

Successful mitral Valve-in-Valve using TAVR THV in a patient with severe MR due to bioprosthetic valve failure

Presenter **Hyungdon Kook**
Operator Cheol Woong Yu
Korea University Anam Hospital

Brief Case Summary

- Female / 82 YO
- C.C: Medically refractory dyspnea (NYHA IV)
- STS PROM 17.843%
 - s/p MVR(Hancock II 27mm), AVR(Hancock II 21mm) [17YA]
 - Severe MR, HFpEF, pAF
 - CKD Stage IV
 - 148 cm 37.2 kg BSA 1.26m²

Clinical Frailty Scale*



1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



3 **Managing Well** – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.



4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being "slowed up", and/or being tired during the day.



5 **Mildly Frail** – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



9. **Terminally Ill** - Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

Transthoracic echocardiography

Mitral valve, post-MVR status



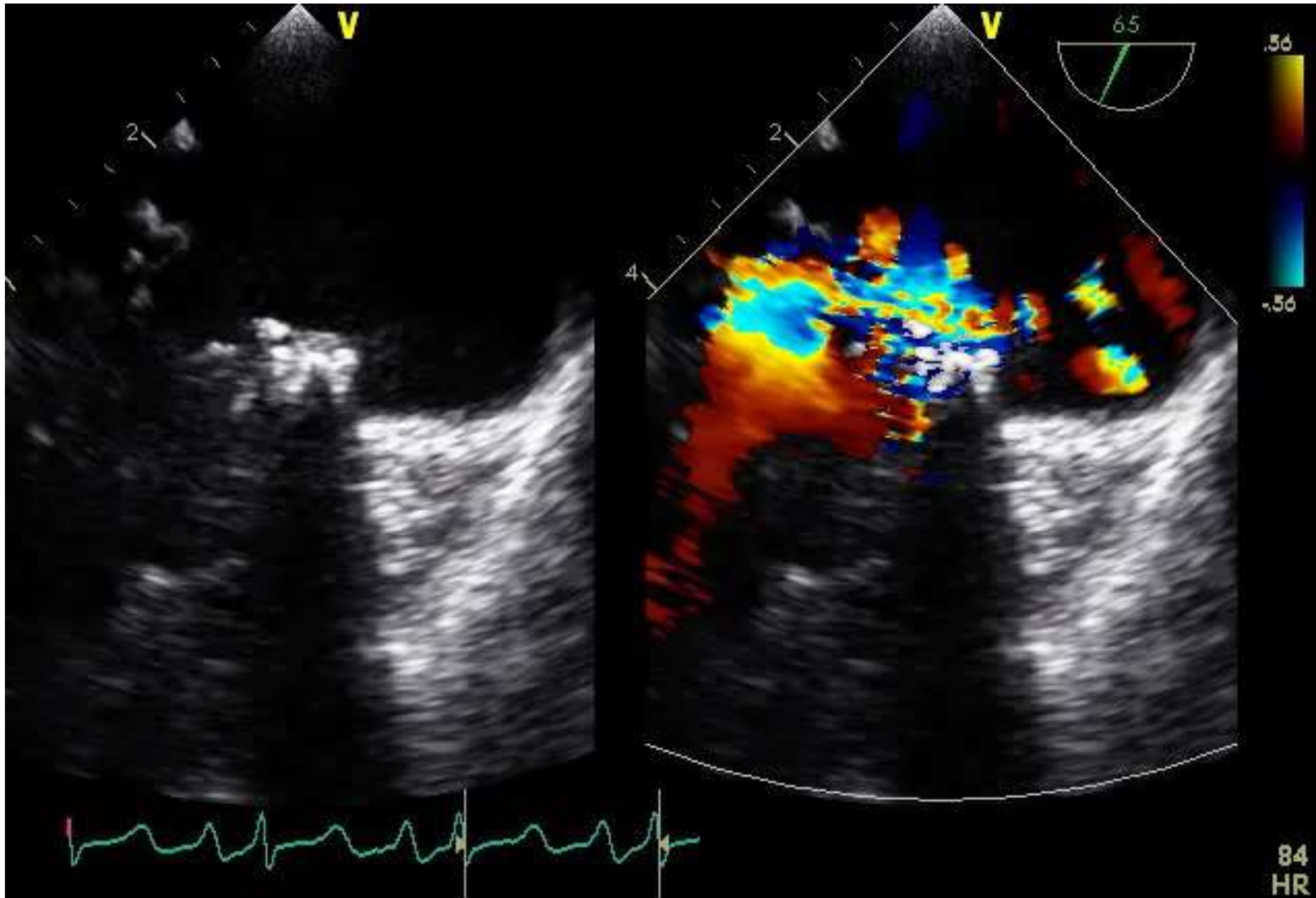
PISA = 5.9mm

✘ Aortic valve, post-AVR status

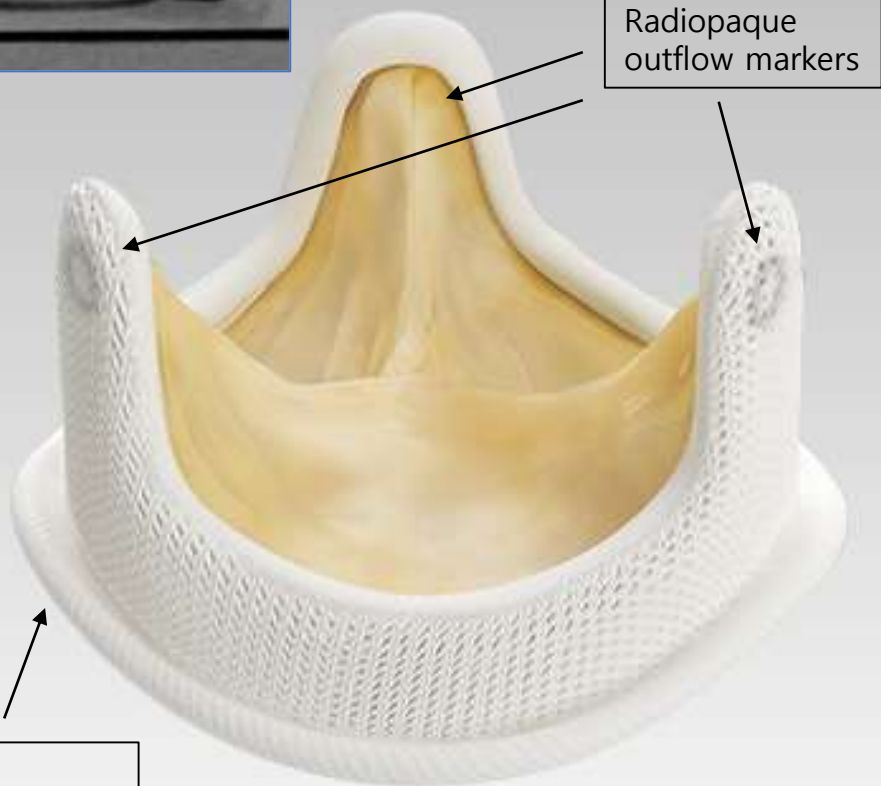
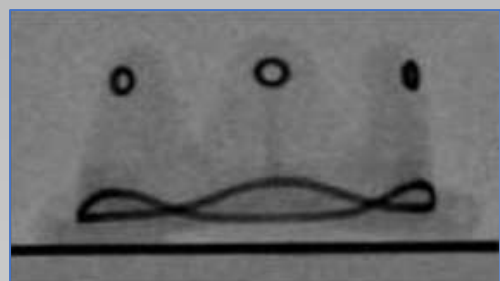
Peak Velocity = 2.21 m/sec

Peak/Mean pressure gradient = 19/8 mmHg

Transesophageal echocardiography



Valve-in-Valve Sizing



Radiopaque outflow markers

Radiopaque sewing ring markers

27 mm Hancock II mitral valve, Medtronic. Internal diameter is significantly smaller than the labeled size.

Table 2 Valve Dimensions for Selected 24- to 29-mm Stented Surgical Bioprostheses, per Manufacturer Product Information

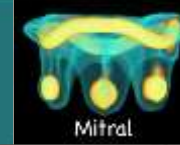
Valve Label Size	Valve Type/Model (Manufacturer)	Sewing Ring External Diameter, mm	Stent Outer Diameter, mm	Stent Internal Diameter, mm
24	Soprano		27	23.7
25	Magna		23	22
	Perimount		23	22
	Mosaic		23	20.5
	Mosaic U		25	22.5
	Mitroflow		25.1	21
	Trifecta		25	N/A
	Epic/Bio		25	23
	Epic Sup		25	25
26	Soprano		29	25.6
27	Magna		27	26
	Perimount		27	26
	Mosaic		27	24
	Mosaic U		27	24
	Mitroflow		27.3	22.9
	Trifecta		27	N/A
	Epic/Bio			27
	Epic Sup			27
28	Soprano			27.6
29	Magna			28
	Perimount			28
	Mosaic/Hancock II (Medtronic)	39	29	26
	Mosaic Ultra/Hancock II Ultra (Medtronic)	34	29	26
	Mitroflow (St. Jude Medical)	31	29	24.7
	Trifecta (St. Jude Medical)	35	29	N/A
	Epic/Biocor (St. Jude Medical)	N/A	29	27
	Epic Supra (St. Jude Medical)	N/A	N/A	N/A

Valve In Valve Mitral

Supported by NIHR Biomedical Research Centre at Guys' and St. Thomas' NHS Foundation Trust and KCL

Developed by Mr. Vinayak (Vinnie) Bapat in conjunction with the technology company UBQO Limited

Enter



Easy way: VIV App available in App store!

Heart CT

9/10/1935
02061685

IMR, 30%
1/31/2018
Phase: 30.0%

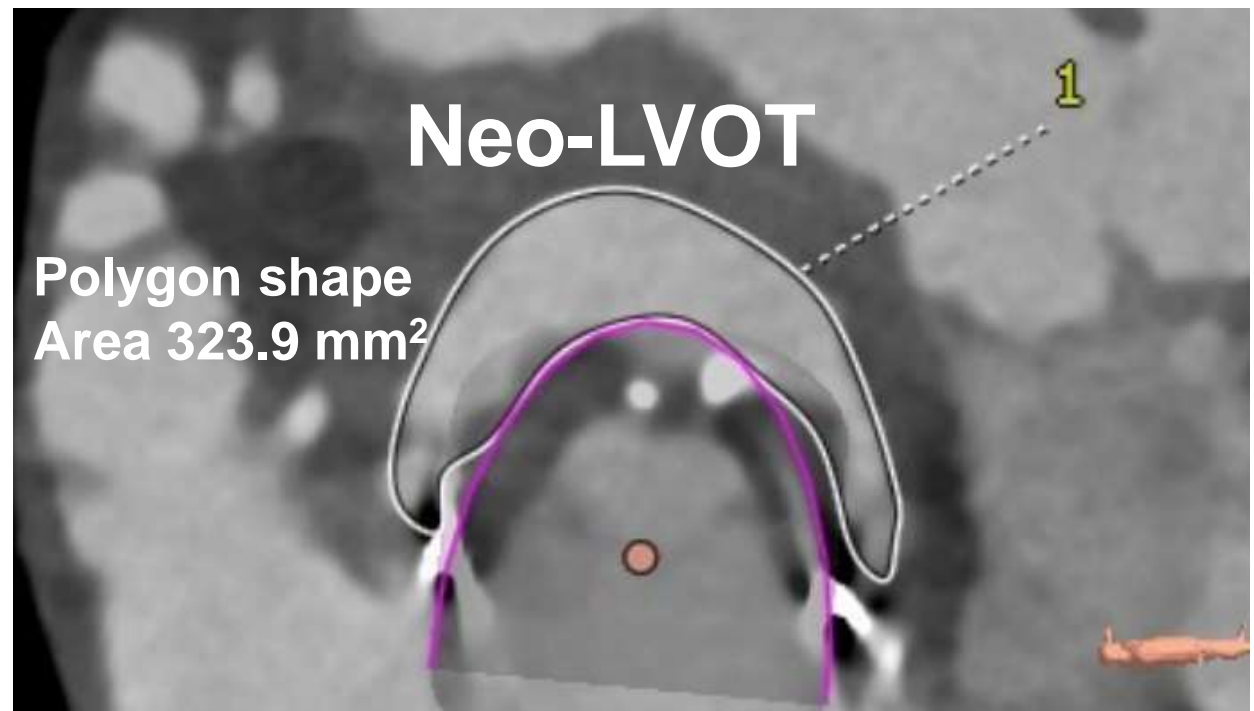
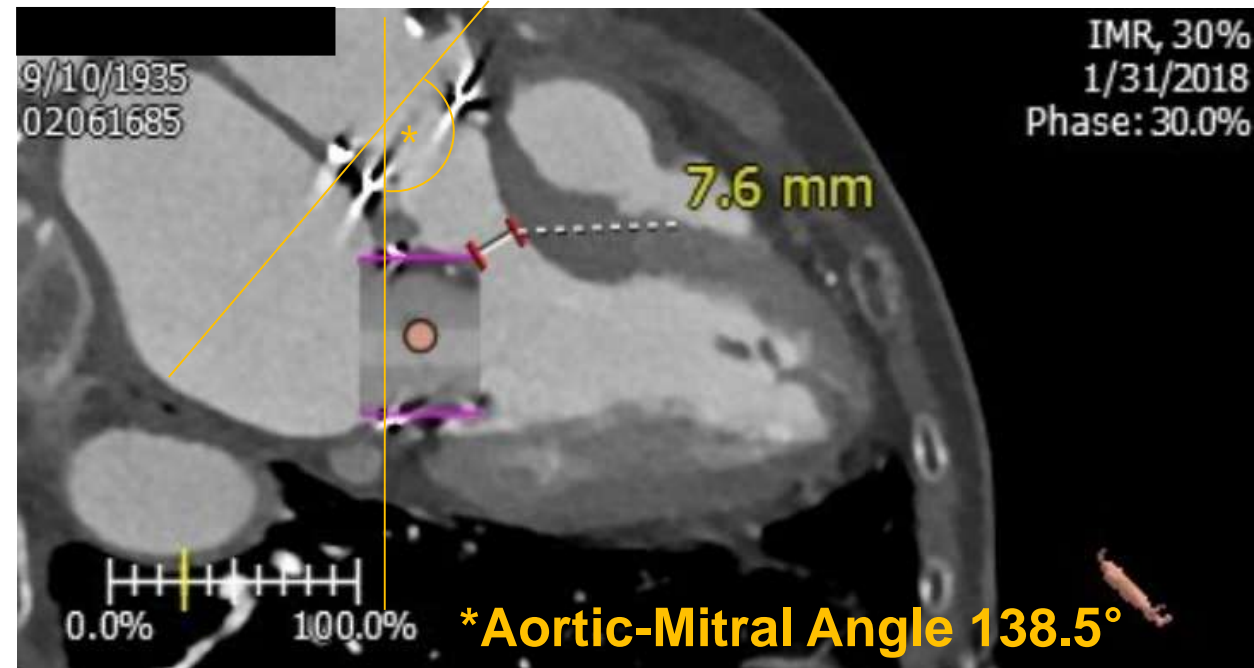
Sizing

1 24.0 mm
2 23.8 mm

Stent ID 24 mm
True ID* 22 mm

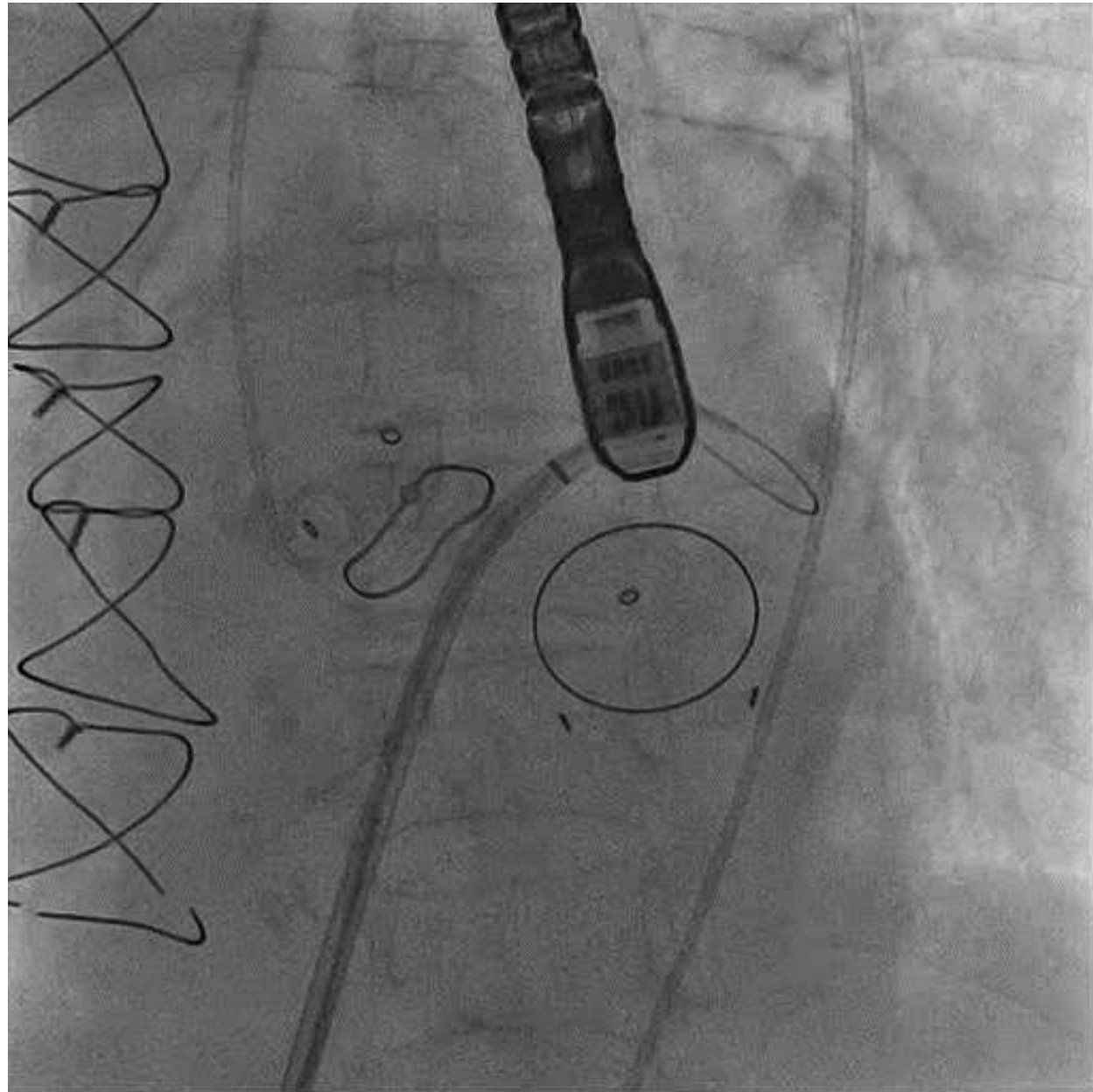
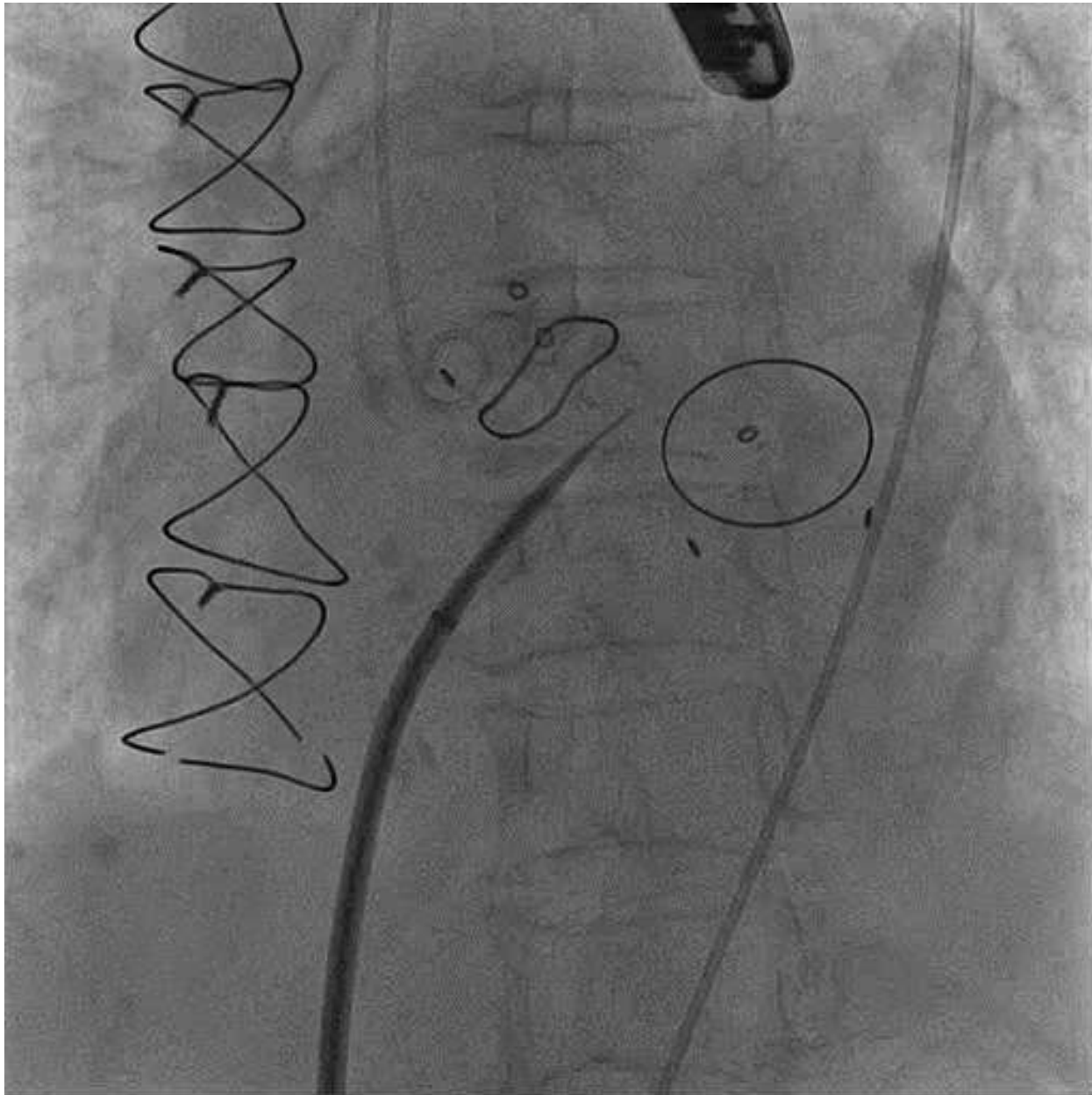
* J Am Coll Cardiol Interv 2011;4:721-32

Surgical Valve True ID*	SAPIEN 3 Transcatheter Heart Valve Size
16.5-19 mm	20 mm
18.5-22 mm	23 mm
22-25 mm	26 mm
25-28.5 mm	29 mm



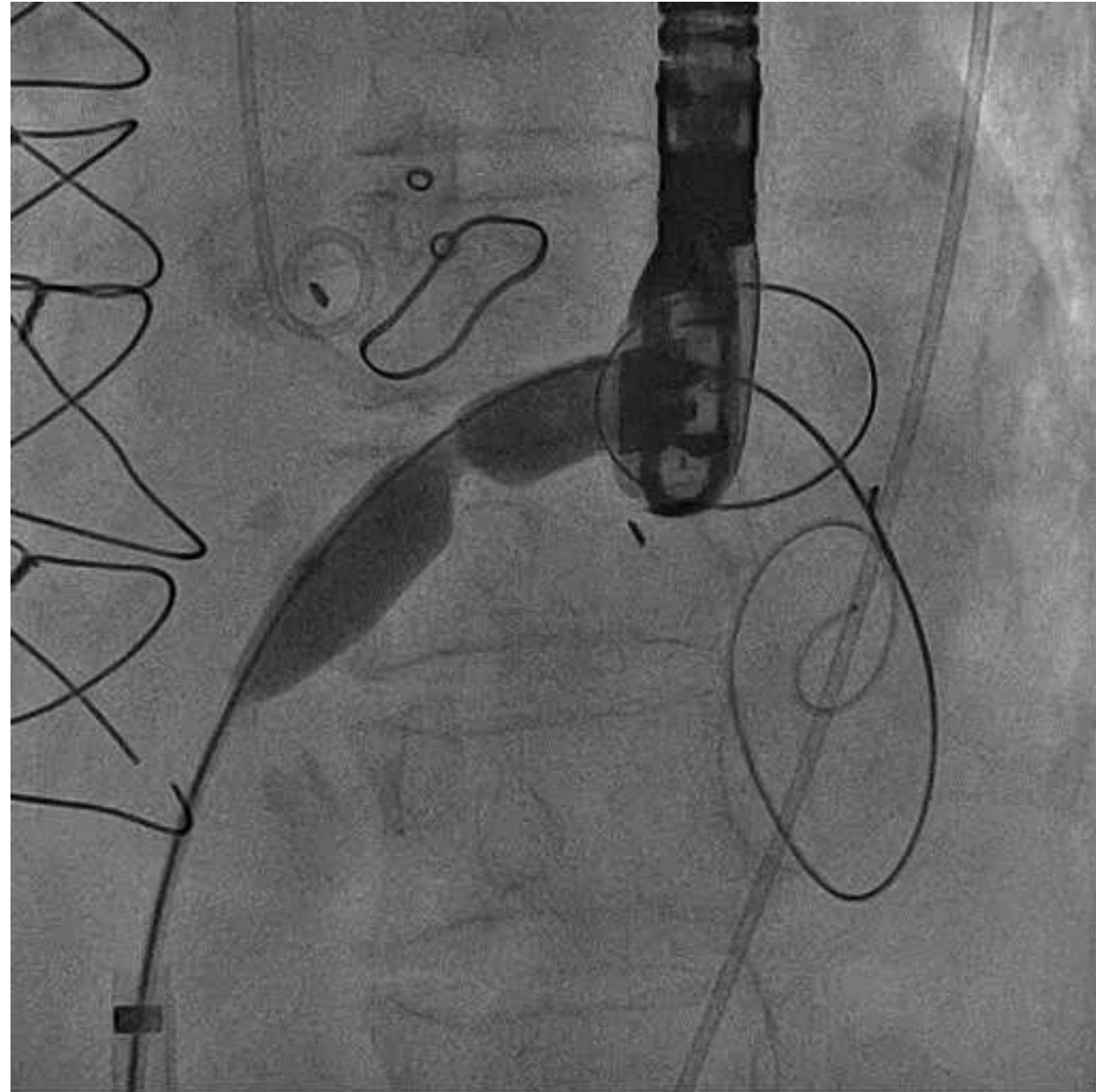
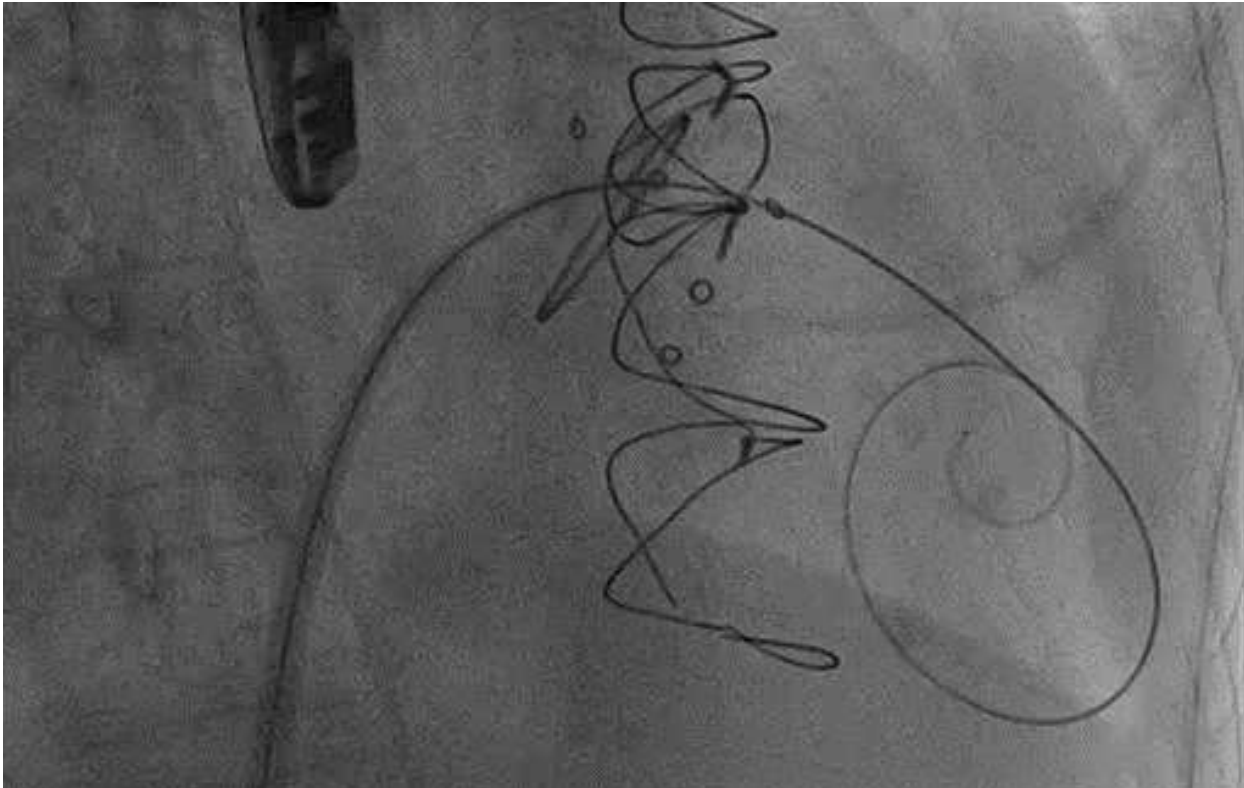
Septal puncture

SL1 sheath/dilator with Brockenbrough needle

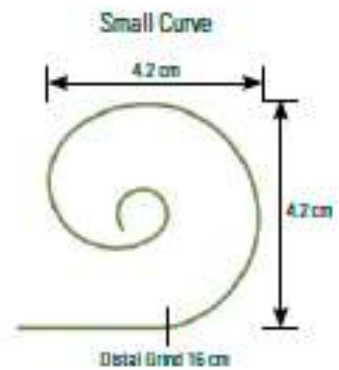


Interatrial balloon dilatation

Balloon: Mustang 12.0mm X 40mm

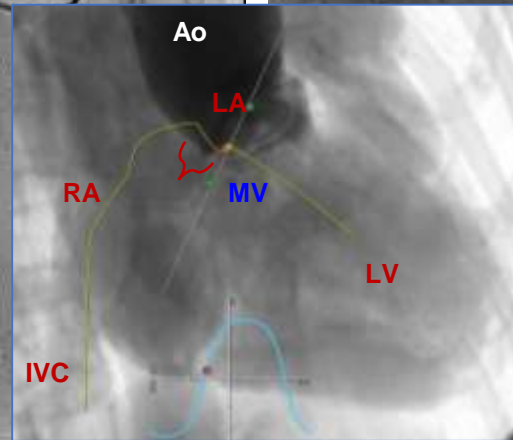
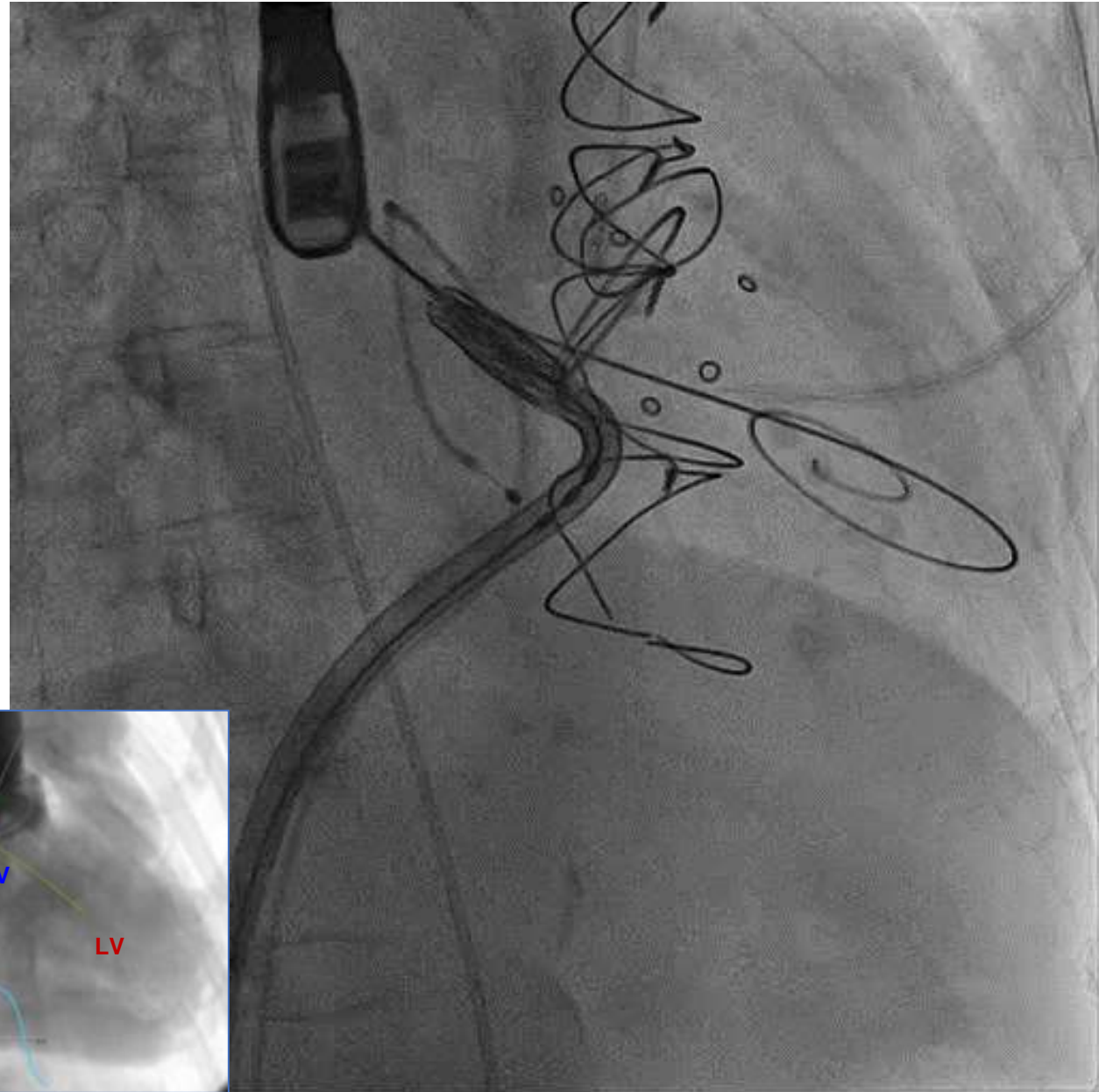
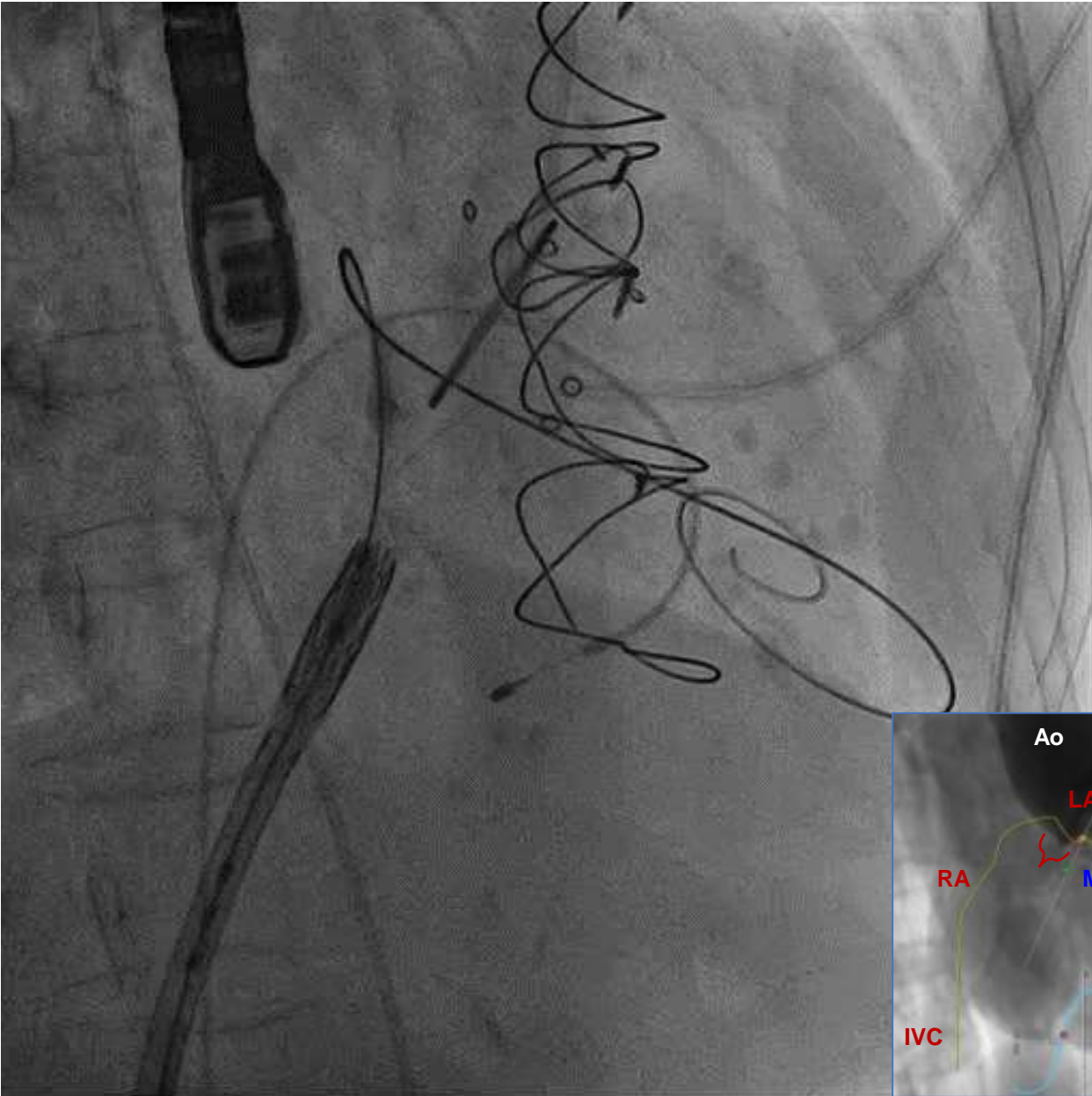


Safari wire



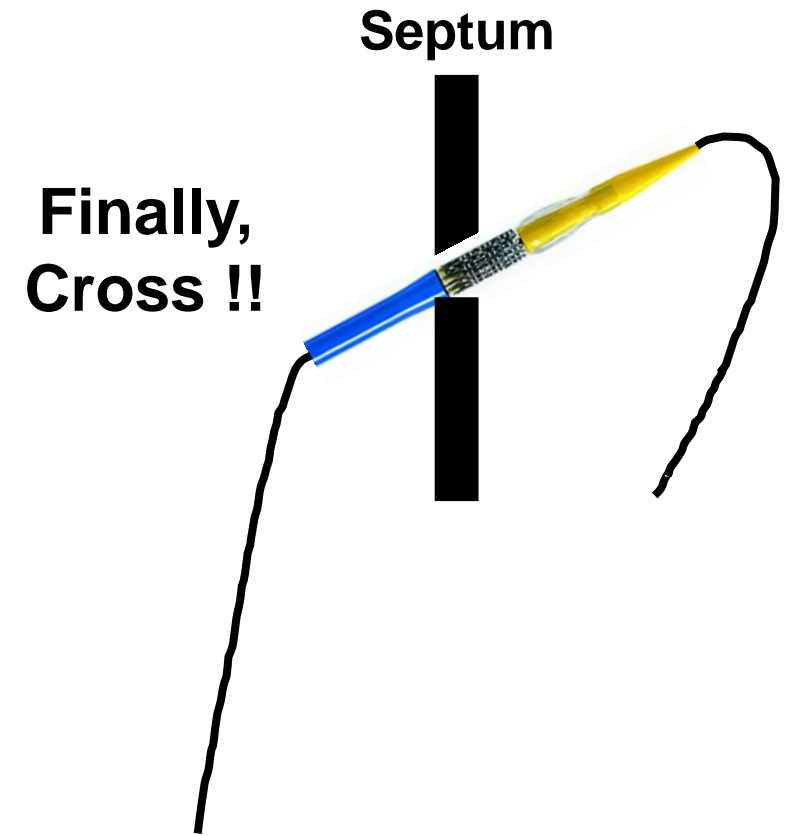
Crossing inter-atrial septum

26mm Sapien 3 THV



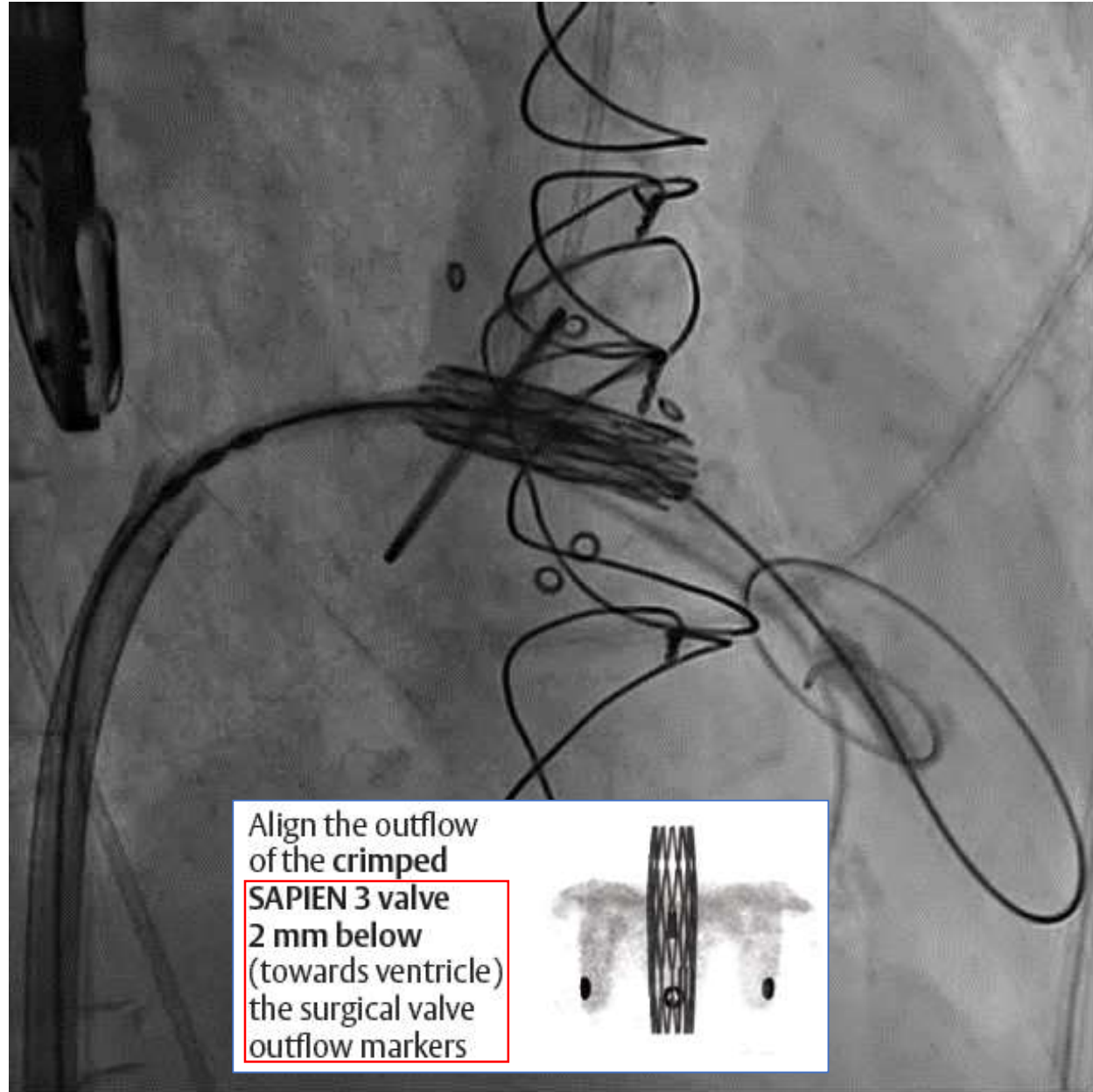
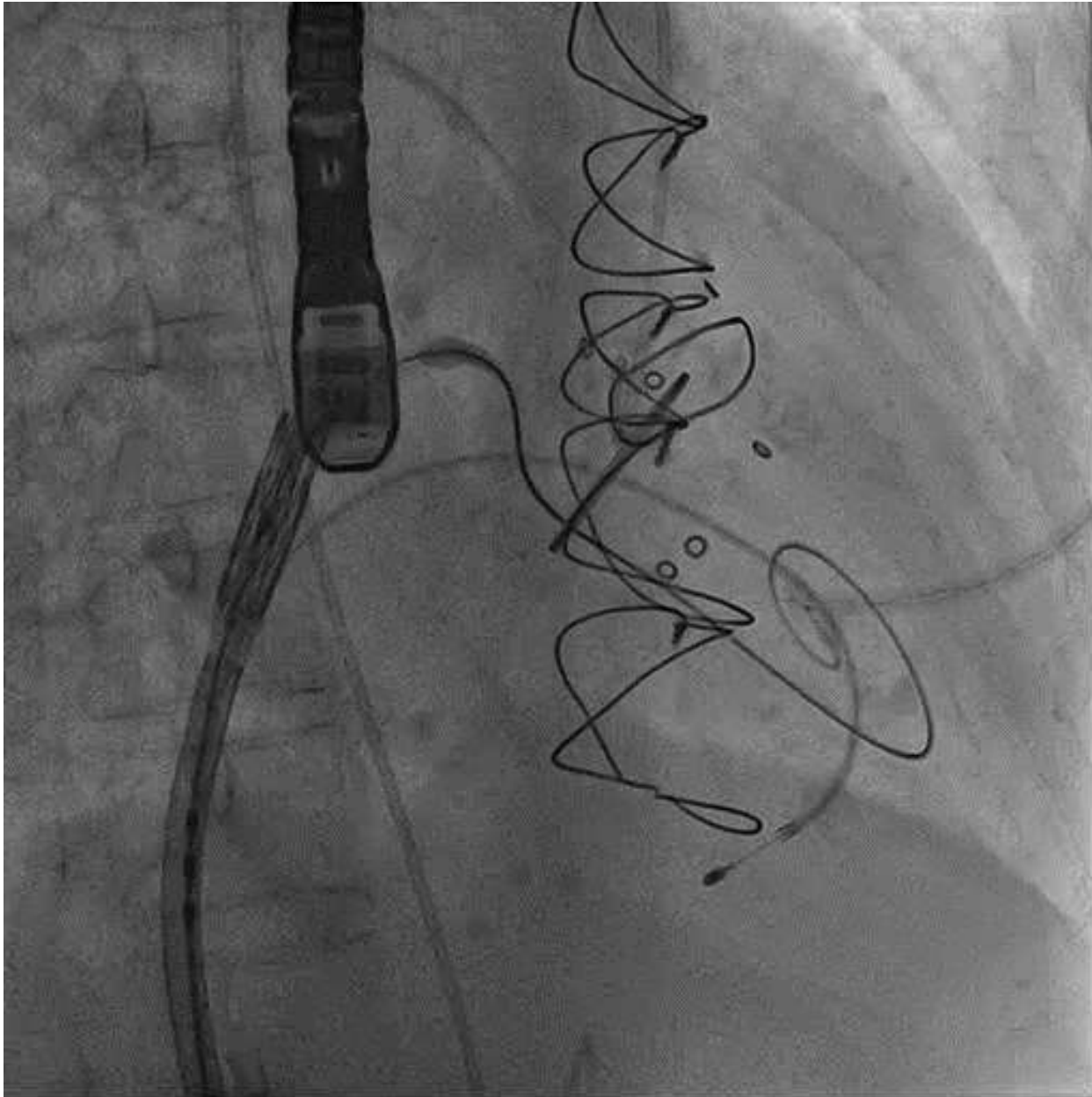
Crossing inter-atrial septum

26mm Sapien 3 THV



Crossing inter-atrial septum and VIV implantation

Nominal Pr.

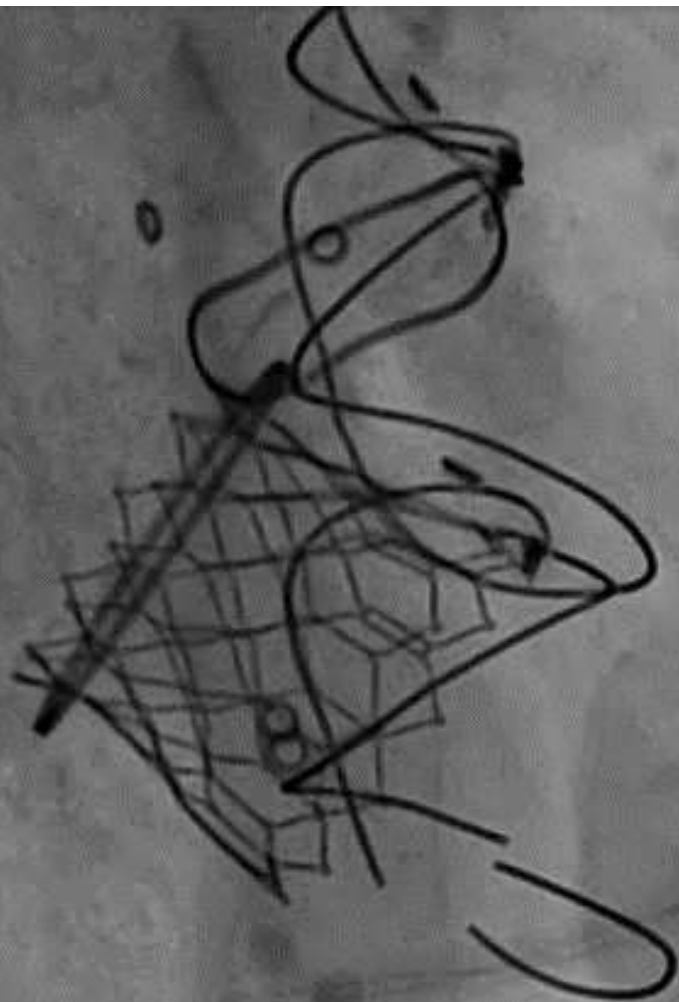


Align the outflow
of the crimped
SAPIEN 3 valve
2 mm below
(towards ventricle)
the surgical valve
outflow markers

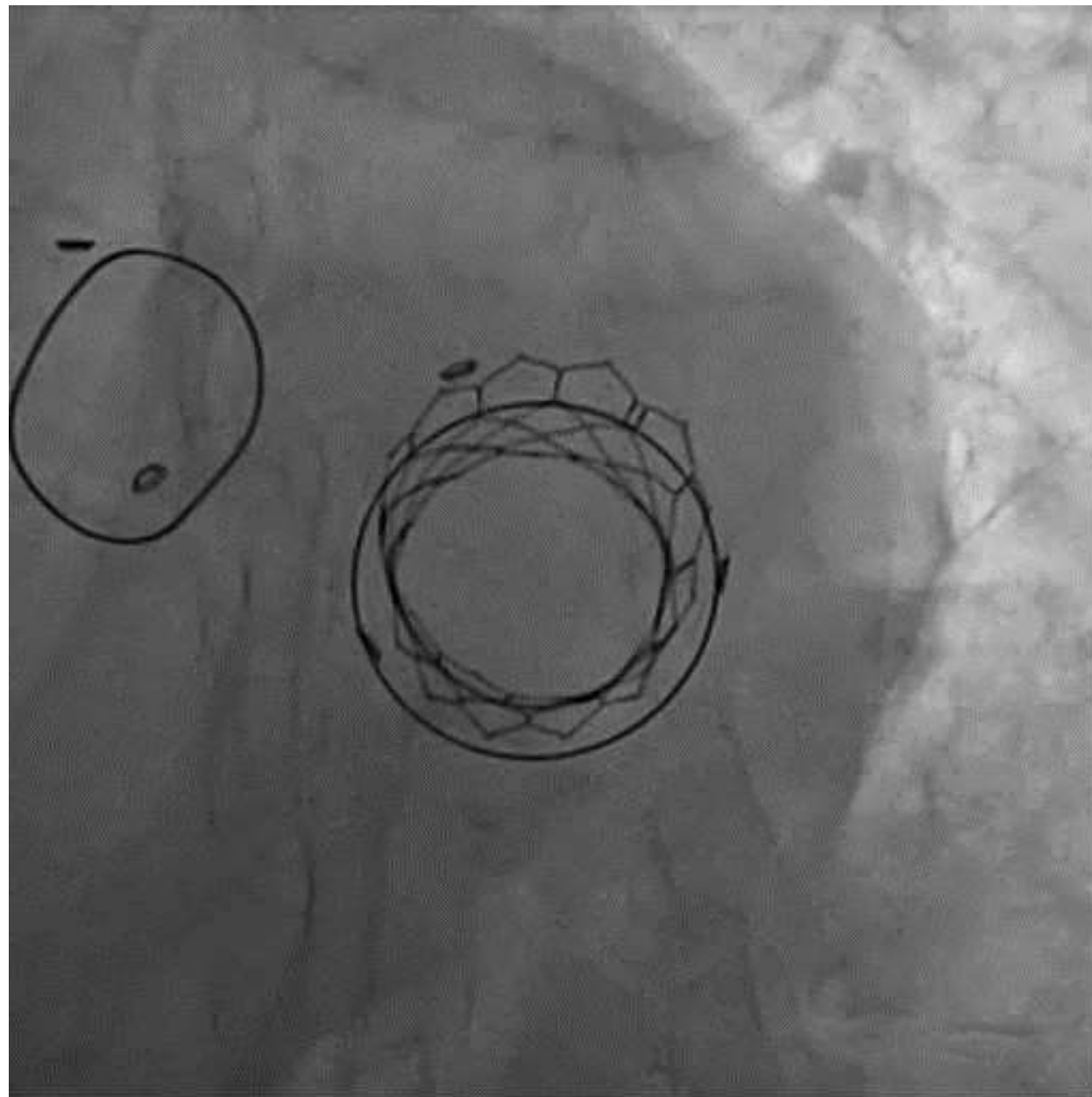


Final images

26mm Sapien 3 Valve-in-Value, Procedure time 144 mins



Positioning
2:8 LA:LV

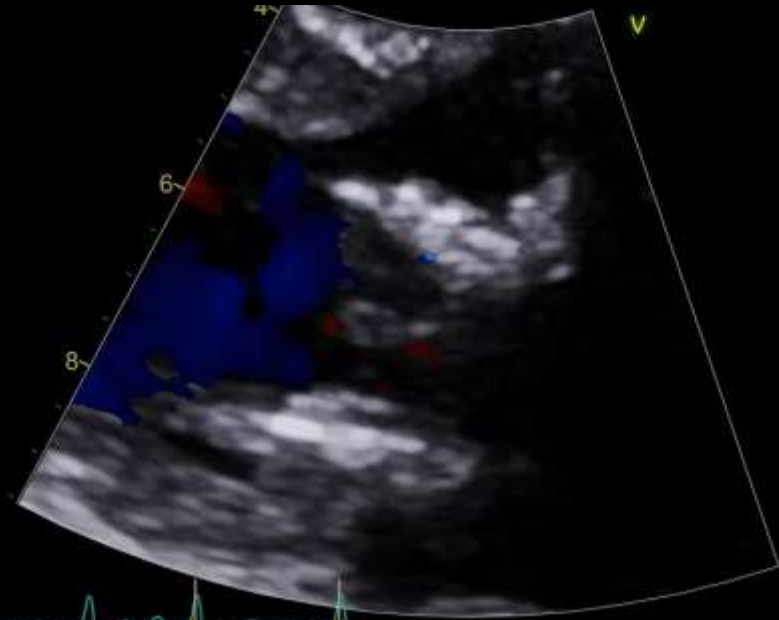


Transthoracic echocardiography

HD



89
HR
Soft



Soft
.73
-.13

HD

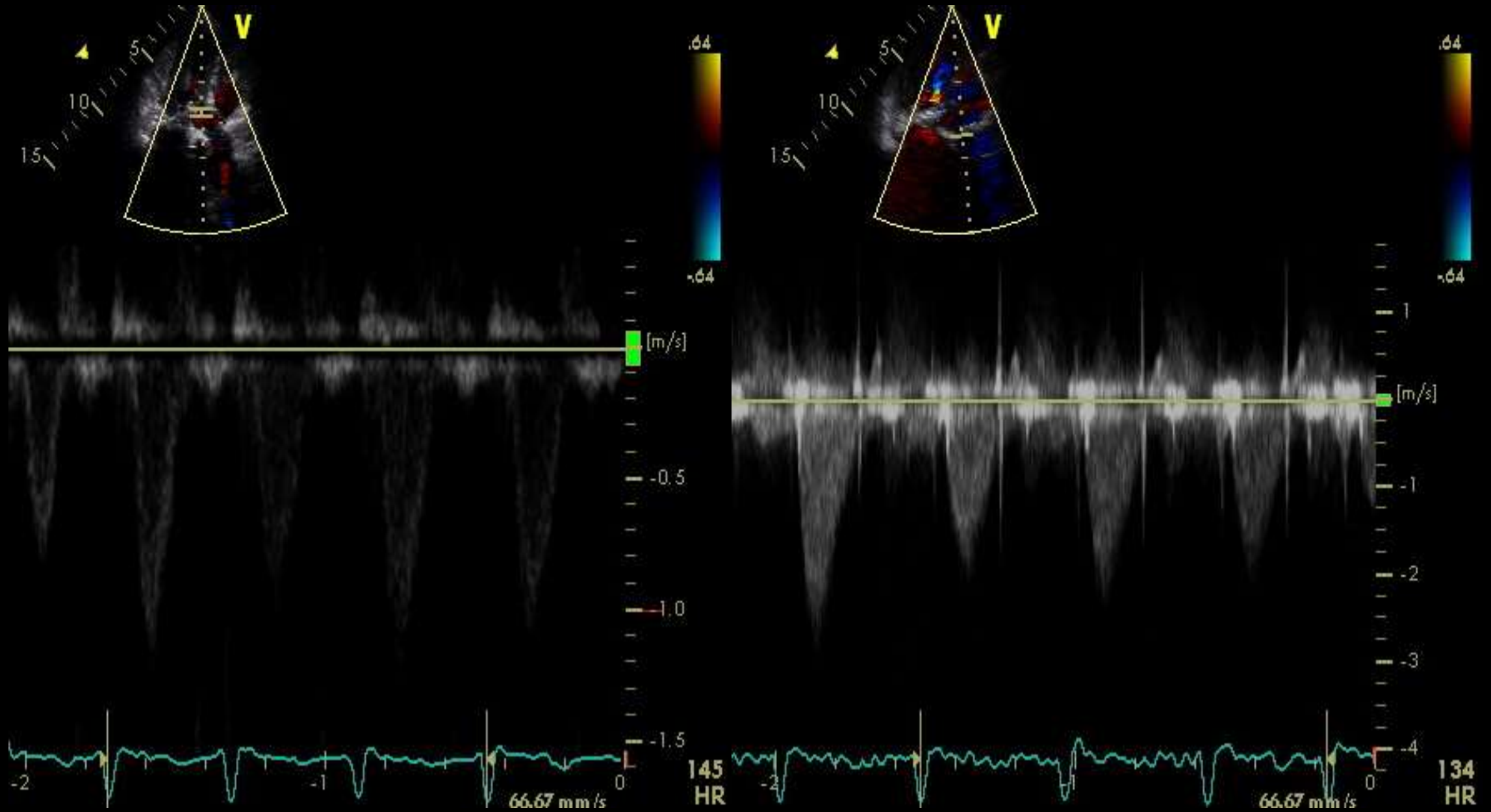


HD



83
HR
Soft
.73
-.13

Transthoracic echocardiography



Conclusions

1. Mitral VIV using balloon-expandable TAVR THV is a feasible solution for mitral bioprosthetic failure with **appropriate anatomy**.
2. Proper **sizing** and accurate deployment **positioning** are crucial for procedural success.
3. For successful device delivery and implantation, **co-axiality** should be achieved.
 - wire management, delivery system flexion, buddy wire technique, telescoping
4. Post-procedural **LVOT obstruction** is the Achilles' heel but can be prevented.
 - meticulous pre-procedural evaluation with imaging modalities: CT, TEE, 3D printing

**THANK YOU FOR YOUR
ATTENTION!**