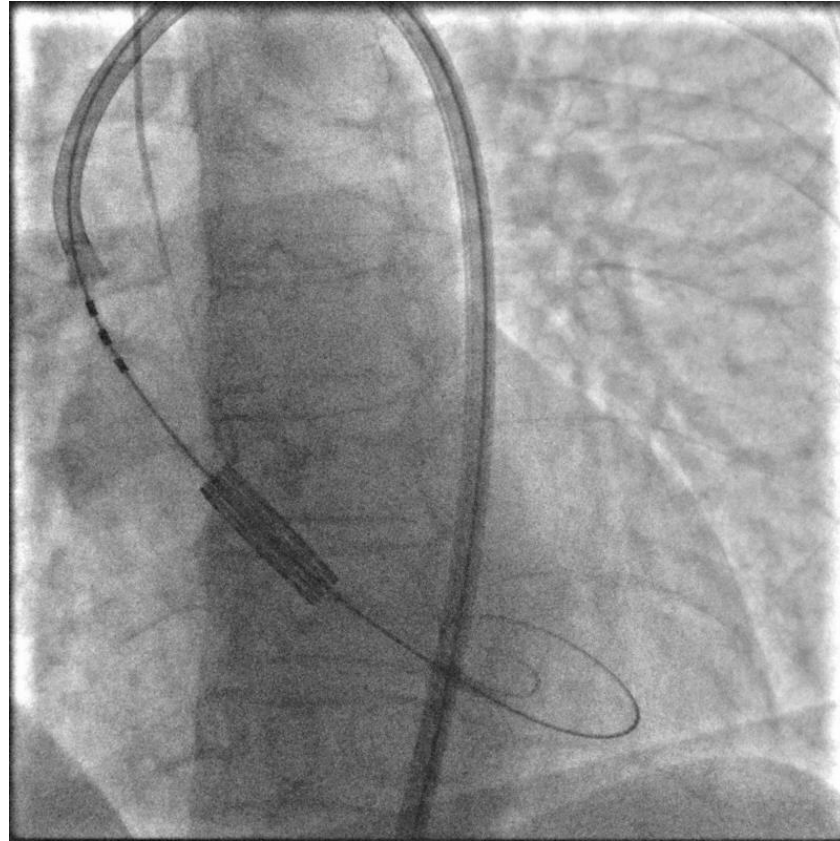




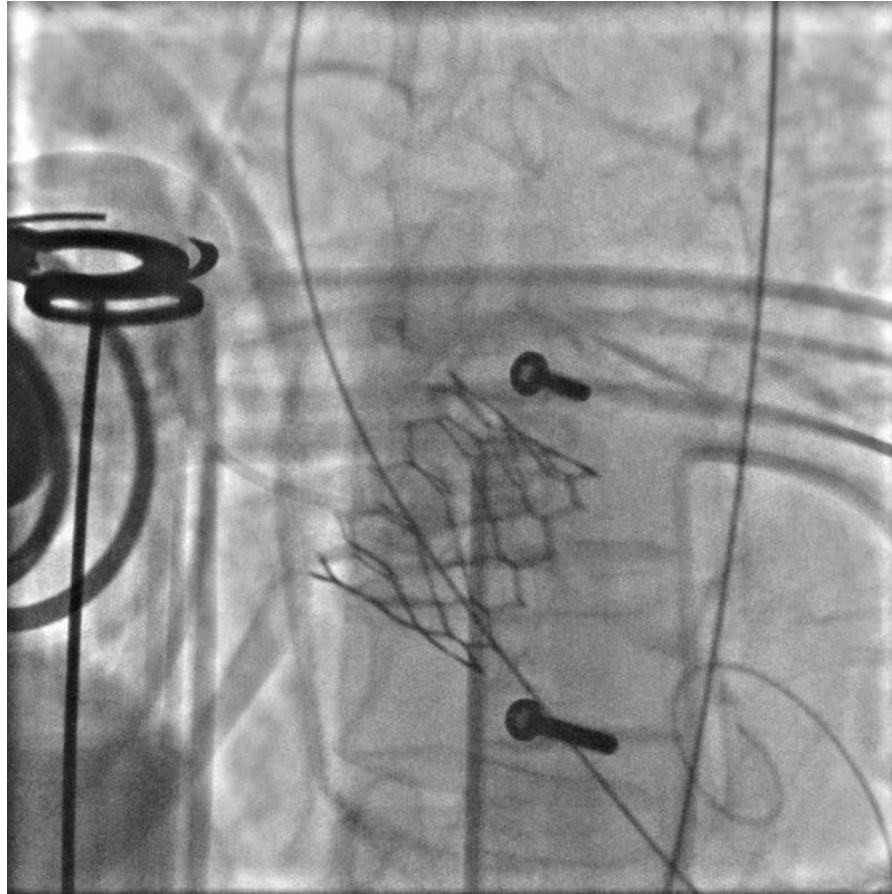
INSTITUT  
CARDIOVASCULAIRE  
PARIS  
SUD

# Management of Coronary obstruction after TAVI

*Philippe Garot, MD  
ICPS, Massy, France*



# This is a TAVR-related coronary obstruction



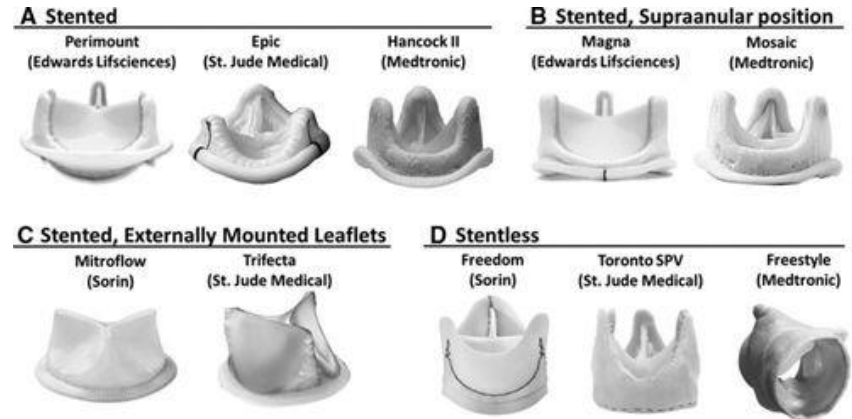
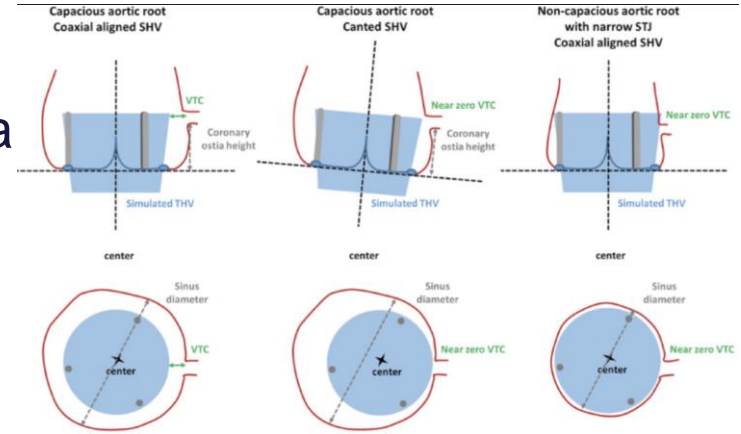
- Uncommon complication (<1%)
- 30-D mortality 40-50%

## Mechanism

- Displacement of bulky native leaflet tissue towards the coronary ostium with direct obstruction of coronary flow
- Contact of the displaced leaflet tissue with the sino-tubular junction and indirectly causing reduction of coronary flow by sealing off the coronary sinuses

# Causes of coronary obstruction

- Patients anatomy
  - VTC < 4mm Virtual THV-coronary ostia
  - SOV < 30mm shallow Valsalva
  - Excessive calcification
  - Coronary height < 12mm
  - Leaflet length/coronary height
- Valve position (high/low)
- ViV procedures
  - Stentless
  - Externally mounted leaflets
- THV Oversizing



## Mr. L. 73 years old

**Severe calcific tricuspid AS with congestive heart failure (NYHA III):** 0.5cm<sup>2</sup>, mean Gd 37mmHg, LVEF 40%

### Medical history

Severe COPD

End-stage renal failure on dialysis

Dual-chamber PPM: sick sinus syndrome

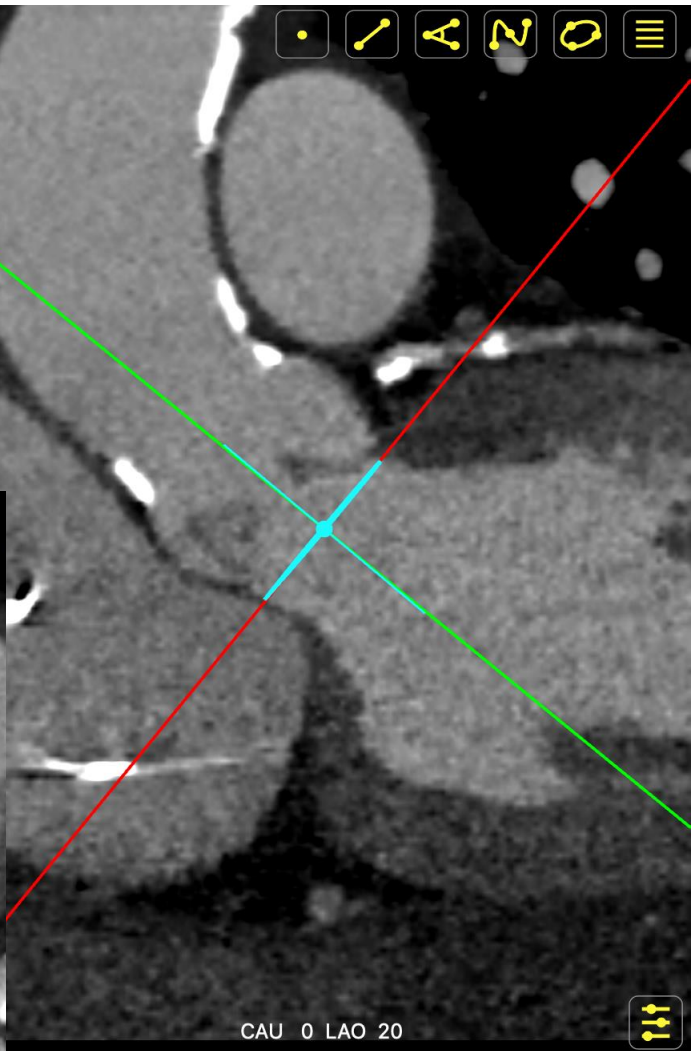
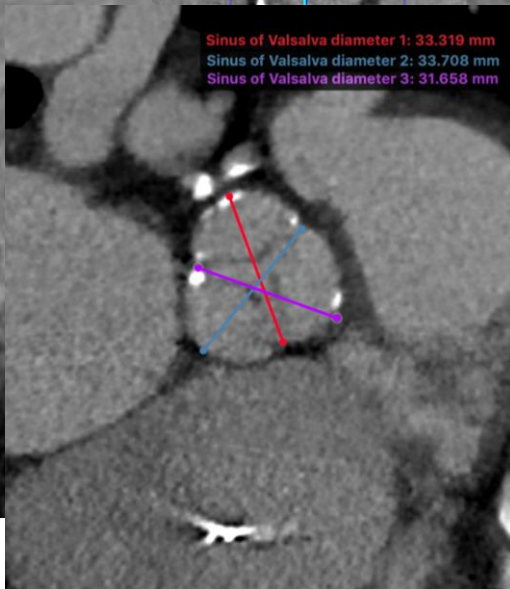
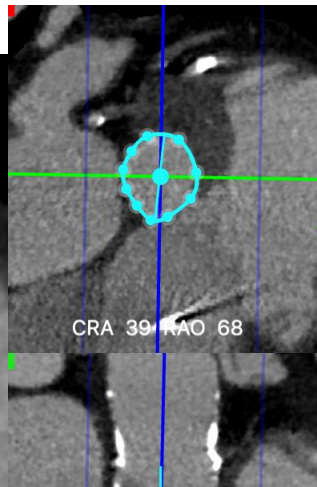
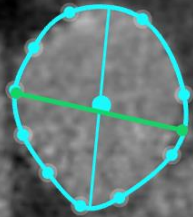
CTO ostial RCA with no viability

### Cardiovascular Risk factors:

Hypertension



Aortic valve annulus  
Perimeter: 78.4 mm  
Surface area: 476.5 mm<sup>2</sup>  
Maximum diameter: 27.6 mm  
Height: 0.1 mm  
En face angle: CRA 39 RAO 69  
Minimum diameter: 23.193 mm  
Mean diameter 24.8 mm



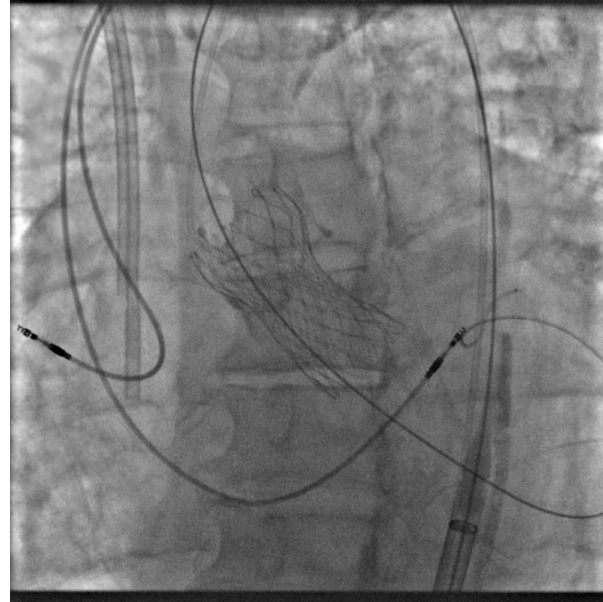




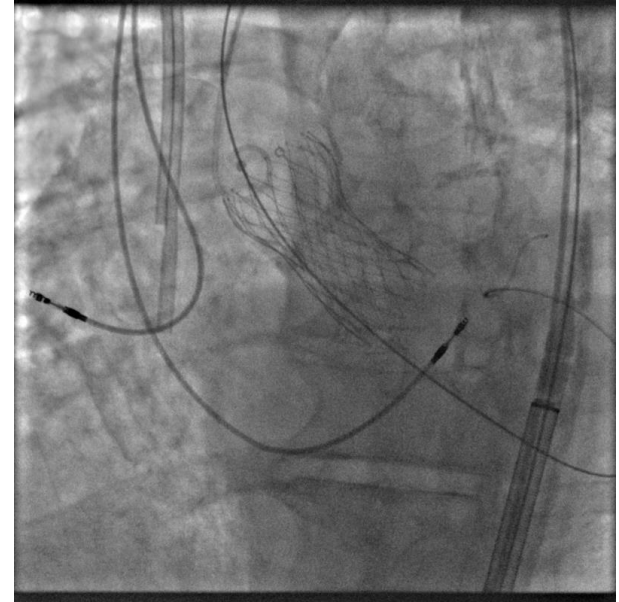
# Mean Diam 24.8mm [23-28]

Manufacturer	Valve name	Size	Oversizing (area)	Oversizing (perimet...
Medtronic	CoreValve 23mm	23 mm (18-20 mm)	<b>-11.2 %</b>	<b>-6.6 %</b>
Medtronic	CoreValve 26mm	26 mm (20-23 mm)	<b>13.5 %</b>	<b>5.6 %</b>
Medtronic	CoreValve 29mm	29 mm (23-26 mm)	<b>41.2 %</b>	<b>17.8 %</b>
Medtronic	CoreValve 31mm	31 mm (26-29 mm)	<b>61.3 %</b>	<b>25.9 %</b>
Edwards	Sapien 3 23mm	23 mm (21-23 mm)	<b>-11.2 %</b>	<b>-6.6 %</b>
Edwards	Sapien 3 26mm	26 mm (23-26 mm)	<b>13.5 %</b>	<b>5.6 %</b>
Edwards	Sapien 3 29mm	29 mm (26-29 mm)	<b>41.2 %</b>	<b>17.8 %</b>
St. Jude	Portico 23mm	23 mm (19-21 mm)	<b>-11.2 %</b>	<b>-6.6 %</b>
St. Jude	Portico 25mm	25 mm (21-23 mm)	<b>4.9 %</b>	<b>1.6 %</b>
St. Jude	Portico 27mm	27 mm (23-25 mm)	<b>22.4 %</b>	<b>9.7 %</b>
St. Jude	Portico 29mm	29 mm (25-27 mm)	<b>41.2 %</b>	<b>17.8 %</b>

# Evolute PRO 29

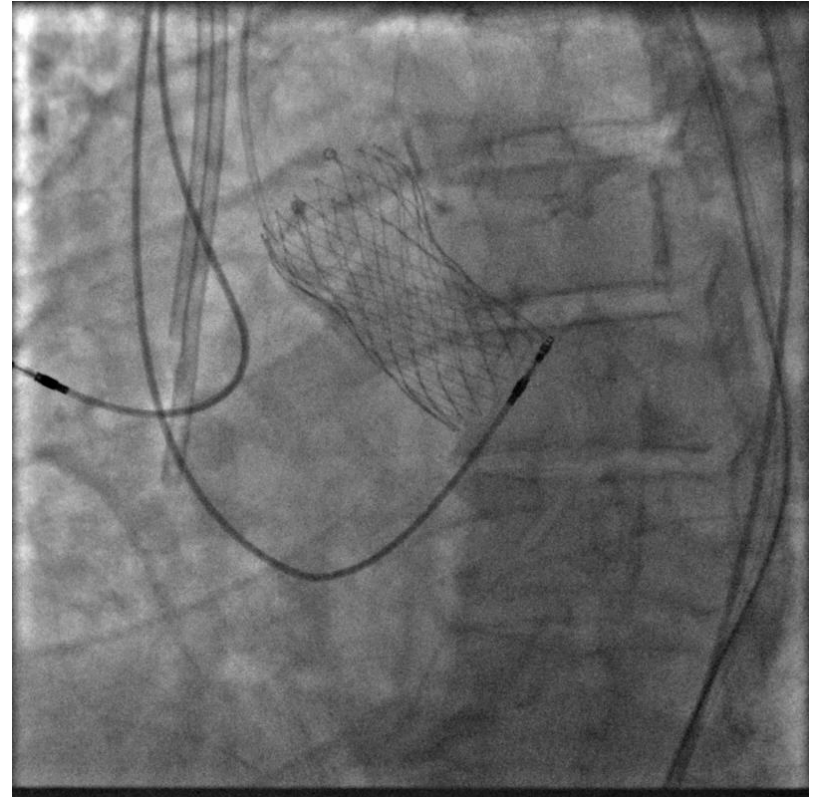
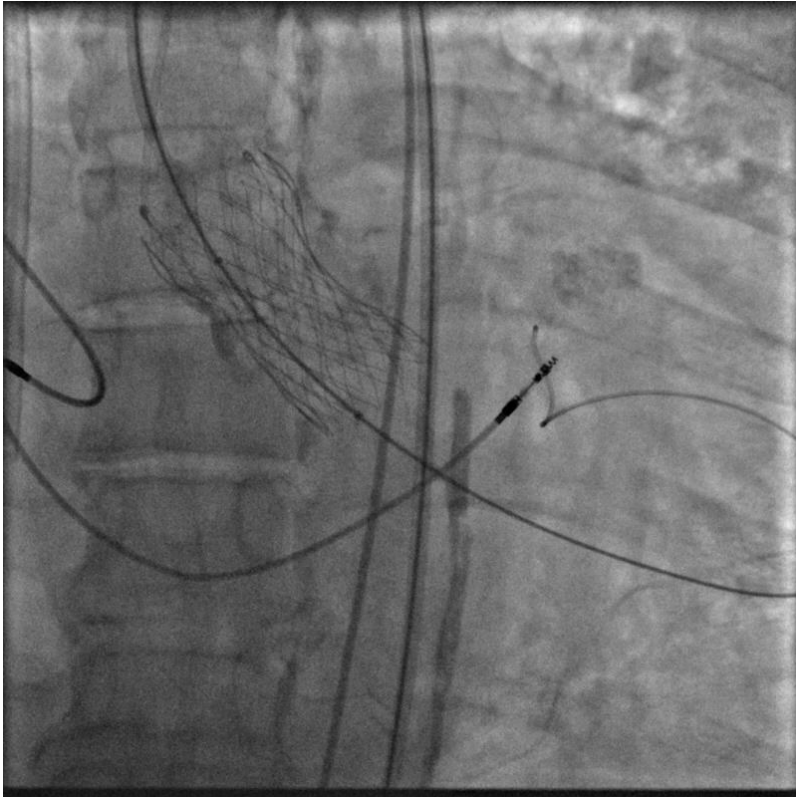


PVL>2

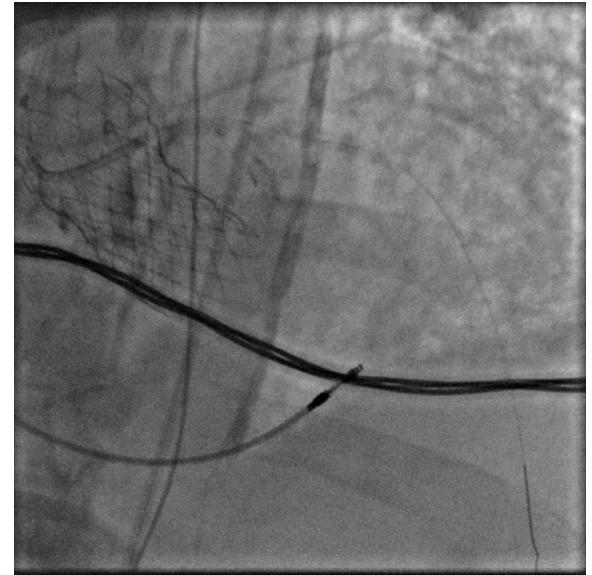
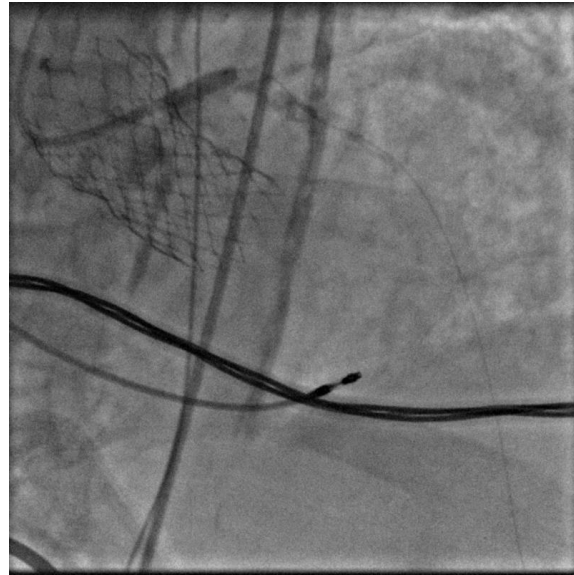


THV underexpansion

# Post-dilatation 23mm







**Xience 4.0 x 12**

# PCI

- Cardiac arrest/CPR
- Cannulation, wiring, stenting

*Technically challenging to cannulate towards the THV and the displaced leaflet*

▶ **Anticipation and prevention**

# Stenting options

- Upfront stenting
- Pre-emptive wire (with eventual stenting)
  - Positioning a guidewire and an undeployed stent in the left coronary system
  - facilitate diagnosis and treatment of a potential occlusion
  - After THV implantation, if CO, the stent is pulled back and deployed at the ostium with minimal to large protrusion into the aorta



# Preventive stenting options

- Regular stenting of the ostium (small protrusion in the aorta)
- Chimney technique (wide protrusion in the aorta)

*The optimal technique has not yet been established*

## Mrs. D. 81 years old

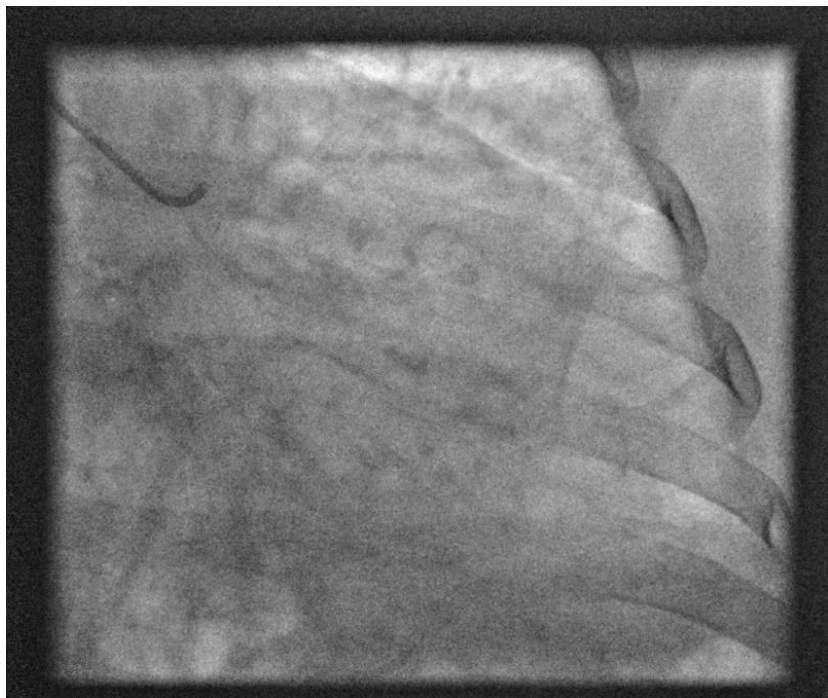
**Severe calcific tricuspid AS with congestive heart failure (NYHA III):** 0.4cm<sup>2</sup>, mean Gd 50mmHg, sysPAP 50mmHg, LVEF 50%

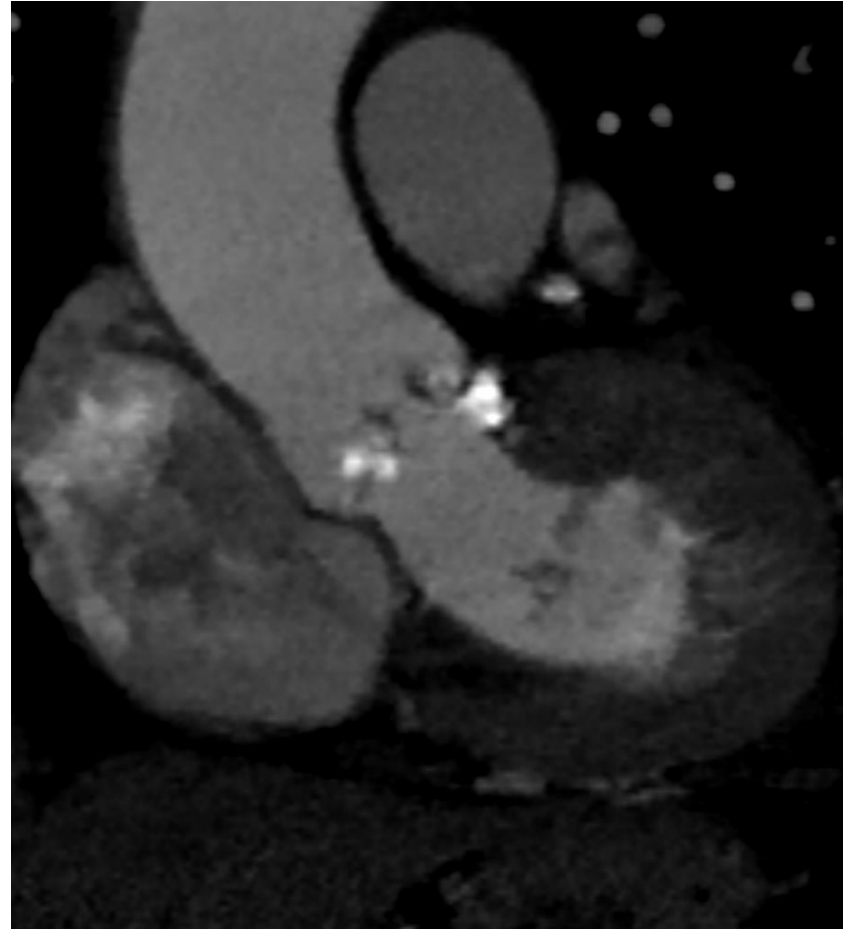
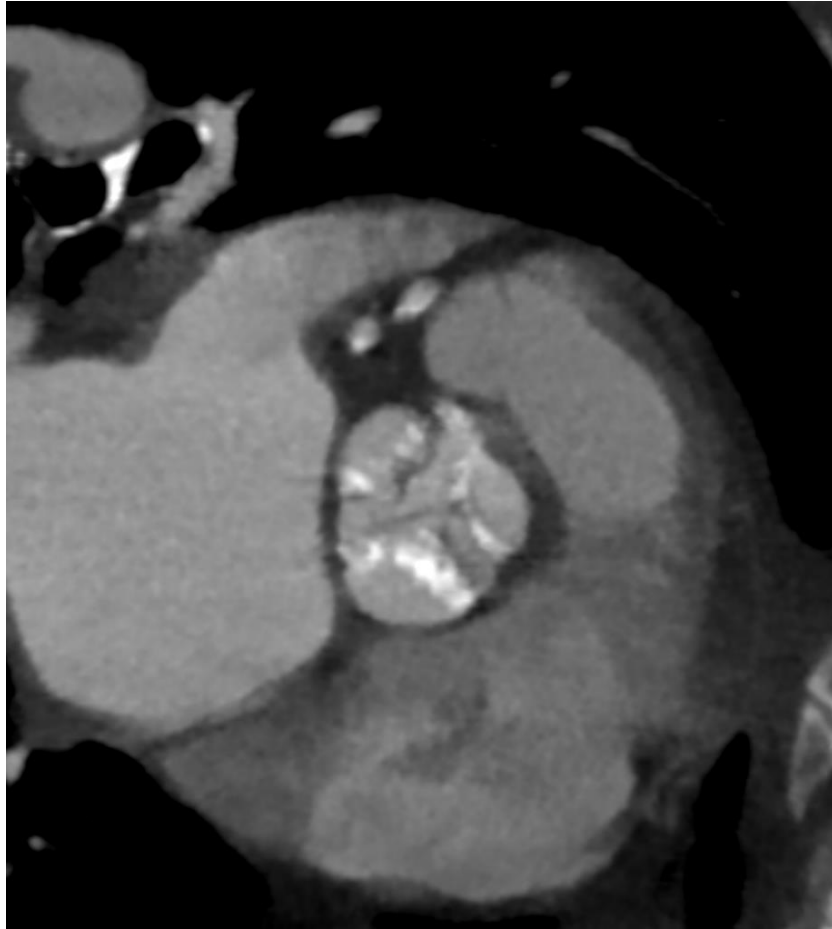
**Medical history:** frail

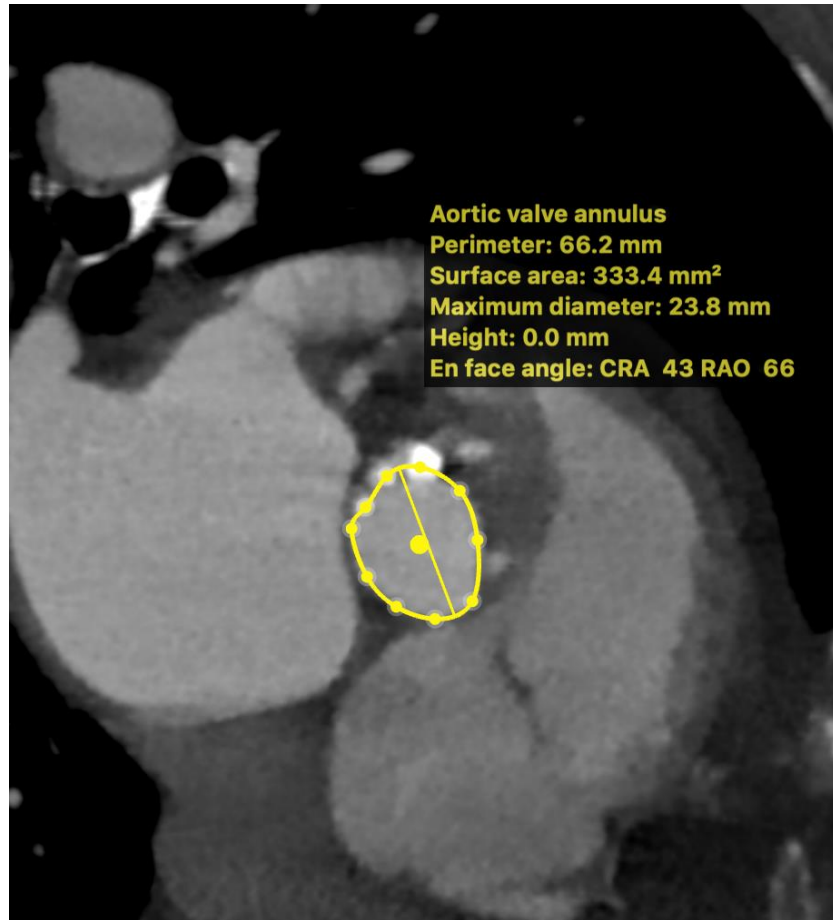
**Cardiovascular Risk factors:**

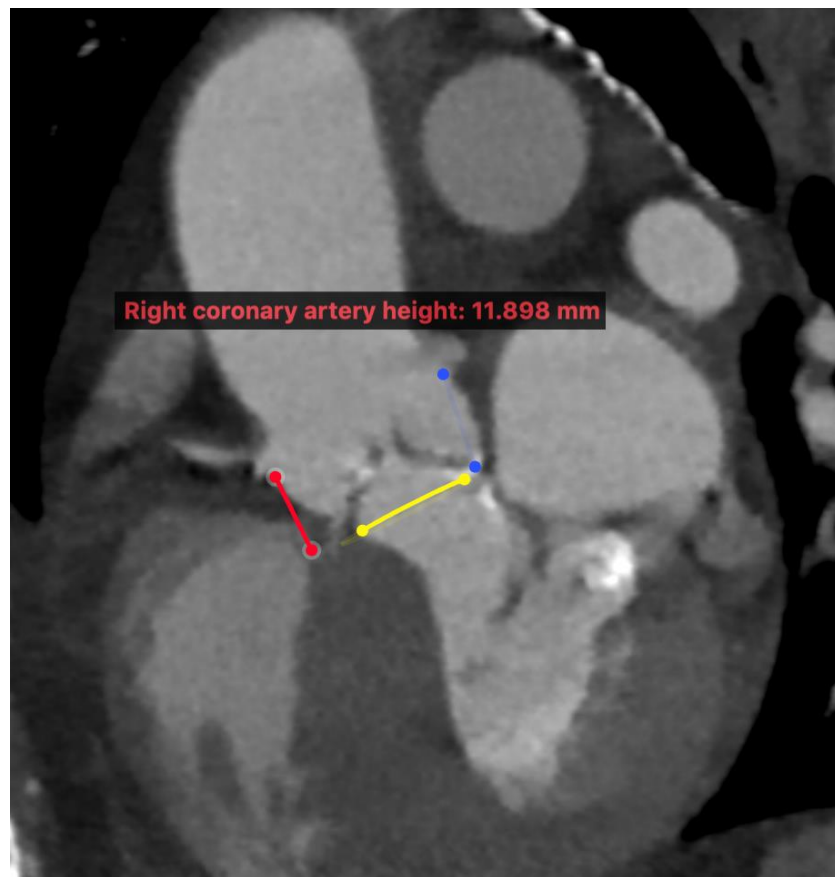
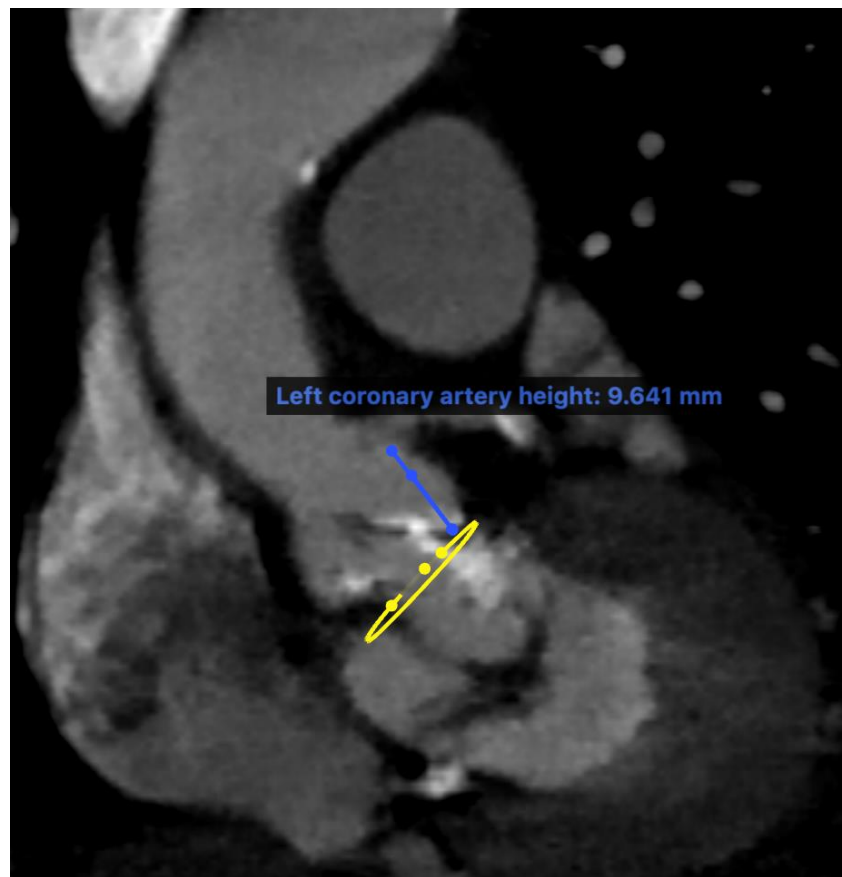
Hypertension, Dyslipidemia, NIDDM

**ECG:** regular sinus rhythm, 1° AVB 210ms, QRS 85ms









TAVR Valve Sizing Chart

Manufacturer	Valve name	Size	Oversizing (area)	Oversizing (perimet...
Medtronic	CoreValve 23mm	23 mm (18-20 mm)	<b>24.6 %</b>	<b>9.1 %</b>
Medtronic	CoreValve 26mm	26 mm (20-23 mm)	<b>59.2 %</b>	<b>23.3 %</b>
Medtronic	CoreValve 29mm	29 mm (23-26 mm)	<b>98.1 %</b>	<b>37.5 %</b>
Medtronic	CoreValve 31mm	31 mm (26-29 mm)	<b>126.4 %</b>	<b>47.0 %</b>
Edwards	Sapien 3 23mm	23 mm (21-23 mm)	<b>24.6 %</b>	<b>9.1 %</b>
Edwards	Sapien 3 26mm	26 mm (23-26 mm)	<b>59.2 %</b>	<b>23.3 %</b>
Edwards	Sapien 3 29mm	29 mm (26-29 mm)	<b>98.1 %</b>	<b>37.5 %</b>
St. Jude	Portico 23mm	23 mm (19-21 mm)	<b>24.6 %</b>	<b>9.1 %</b>
St. Jude	Portico 25mm	25 mm (21-23 mm)	<b>47.2 %</b>	<b>18.6 %</b>
St. Jude	Portico 27mm	27 mm (23-25 mm)	<b>71.7 %</b>	<b>28.0 %</b>
St. Jude	Portico 29mm	29 mm (25-27 mm)	<b>98.1 %</b>	<b>37.5 %</b>
JenaValve	JenaValve 29mm	23 mm (21-23 mm)	<b>24.6 %</b>	<b>9.1 %</b>
JenaValve	JenaValve 25mm	25 mm (23-25 mm)	<b>47.2 %</b>	<b>18.6 %</b>

Aortic valve annulus

Area  mm<sup>2</sup>      Perimeter  mm

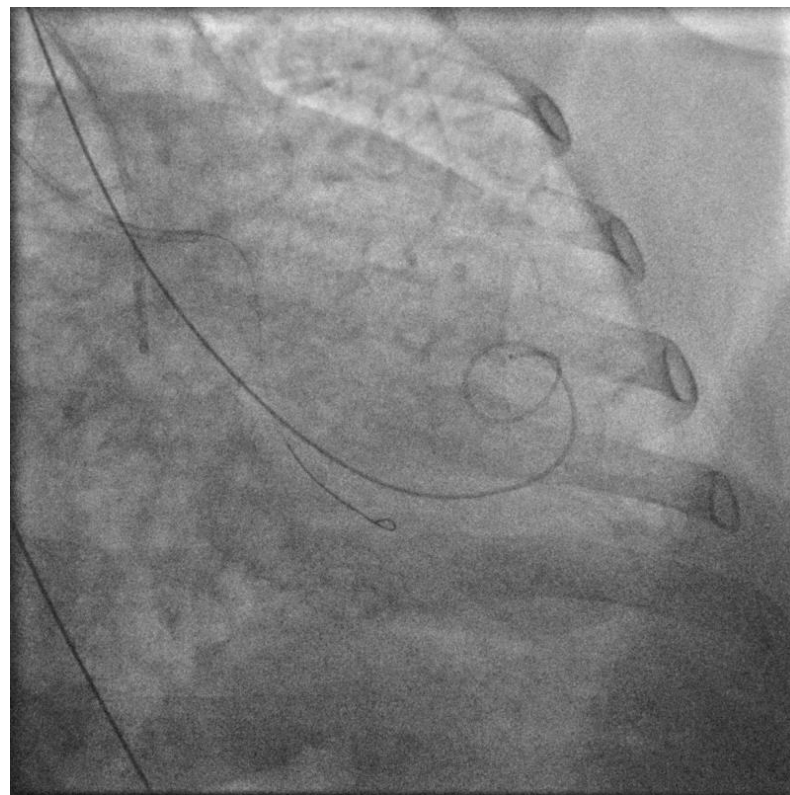
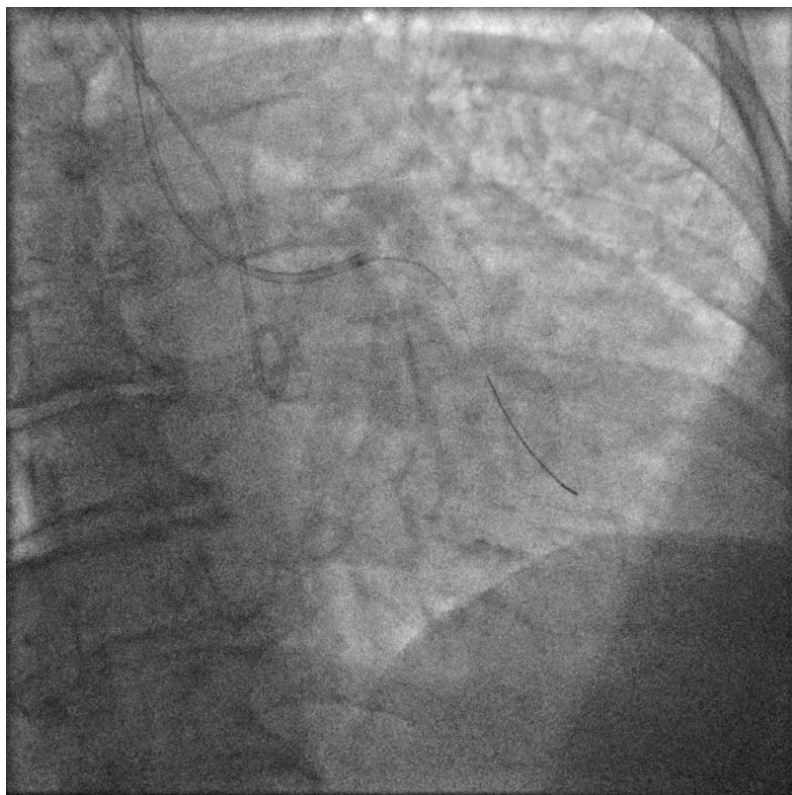
Spline: Aortic valve annulus

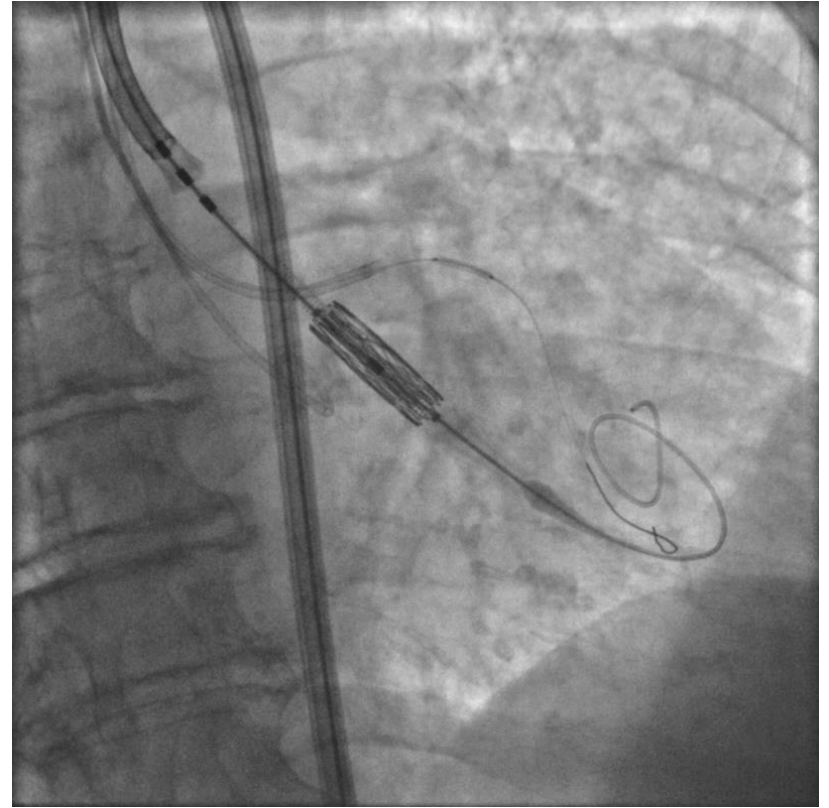
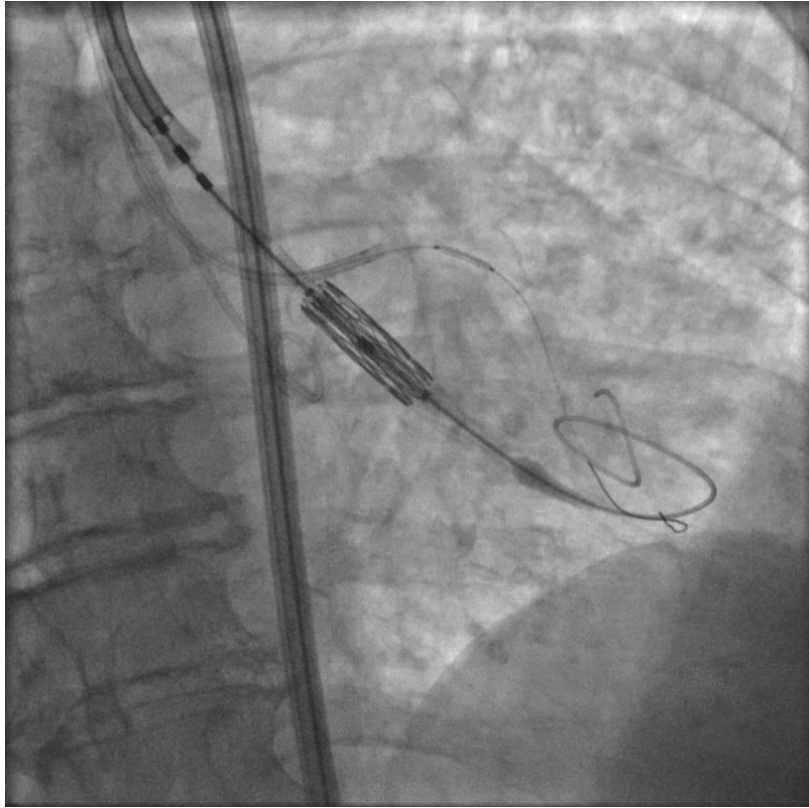
Perimeter-derived diameter  mm



# Sapien 3 23mm (-1mL)

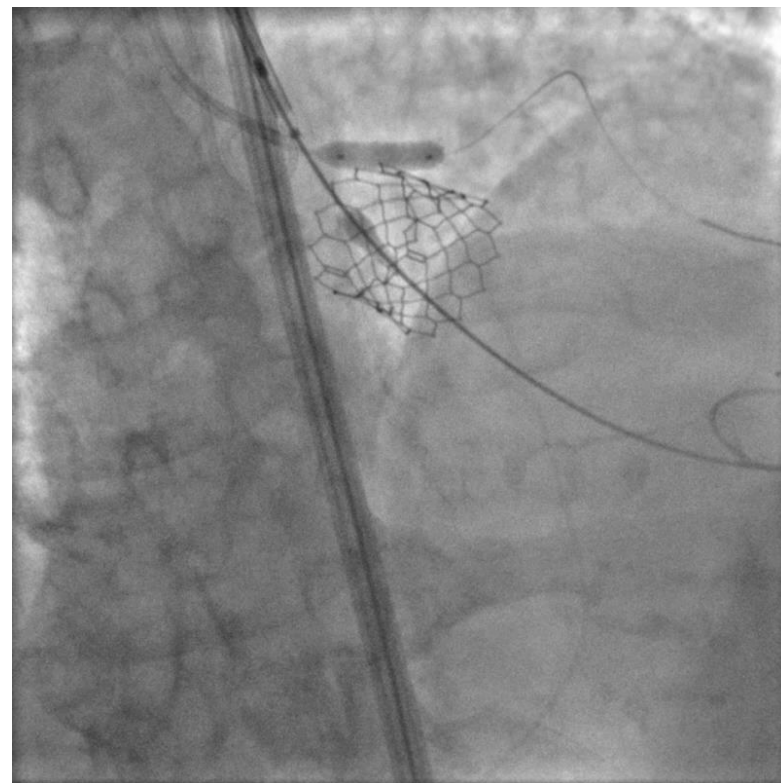
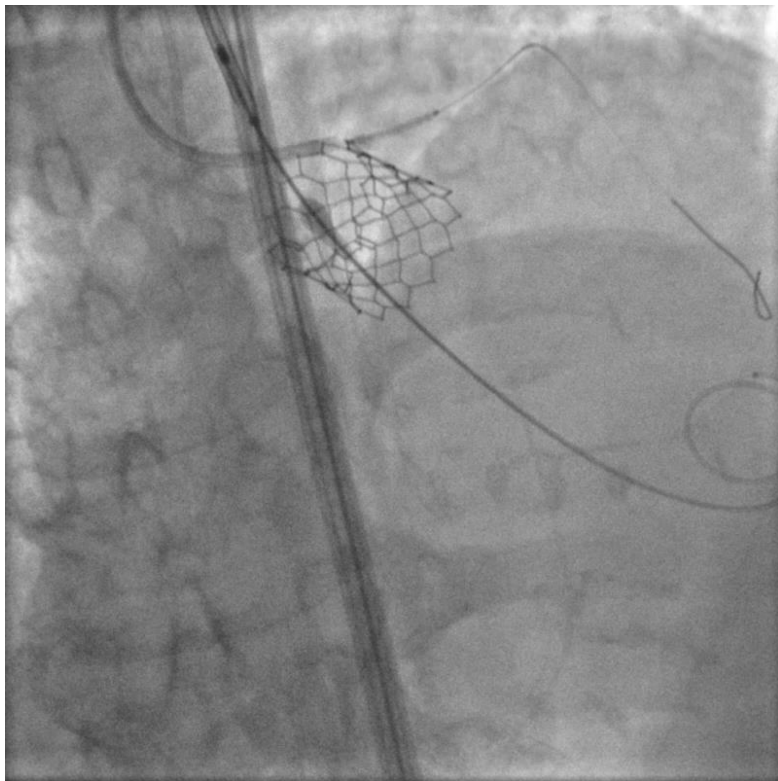
## Coronary protection





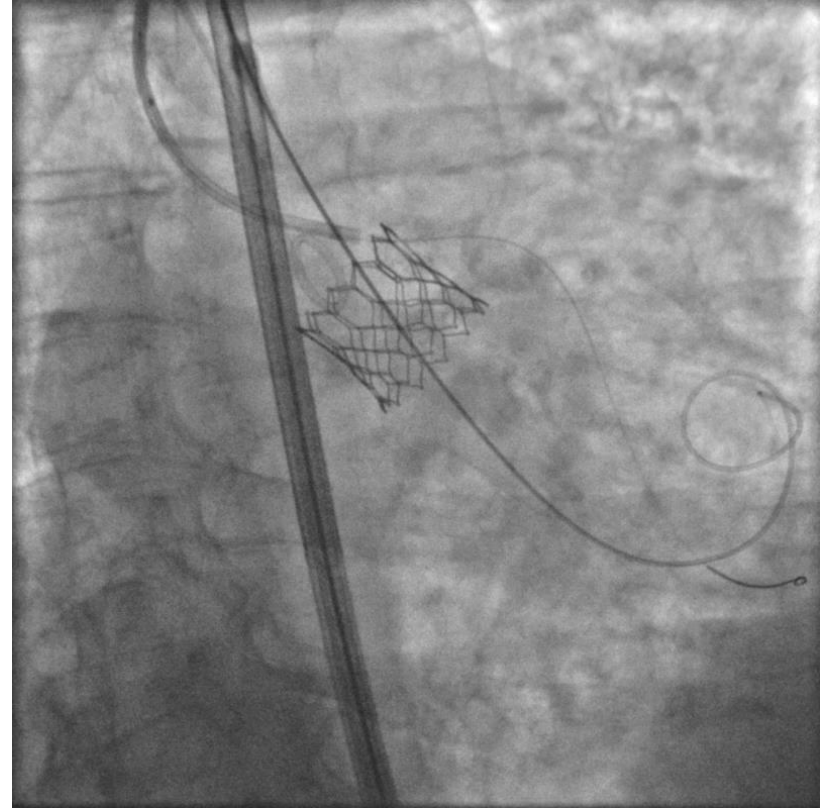
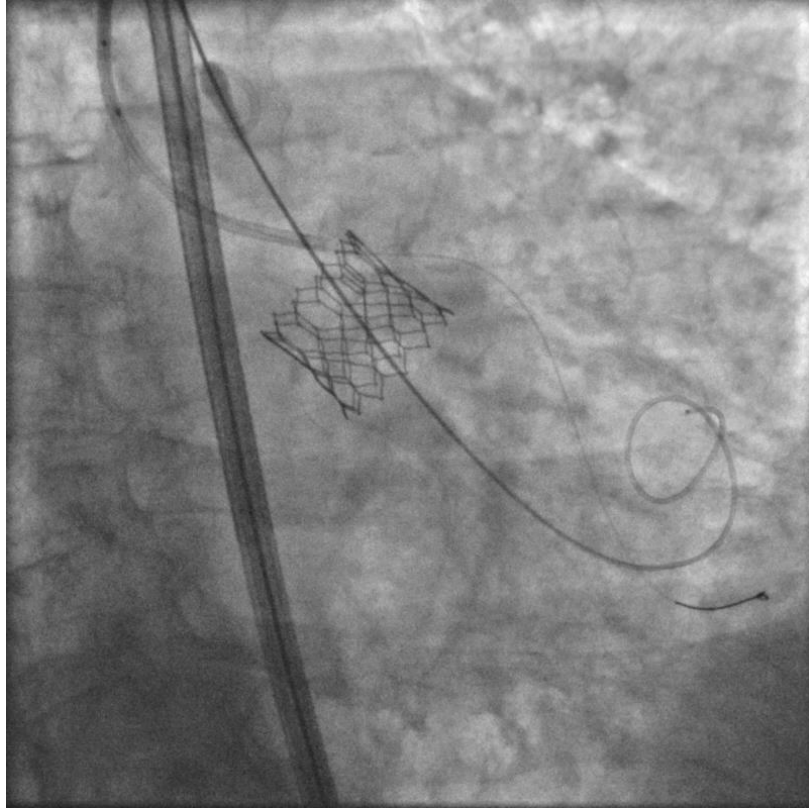
# Contact leaflet-STJ

**CBF reduction by sealing off the coronary sinuses**



**Ultimaster Tansei 4.0x12mm**



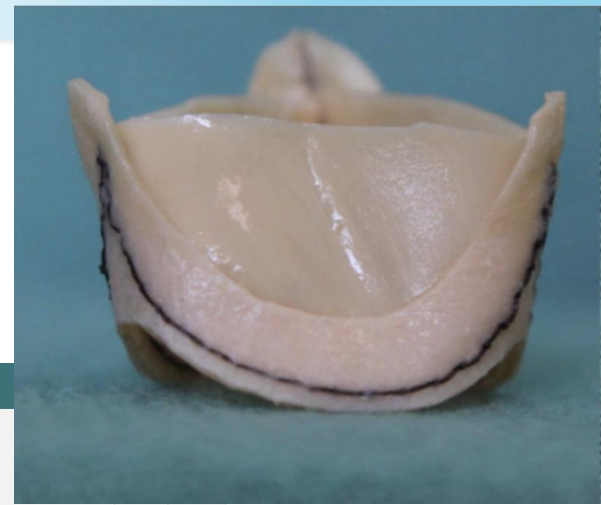


**Mrs. T. 82 years old**

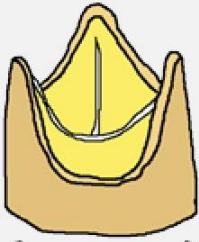
**Degenerated stentless  
Bioprosthesis (Sorin  
Freedom Solo 21mm)**

**Congestive heart failure  
(NYHA III)**


0.83cm<sup>2</sup>, mean Gd 50mmHg,  
sysPAP 55mmHg, LVEF 65%



Freedom Solo, 21

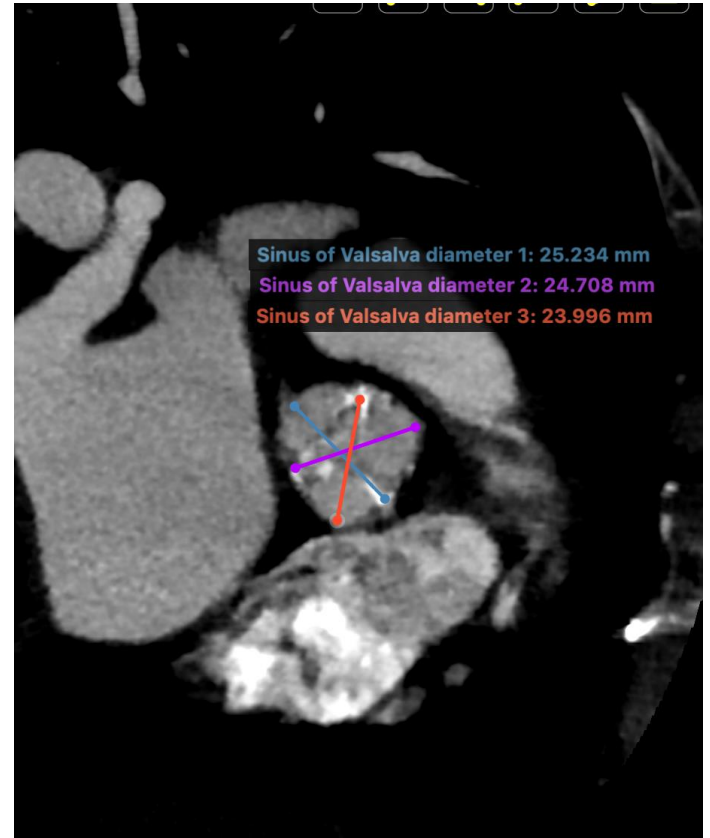
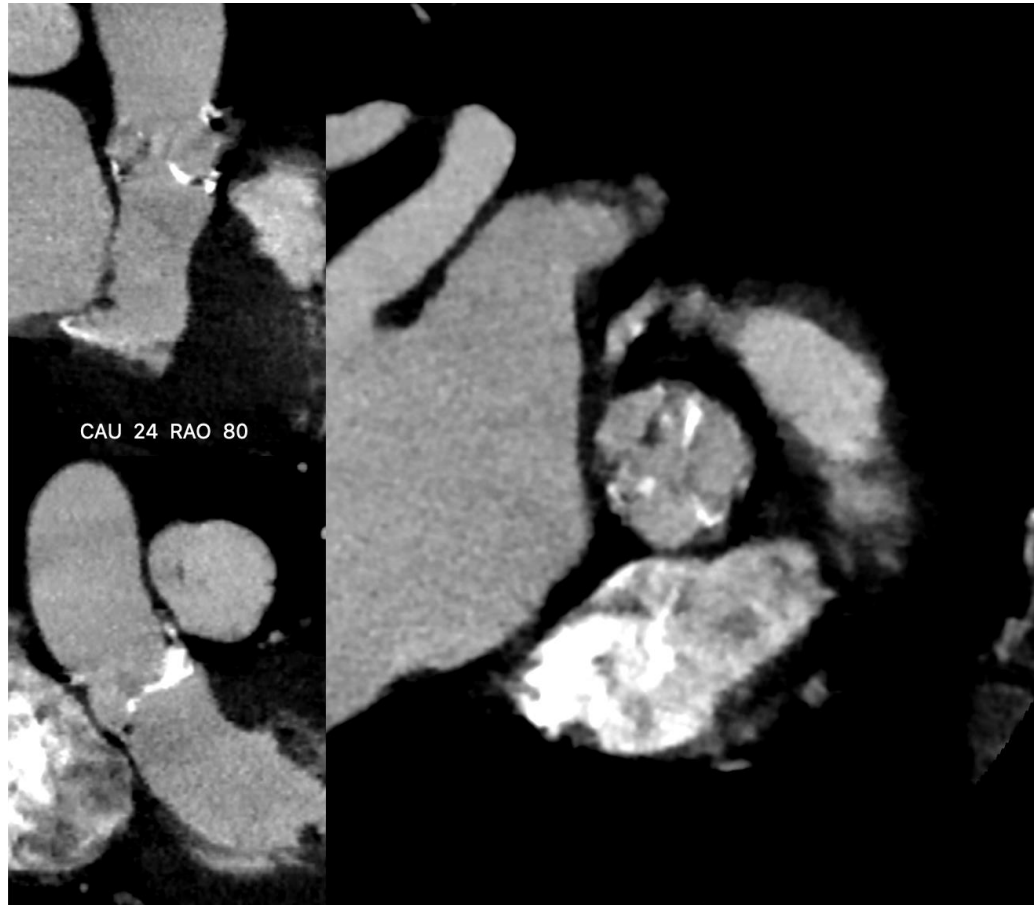


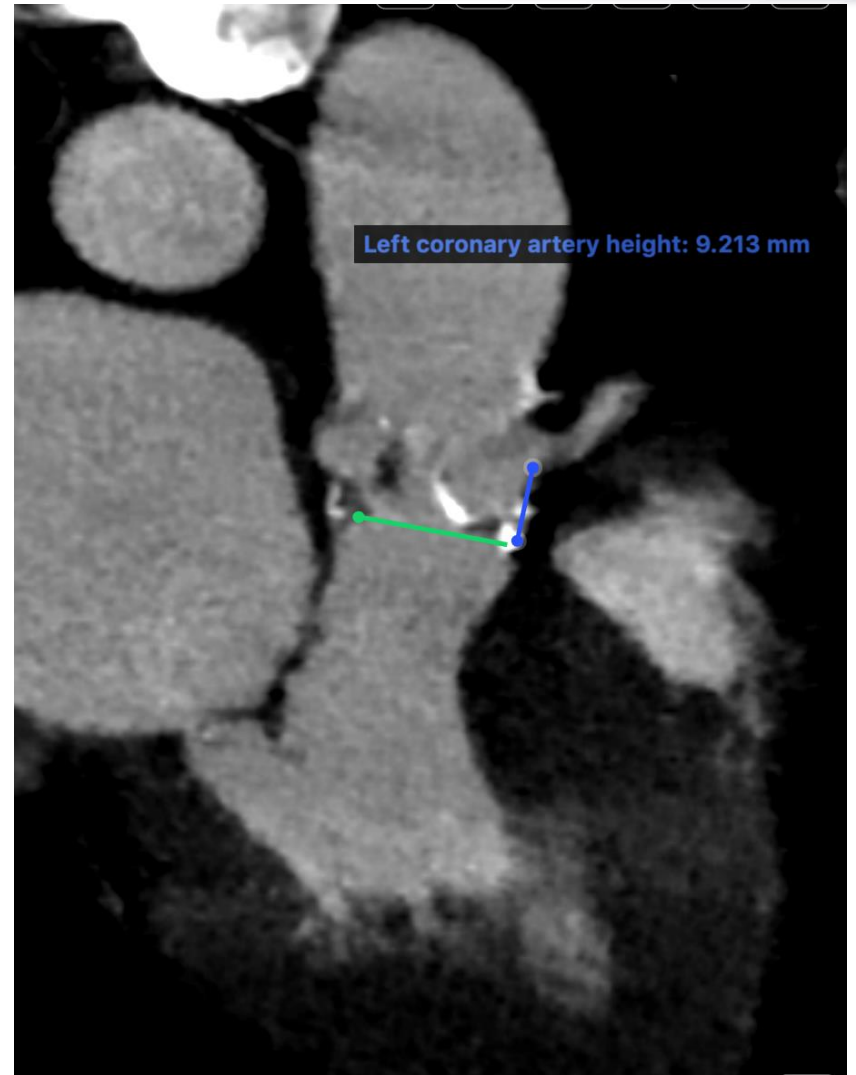
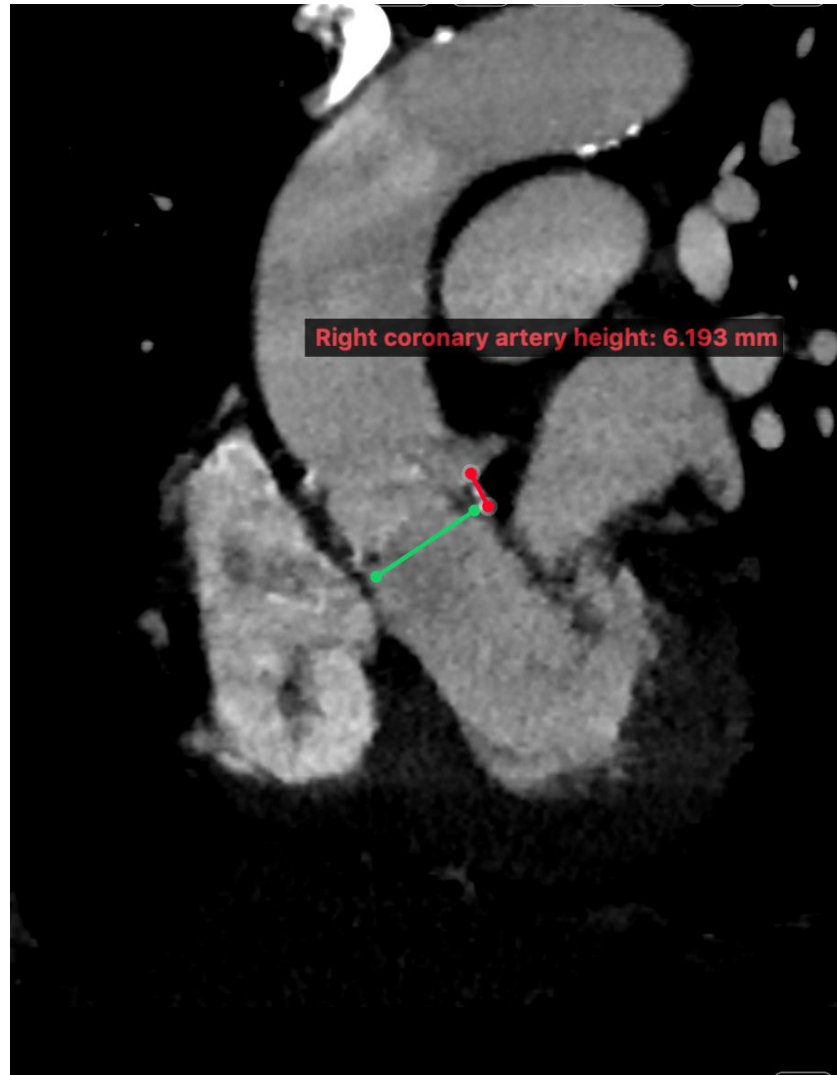
Stent ID: 21

 True ID 21

**THV  
Selector**

The image shows a digital interface for a THV Selector. At the top, it displays 'Freedom Solo, 21'. Below this is a diagram of the bioprosthesis, a yellow cup-like structure with a central opening. A double-headed arrow below the diagram indicates the stent ID, which is '21'. A warning icon (a red lightbulb) is present next to the text 'True ID 21'. At the bottom, there is a large teal circle containing the text 'THV Selector'.

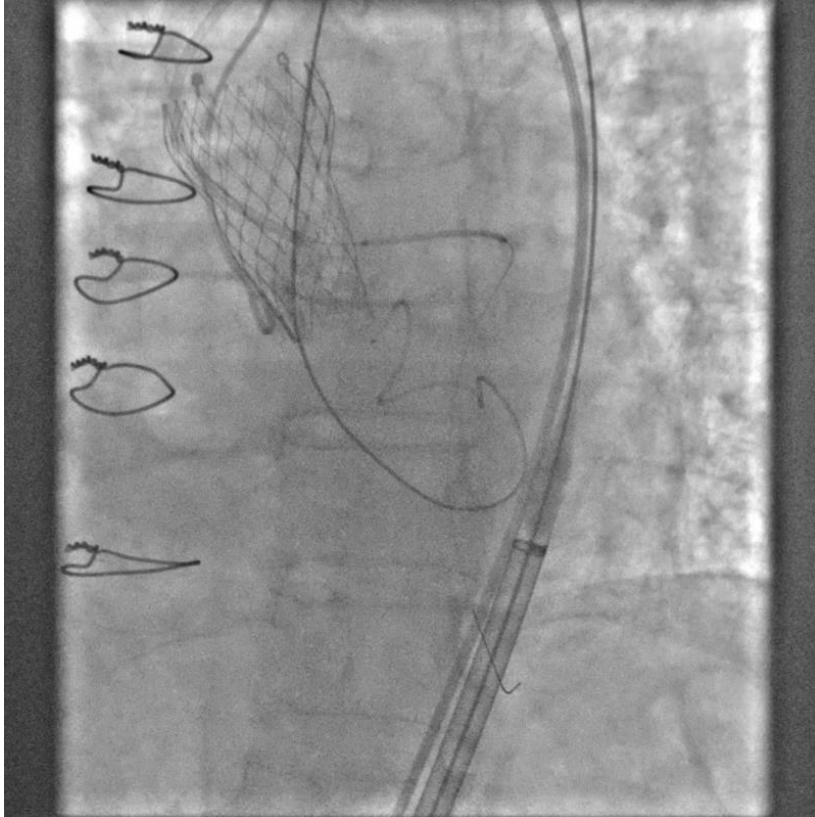




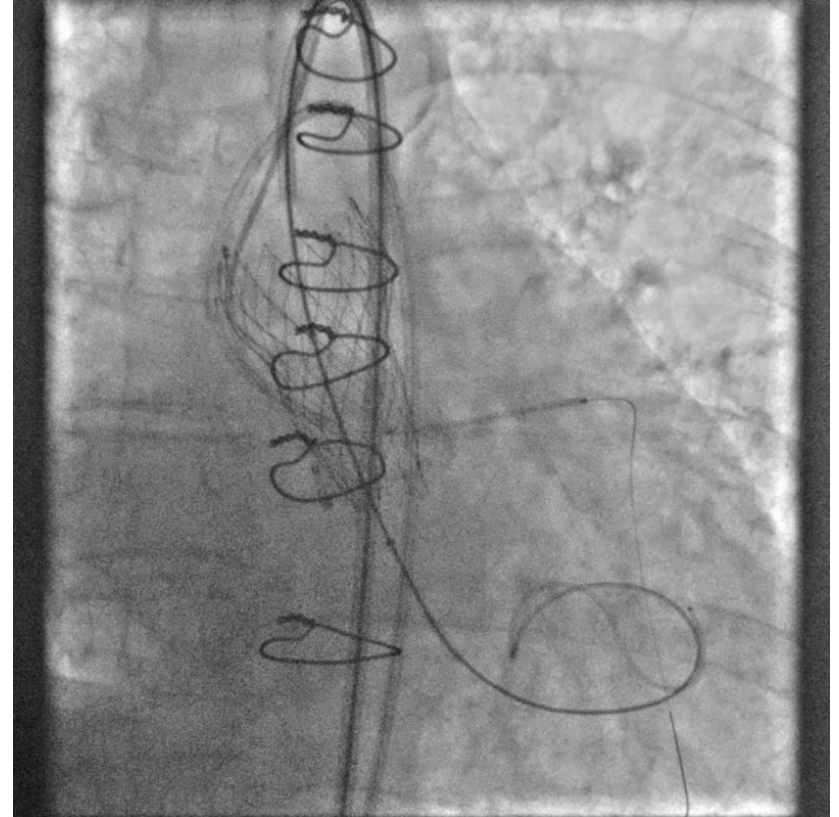




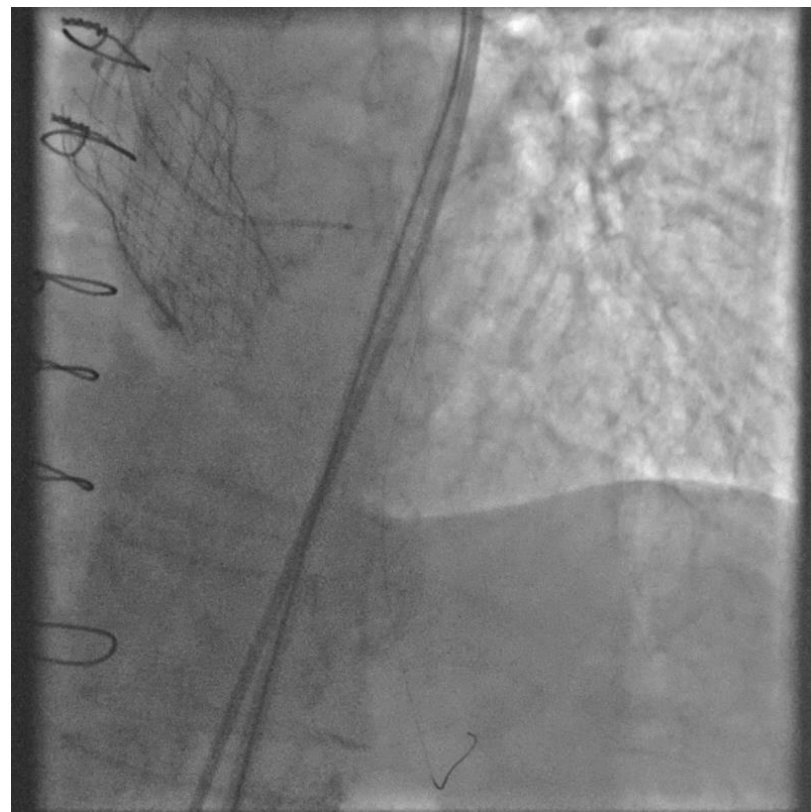
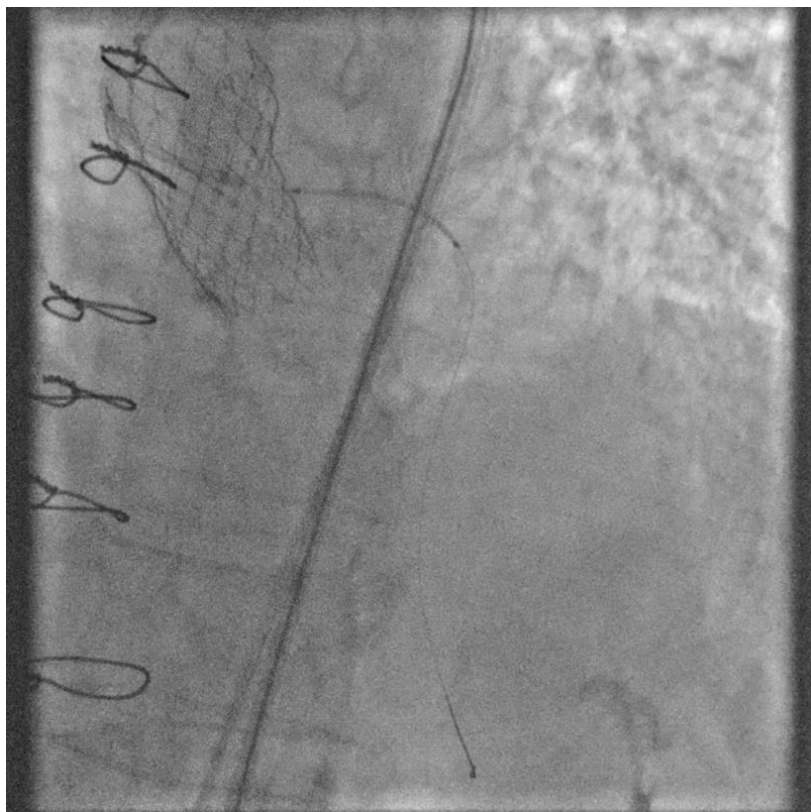
# Post-dilatation 23mm



THV Under-deployed + AR

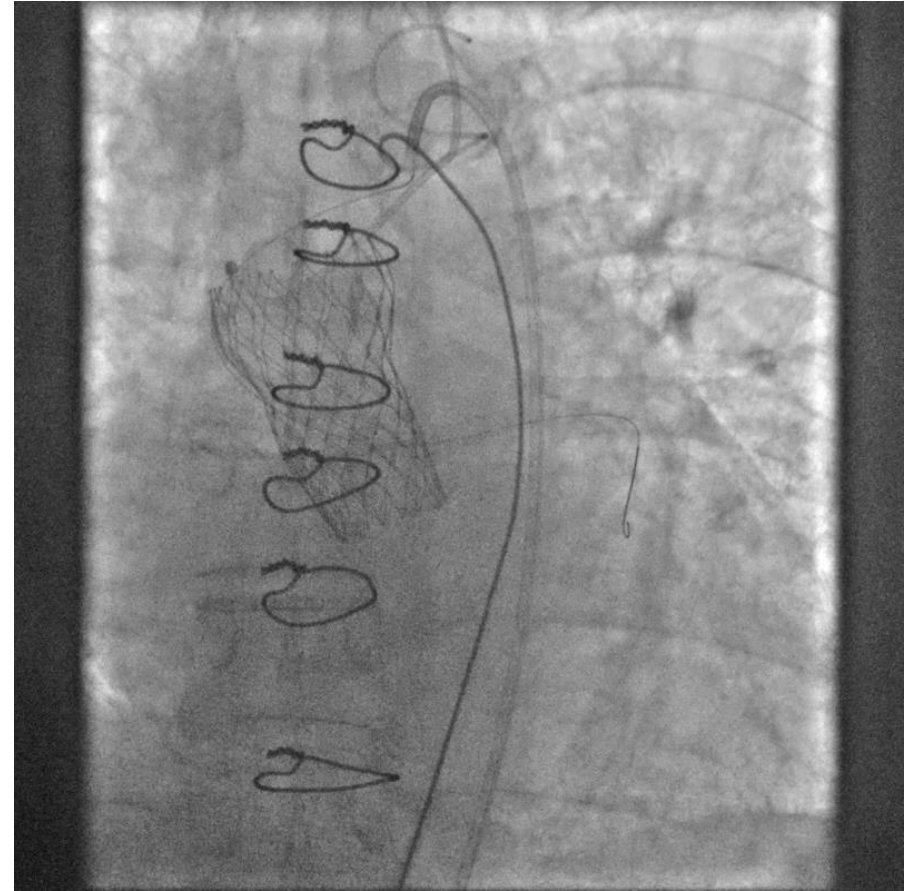
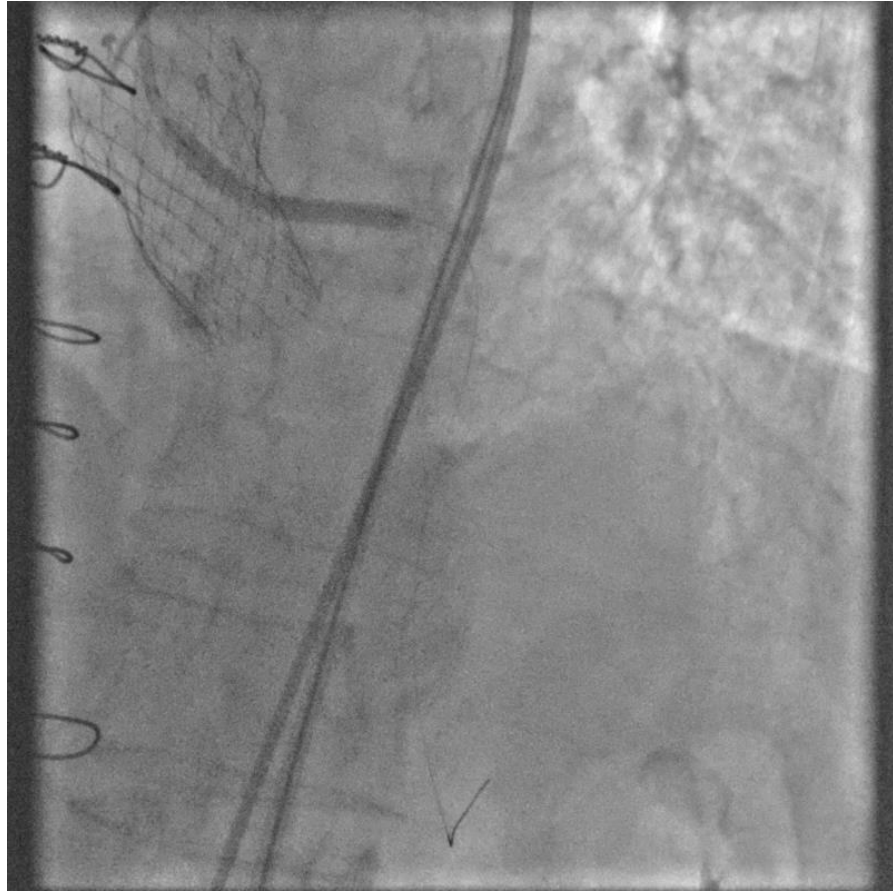


Post-dil



**Xience 4.0x38mm**

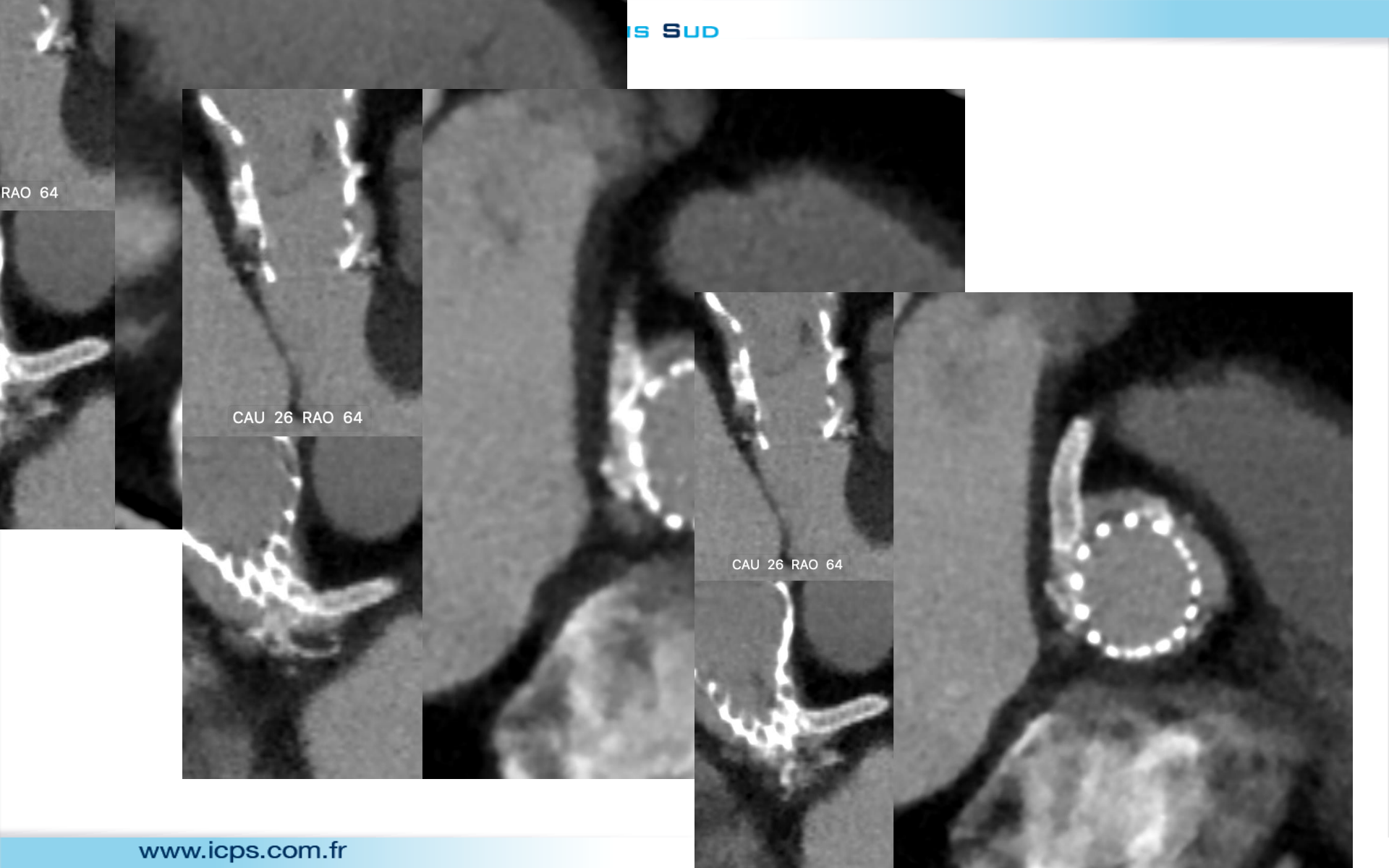




RAO 64

CAU 26 RAO 64

CAU 26 RAO 64

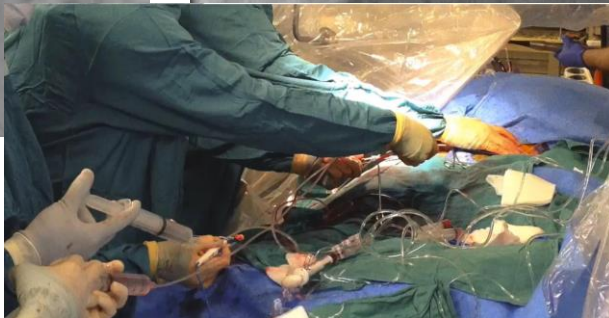
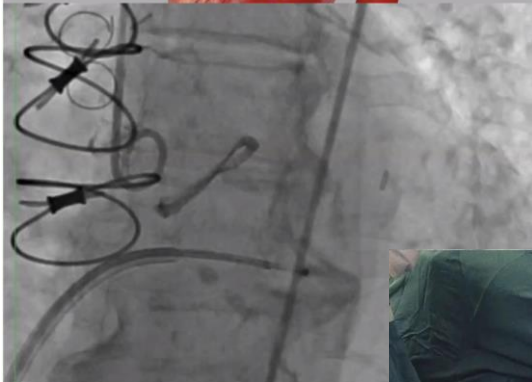
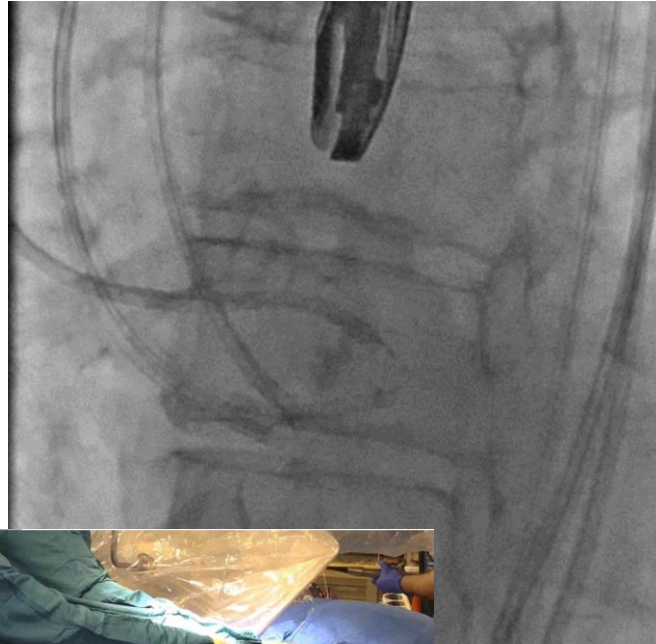
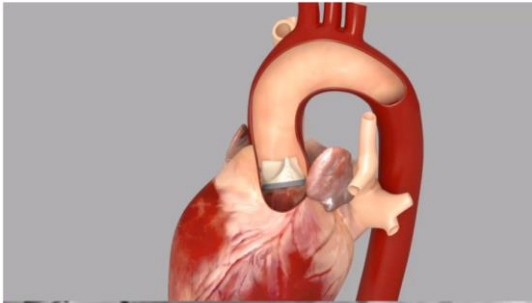


# Delayed coronary occlusion

- Early (<7D)
  - Narrow SOV
  - ViV
  - Continuing expansion (SEV)
  - Wire protection without stenting++
- Late (>7D)
  - ViV
  - Thrombus/antiplatelet

# BASILICA

An upfront transcatheter radiofrequency-based laceration of the aortic leaflets in order to create a triangular space in front of the coronary ostium



<p><b><u>BASILICA Trial (2019)</u></b> <b>30 Pts</b> <b>No Coronary obstruction</b> <b>10% stroke</b> <b>46% embolic debris</b></p>
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# J-Valve

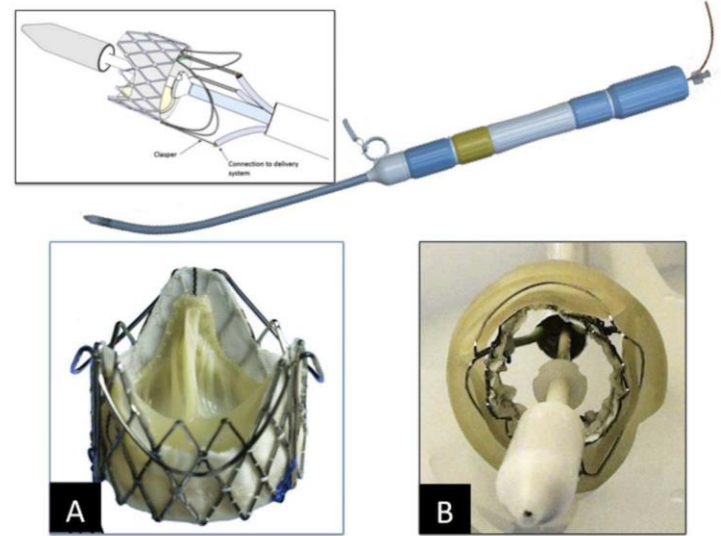


FIGURE 3 A, J-Valve; B, Ausper delivery system, and in vitro implant (native or surgical leaflets embraced between three claspers and valve stent) [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

- The J-Valve THV consists of the valve and three U-shaped “anchor rings” and is deployed in a two-step process.
- First, the anchor rings are opened above the native valve and are retracted (TA) or advanced (TF) into the valve apparatus allowing automatic anatomic alignment in the aortic sinuses and claspings of the native valve leaflets.
- Once positioned, the self-expanding valve is then deployed within the anchor rings and secures the native valve leaflets. The valve, which is not recapturable, is currently available in three sizes.

# To summarize

- TAVR-related CO is a dramatic complication
- Very difficult to manage (CA)
- Prevention and anticipation are mandatory (CT+++)
- Wires/stents are valuable options
- BASILICA is under evaluation
- New THV designed to secure the leaflets into the valve complex seem promising