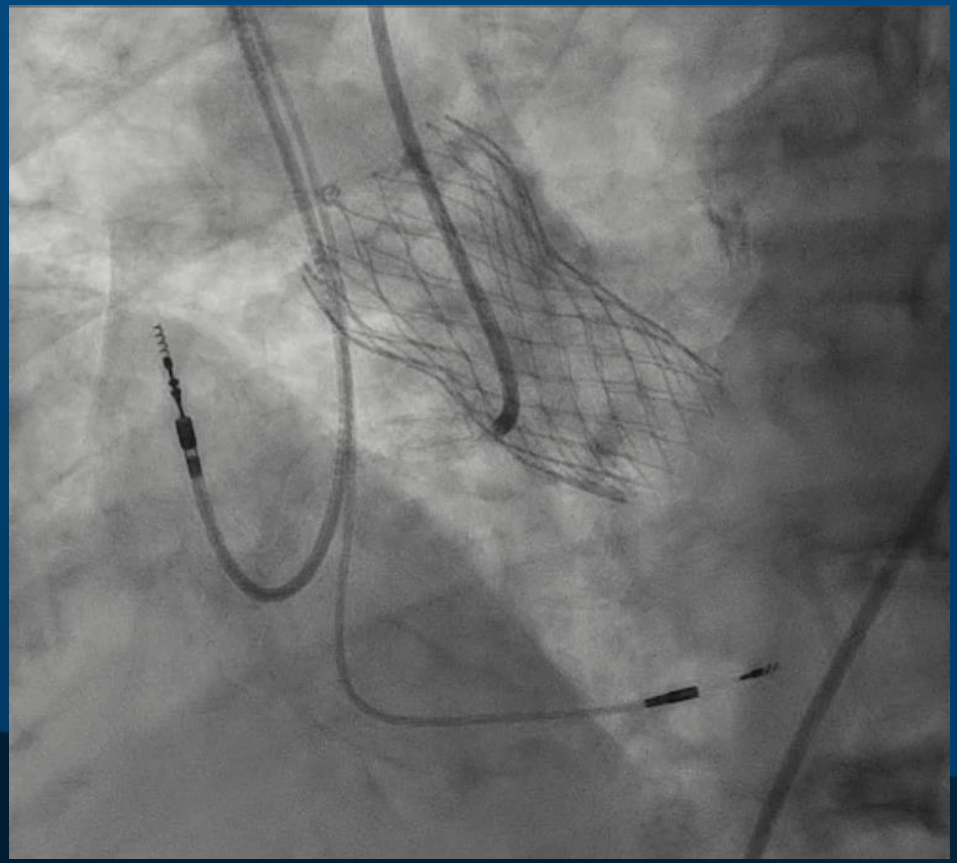


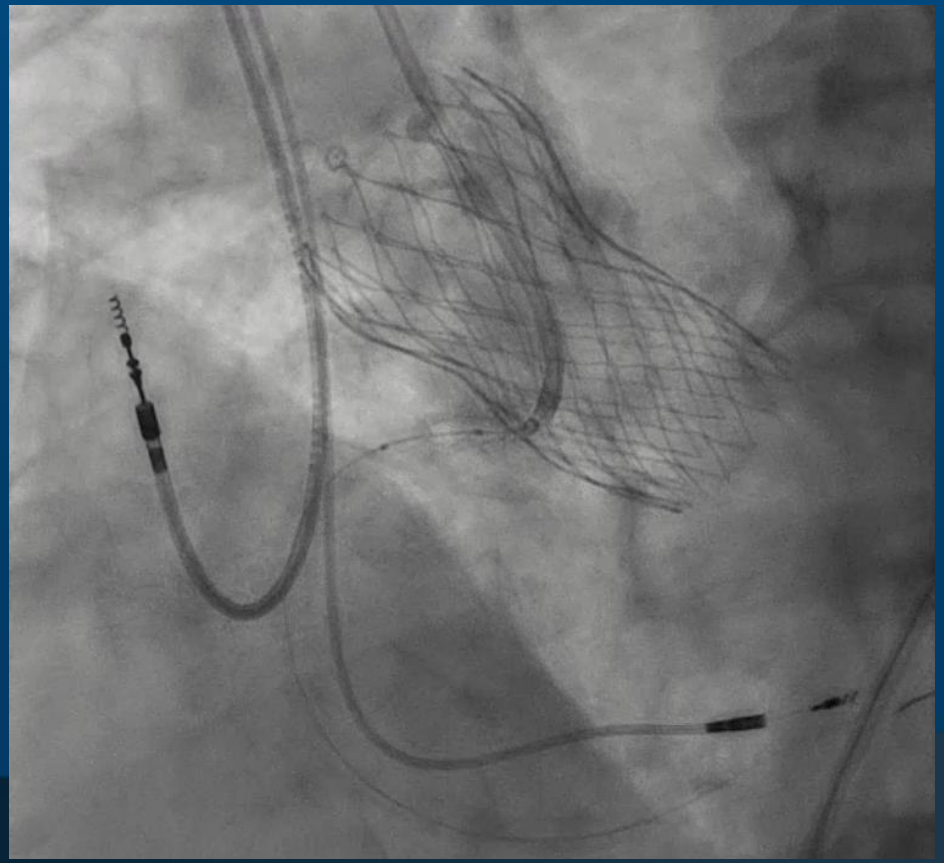
Case example 4: 81 yo F, 26 mm Evolut Pro+, prior ostial RCA PCI , hospitalized with NSTEMI



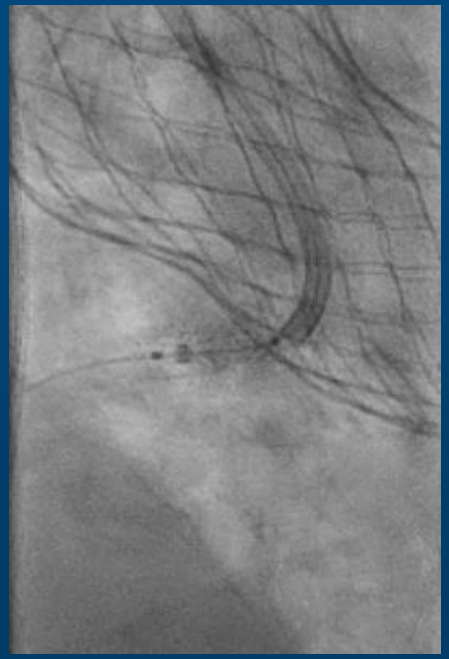
c/o Harold Dauerman MD

PCI – Femoral approach, 6 Fr. IM guide (JR4 and AR1 attempted unsuccessfully)

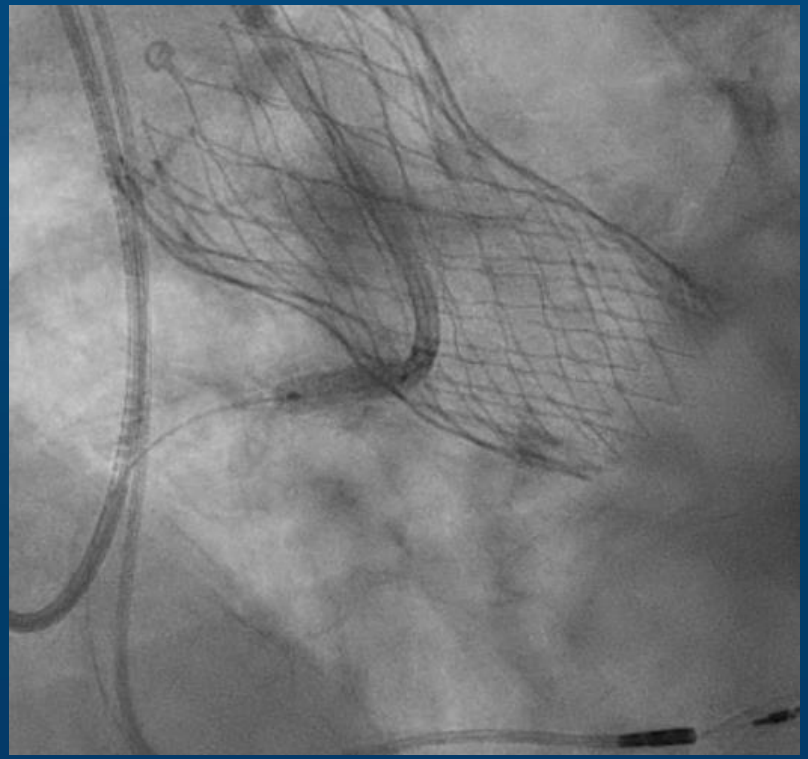




PCI

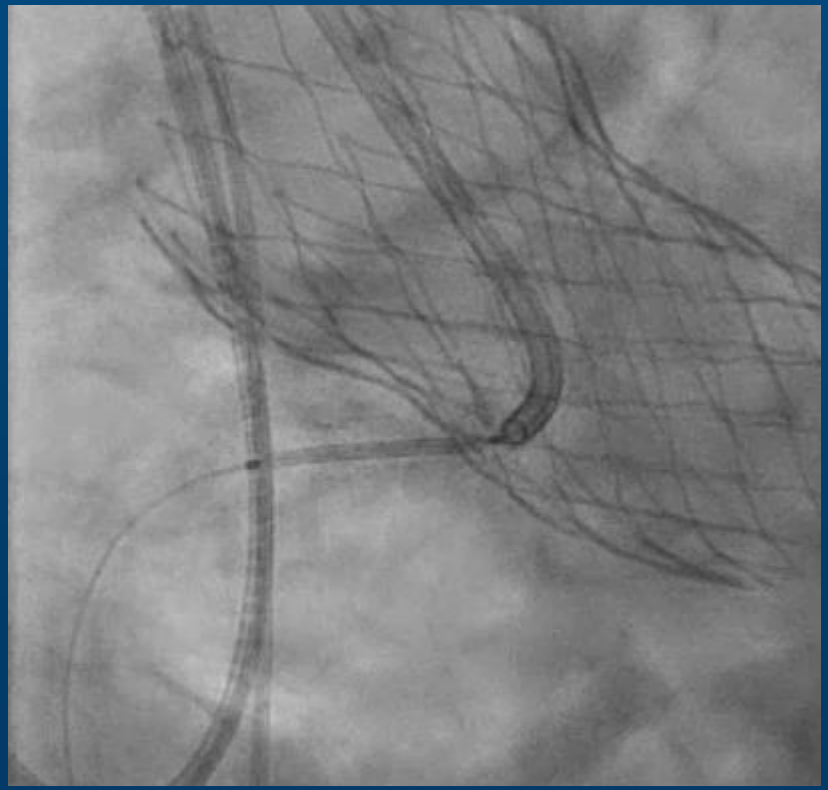


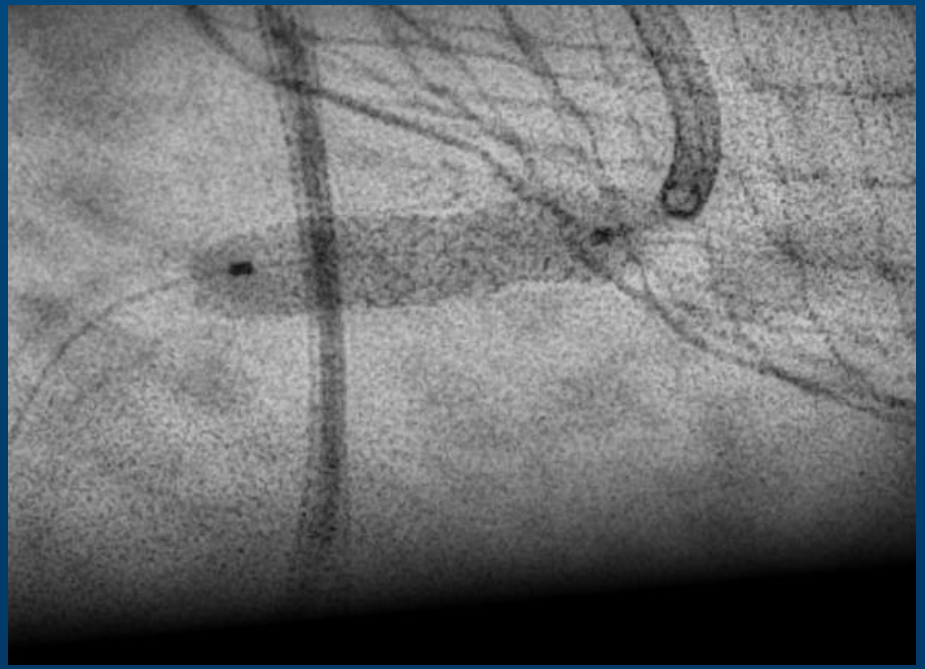
2.0 mm balloon used to anchor 6 Fr. Guideliner



High pressure pre-dilation with 3.0 mm NC and 3.5 mm Angiosculpt

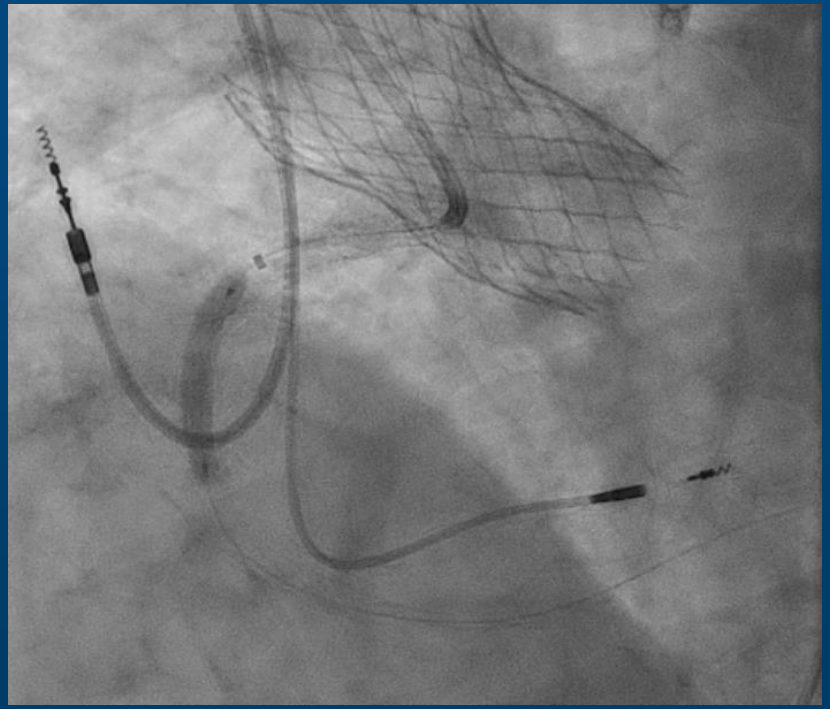
PCI



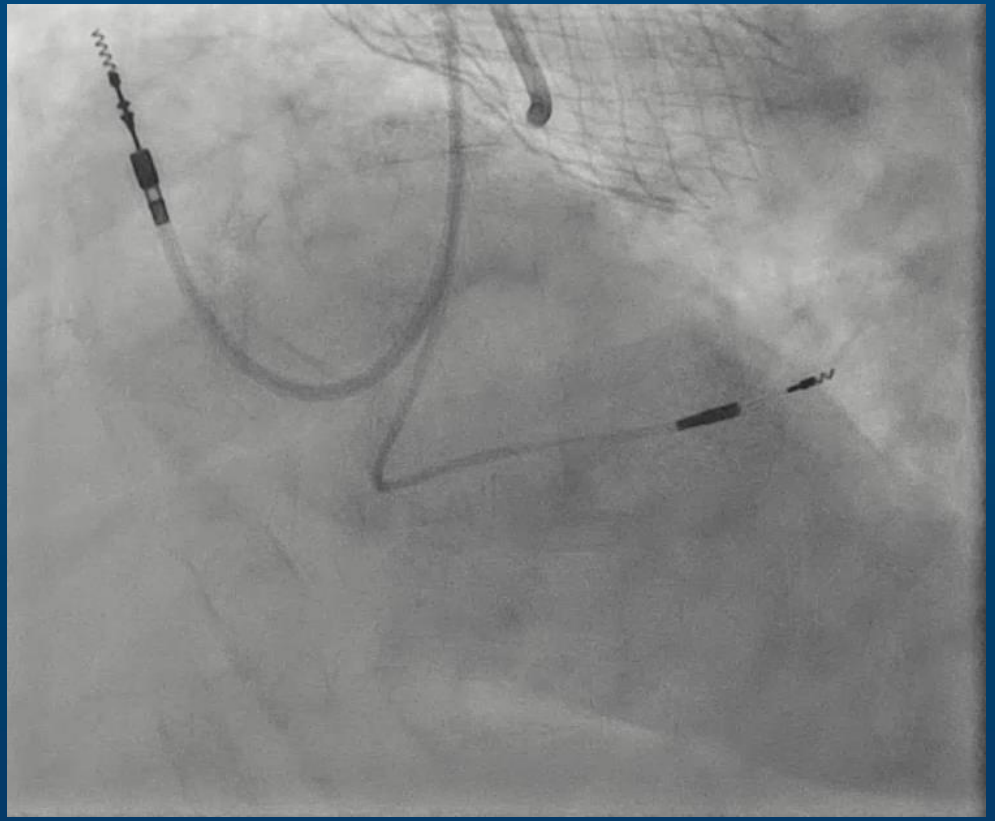


4.0 X 18 DES (2nd layer)

PCI



Mid RCA PCI with 3.5 X 18 DES
High-pressure post-dilation



Final result

Conclusions

- Unplanned coronary access after TAVR is infrequent with overall incidence (including CCS and ACS) of <10% at 5-year follow-up.
- Valve design, implant depth, and commissural alignment are key device-related factors that influence success of coronary access.
- Coronary access and PCI can be performed successfully in >95% of post-TAVR cases with minor modifications in equipment choice and technique.
- Complex PCI may be safer in most cases after “correcting” aortic stenosis with TAVR.
- When selective catheter engagement is not possible, free wiring and balloon anchoring of a guide extension catheter may allow for successful PCI.