



# **Structural Case**

## **A complicated TAVR**

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**No disclosures!**



# Case History

## ❖ 85-year-old man

- **PMH:** HTN, HLD, Multivessel CAD (involving LM) s/p CABG x 3 (LIMA-LAD and SVG-RCA, SVG-OM), preserved LV systolic function (50-55%) and moderate to severe AS by ECHO (AVA=0.98cm<sup>2</sup>, PSV=297cm/sec, MPG=23mmHg, DVI 0.26)
- Underwent LHC for Anginal symptoms with an abnormal nuclear stress test

## ❖ Social History

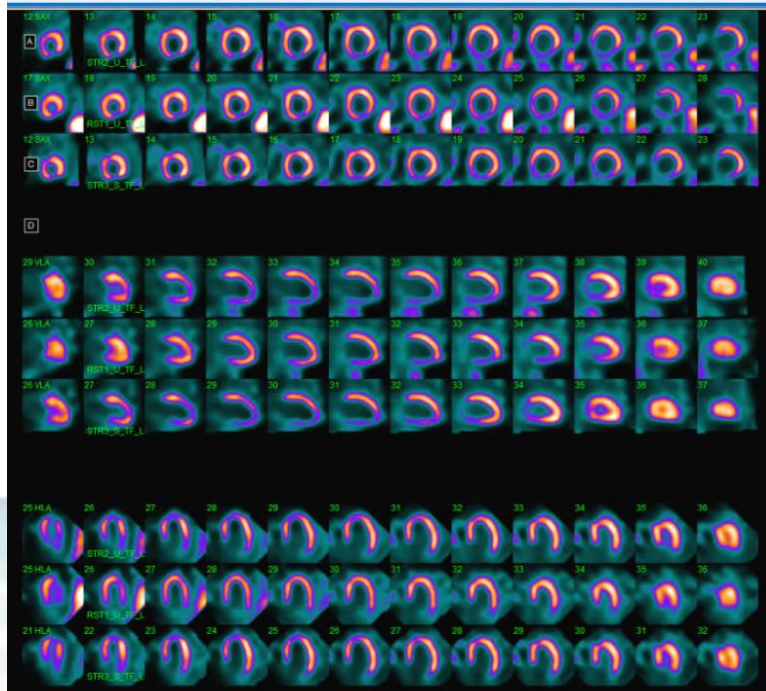
**Tobacco:** Never smoker

**Alcohol:** rarely

**Recreational drugs:** denies

## ❖ Family History

Denies any MI, HF, or SCD



## Physical exam

**Appearance:** No acute distress.

**Communication:** Able to communicate.

**Neuro/Psych:** Alert with normal mood and affect.

**Abdominal:** Unremarkable

**Respiratory:** Bilateral air entry decreased

**Skin:** No rashes, skin warm and dry, no erythematous areas

**Cardiovascular:** Regular rate and rhythm. **Sternal mid to late peaking systolic murmur with diminished A2.**

**Extremities:** Able to move extremities with effective range of motion

### **Vitals:**

BP: 143/68,  
Pulse 70,  
Temperature 98.3 °F (36.8 °C),  
SpO2 100 % on RA.  
Body mass index is 30.3 kg/m².

## Medications

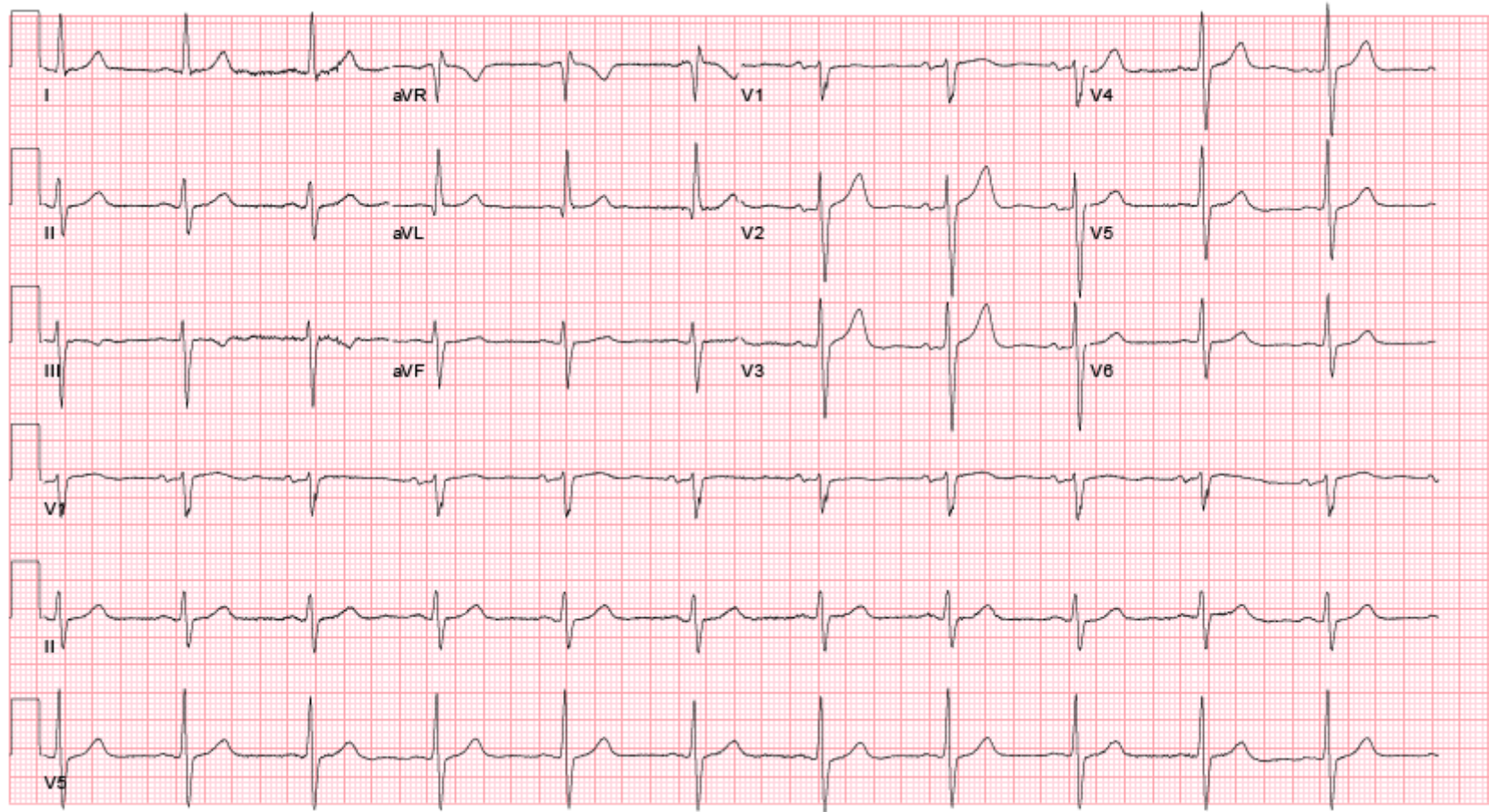
- Aspirin 81mg qD
- Atorvastatin 40mg qD
- Metoprolol 100mg BID
- Imdur 60mg qD
- Ranolazine 500mg BID

	06/2022
Hb	10.7
WBC	4.3
Creatinine	1.2
Pro BNP	NA
Platelets	103k
INR	NA





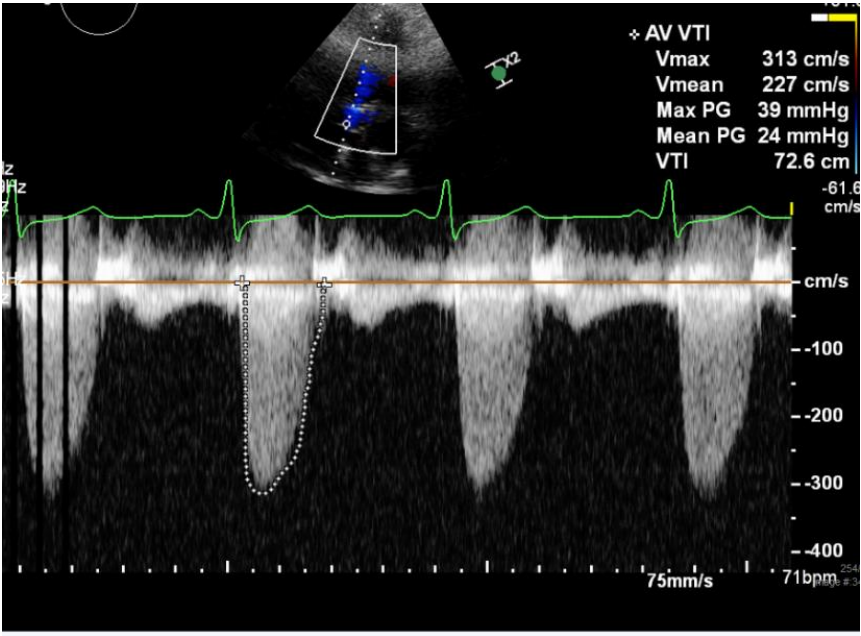
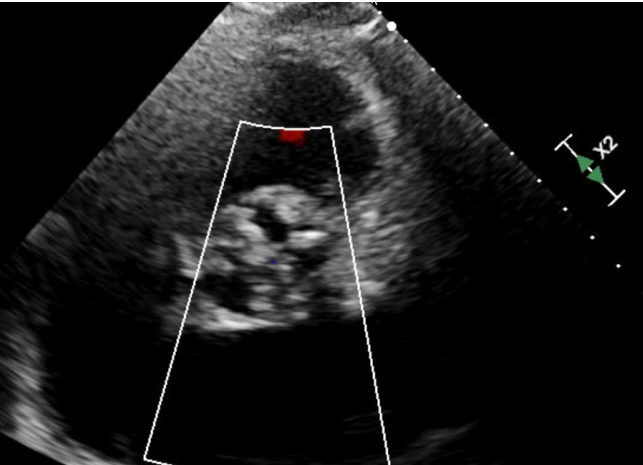
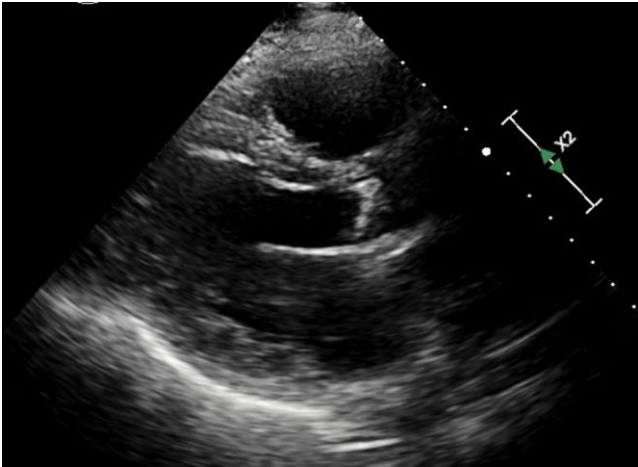
# 12 lead-EKG



# Lab and other data

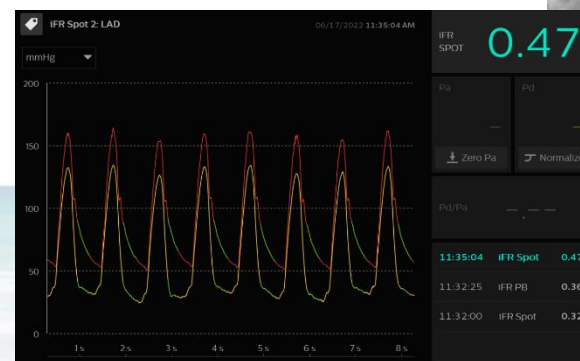
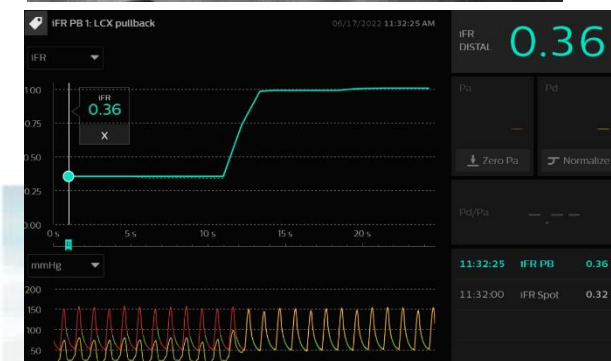
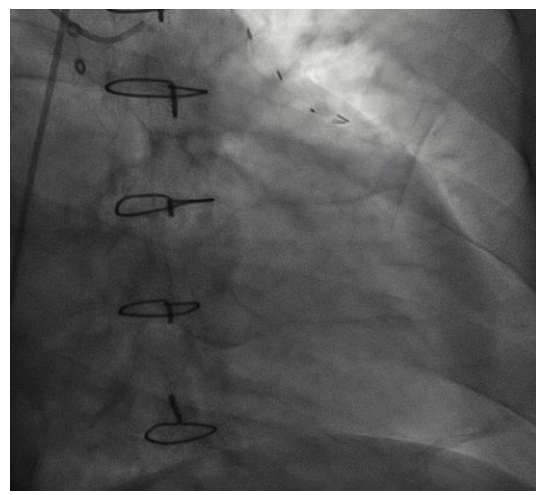
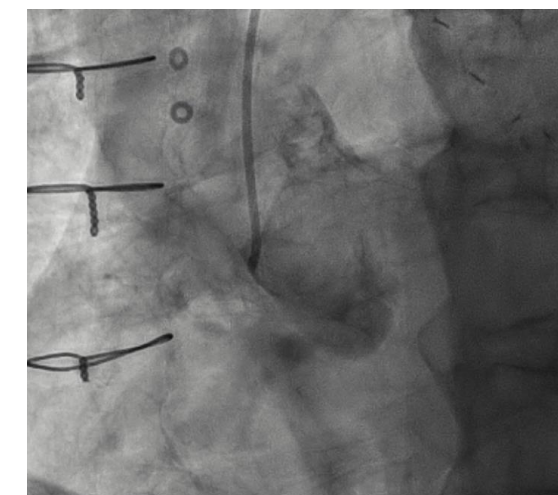
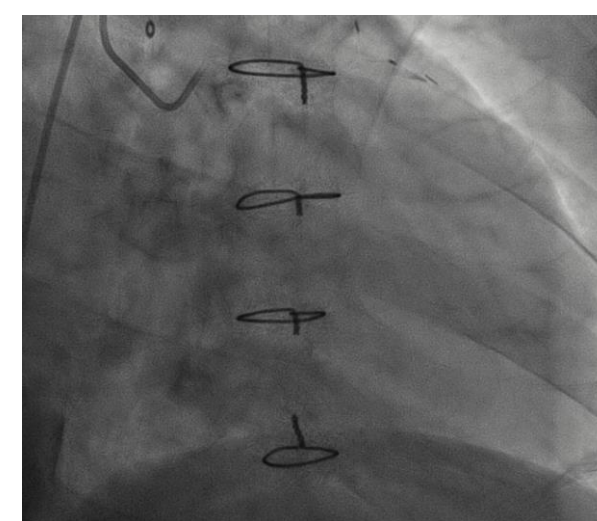
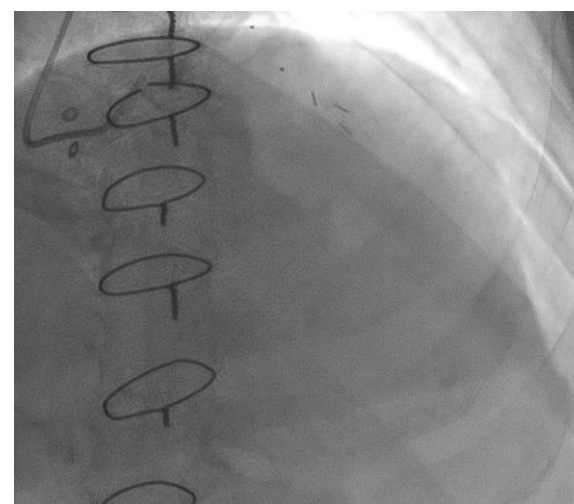
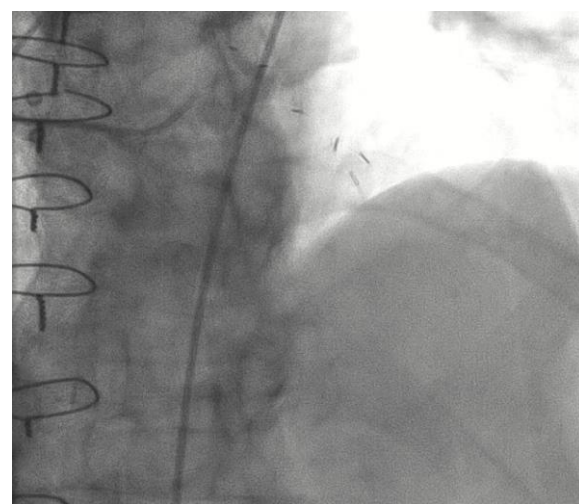
❖ 85-year-old male

- ECHO in 06/2022 revealed moderate to severe AS.



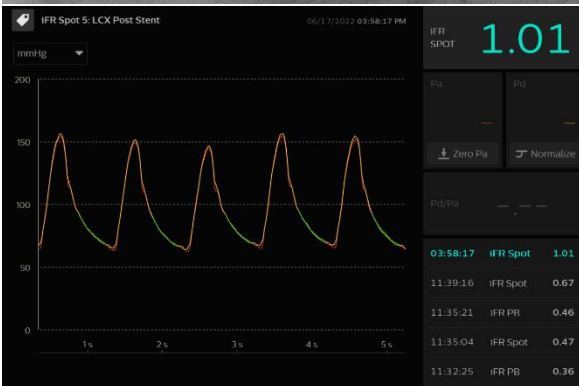
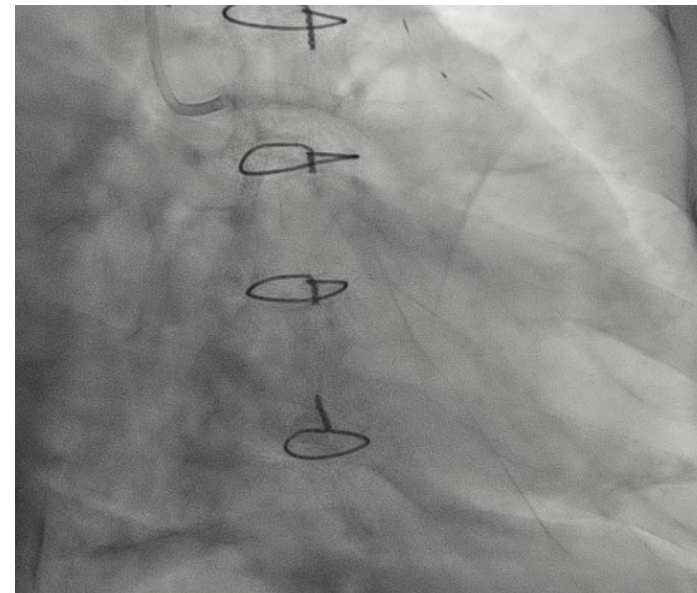
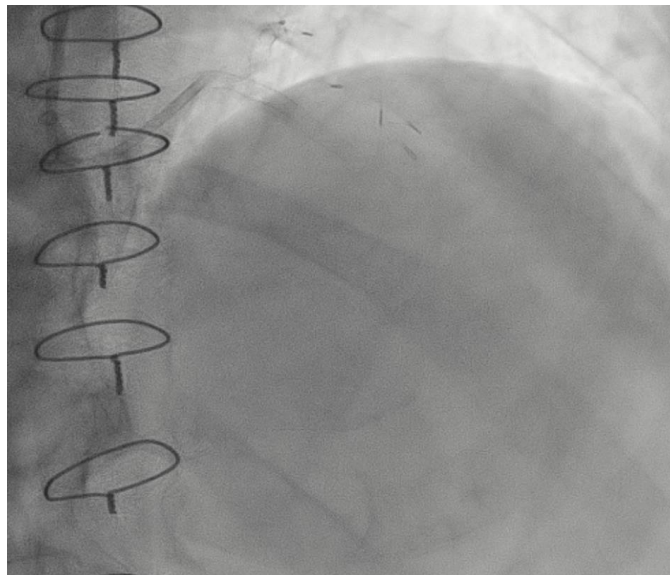
ECHO 06/18/2022	
LV, EF %	50-55%
AV V max	2.93 m/s
DVI AVA	0.26 0.90 cm <sup>2</sup>
AVA index	0.45cm <sup>2</sup> /m <sup>2</sup>
AVG (mean)	23.0 mmHg
SV index	35.2 ml/m <sup>2</sup>
RVSP	39 mmHg
AI MI MS TI	No Trace No Moderate





## Coronary and graft angiography 06/2022

**Critical multivessel CAD with 1 patent bypass graft  
LCx and LAD markedly abnormal physiology by iFR (0.32 and 0.47 respectively)**



## IVUS guided PCI of the LM into the LAD and LCx using DK Crush Technique

- Rotational Atherectomy of the LM into the LCx, 1.5 and 1.25mm Burrs
- Intravascular Lithotripsy of the LCx and LAD, 3.5mm Shockwave; 80 pulses
- LCx stents: Synergy 2.5 x 20mm distally and 3.5 x 32mm proximally
- LAD Stent: Synergy 3.5 x 20mm in the proximal to mid segment
- LM into LAD Stent: Megatron 3.5 x 24mm post dilated to 4.5mm





# Follow up after 2 months

## Pre-operative optimization

- His functional capacity has improved, and his dyspnea nearly resolved
- But his hearing is significantly impaired, and he is now completely deaf. He is being considered for Cochlear implants by ENT.



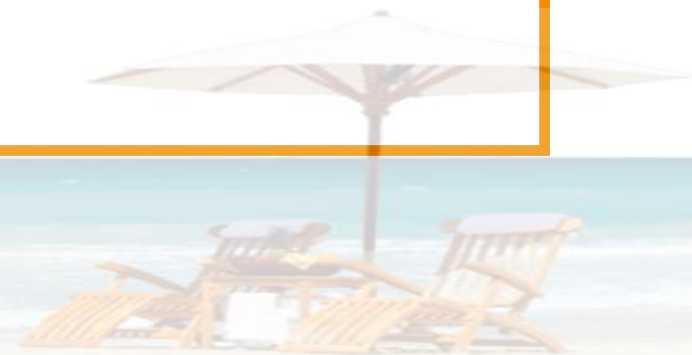
ECHO 09/14/2022	
LV, EF %	60-65%
AV V max	3.6 m/s
DVI AVA	0.22 0.88 cm <sup>2</sup>
AVA index	0.44cm <sup>2</sup> /m <sup>2</sup>
AVG (mean)	30.0 mmHg
SV index	41.35 ml/m <sup>2</sup>
RVSP	39 mmHg
AI MI MS TI	No Trace No Moderate

# CT surgery evaluation

**STS score 7.07%**  
**Frailty RAI 32**

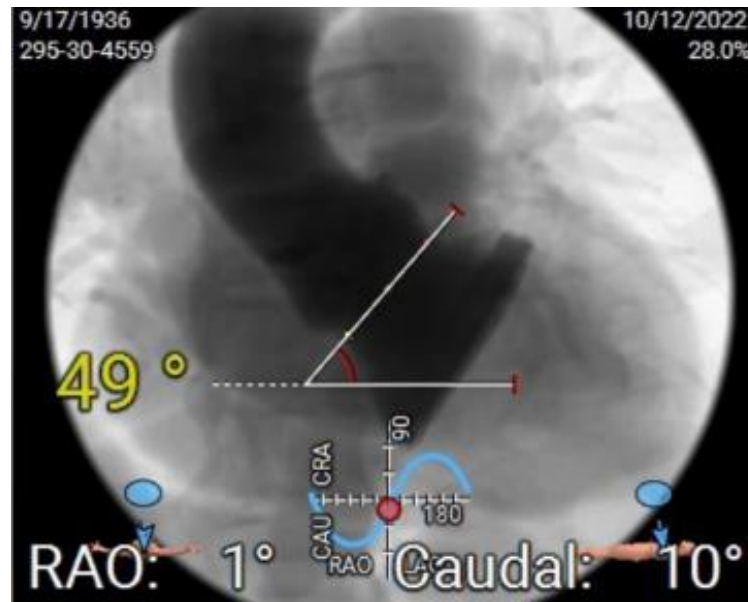
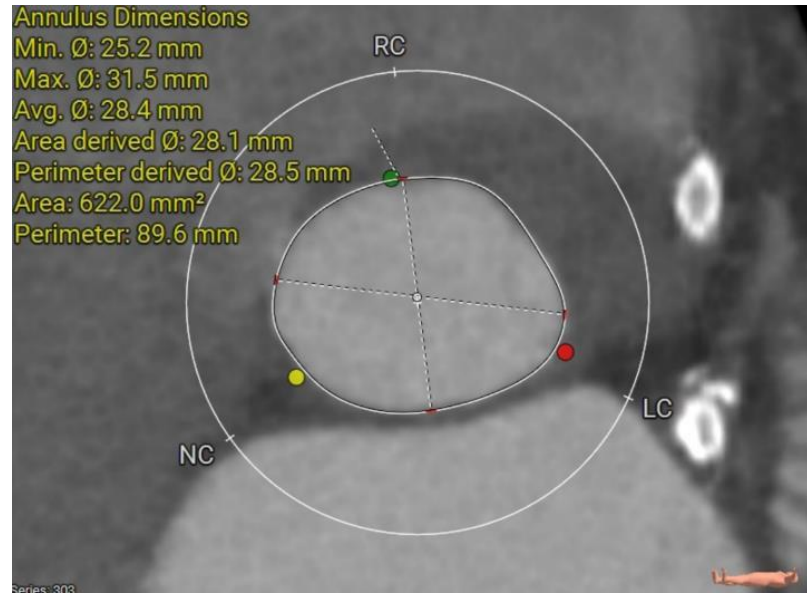
- 85 male
- Weight 84.6 kg/ height 172.7 cm
- Creatinine: 1.5 mg/dl
- Diabetes: No
- Lung disease: No
- Previous PCI Yes
- PVD: Yes
- Stroke: No
- Arrhythmia: Isolated atrial flutter
- NYHA CHF: Class II

- Number of diseased vessels: 3
- EF: 60-70%
- Severe AS, No MS, No AI, Trace MI, Mild TI
- CV Surgery: 1<sup>st</sup>
- Elective Isolated AVR

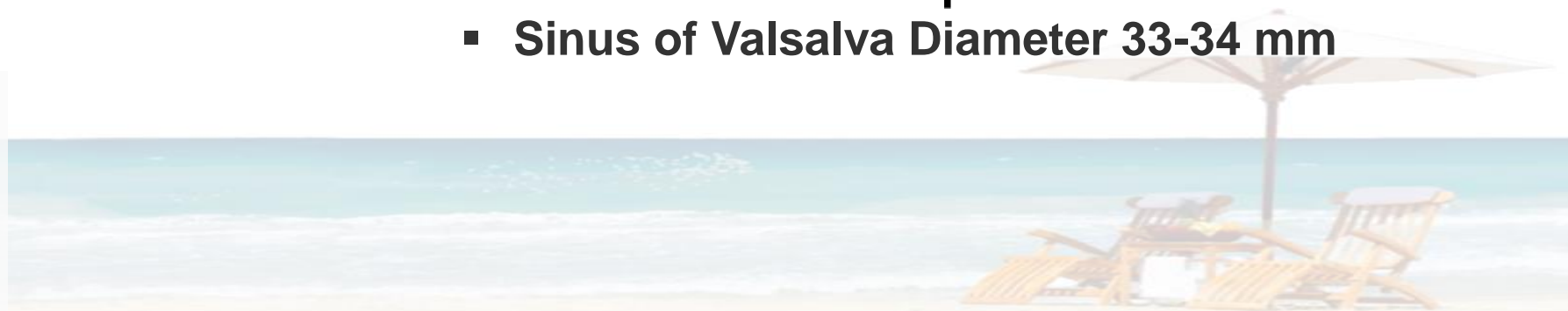


# Pre TAVR imaging data

## Cardiac gated CT



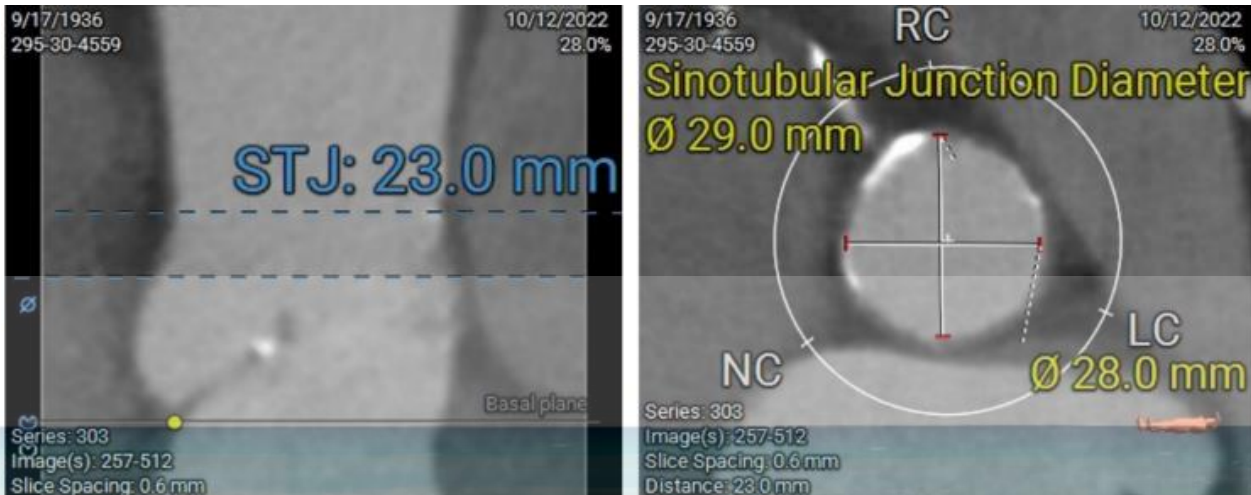
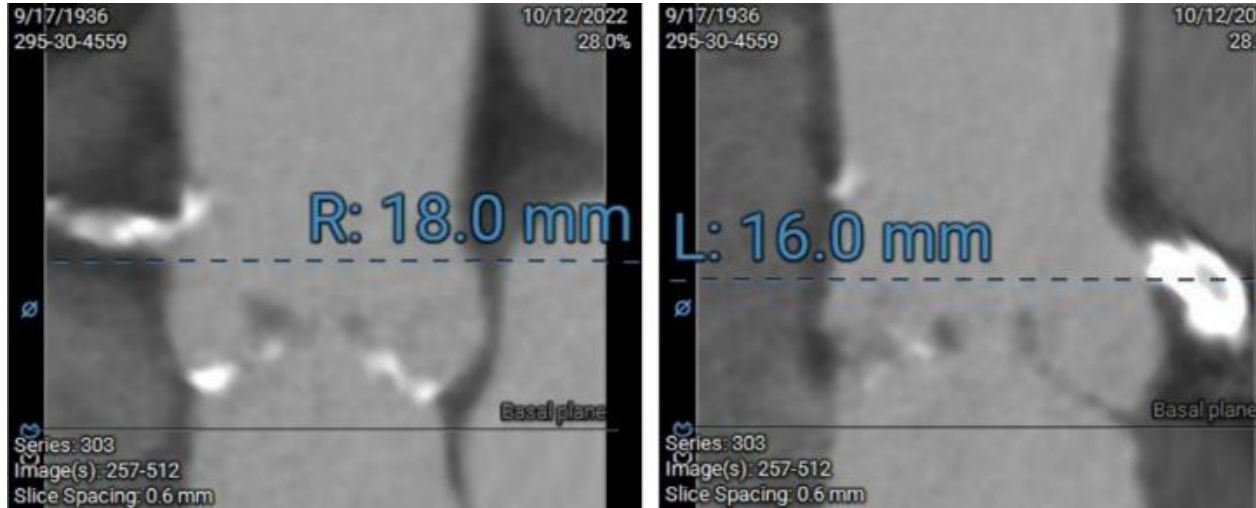
- Aortic annular dimensions:
  - Perimeter 89.6 mm
  - Area 622.0 mm square
- Sinus of Valsalva Diameter 33-34 mm





# Pre TAVR imaging data

## Cardiac gated CT

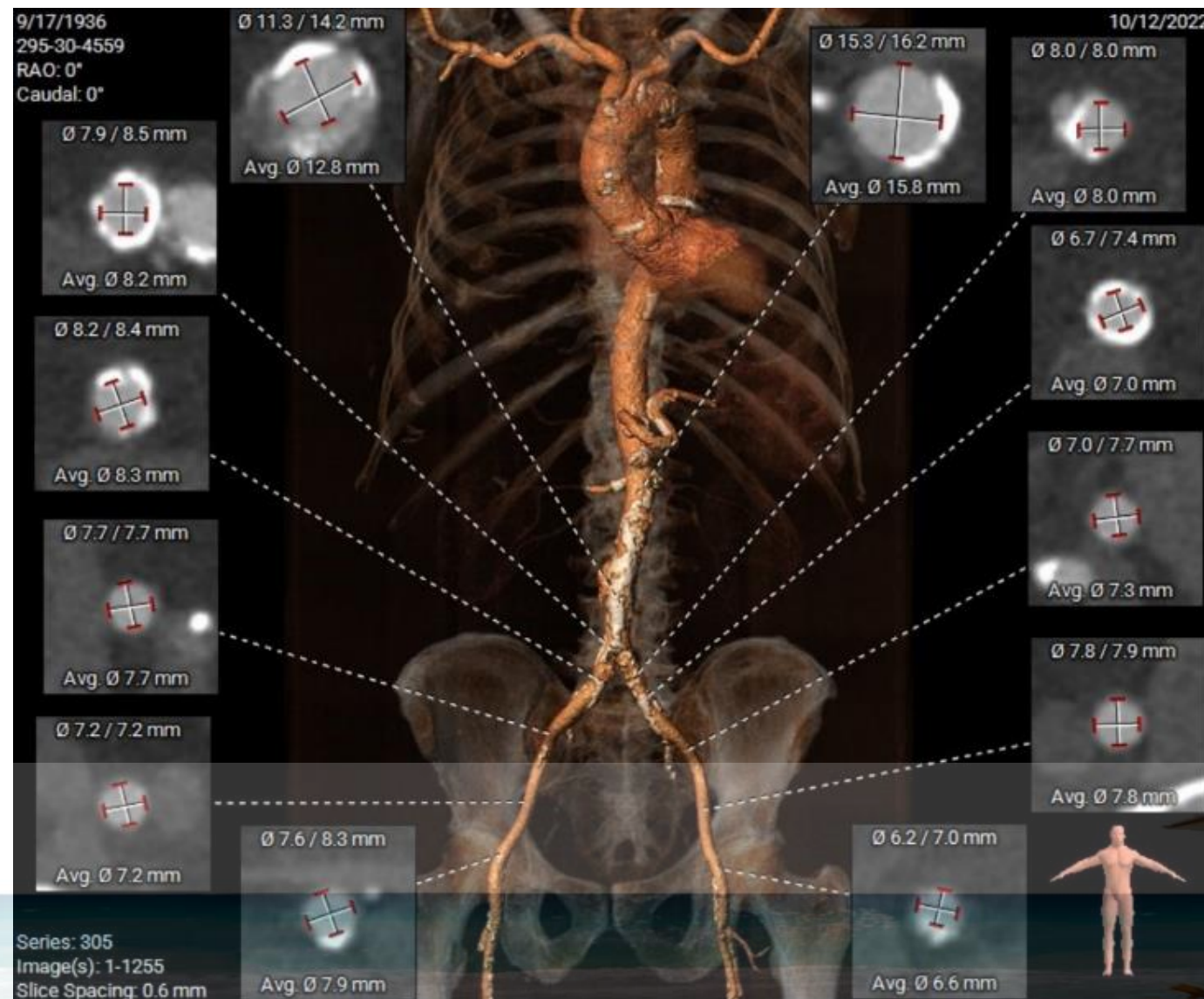


- Right coronary ostium height 18.0 mm
- Left coronary ostium height 16.0 mm
- Sino Tubular junction diameter 28-29 mm
- Sino Tubular junction height 23 mm




# Pre TAVR imaging data

## Peripheral vessels (Femoral)



# Valve sizing



20 mm

23 mm

26 mm

29 mm

15.5 mm

18 mm





20 mm

22.5 mm

Annulus Sizing		20 mm	23 mm	26 mm	29 mm
Native Valve Annulus Size (CT)	Area	273 - 345 mm²	338 - 430 mm²	430 - 546 mm²	540 - 683 mm²
	Area Derived Diameter	18.6 - 21 mm	20.7 - 23.4 mm	23.4 - 26.4 mm	26.2 - 29.5 mm
Native Valve Annulus Size TEE		16 - 19 mm	18 - 22 mm	21 - 25 mm	24 - 28 mm

Sapien 3 Valve

## Evolut Pro +

					
Size		23 mm	26 mm	29 mm	34 mm
Annulus Diameter	21.7 mm	17*/18-20 mm	20-23 mm	23-26 mm	26-30 mm
Annulus Perimeter†	68.1 mm	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)	25.8 mm	≥ 25 mm	≥ 27 mm	≥ 29 mm	≥ 31 mm
Sinus of Valsalva Height (Mean)	17.9 mm	≥ 15 mm	≥ 15 mm	≥ 15 mm	≥ 16 mm
Oversizing Percentage		6%	20%	34%	57%





# HEART team meeting

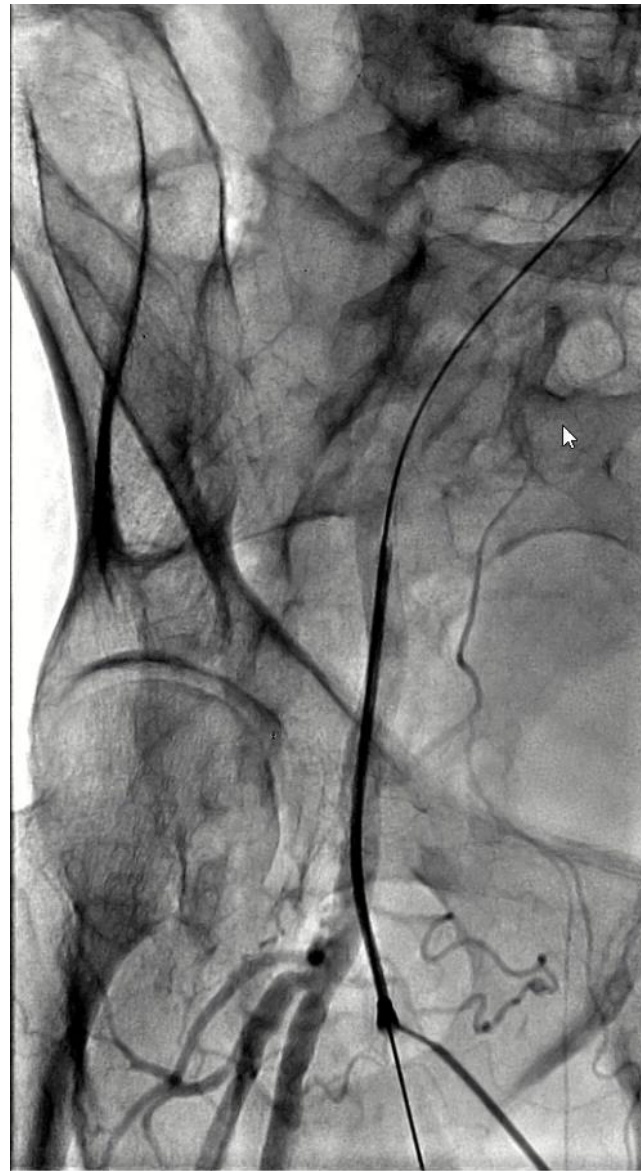
Patient deemed appropriate candidate for TAVR

- ✓ **Femoral artery access acceptable**
- ✓ **Bilateral common iliac and abdominal aorta disease noted**
- ✓ **29 mm Edward SAPIEN 3 valve (4.3% oversized)**

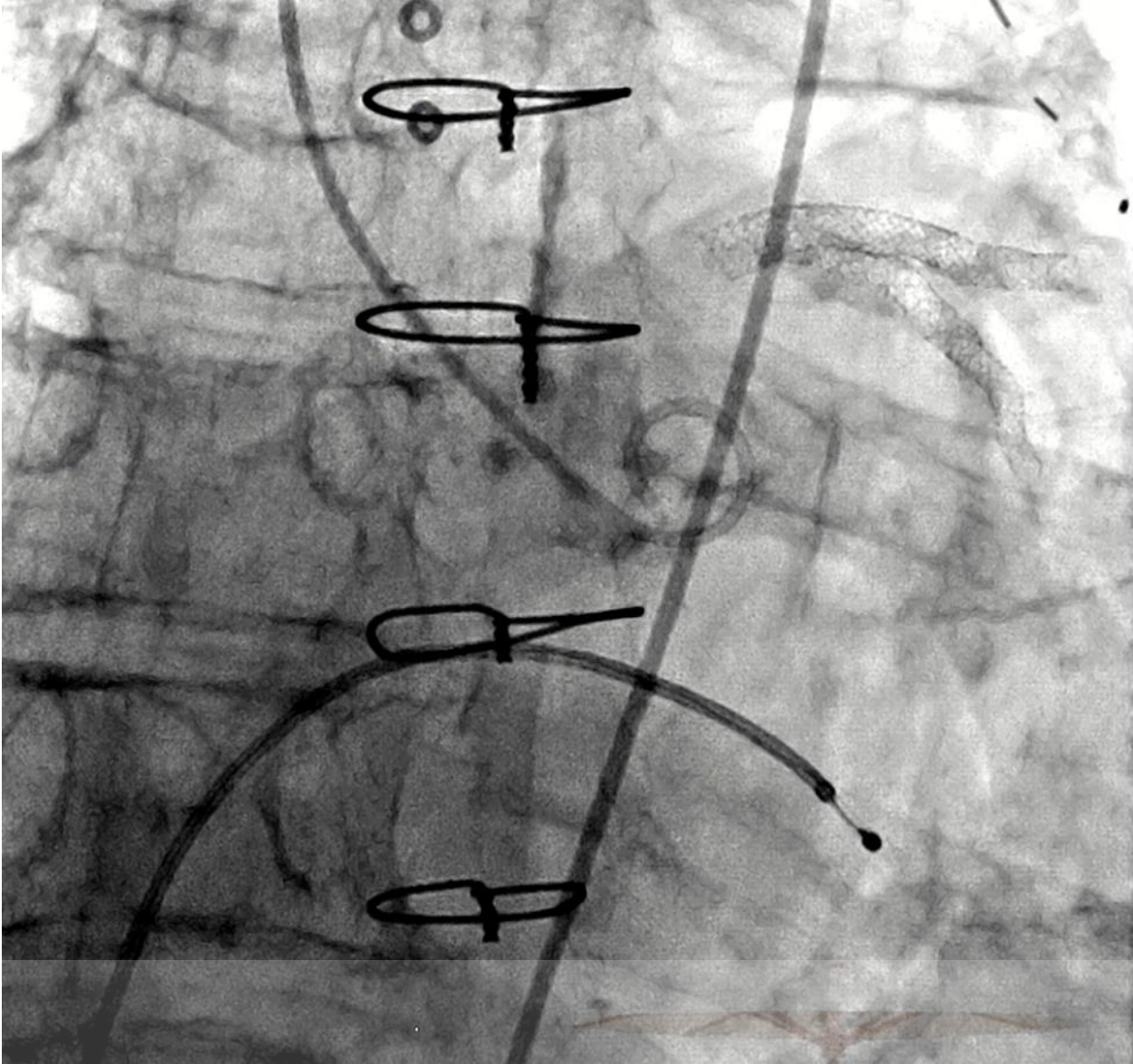


## Bilateral femoral access

- Edwards 14F eSheath Introducer



Pigtail catheter positioning in RCC





**Valve loaded over the balloon and  
is in position**

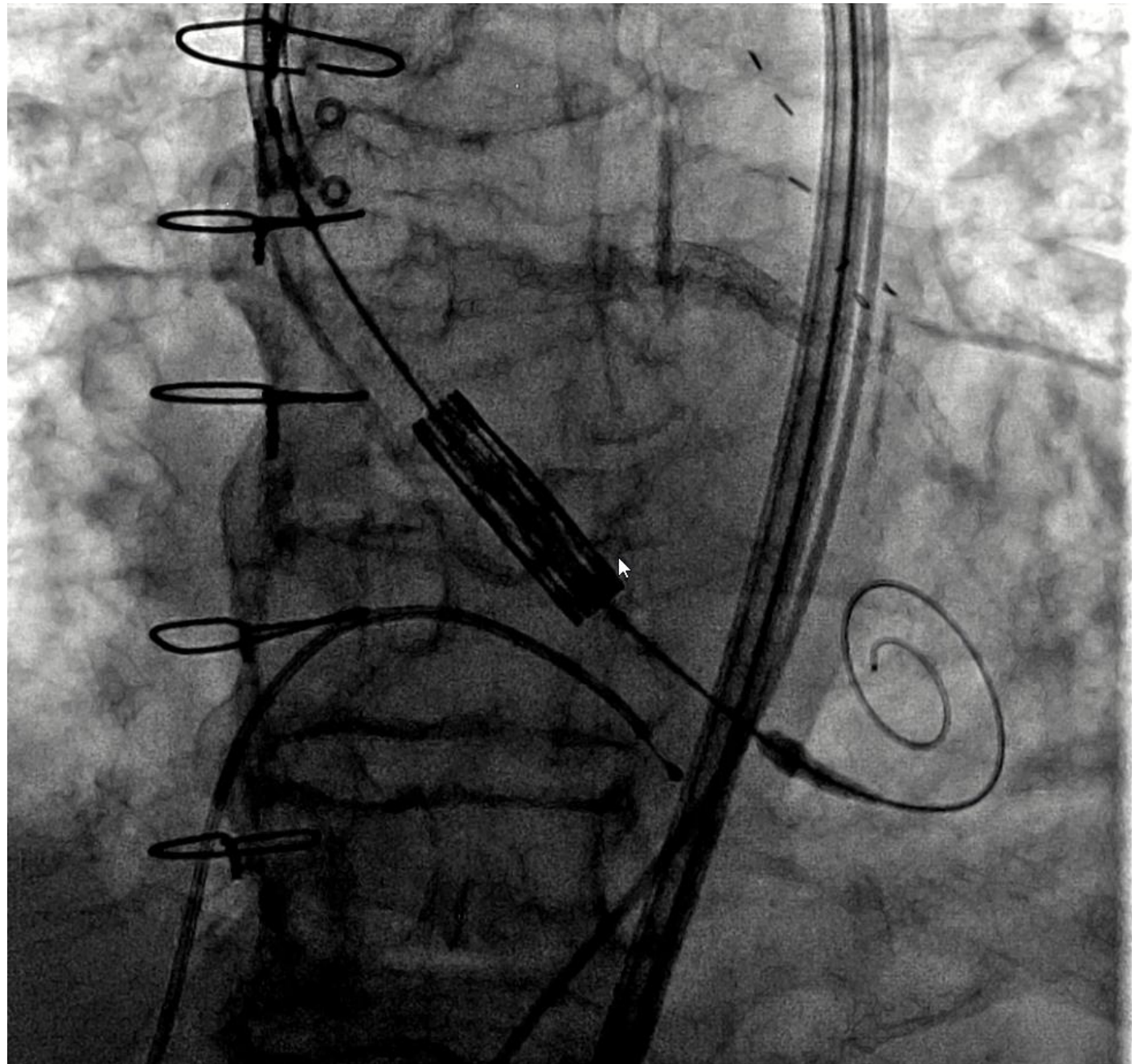


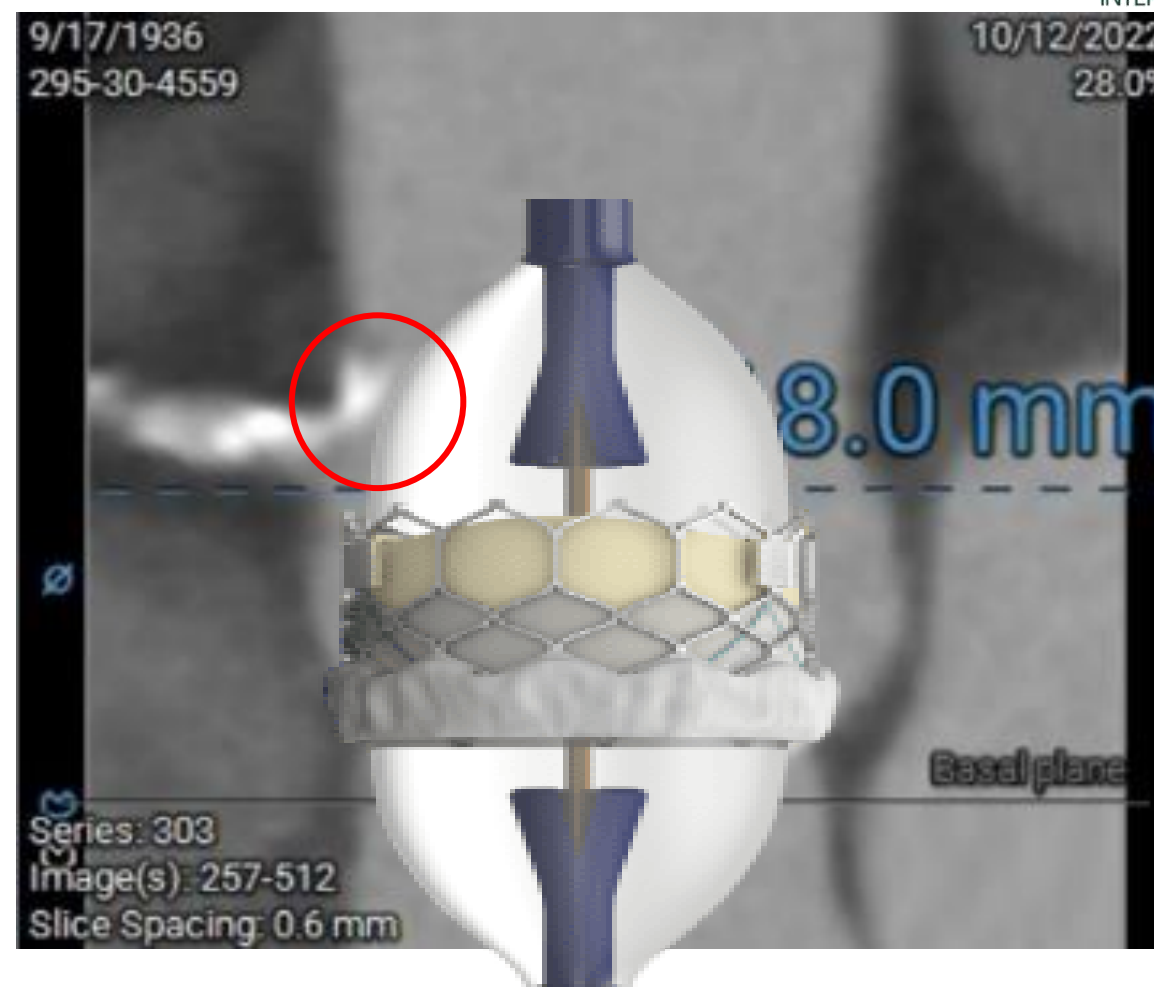
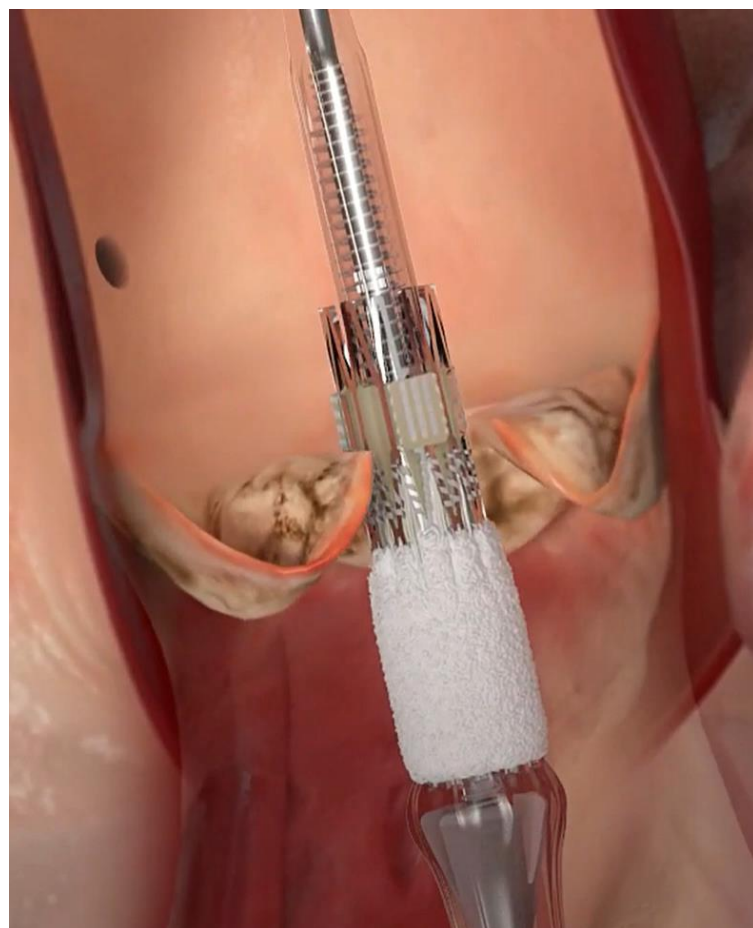
# SAPIEN Valve deployment

**Sudden decrease in inflation pressure..**

**Balloon rupture!!!!**

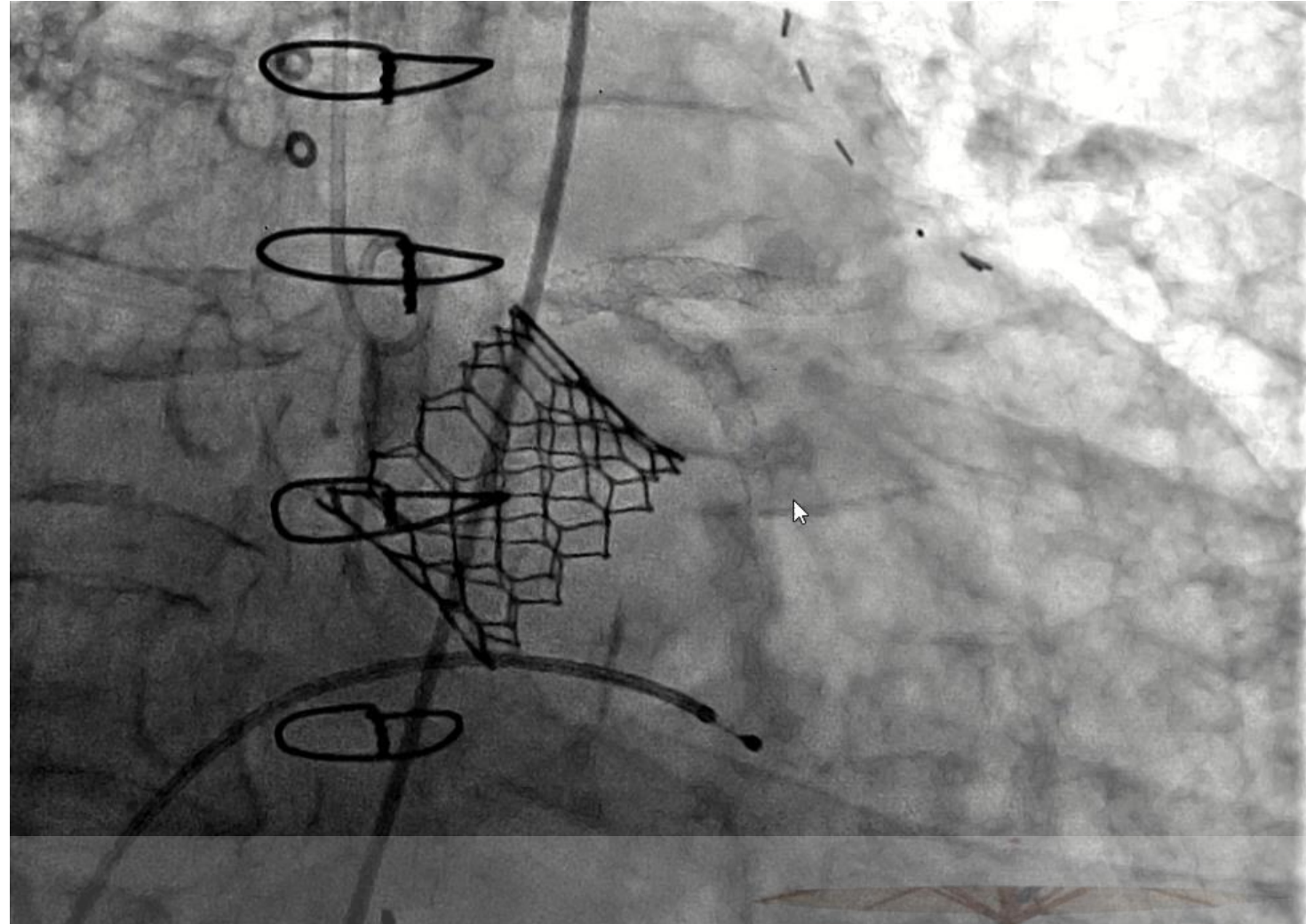
The balloon catheter was immediately pulled back into the descending aorta!



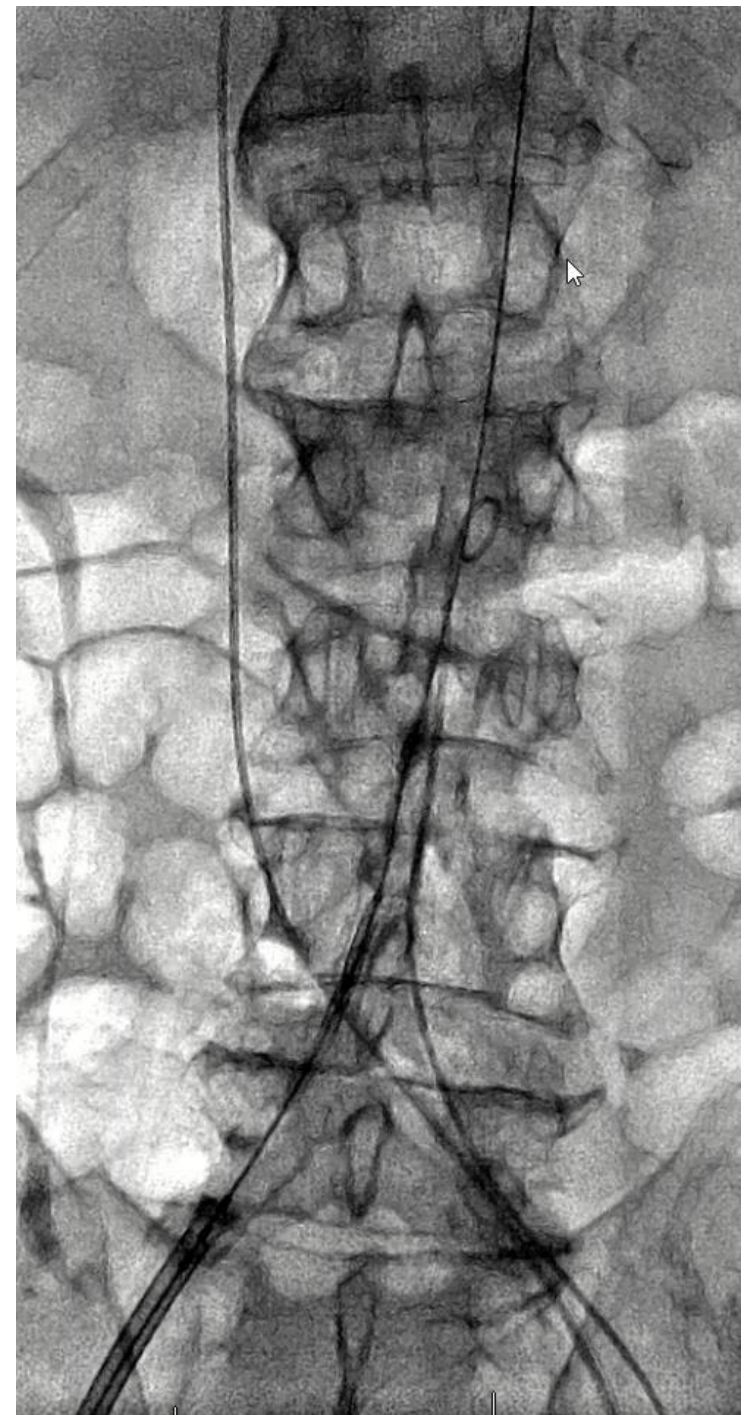




**Post valve deployment aortogram**

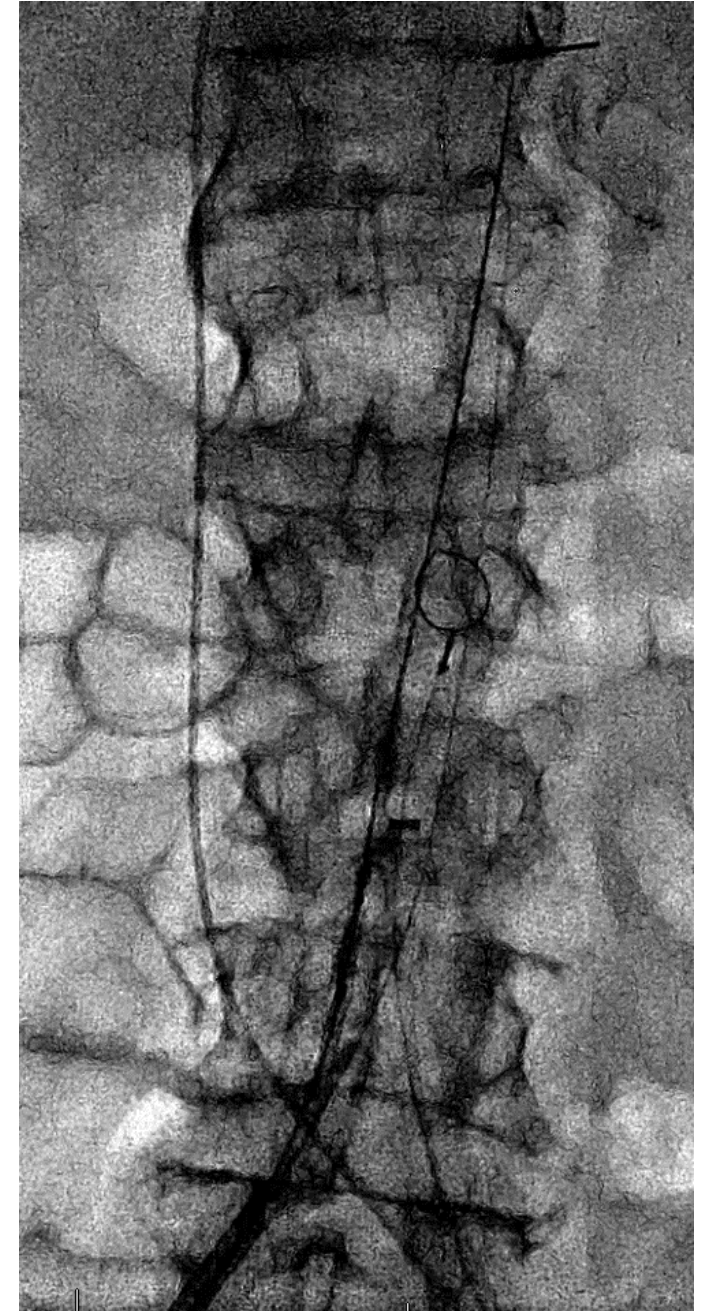
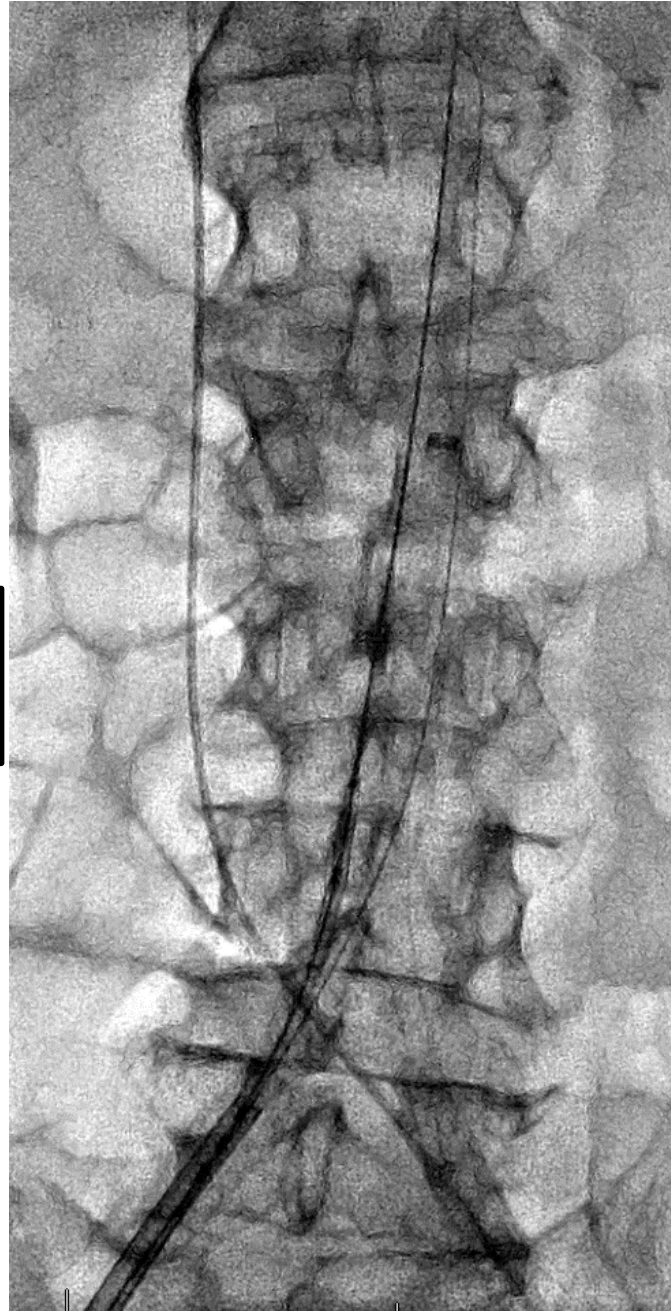


**Ruptured balloon not recoverable via introducer**



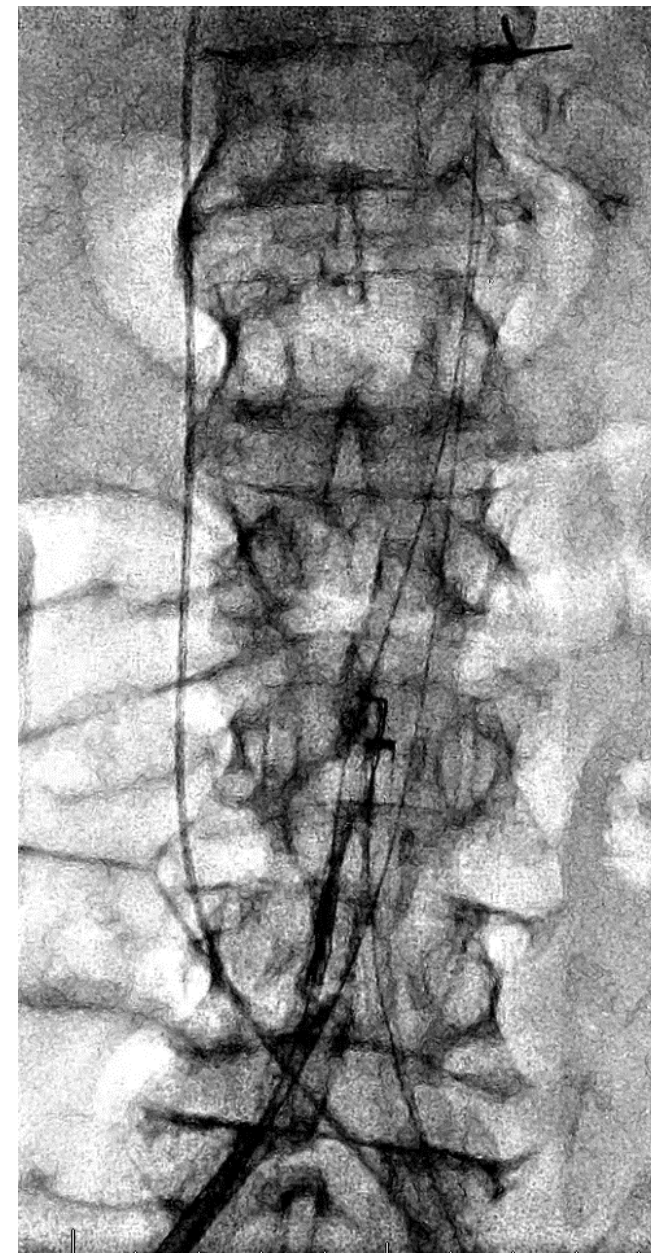
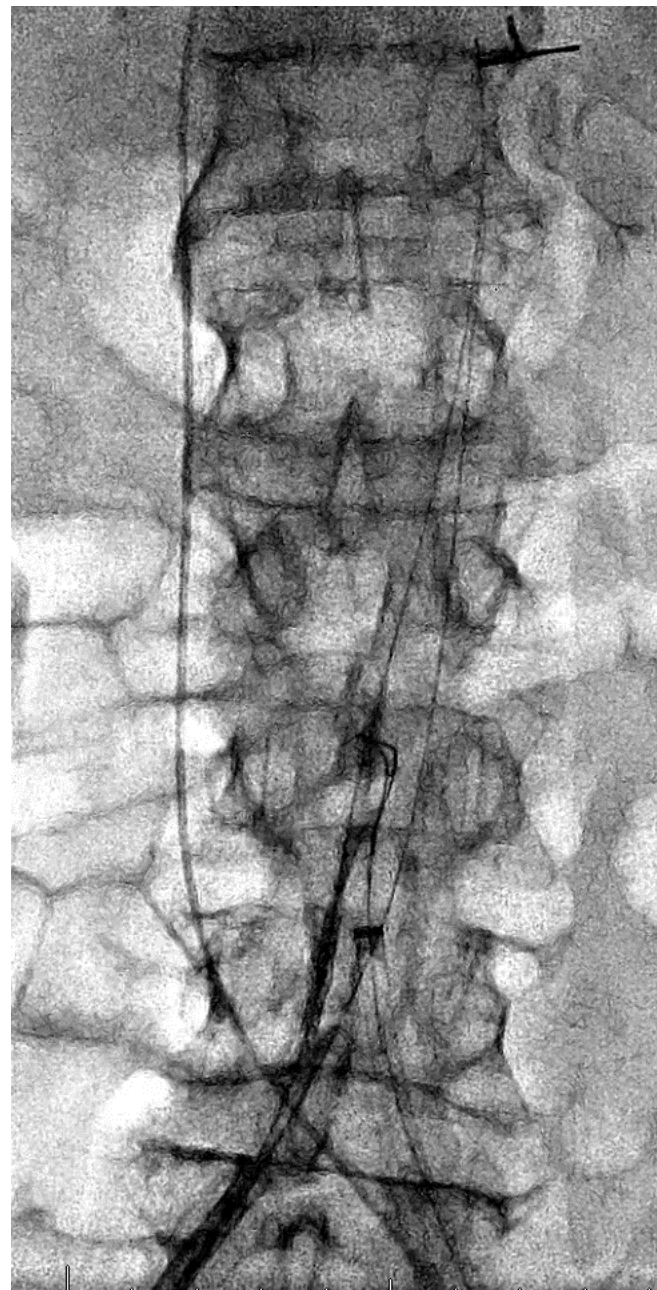


**Gooseneck Snaring of ruptured  
balloon via left femoral access**



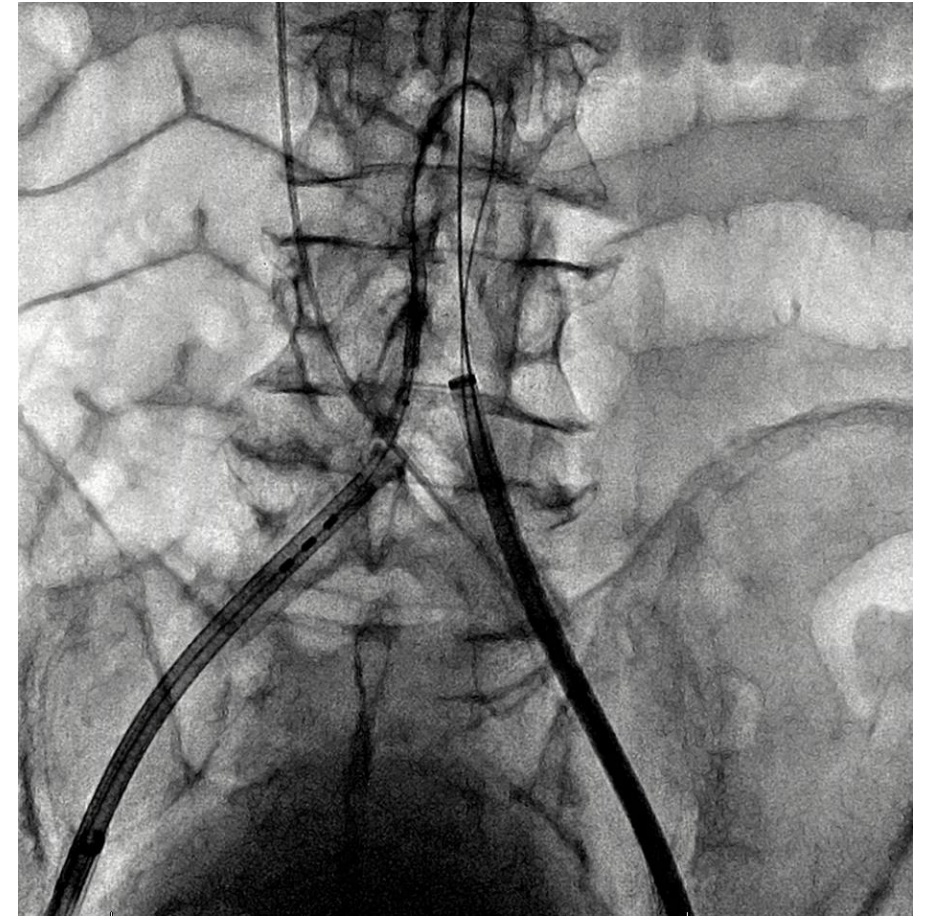
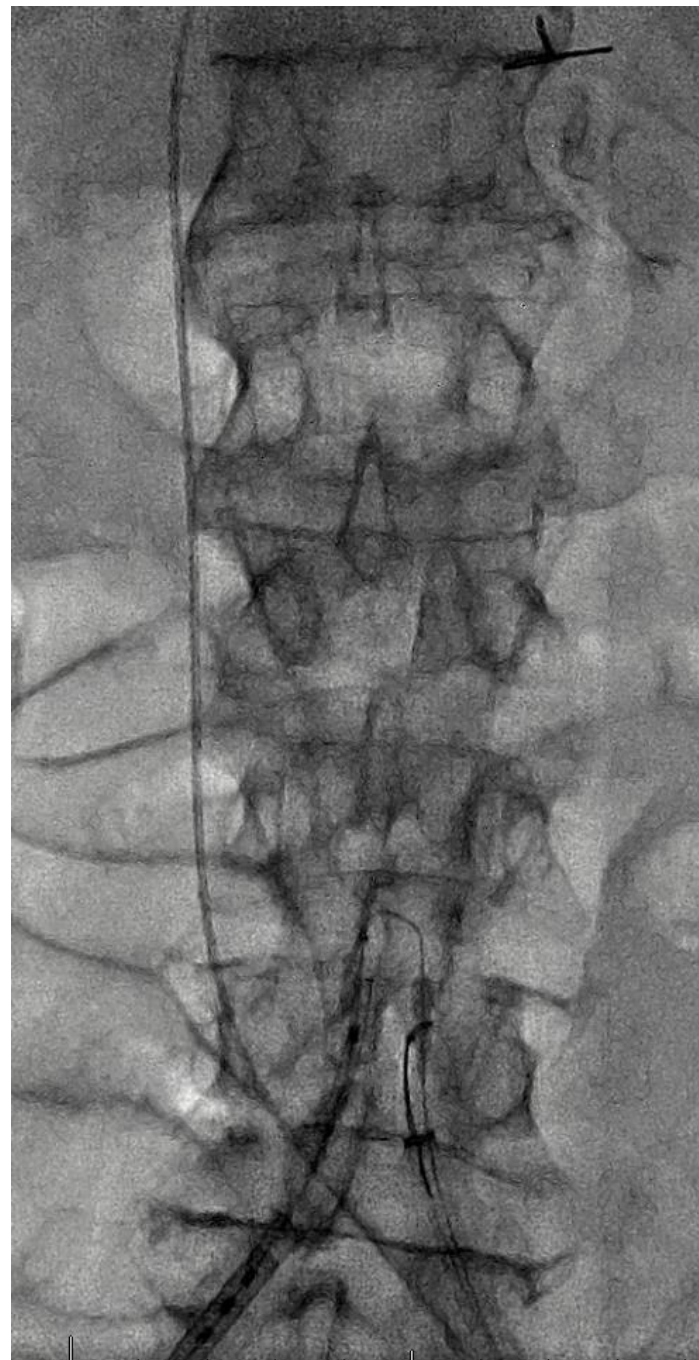


**Gooseneck  
Snaring of  
ruptured  
balloon via left  
femoral access**



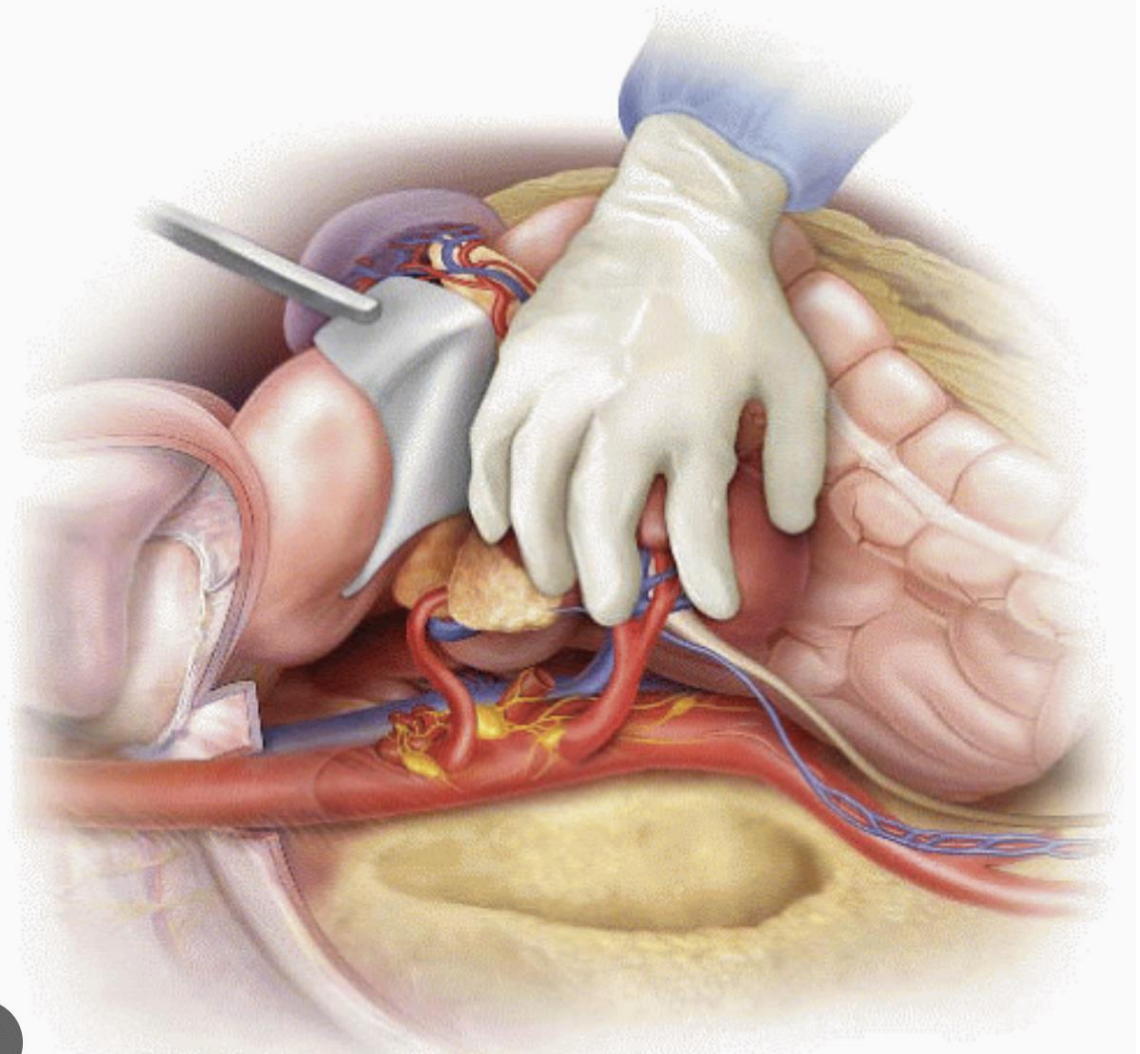
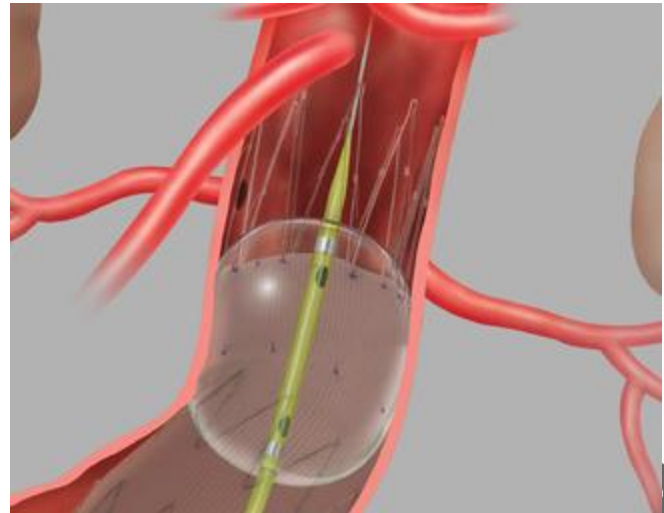


**System stuck  
at Aorto-iliac  
bifurcation**



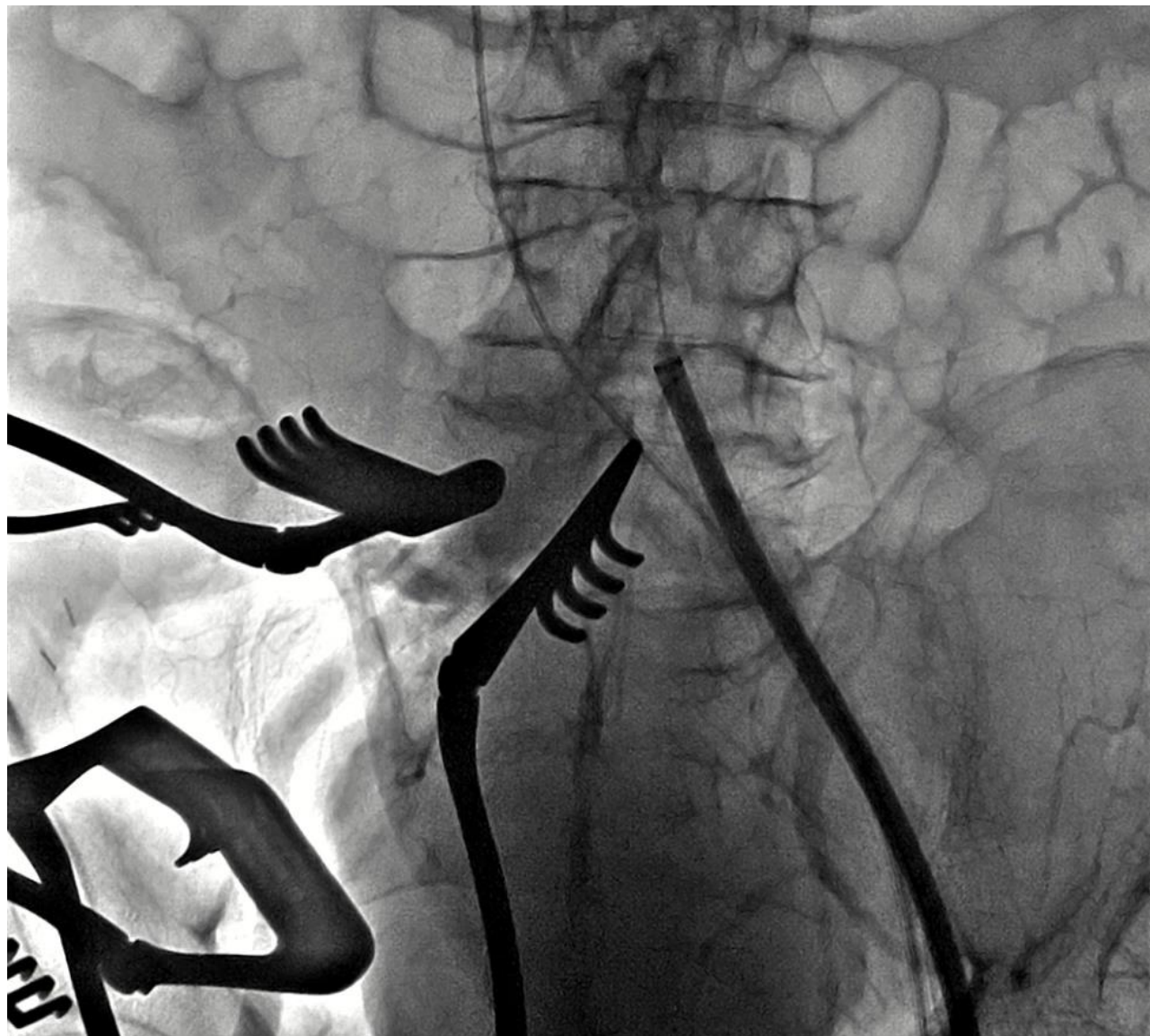
# Retrieval of the fractured balloon

**Retroperitoneal surgical  
approach**



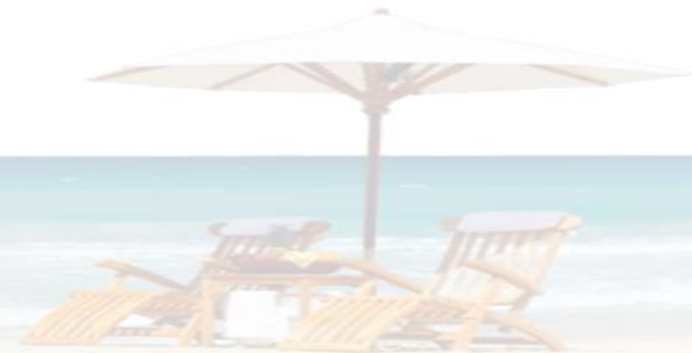


**Post balloon  
extraction  
Aorto-iliac  
angiogram**



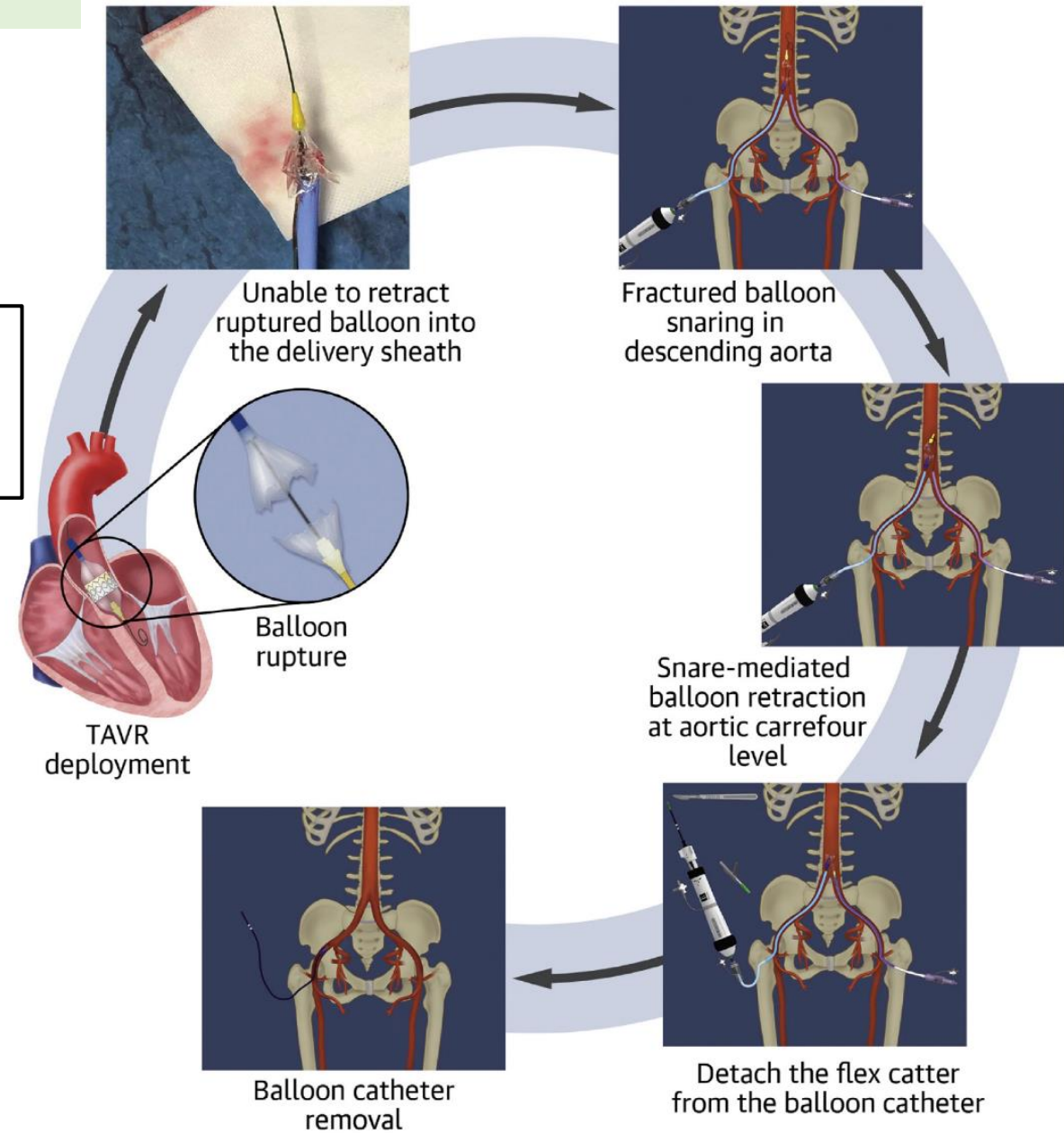
# Post operative course

- Post operative course complicated by ileus, drop in Hemoglobin (requiring PRBC transfusions) and prolonged hospital stay
- CTA was negative for active bleeding in the pelvic area
- Patient recovered and was discharged home



## Balloon Fracture During TAVR: Effective and Repeatable Technique

Berti S, De Caterina A, Esposito A, et al. Balloon Fracture During TAVR. J Am Coll Cardiol Case Rep. 2022 Apr, 4 (8) 455–459. <https://doi.org/10.1016/j.jaccas.2022.01.024>





# Edwards Catheter design and key steps in endovascular solution to Balloon rupture during TAVR





# Thank you

