Video Case Presentation

Self-Expandable Evolut R & PRO Valve

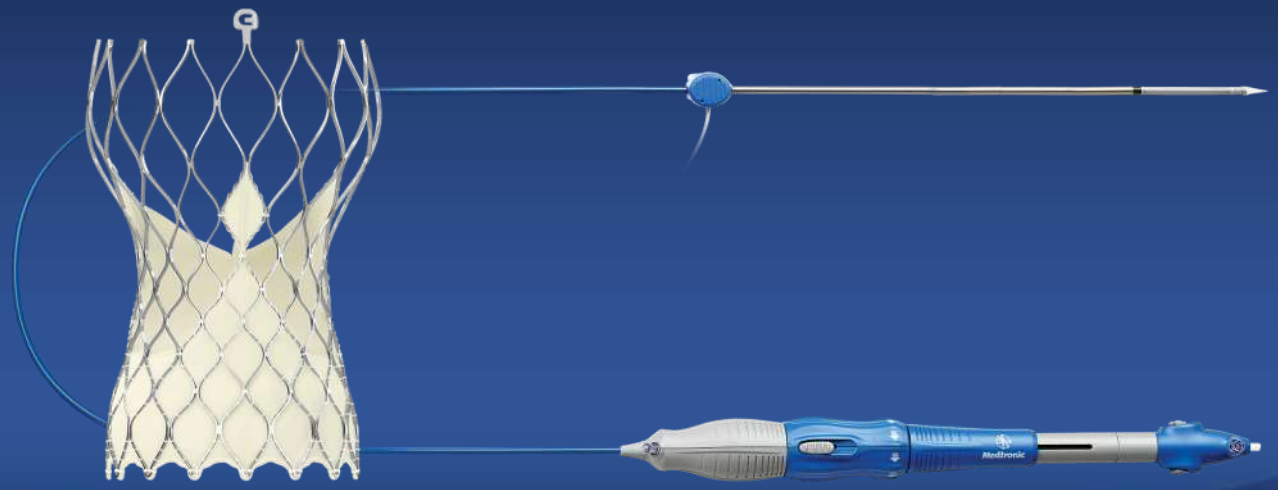
Jung-Min Ahn, MD.

Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea.

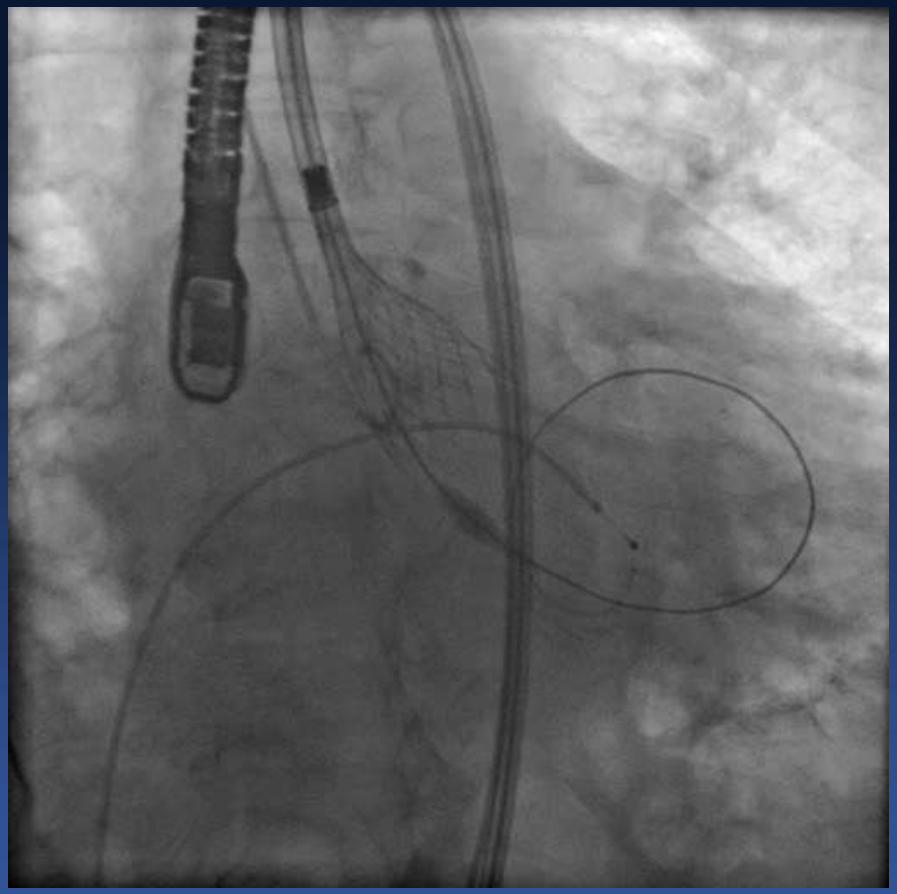
EVOLUT R

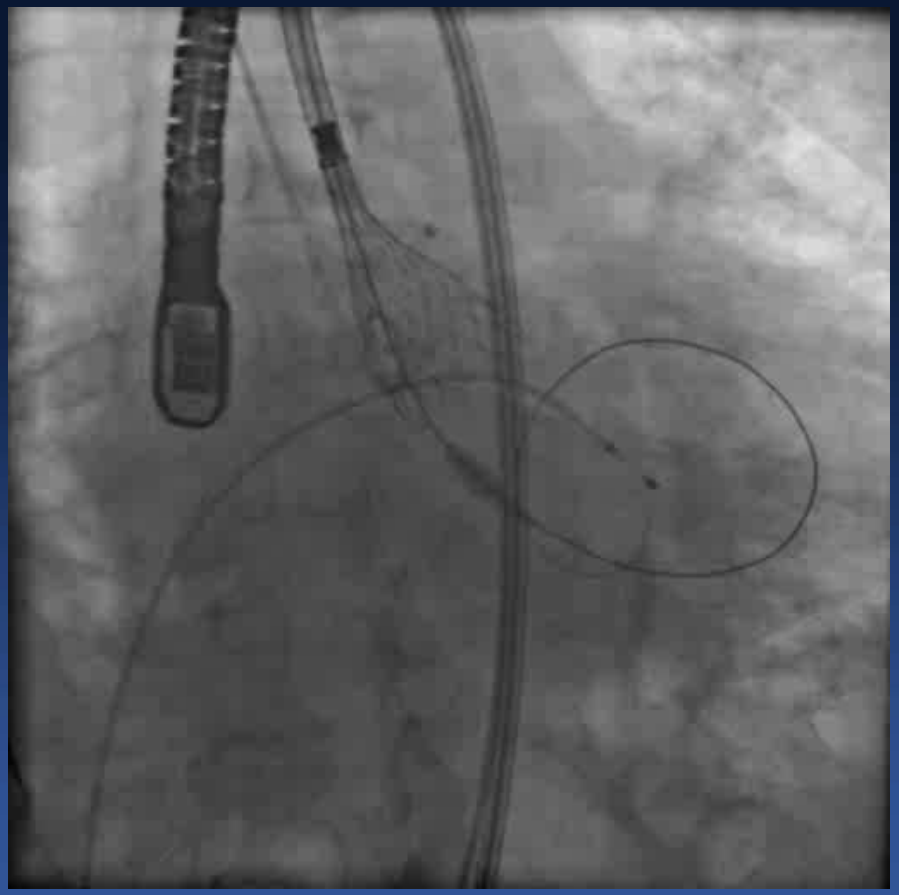
- SUPRA ANNULAR VALVE DESIGN
  - Maximizes leaflet coaptation
  - Promotes single digit gradients and large EOAs
- PORCINE PERICARDIAL TISSUE
  - Thin for low profile delivery
  - Strength and pliability for durability
- SELF-EXPANDING FRAME
  - Conforms and seals to the annulus
  - The foundation for recapturability

- 4 Transcatheter aortic valves (23, 26, 29, and 34 mm)
- 2 Delivery catheter systems (14 and 16 Fr equivalent)
- 3 Loading systems (23, 26/29, and 34 mm)



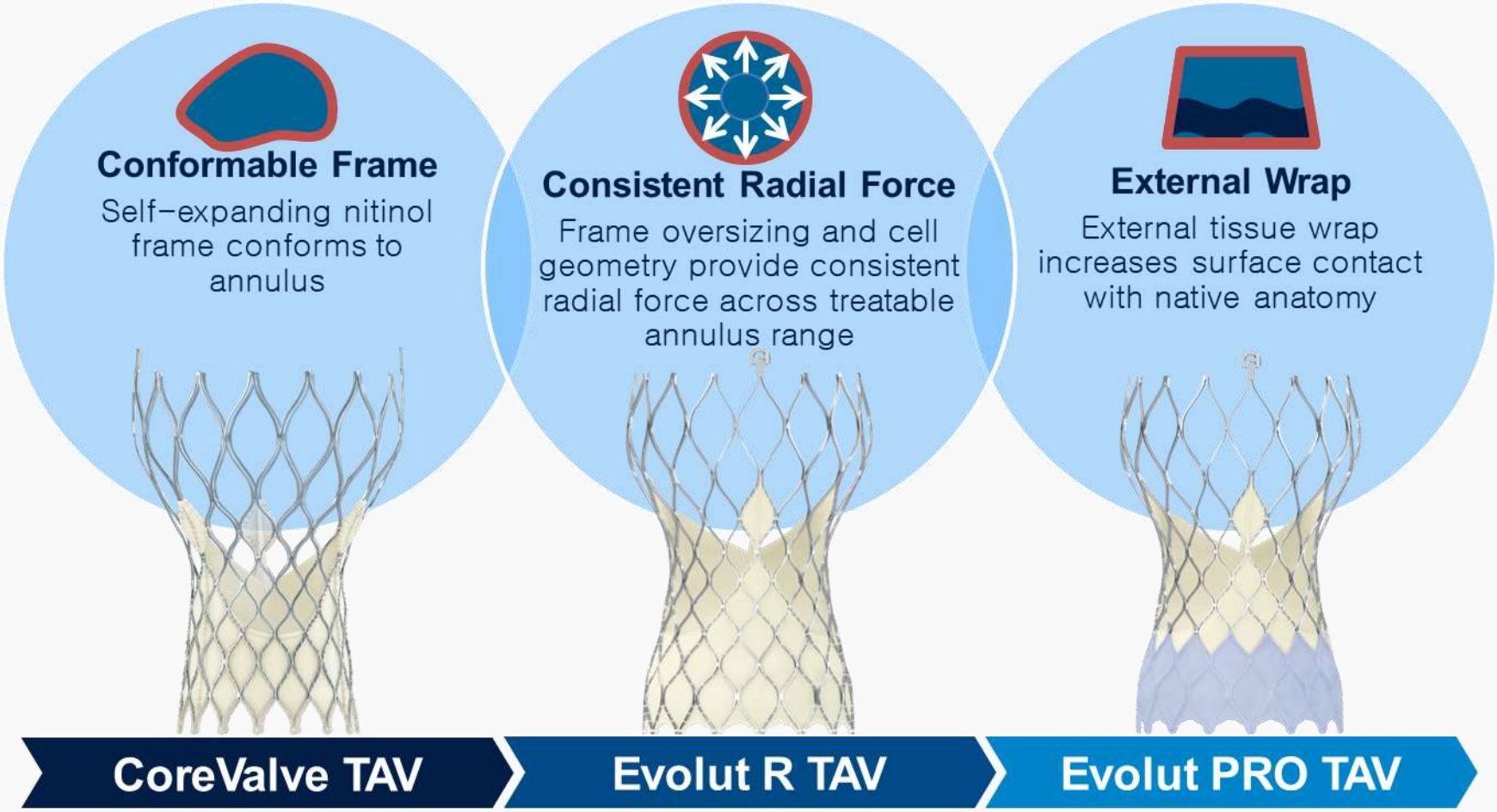
Recapture



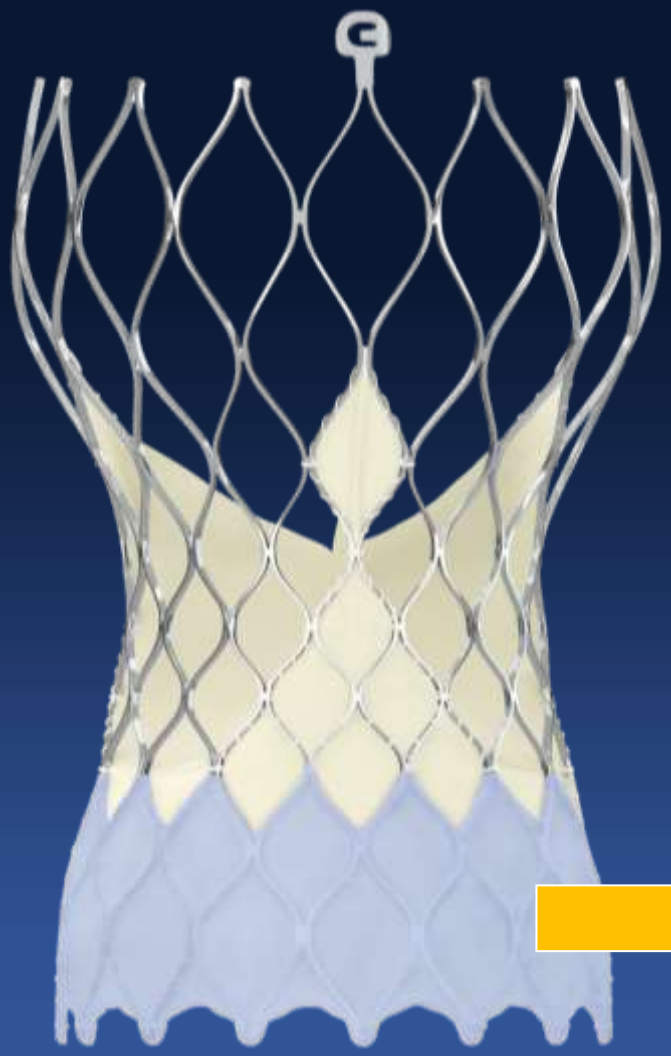


EVOLUT PRO TRANSCATHETER AORTIC VALVE
ADVANCED SEALING

Building on Proven Design for Advanced Sealing



EVOLUT PRO



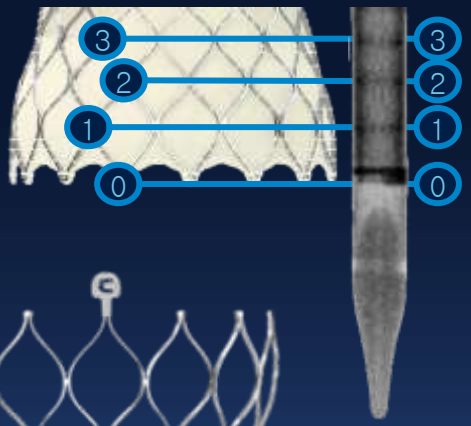
- The Evolut PRO TAV is an Evolut R TAV with an ***added external porcine pericardial wrap***
  1. Identical frame and inner tissue as the Evolut R TAV
  2. External wrap covers first 1½ inflow cells and extended skirt
- Sutures secure inner skirt and outer wrap together to the frame
  1. Same number and location of sutures as Evolut R TAV

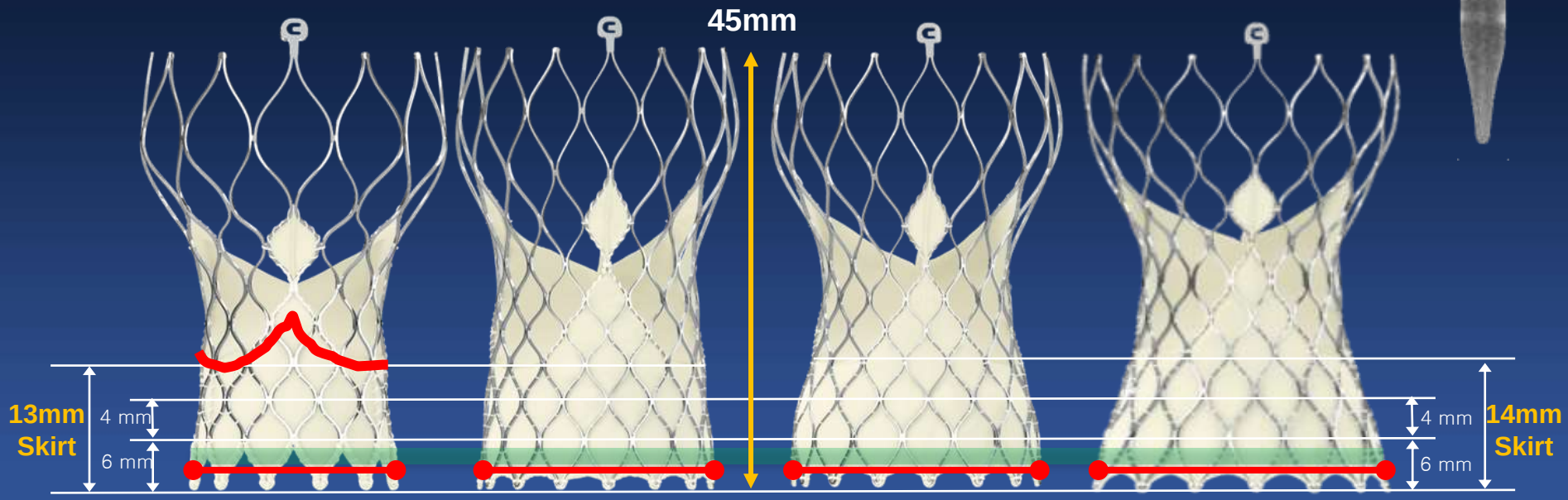
Effective Sealing:

The external wrap provides added tissue volume between the TAV and native anatomy to help reduce gaps and increase surface contact area

Dimension and Skirt Height

Target implant depth is **3 – 5 mm** for all valve sizes

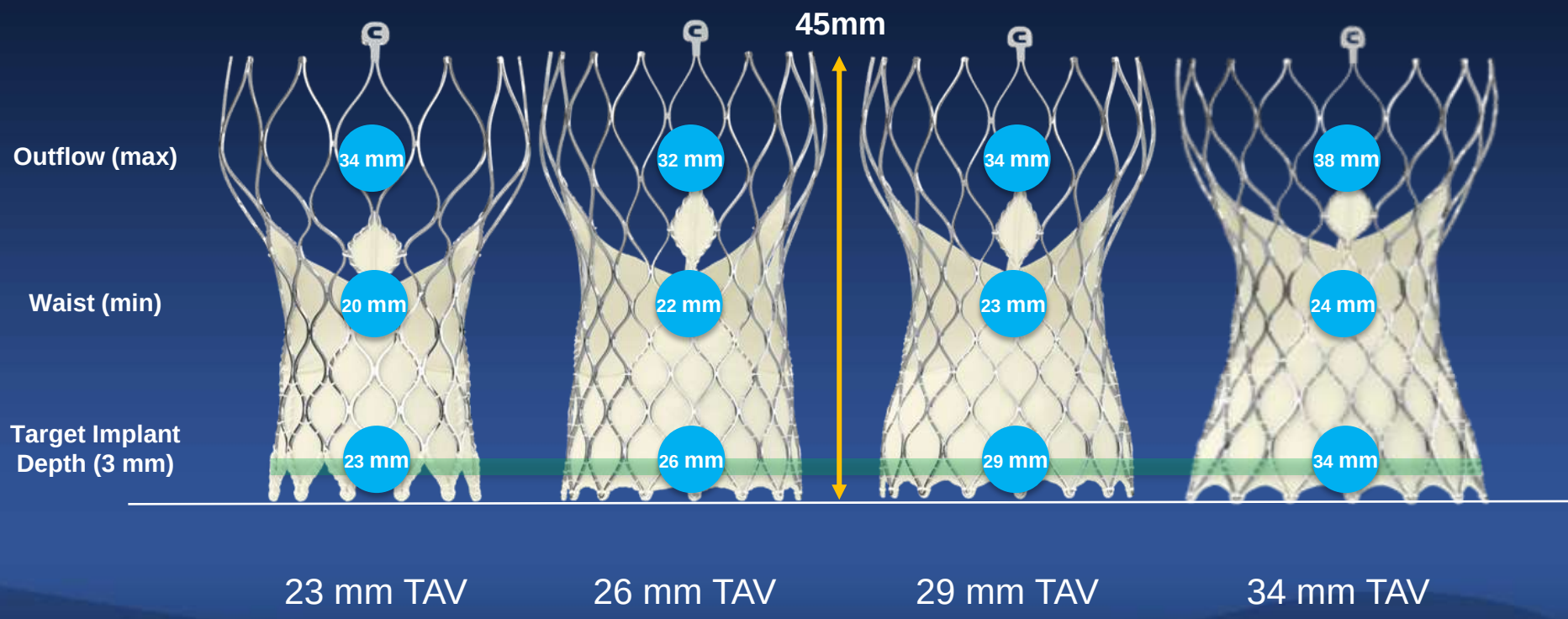




23 mm TAV | 26 mm TAV | 29 mm TAV | 34 mm TAV

Dimension and Skirt Height

Target implant depth is **3 – 5 mm** for all valve sizes



Device Selection

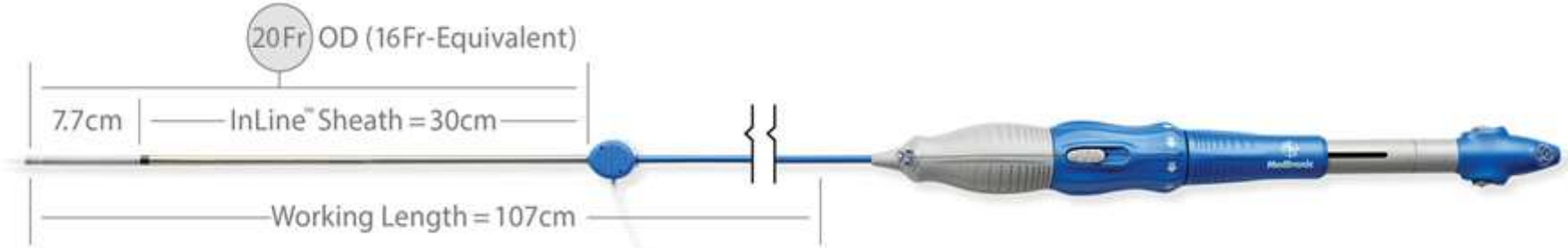
Perimeter Oversize = 20%

Valve Size Selection	Evolut R and PRO TAVs			Evolut R TAV
				
Size	23 mm	26 mm	29 mm	34 mm
Annulus Diameter	17*/18 – 20 mm	20 – 23 mm	23 – 26 mm	26 - 30 mm
Annulus Perimeter (π x Diameter)	53.4*/ 56.5 – 62.8 mm	62.8 – 72.3 mm	72.3 – 81.7 mm	81.7 – 94.2 mm
Sinus of Valsalva Diameter (Mean)	≥ 25 mm	≥ 27 mm	≥ 29 mm	≥ 31 mm
Sinus of Valsalva Height (Mean)	≥ 15 mm			≥ 16 mm

Femoral Access

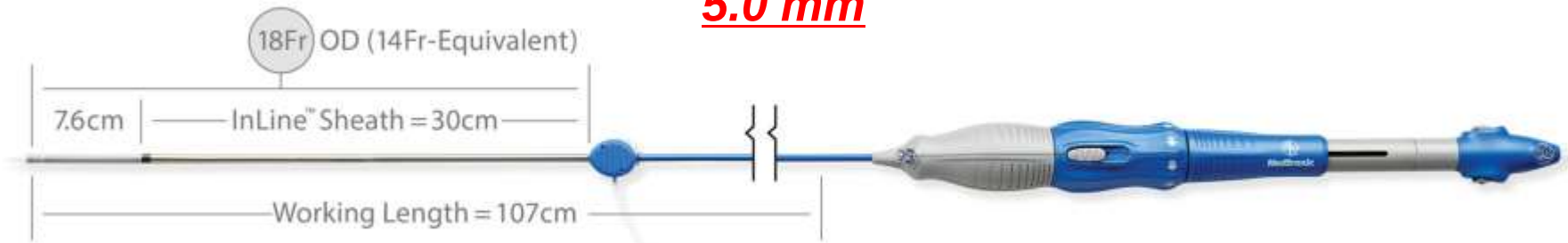
16 Fr Equivalent DCS for Evolut PRO and Evolut R 34 mm TAVs

16Fr-Equivalent system with In-Line Sheath is indicated for vessels down to ***5.5 mm***



14 Fr Equivalent DCS Evolut R 23/26/29 mm TAVs

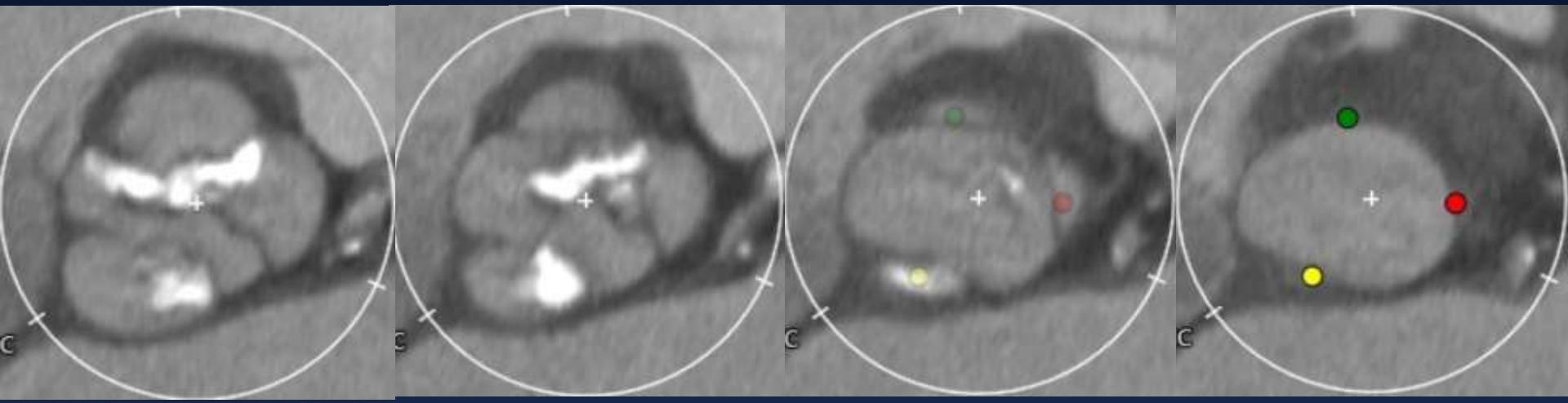
14Fr Equivalent system with In-Line Sheath is indicated for vessels down to ***5.0 mm***



Case 1: Bicuspid AV and Small Access

- 67/M, 162.7 cm, 52.3 kg, BMI 19.76, BSA 1.54
- Chief complaints
  - Chest pain (CCS III)
- Medical history
  - DM on insulin, HTN
  - ESRD on HD via AVF (2016.9.12-)
  - ASO s/p PTA (2010.12)
  - 1VD s/p PCI at RCA (2008.1) : Patent (2017.2)
  - s/p Lt.MCA infarction (2015.2), s/p traumatic EDH (2016.11)
  - Hypothyroidism / s/p total gastrectomy (15YA)
- ECG : NSR
- STS score = 9.977 %, Euroscore I = 45.94 %, Euroscore II = 4.60 %

CT findings – Aortic annulus view



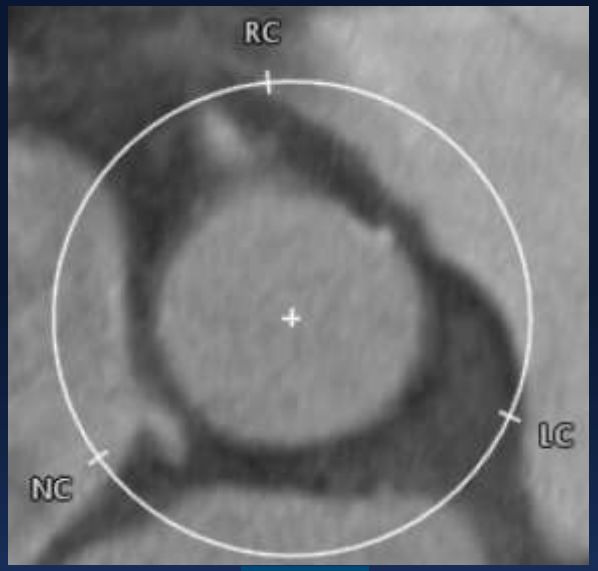
Bicuspid AS with L-R fusion

Annulus plane

Aortic Annulus parameters	
Annulus short diameter	20.2 mm
Annulus long diameter	28.0 mm
Annululs mean diameter	24.1 mm
Annulus area	452 mm^2
Annulus area-driven diameter	24.0 mm
Annulus perimeter	77.6 mm
Annulus perimeter-driven diameter	24.7 mm

CT findings – Aortic Valve Complex

Sinus of Valsalva

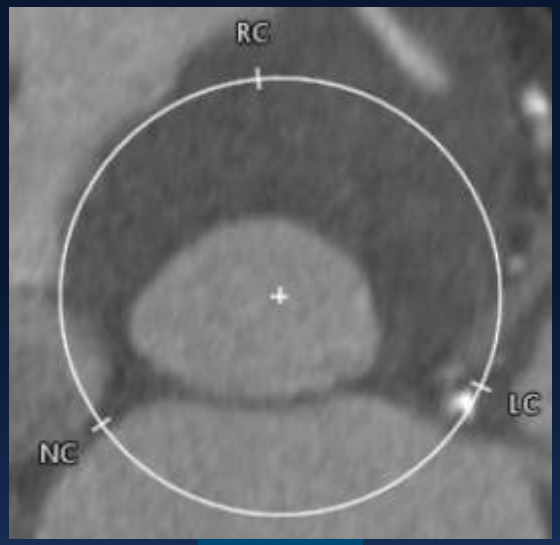


STJ

Sinus of Valsalva		STJ	
Area	838 mm^2	Area	565 mm^2
Sinus / Annulus Area Ratio	1.85	STJ/ Annulus Area Ratio	1.25
NCC diameter	34.9 mm	Mean diameter	26.9 mm
LCC diameter	31.7 mm		
RCC diameter	29.7 mm		

Mean Sinus / Annulus Area Ratio 1.83 ± 0.27 **Mean STJ / Annulus Area Ratio** 1.49 ± 0.29

CT findings – Aortic Valve Complex

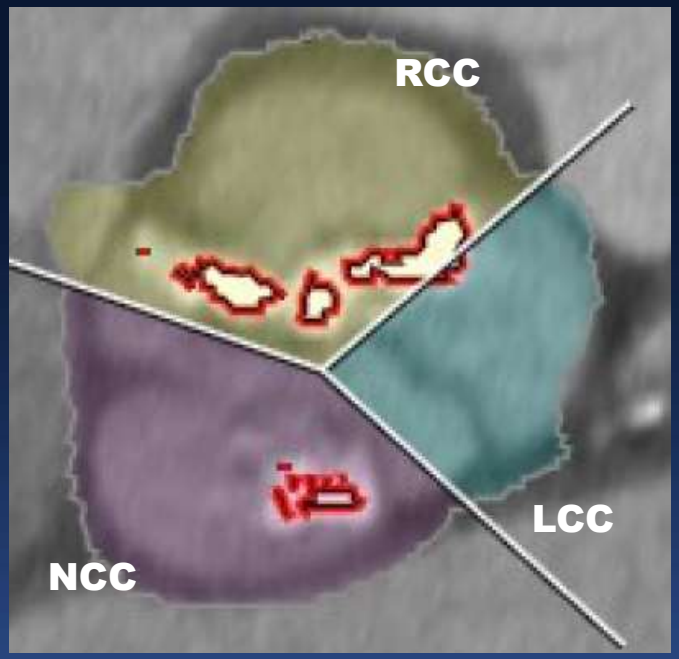


LVOT

LVOT	
Area	446 mm^2
LVOT / Annulus Area Ratio	0.99
Short diameter	20.0 mm
Long diameter	28.3 mm

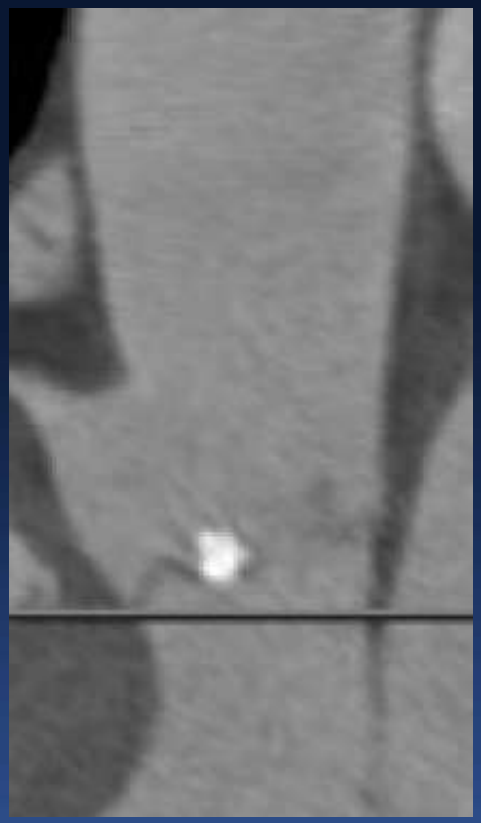
Mean LVOT / Annulus Area Ratio **0.95 ± 0.12**

CT findings – Aortic Valve Complex



Calcium volume	
NCC	62 mm^3
RCC	267 mm^3
LCC	15 mm^3
Total	343 mm^3

CT findings – Coronary Height



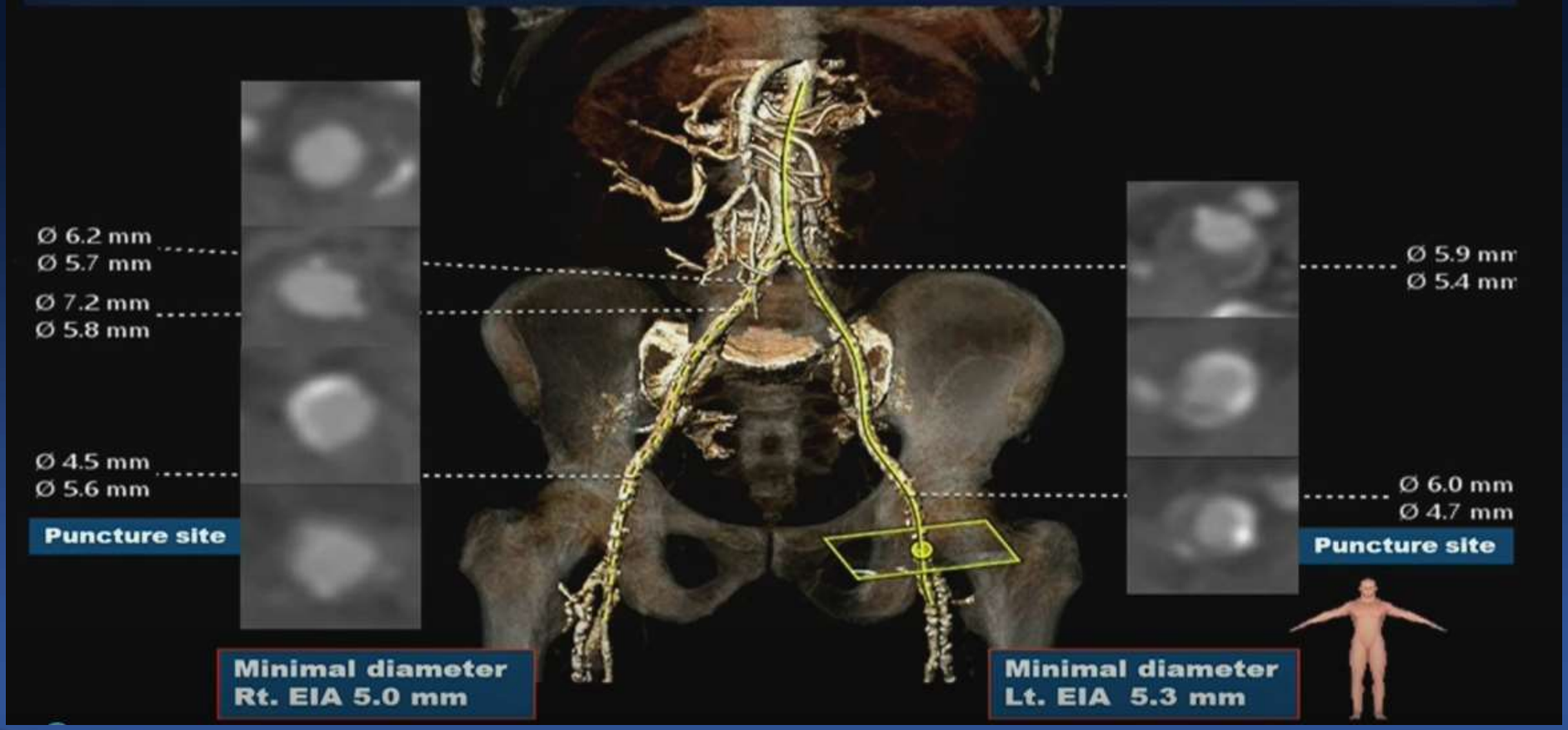
Coronary Height	
LCA	11.4 mm
RCA	18.1 mm

Sizing for Evolut R

Size	Area_oversize (%)	Perimeter_oversize (%)
23	91.9	93.1
24	100.0	97.1
25	108.5	101.2
26	117.4	105.2
27	126.6	109.3
28	136.2	113.3
29	146.1	117.3

Live Case Briefing

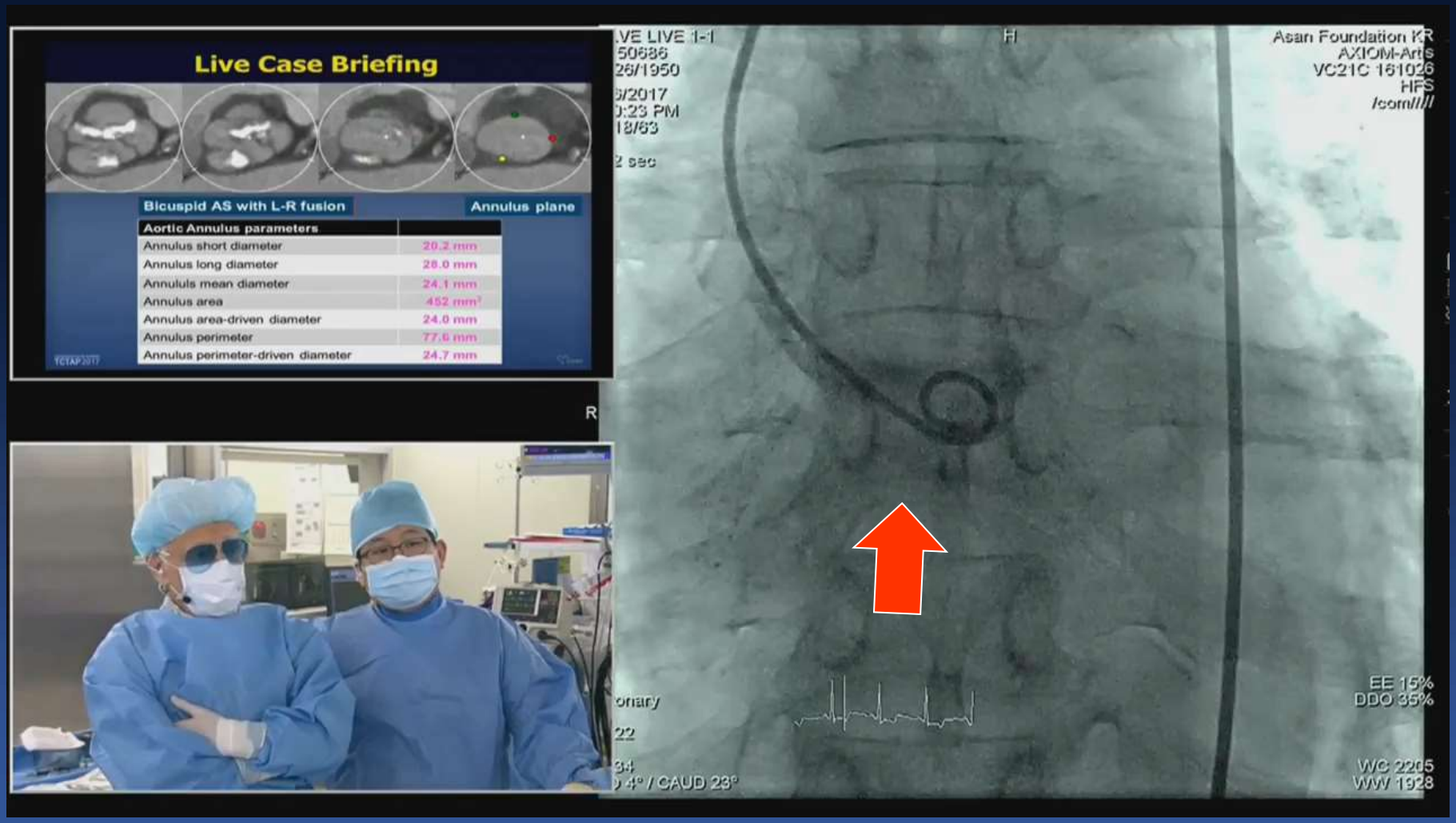
CT findings – Ileofemoral Angio



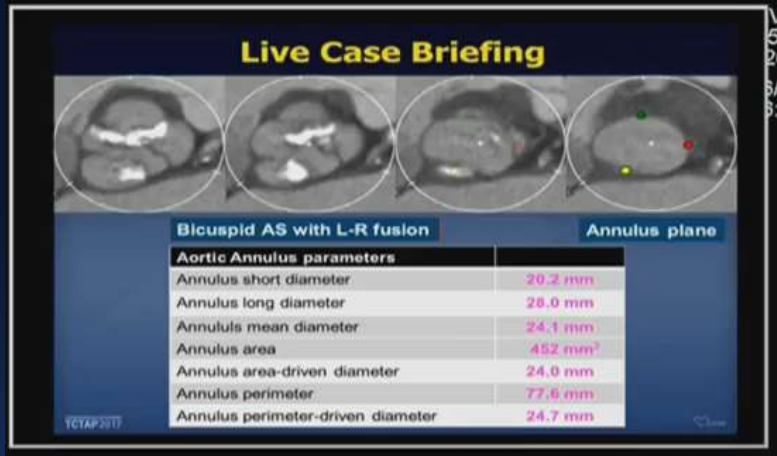
Procedural Plan

1) General Anesthesia
2) Rt. Side 14F Sheath for BAV
3) Balloon Sizing With 18mm Balloon
4) Valve Delivery Using InLine Sheath

Place Reference Pigtail Catheter In NCC



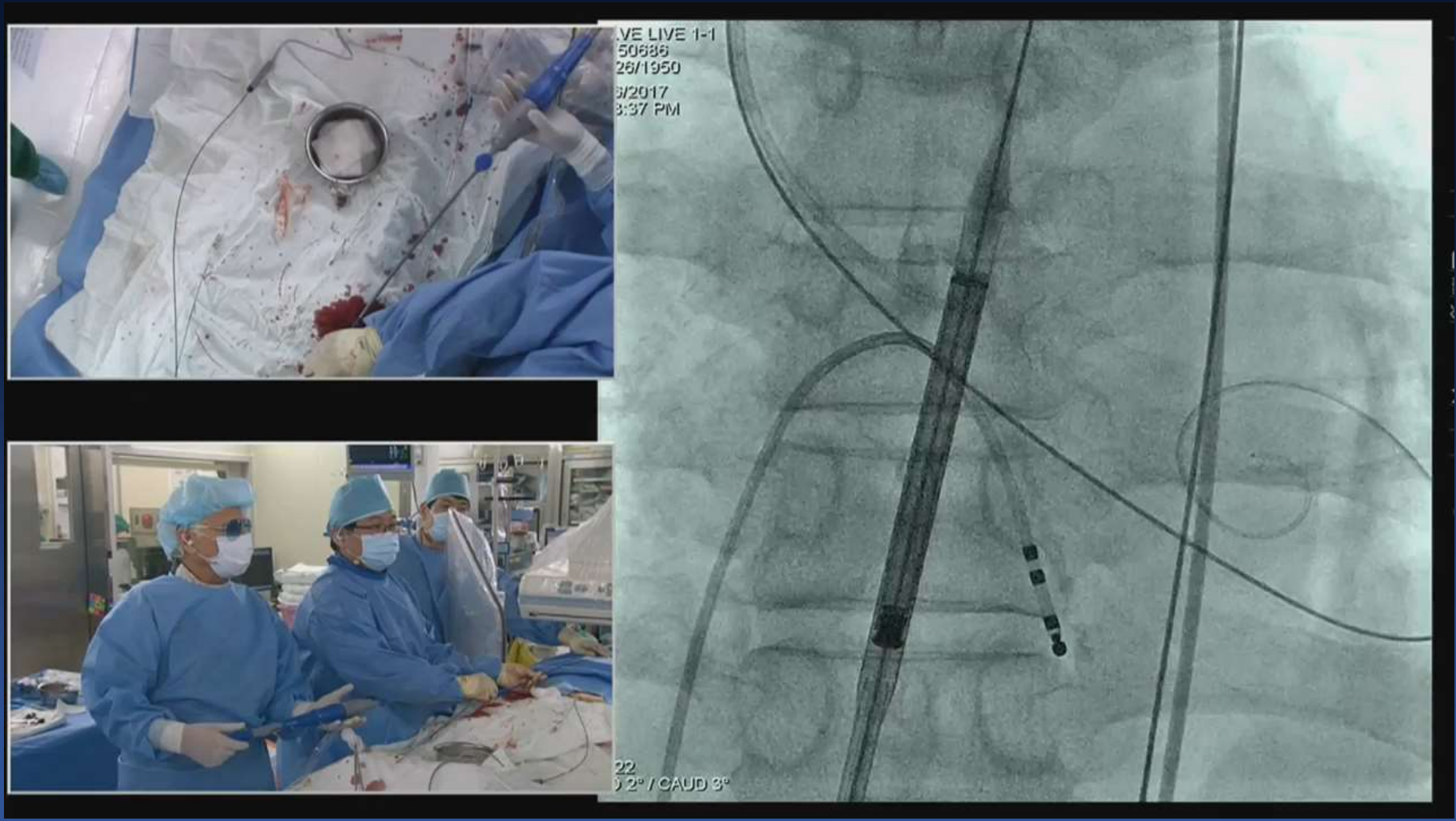
Crossing the Aortic Valve



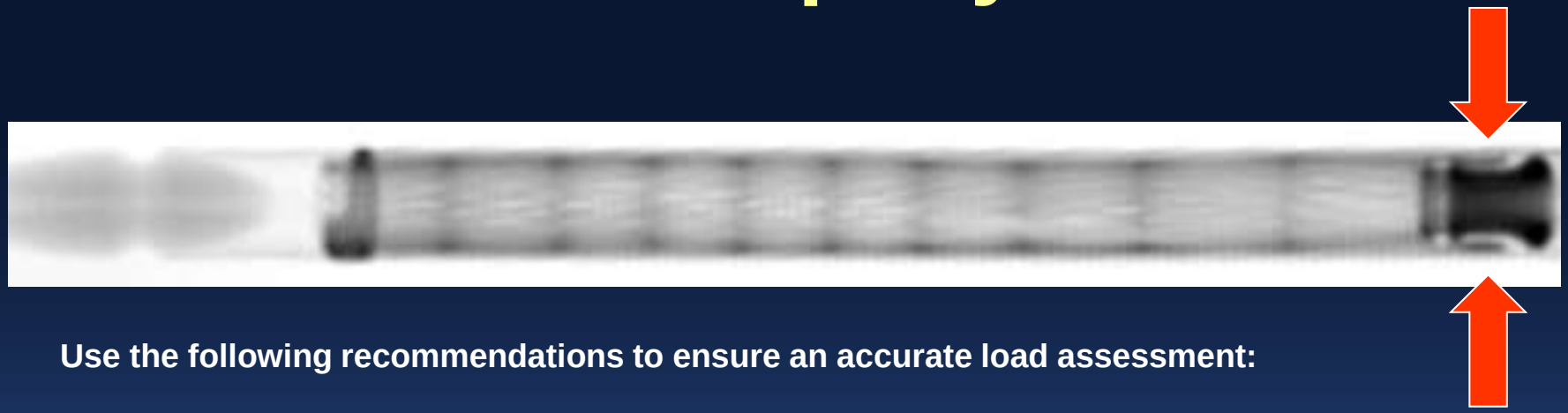
VE LIVE 1-1
50686
26/1950
6/2017
6:46 PM

22
3° / CAUD 23°

Fluoro Load Inspection



Fluoro Load Inspection:
Paddles Properly Seated



Use the following recommendations to ensure an accurate load assessment:

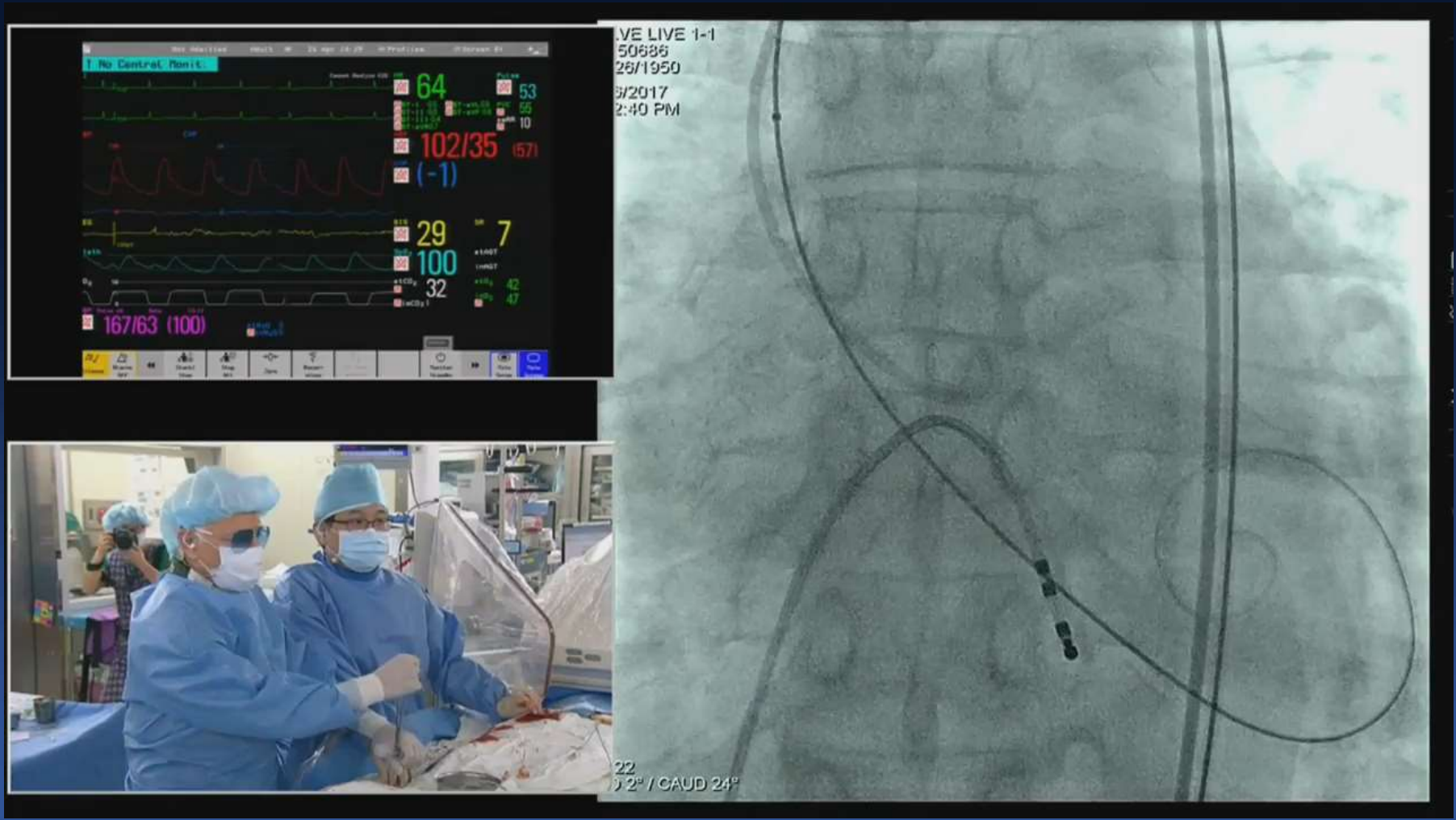
Imaging Projection:

- **AP projection**
- **High magnification**
- **Low resolution to locate paddles**
- **High resolution (30 FPS) for load check**

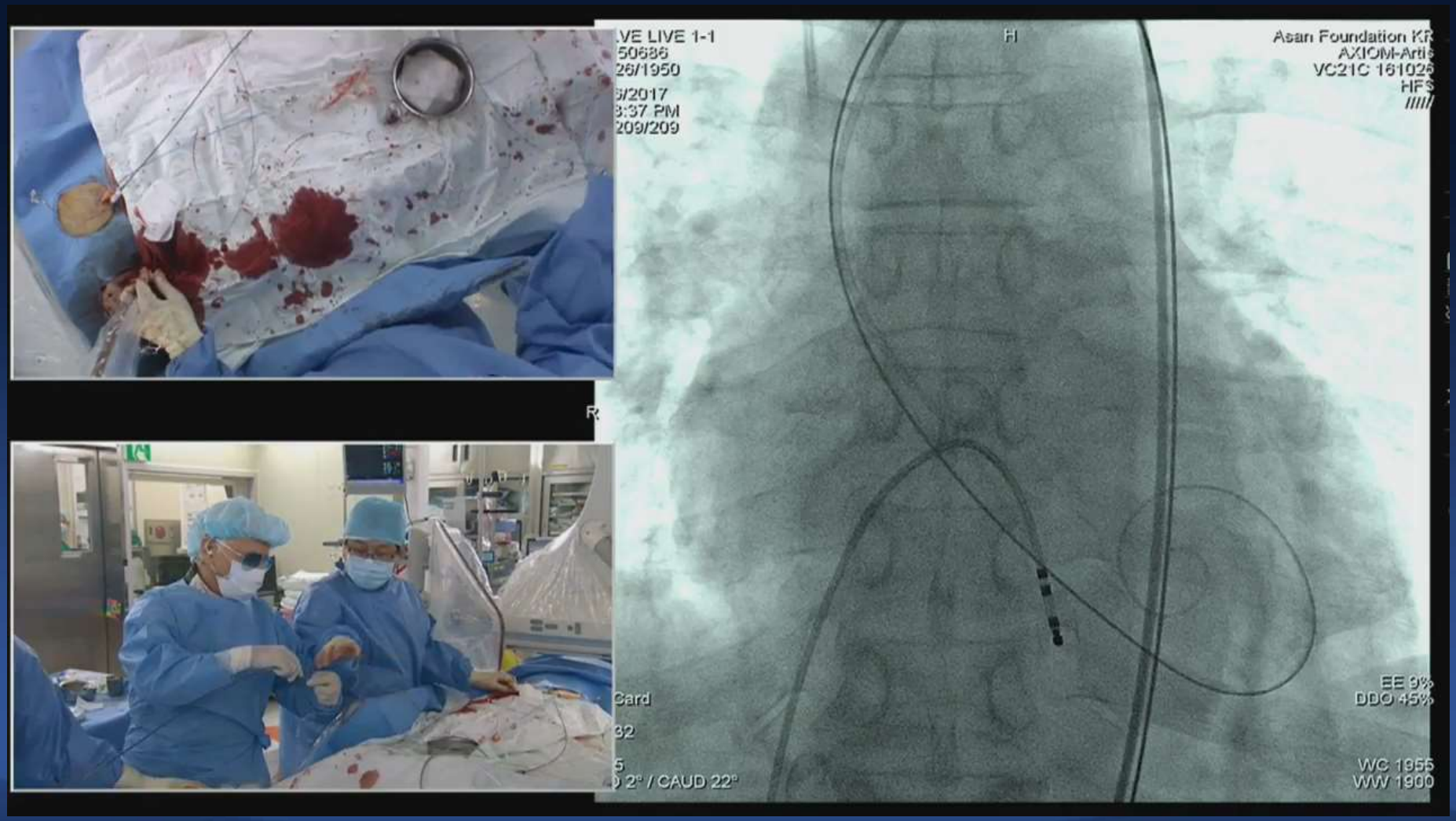
Delivery System:

- **Flush ports at 3:00/9:00**
- **Capsule flat on table or patient**
- **Rotate delivery system a few degrees in either direction until both paddles are visible simultaneously**

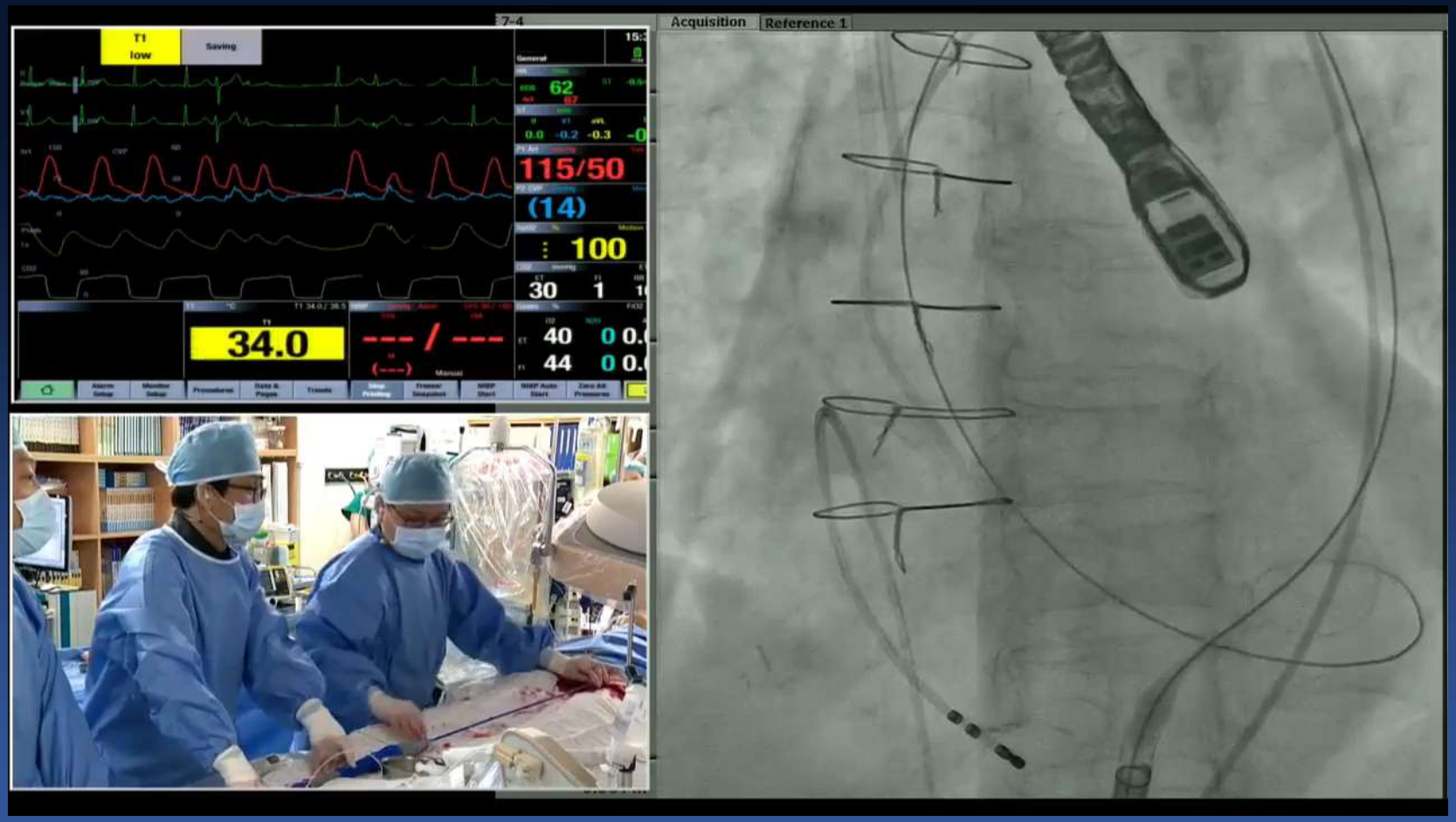
Balloon Aortic Valvuloplasty



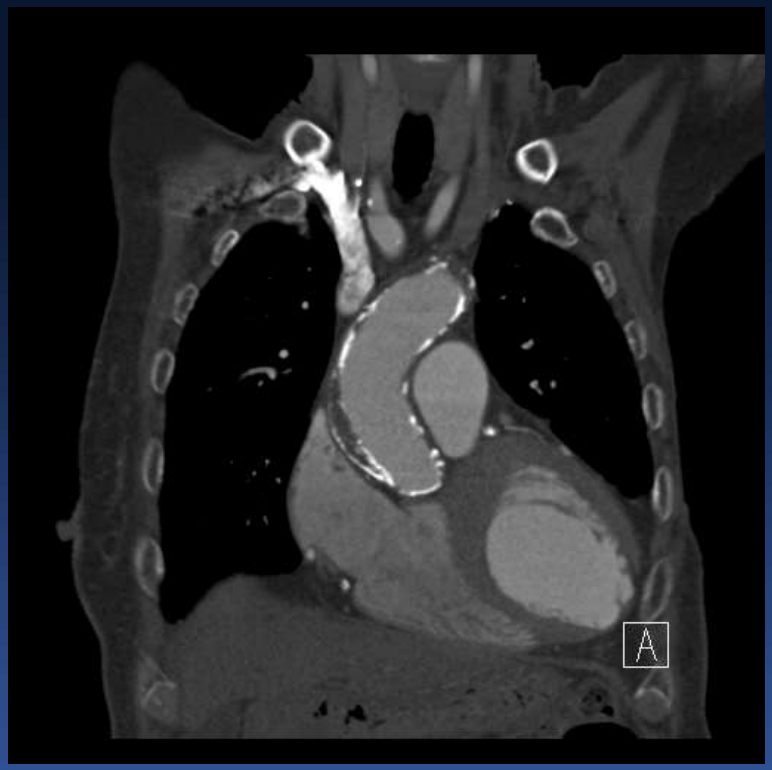
Introduce the Delivery System and Position System Within Native Annulus

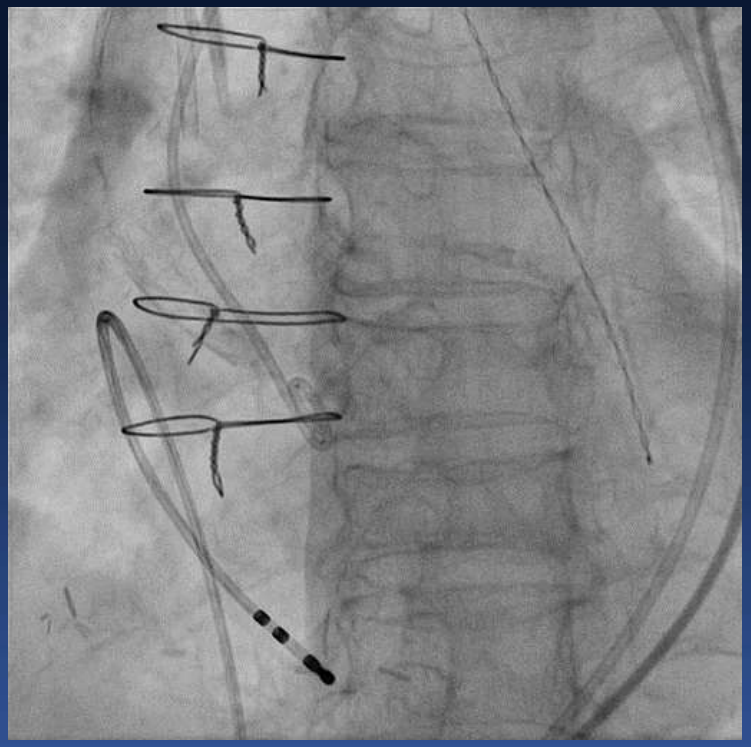


Hard to Deliver the System (I)

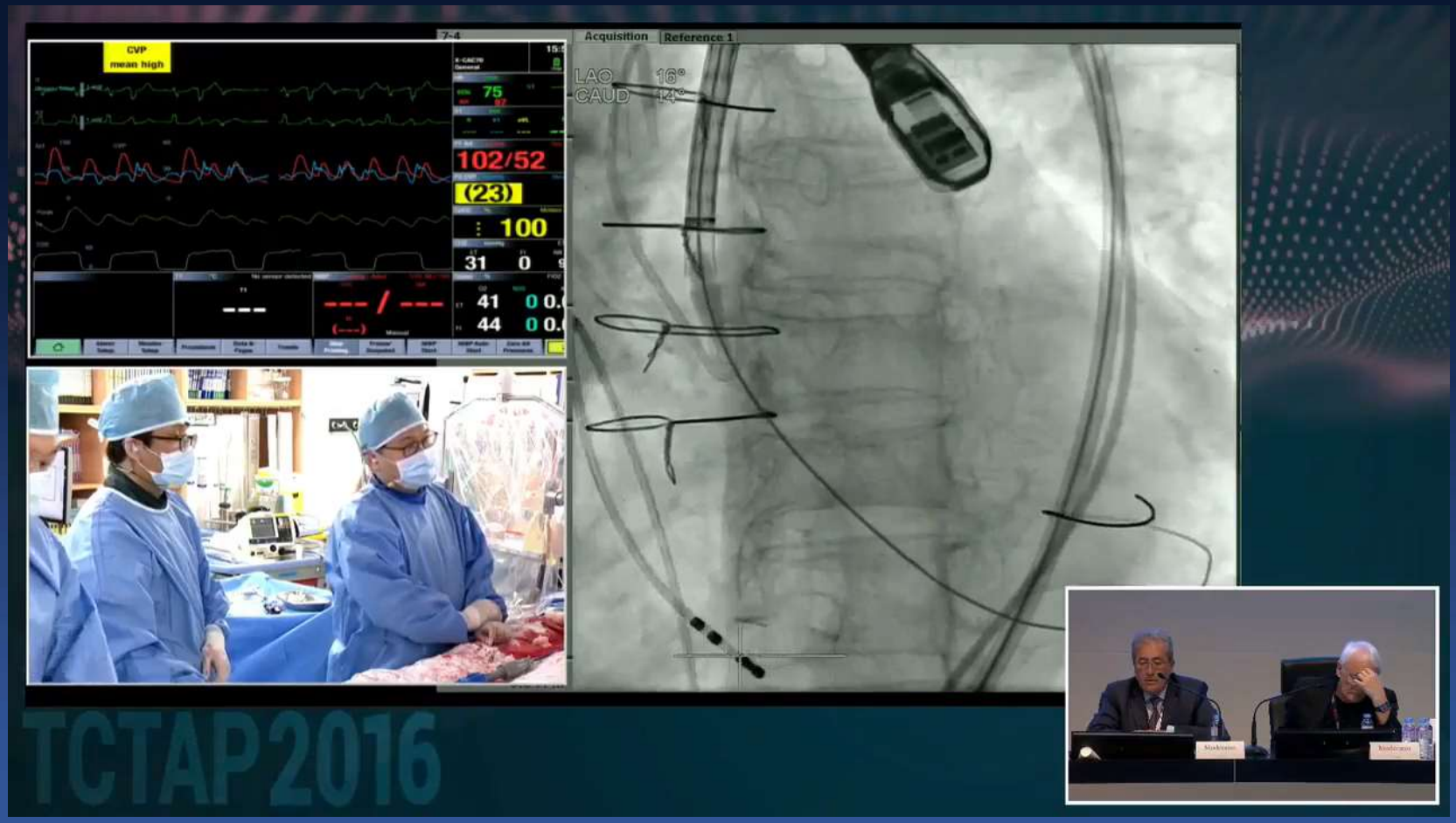


Bone-Like Aorta





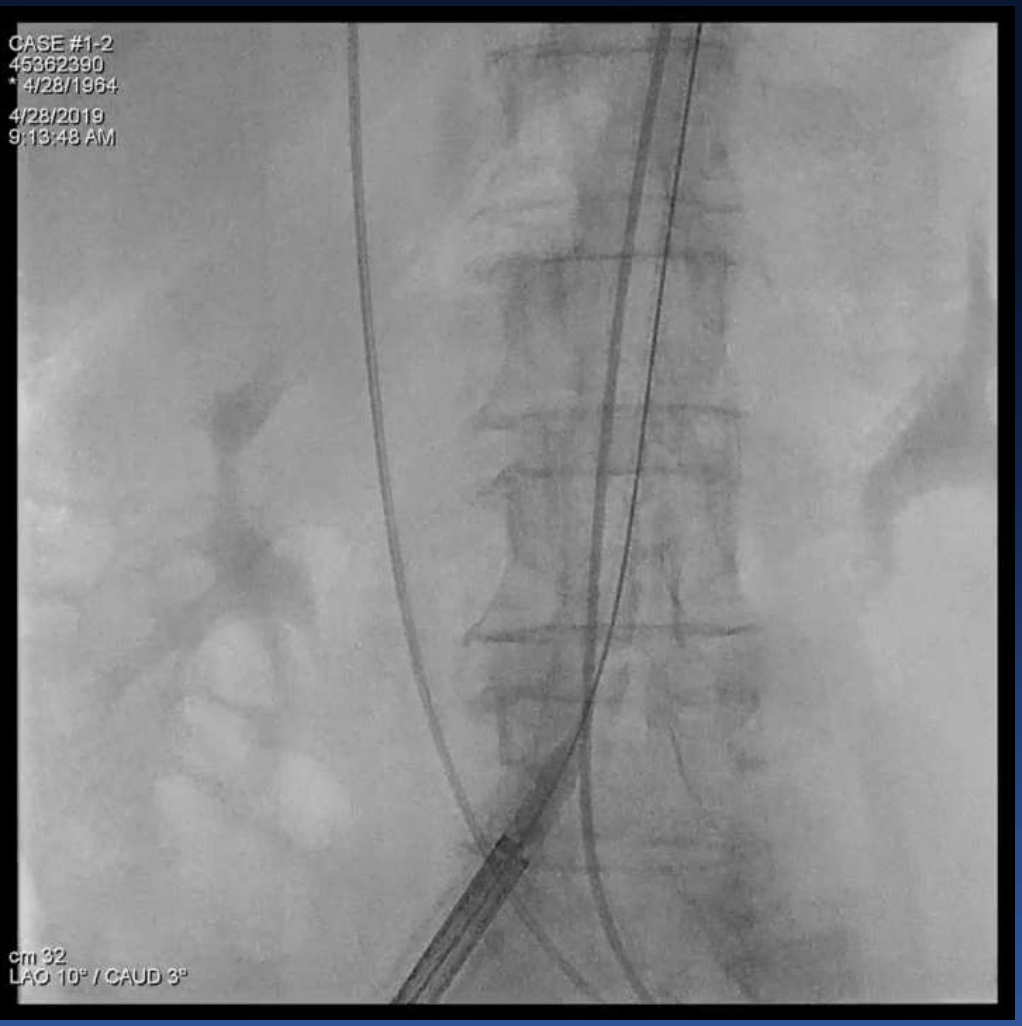
Stiffer Guidewire: Lunderquist



Hard to Deliver the System (II)

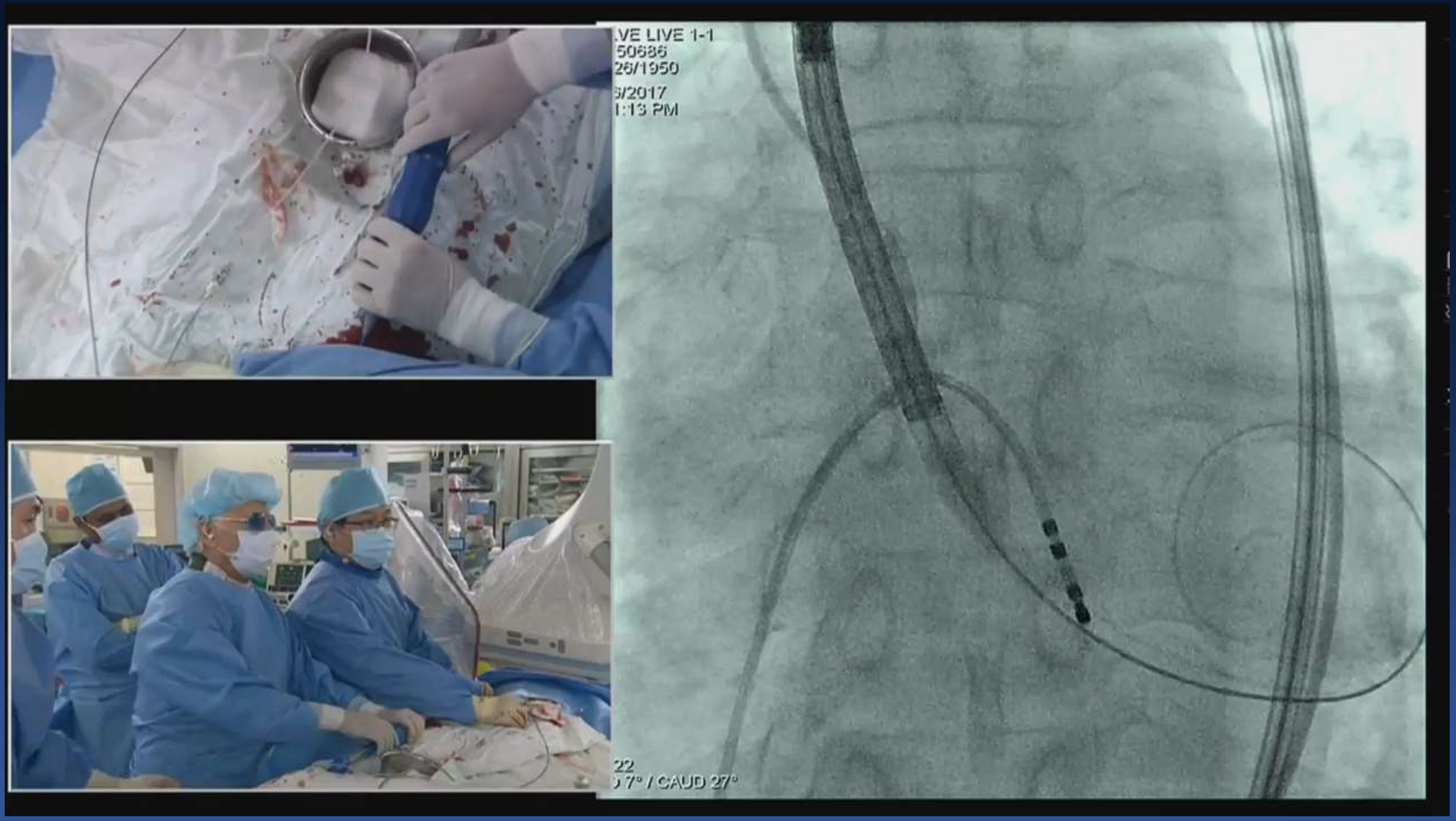
Live Case Briefing
Sizing for Evolut Pro

Size	Area_oversize (%)	Perimeter_oversize (%)
23	136.7	114.8
24	148.9	119.8
25	161.5	124.8
26	174.7	129.8
27	188.4	134.8
28	202.6	139.8
29	217.4	144.8



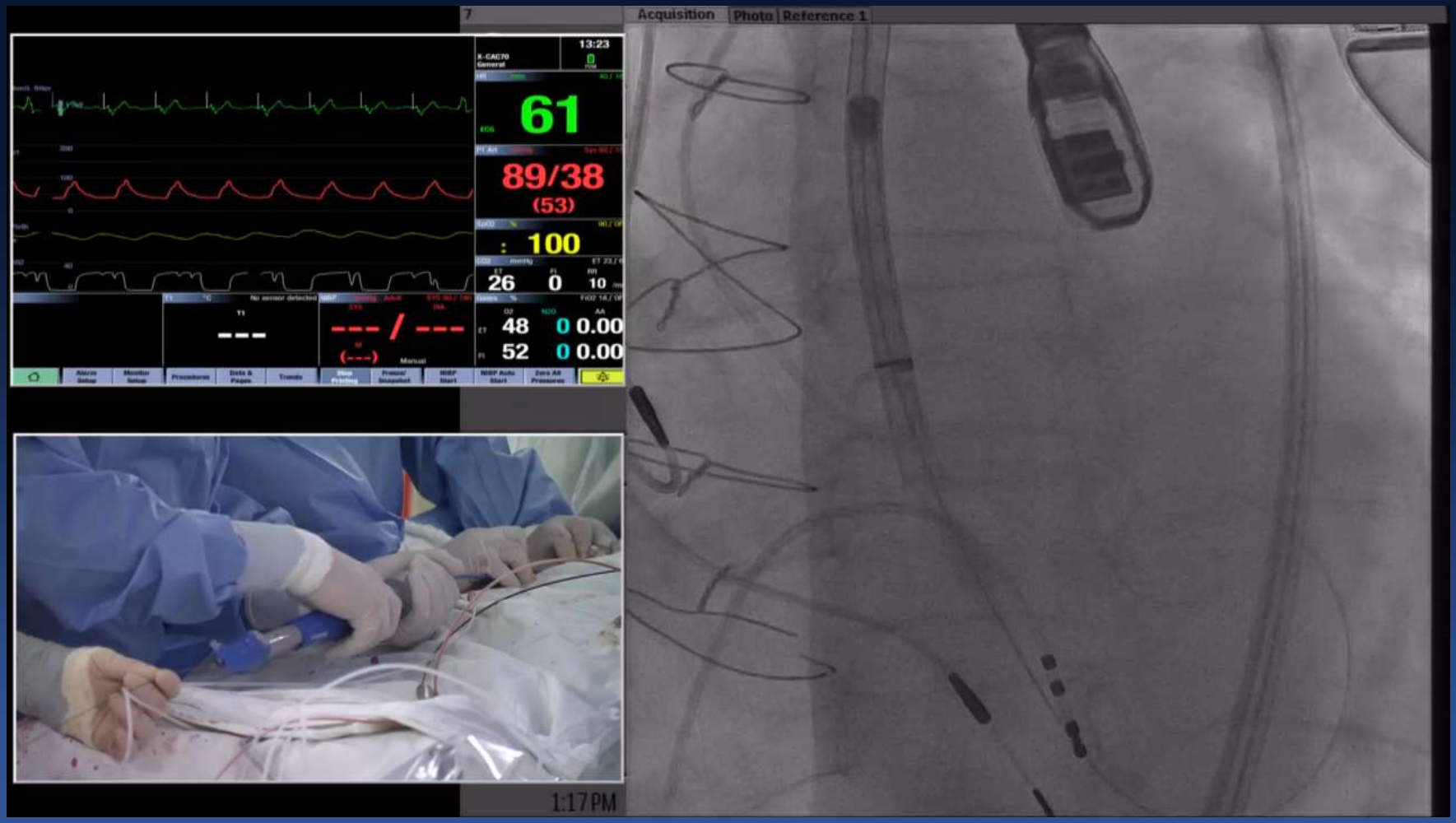
Evolut Pro; bigger than R

Deployment

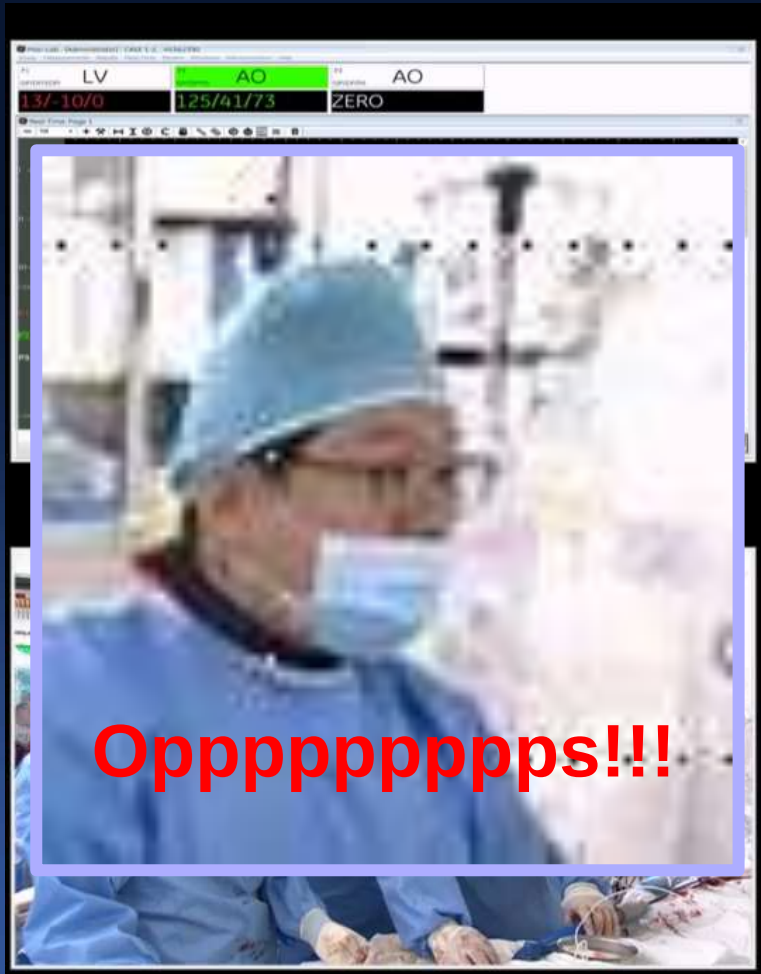


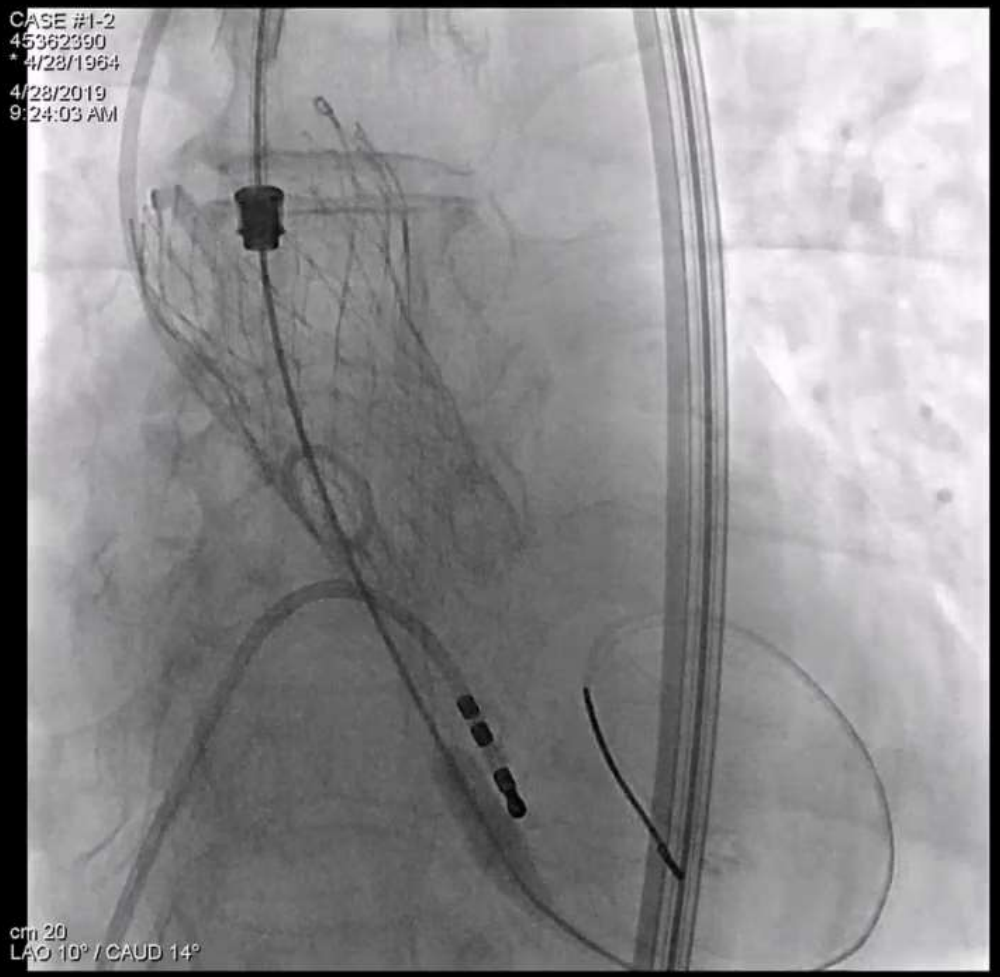
Unstable Valve Placement

Controlled Pacing



Nose-Cone, Be careful !!





Nose-Cone, Be careful !!

Low Coronary Height

- Tapered shape of the frame
- If needed, coronary access can be achieved through the struts of the frame
- Can be completely recaptured in an emergency situation

Case 2

- 79/F, 151.5 cm, 54.15 kg, BMI 23.59, BSA 1.51
- Chief complaints
  - Dyspnea on exertion
- Medical history
  - DM, atrial fibrillation
  - 2003.3.14 AVR (Prima Plus 21mm subcoronary implantation), MVR (CE 25mm), ASD direct closure
  - 2009.1.23 redo MVR (SJ 25mm)
- ECG : Atrial fibrillation
- Serum Cr : 0.66 (GFR 84)
- STS score = 4.604 %
- Euroscore I = 17.10 %, Euroscore II = 4.75 %

Echo findings

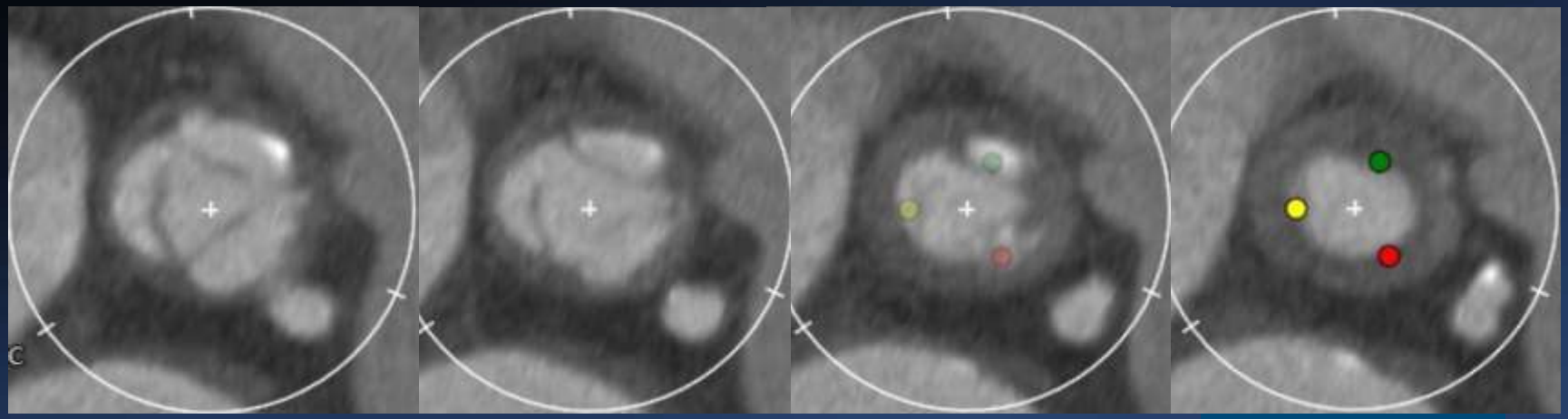
- Degenerative stenosis of prosthetic aortic tissue valve
- AVA (Doppler) = 0.50 cm^2
- Peak / Mean PG = 89 / 51 mm Hg
- V max = 4.7 m/s
- EF= 58 %
- Moderate AR, Mild TR, Trivial MR
- Severe degenerative stenosis of prosthetic aortic tissue valve with at least moderate AR
- Well functioning prosthetic mitral mechanical valve
- Ascending aorta dilation (tubular portion 48 mm)

Prima Root 21 mm bioprosthetic AV

Stent-less tissue valve with LM & RCA ostia in the graft

Side view **View from above** **View from below**

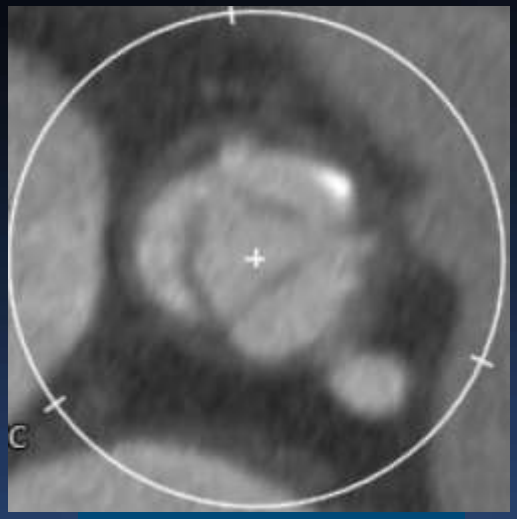
Small ID of the failed surgical valve = 14 mm



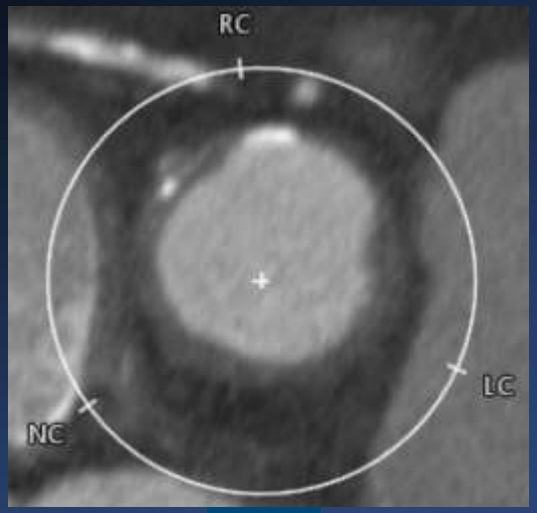
Annulus plane

Aortic Annulus parameters (INNER)	
Annulus short diameter	12.9 mm
Annulus long diameter	15.7 mm
Annululs mean diameter	**14.3 mm**
Annulus area	158 mm^2
Annulus area-driven diameter	**14.2 mm**
Annulus perimeter	45 mm
Annulus perimeter-driven diameter	**14.3 mm**

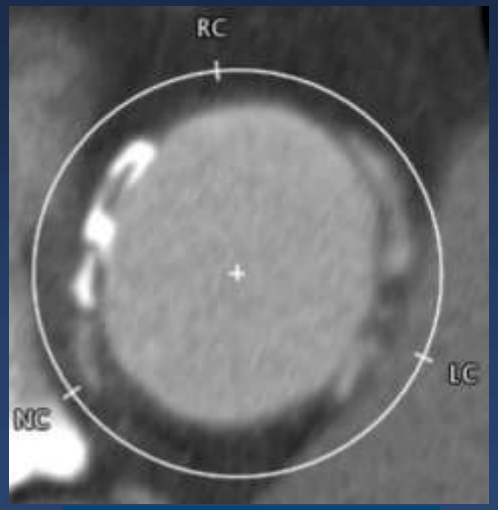
Aortic Valve Apparatus



Sinus of



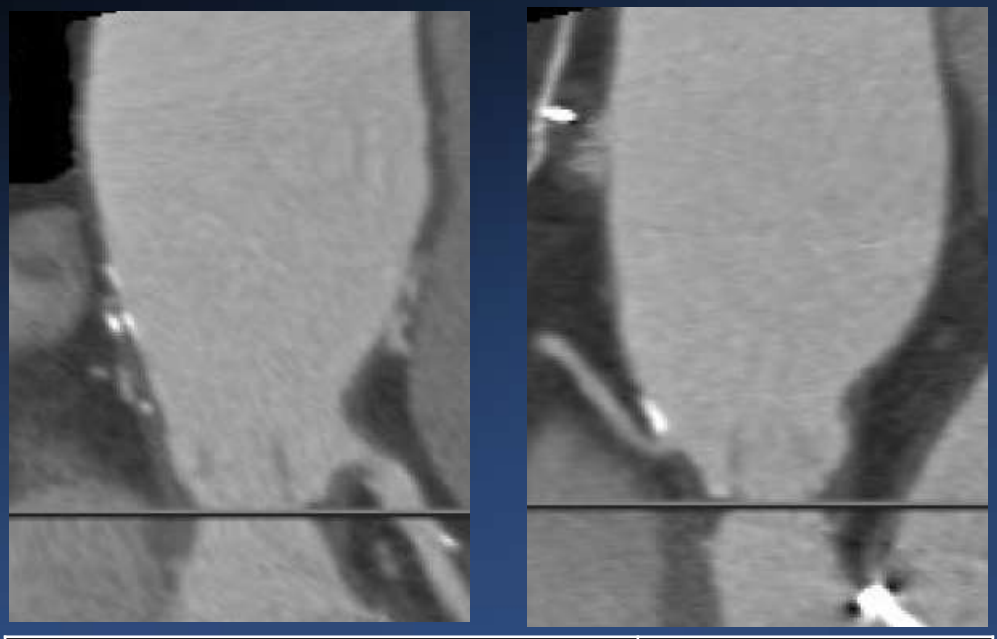
ST



Ascending

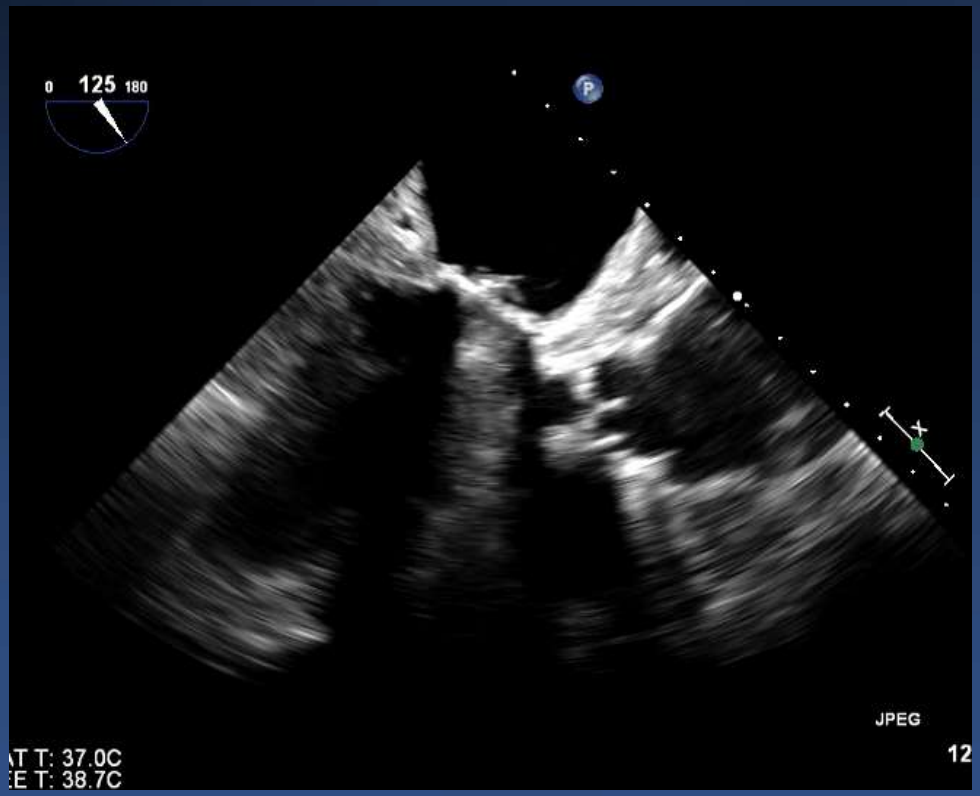
Sinus of Valsalva		STJ		Ascending aorta	
Area	398 mm^2	Area	580 mm^2	Area	1399 mm^2
NCC diameter	22.8 mm	Mean diameter	26.8 mm	Mean diameter	42.2 mm
RCC diameter	20.6 mm				
LCC diameter	20.4 mm				

Low Coronary Height & Shallow Sinus

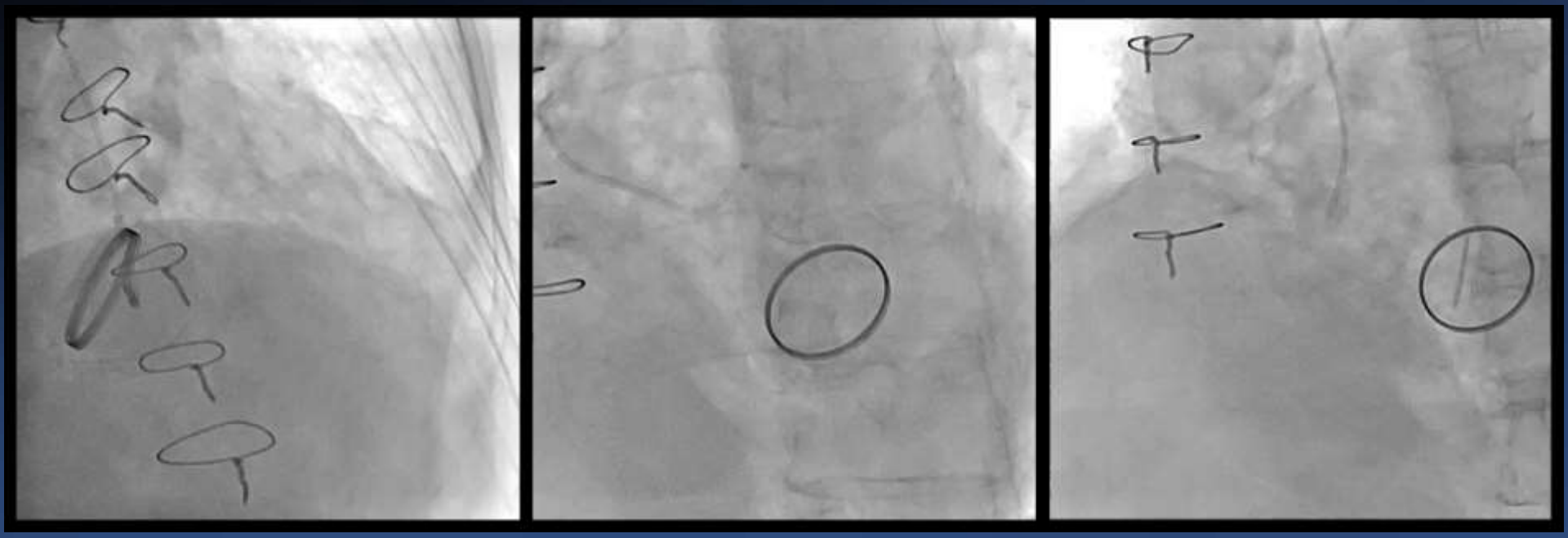


Coronary Height	
LCA	**6.8 mm**
RCA	**7.5 mm**

Mitral Mechanical Valve



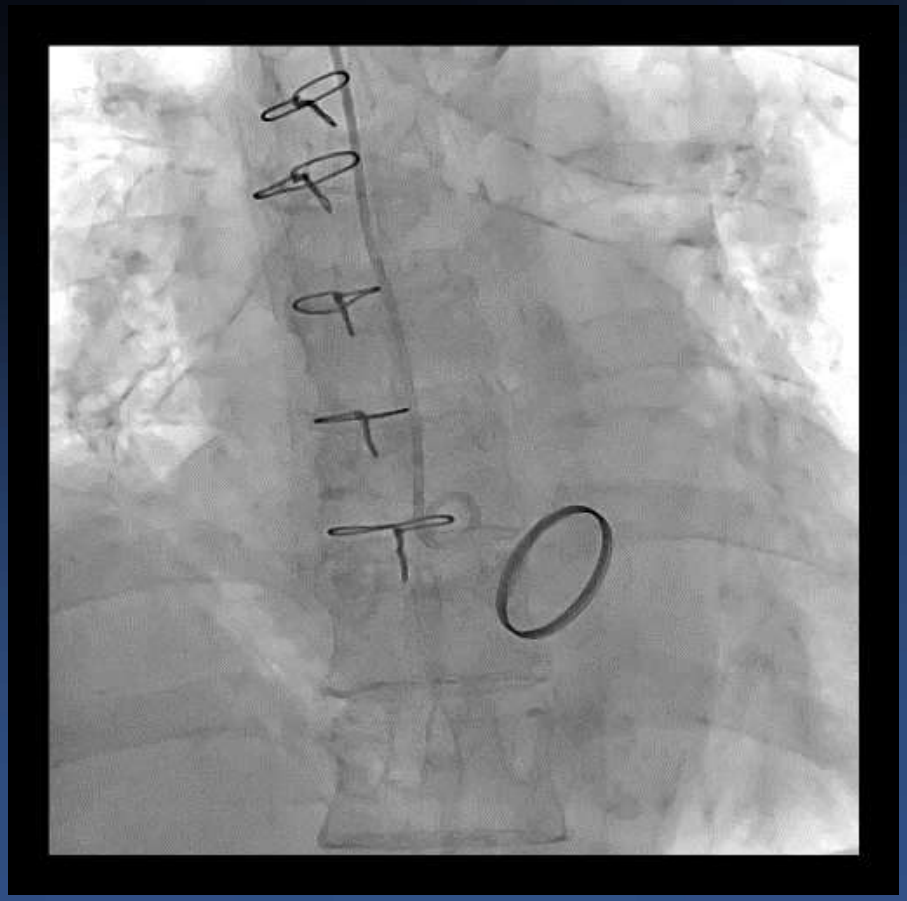
CAG



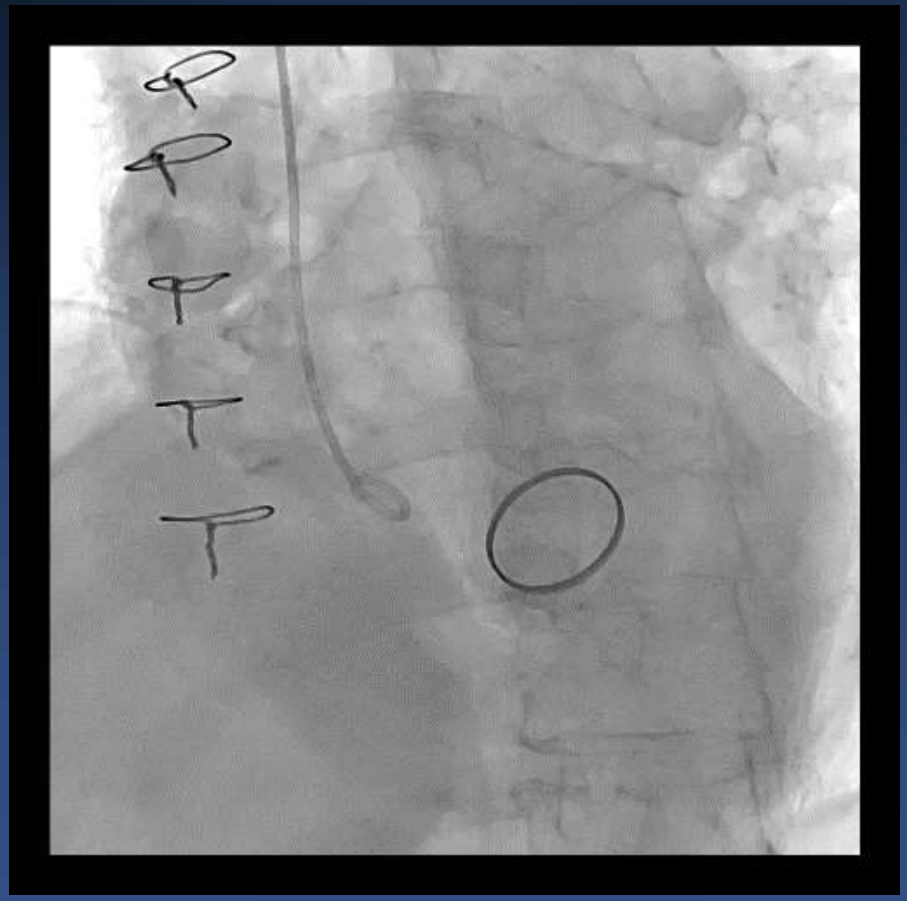
Patent LCA opening

Diminutive RCA

Root Aortography

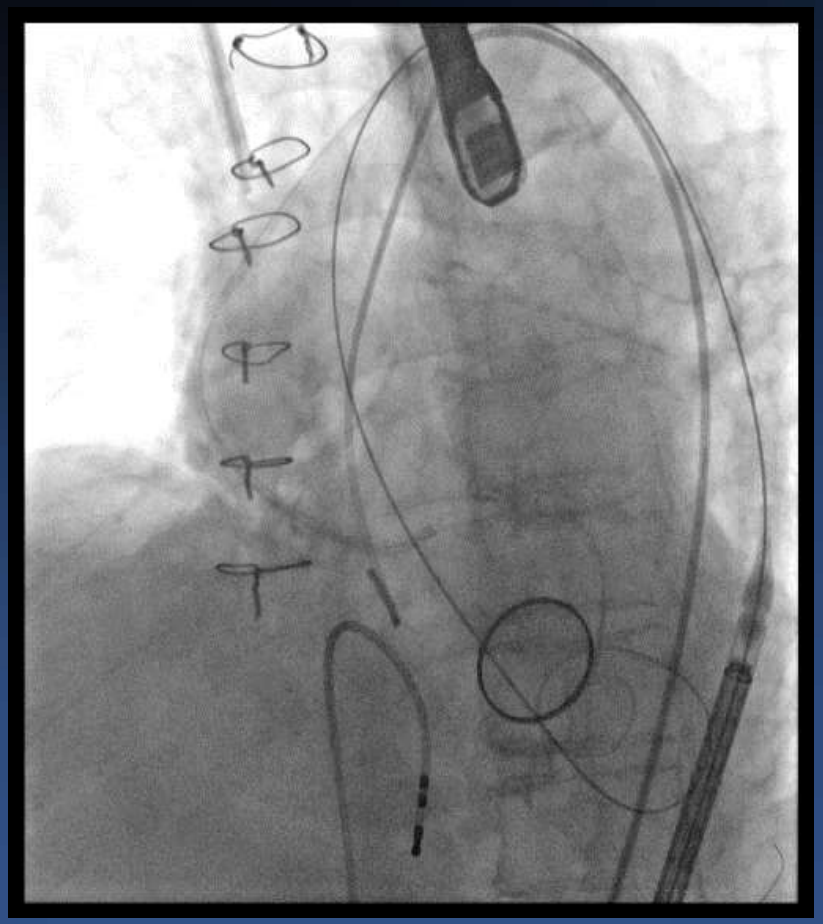


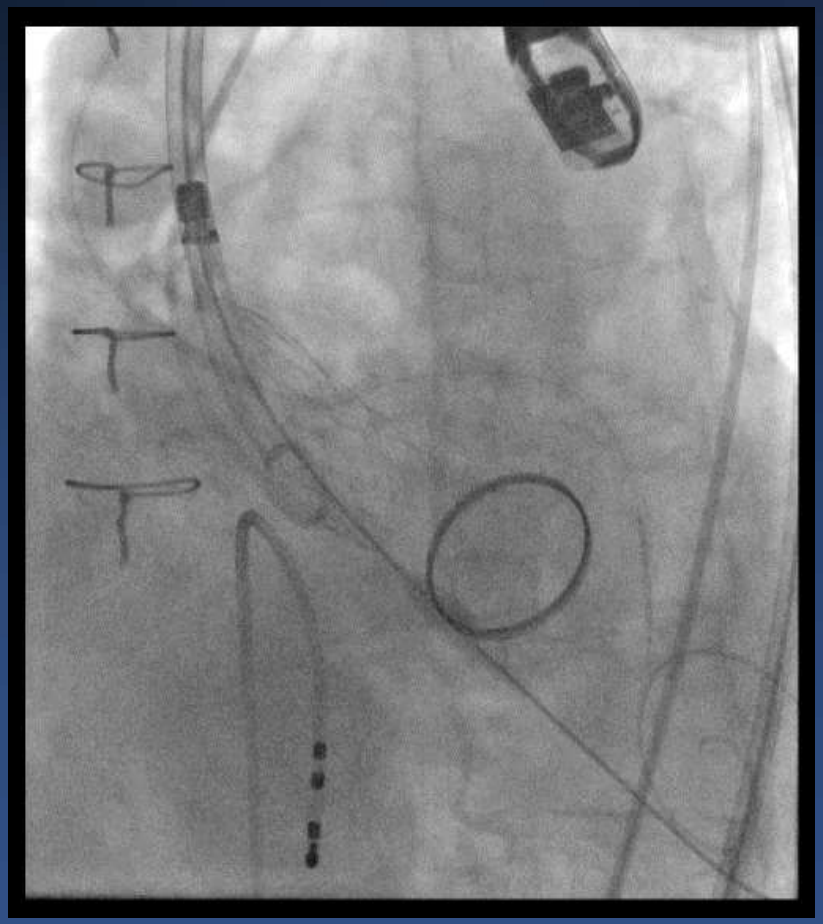
AP



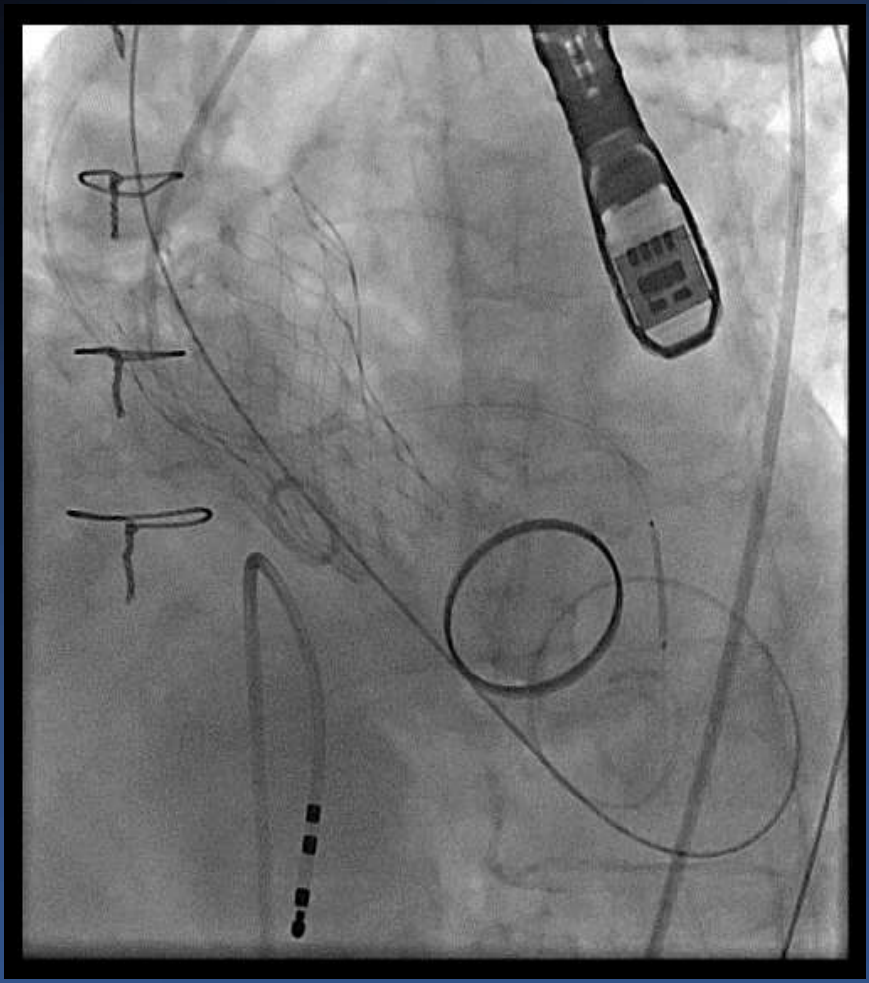
LAO 24 -CRAN 8

TAVR procedure

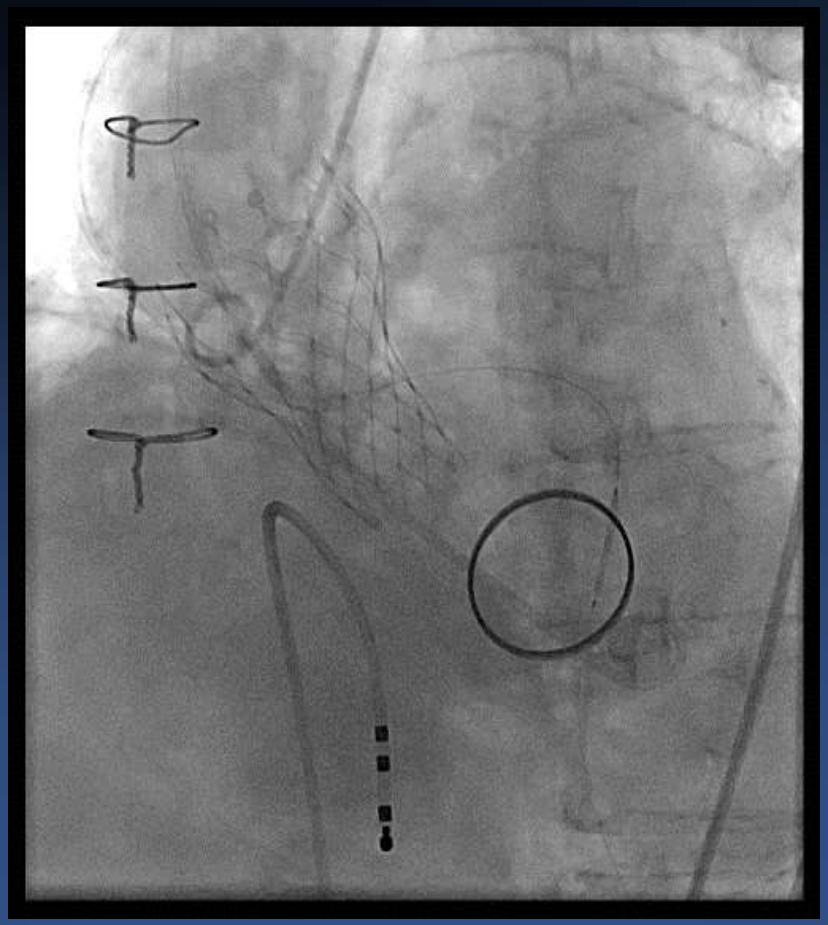


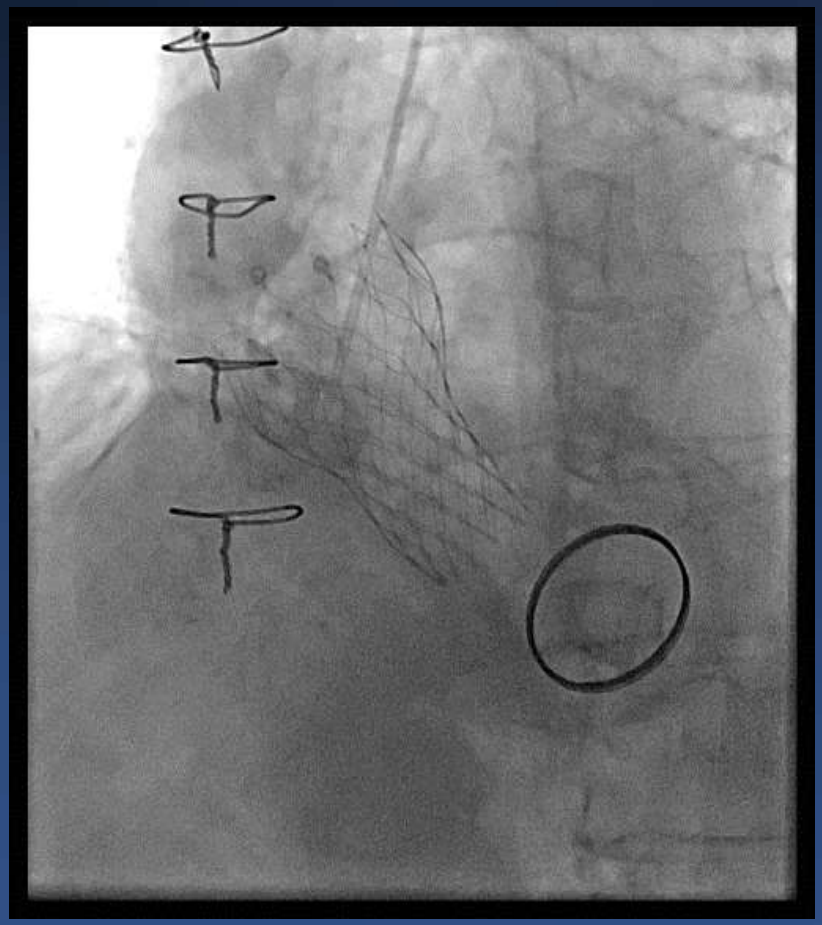


TAVR procedure



TAVR procedure

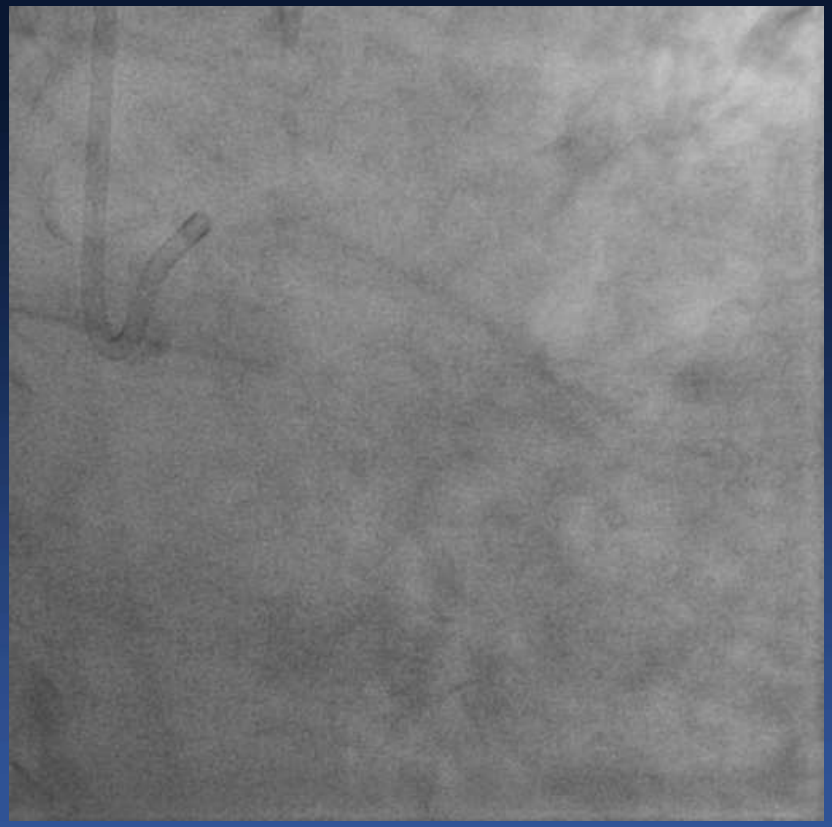




CASE 3

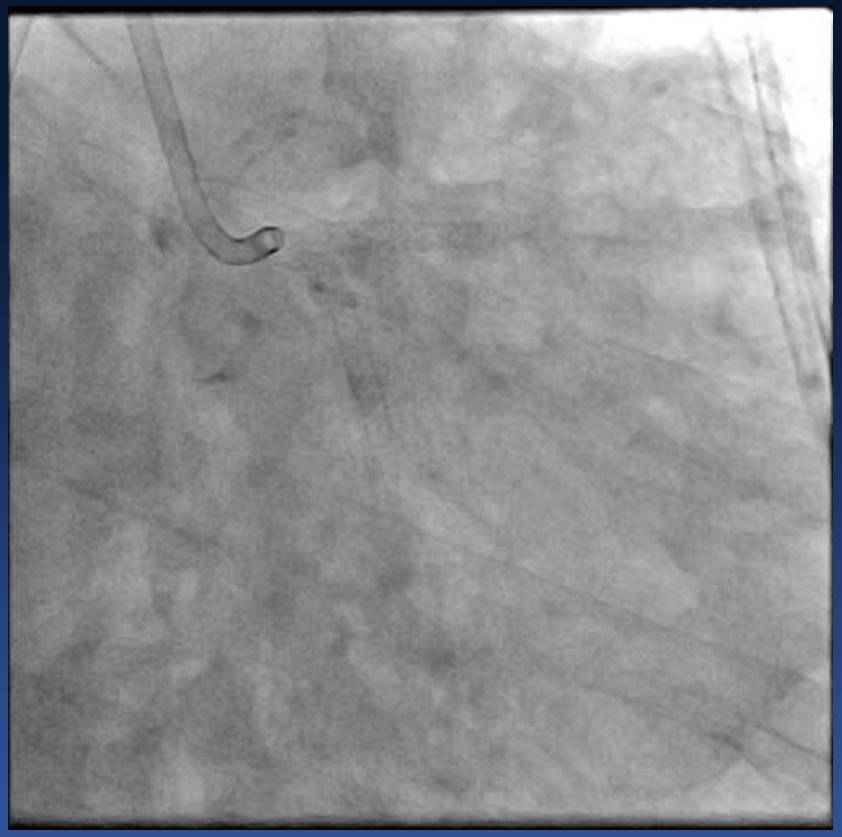
- 78/F
- Effort chest pain
- P/MHx
  DM, HT
  NSTEMI s/p PCI at pLAD, pLCX (‘16.11.25)
  Rt. ICA stenosis
  Severe AS s/p TAVR (’16.11.29)
- STS score 2.359%

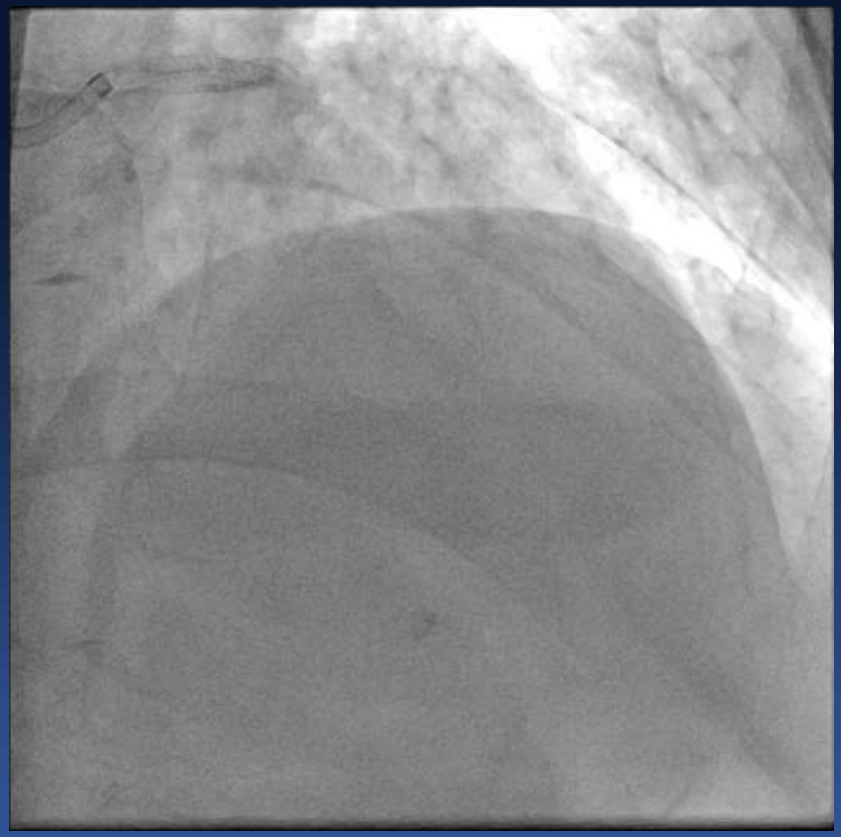
PCI Before TAVR (16.11.25)



Stenosis at LM bifurcation

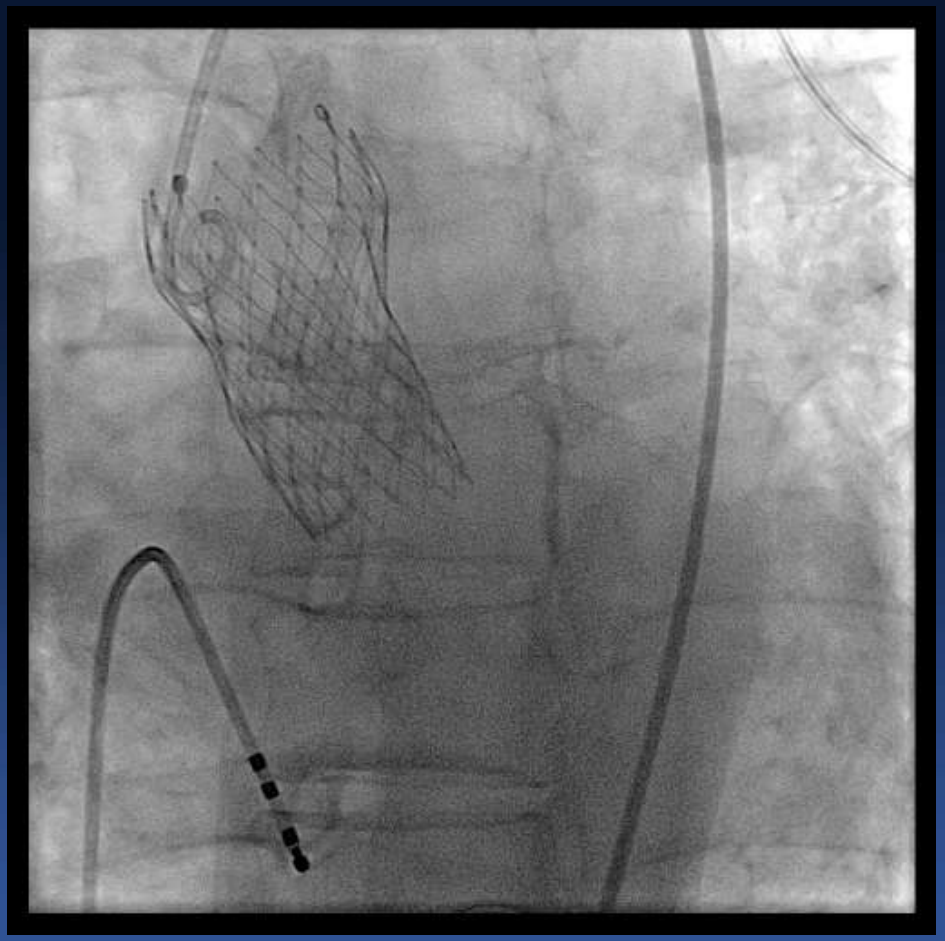
PCI Before TAVR (16.11.25)





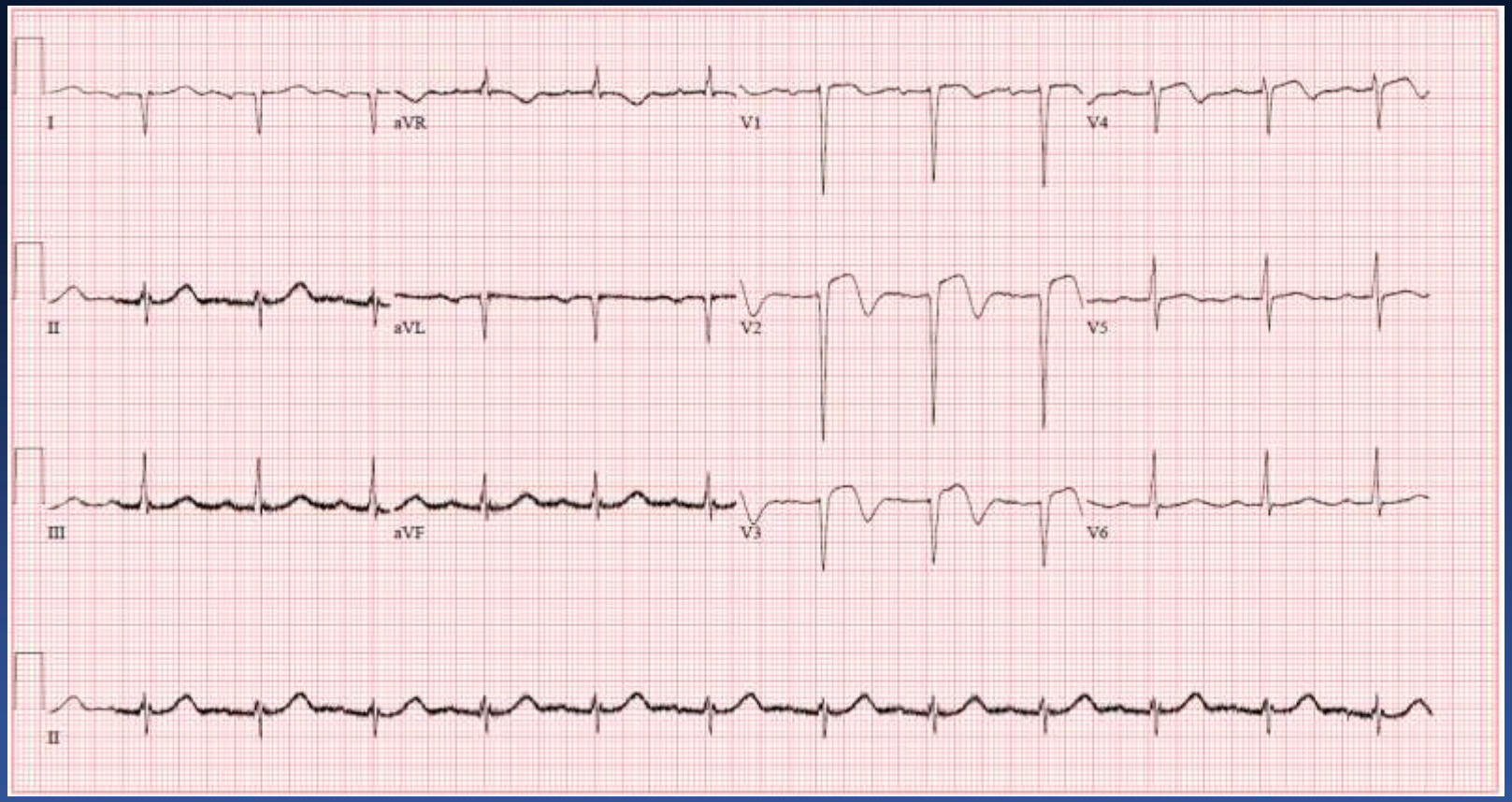
LM-pLAD Xience A 3.0 (28)
pLCX Xience A 2.5 (33)

TAVR ('16.11.29)

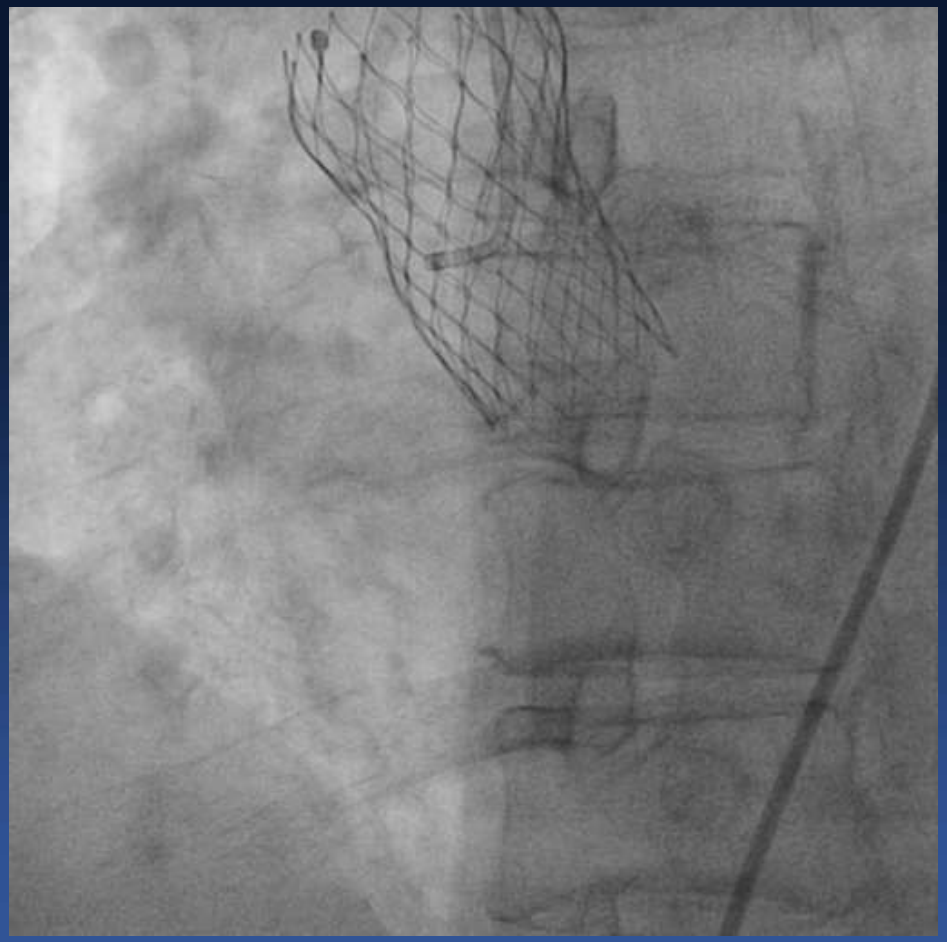


Evolut R 26 mm

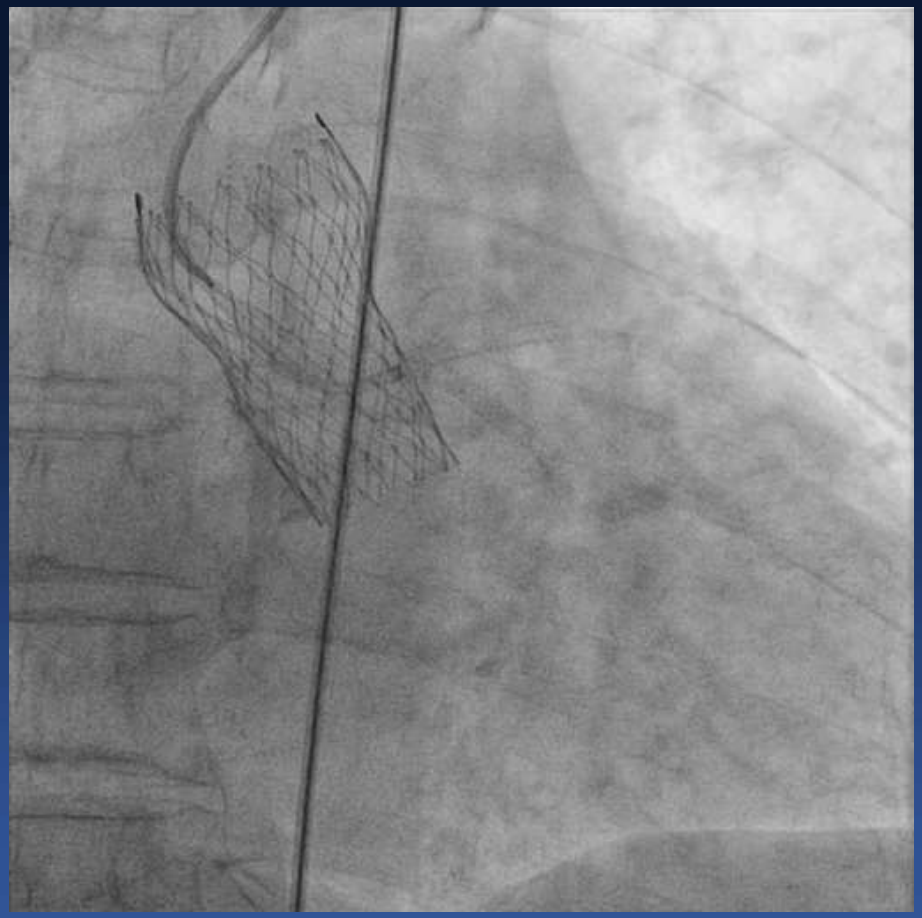
Chest Pain, 1 year later



Coronary angiogram

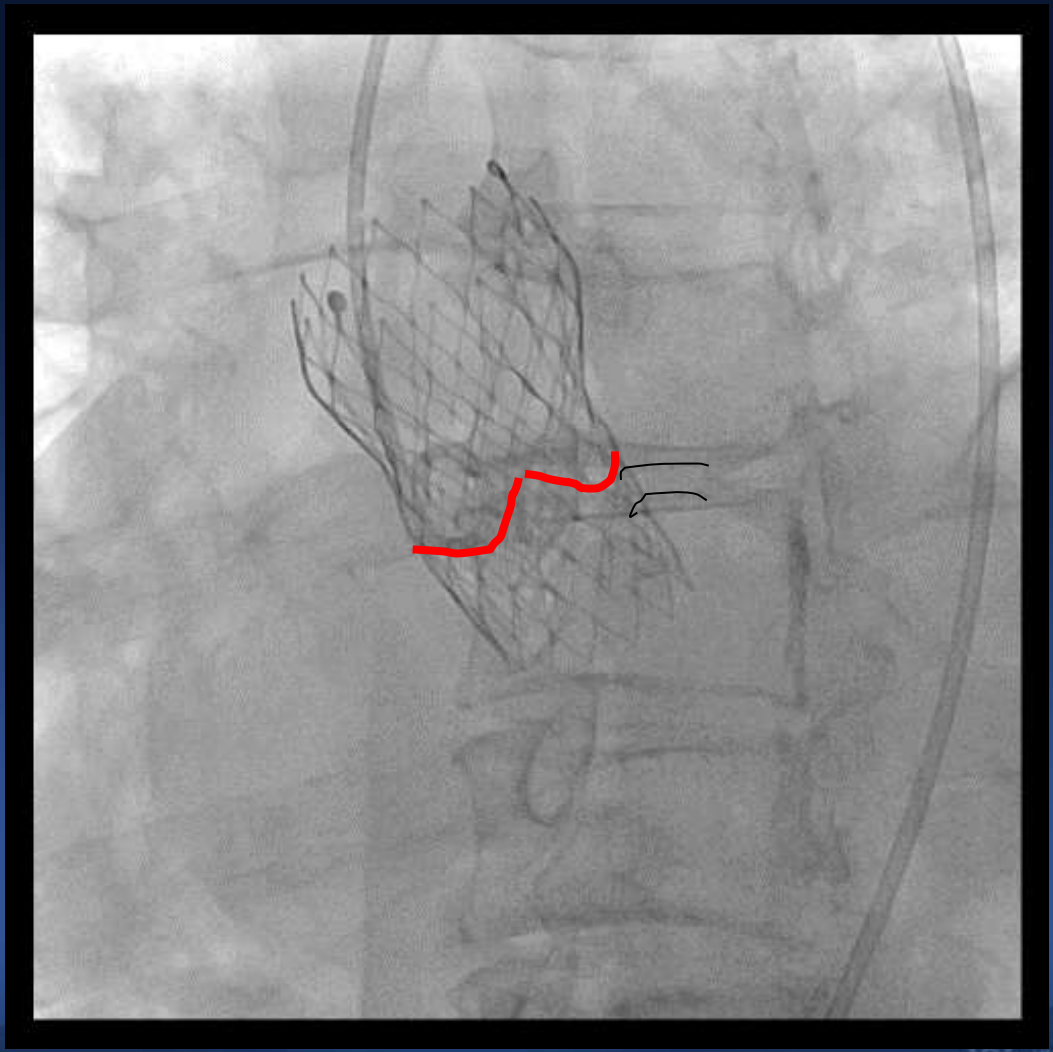


We couldn’t engage LCA

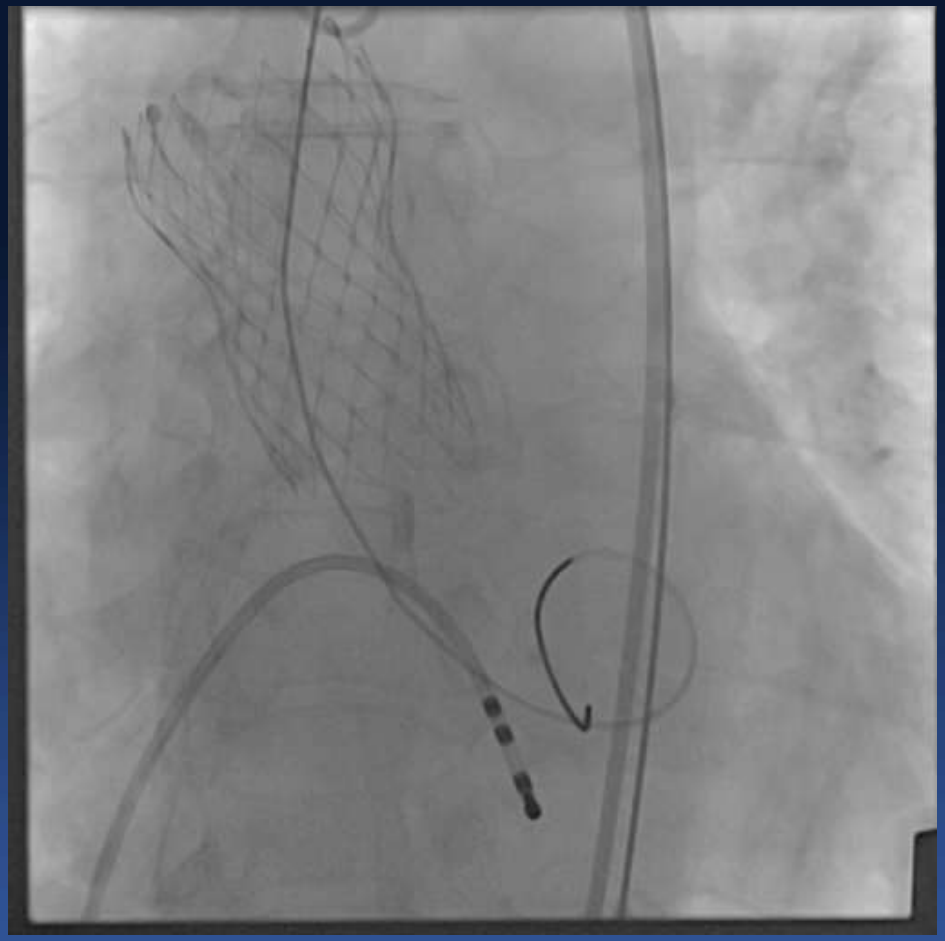


Suspected Stent Thrombosis

80 YO Female, 4months after TAVR and PCI

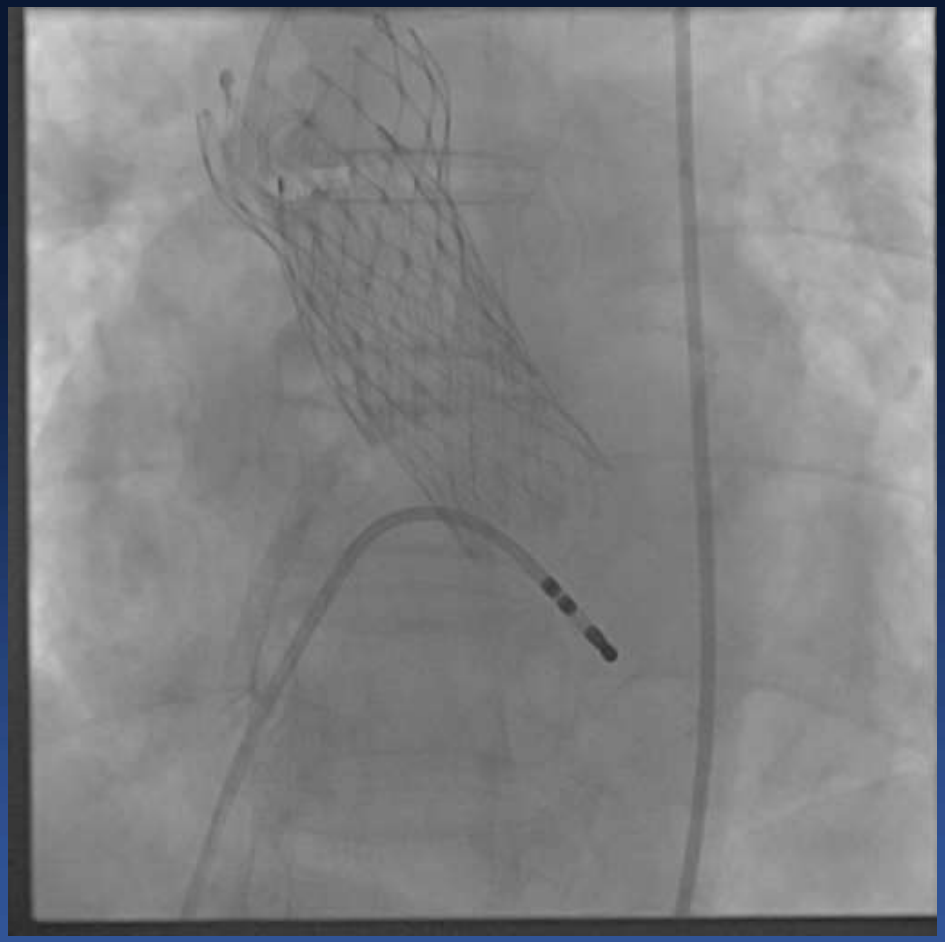


TAVR



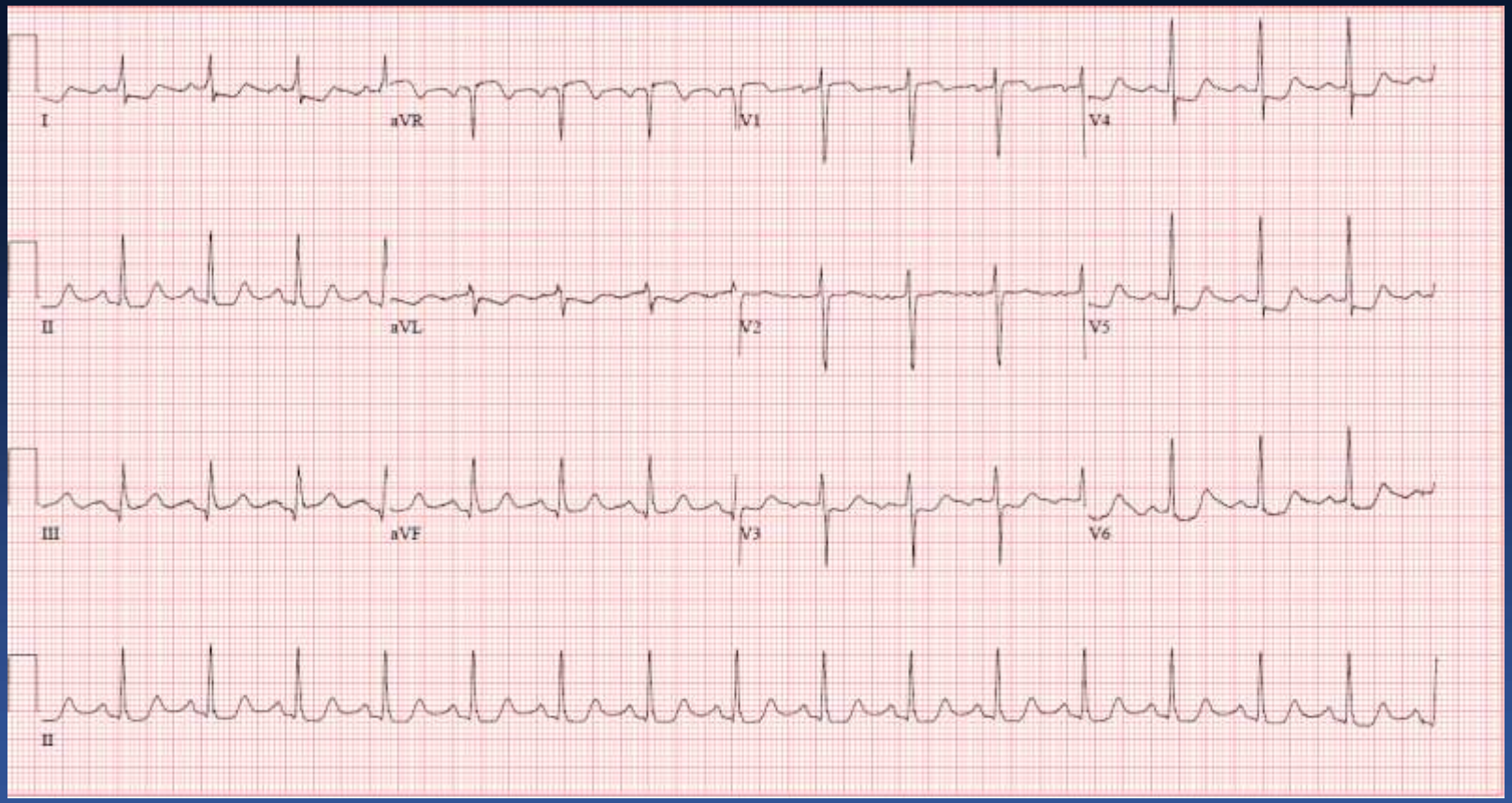
Evolut Pro 26 mm
Device Embolization after deployment

TAVR: Valve-in-Valve



Evolut R 26 mm

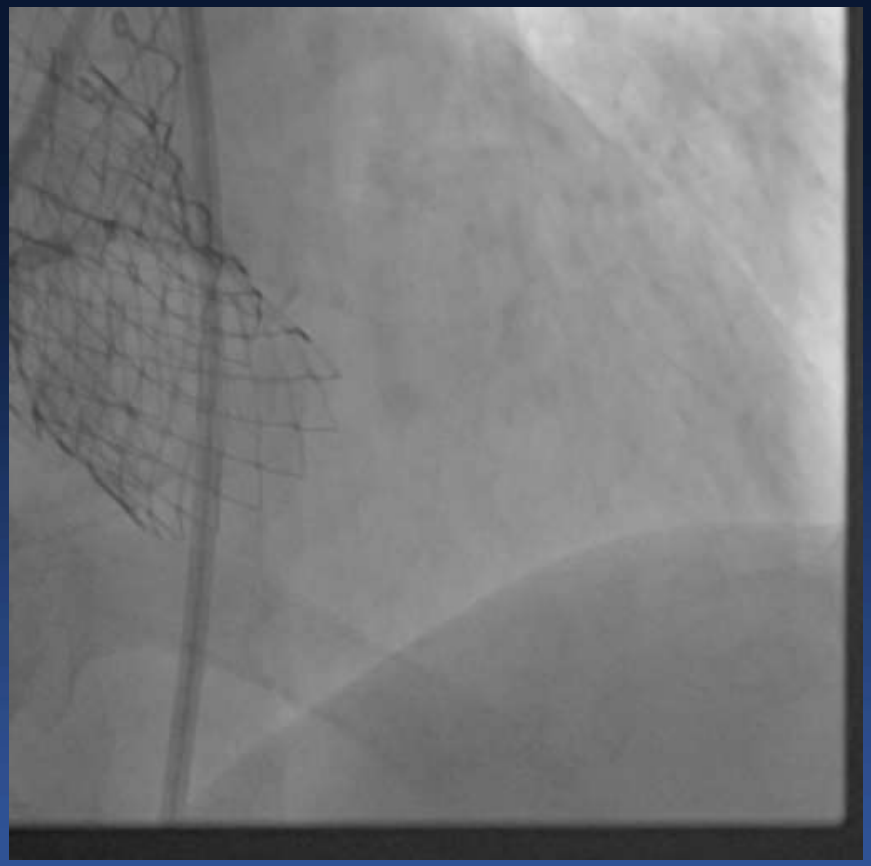
Chest pain, 4 months later

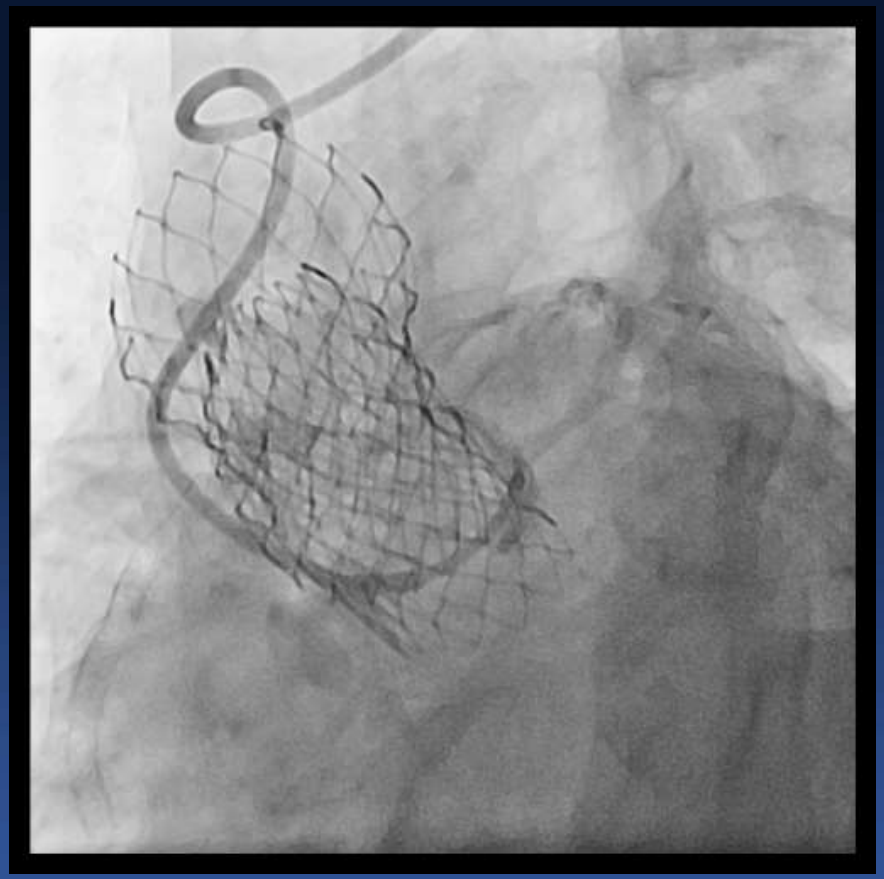


Troponin-I 5.973 ng/mL

Coronary angiogram

Coronary angiogram





Engagement using Guidezilla

We Made Neo-Sinus Using Stent

Please Visit Training Center
2 PM, Today!

TAVR and LAA Closure Hands-on Training

TAVR - Evolut: A-to-Z with Experts

2:10 PM ~ 3:10 PM
Training Center, Vista Hall, B2

2:10 PM CT Planning for Evolut System
Lecturer: Do-Yoon Kang

2:25 PM Post TAVR Coronary Access with Evolut System
Lecturer: Jung-Min Ahn

2:40 PM Hands-on Teaching with Simulator
Trainer: Toru Naganuma

Post TAVR PCI Simulator Hands-on

Organized by CVRF and Supported by Educational Grant from Medtronic Korea plc.

3:10 PM ~ 4:30 PM
Training Center, Vista Hall, B2