

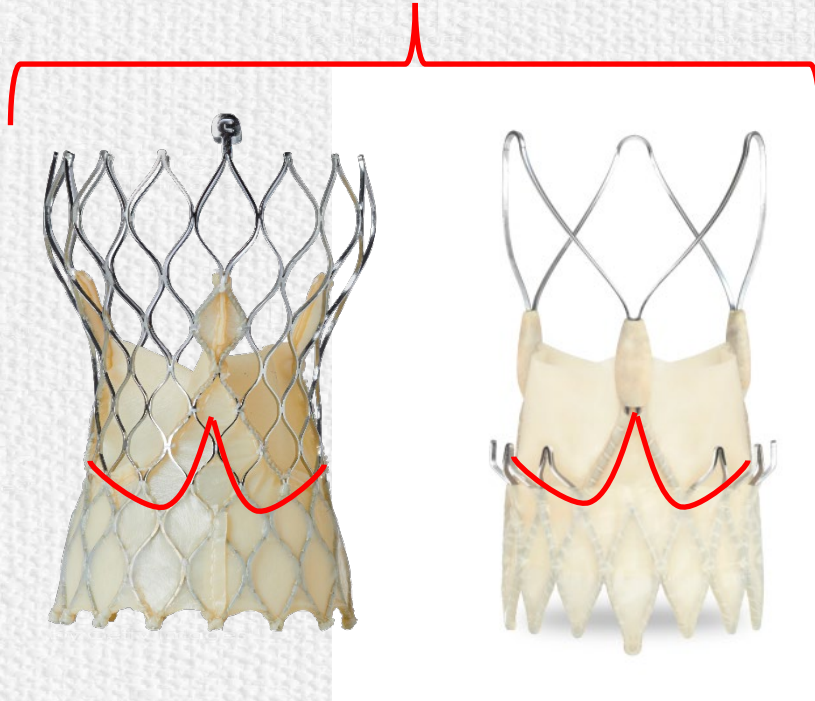
TAVI for aortic valve stenosis: prosthesis selection

How to perform a correct intervention

Flavio L. Ribichini
Universidad de Verona
Italia

Transcatheter Heart Valves

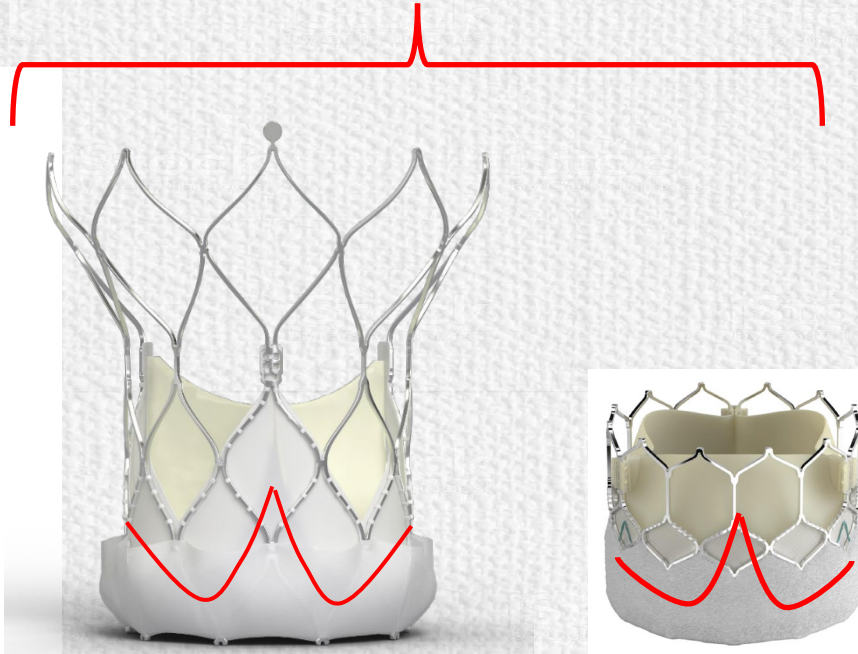
supra-annular design



Evolut R/PRO/FX

Acurate Neo2/Prime

intra-annular design

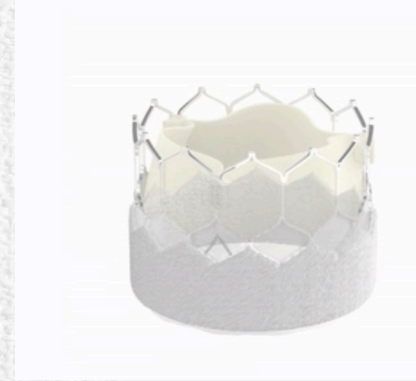
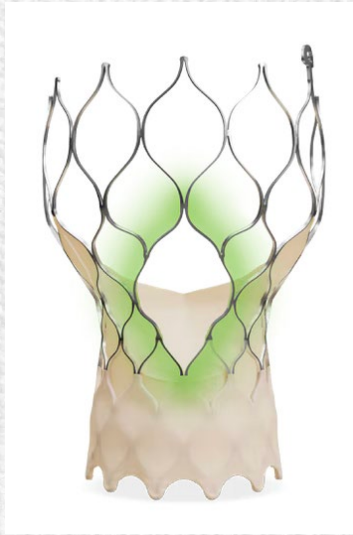


Portico/Navitor

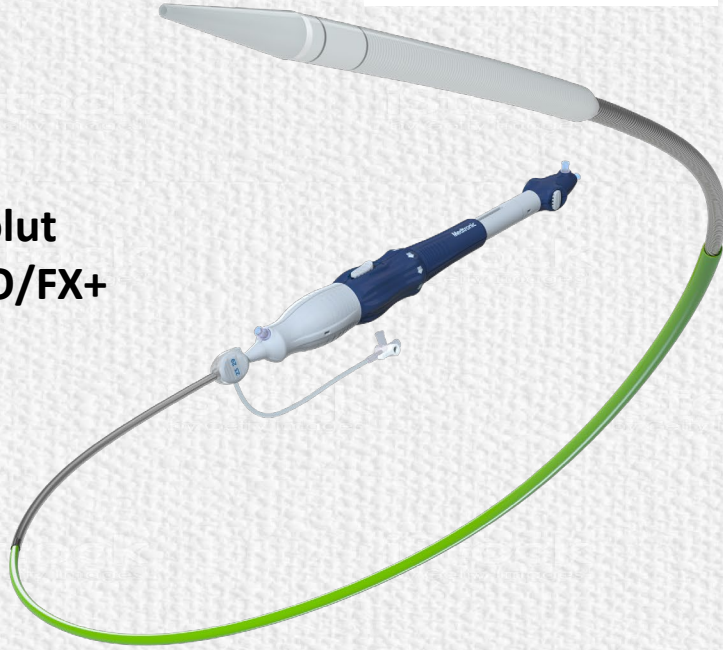
Sapien 3 Ultra/Resilia

large cell design

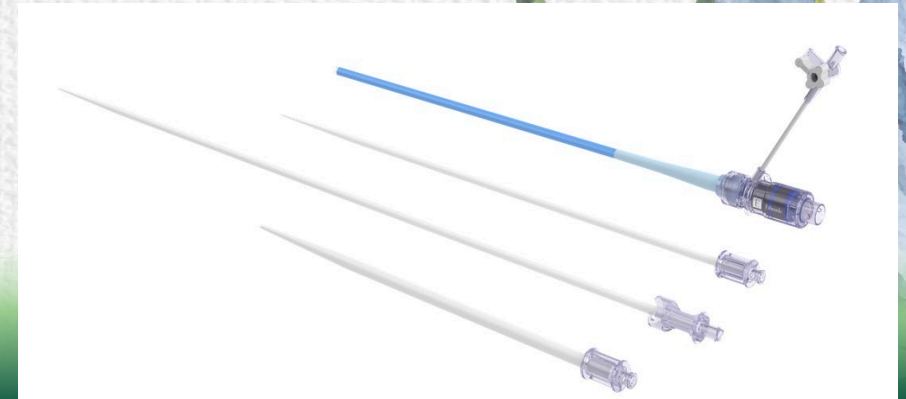
Delivery systems



**Evolut
R/PRO/FX+**



Sapien 3 Ultra/Resilia



Evolut

Contra:

Coronary access

PM rate

Asymmetrical expansion

Very calcified high-risk anatomies

Bicuspid

Small native annuli

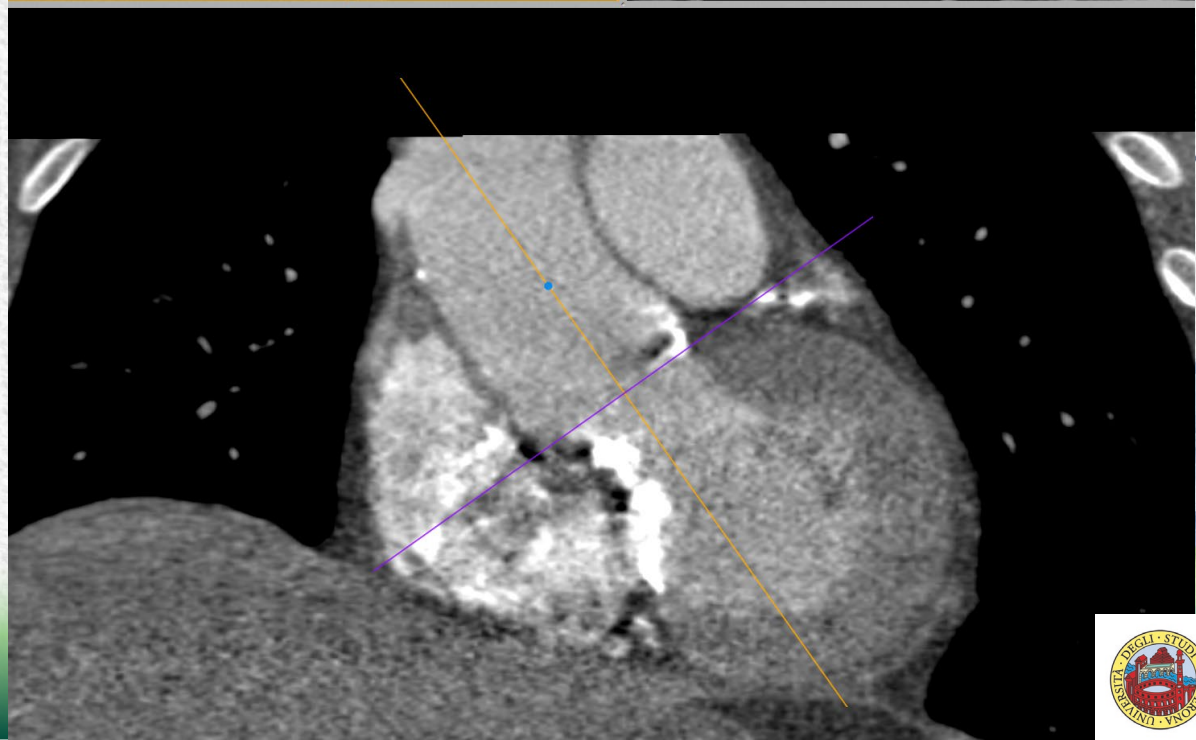
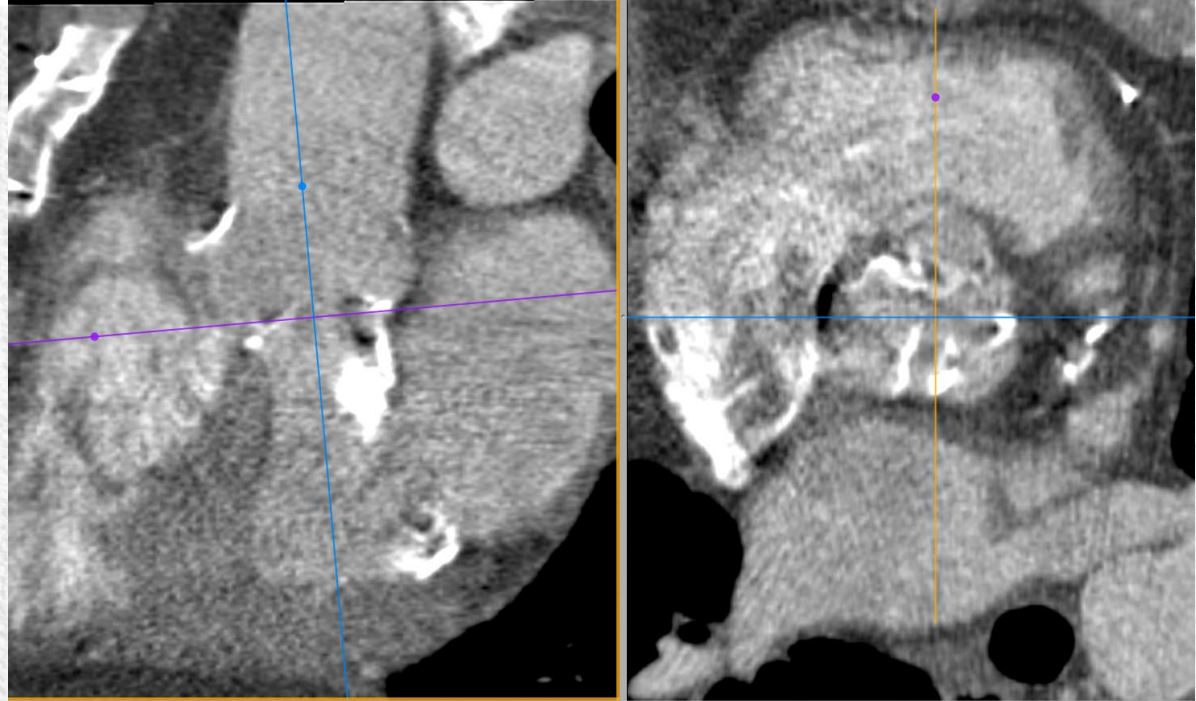
VIV of small surgical valves

SELEZIONE DELLA MISURA	VALVOLA EVOLUT™ PRO			VALVOLA EVOLUT™ R
				
MISURA	23 mm	26 mm	29 mm	34 mm
DIAMETRO ANNULUS	18-20 mm	20-23 mm	23-26 mm	26-30 mm
PERIMETRO ANNULUS†	56.5-62.8 mm	62.8-72.3 mm	72.3-81.7 mm	81.7-94.2 mm
DIAMETRO SENI DI VALSALVA (MEDIA)	≥25 mm	≥27 mm	≥29 mm	≥31 mm
ALTEZZA SENI DI VALSALVA (MEDIA)	≥15 mm	≥15 mm	≥15 mm	≥16 mm

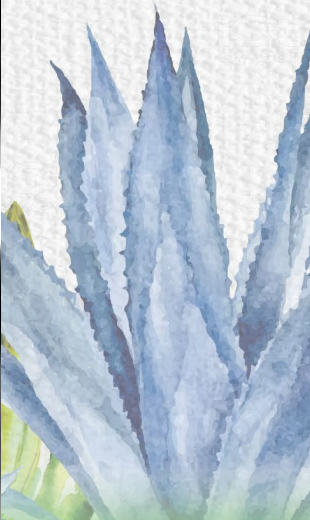
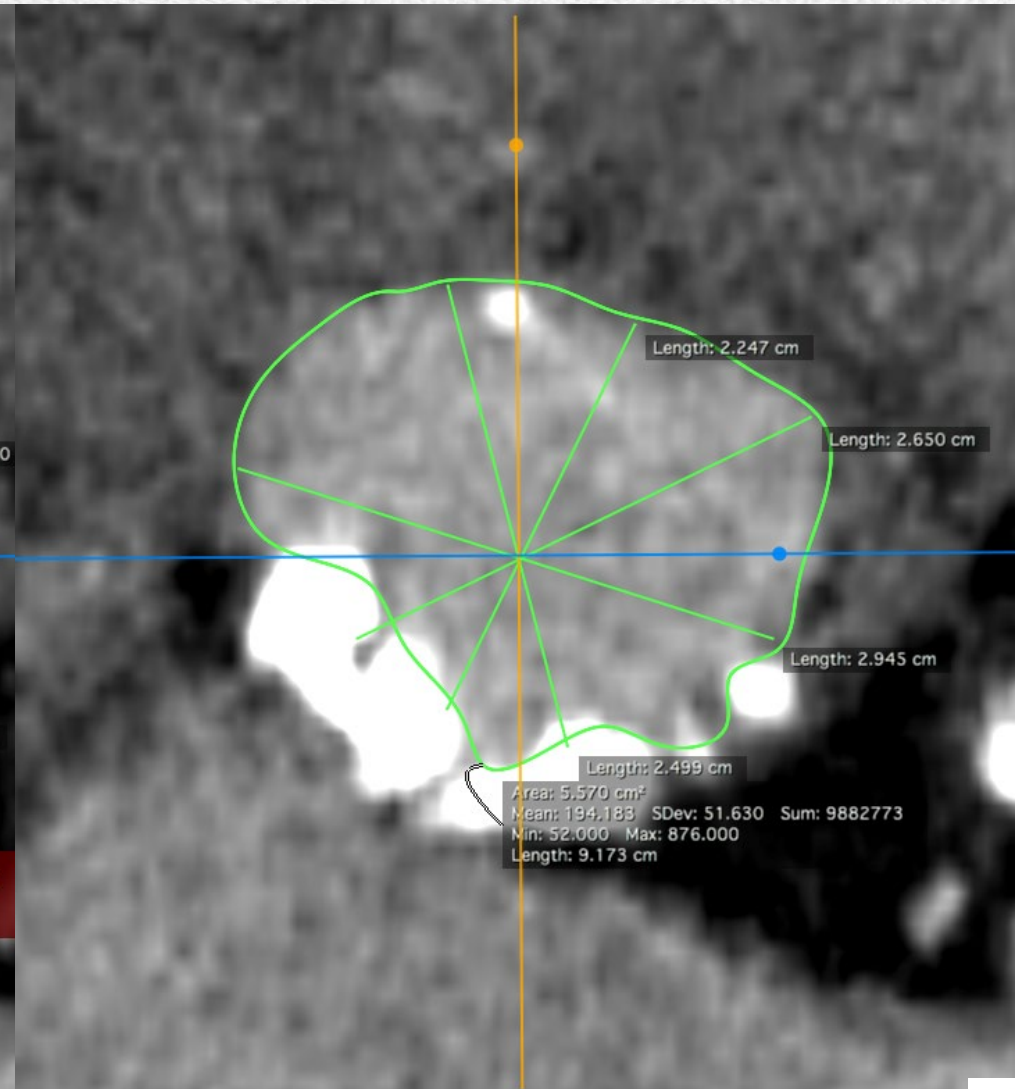
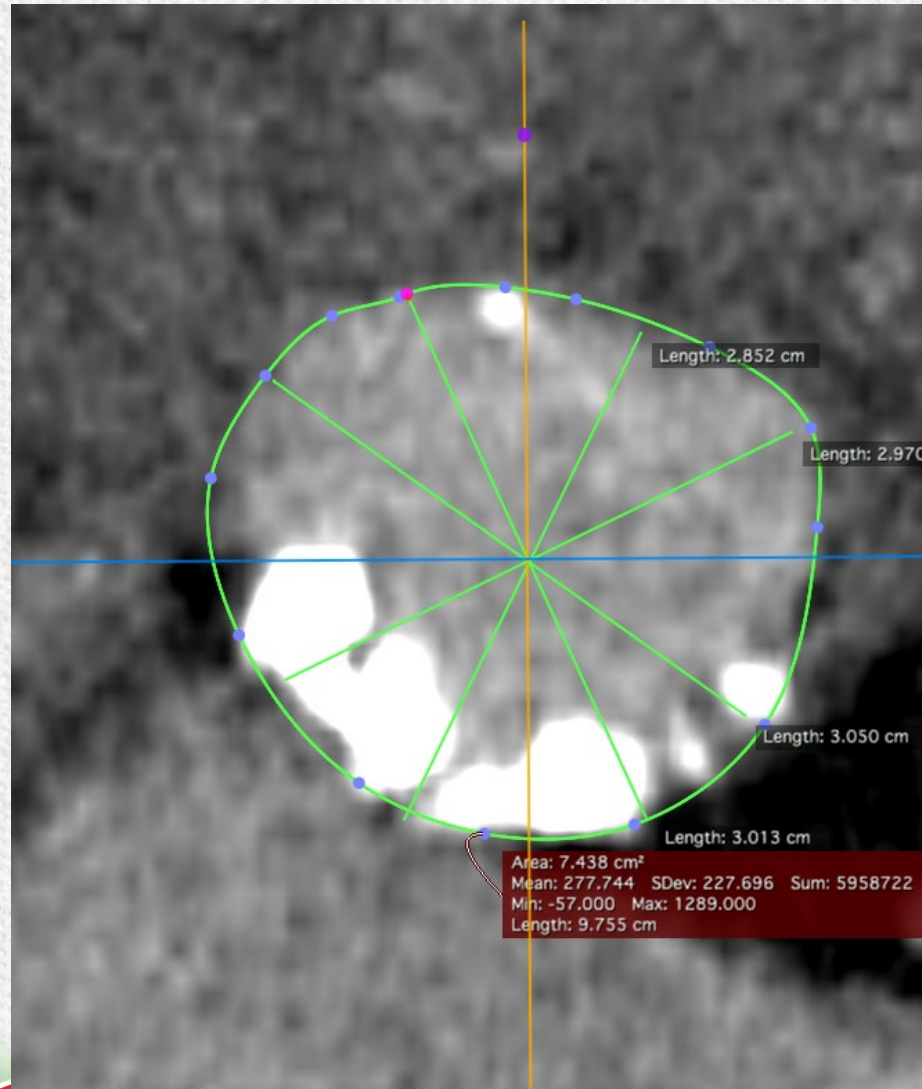
High-risk valve morphology

Evolut FX:

- Tall stent frame
- Recapturable
- Supra annular leaflets
- Self-expanding with high radial force: not aggressive to vascular structures:
- Adapts and seals to the annulus and minimizes the risk of annulus rupture in the most difficult cases when calcium extends below the annulus or is very asymmetrical



High-risk valve morphology



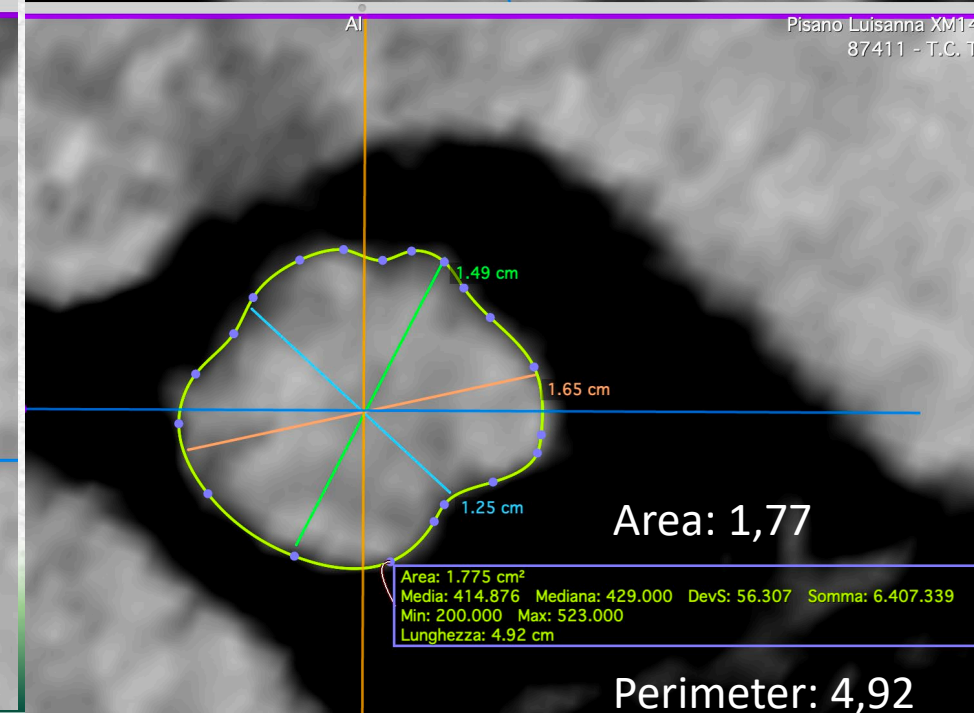
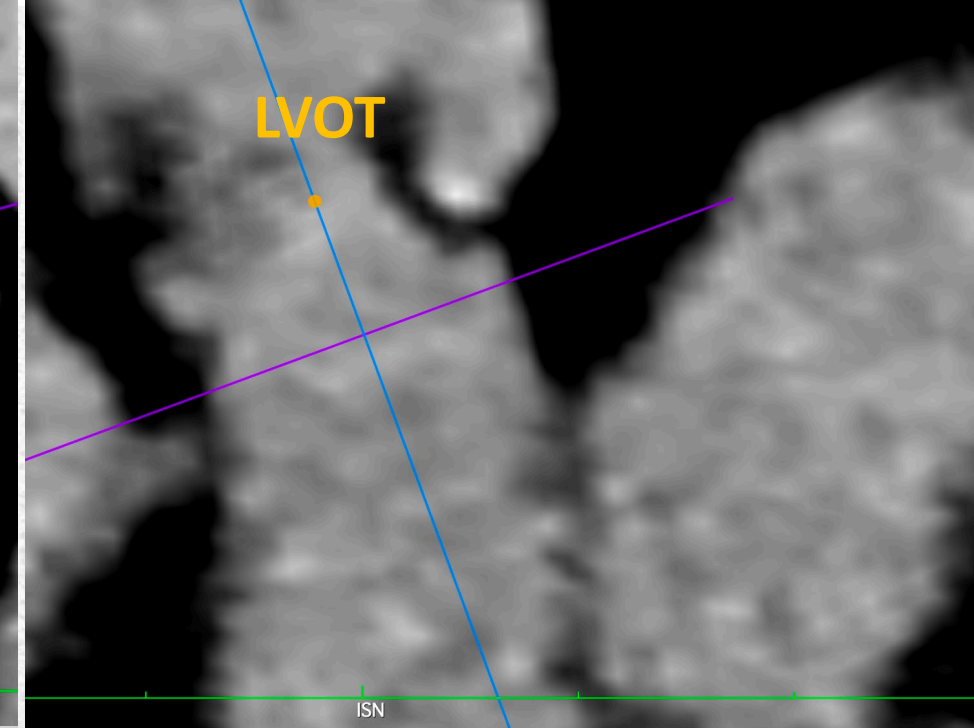
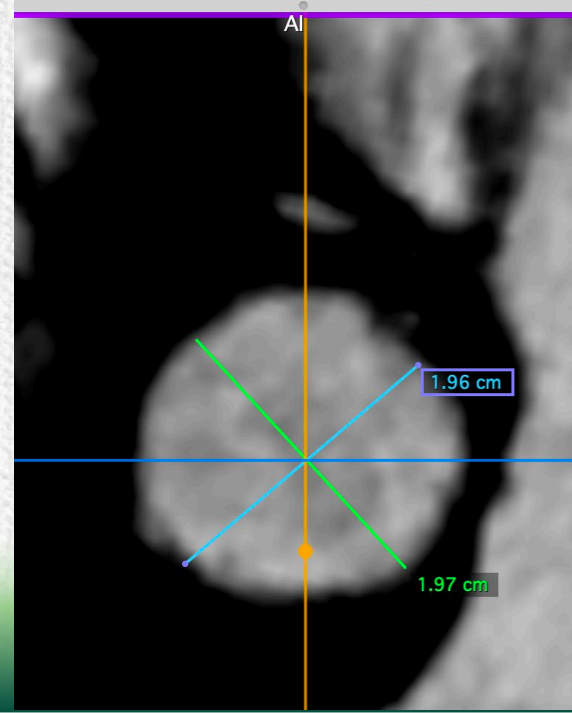
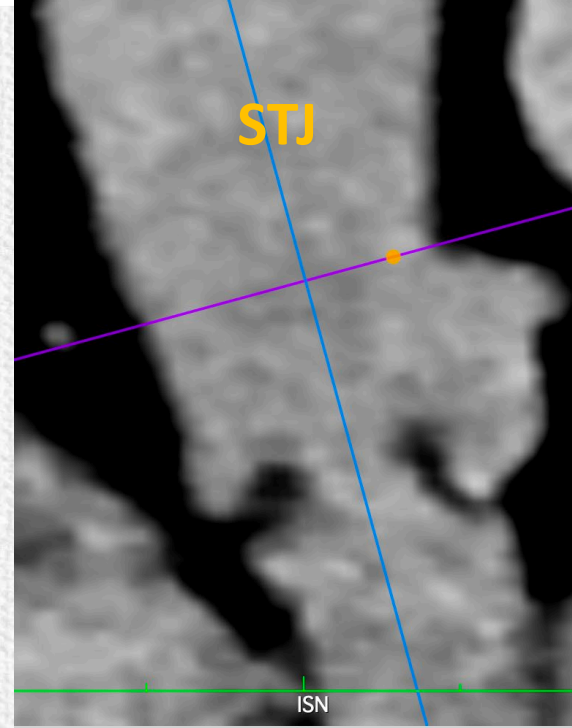
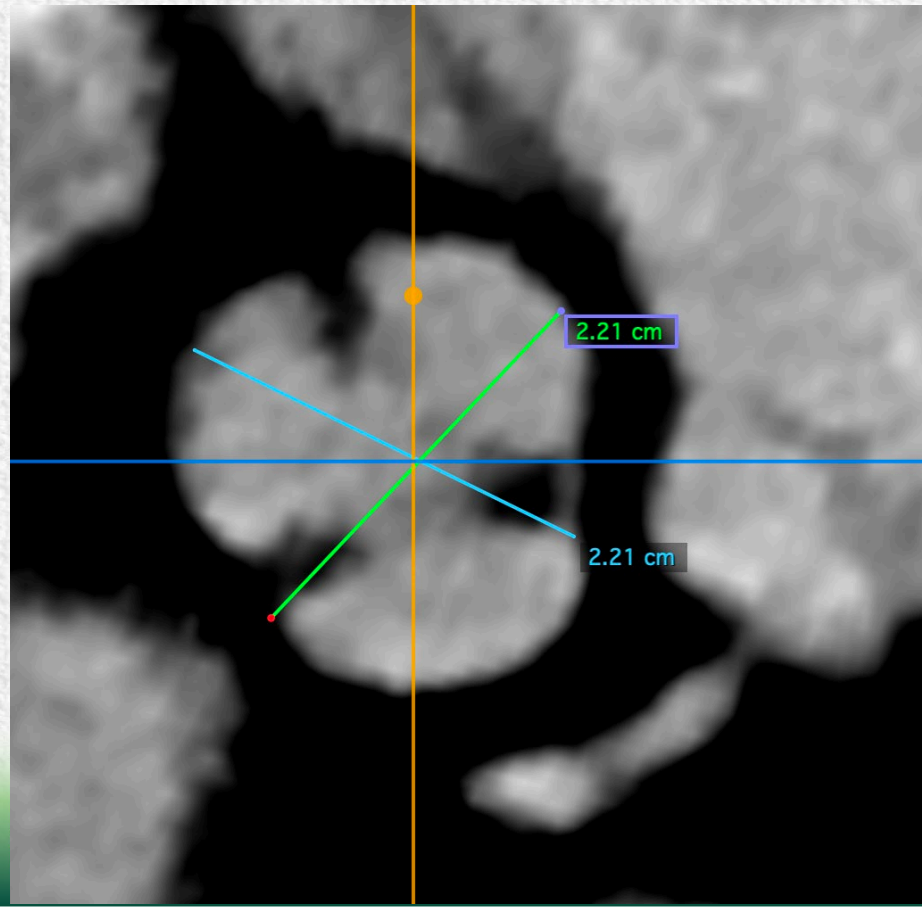
High-risk valve morphology

Asymmetrical valve expansion

But too aggressive post dilatation
may however cause annulus
rupture and should be avoided

Very small annulus

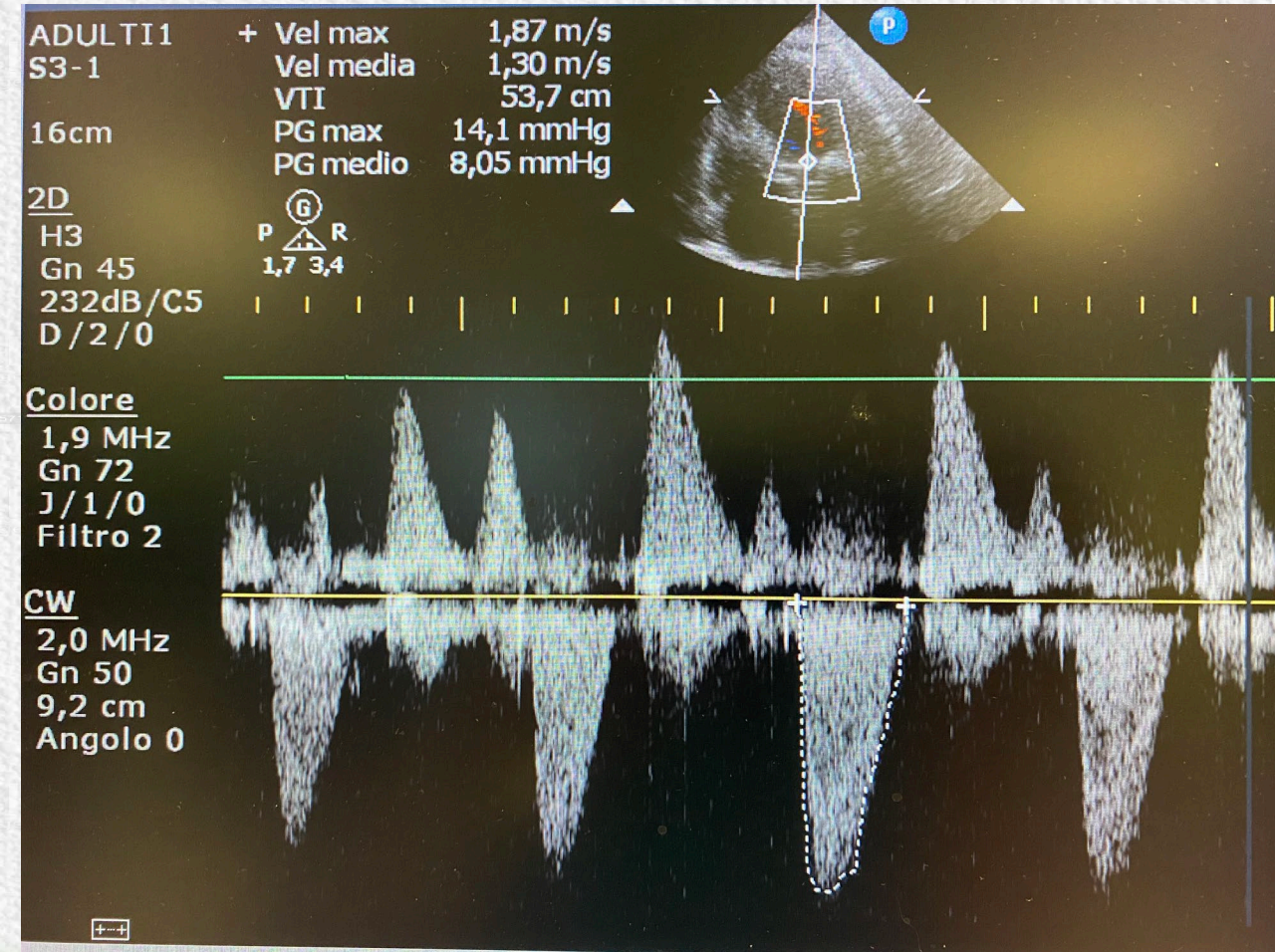
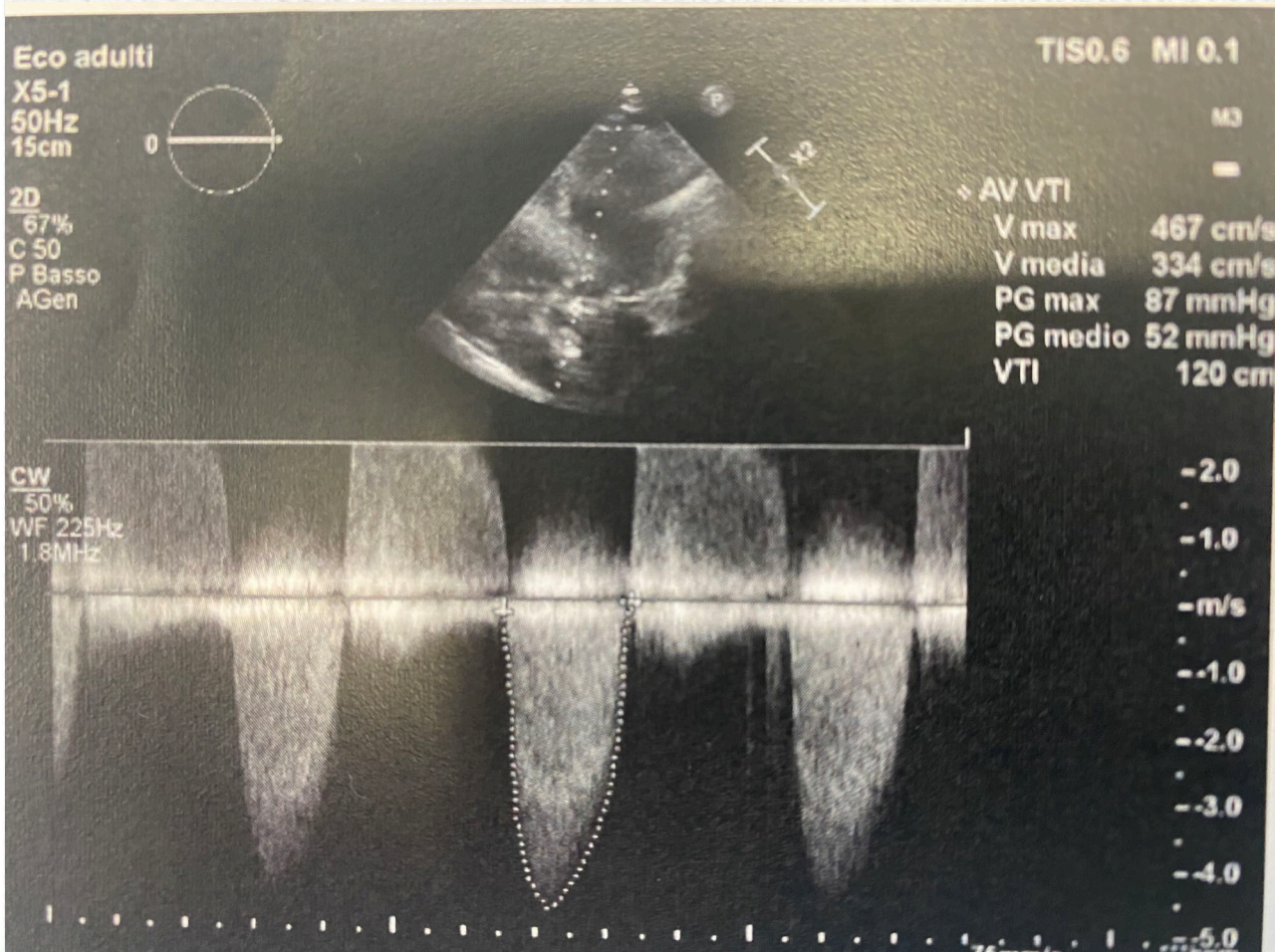
SOV



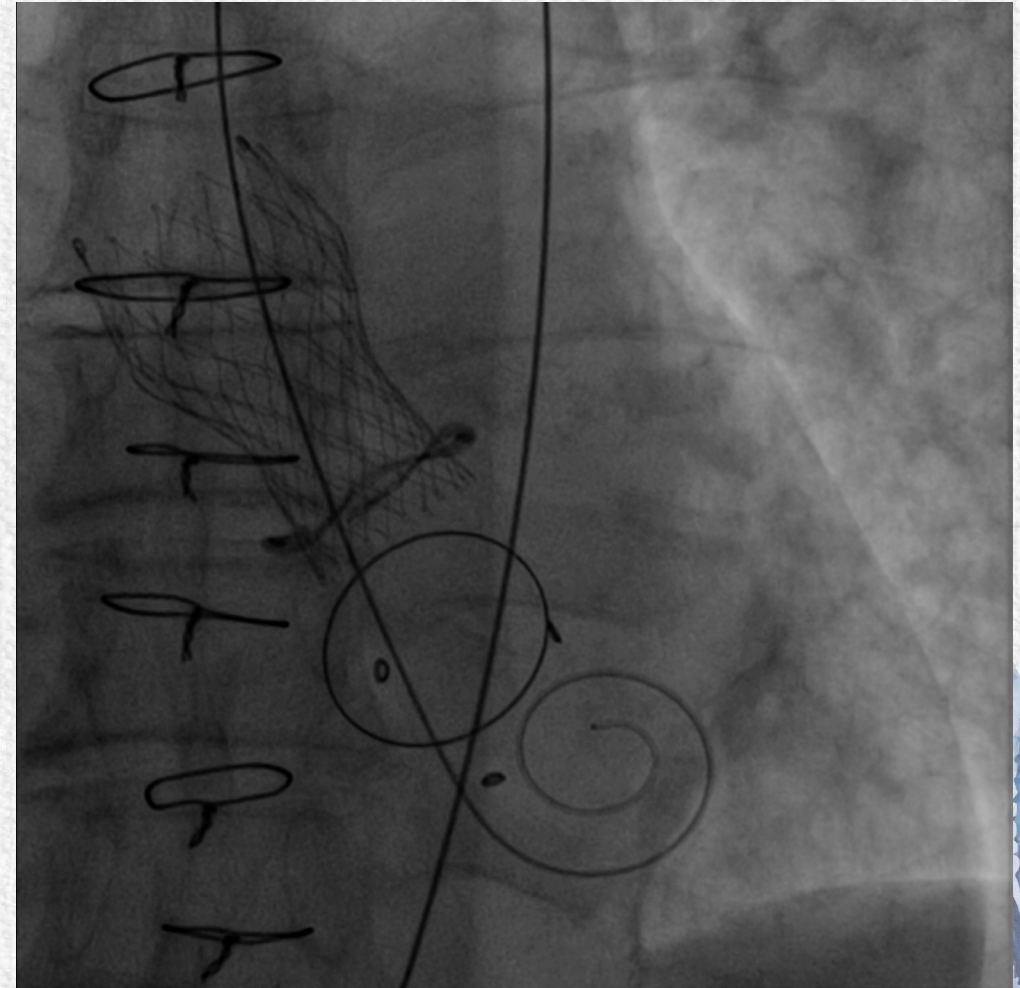
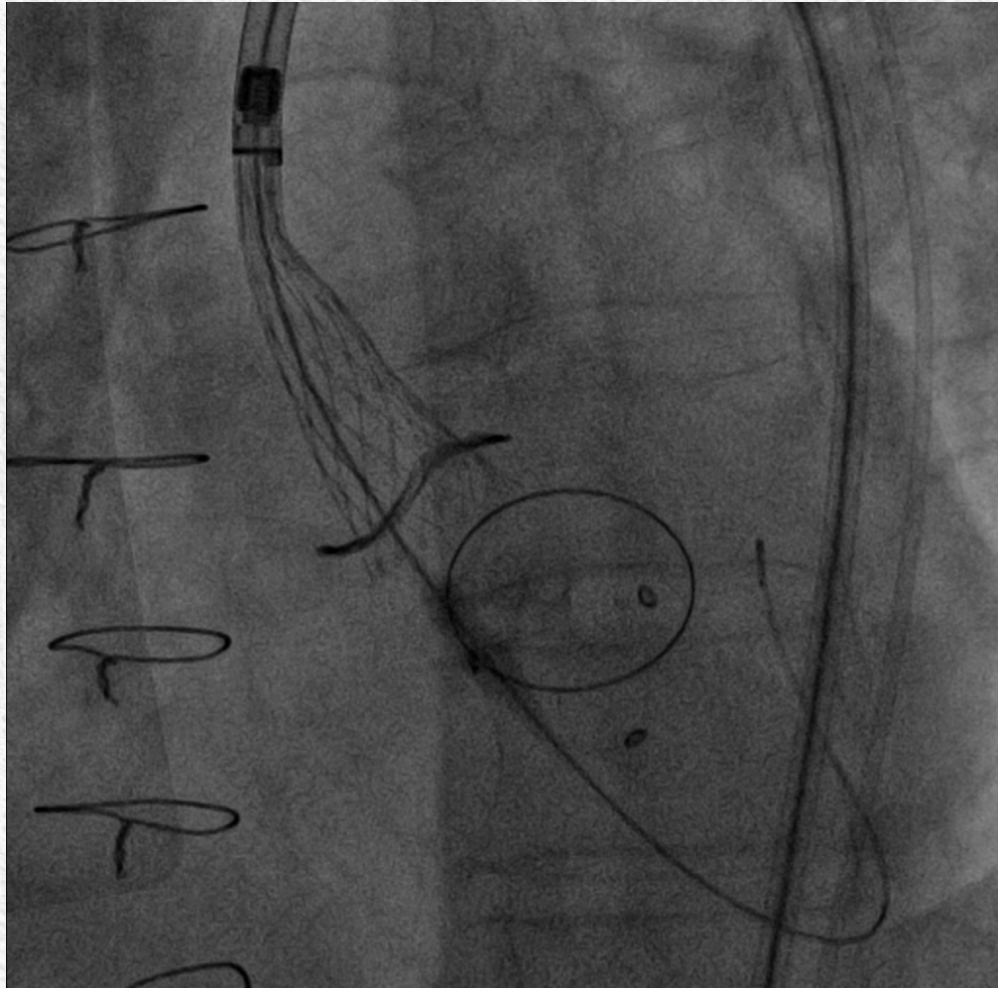
Evolut Pro Plus 23mm

932557 154

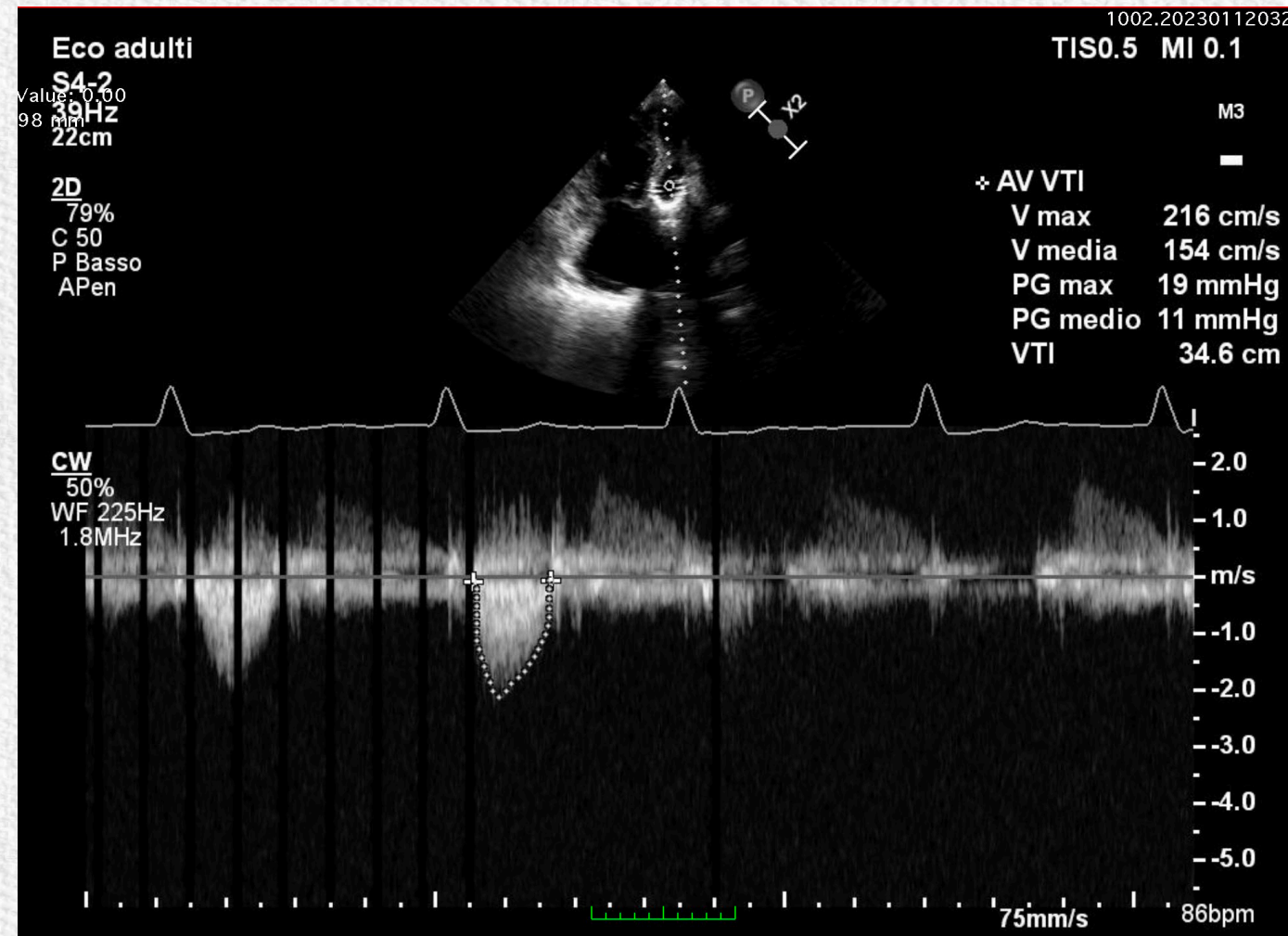
Pre TAVI echocardiogram



VIV in small surgical valves



Cardiac surgery in 2015: aorta Mitroflow 21, mitral Magna 26



Off-lable use **In pure, non** **calcific AR**

A 72 years old female,
Known AR and MR, refused surgery in 2020,
EF 55%

In the last 9 months 3 hospital admissions for
HF

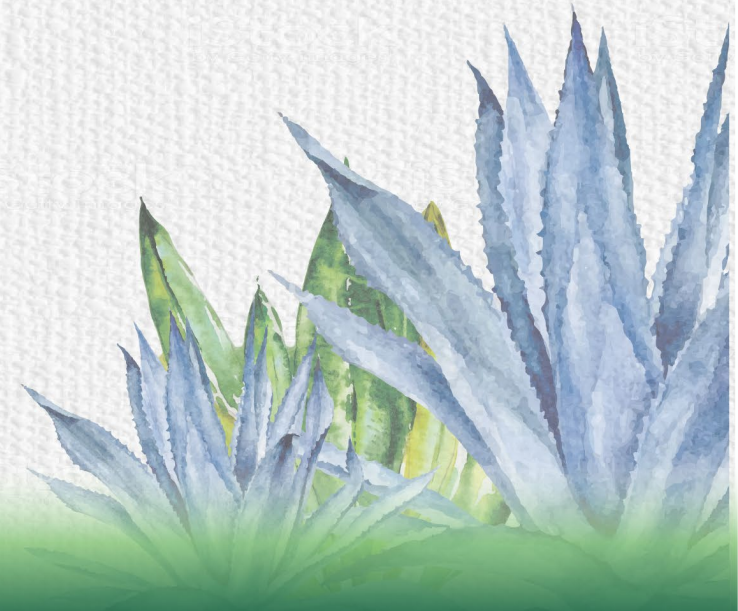
and rapid worsening of the LV function (EF 25%)

Rapid AF

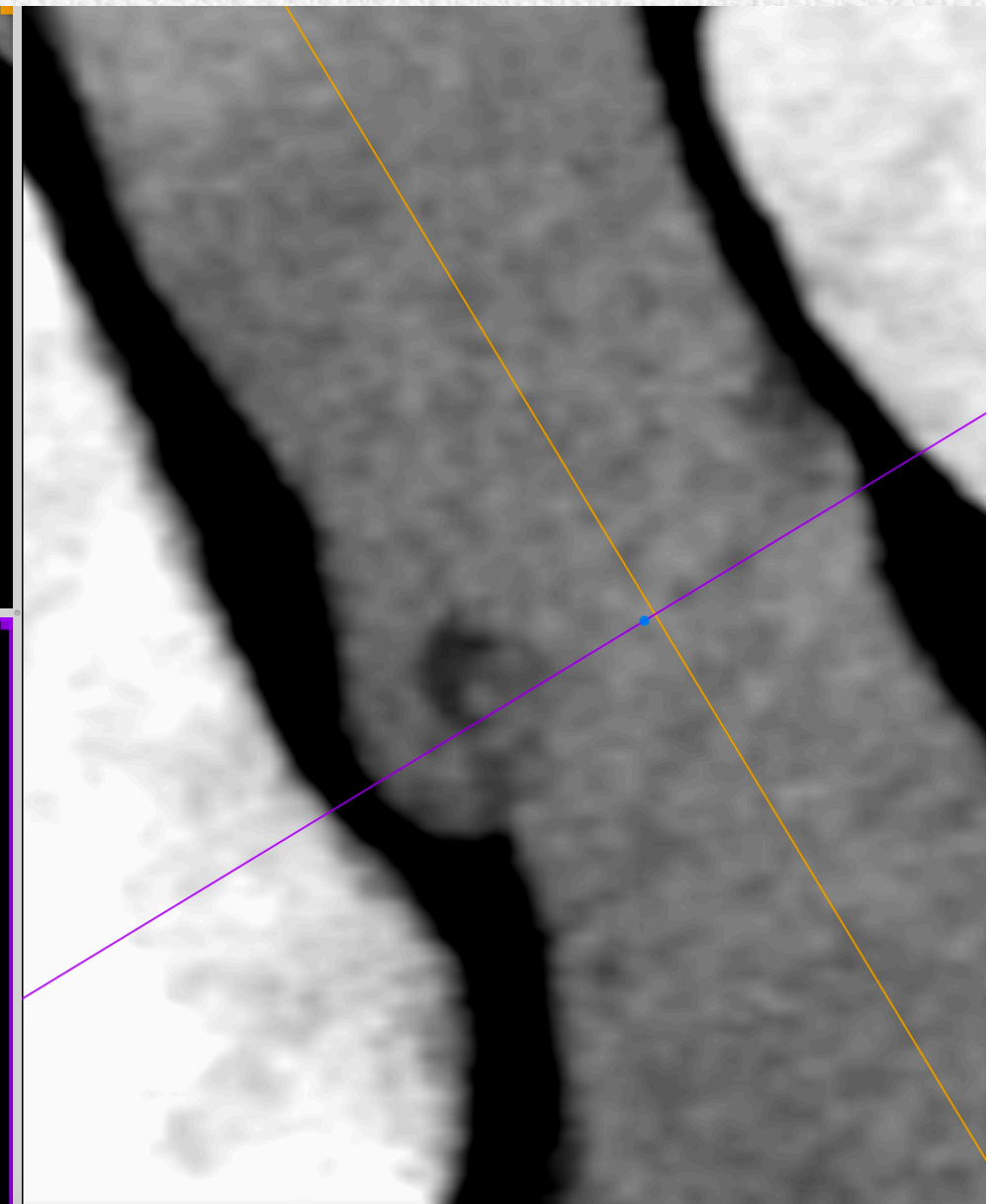
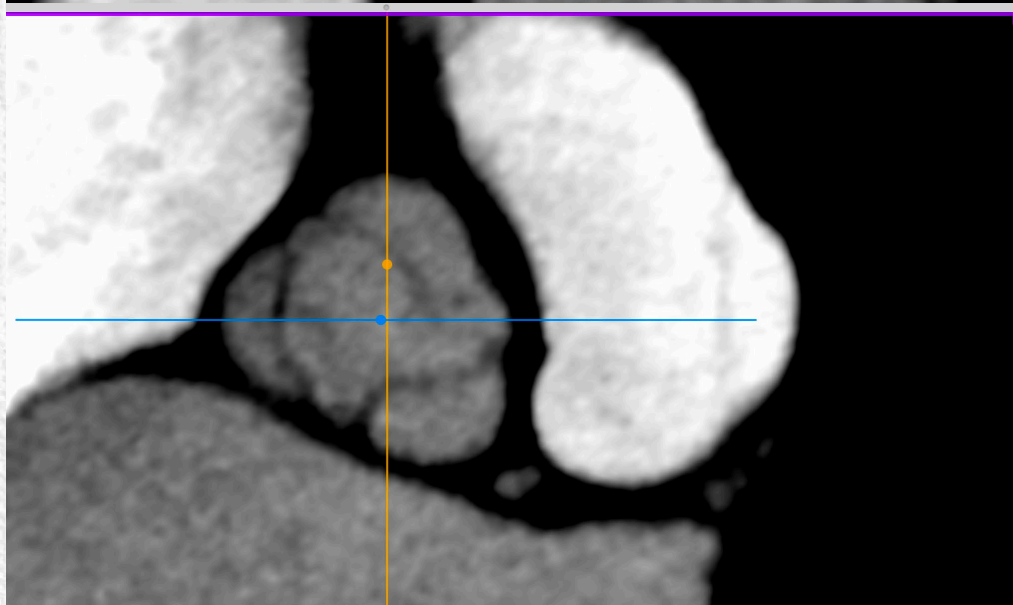
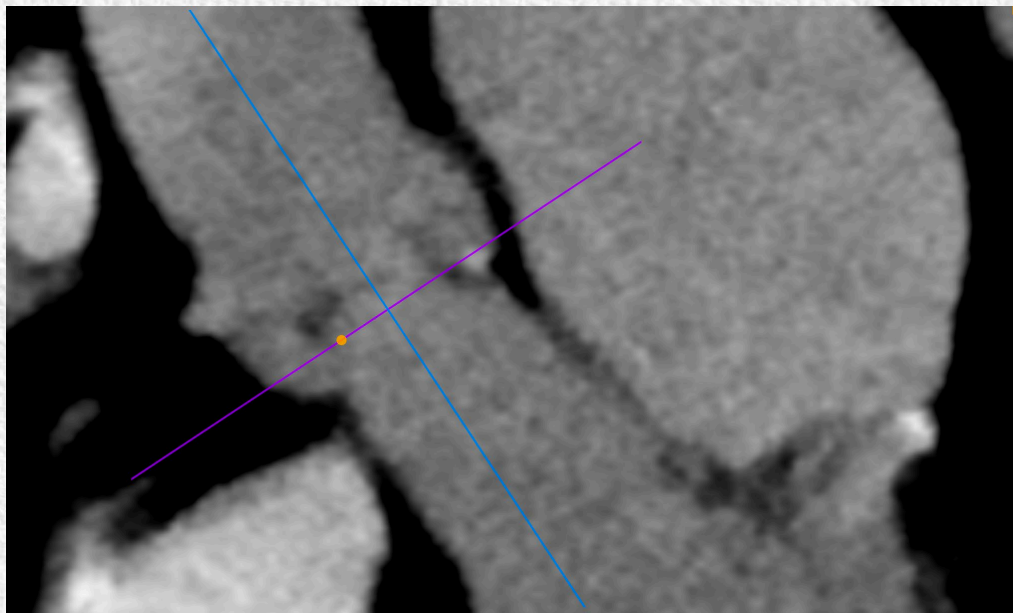
Extremely fragile (40Kg, 1.50m, BMI:....)

End-stage HF NYHA class III-IV

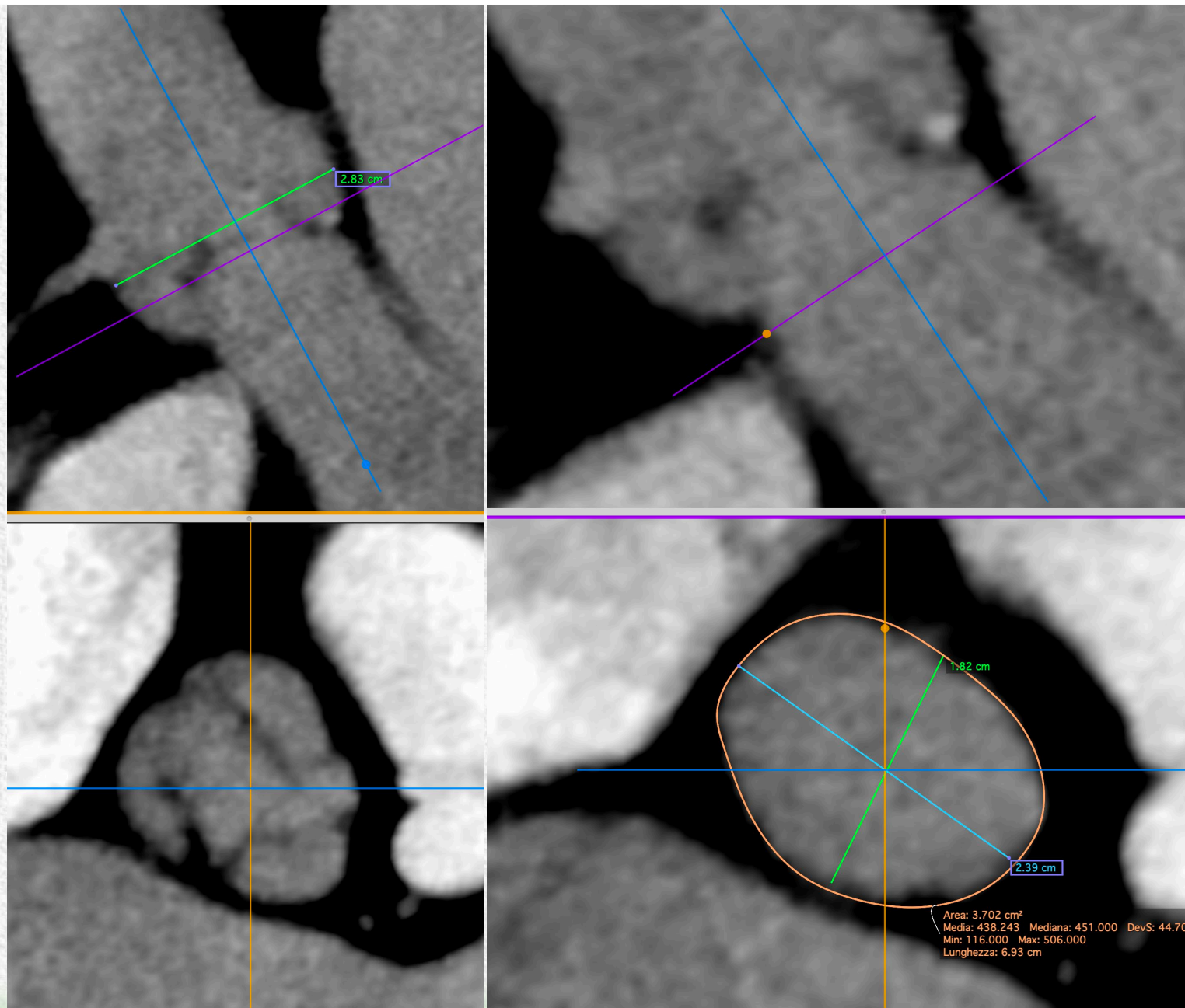
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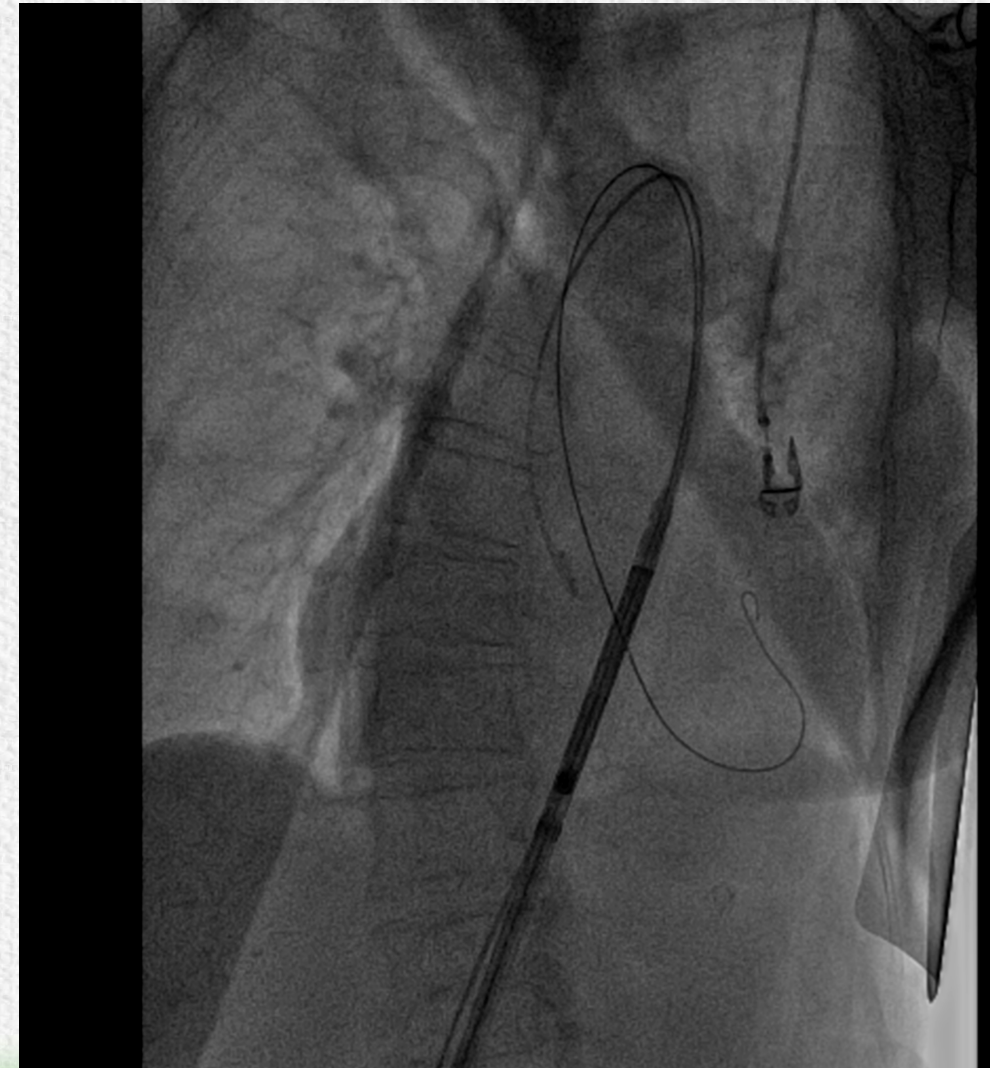
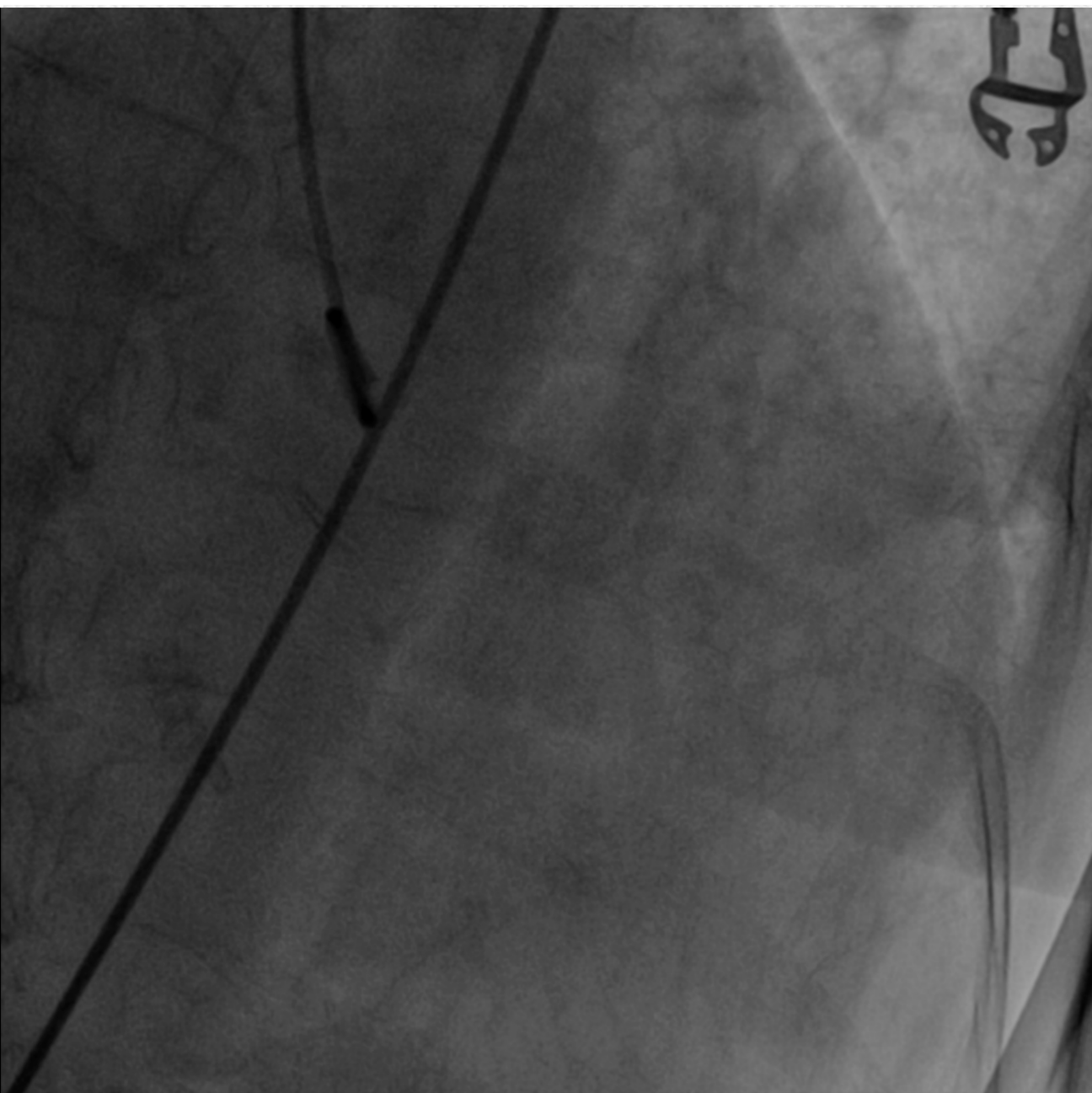
Off-lable use
In pure, non
calcific AR

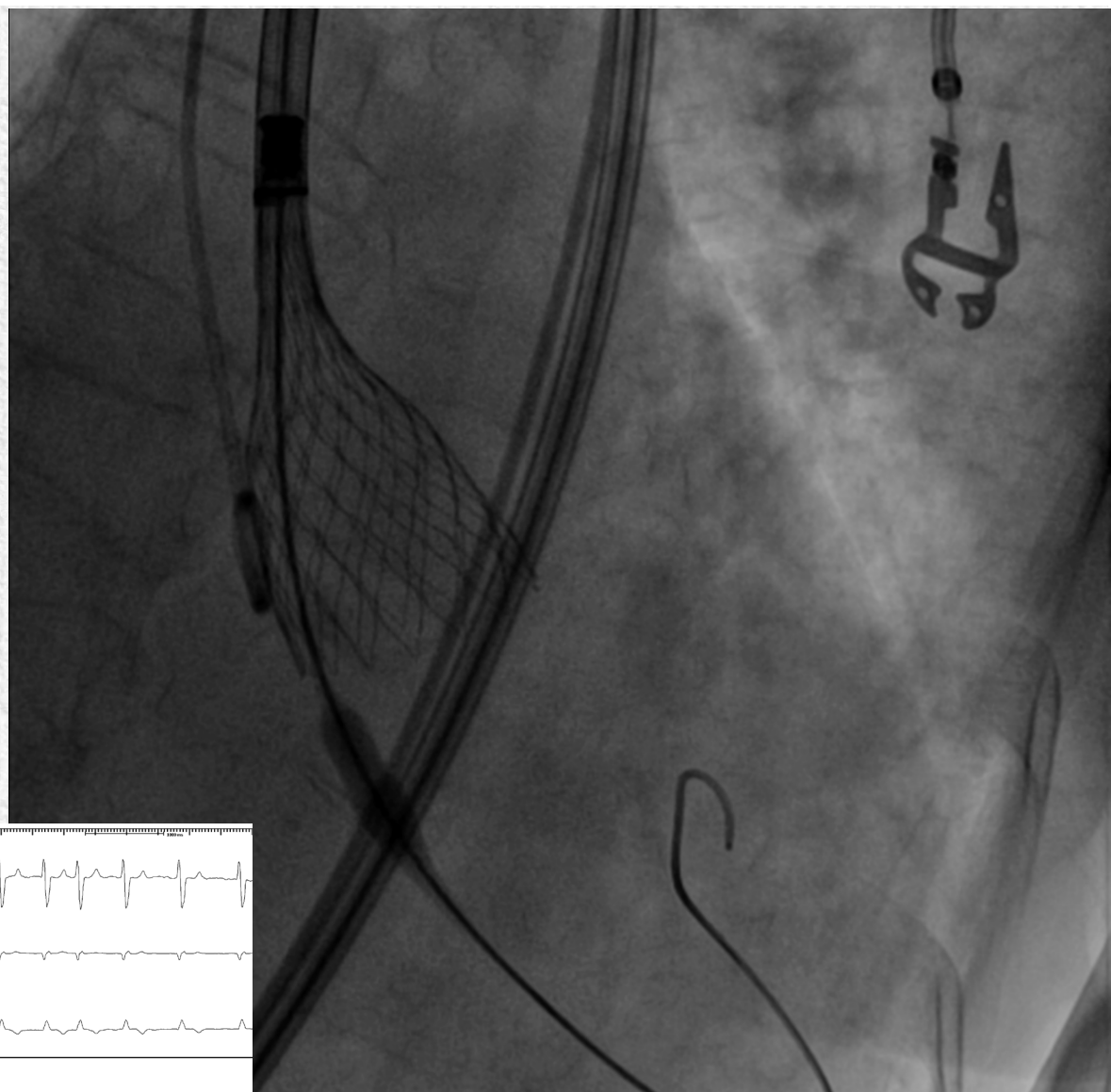
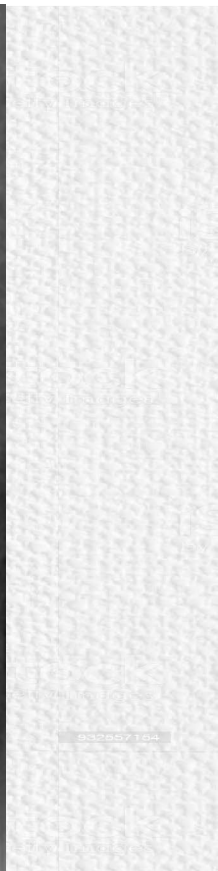
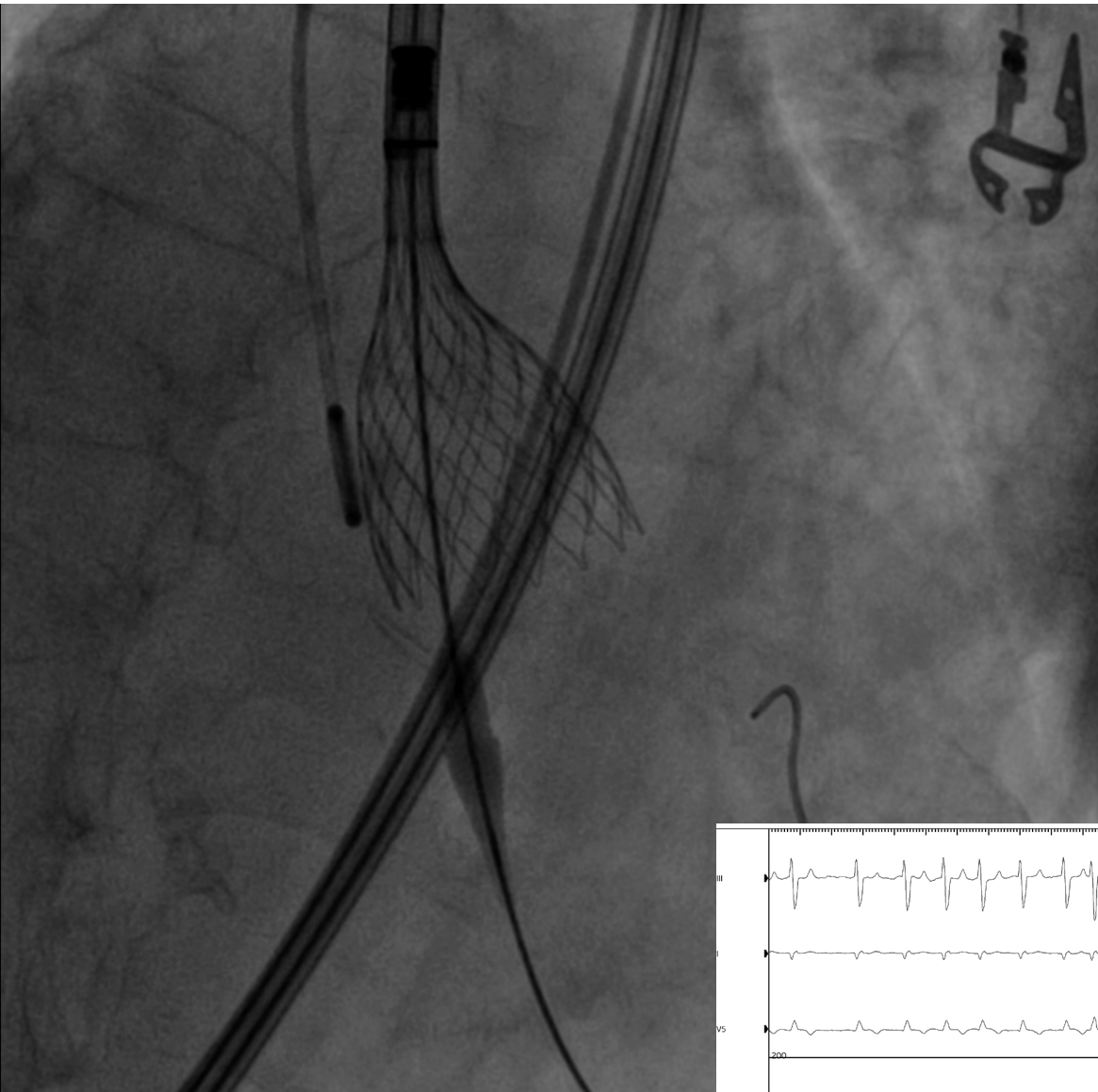


Off-lable use In pure, non calcific AR

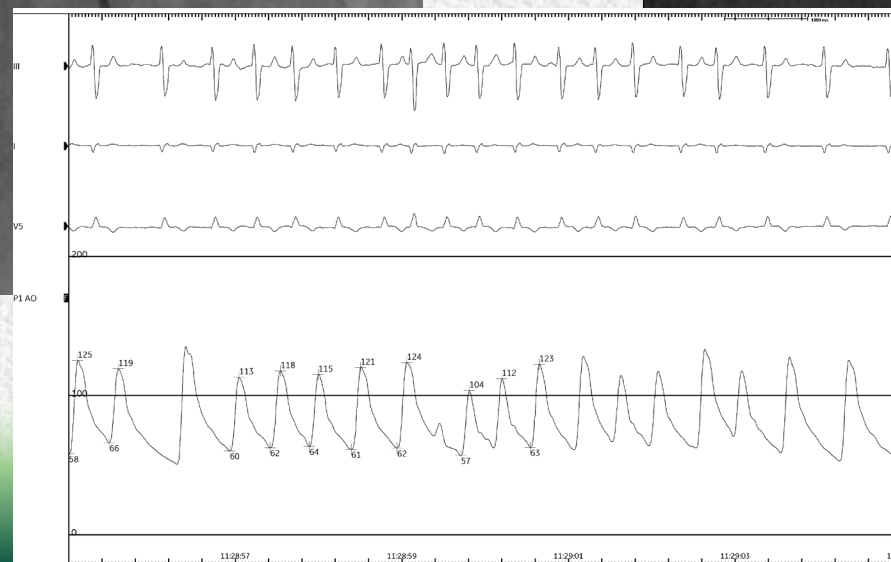


Diagnostic angiogram

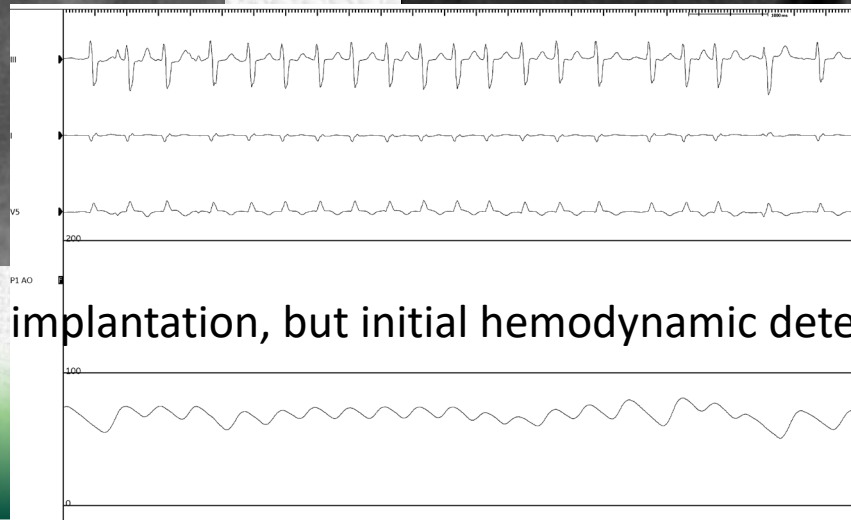
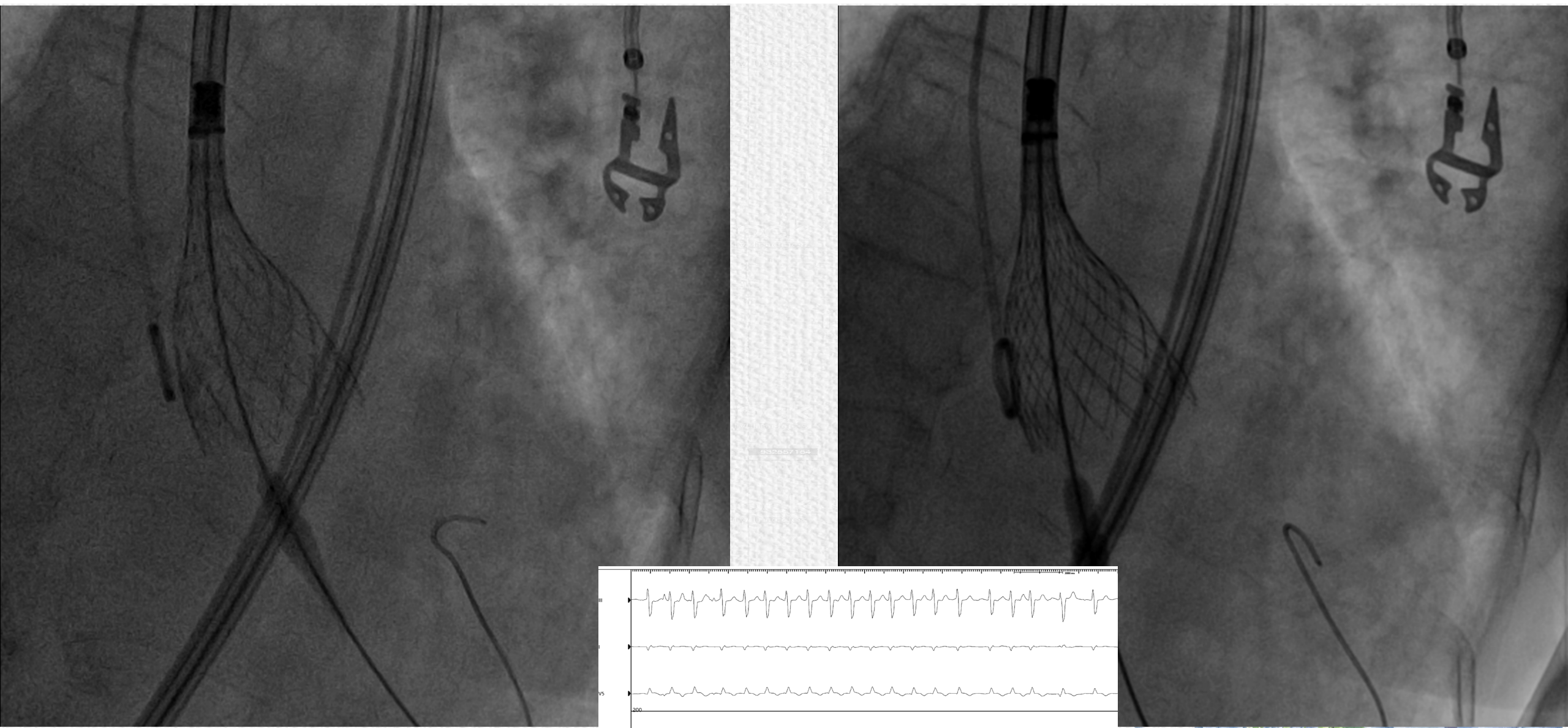




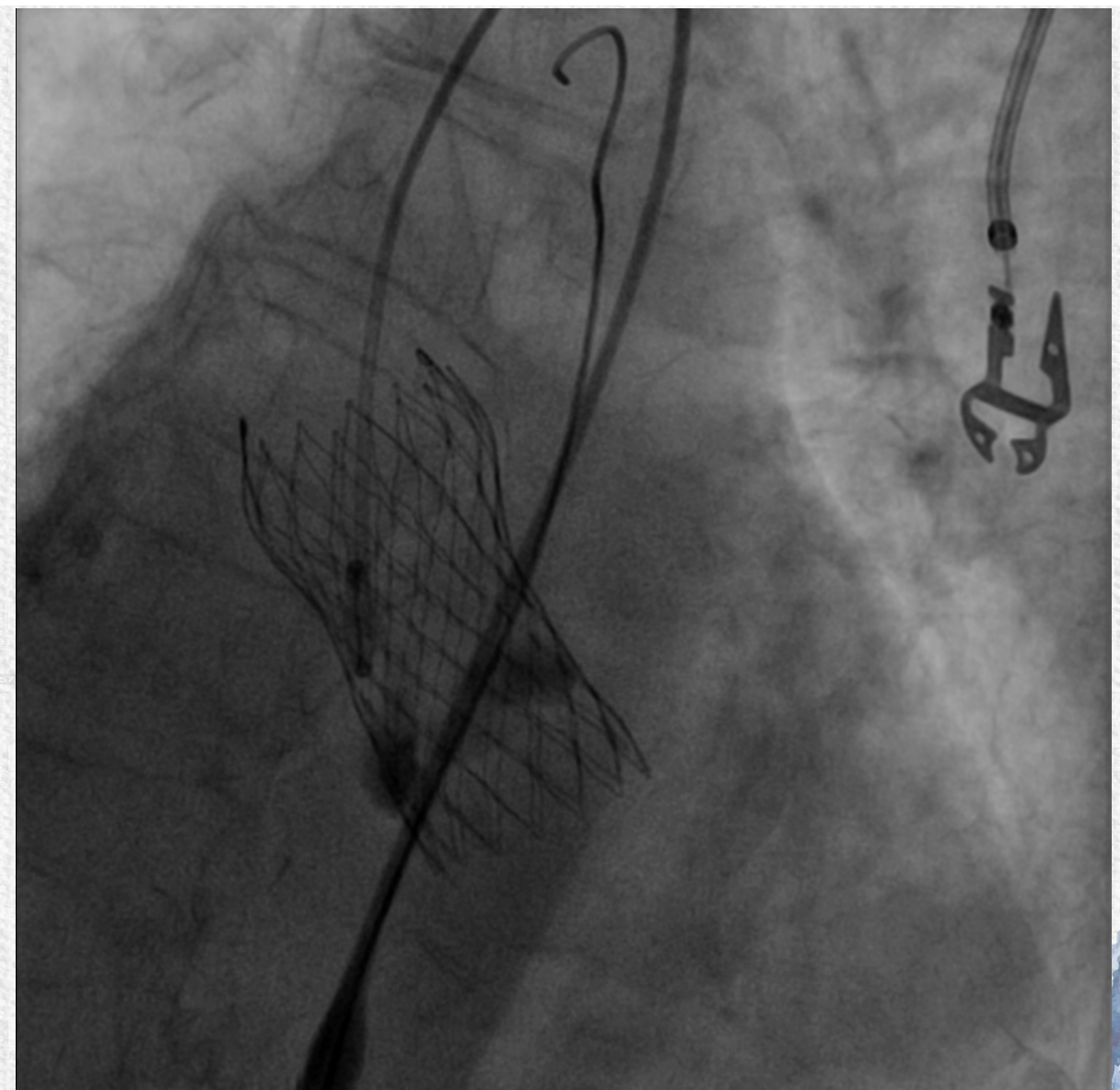
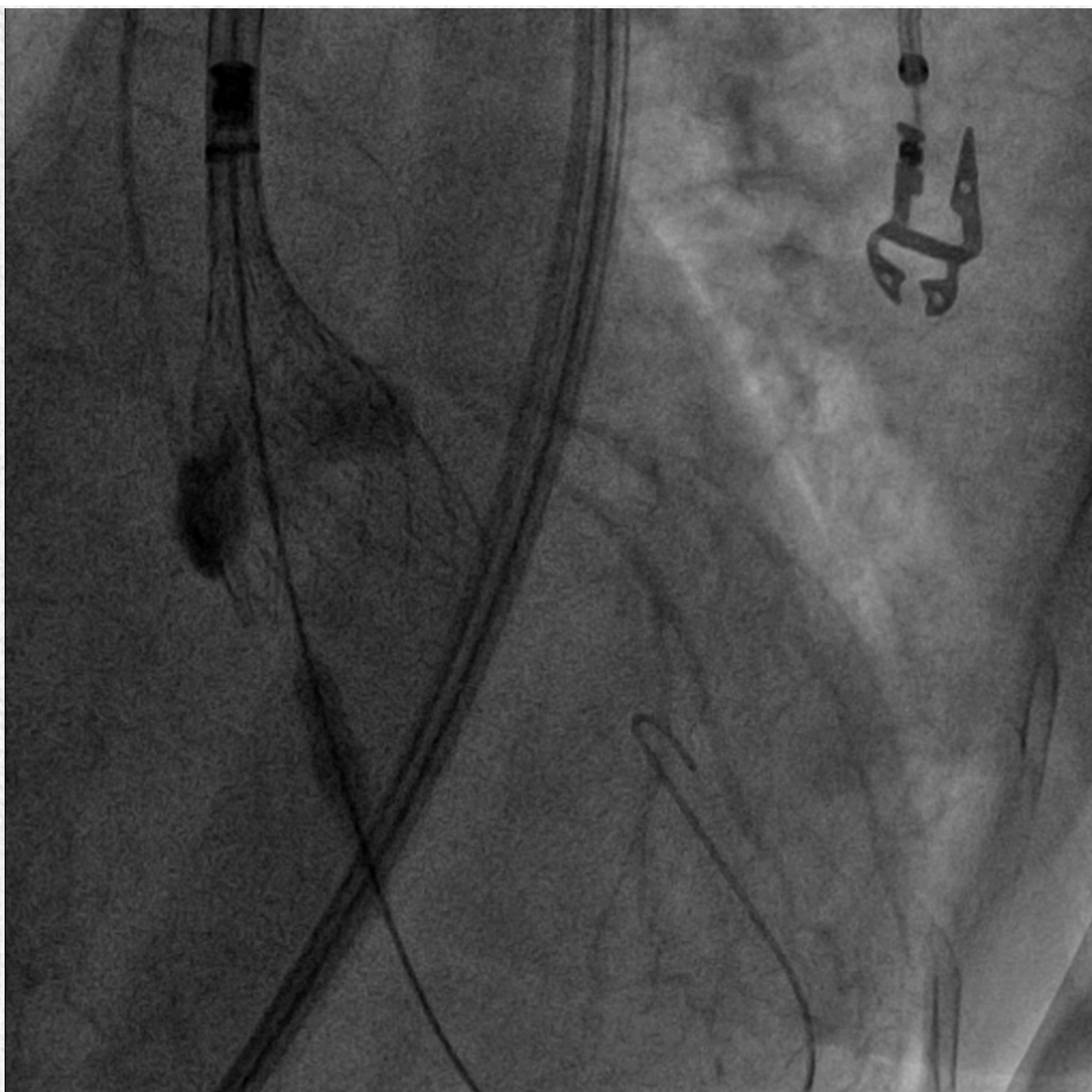
First attempt: too low



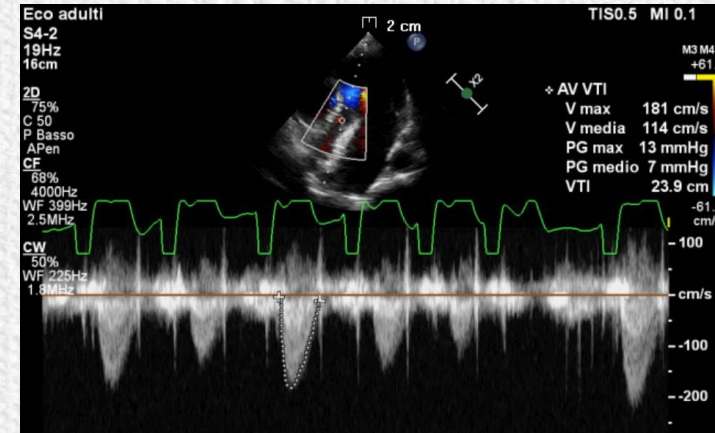
Second attempt: still too low



Partial recapture and higher implantation, but initial hemodynamic deterioration



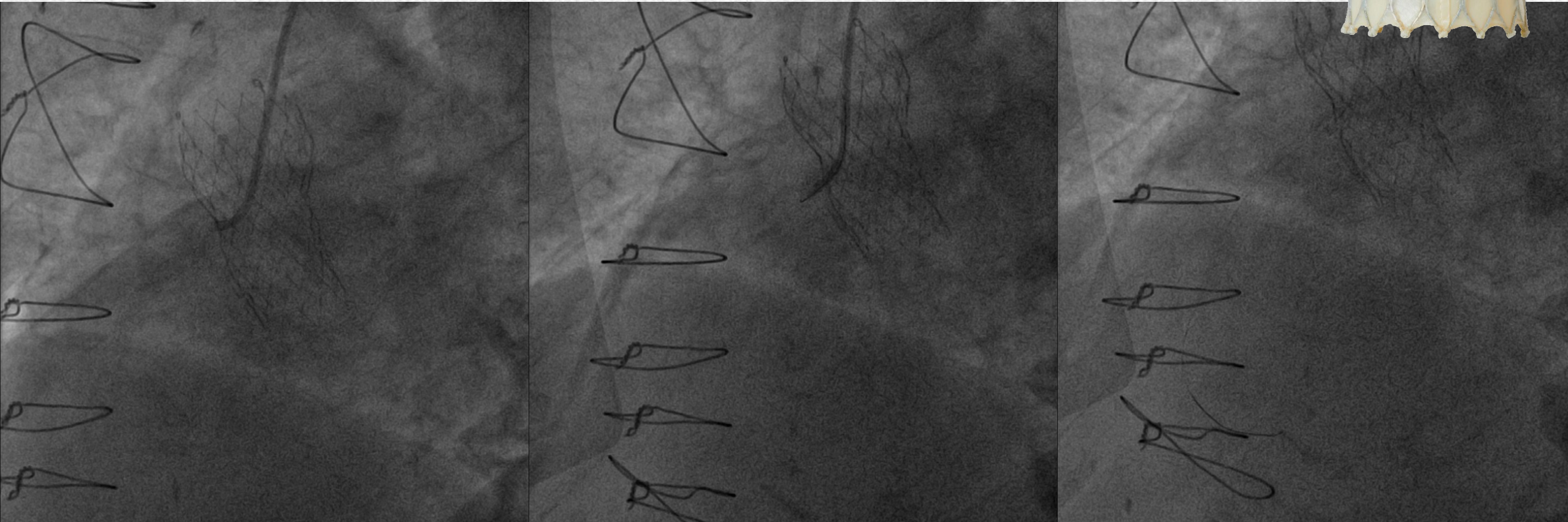
Further partial recapture and higher implantation, causes heart arrest recovered after valve release ECM and adrenalin



Coronary access through the valve struts and commissures



Coronary access through the valve struts and commissures

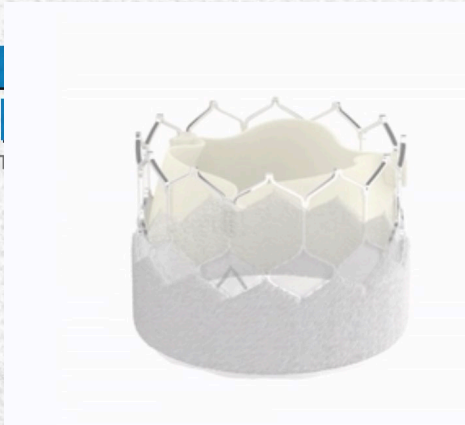


Implantation depth



932557 154





Sapien

Cons:

Annulus rupture

Residual gradients in small annuli

Cost

Sapien

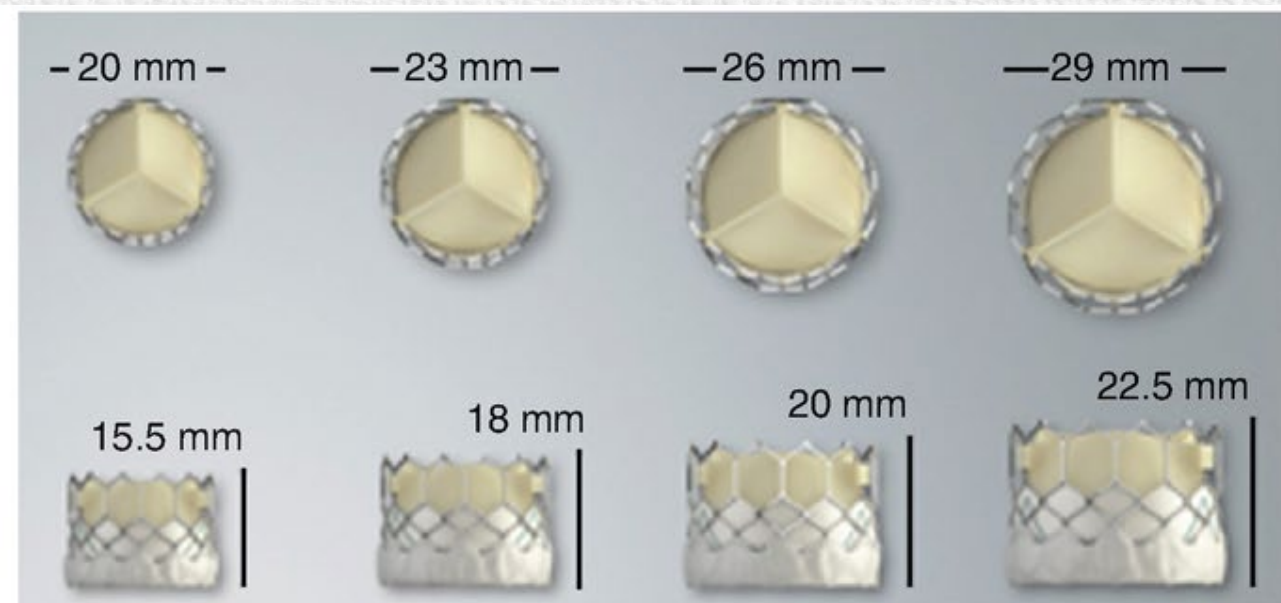
Pro:

Precise landing zone

Symmetrical expansion

Access to mitral and tricuspid VIV

Easy coronary access



Annulus Sizing		20 mm	23 mm	26 mm	29 mm
Native Valve Annulus Size (CT)	Area	273 - 345 mm ²	338 - 430 mm ²	430 - 546 mm ²	540 - 683 mm ²
	Area Derived Diameter	18.6 - 21 mm	20.7 - 23.4 mm	23.4 - 26.4 mm	26.2 - 29.5 mm

Sapien:

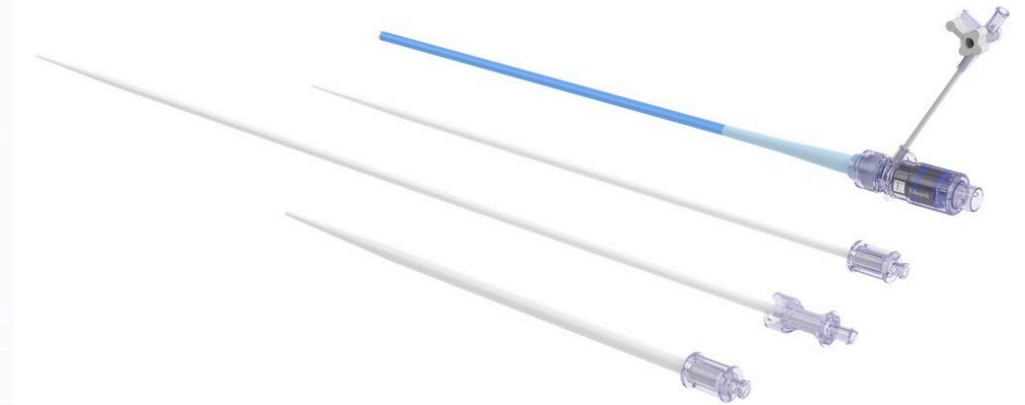
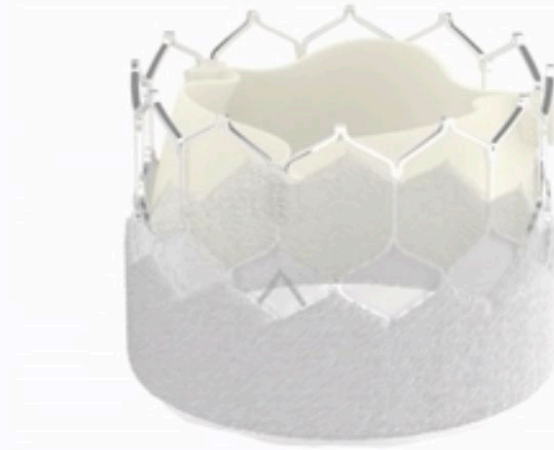
Balloon-expandable

Short stent frame

Not recapturable

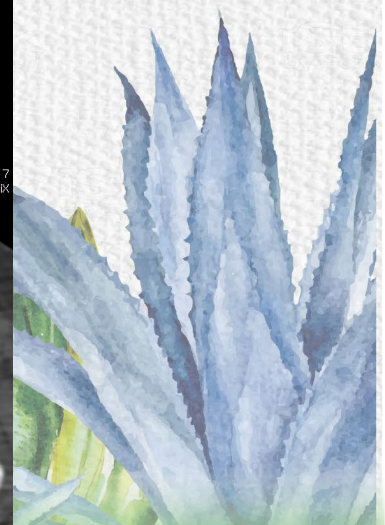
Intra-annular

**High-radial force: aggressive
to vascular structures**



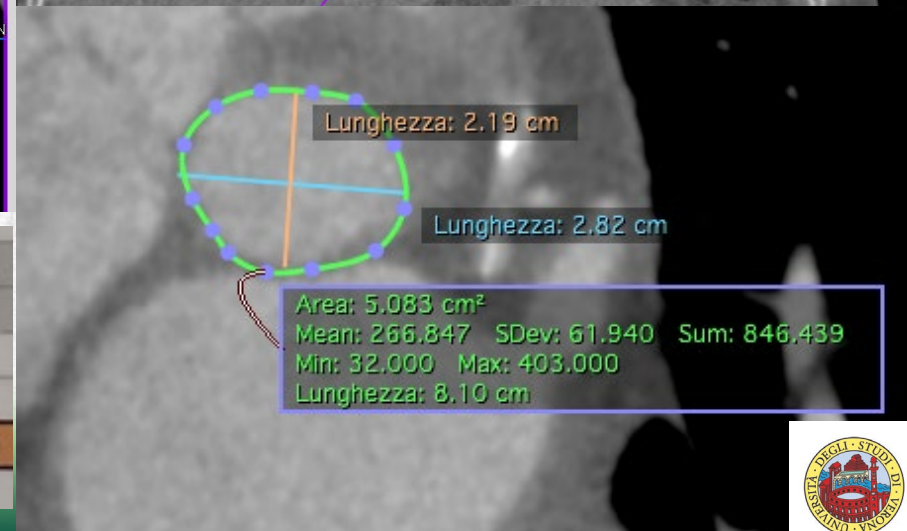
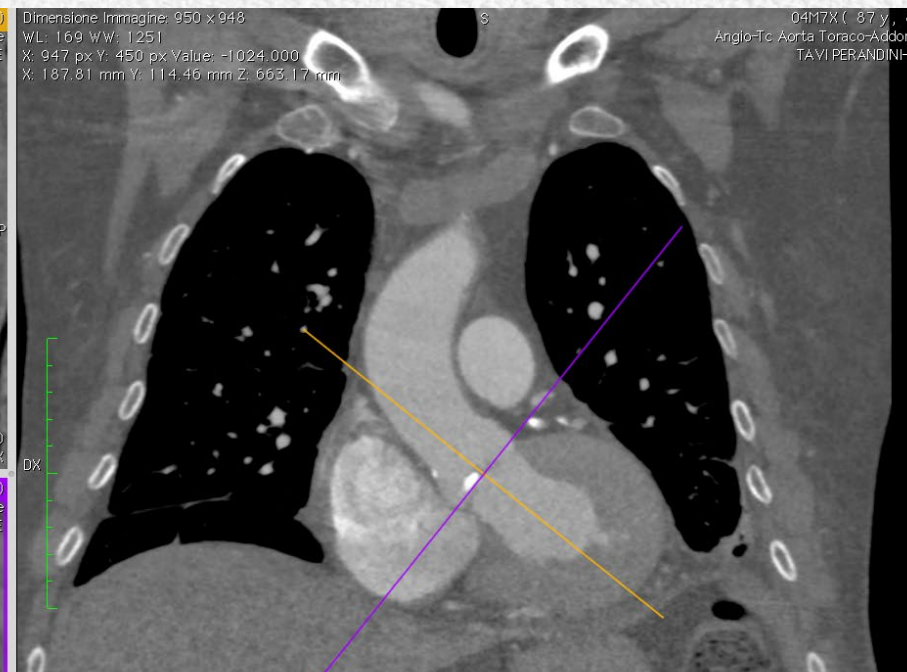
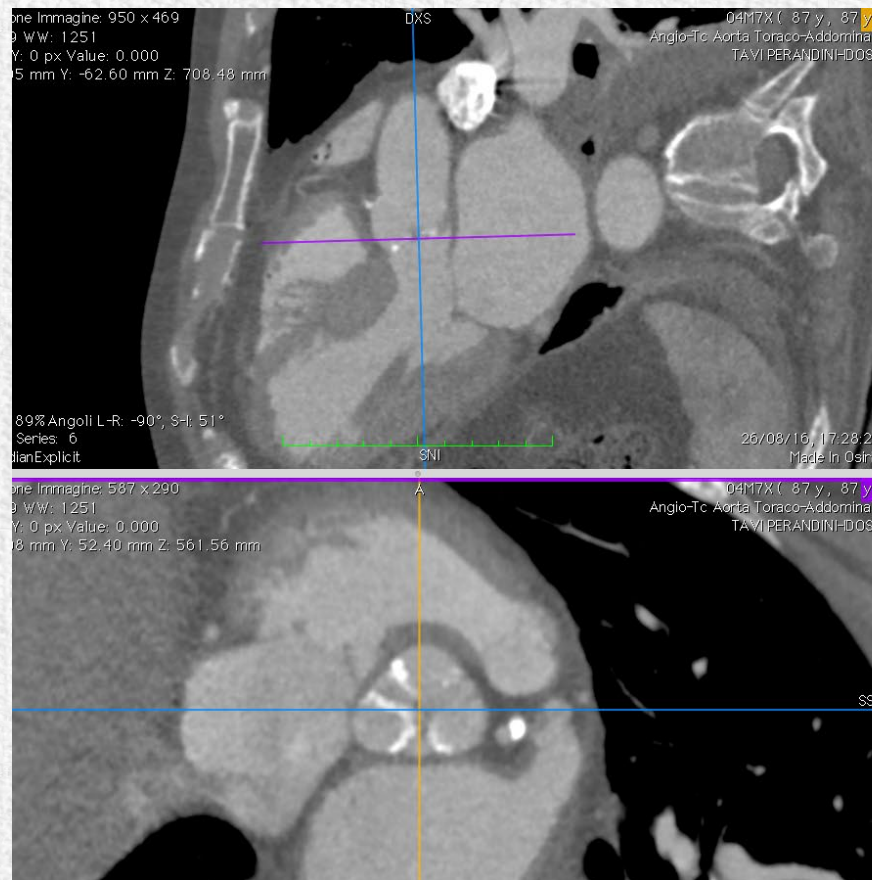
Perfect fitting for either a balloon or a self-expandable valve

CT-SCAN EVALUATION



Perfect fitting for either a balloon or a self-expandable valve

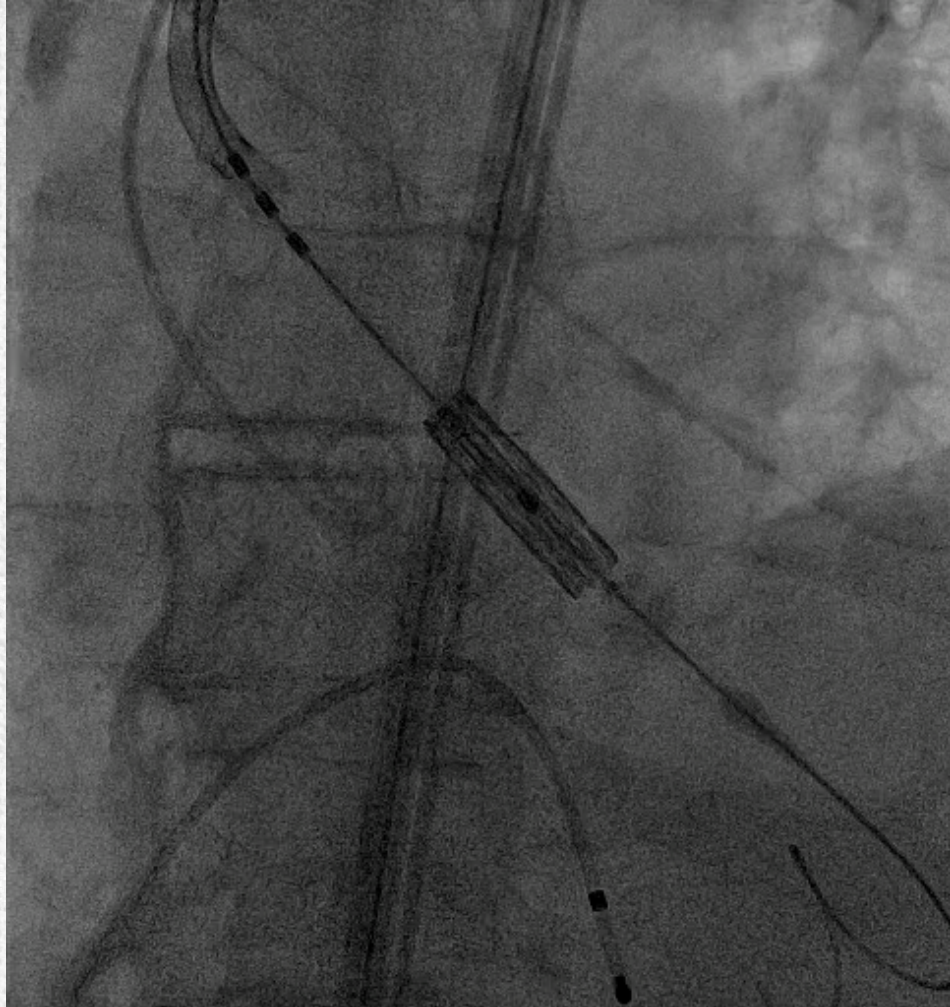
CT-SCAN EVALUATION



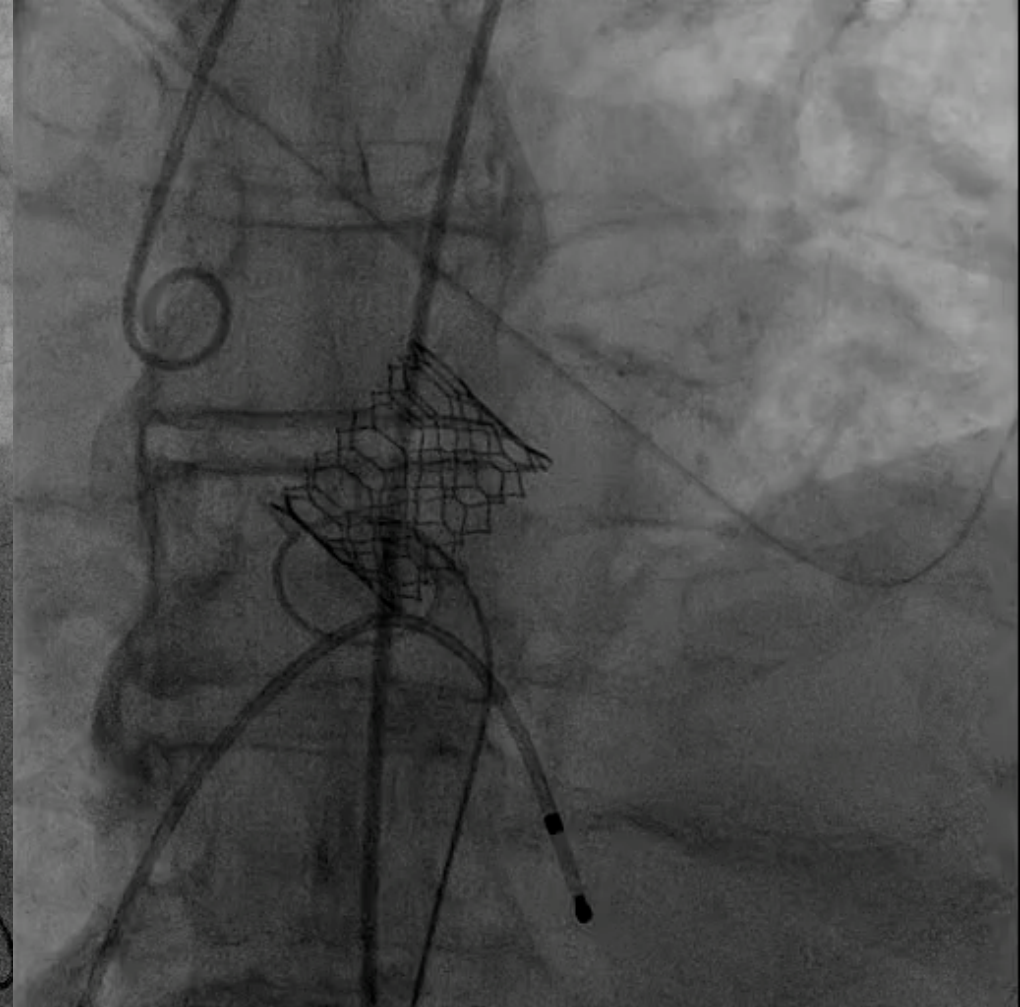
24.2	24.5	24.7	25.0	25.2	25.5	25.7	26.0	26.2	26.4	26.5
460	470	480	490	500	510	520	530	540	546	550
12.8	10.4	8.1	5.9	3.8	1.8	-0.2	-2.1	-3.9	-4.9	-5.6
				29.8	27.3	24.8	22.5	20.2	18.9	18.0

23
26
29

Perfect fitting for either a balloon or a self-expandable valve

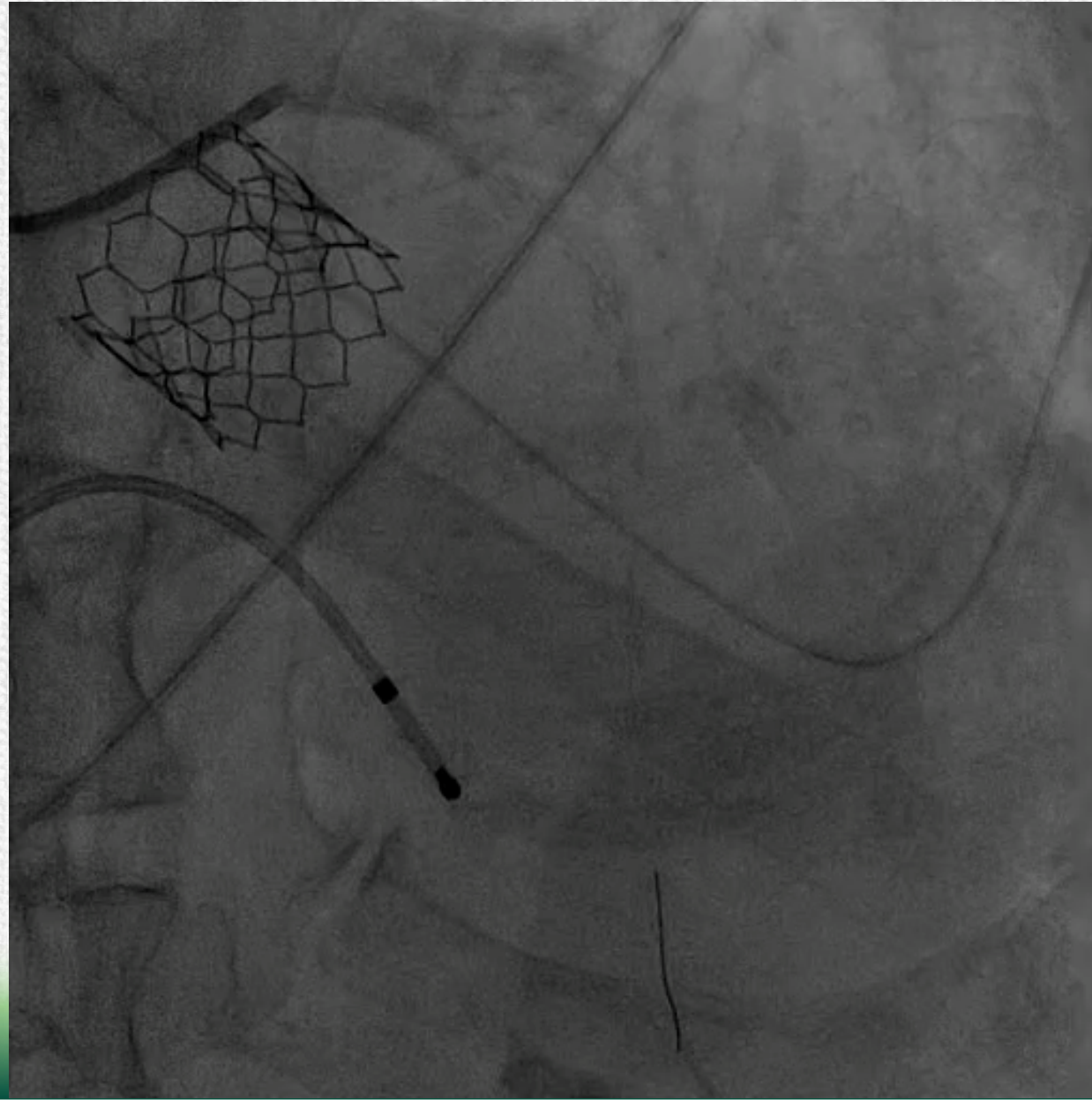


Valve deployment Sapien 26mm

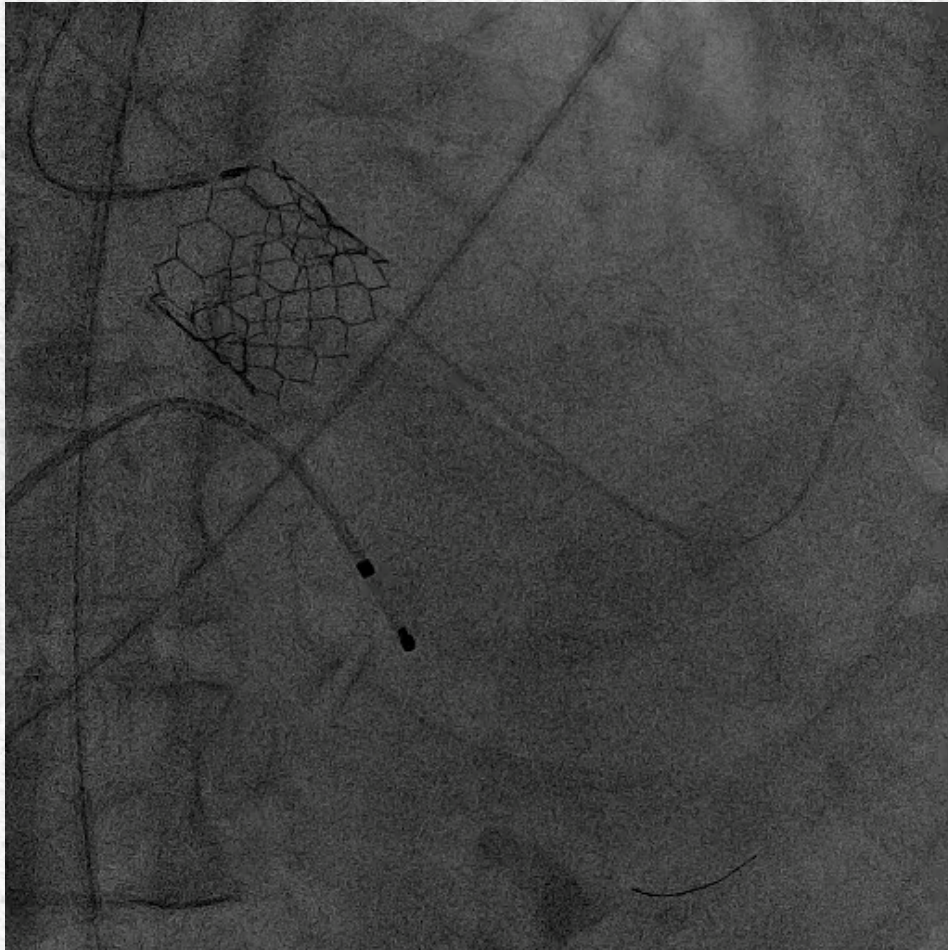


Acute Result

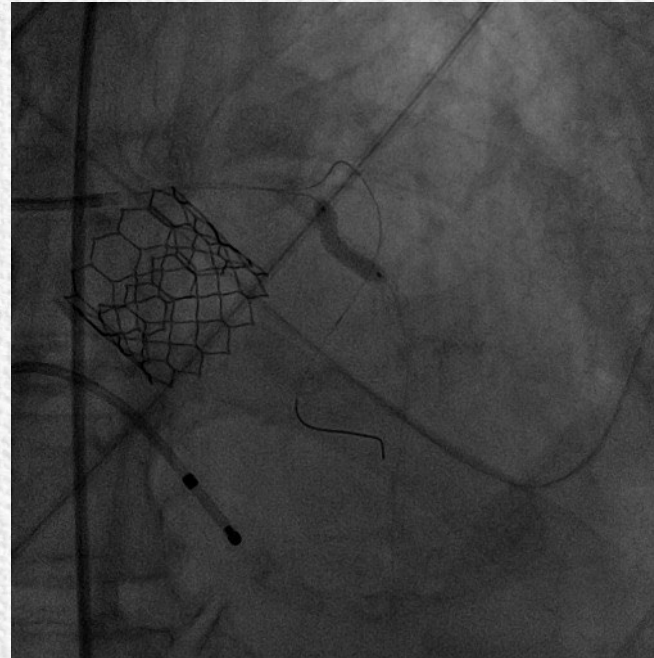
Easy coronary access



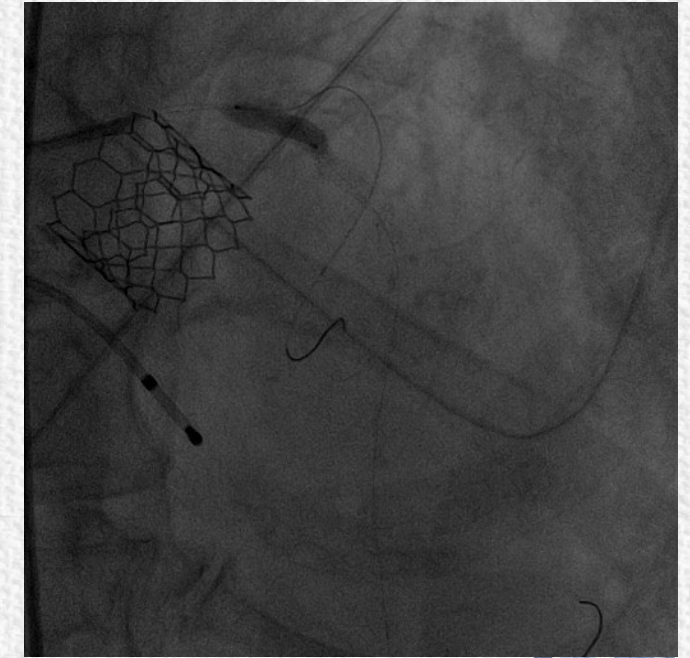
Rotational Atherectomy



RA (Rotalink 1.75mm)



Promus premiere 3.0x18mm



Promus premiere 4.0x18mm

932557 154

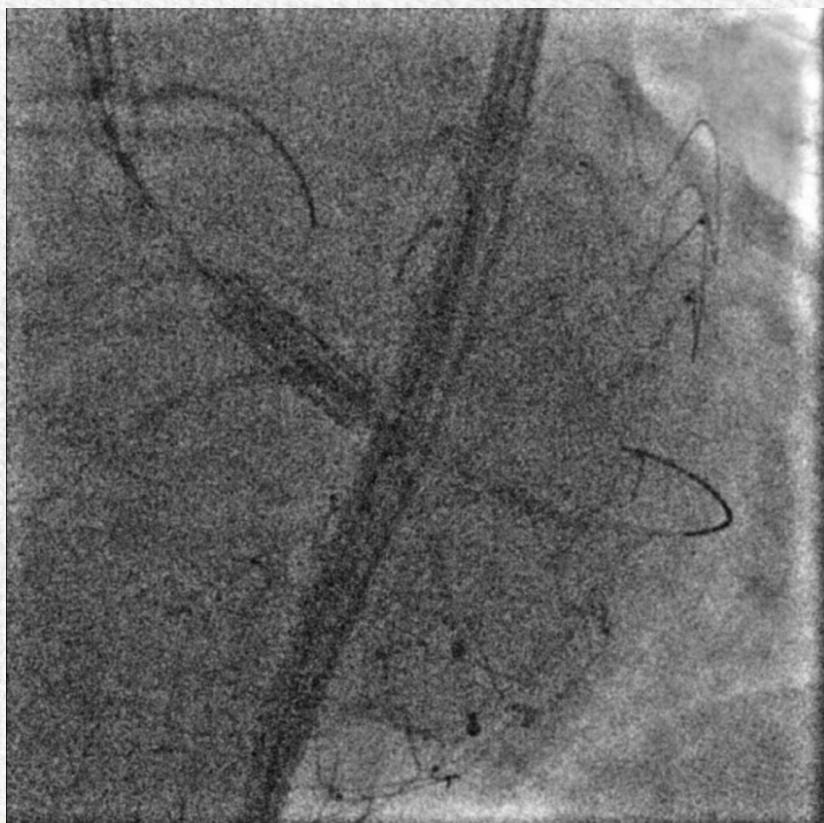
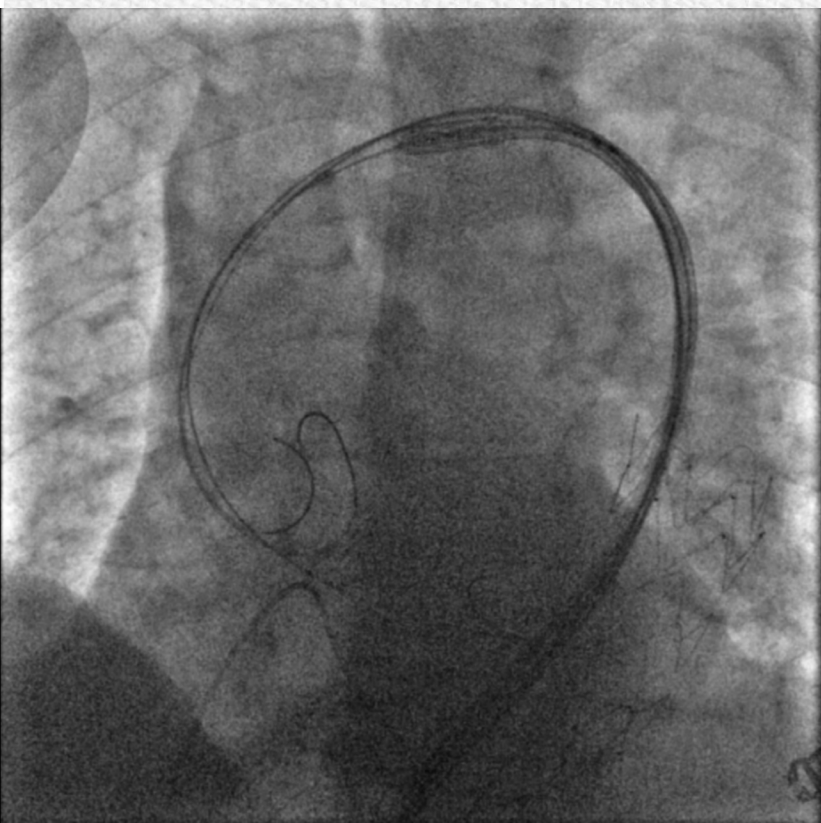


Precise landing zone in difficult anatomies

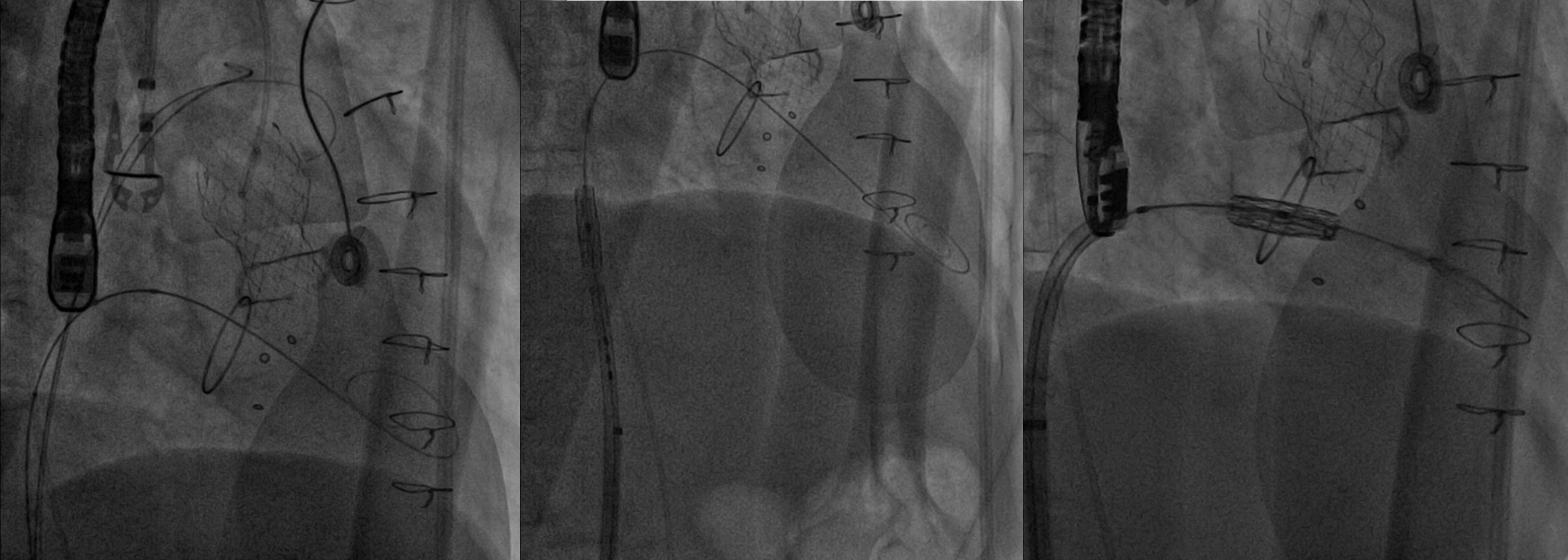
↑
Thoracic aorta

Abdominal aorta →

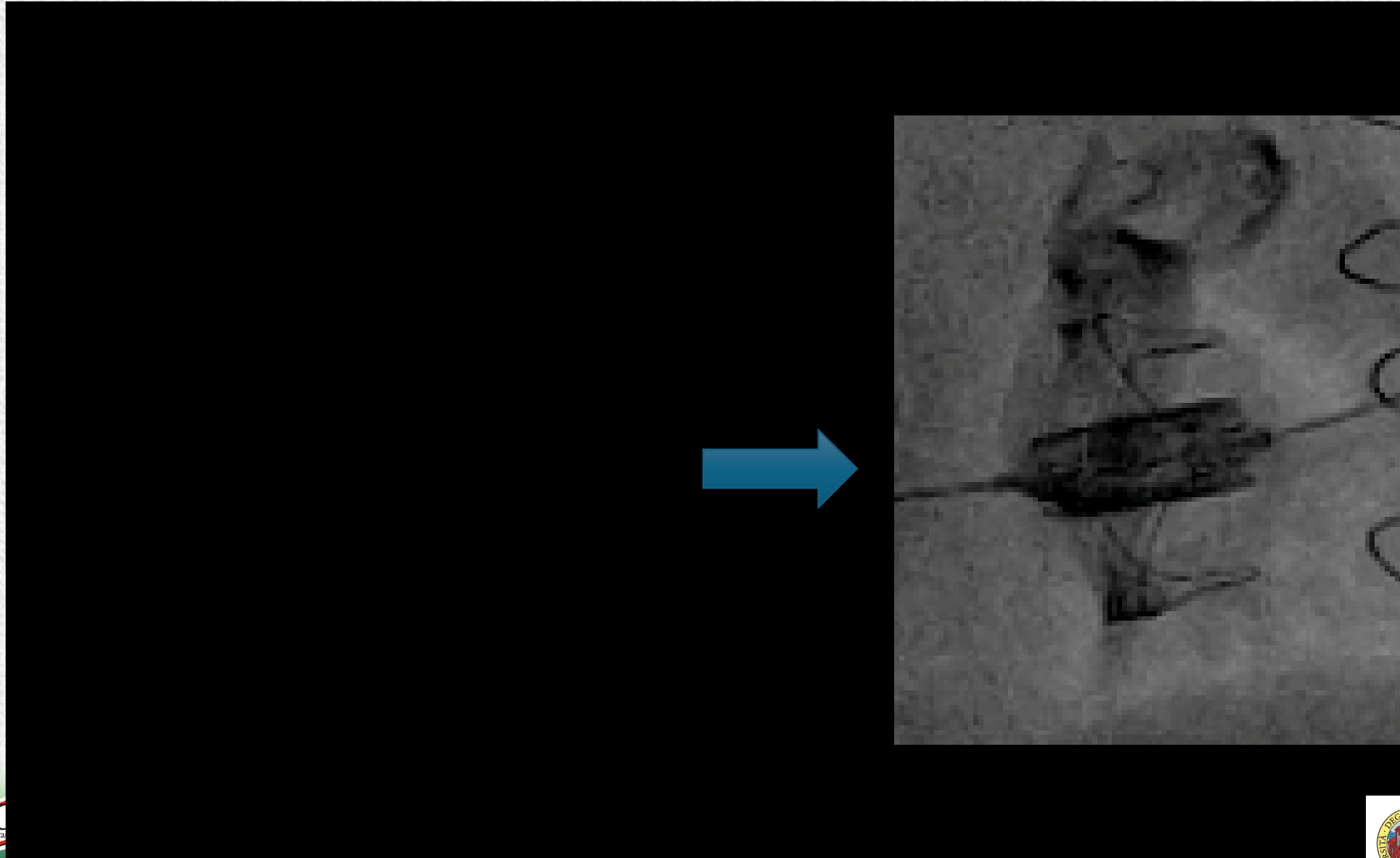
Precise landing zone in difficult anatomies



Trans-septal implantation in mitral position



Trans-venous implantation in tricuspid position



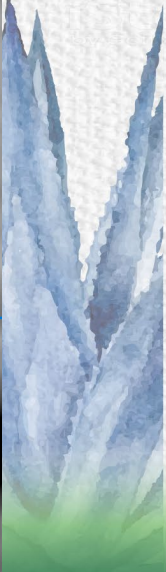
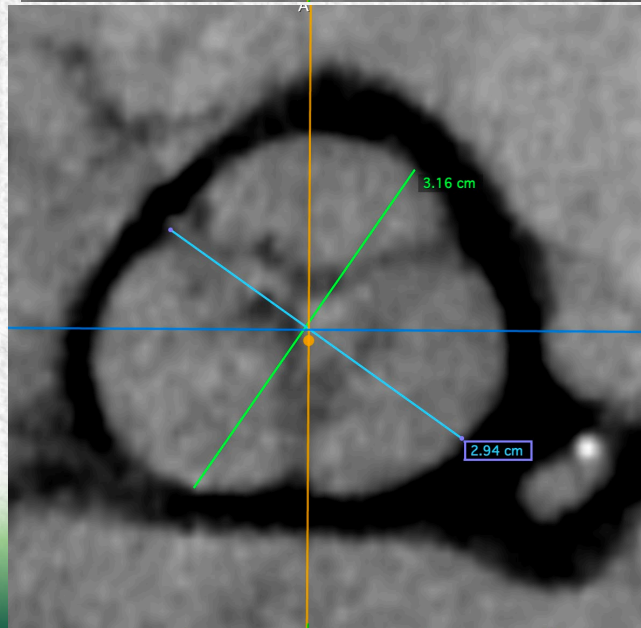
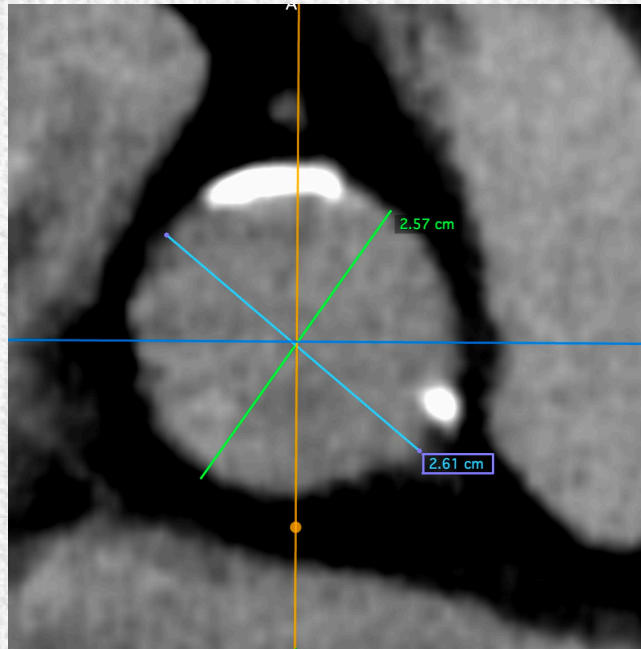
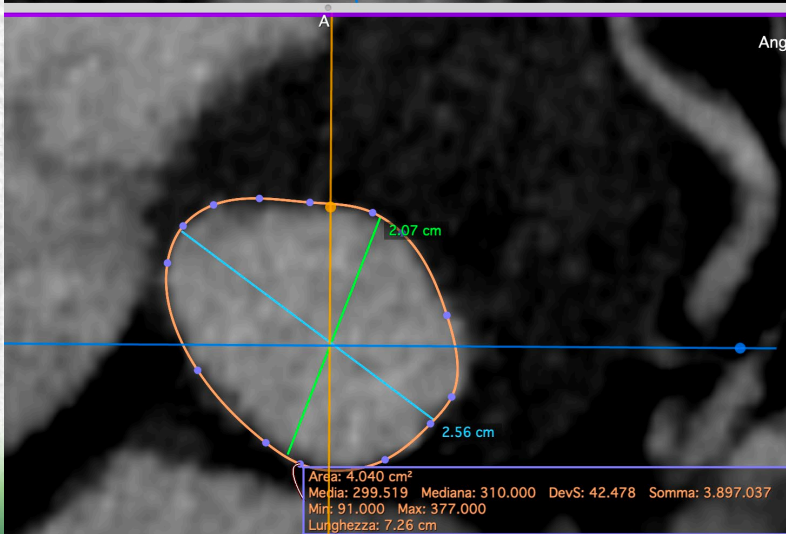
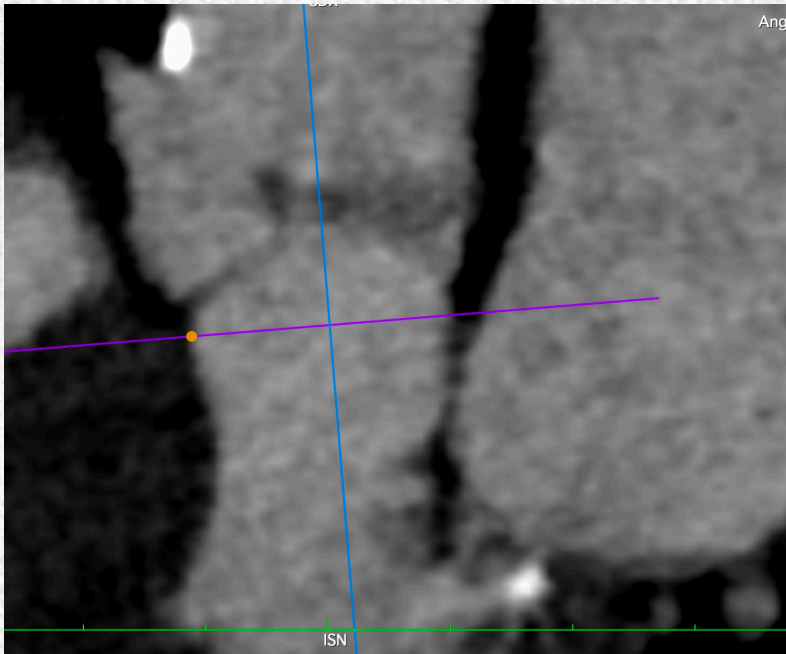
Rapid pacing and risk of valve embolization

932557 154

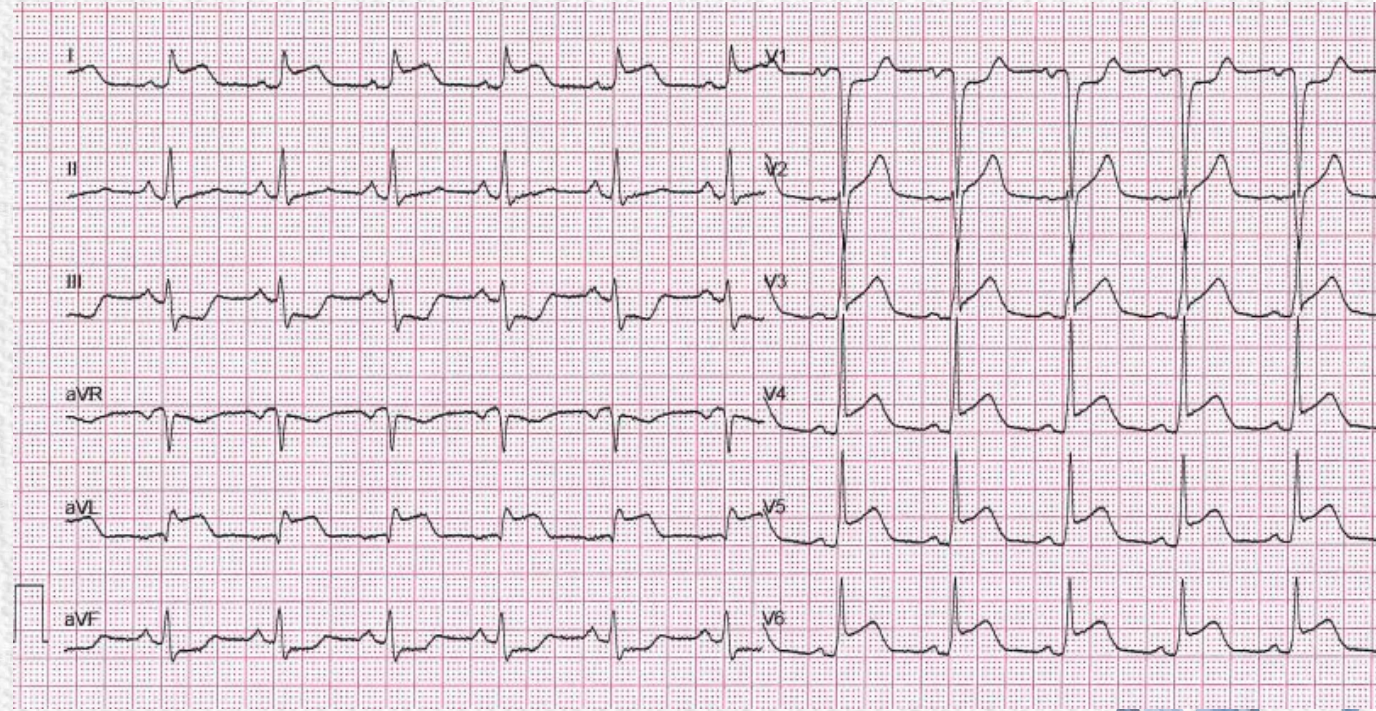
Implantation is a «one shot» attempt because it is not recapturable



Balloon expansion and risk of annular rupture

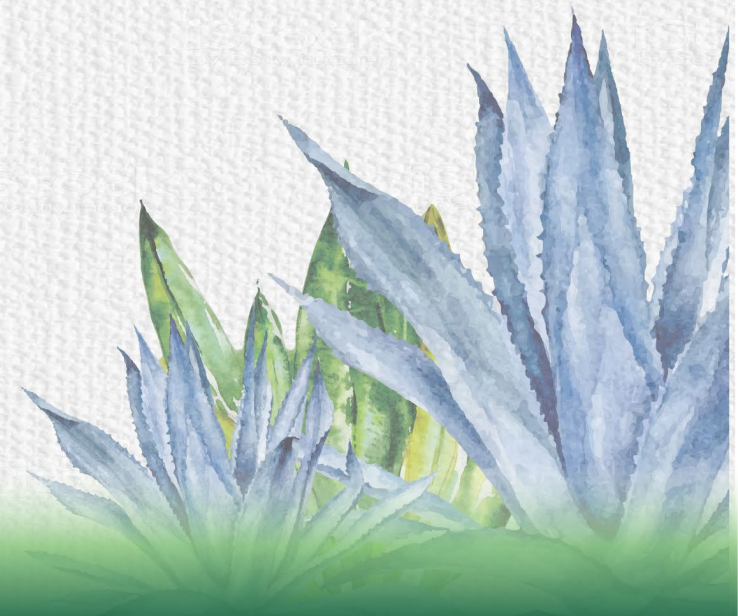


Balloon expansion and risk of annular rupture

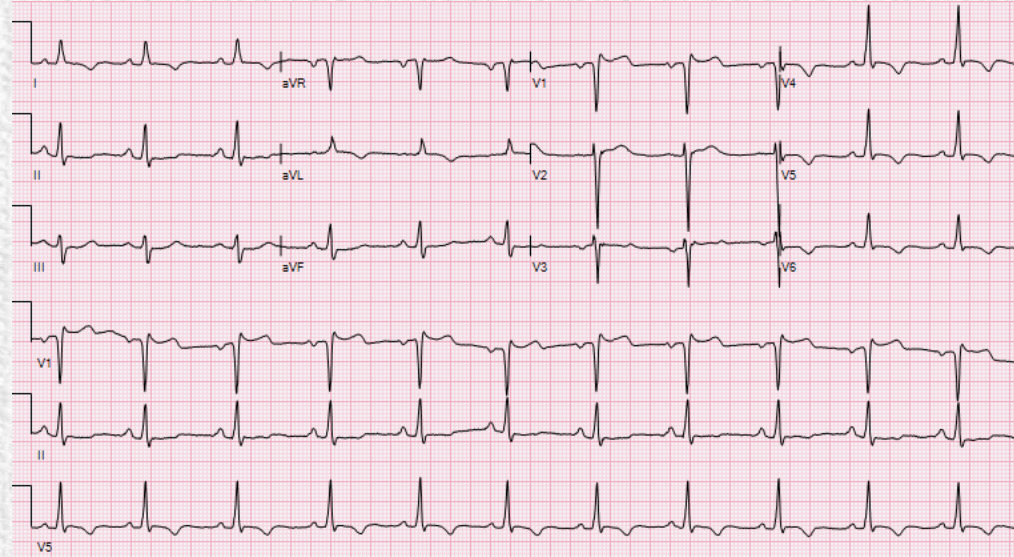


Post TAVI

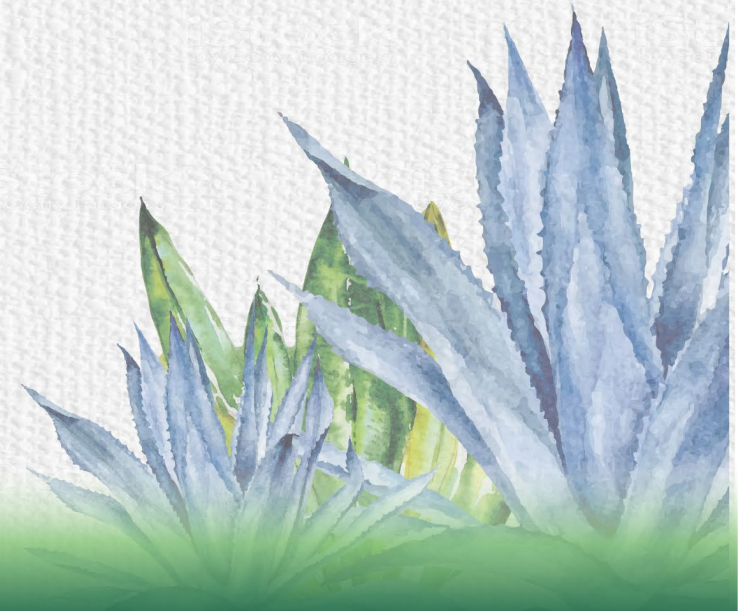
Pre TAVI



Balloon expansion and risk of annular rupture



532557 104



Conclusions

Many patients can be treated with either type of valves that have shown long-term results

The type of valve should be chosen according to the valve anatomy (native or prosthetic)

In certain circumstances one type of THV may be preferred

The presence of CAD should not determine the valve type

But residual leak, residual gradient and need for permanent PM should be considered

Safety should always be the priority since future therapies will change the present life-time management landscape.

