

Transcatheter Aortic Valve Implantation

Management of risks and complications

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Complications of TAVI

Depending on valve model, approach, and definition used (VARC?)

-Vascular complications	3 to 22%
-Stroke	0 to 7%
-AMI	

➤ Most complications can be avoided by a **careful pre-procedural screening** and can be **prevented during the procedural phase** (learning curve)

➤ Early detection of complications during the procedure **request an urgent and adapted management**

- Aortic rupture/dissection	1 to 2%
	< 2%

Prevention of complications

1) Screening phase

Patient selection
*Clinical indications &
Relative contra-indications*

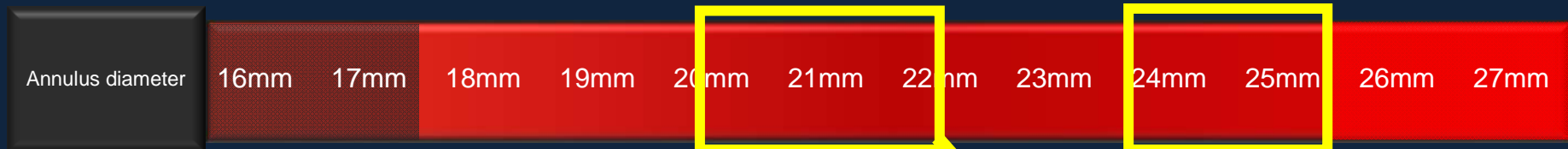
All bad candidates for
AVR are not good
candidates for TAVI

- Life expectancy compromised (comorbidities)
- Low LVEF with no contractility reserve
- Bulging septum intraventricular gradient
- Supra-valvular calcified stenosis
- Severely calcified bicuspid valve
- Low LM insertion and no dilated sinus
- Bulky calcified leaflets
- Specific contra-indications to TA approach

Prevention of THV embolization, paravalvular AR or aortic rupture

Valve sizing

SAPIEN and SAPIEN XT



ANNULUS

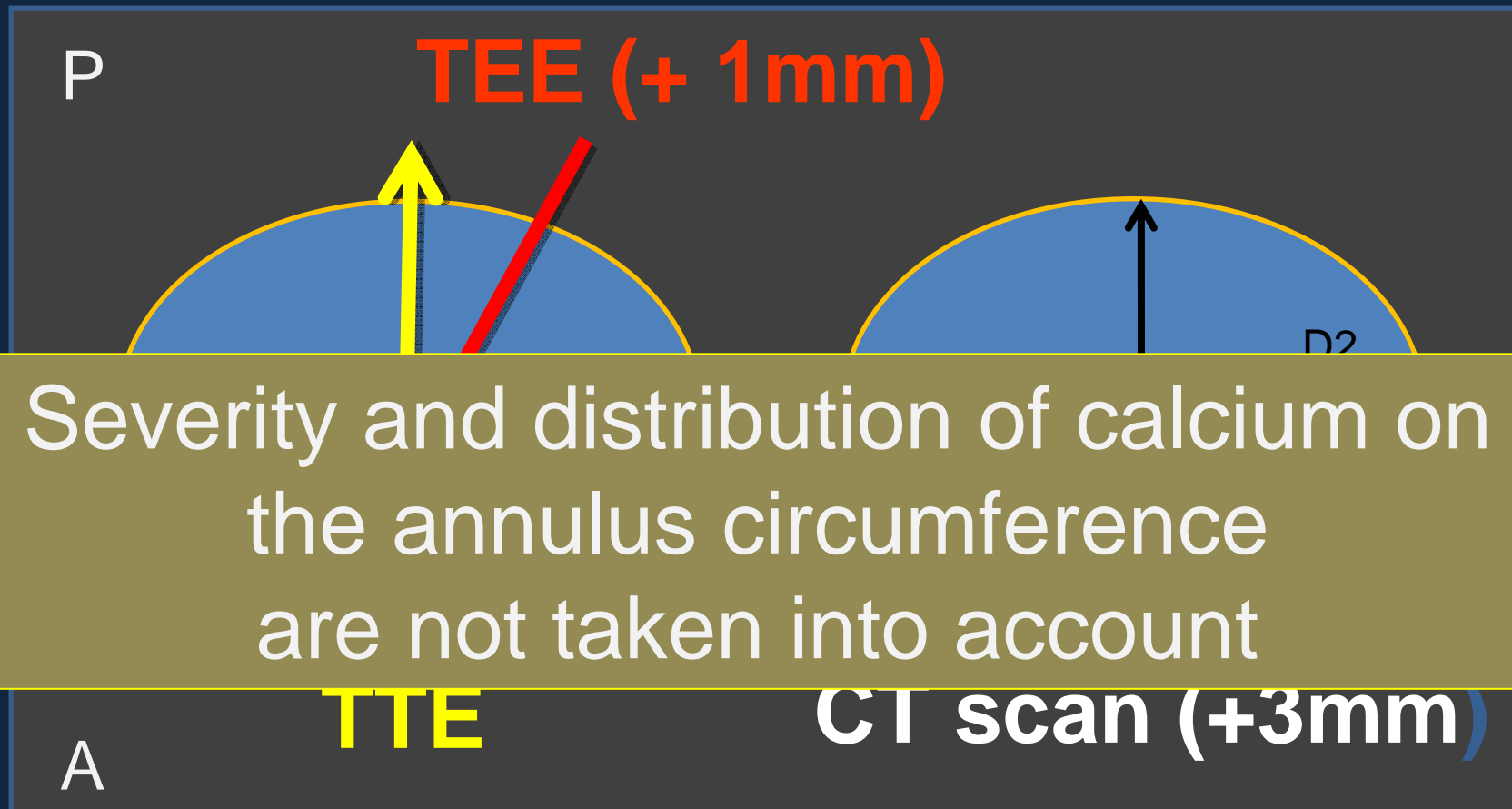
- 18-21mm THV 23mm
- 21-25mm THV 26mm
- > 25mm THV 29mm

23 or 26mm ?

26 or 29mm ?

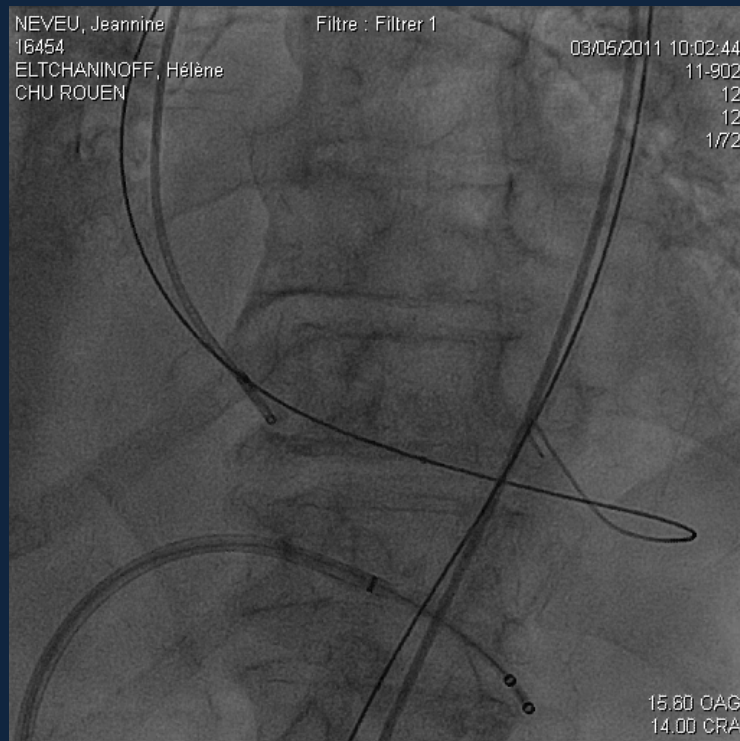
Any progress in annulus sizing?

No gold standard technique



Dynamic sizing by aortography per-BAV

Aortogram during 23mm balloon inflation



Balloon size = annulus size,

no AR

23mm THV confirmed

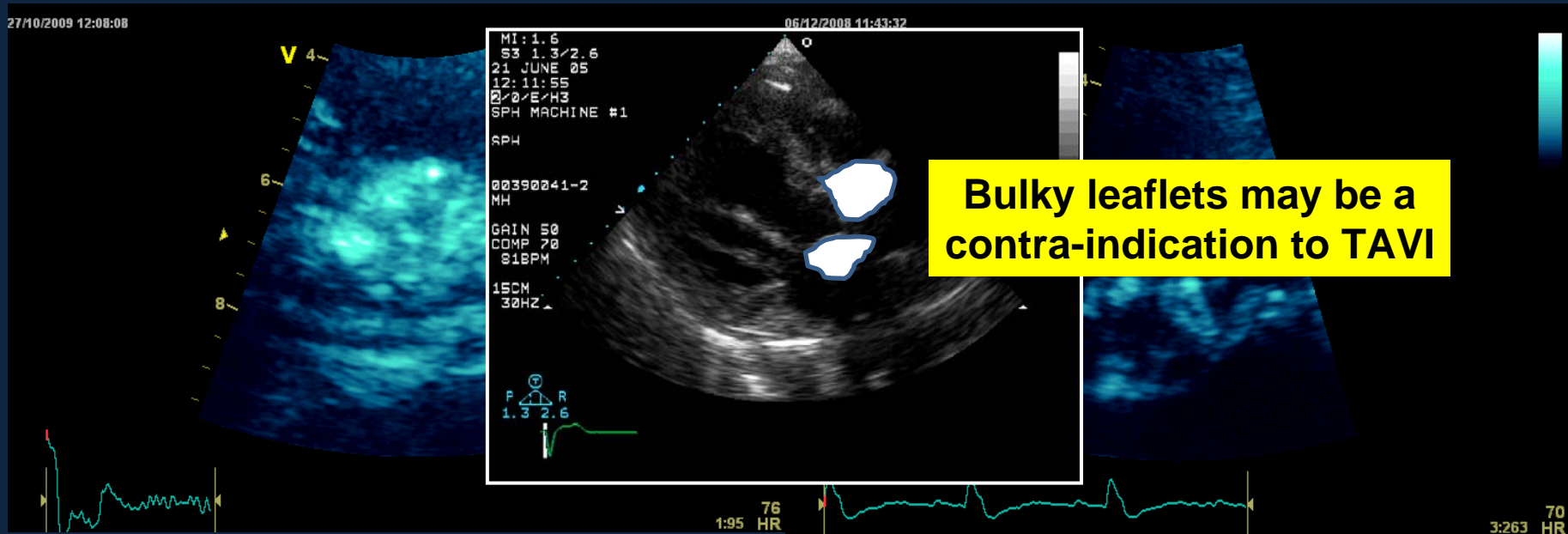
Balloon size < annulus size

AR +

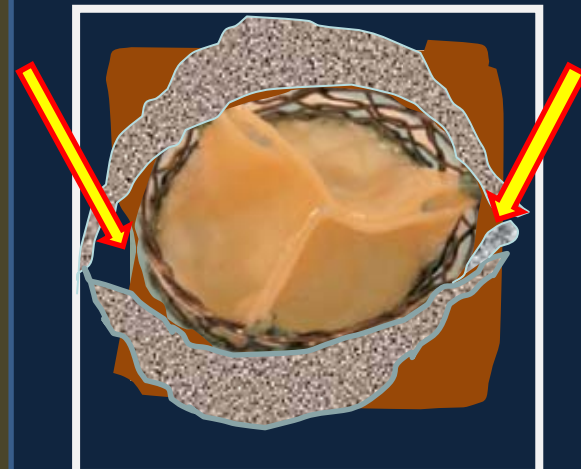
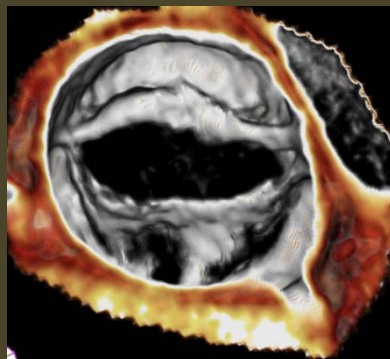
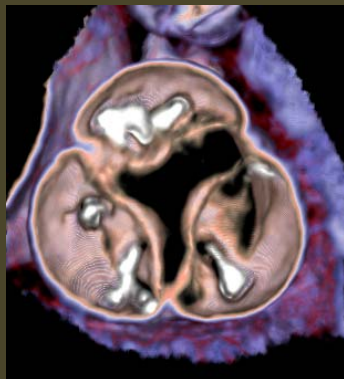
26mm THV confirmed

Prevention of THV embolization paravalvular AR or aortic rupture

Valve anatomy calcium distribution, calcific nodules: TTE, TEE, CT



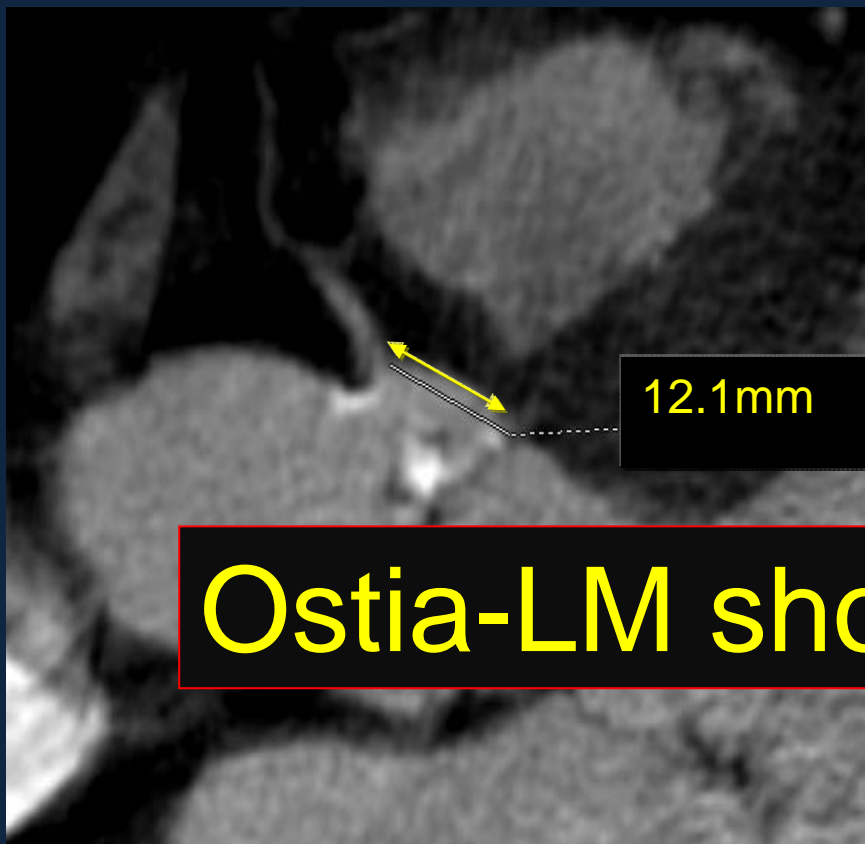
Tricuspid or bicuspid valve?



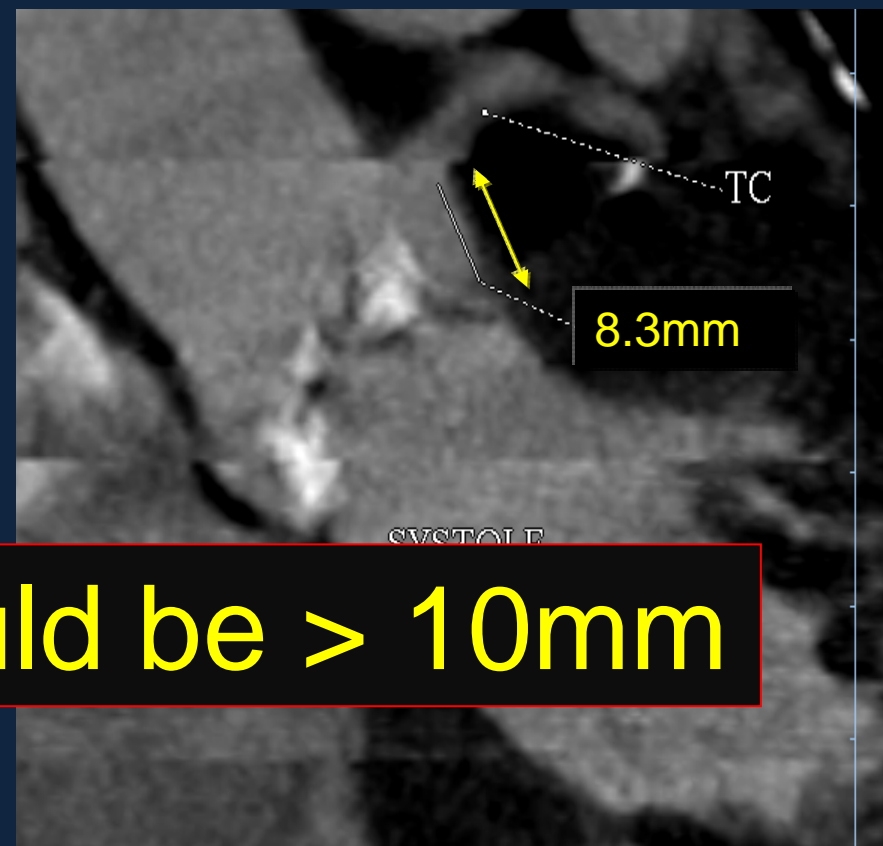
Prevention of coronary occlusion

CT-Scan

- Distance Ostium-Annulus
- Dilated or not dilated sinus?



RCA

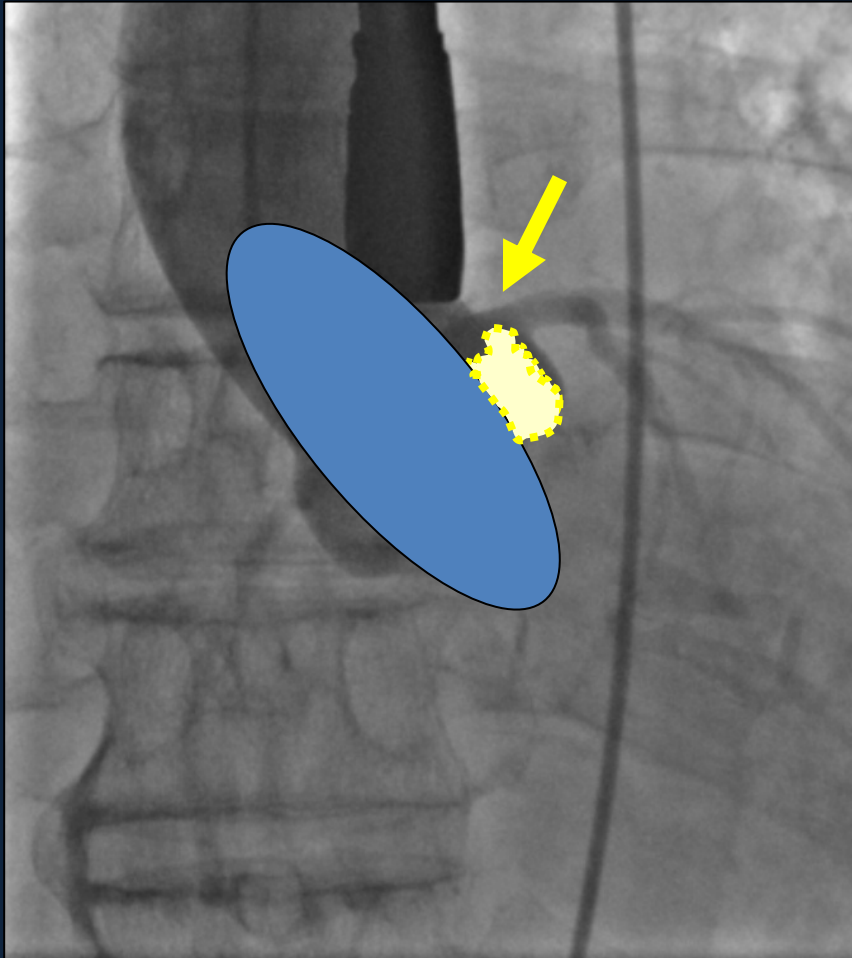


LM

Ostia-LM should be $> 10\text{mm}$

Prevention of coronary occlusion

Aortogram during pre-dilatation



NEVEU, Jeannine

16454

ELTCHANINOFF, Hélène

CHU ROUEN

Filtre : Filtre 1

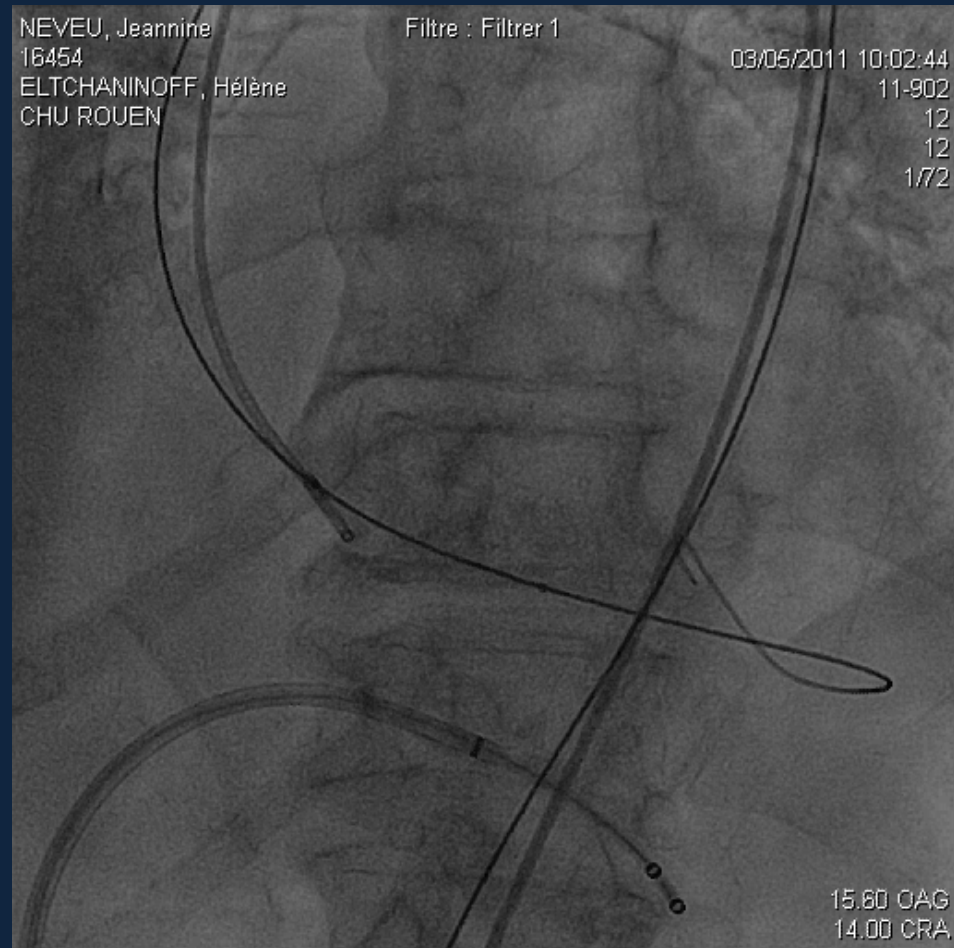
03/05/2011 10:02:44

11-902

12

12

1/72



15.60 CAG

14.00 CRA

Prevention of vascular complications

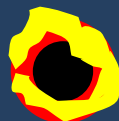
CT Scan

Minimal internal diameters

BASIC GUIDELINES NOVAFLEX

Minimal arterial sizes

Calcifications	18F	19F
Grade 0	6mm	6.5mm
Grade 1	6.5mm	7mm
Grade 2	7mm	7.5mm
Grade 3 (circonf)	7.5mm	8mm

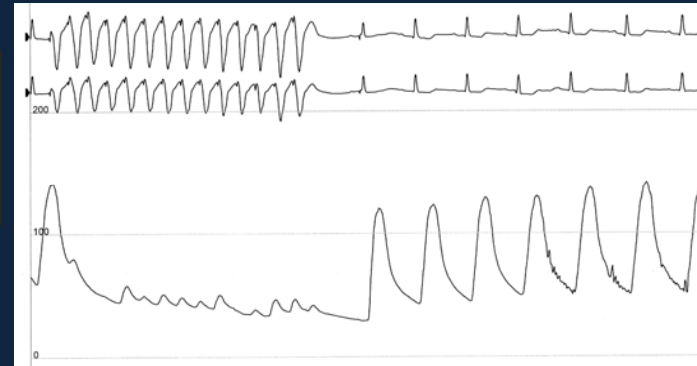
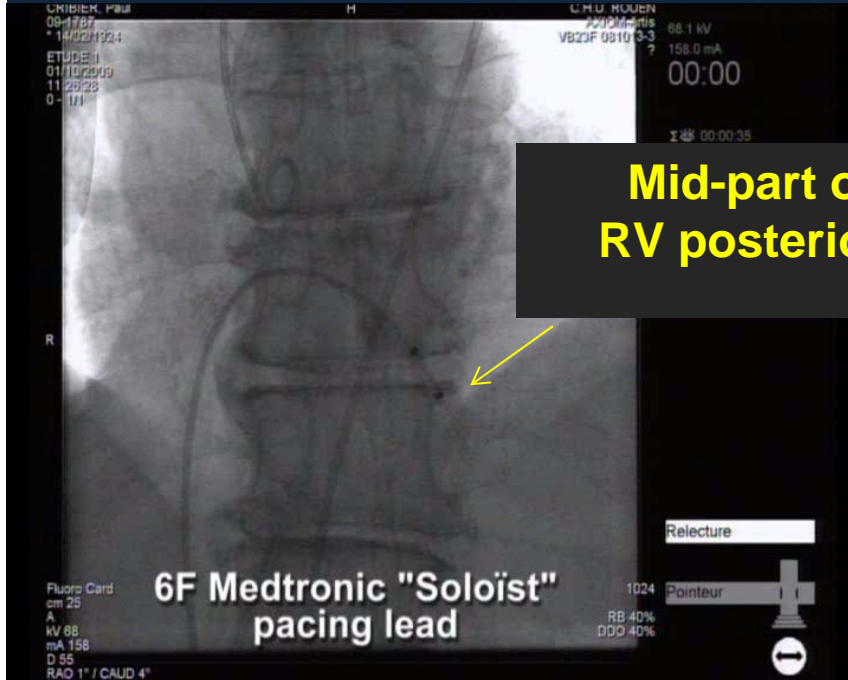


Prevention of complications

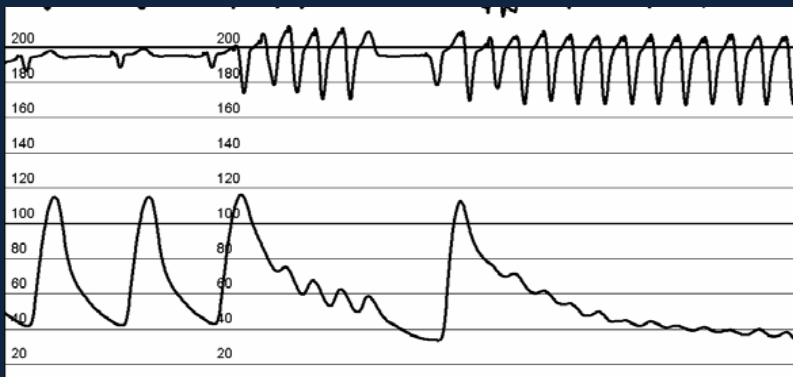
2) Per-procedure

Prevention of THV migration

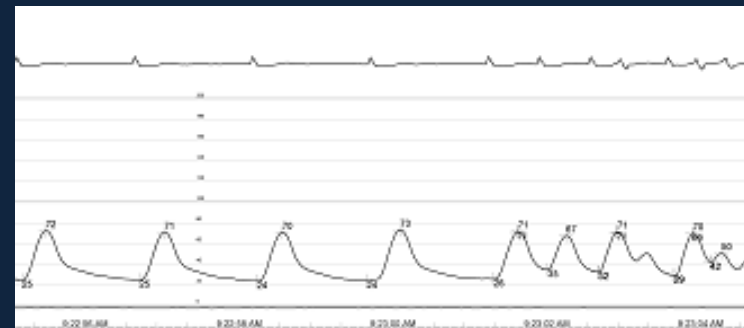
RVP



200 or 220 bpm, 180 bpm acceptable
150 bpm in case of severe LV depression



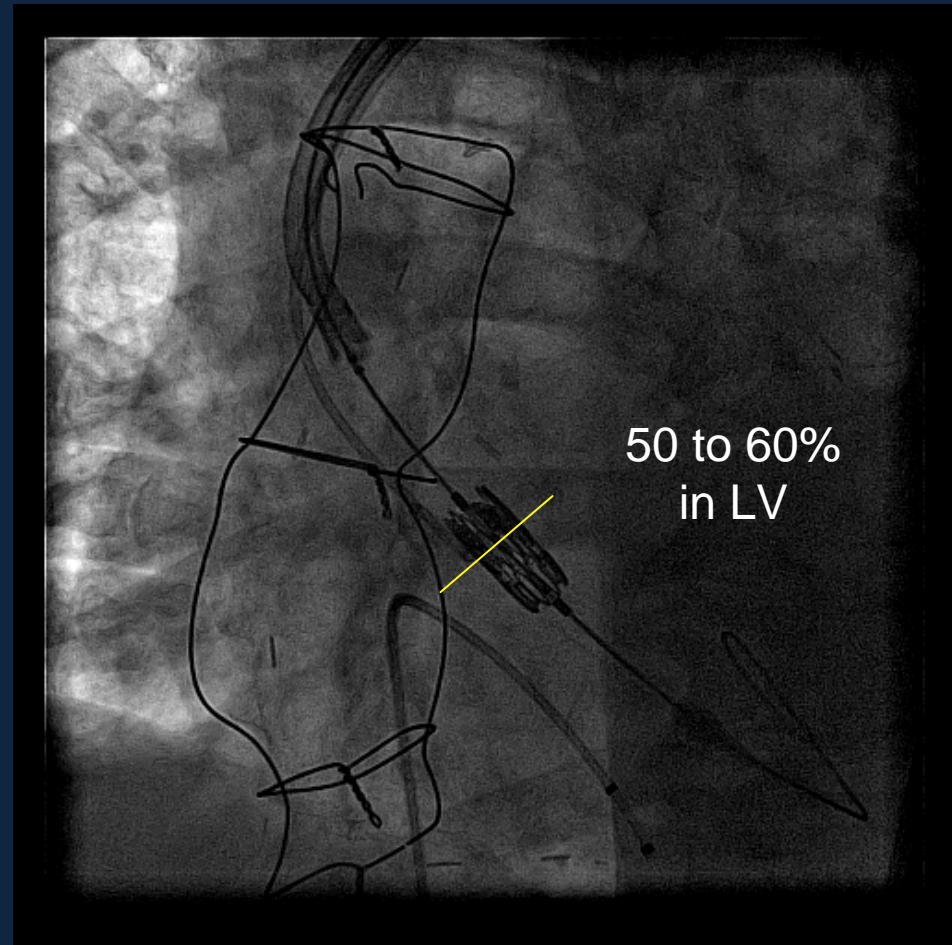
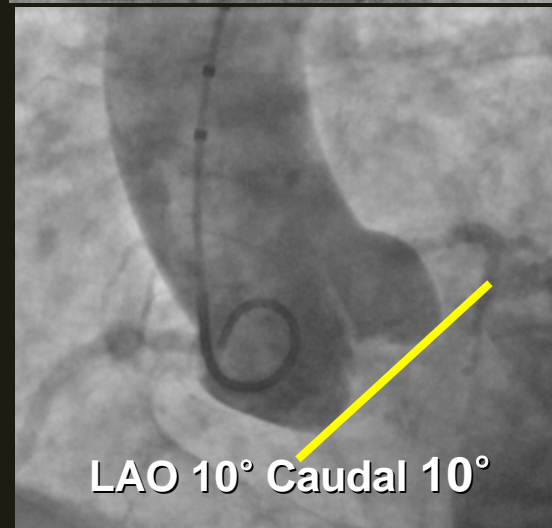
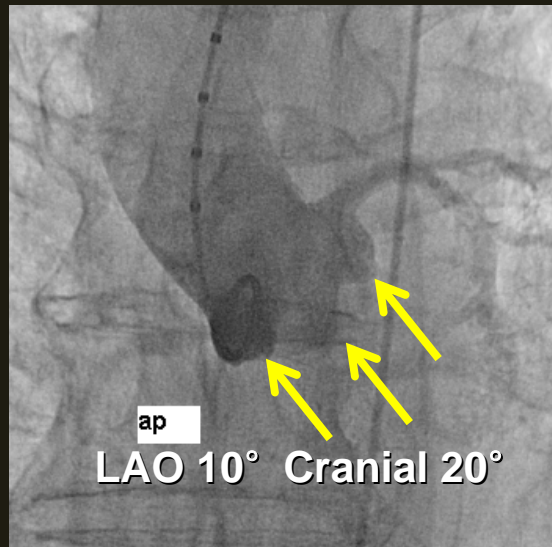
Loss of Capture



2/1 Capture

Prevention of THV migration

Aortography: reference view



Do aortogram during RVP

Valve delivery

- Sheath at the level of the double marker on novaflex (stability)
- Holding the balloon fully inflated 5 sec decreases recoil and paravalvular AR
- The full quantity of contrast must be administered
- Final valve size is volume dependent !



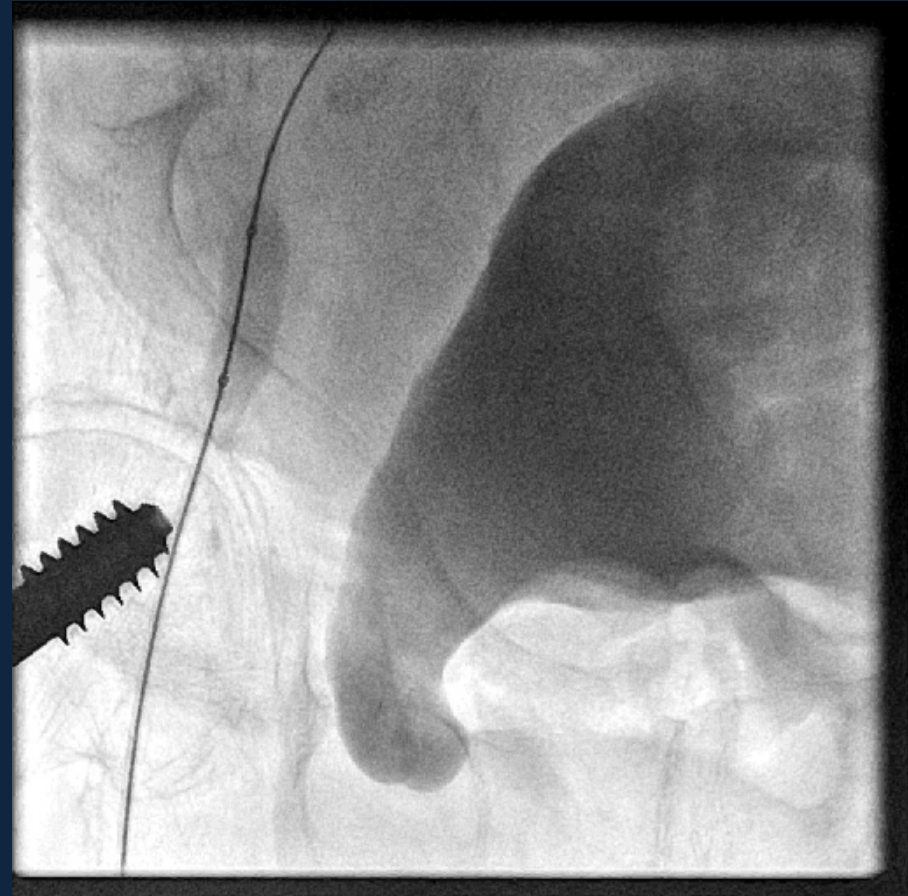
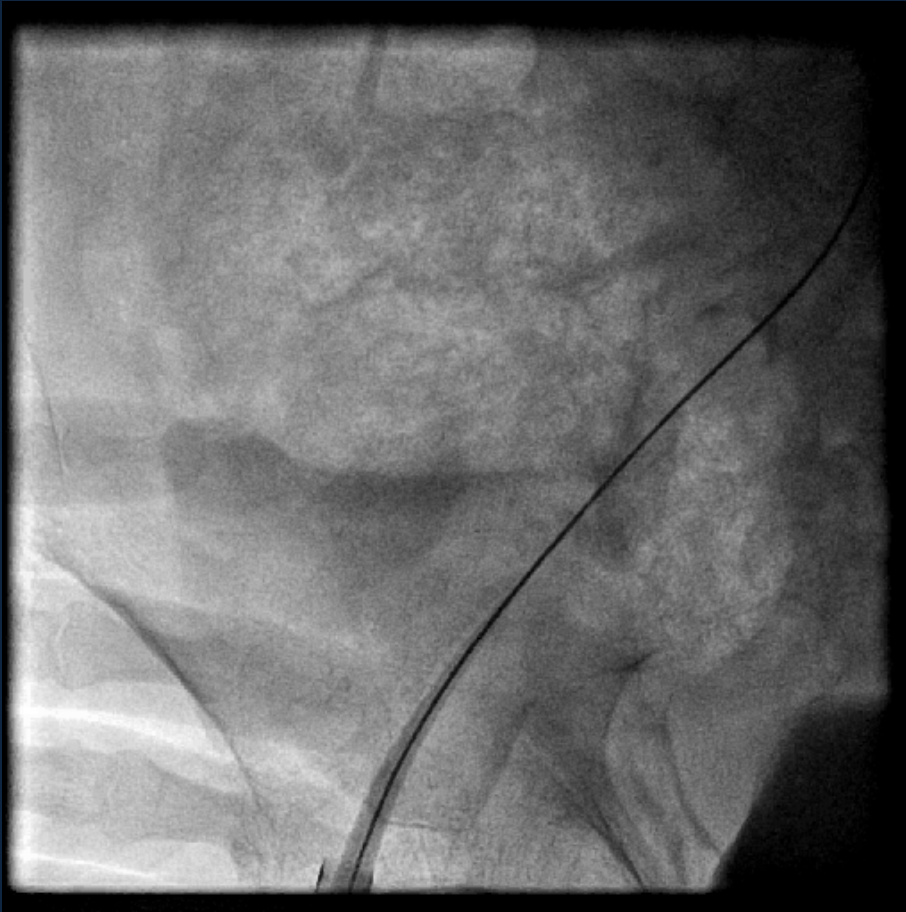
Management of Complications

Vascular complications

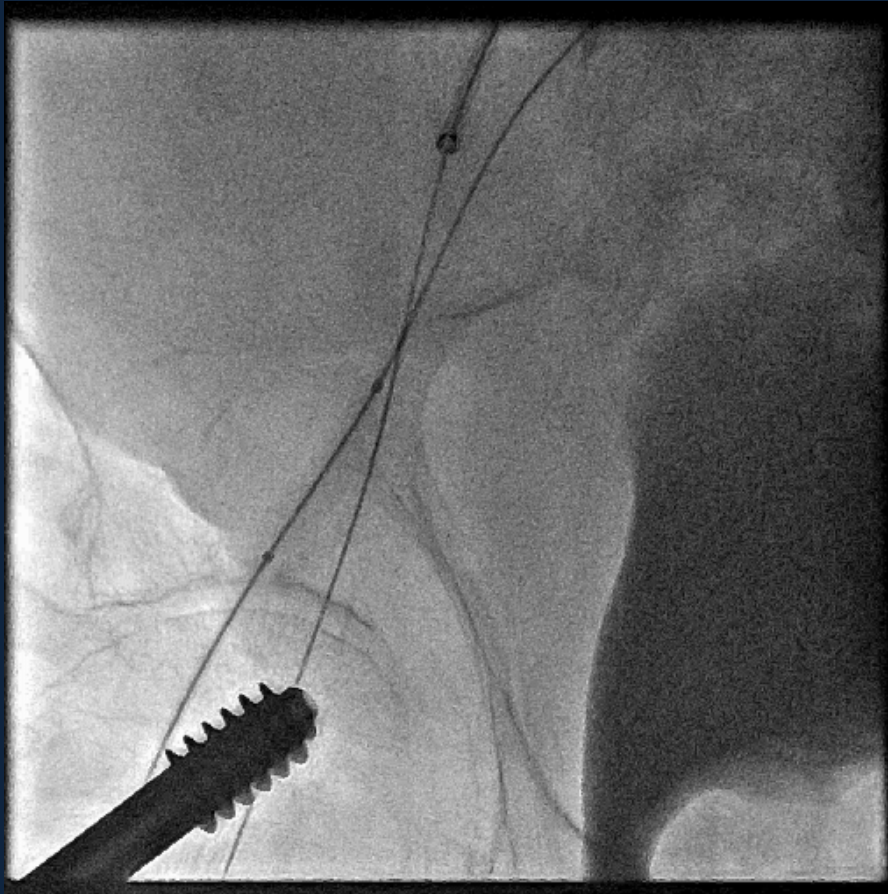
- Never remove the sheath without contra-lateral contrast injection
- Have all type/sizes of occlusion balloons, covered and non-covered stent available
- Consider femoral repair

Critical to be prepared to deal with femoro-iliac complications

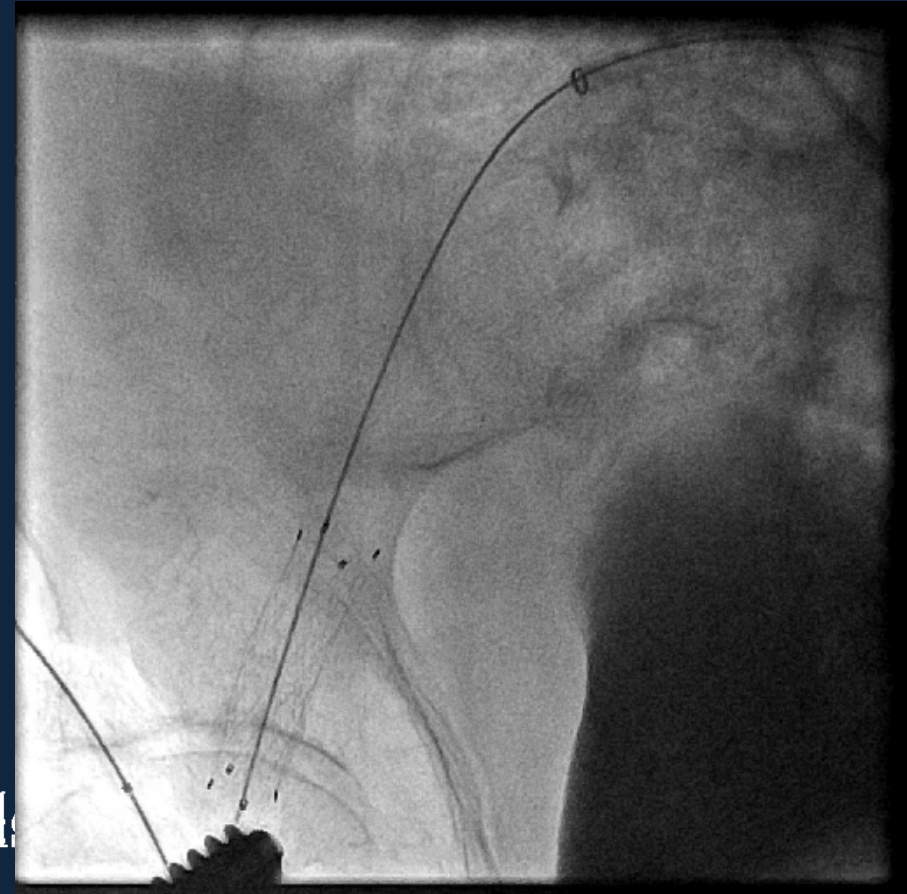
Iliac/femoral rupture after sheath
removal (same patient)
COVERED STENT



Iliac/femoral rupture after sheath removal (Rouen)



Super Arrow-Flex sheath
10F from LFA



Vascular Stent Graft
Fluency Plus 13.5 / 40m (BARD)

Complications

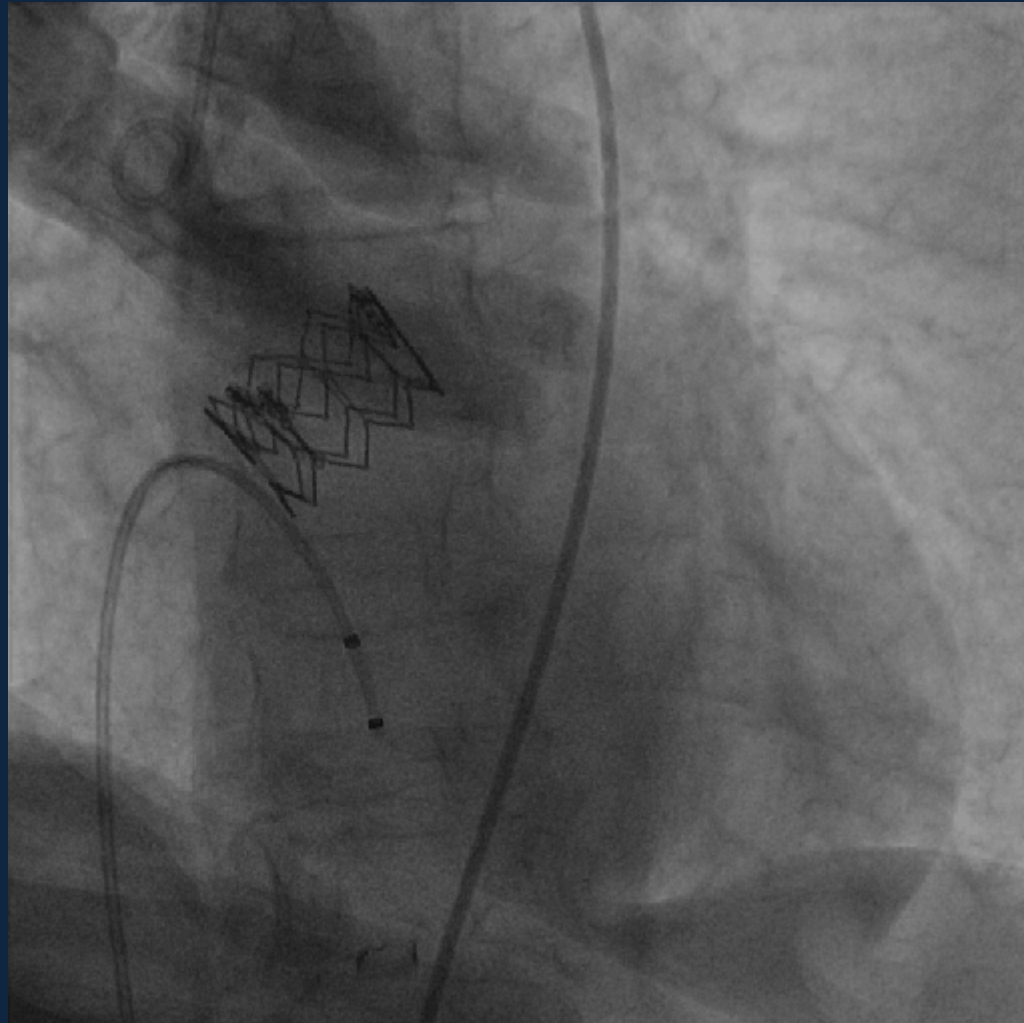
Rupture of the annulus

- Higher risk in case of porcelain aorta and angulated aorta
- Almost always related to balloon or valve oversizing:

Prefer smaller size in heavily calcific valve, porcelain aorta, extremely old patients

Rupture of the annulus by valve oversizing

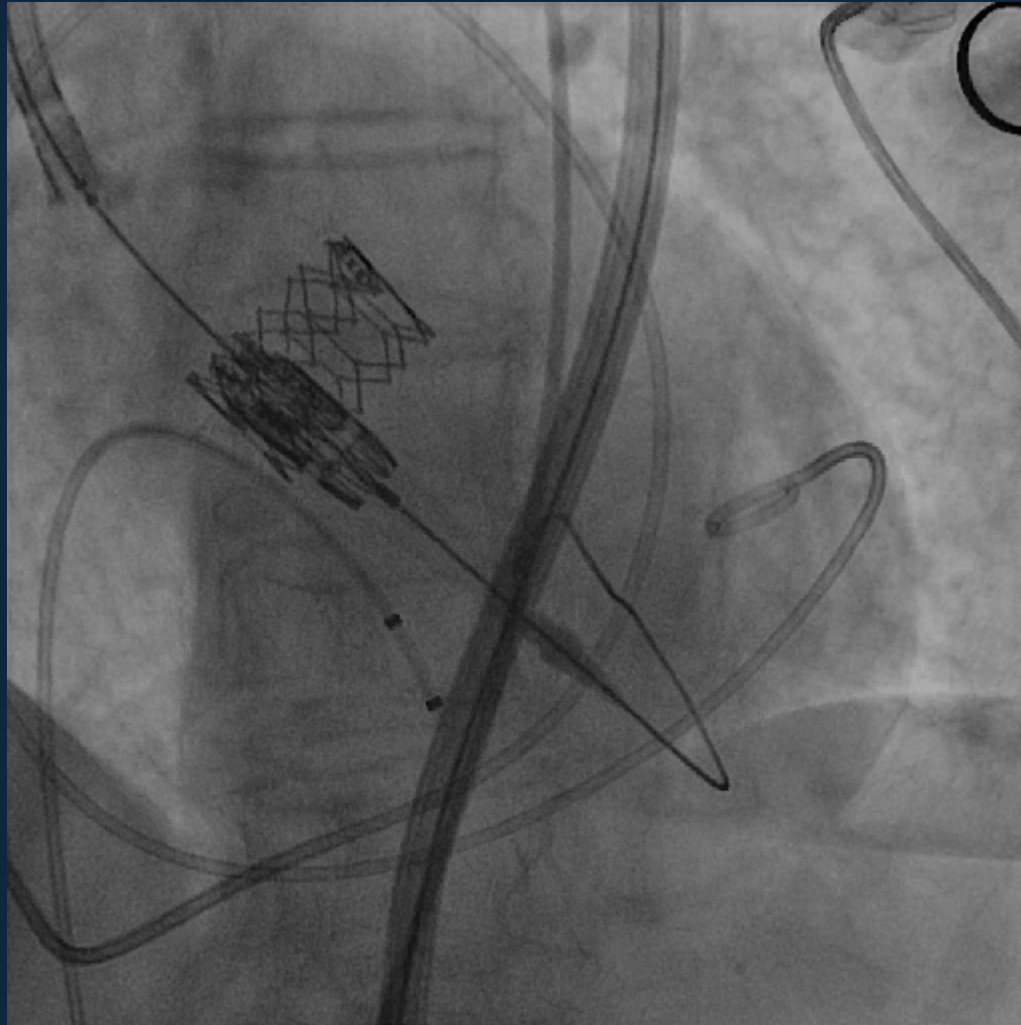
Annulus 20.5mm on TTE: 25 mm THV, 90y-old woman



Rupture of the annulus
at the low border
of the stent
+
Pericardial
tamponade

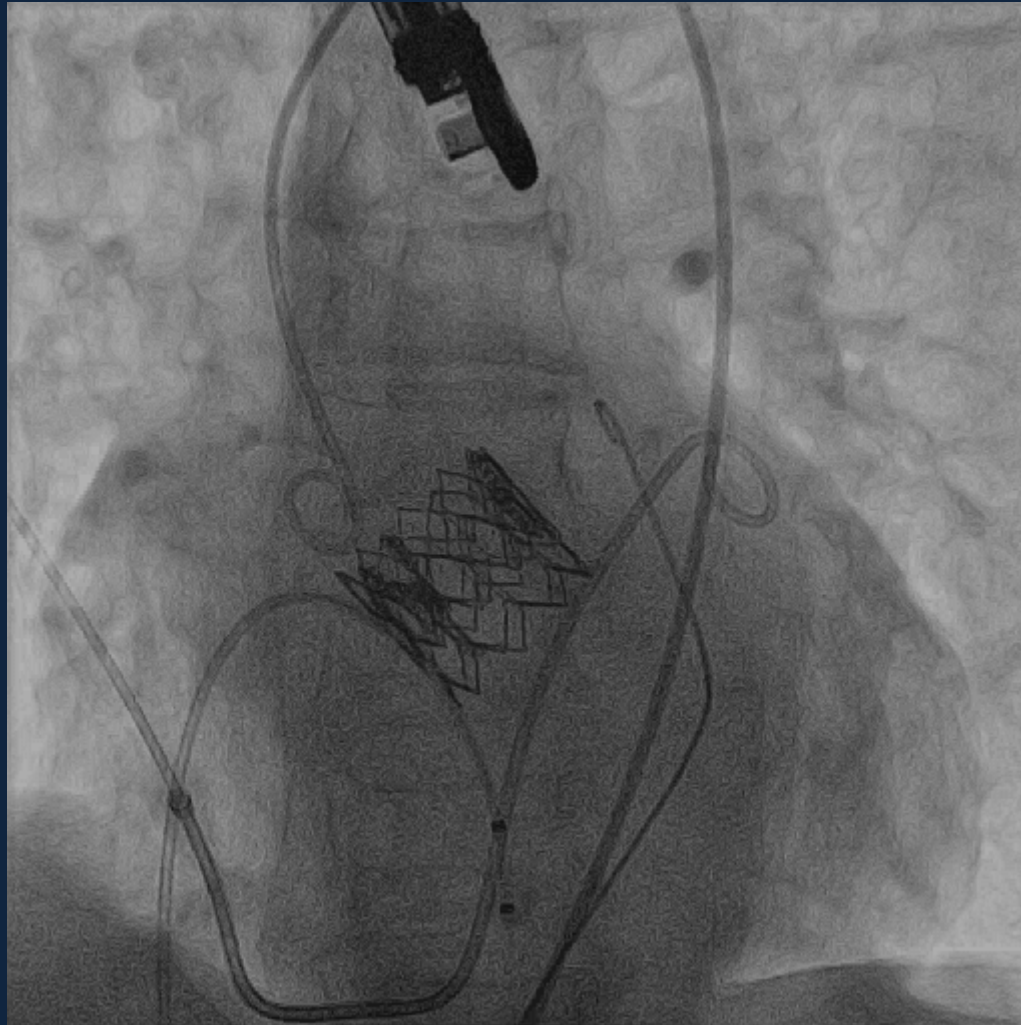
Rupture of the annulus

Annulus 21.5 on TTE, 25 mm THV
90y-old woman: VALVE-IN-VALVE



Rupture of the annulus

Annulus 21.5 on TTE, 25 mm THV
90y-old woman



Complications

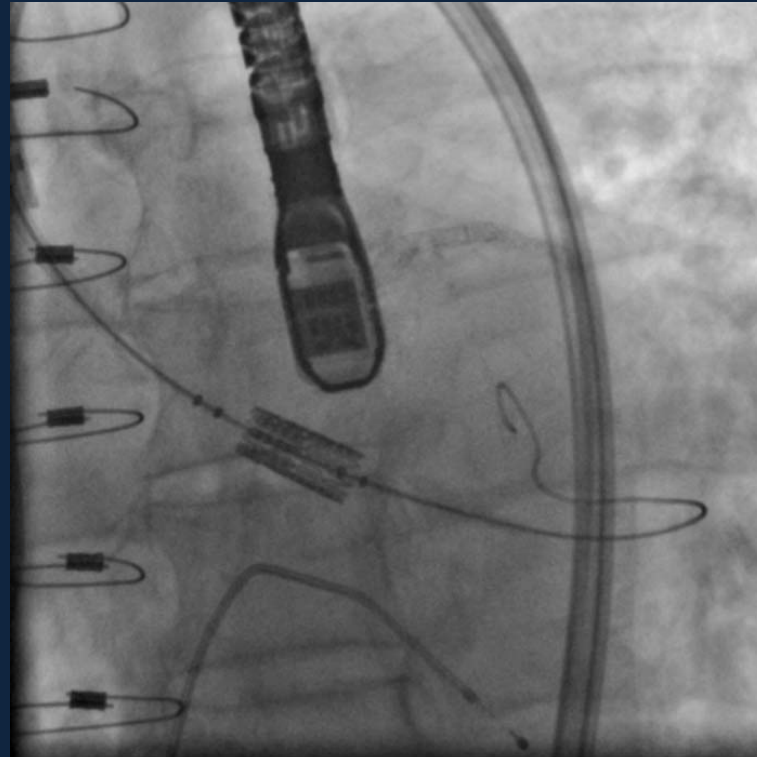
Valve embolization

TECHNICAL ERROR

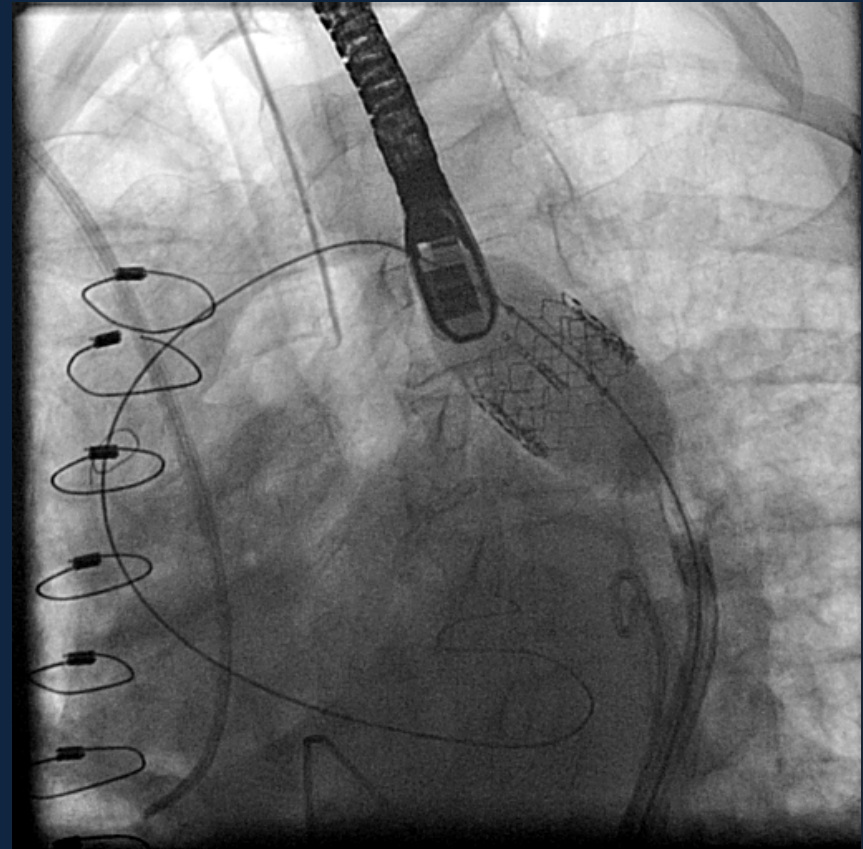
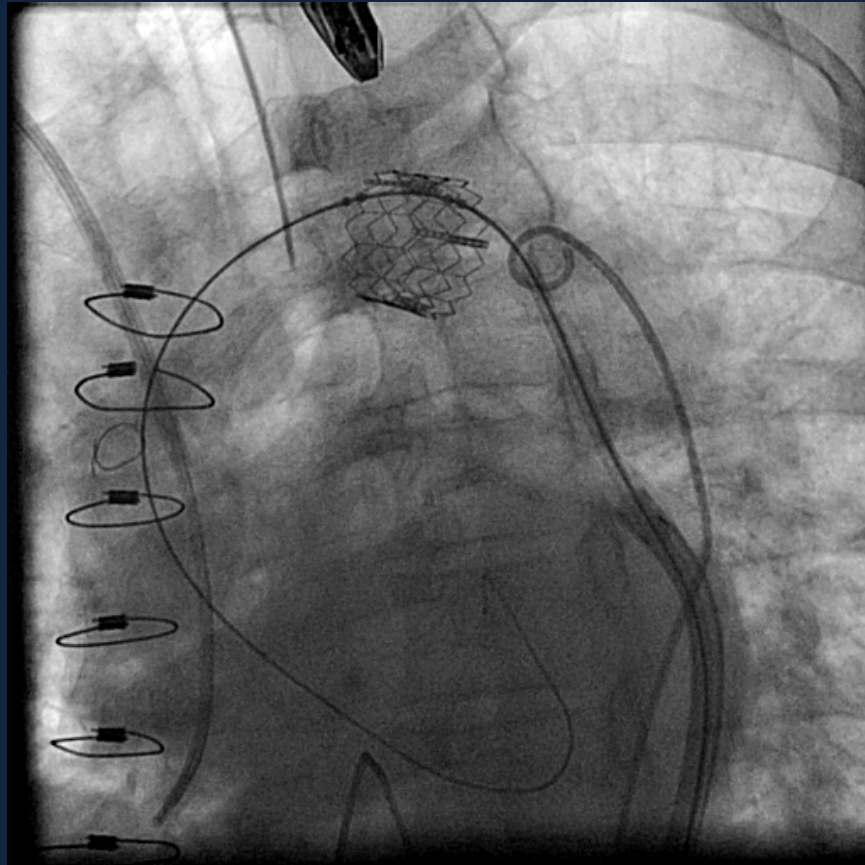
- ~ THV positioned too high*
- ~ Valve not inflated fully*
- ~ Pacing stopped prematurely or lack of capture*
- ~ Under THV sizing or annulus too large*
- ~ THV positioned too ventricular*

BULGING SEPTUM

Explanation: loss of capture during RVP



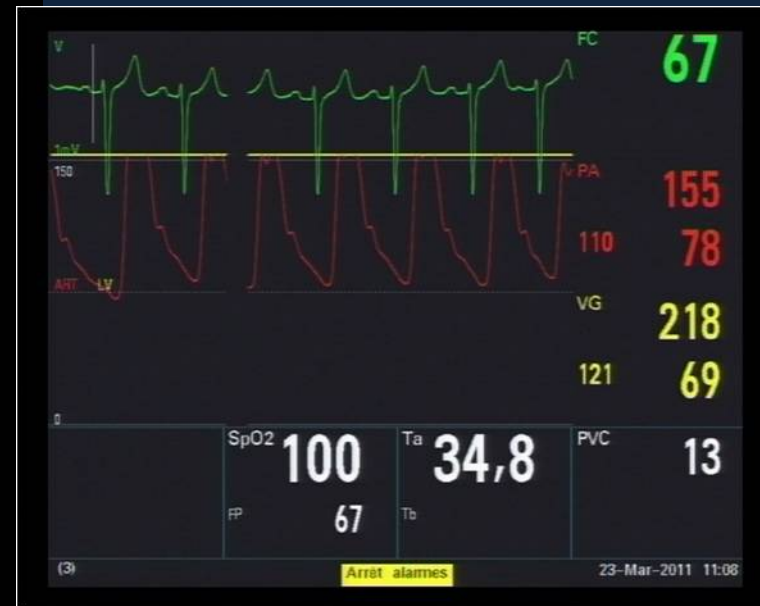
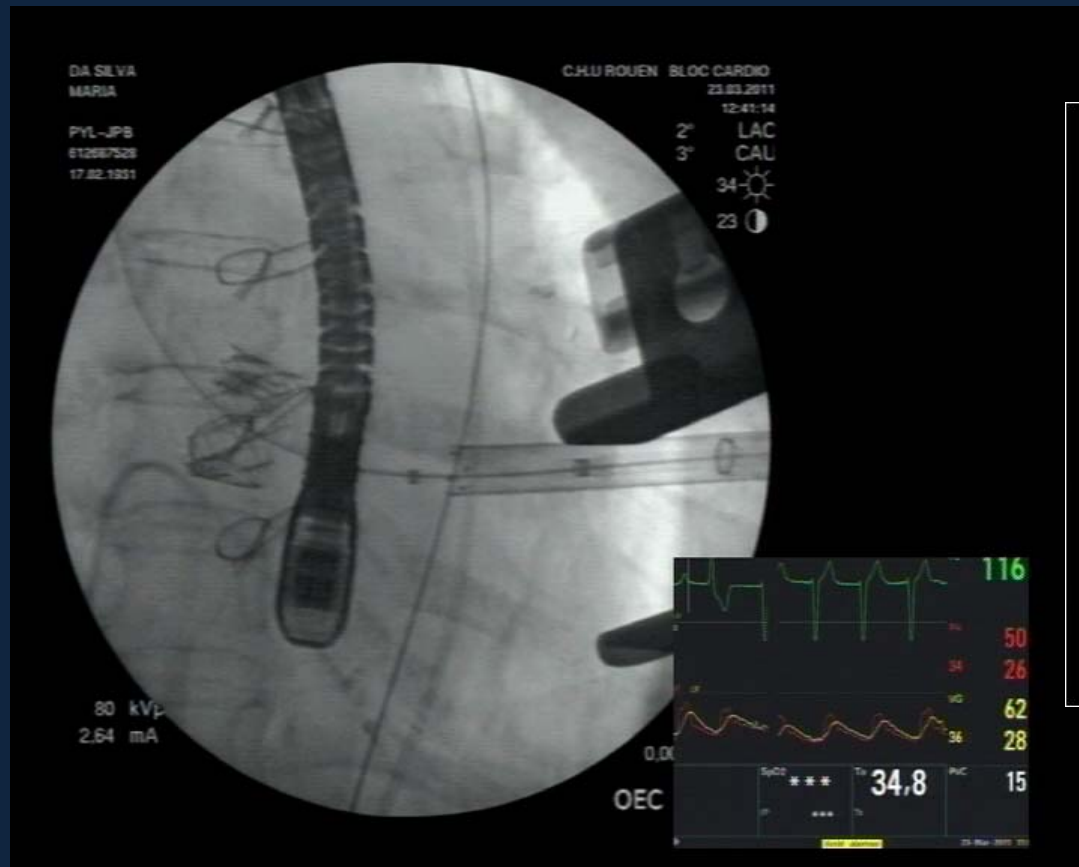
THV Deployed In Distal Aorta



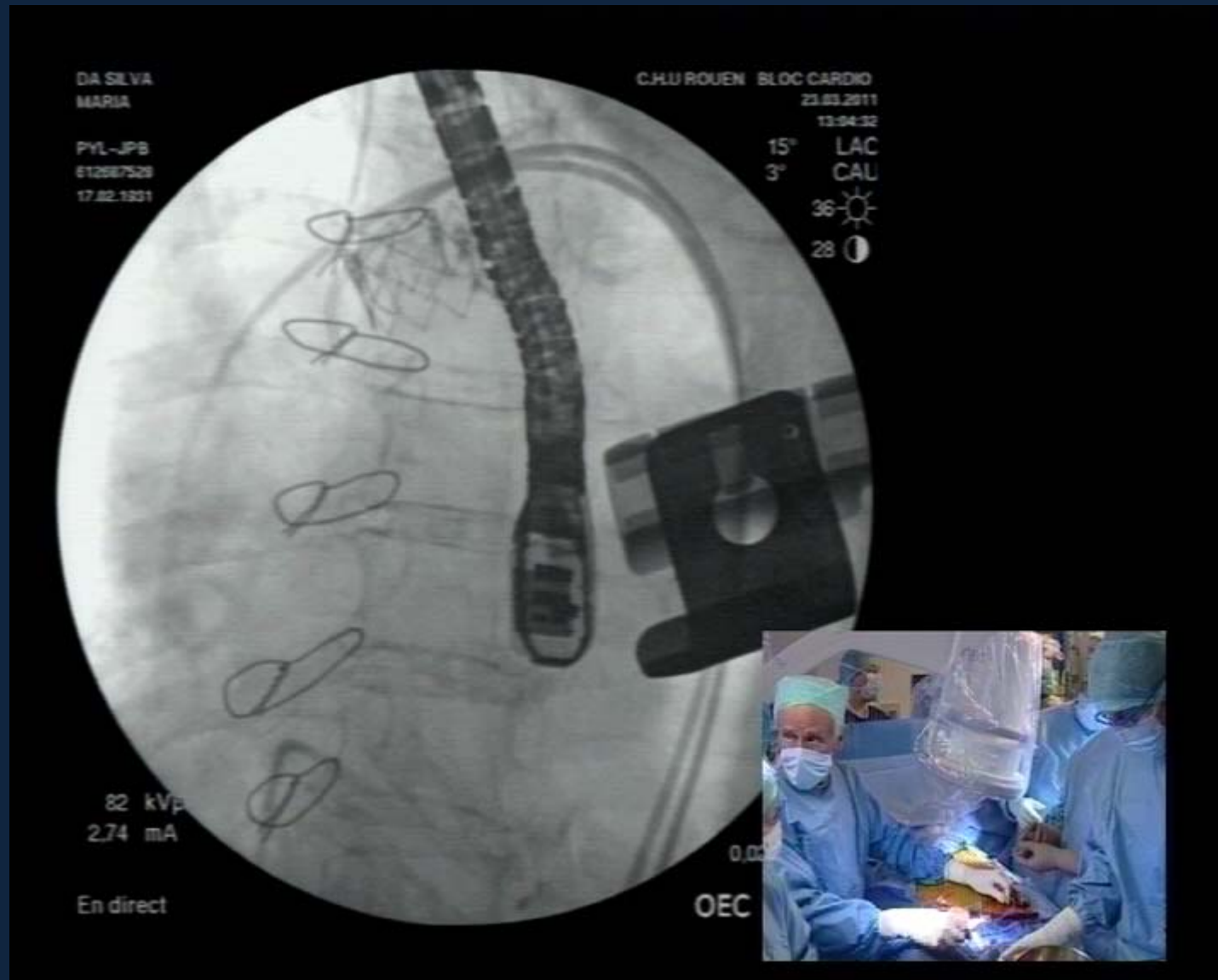
Bulging septum: Transapical case



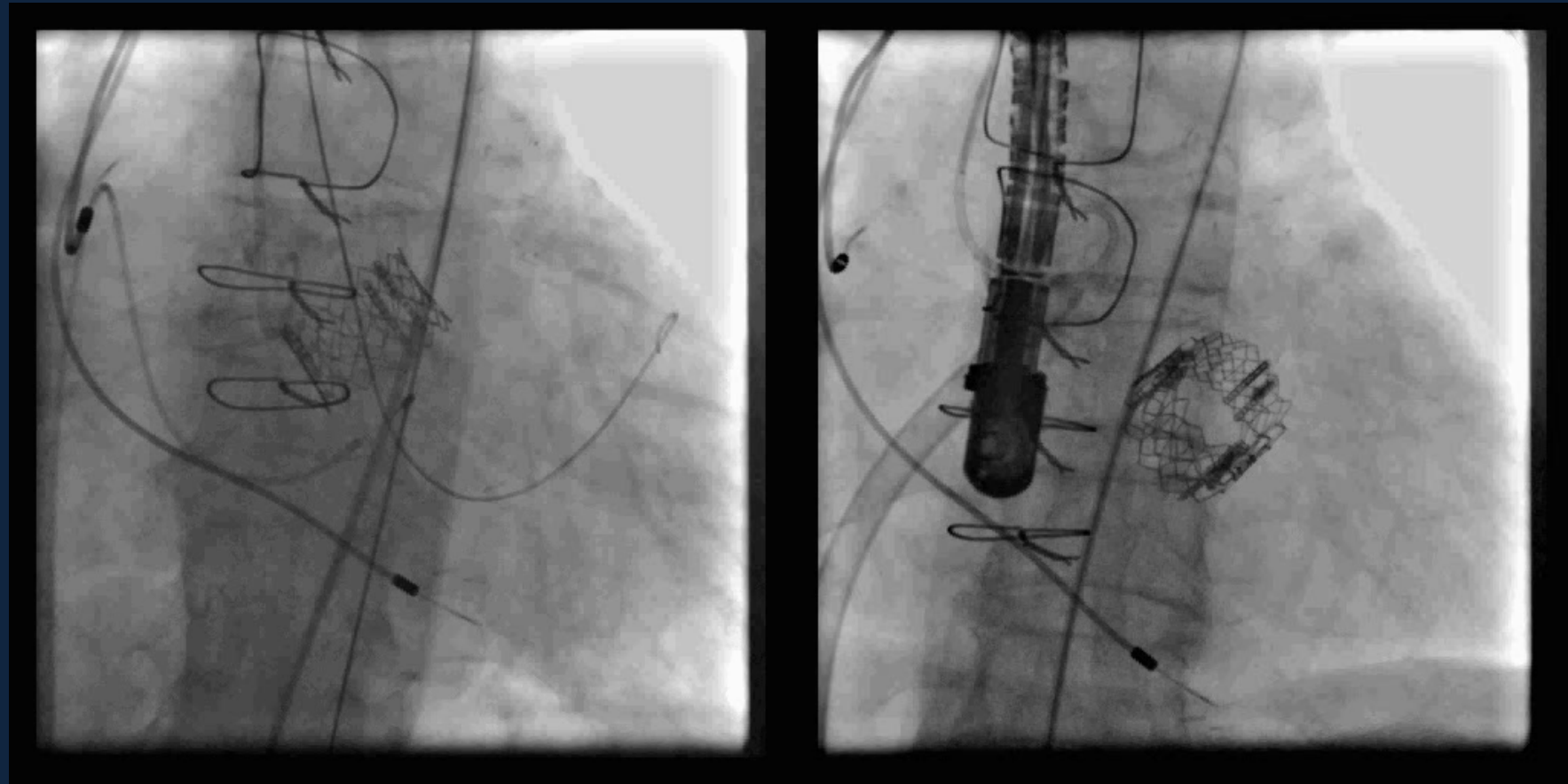
Bulging septum: Transapical case



Bulging septum: Transapical case



Valve embolization: LV

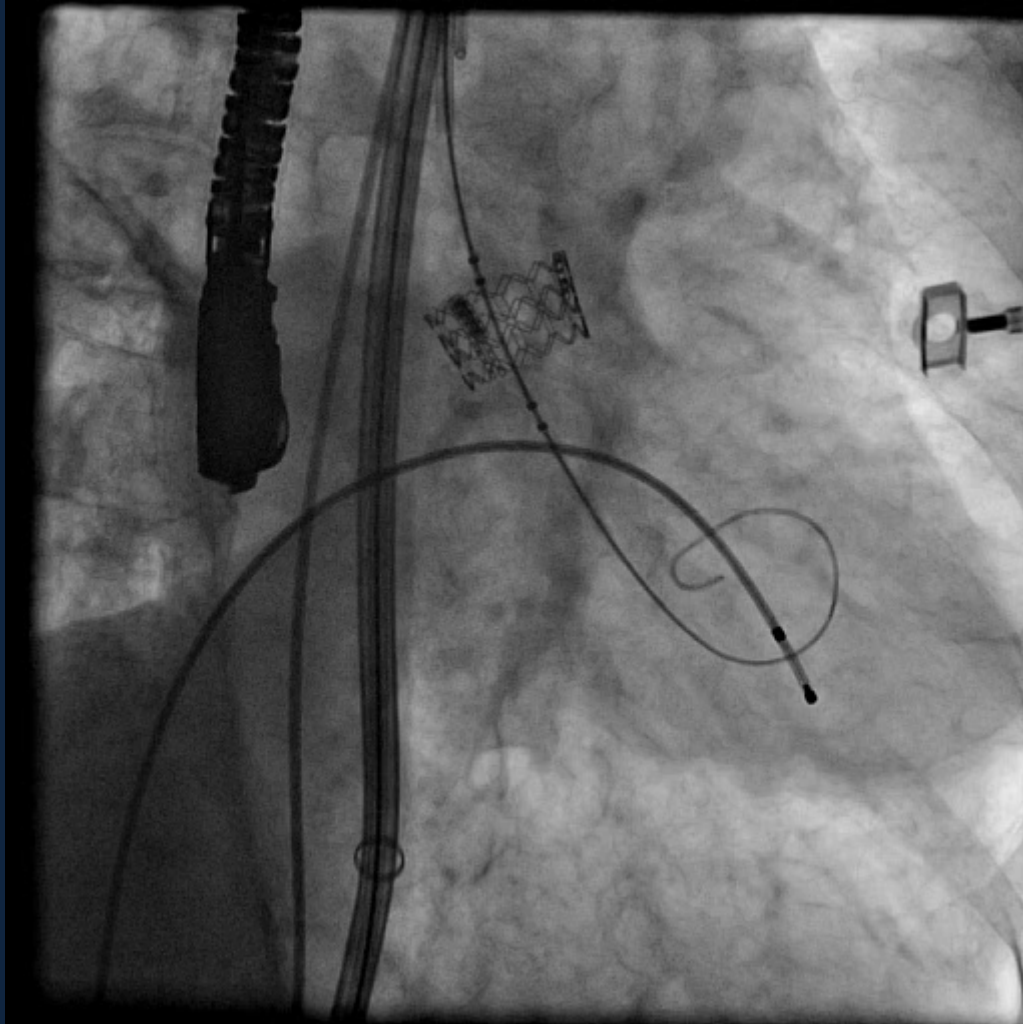


- - Aortogram post reveals severe AI secondary to valve being too low
- Valve embolized into LV

Complications

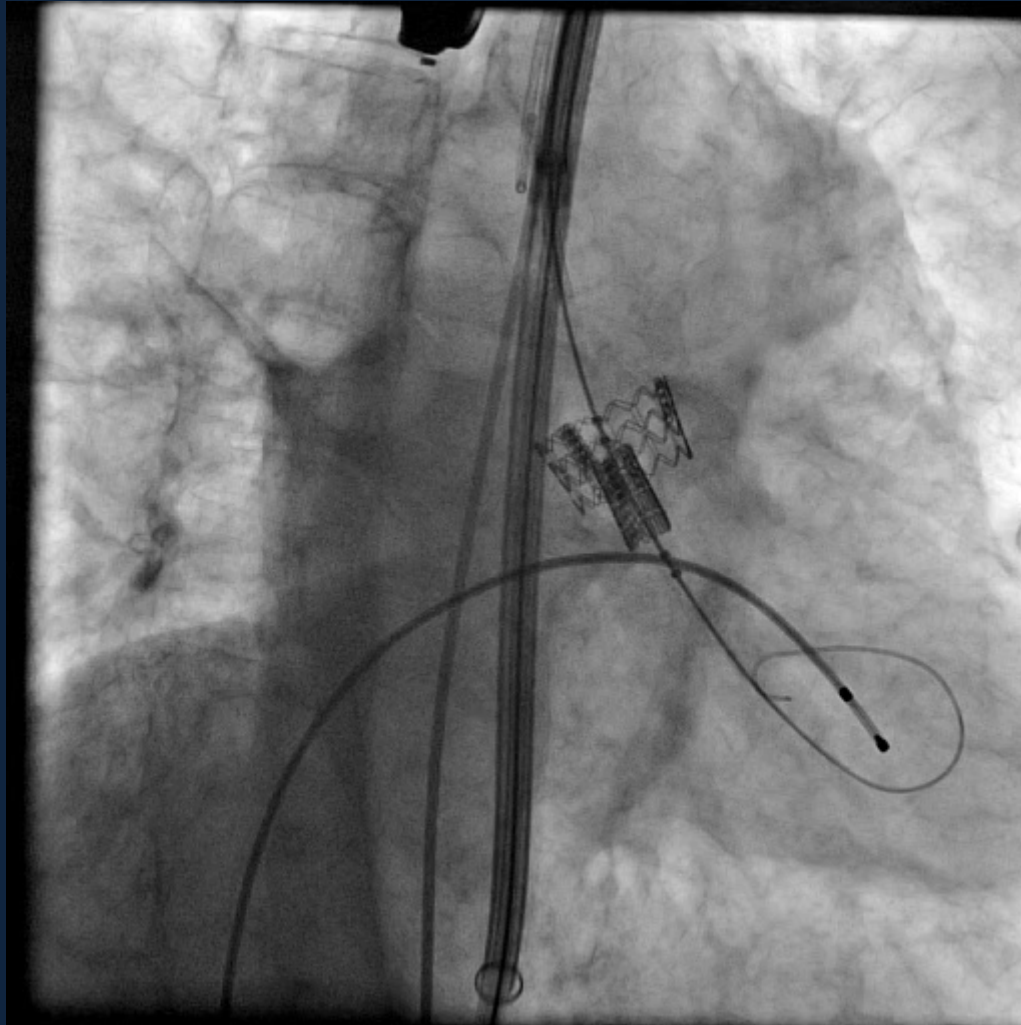
Valve malpositioning

Valve in Valve for Malpositioning



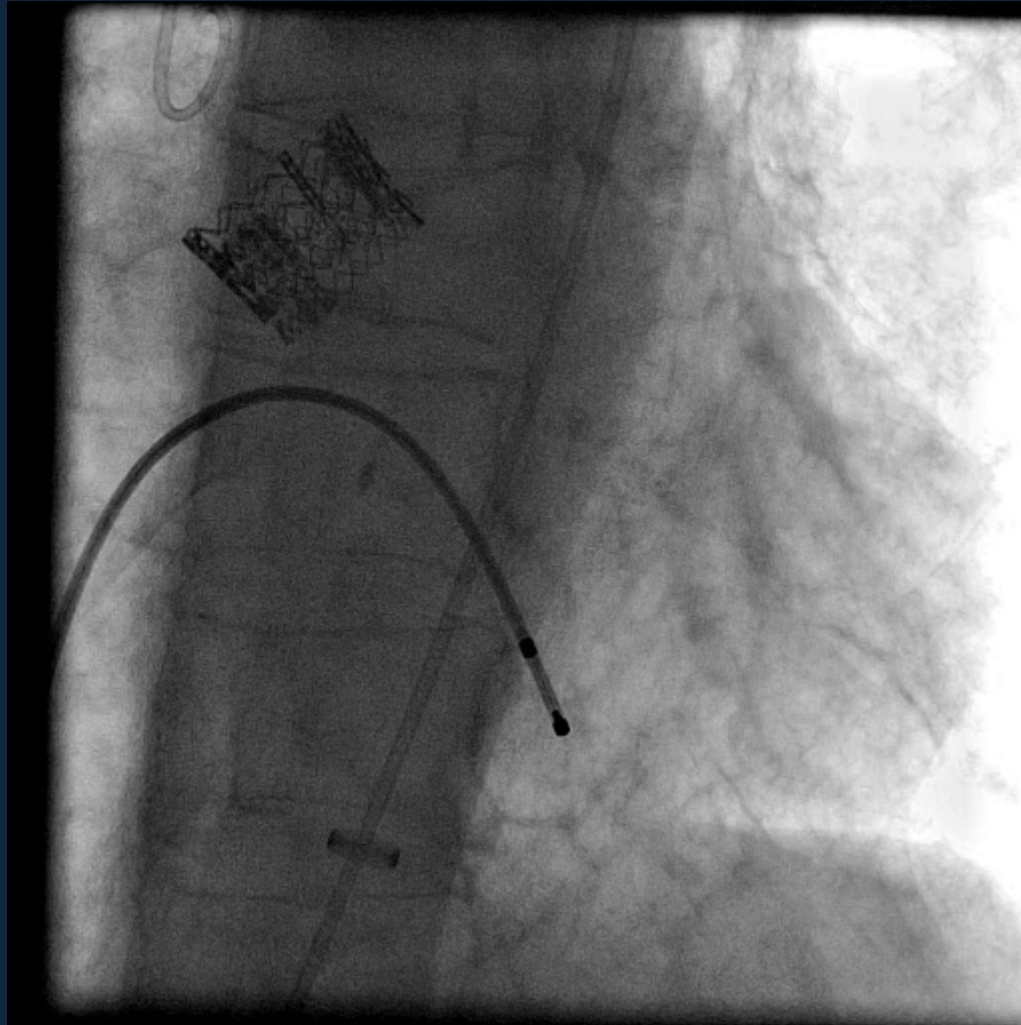
- During deployment, valve migrated cranially
- Valve is clearly above annulus and not in stable position

Valve in Valve for Malpositioning



- Second valve positioned inferiorly and deployed to secure the first valve and correct paravalvular leak

Valve in Valve for malpositioning



Complications

Left main occlusion

Left Main Occlusion

➤ Preventive wiring of the LAD for urgent post-THV delivery stenting has been done but LM stenting can be successfully achieved in only 50% of the cases.

Never hesitate to decline TAVI !

THV deployment led to left main occlusion by calcific native aortic valve leaflet

Conclusions

- In spite of optimal training and proctoring programs, the learning curve for TF-TVAI is permanent, on a case after case basis
- The success and safety of the procedures rely on the respect of protocols and recommendations.
 - Each step is a succession of "important details".*
 - Each omission may be life threatening*
- An optimal partnership within the team is crucial for both patient selection and procedure