

Post TAVR PCI



Young-Guk Ko, M.D.

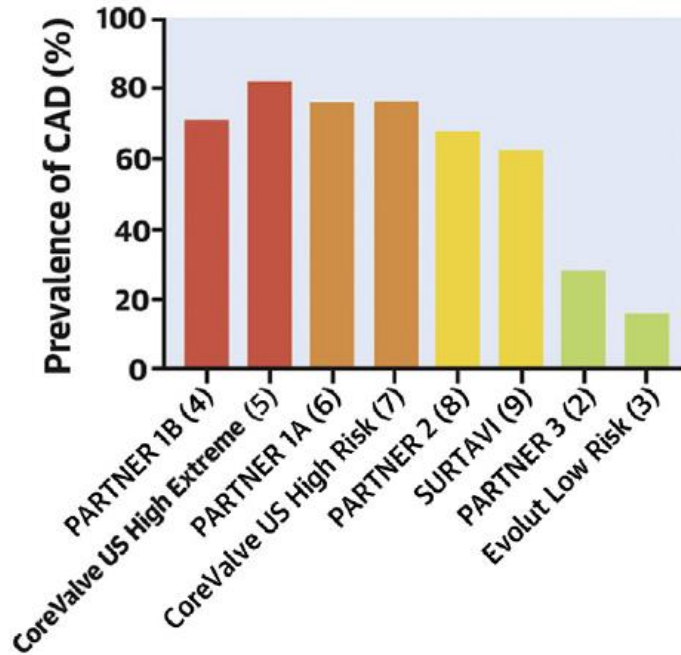
*Severance Cardiovascular Hospital, Yonsei University Health System,
Seoul, Korea*



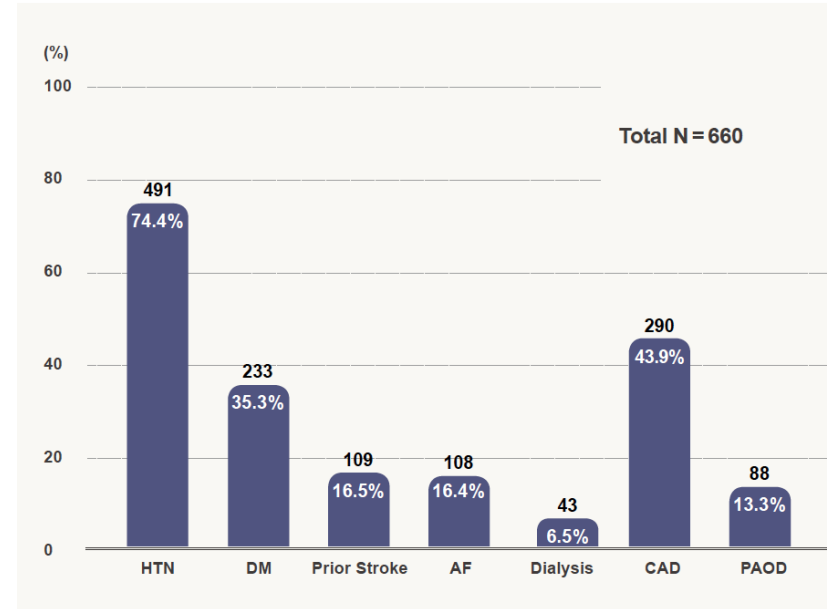
Prevalence of CAD in TAVR Patients



Clinical Trials



K-TAVI registry



Faroux L, JACC 2019;74:362

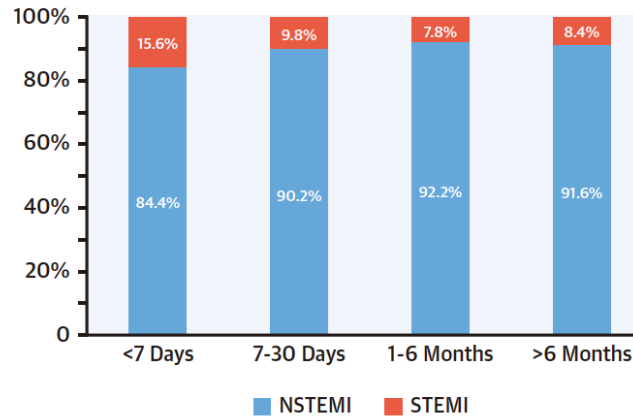


US Medicare Data: Incidence of ACS after TAVR

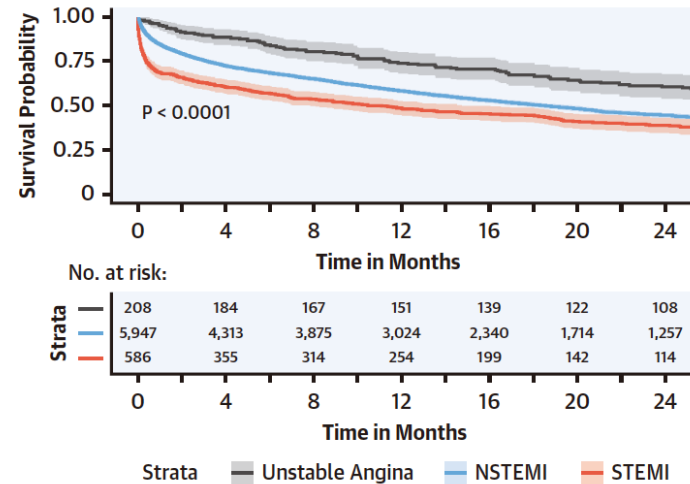


- 142,845 patients treated with TAVR between 2012 and 2017
- 4.7% admitted with ACS after a median time of 297 days

A Distribution of MI Type by Time of Presentation



B Survival by Type of Acute Coronary Syndrome



Unplanned PCI After TAVR



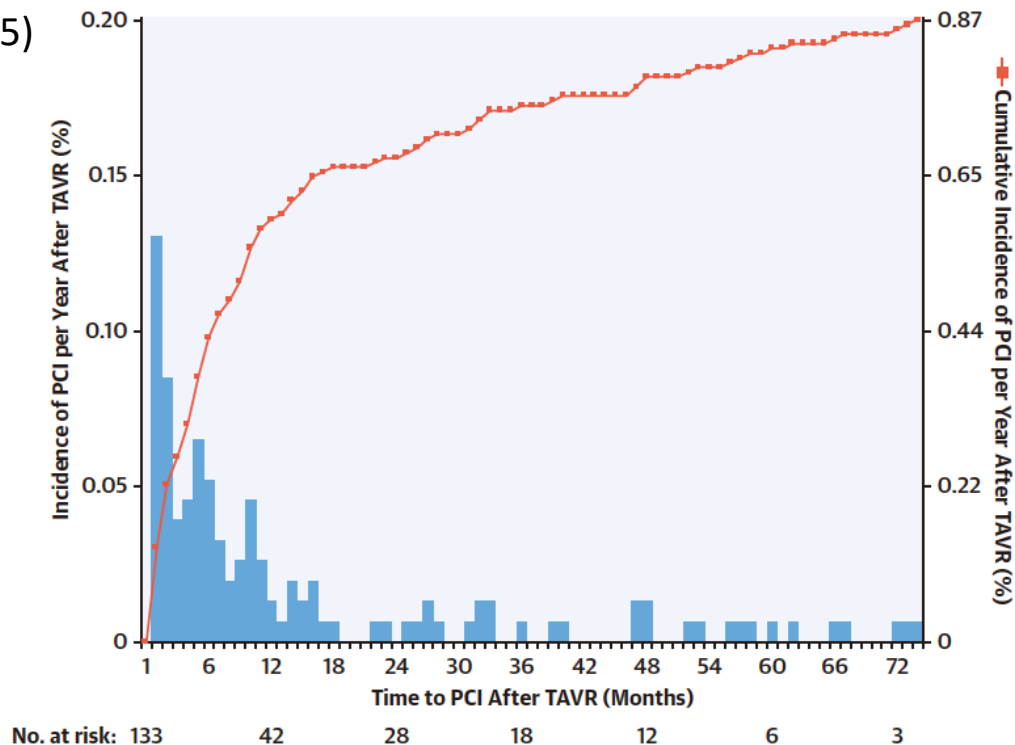
REVIVAL:

Multicenter retrospective registry (n=15,325)

0.9% patients required PCI
median time to PCI : 191 days

- NSTEMI: 32.3%
- UA: 15.4%
- STEMI: 9.8%
- Cardiac arrest: 2.2%

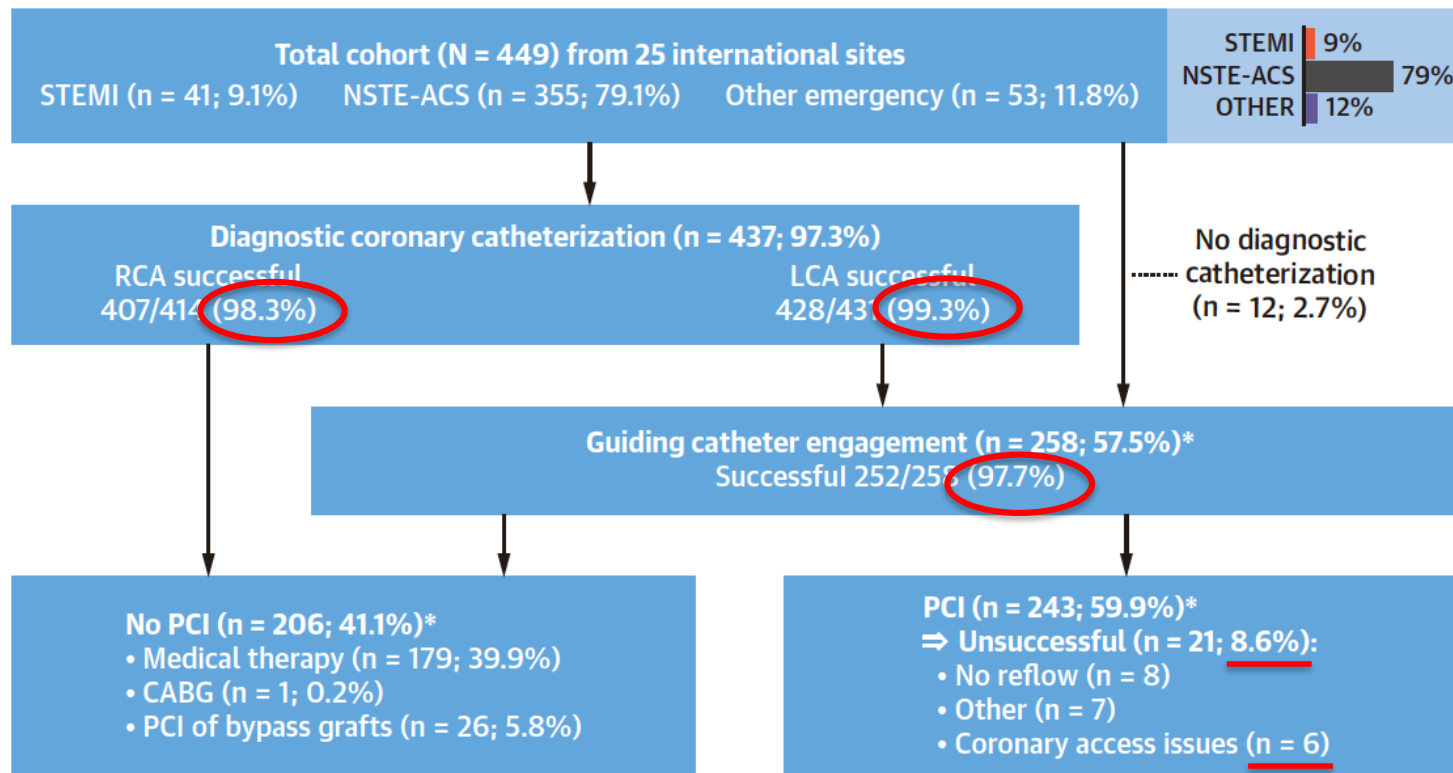
PCI success 96.6%!



Stefanini GG, JACC Intv 2021;14:198



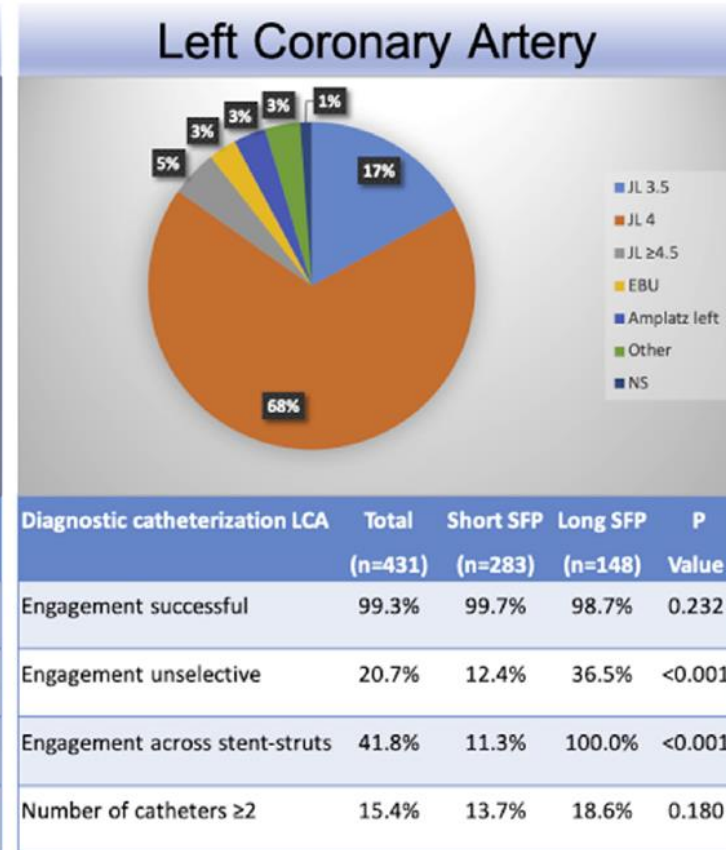
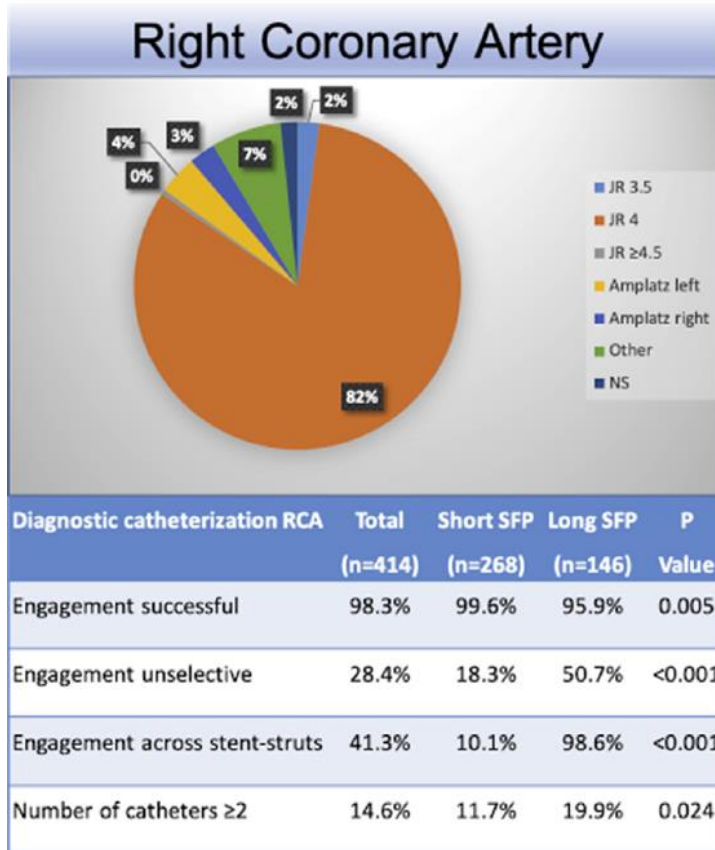
Feasibility of Coronary Access in Patients With ACS and Previous TAVR



Only 1 case was Evolut



Feasibility of Coronary Engagement for Diagnostic Catheterization

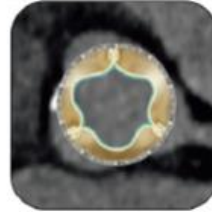
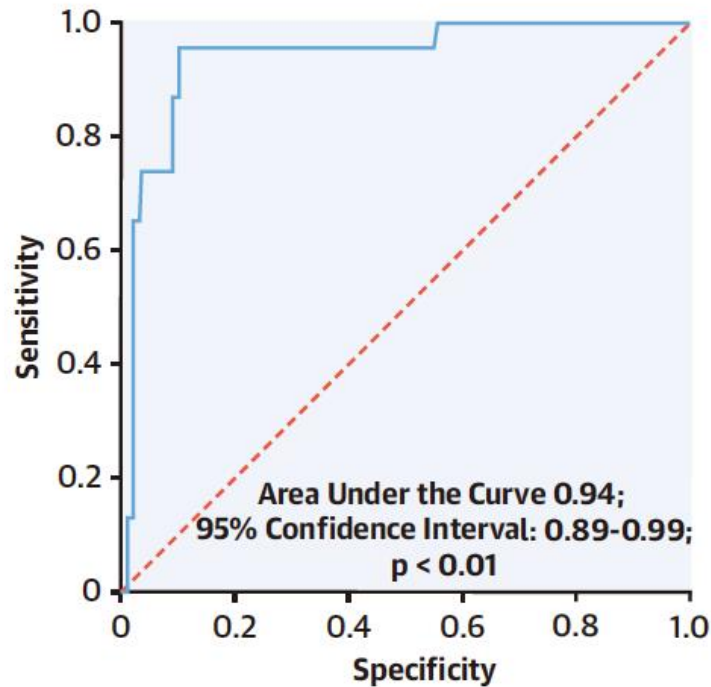


SFP = stent-frame prosthesis.

Kim WK. JACC Intv 2021;14:1578



Predictors of Unsuccessful Coronary Cannulation After TAVR



**Transcatheter Aortic Valve/
Sinuses of Valsalva Relation**
Odds Ratio 1.1;
95% CI: 1.0-1.2; p < 0.01



Transcatheter Aortic Valve Implant Depth
Odds Ratio 1.7;
95% CI: 1.3-2.3; p < 0.01



Evolut Transcatheter Aortic Valve
Odds Ratio 29.6;
95% CI: 2.6-335.0; p < 0.01

Barbanti M, JACC Intv 2020;13:2542



Conditions Favoring Specific Valves



No device is perfect!

Evolut R/PRO

- Small lumen vascular access
- Severe/unfavorable calcification of AV
- Risk of coronary obstruction
- Small AV annulus (<23 mm)
- Annulus sizing by echo (CKD or emergency TAVR)
- Severe LV dysfunction

Sapien 3

- Risk of paravalvular leak
- Risk of AV conduction disturbance
- Severe aortic arch angulation with horizontal ascending aorta
- Future coronary access



Coronary Obstruction during TAVR



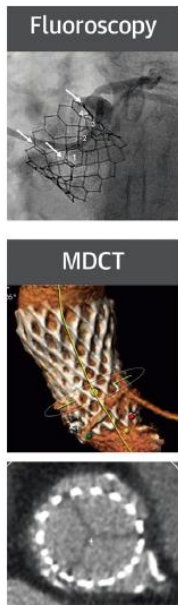
Risk Factors

Anatomical

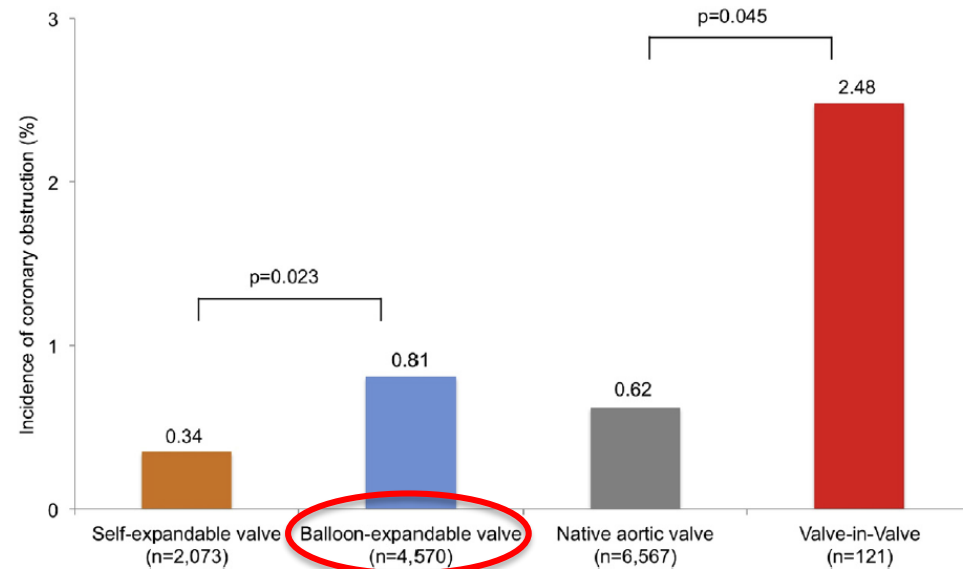
1. Sinotubular junction dimensions
2. Sinus height
3. Leaflet length and bulkiness
4. Sinus of Valsalva width
5. Coronary height

Device and Procedural

1. Commissural tab orientation
2. Sealing skirt height
3. Valve implant depth



Incidence of coronary obstruction

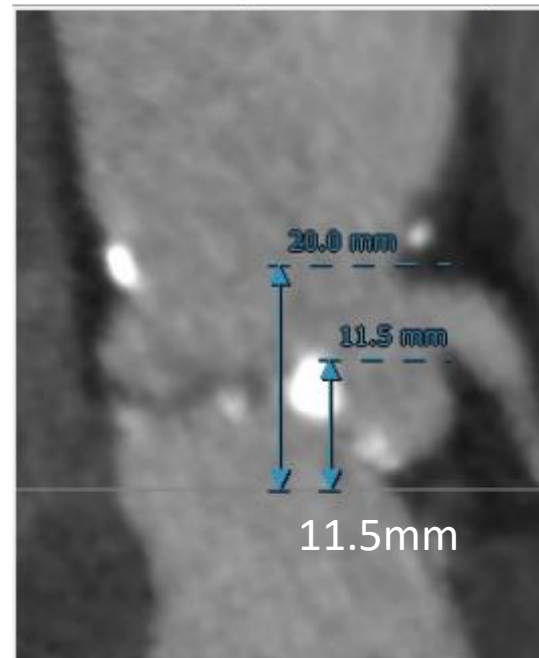
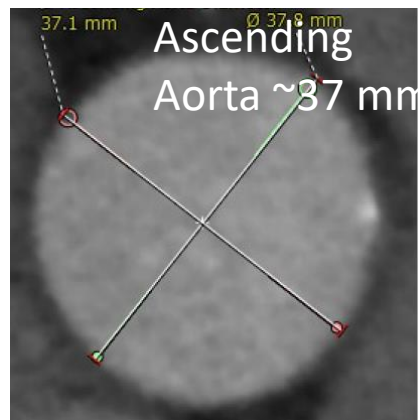
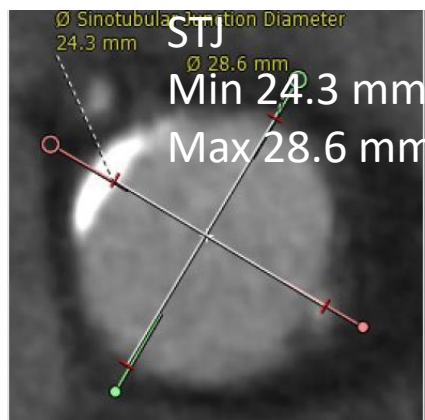
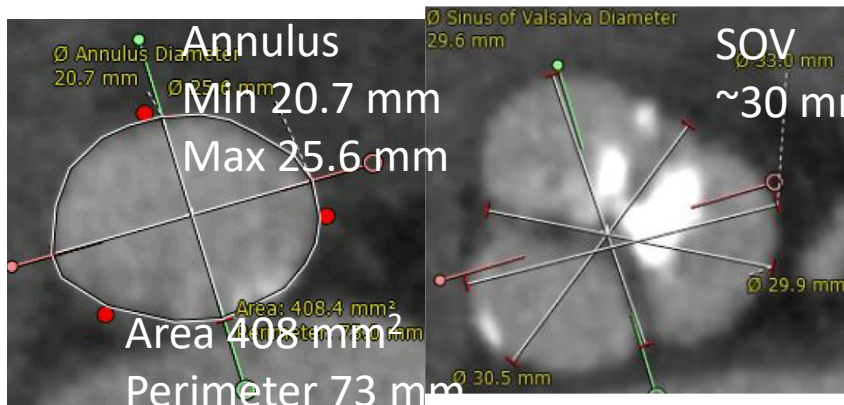


Yudi MB, JACC 2018;71:1360

Robeiro H, JACC 2013;62:1552



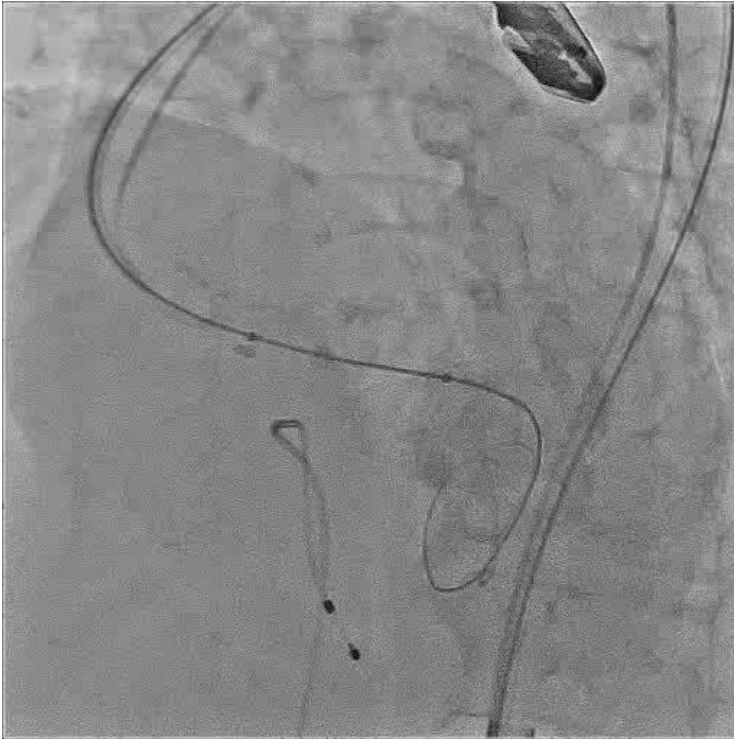
F/80,



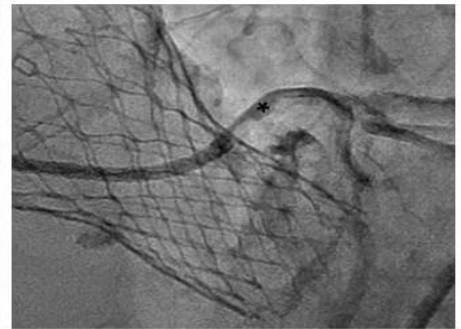
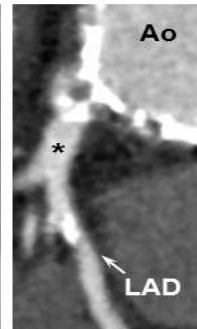
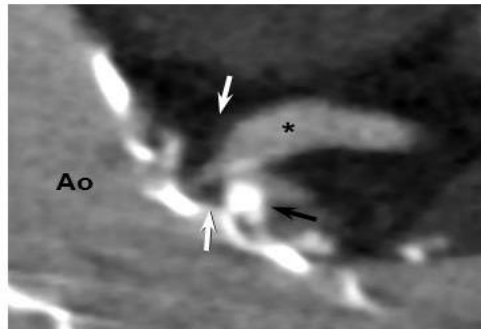
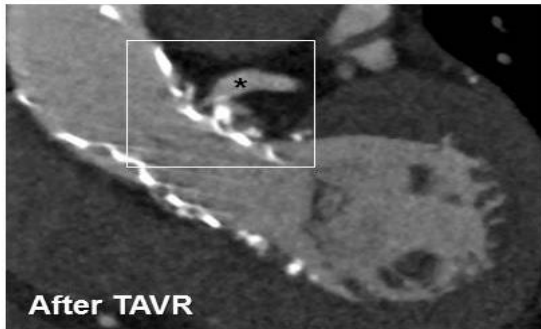
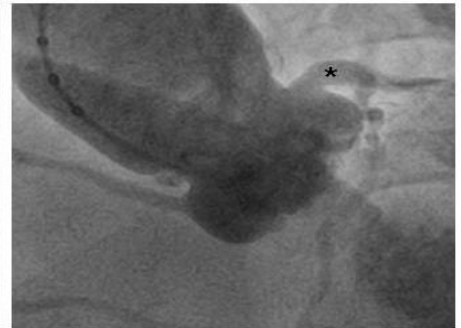
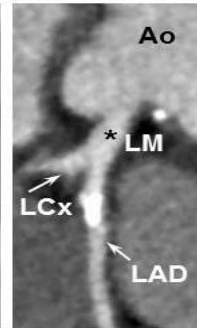
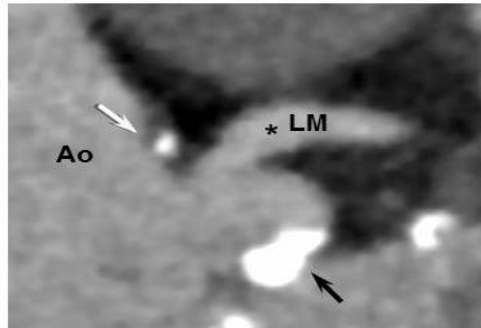
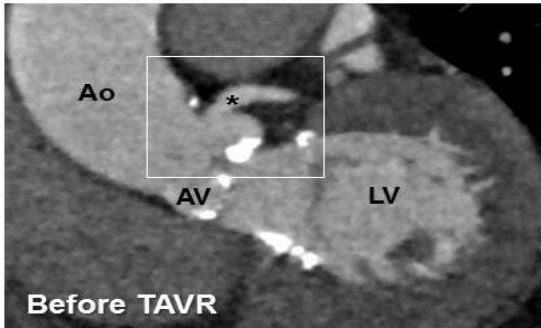
TAVI



CoreValve 26 mm



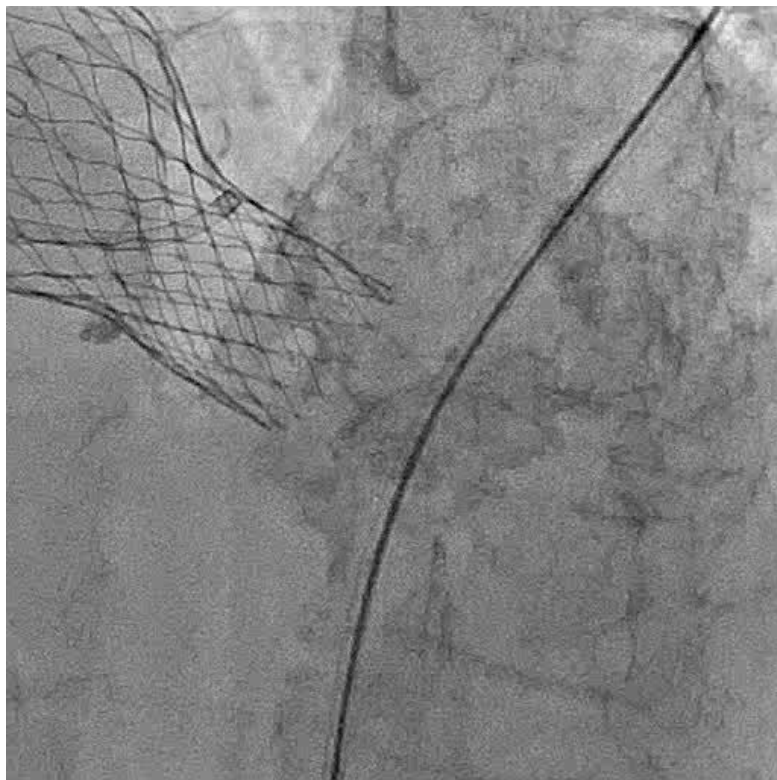
Left Coronary Artery before and after TAVI



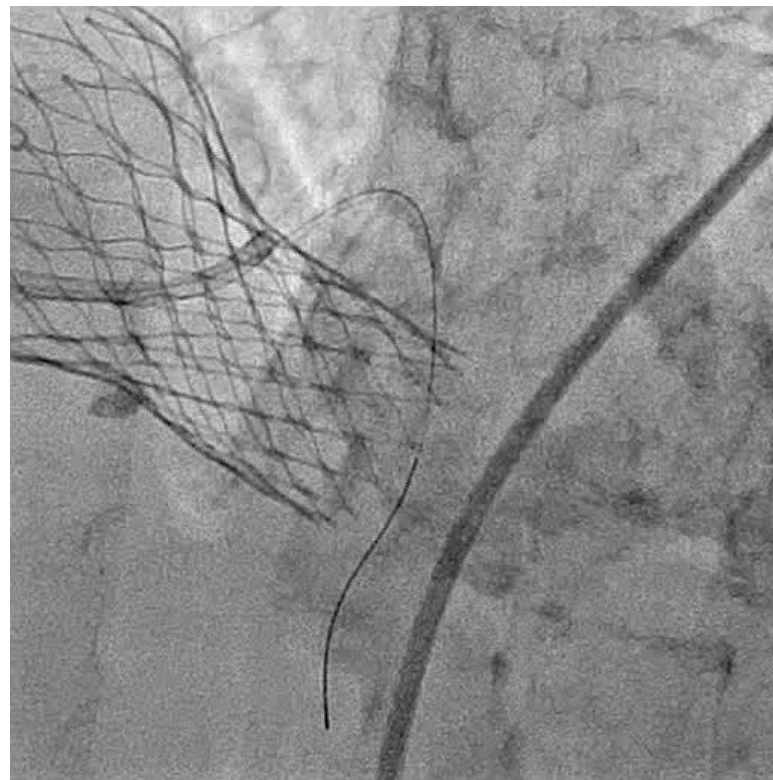
Lt Main Stenting



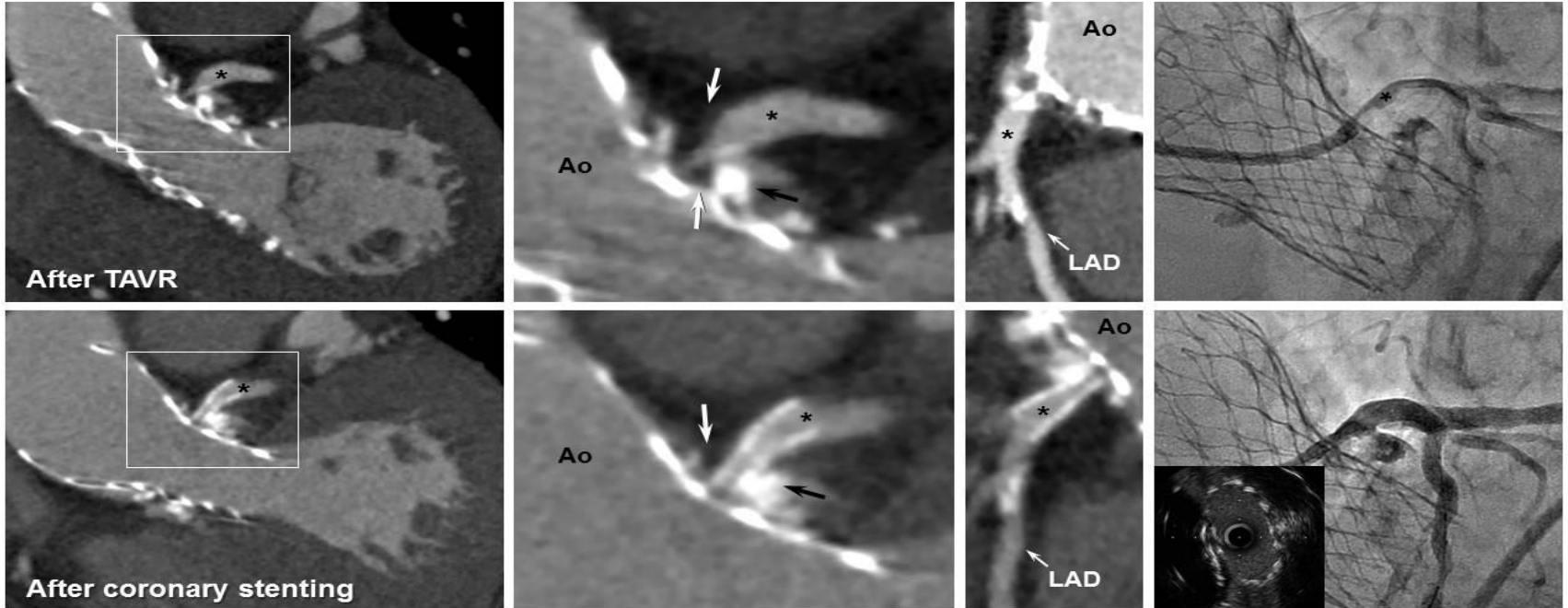
JL guiding 7F



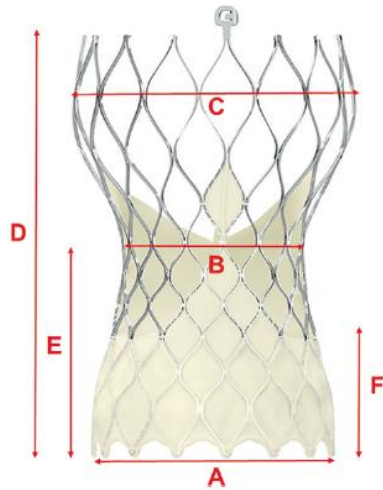
Xience Prime 4.0 x 15 mm



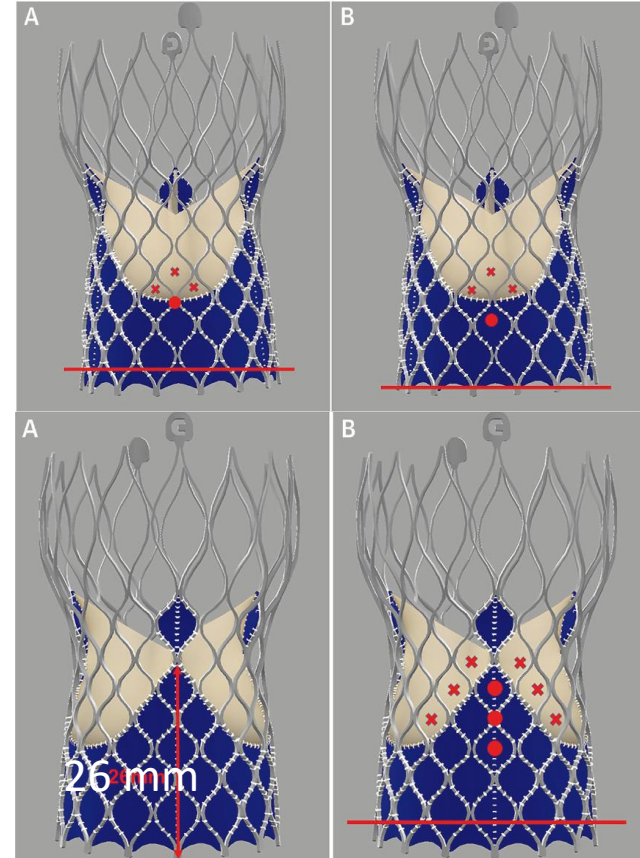
Left Main before and after Stenting



Evolut Valve Dimensions



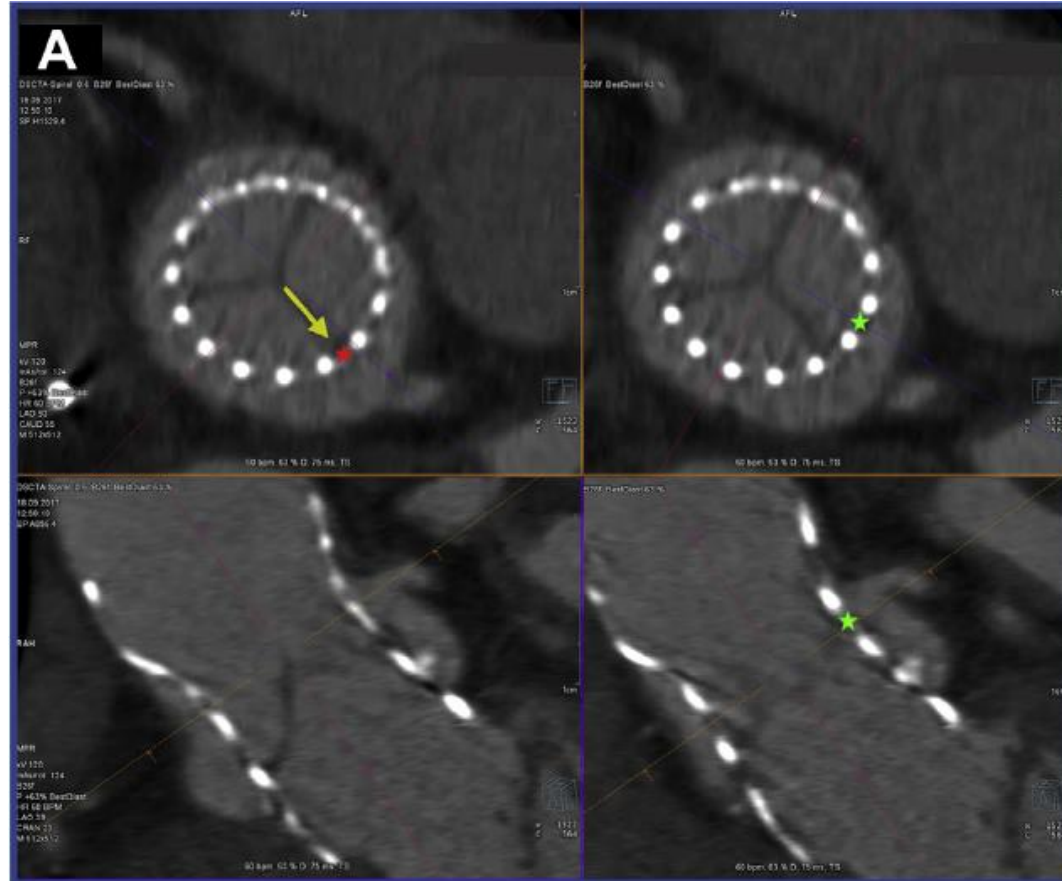
	23mm Evolut R / PRO	26 mm Evolut R / PRO	29mm Evolut R / PRO	34mm Evolut R
A. Inflow Diameter	23 mm	26 mm	29 mm	34 mm
B. Waist Diameter	20 mm	22 mm	23 mm	24 mm
C. Outflow Diameter	34 mm	32 mm	34 mm	38 mm
D. Frame height	45 mm	45 mm	45 mm	46 mm
E. Commissure Height	26 mm	26 mm	26 mm	26 mm
F. Skirt Height	13 mm	13 mm	13 mm	14 mm



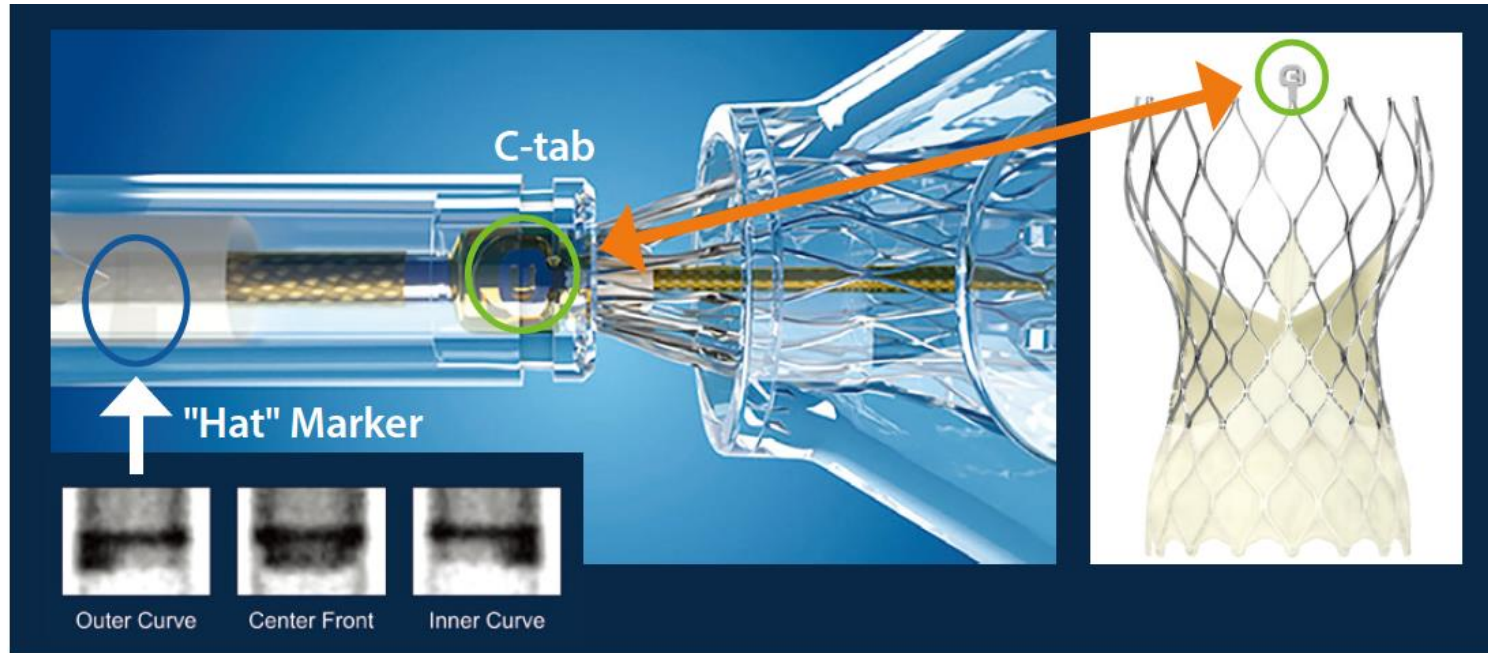
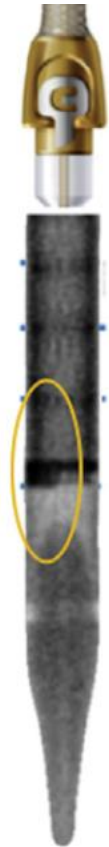
Yudi MB. JACC 2018;71:1360



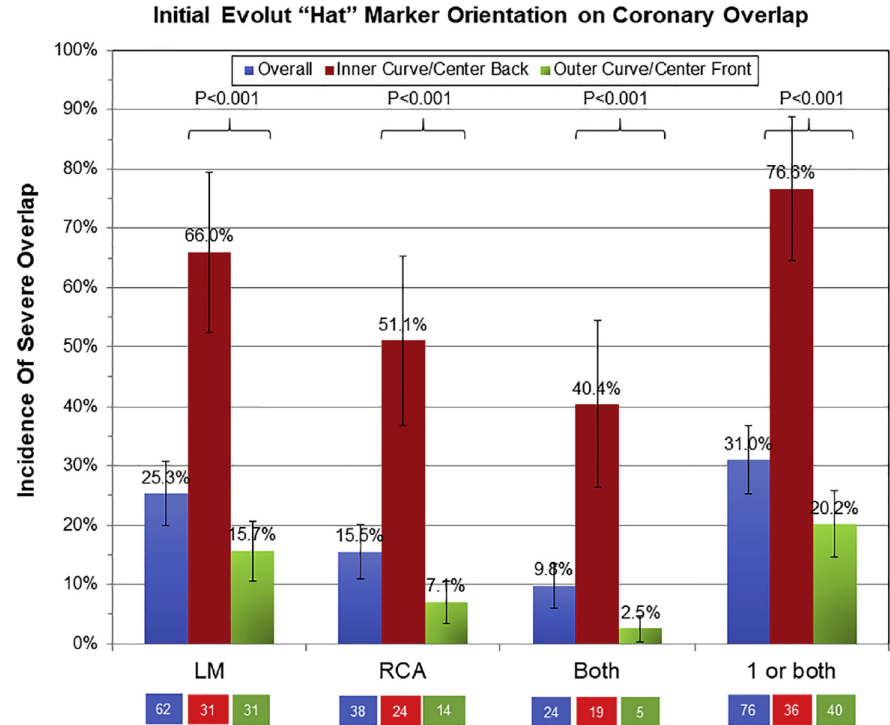
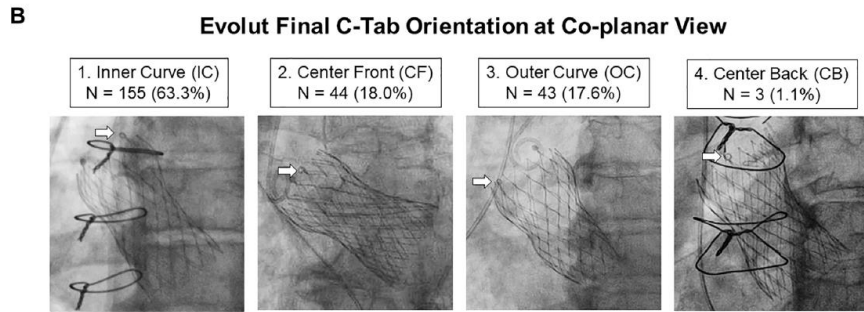
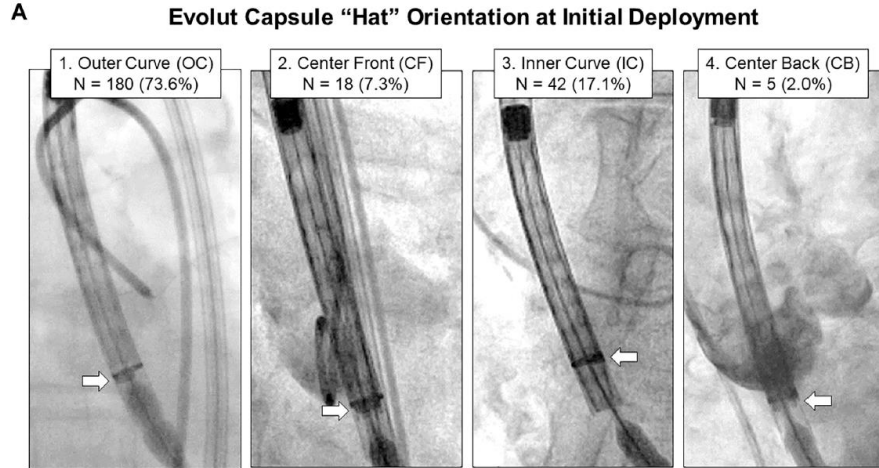
Evolut R/Pro: Commissural Post Facing the LCA Ostium



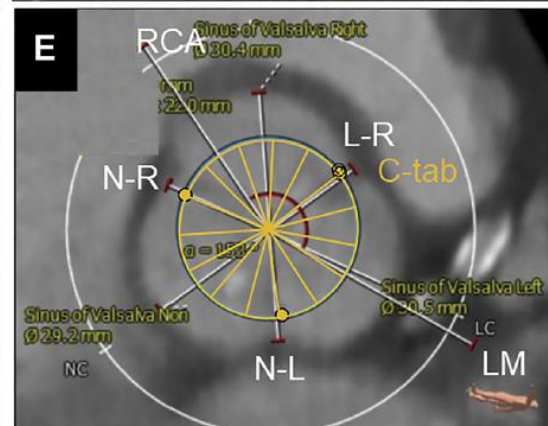
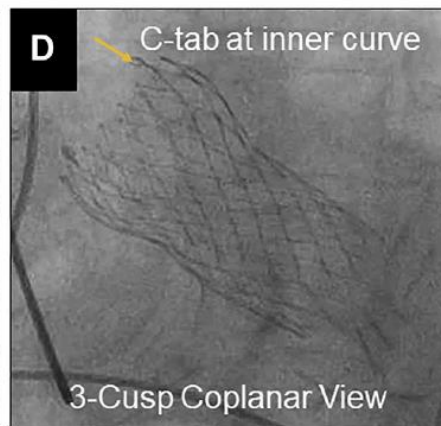
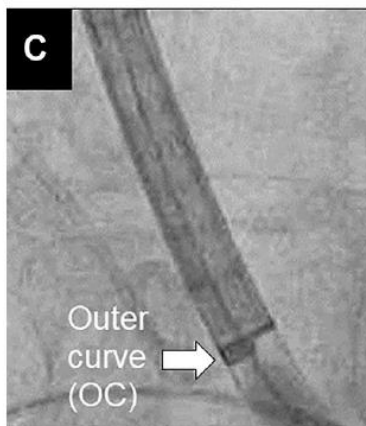
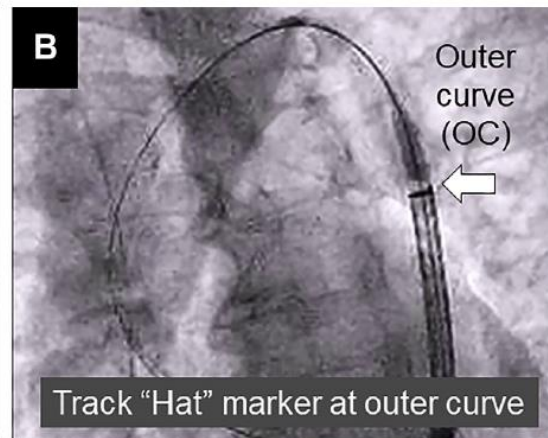
C-Tab Loaded 90° Clockwise from the "Hat" Marker



Hat Marker & C-Tab Orientation



Commissural Alignment



Conventional Versus Modified Delivery System Technique In Commissural Alignment



Evolut Delivery Catheter Insertion Technique	Outer Curve (IC)	Center Front (CF)	Inner Curve (IC)	Center Back (CB)	P Value
Conventional (12 o'clock) (N=154)	104 (67.5%)	3 (1.9%)	44 (28.6%)	3 (1.9%)	<0.001
Modified (3 o'clock) (N=240)	215 (89.6%)	9 (3.7%)	16 (6.7%)	0 (0.0%)	
P value* (12 vs 3 o'clock)	< 0.001	0.31	< 0.001	0.06	

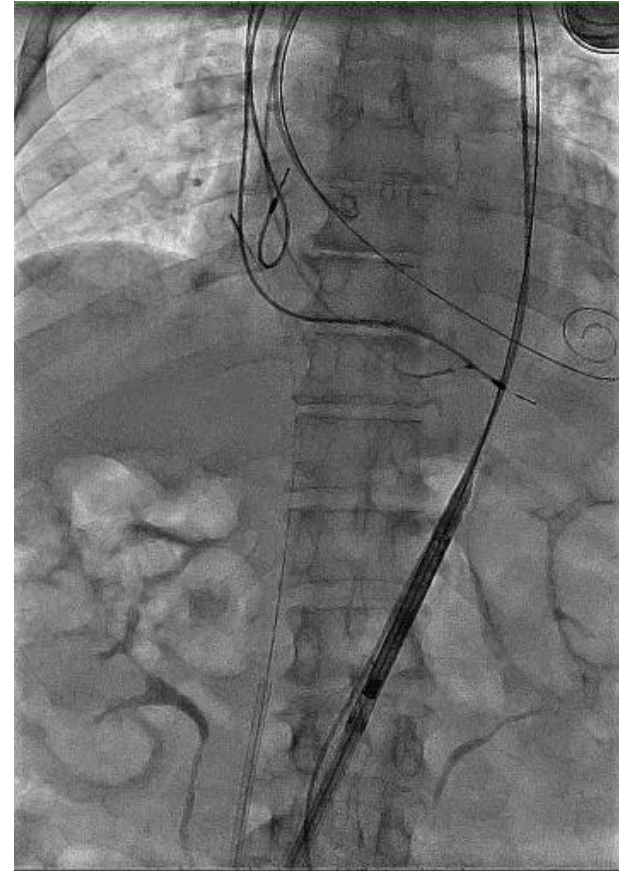
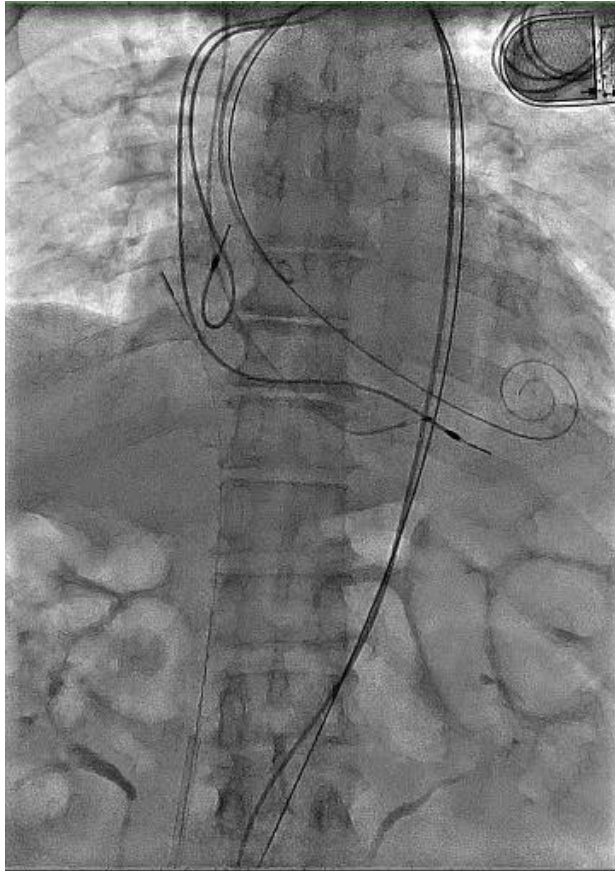
Tang GHL, Catheter Cardiovasc Interv. 2021;1-8



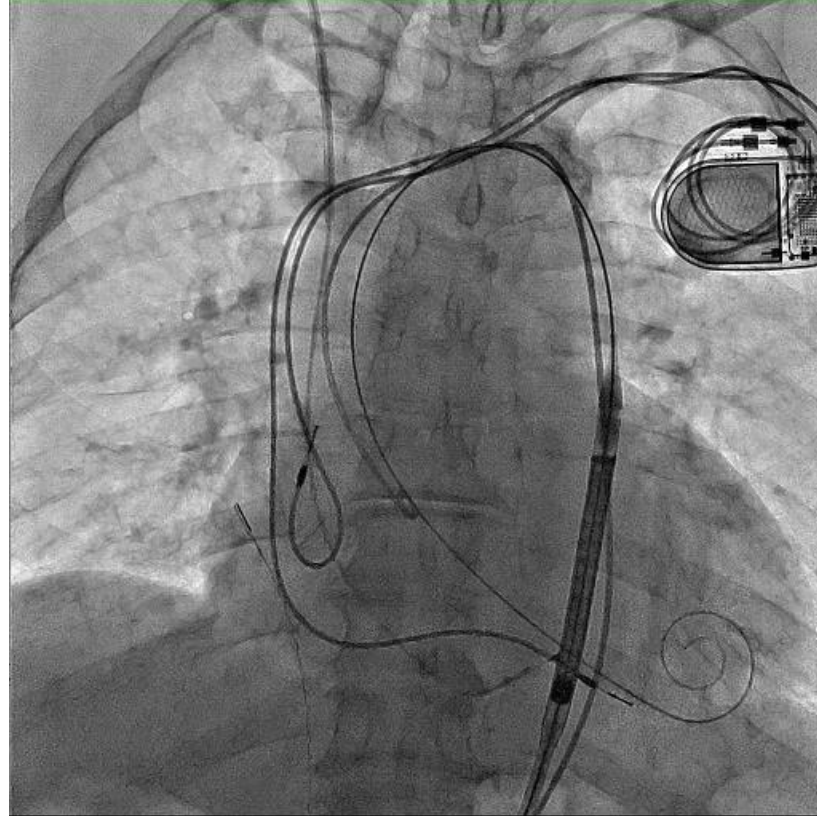
Insertion of Delivery Catheter



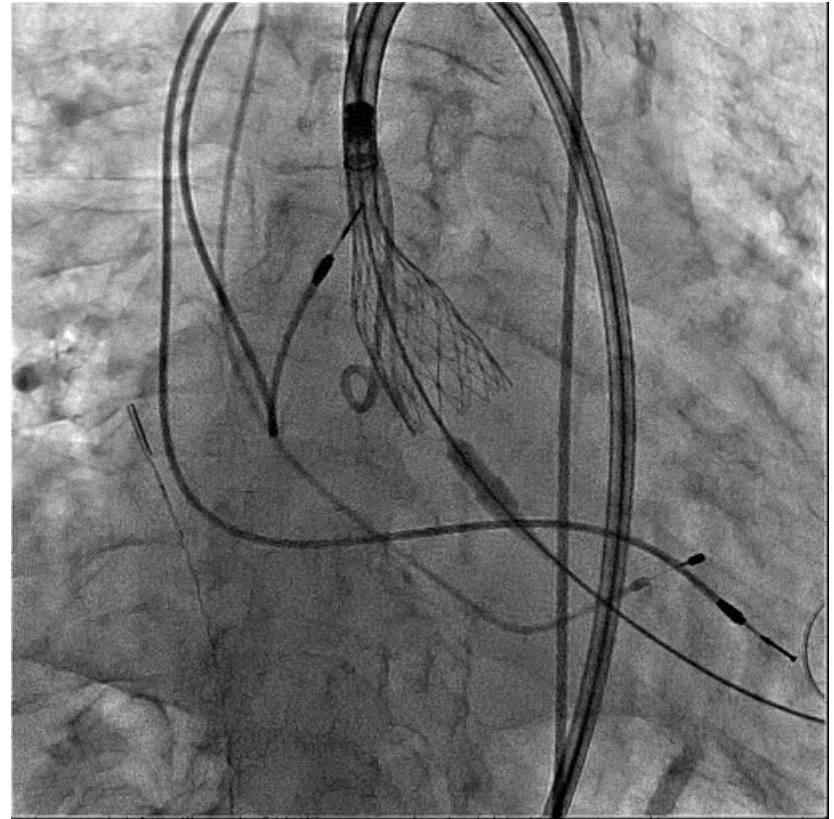
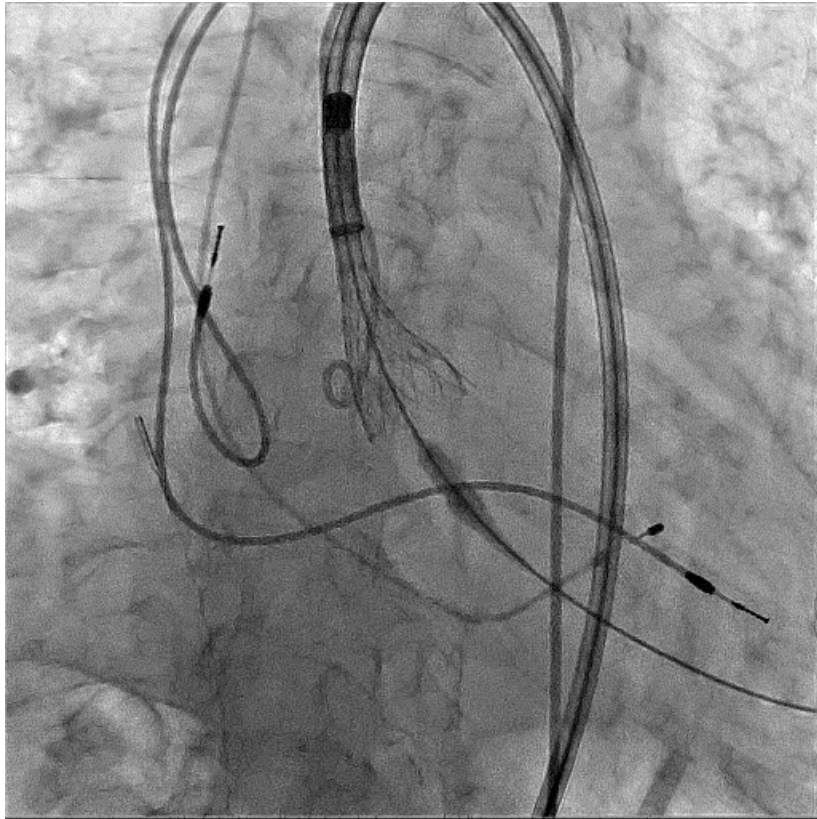
Evolut R 29 mm



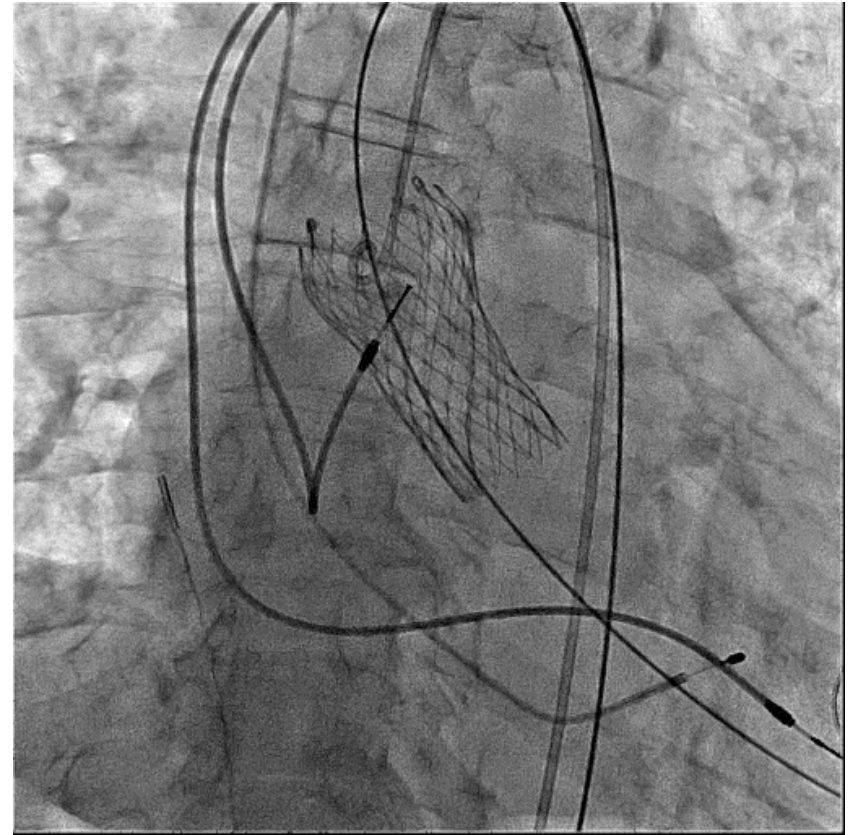
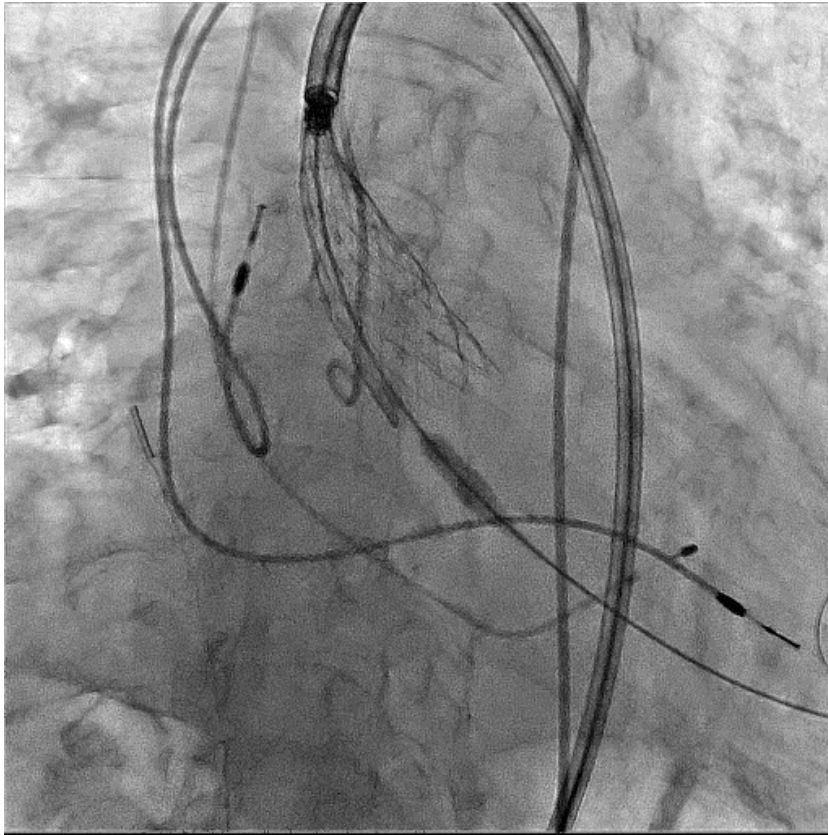
Orientation of Hat Marker



Valve Deployment



Valve Deployment



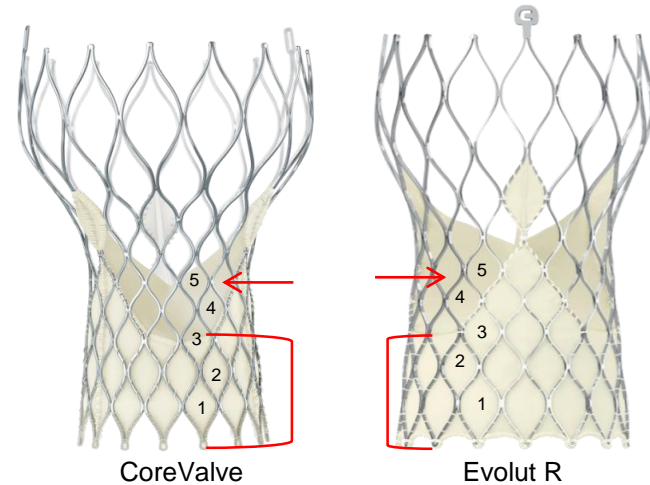
Tips and Techniques: Step 1



Use aortography to confirm ostia takeoff points and positioning of the Evolut R prosthesis

(by using a pigtail catheter)

- Count 5 alternating diamonds on the valve to identify access point above the sealing skirt
 - » 2.5 diamonds = top of sealing skirt
 - » 5 diamonds = top of commissure point

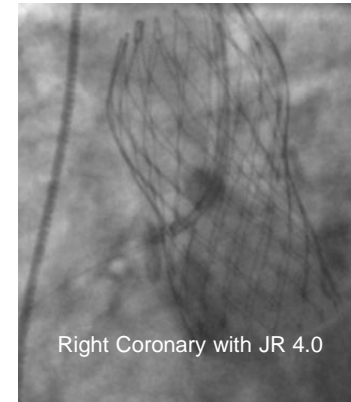
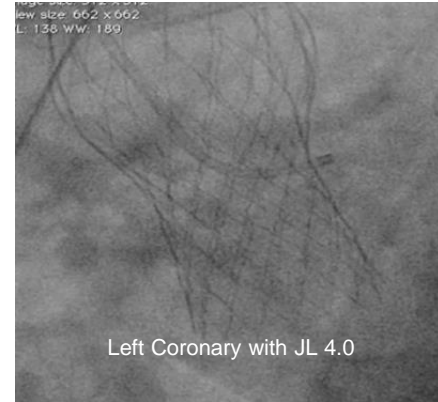


Tips and Techniques: Step 2



Engage the coronary ostium coaxially through the middle of the frame cell:

1. Start with a 3.5 or 4.0 Judkins catheter, take image and assess for curve size
 - => If necessary, change size of the Judkins catheters
2. Target the valve frame cell that is co-axial to the coronary ostia
3. Always take the catheter tip into the frame cell over the guide wire
4. If there is difficulty with the frame cell that is directly coaxial to the ostium, use the frame cell to the left or right or above the ostium



Tips and Techniques

Step 2: Considerations



CONSIDERATIONS:

- Contralateral support is given by the valve frame, therefore a Judkins is recommended.
- Cannulation of the ostium from below the coronary take-off is not recommended (for example, EBU guide catheter)
- If coronary engagement is unsuccessful, try the following steps:
 1. Change guide catheter size
 2. Attempt a partial selection, then engage with the wire
 3. Use an extension. This can be helpful when extra support is needed or when the distance between the frame and the coronary ostia is long – common with right coronary artery.



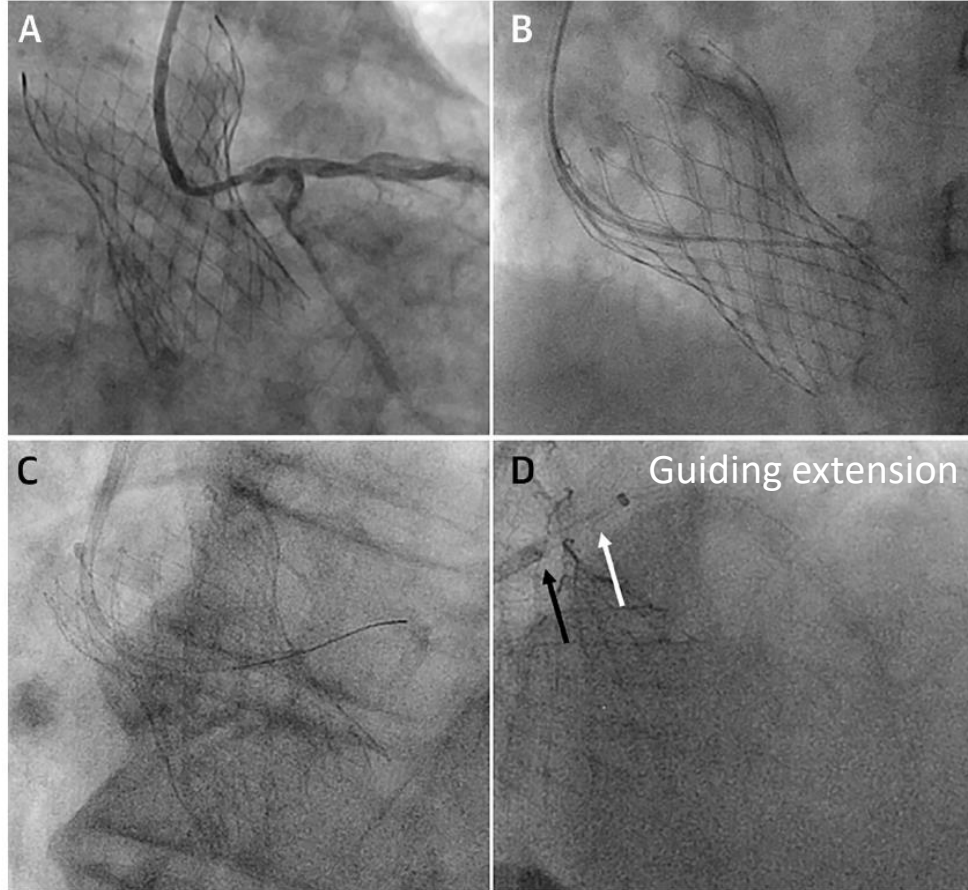
Tips and Techniques: Step 3



- After stent deployment, disengage the guide catheter from the ostium over the guide wire prior to removing through the frame cell and pulling out of patient
- **Do not pull the guide catheter** if there is difficulty removing it from the ostium over the guide wire. Use a balloon to disengage the guide catheter.



Tips for PCI Post-TAVR



J-wire use to cross the lowest diamond above the skirt

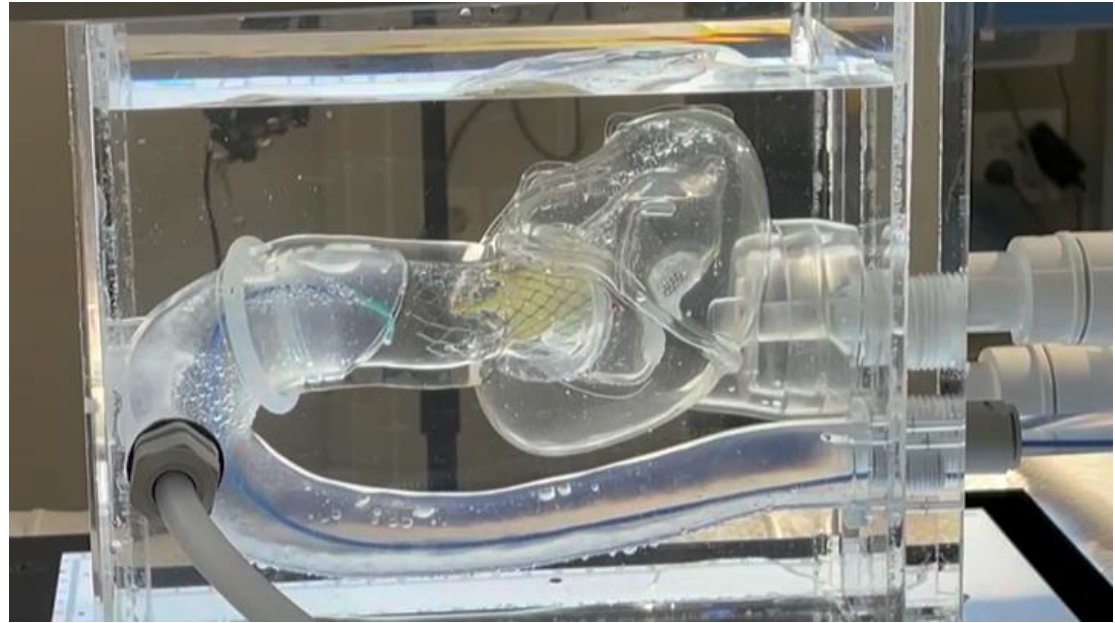
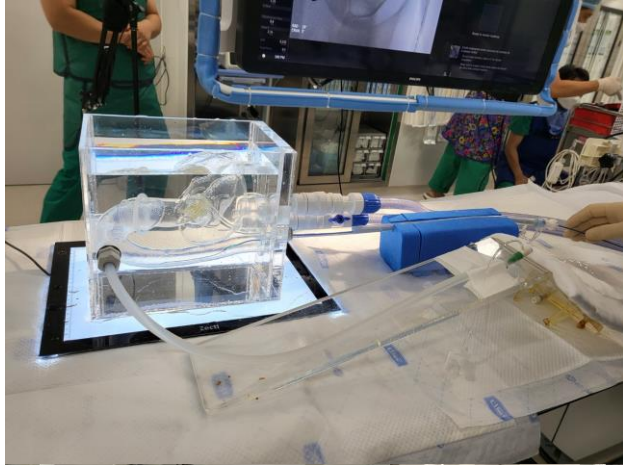
Wiring into the coronary artery before railing the guide for selective engagement.

Guide extension catheter can be used to selectively engage the coronary artery

Yudi MB. JACC 2018;71:1360



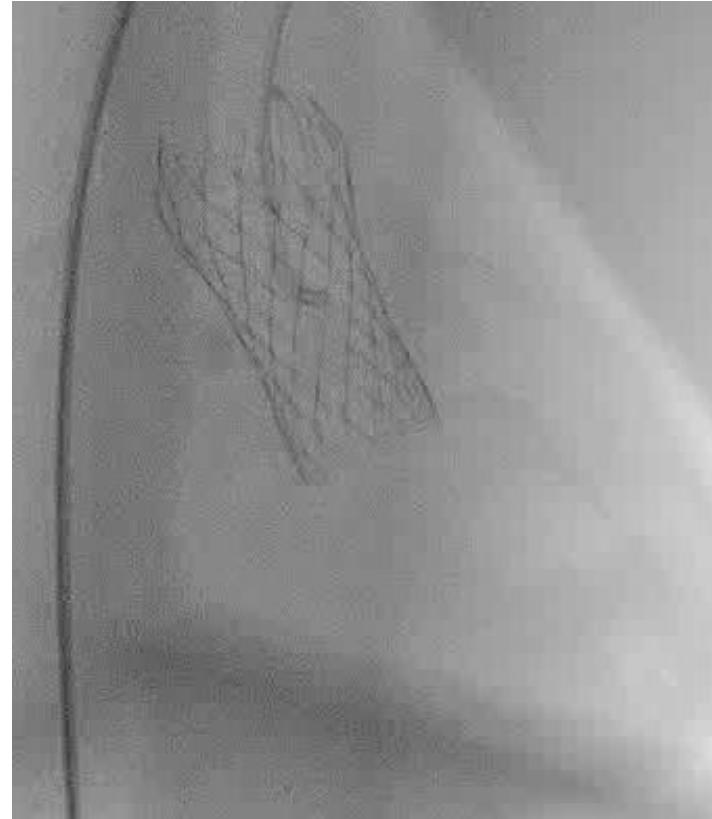
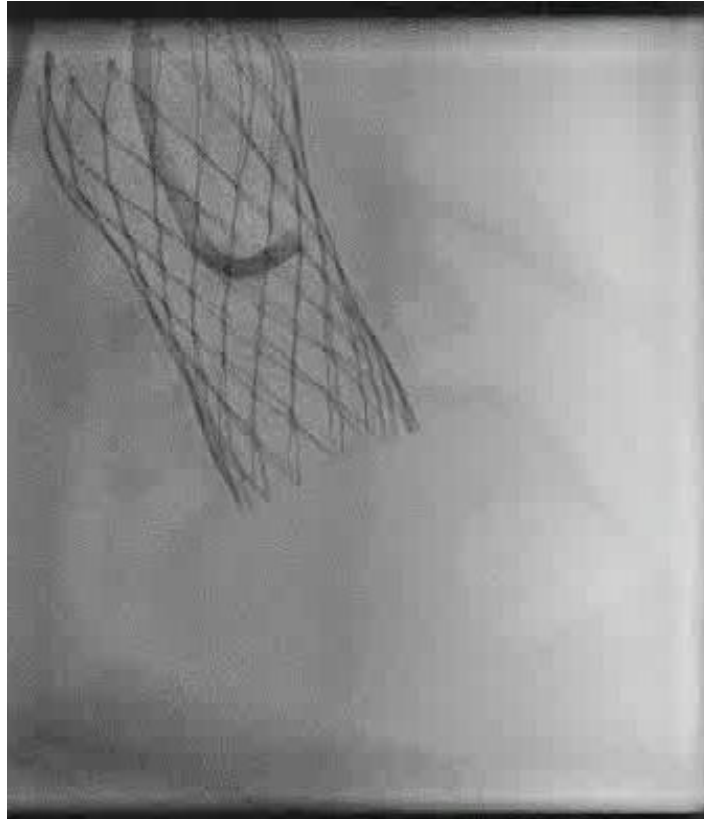
Heartroid Simulator



Severance Cardiovascular Hospital, Yonsei University Health System



LCA Cannulation: JL 3.0



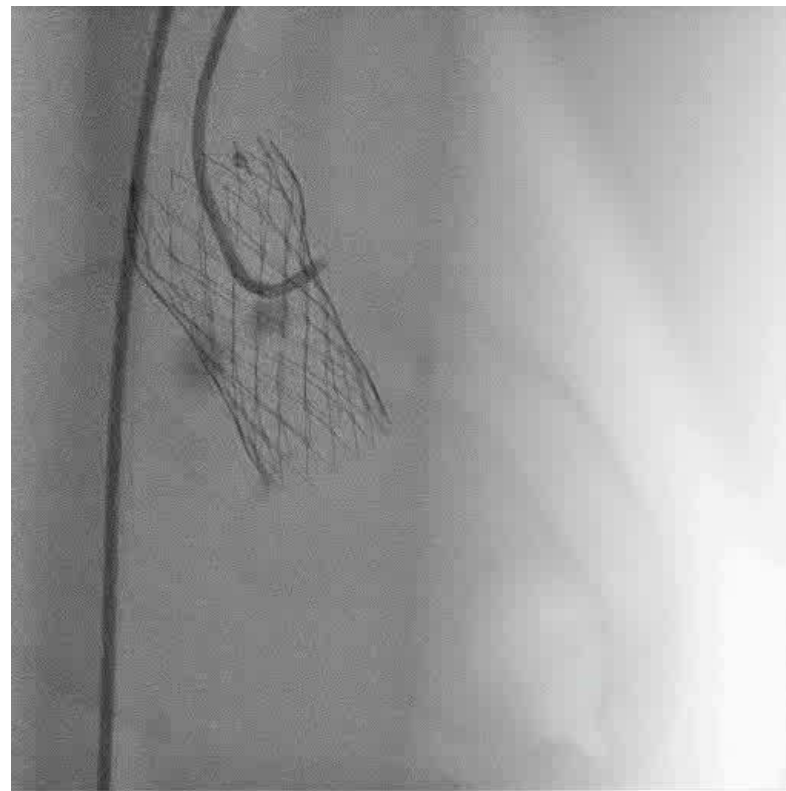
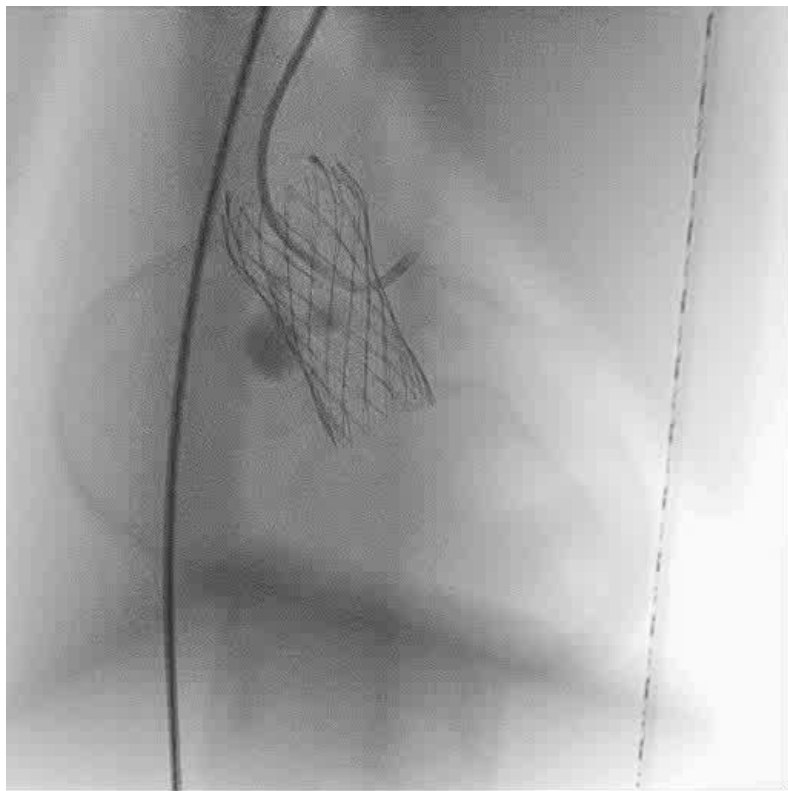
Left Coronary Artery



Evolut 29 mm

JL 3.0

JL 3.5



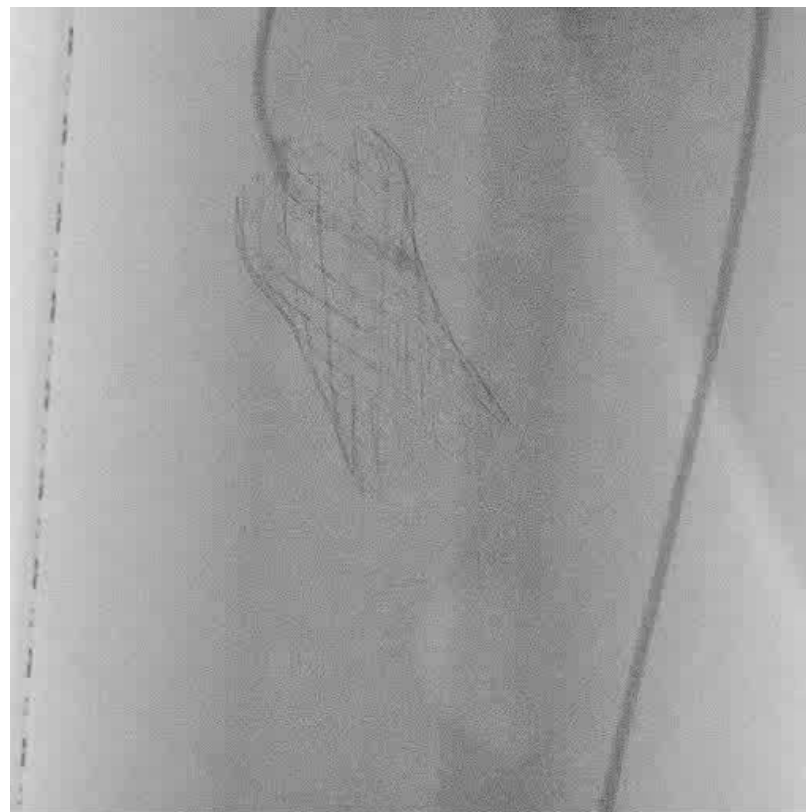
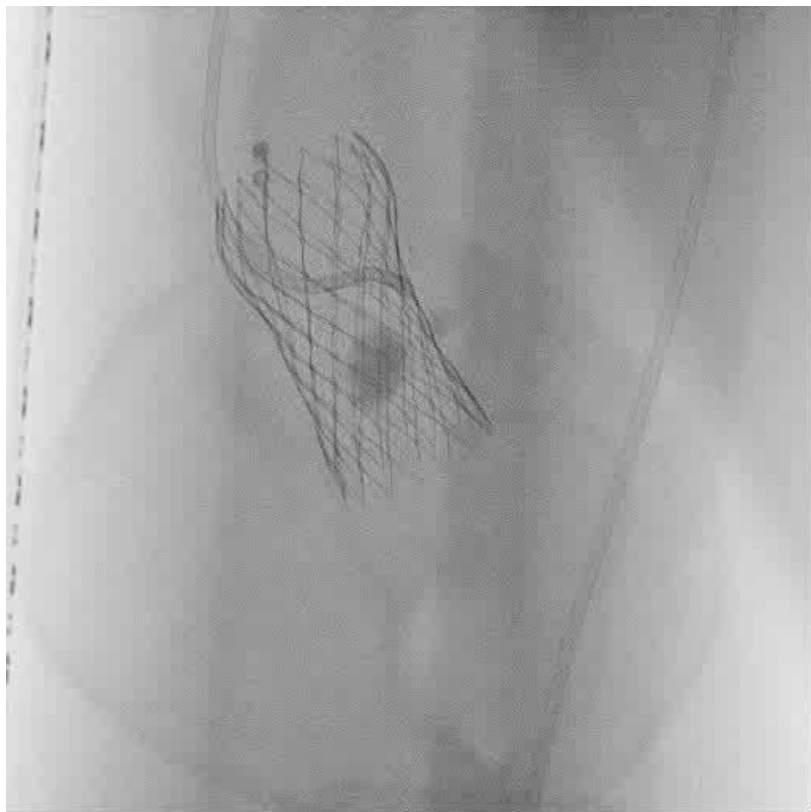
Left Coronary Artery



Evolut 29 mm

AL 1

EBU



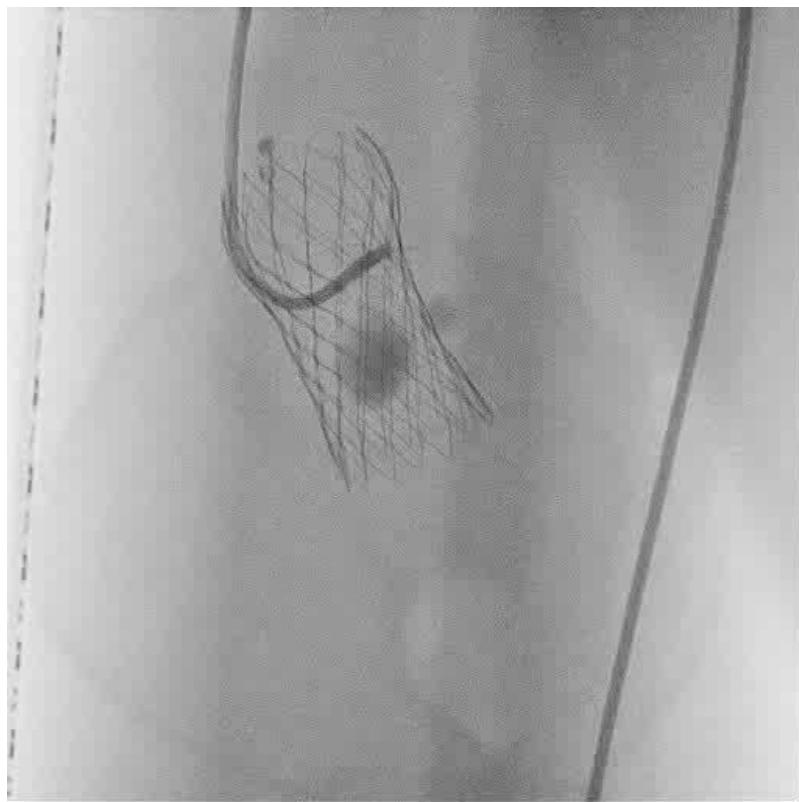
Left Coronary Artery



Evolut 29 mm

AR 2

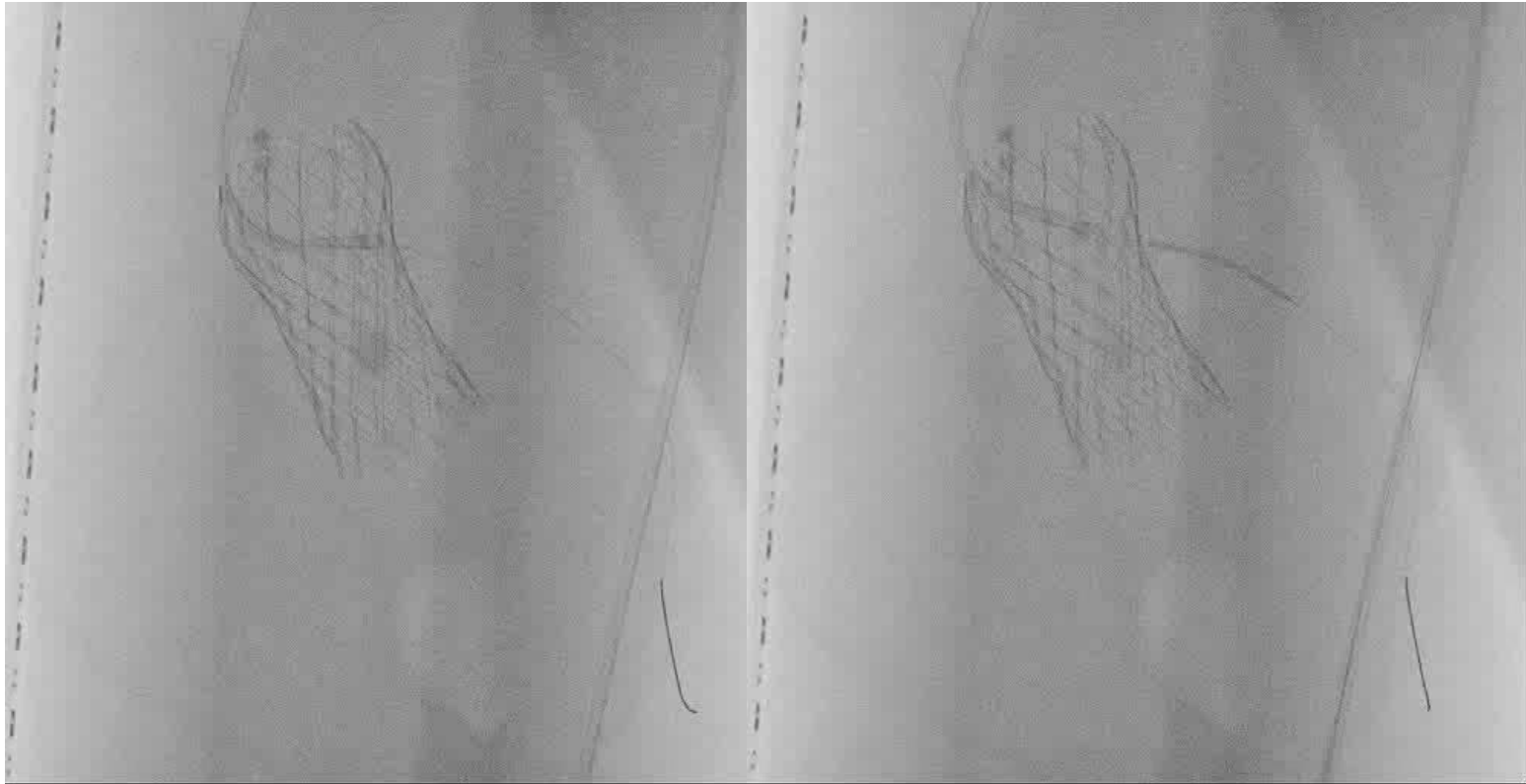
AR 2



Indirection Selection of LCA



AR 2



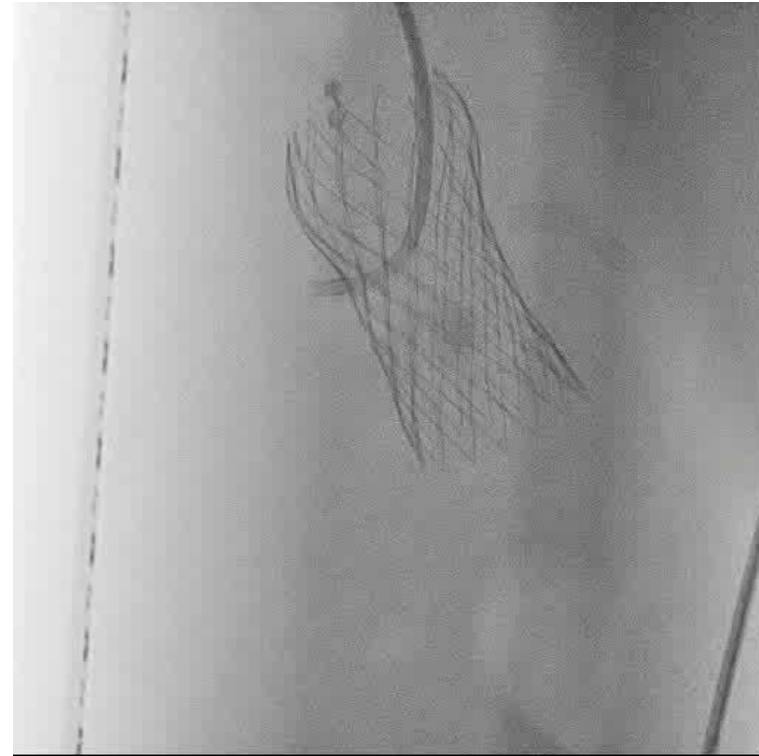
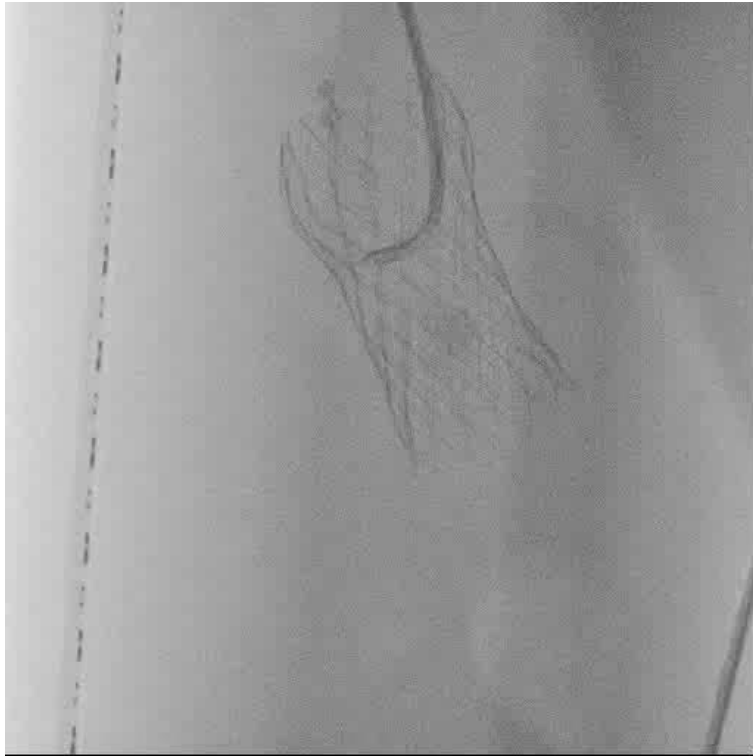
Right Coronary Artery



Evolut 29 mm

JR 3.5

JR 3.5



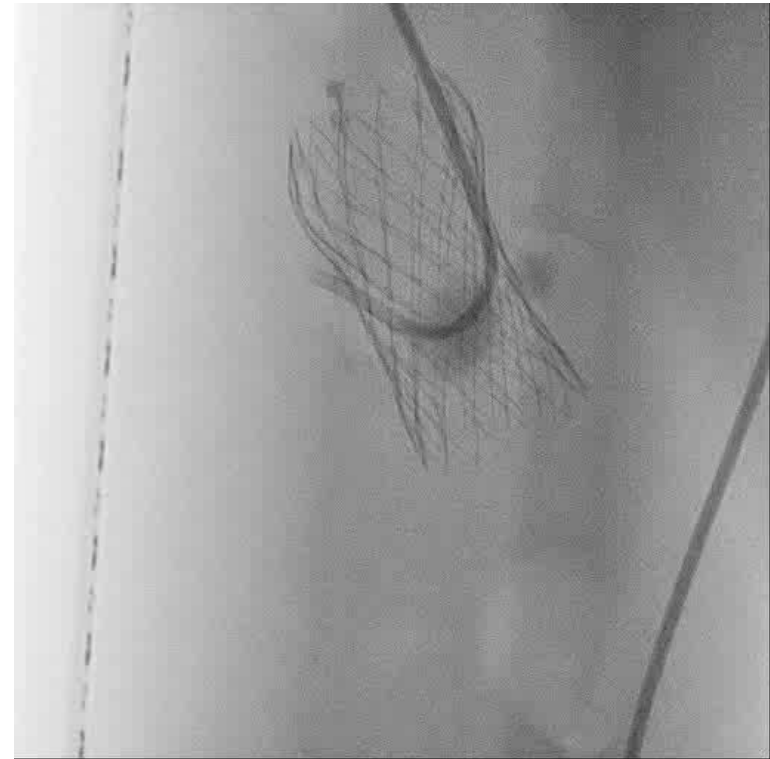
Right Coronary Artery



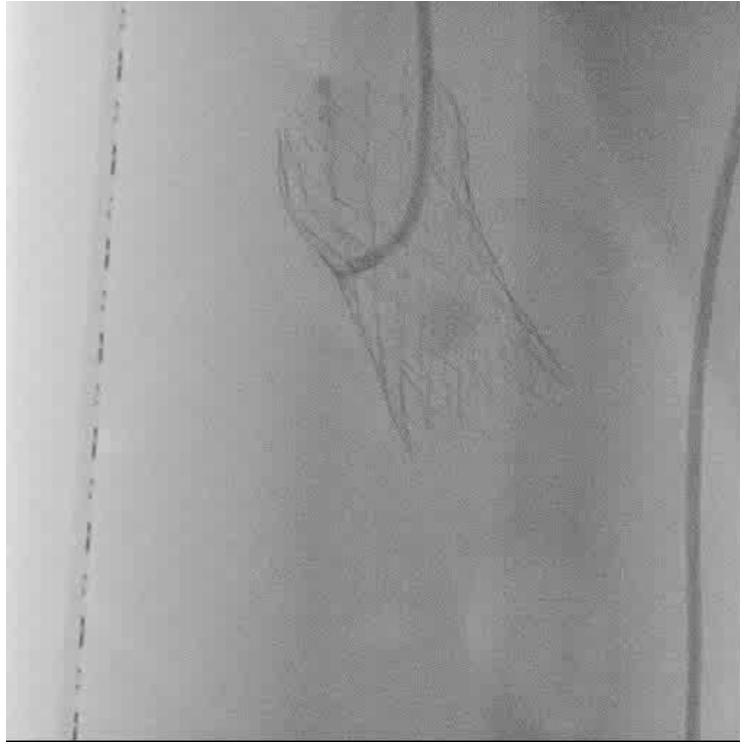
Evolut 29 mm

AR 2

AR 2



Indirection Selection of RCA



Take Home Messages



- Incidence of PCI after TAVR is expected to increase as the indication for TAVR expands to younger and lower risk patients.
- In general, the success rate of PCI in patients treated with TAVR is over 90%.
- Indirect selection of coronary arteries for PCI is still feasible in most of cases even though direct coronary artery cannulation with guiding catheter may be sometimes difficult in cases of Evolut calves due to the high valve frame.
- The orientation of commissural post away from coronary artery ostia by positioning the Hat marker towards the aorta arch outer wall is of great importance to secure the coronary access for future PCI.





Thank you for your attention!

