



Centre for
Heart Valve Innovation
St. Paul's Hospital, Vancouver

TMVR for Mitral Annular Calcification

Technical considerations

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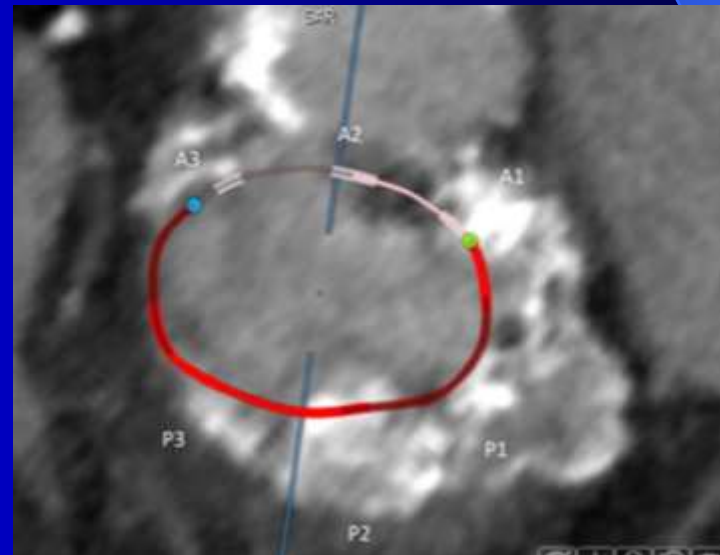
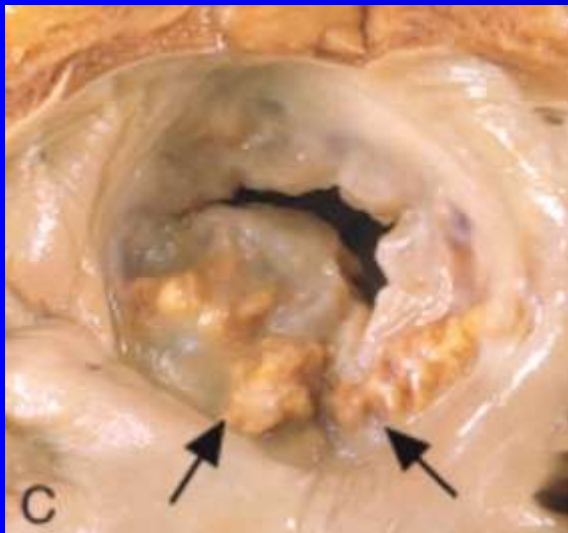
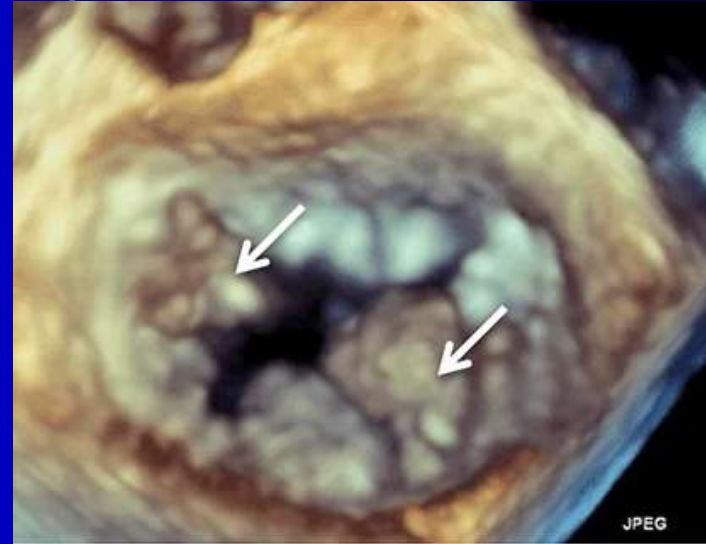
Disclosure

- **Consultant**

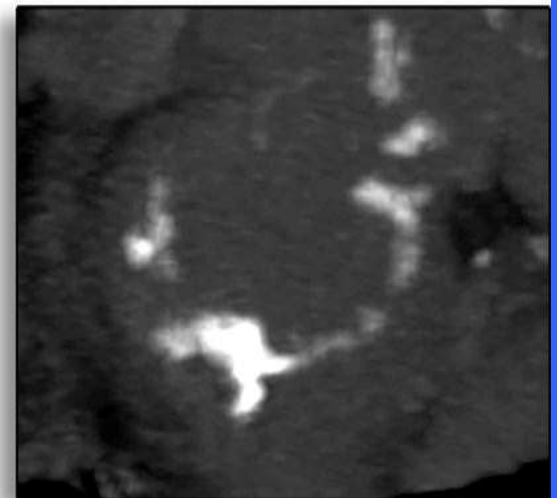
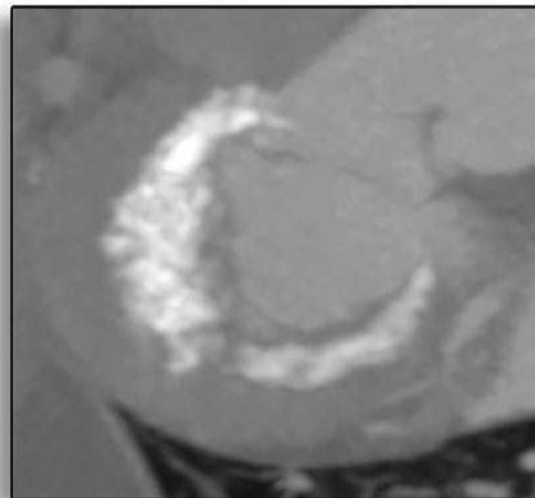
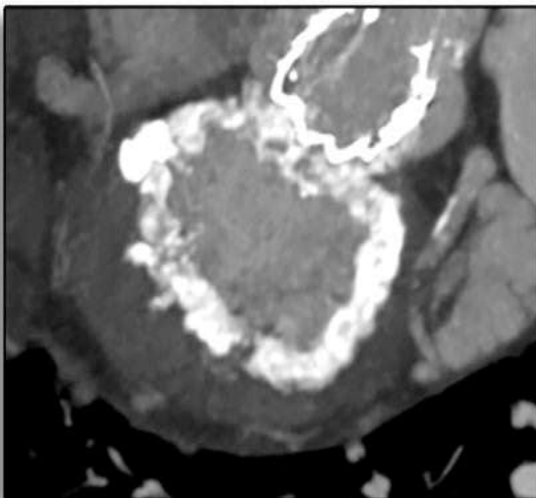
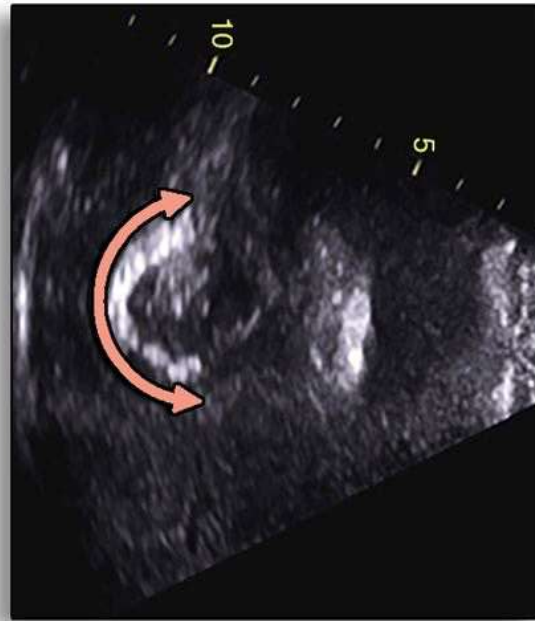
Edwards Lifesciences

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Mitral Annular Calcification (MAC)



Degree of MAC



Potential Fatal Complications with MV Surgery

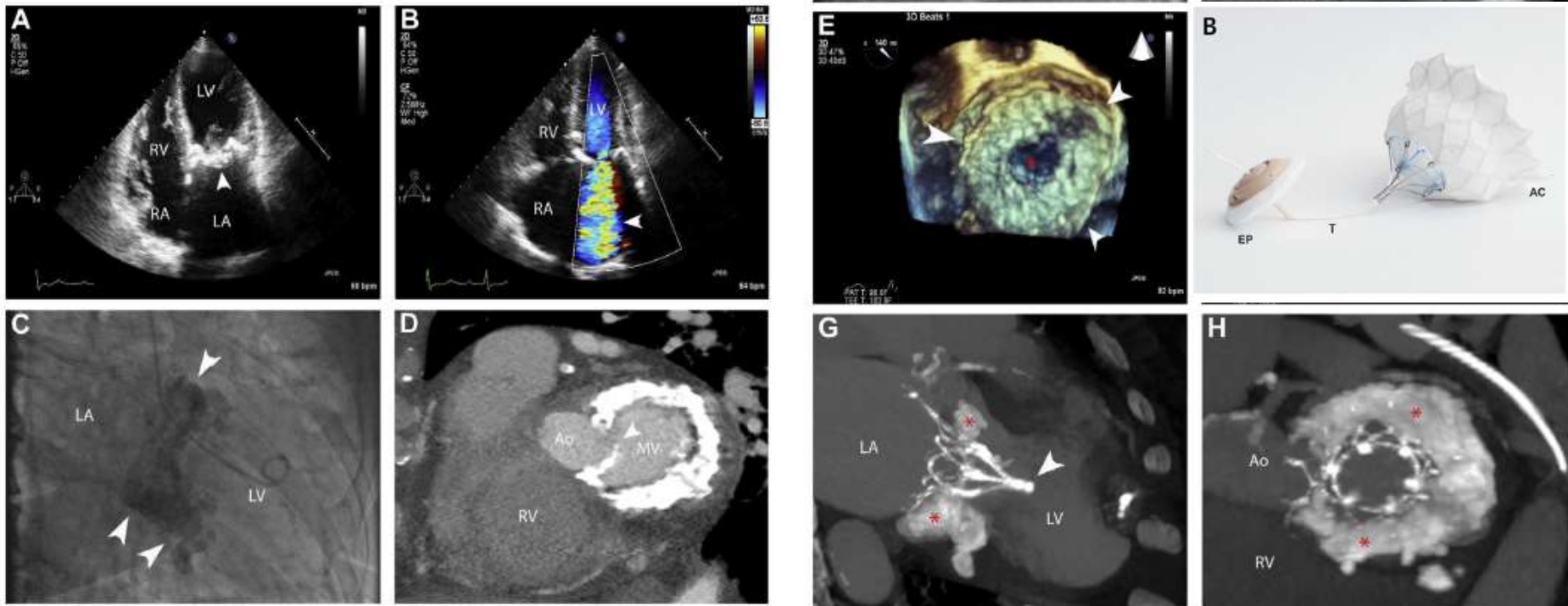
- **LV perforation**
- **Coronary injury and Acute posterior myocardial infarction**
- **Rupture of atrioventricular groove**
- **LV hematoma/delayed hemorrhage**
- **Significant paravalvular leak**
- **High operative mortality**

Transcatheter Options

- **MitraClip**
- **TMVR with transcatheter mitral valves**
- **TMVR with transcatheter aortic valves**
- **Hybrid approach (surgical implantation of THVs)**

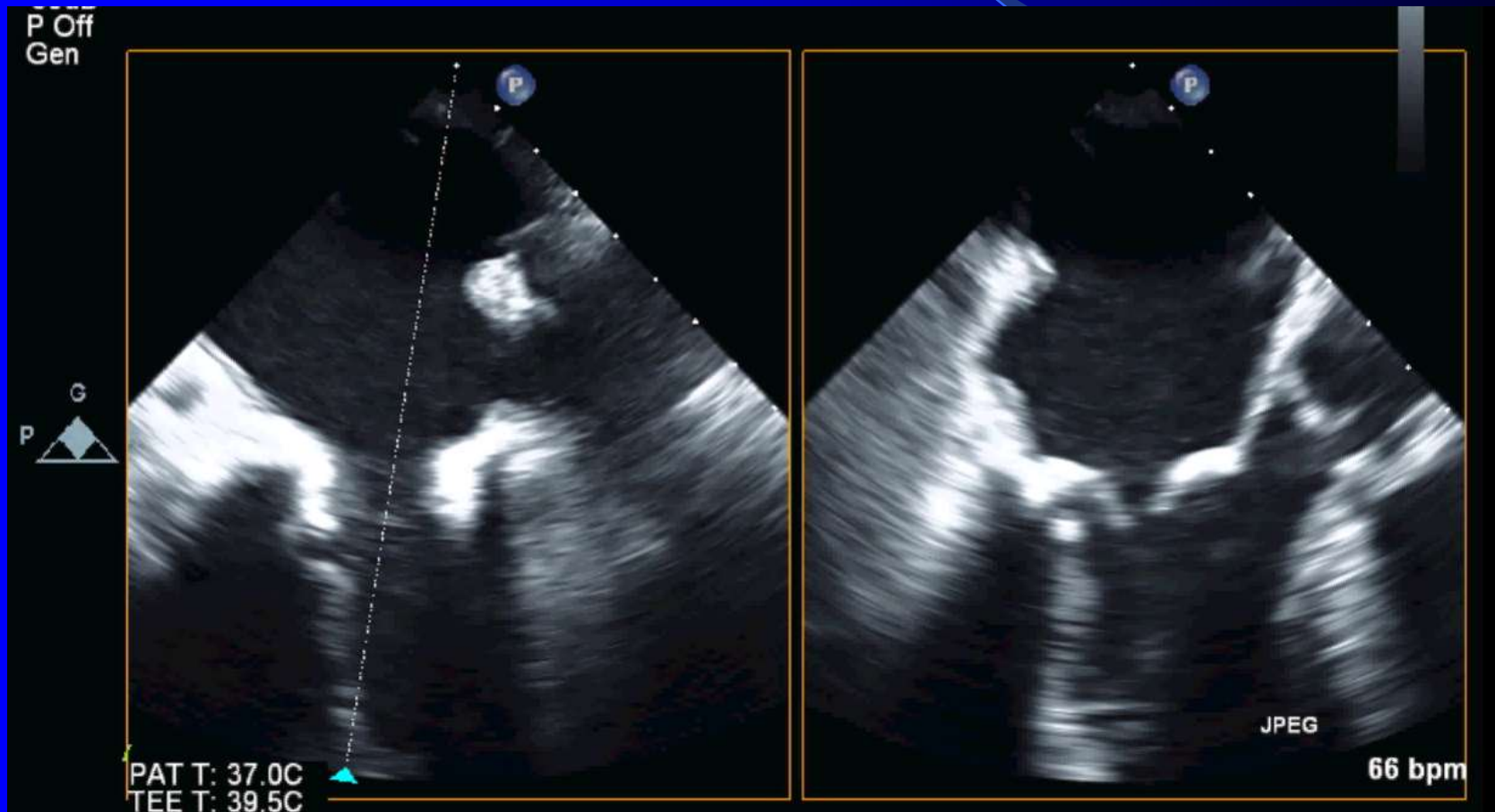
TMVR with transcatheter mitral valve

Tendyne valve



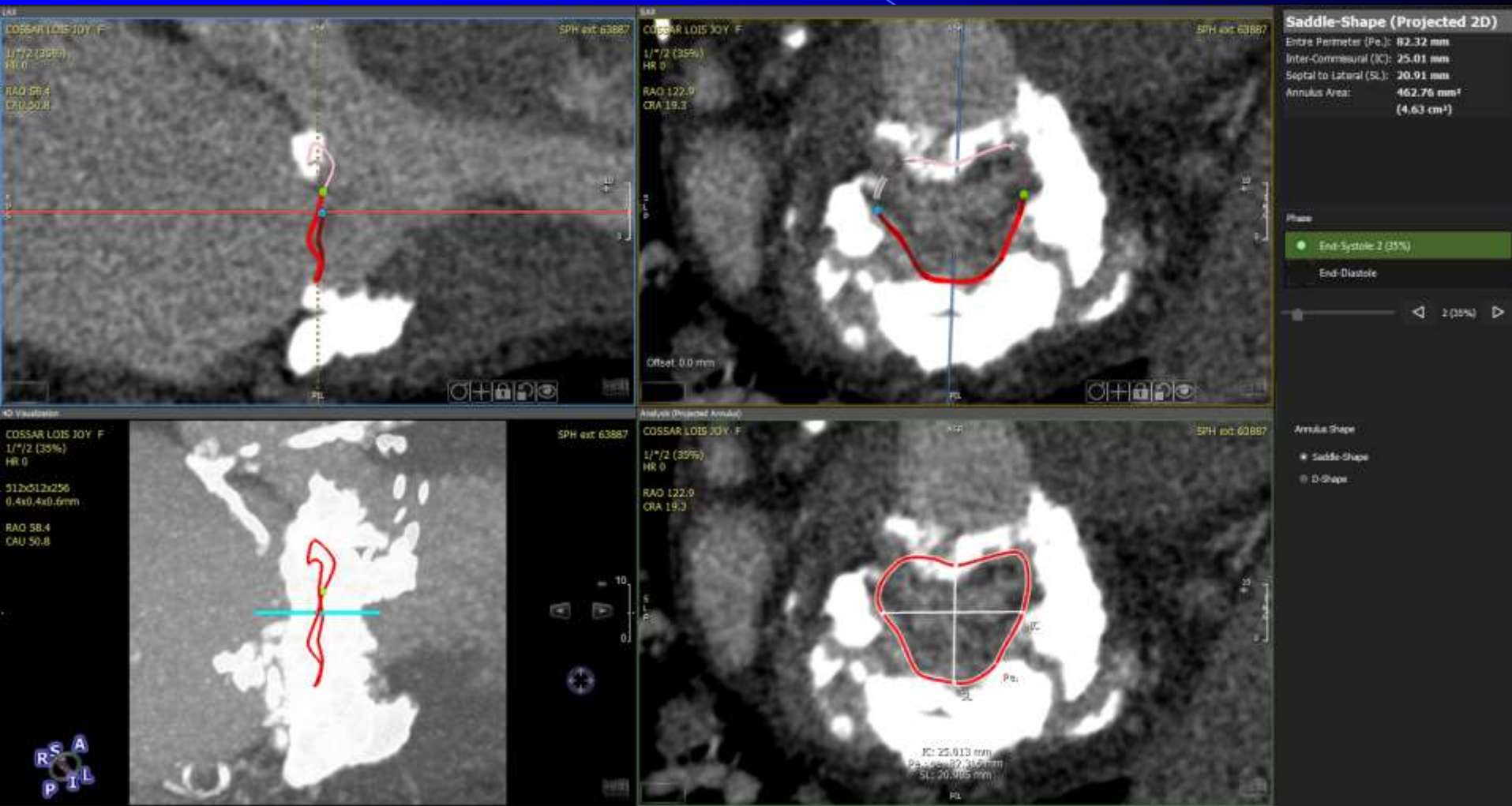
Case: TMVR with SAPIEN valve

MAC with severe MS and moderate MR.



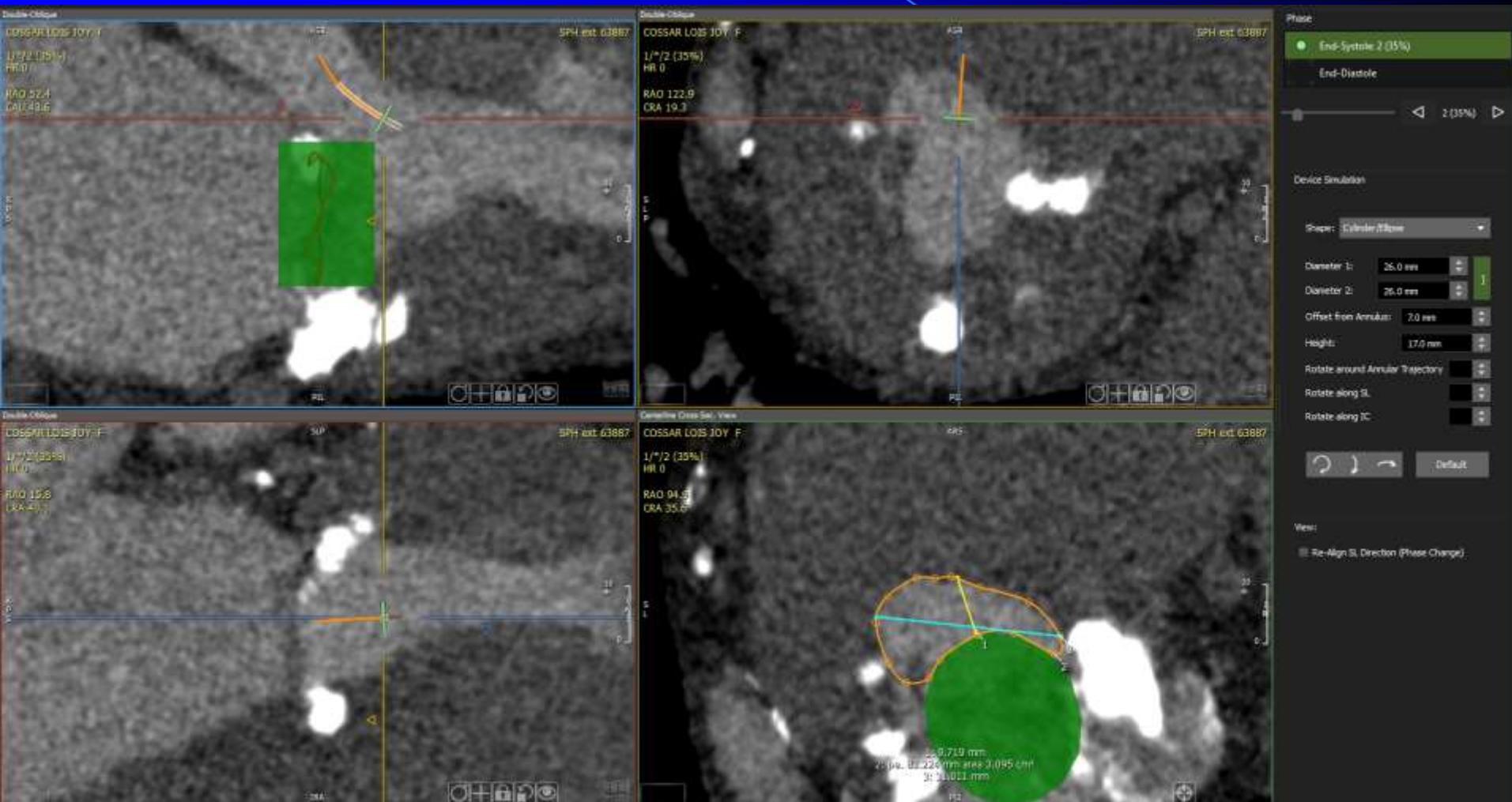
TMVR with SAPIEN valve

CT measurement of mitral annulus size: 4.6-5.3 cm²



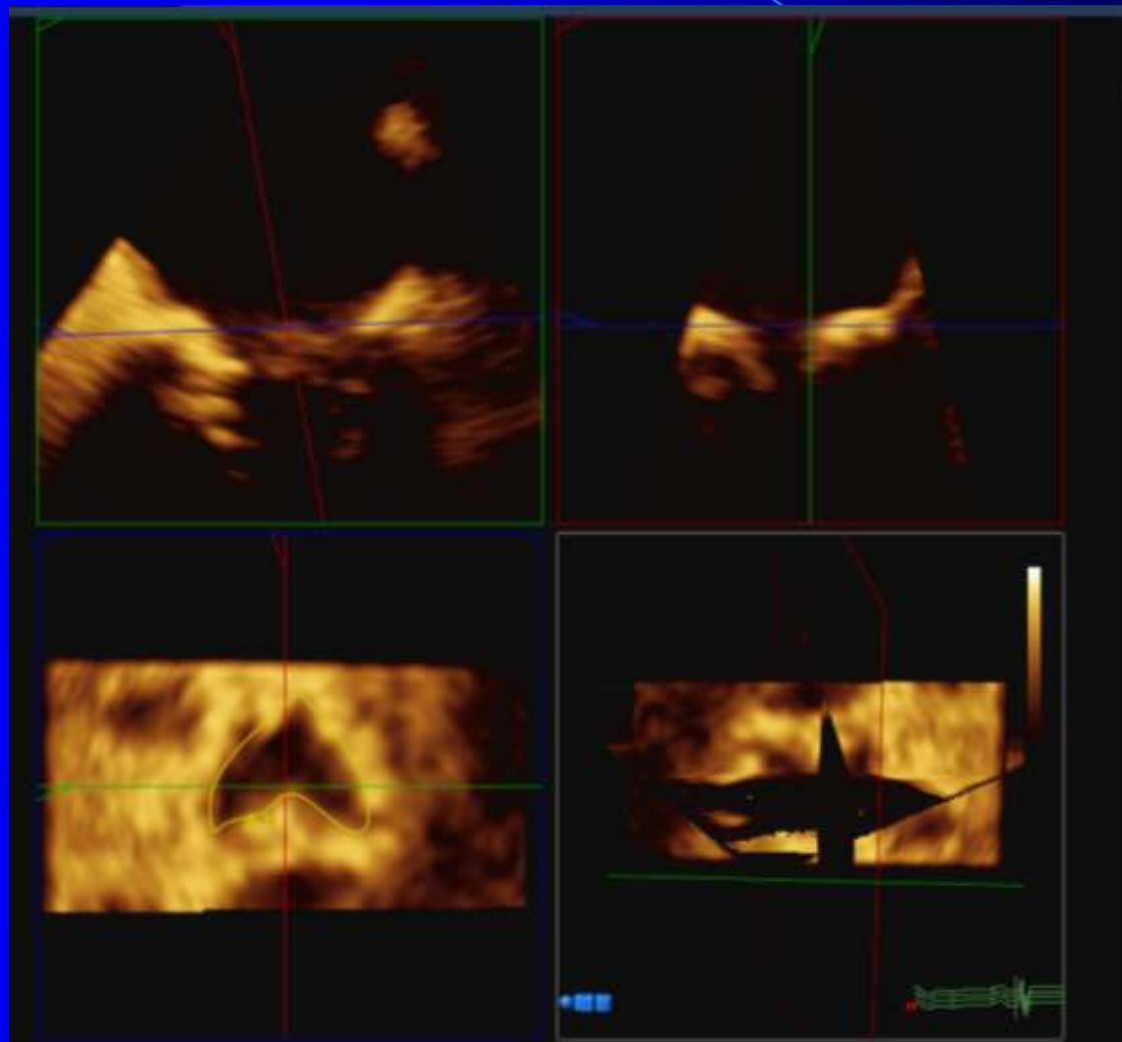
TMVR with SAPIEN valve

CT measurement of Neo-LVOT - 3.1 cm²



TMVR with SAPIEN valve

TEE 3D measurement of mitral annulus size - $\sim 4.0 \text{ cm}^2$



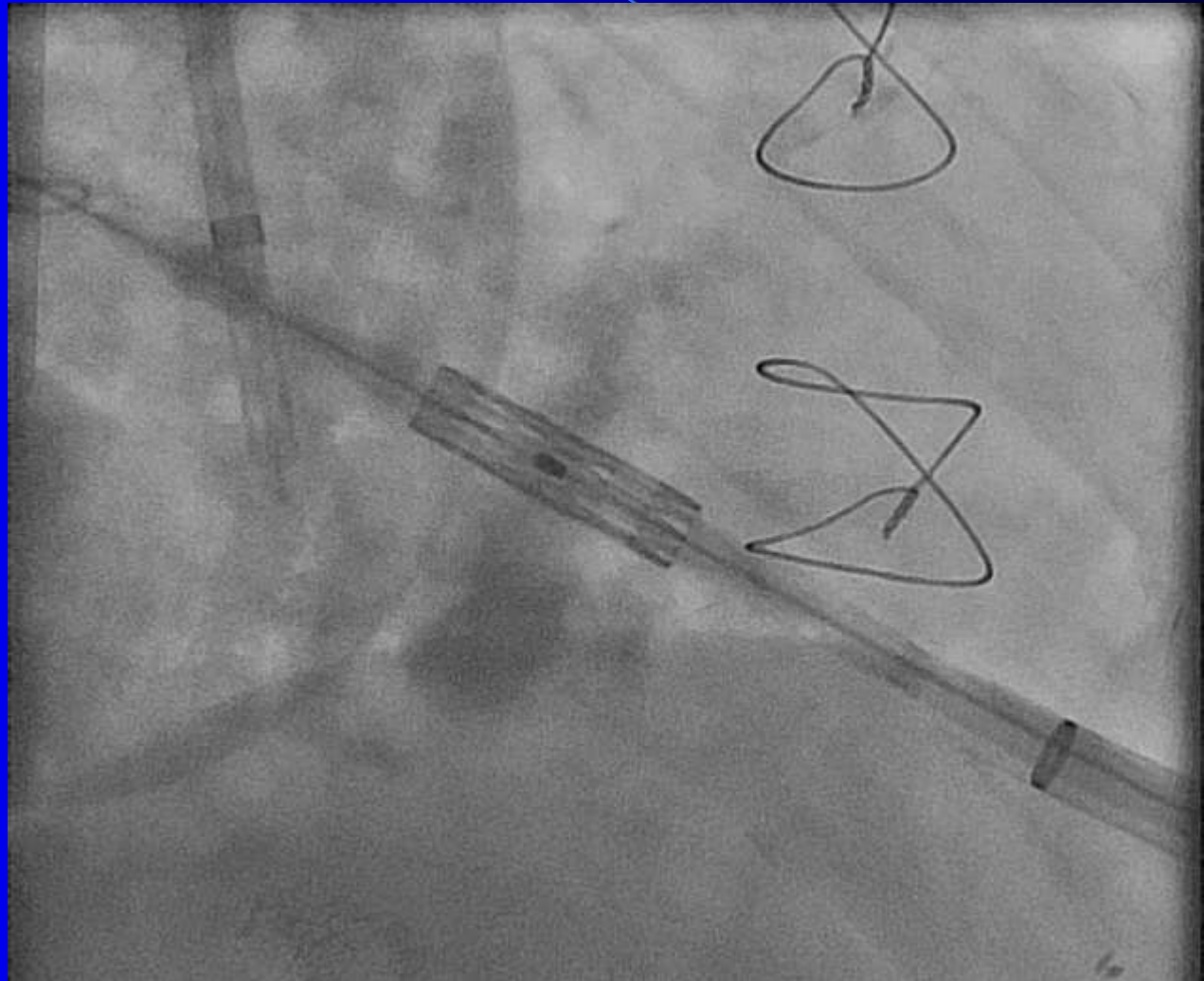
TMVR with SAPIEN valve

Balloon sizing – 25mm balloon



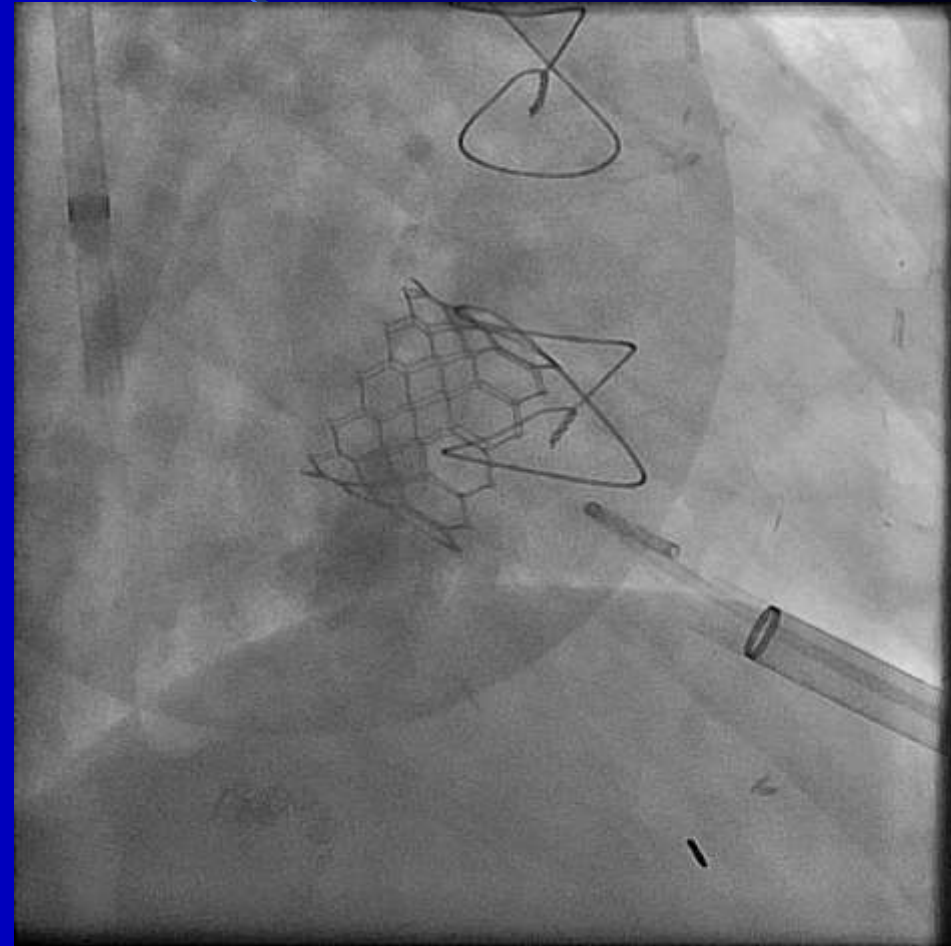
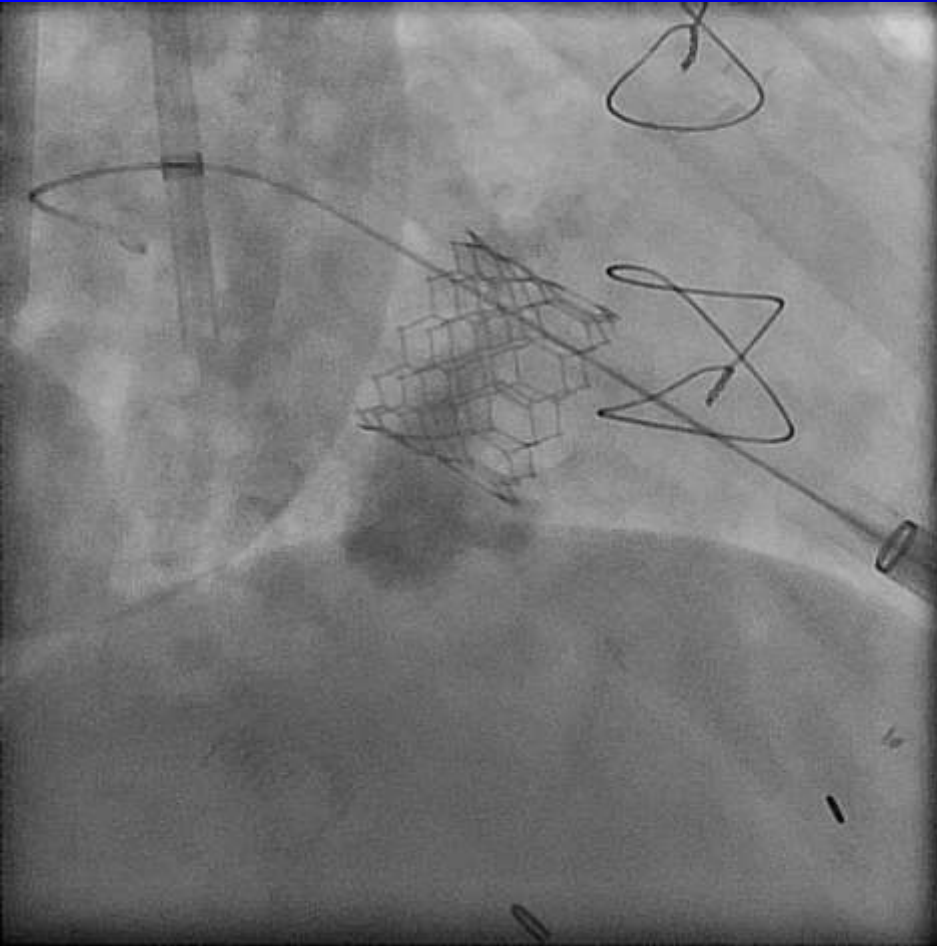
TMVR with SAPIEN valve

Implanting a 26mm SAPIEN 3 valve



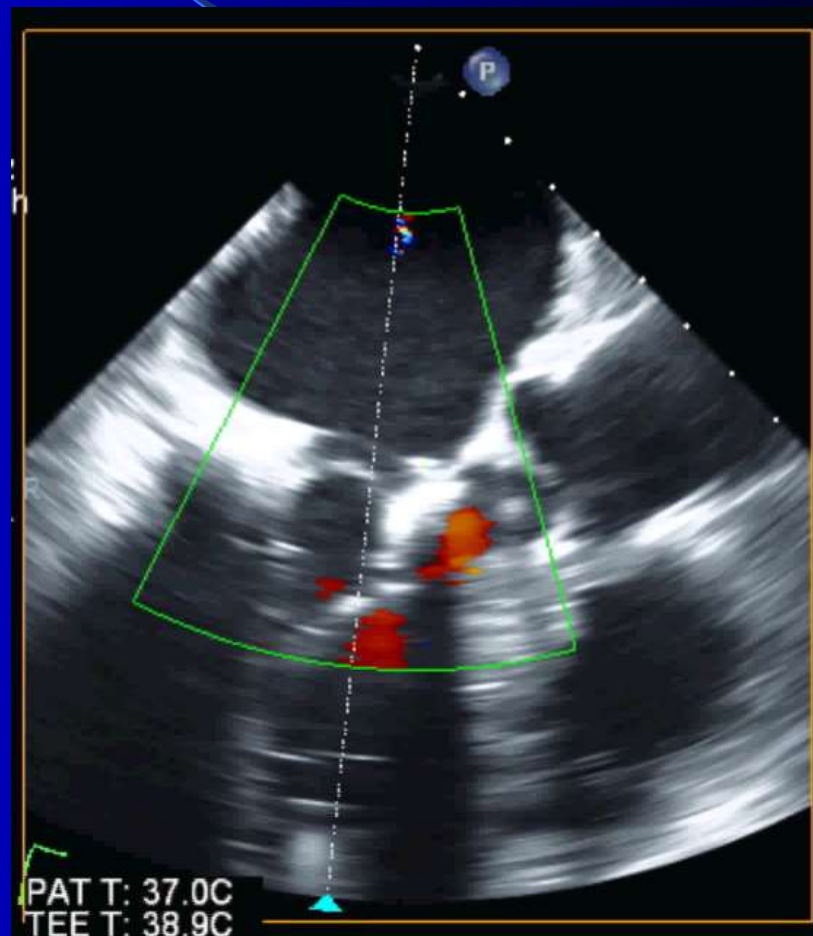
TMVR with SAPIEN valve

Post-implantation



TMVR with SAPIEN valve

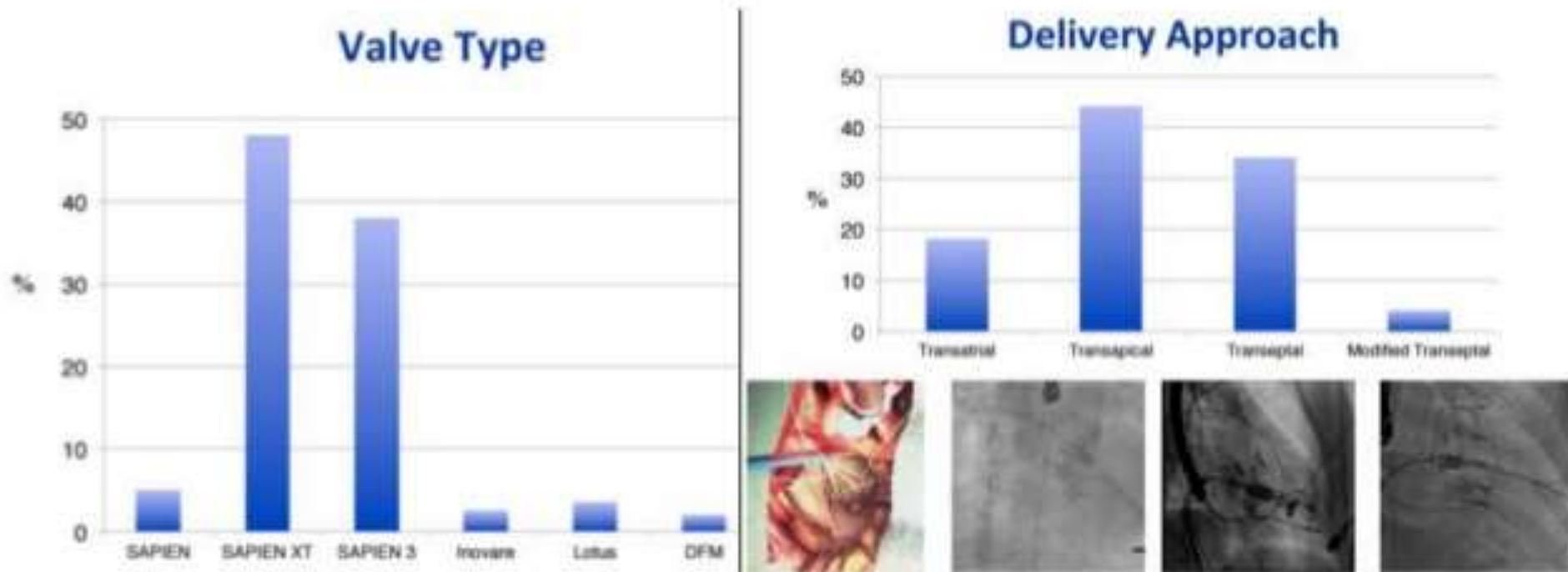
Post-implantation



Valve in MAC

TMVR in MAC Global Registry

104 patients from 47 centers in 11 countries (Sept 2012-April 2016)
Underwent TMVR with compassionate use of aortic THV



Transcatheter Mitral Valve Replacement in Native Mitral Valve Disease With Severe Mitral Annular Calcification

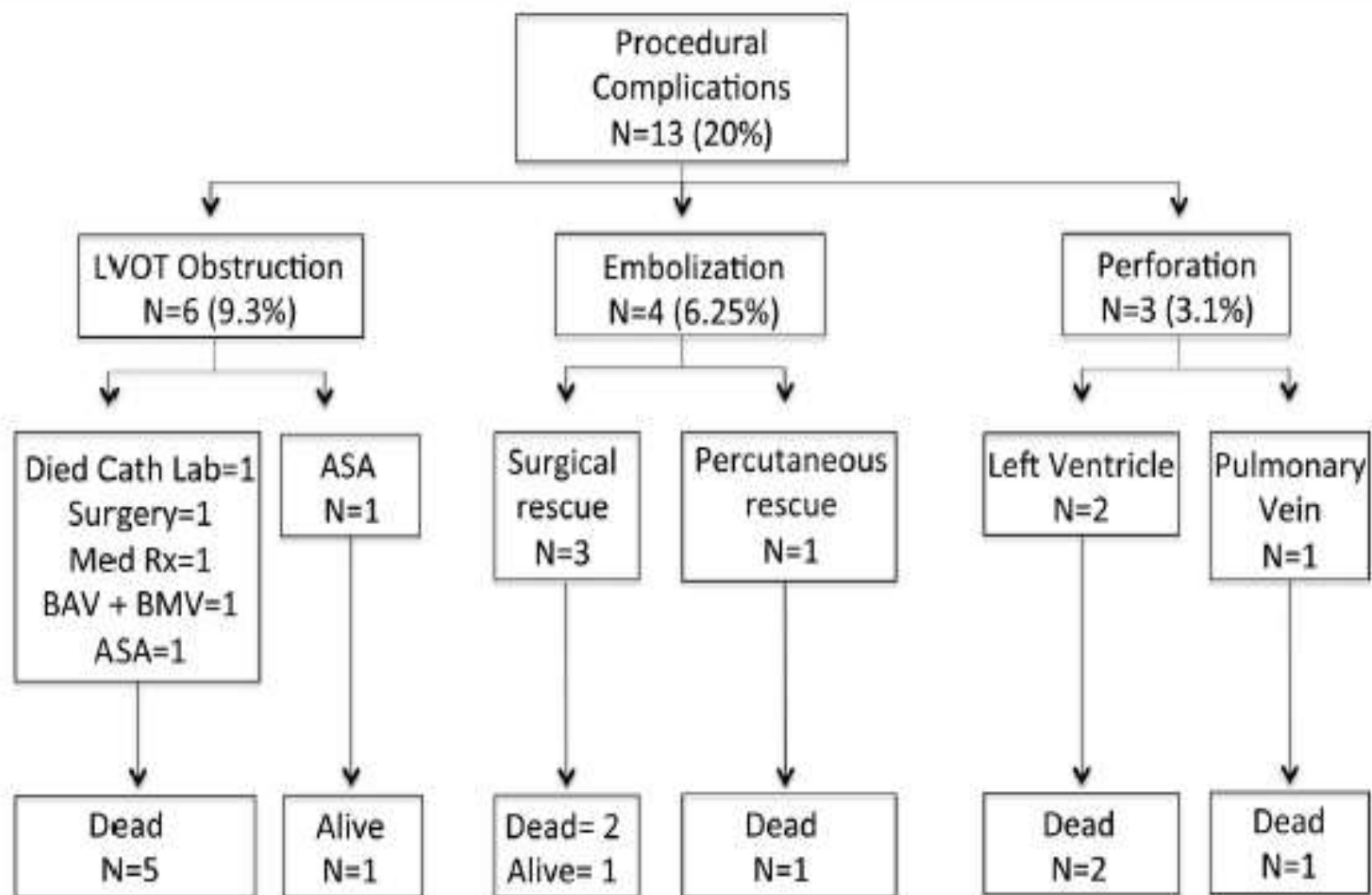
Results From the First Multicenter Global Registry

J Am Coll Cardiol Intv 2016;9:1361-71

Between 2012 – 2015
32 Centers
64 Patients
Mean age 73±13 years
STS score 14.4±9.5%

SAPIEN	7.8%
SAPIEN XT	59.4%
SAPIEN 3	28.1%
Inovare (Brazil)	4.7%

FIGURE 4 Procedural Complications and Related 30-Day Mortality



ASA = alcohol septal ablation; BAV = balloon aortic valvuloplasty; BMV = balloon mitral valvuloplasty; LVOT = left ventricular outflow tract; Med Rx = medical treatment.

30-day Outcomes

30-day echo	
Mean MVG (n = 21)	5.9 ± 2.1
MVA (n = 11)	2.3 ± 0.8
MR	
None to trace	18/22 (81.8)
Mild 2(+)	4/22 (18.2)
≥3(+)	0/22 (0)
LVOT gradient (n = 12)	15 ± 17.8
30-day NYHA functional class	
I	7/25 (28)
II	14/25 (56)
III	4/25 (16)

TABLE 3 Clinical Outcomes

Length of stay, days	17.7 ± 18
30-day/procedural death*	19/64 (29.7)
Cardiovascular	8/64 (12.5)
LVOTO	2/64 (3.1)
LV perforation	2/64 (3.1)
Complete AV block	1/64 (1.56)
MI (air emboli due to pulmonary vein perforation)	1/64 (1.56)
Stroke	2/64 (3.1)
Noncardiac	11/64 (17.2)
Multiorgan failure	5/64 (7.8)
Pneumonia	3/64 (4.6)
Thoracentesis related bleeding complication	1/64 (1.56)
Infection	2/64 (3.1)
In-hospital complications	
Stroke	4/58 (6.9)
Myocardial infarction	1/64 (1.6)
Mitral valve reintervention after index procedure	1/64 (1.6)
Major bleeding	14/46 (30.4)
Vascular complication	5/58 (8.6)
New HD requirement	6/58 (10.3)
New permanent pacemaker requirement	8/58 (13.8)
Endocarditis	2/58 (3.5)
Hemolytic anemia	1/58 (1.7)
Valve thrombosis	0/64 (0)

TMVR for MAC

Challenges and complications

- **Valve sizing**
- **Amount of calcification for anchoring**
- **Optimal oversizing**
- **Selection of THV**
- **Predicting factors for LVOT obstruction, paravalvular leak, PHV deformity and rupture of atrioventricular groove**

Summary

- **TMVR for MAC is feasible, but associated with high mortality and morbidity.**
- **Pre-procedural anatomic assessment (CT and TEE) and team discussion is critical.**
- **Transcatheter intervention can only be considered in very high-risk or non-operable patients.**



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THANKS!