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Imaging for Cath Lab Interventions
The role of 3D

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Disclosures

- None

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Outline

- Introduction
- Why 3D?
  - Periprosthetic regurgitation
  - Mitral interventions
- What is the future?

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Number of Echo Studies in Cath Lab

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Periprosthetic Regurgitation

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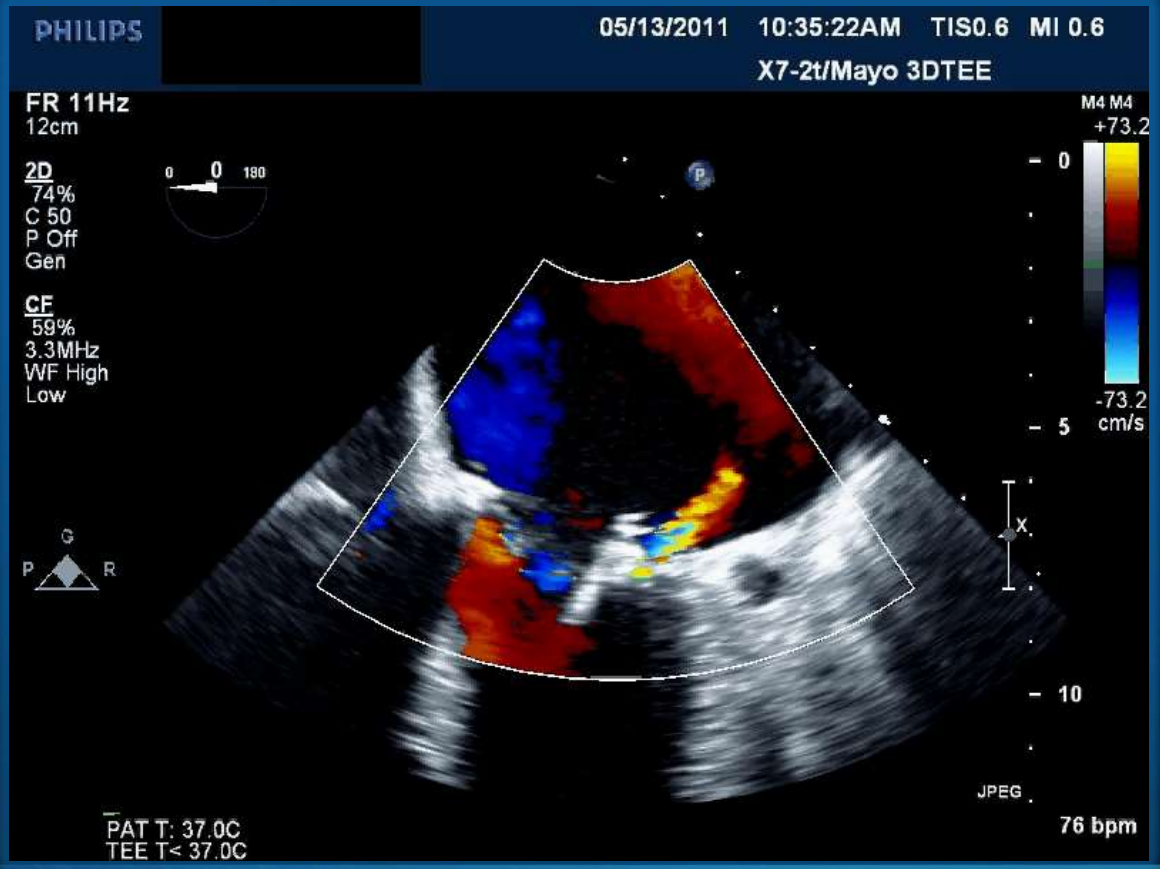
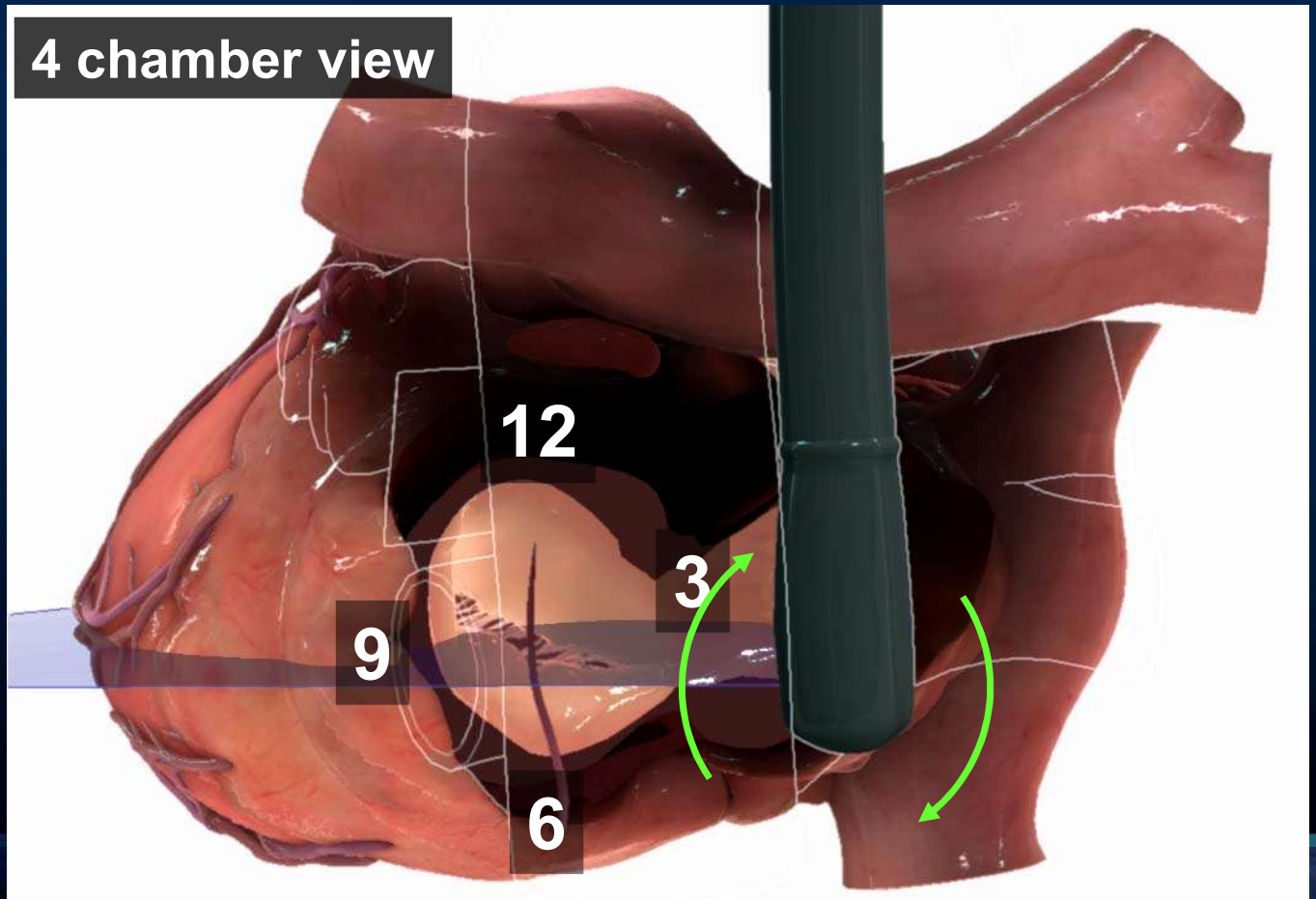
78 yo withworsening dyspnea



The Clock Face - Rotation



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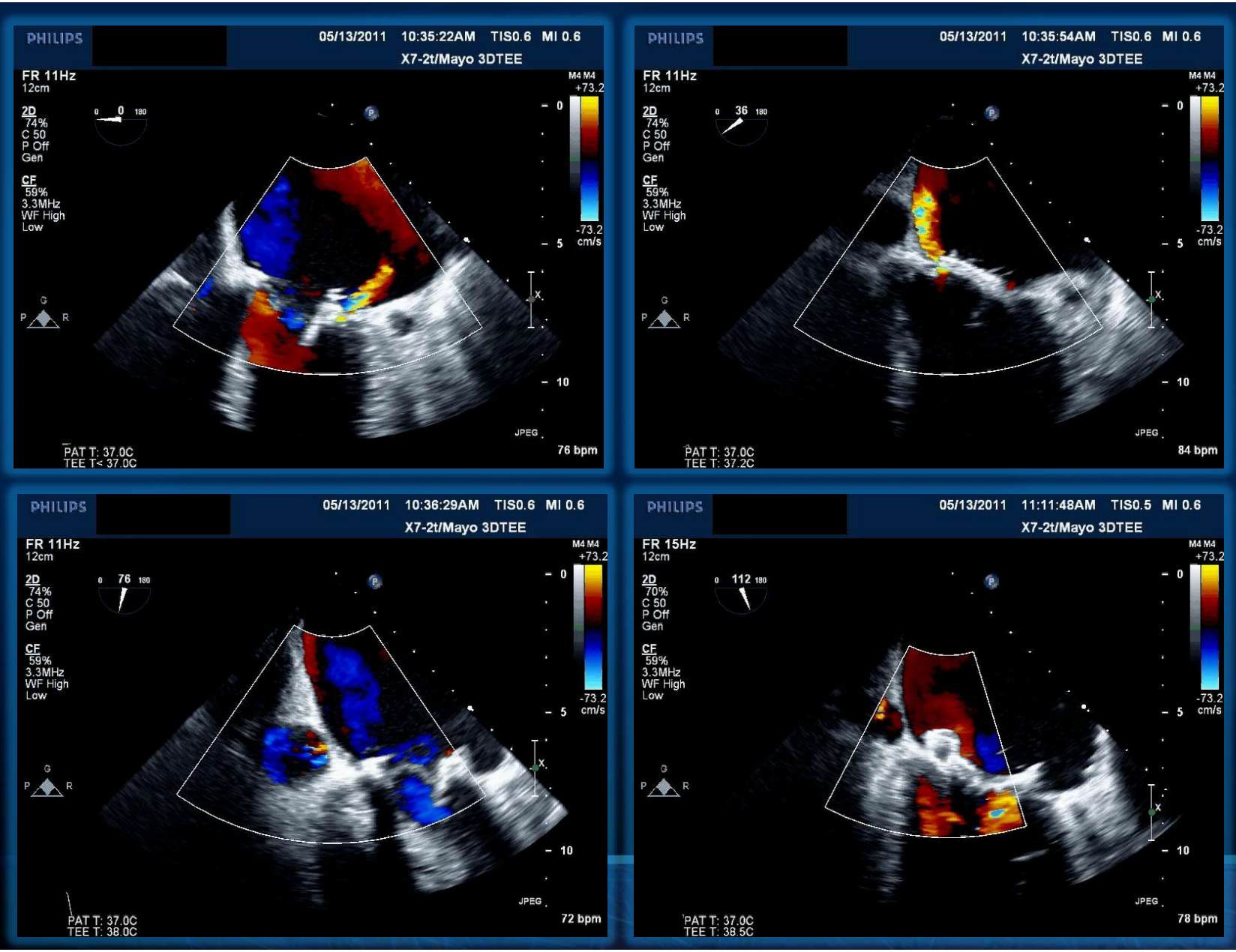

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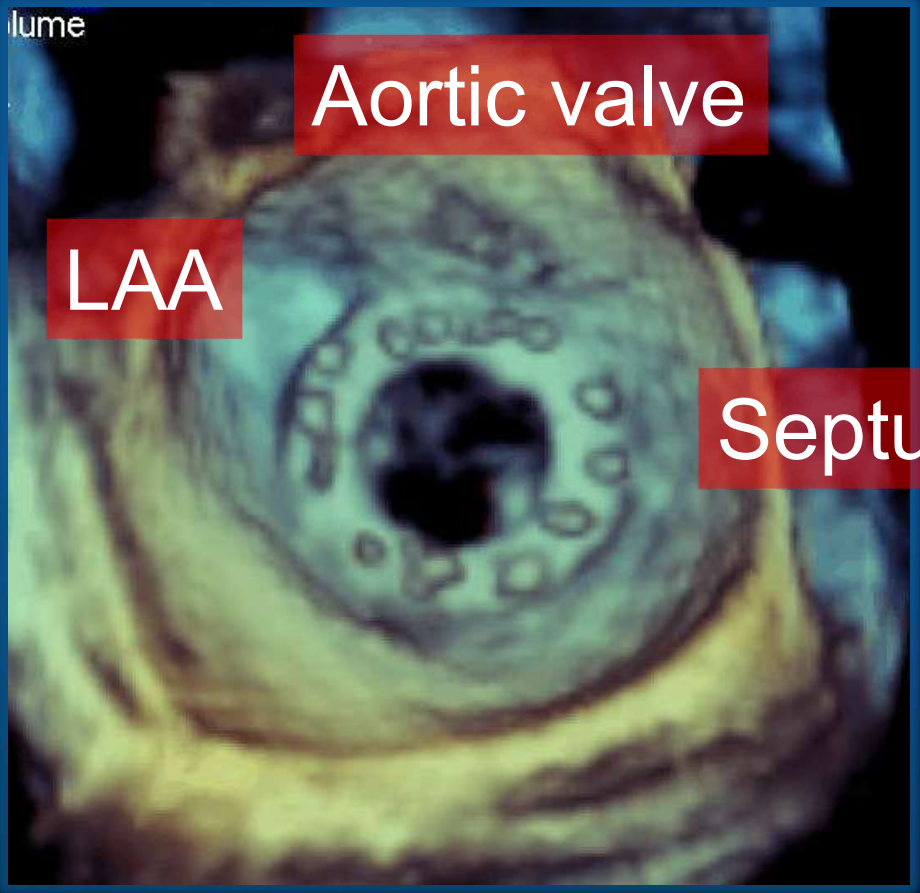
3D TEE



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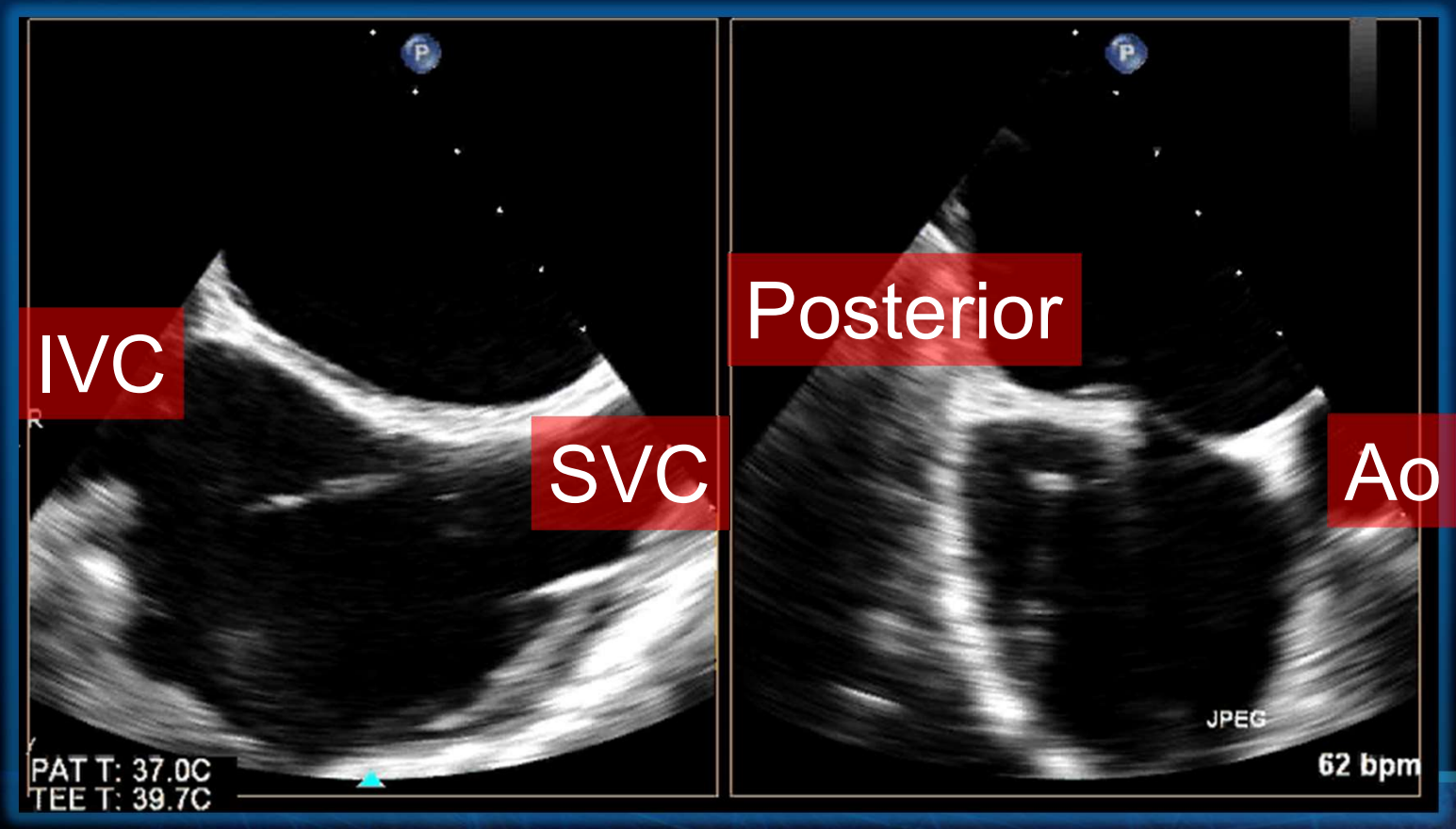
Procedure Guidance

Step 1: Trans-septal Puncture



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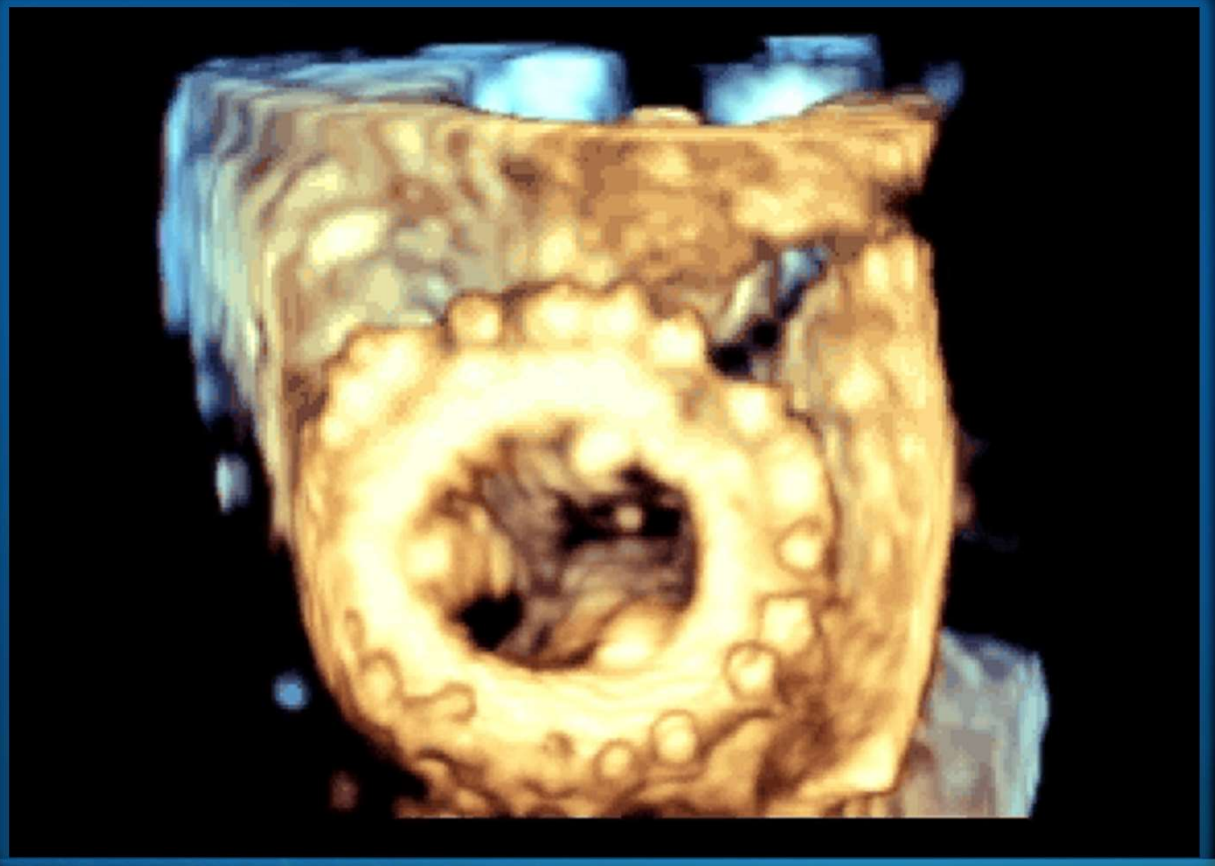
Procedure Guidance

Step 2: Crossing Defects



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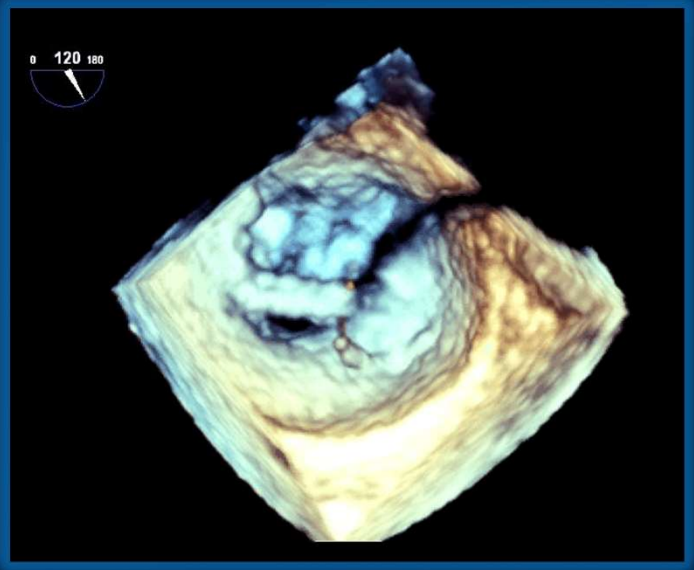

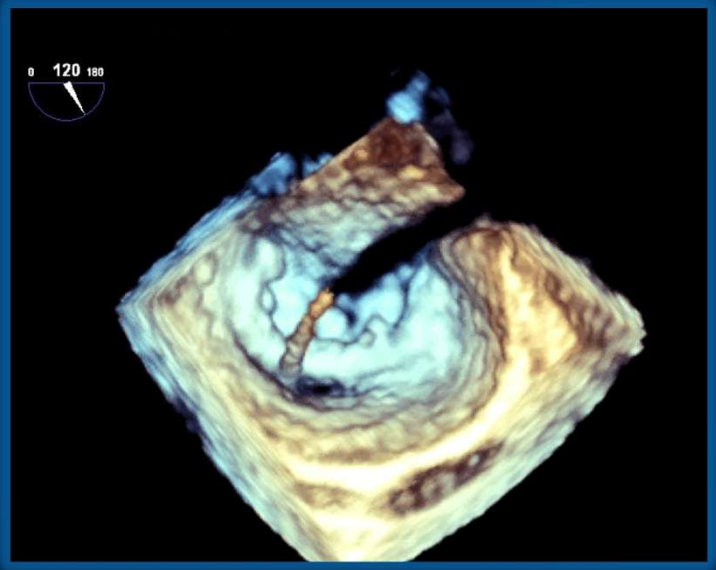

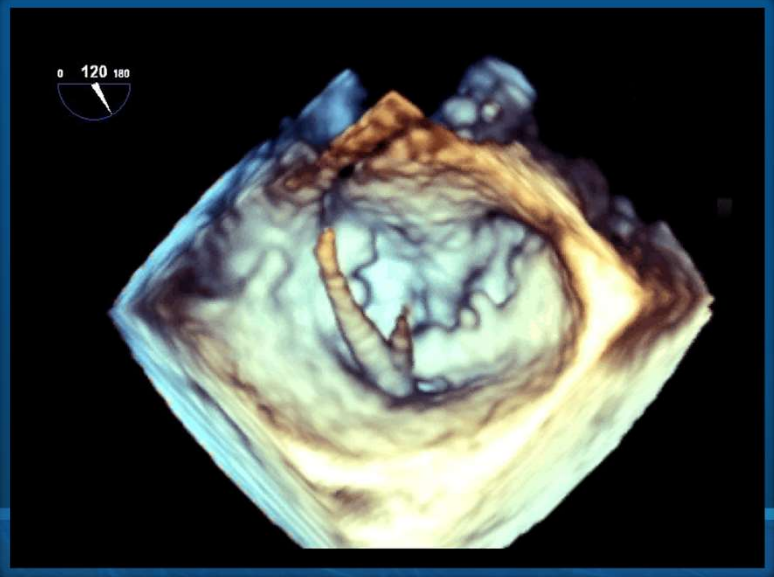

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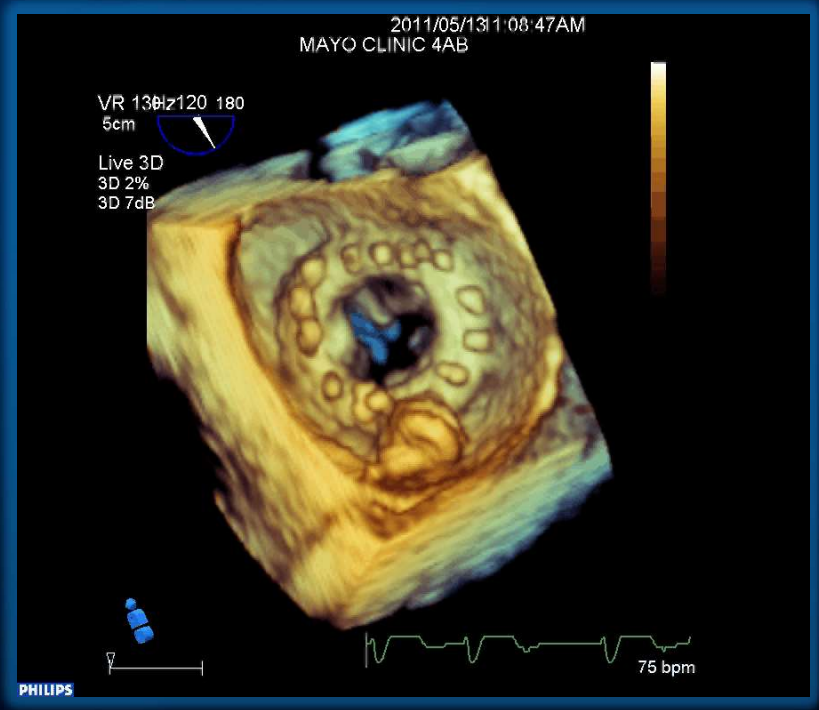
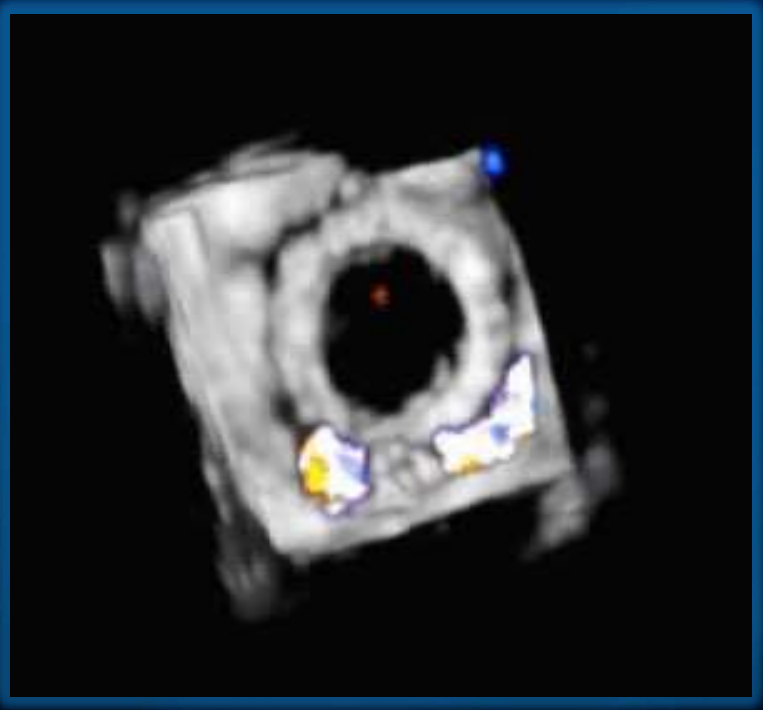
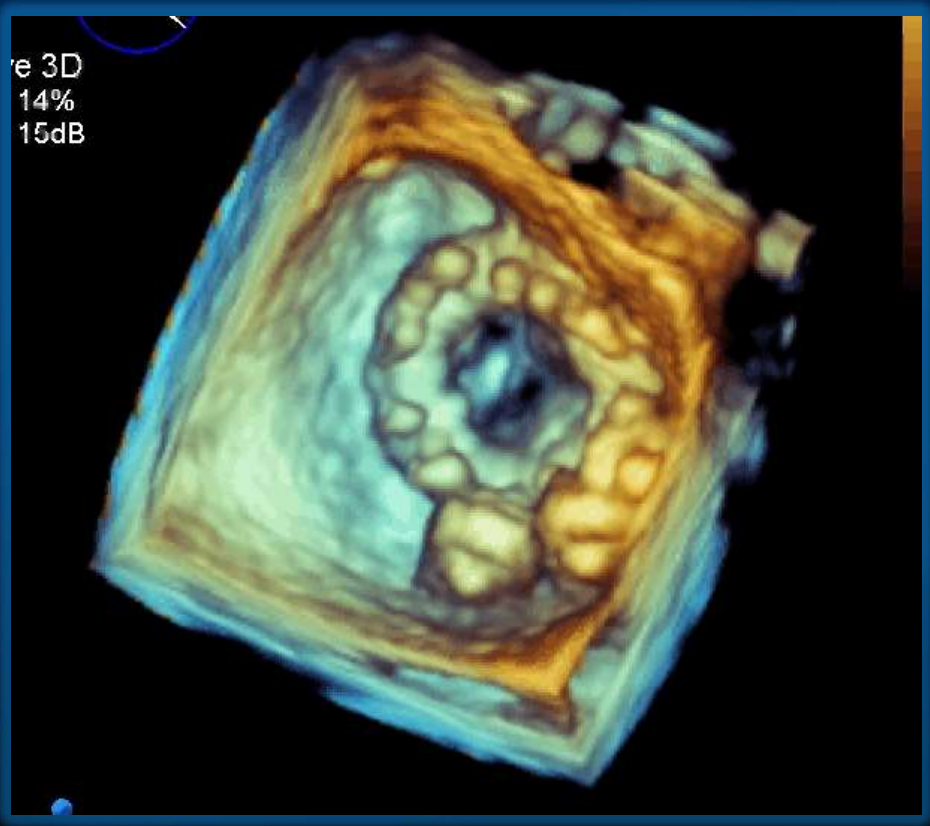
S/P 1st Device Placement





2nd defect – 2 devices simultaneously



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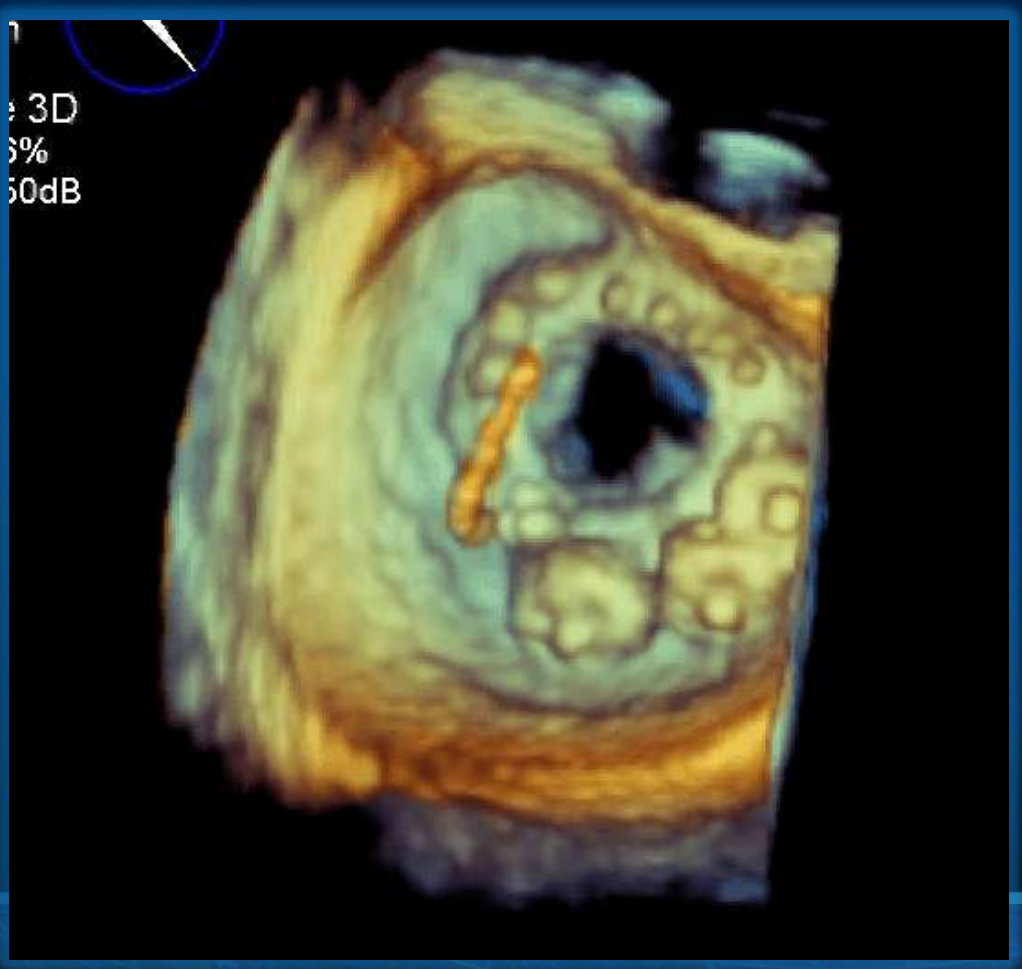
Final Posterior Leak: Too Small



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JACC: CARDIOVASCULAR INTERVENTIONS

PUBLISHED BY ELSEVIER INC. http://dx.doi.org/10

STRUCTURAL
Clinical Research

The Learning Curve in Percutaneous Repair of Paravalvular Prosthetic Regurgitation

An Analysis of 200 Cases

Paul Sorajja, MD,* Allison K. Cabalka, MD,† Donald J. Hagler, MD,†
Charanjit S. Rihal, MD*

Rochester, Minnesota

- ~ 400 patients
- 30 day MACE ~ 4%
- Improvement
  - 90% for HF
  - ~50% for hemolysis

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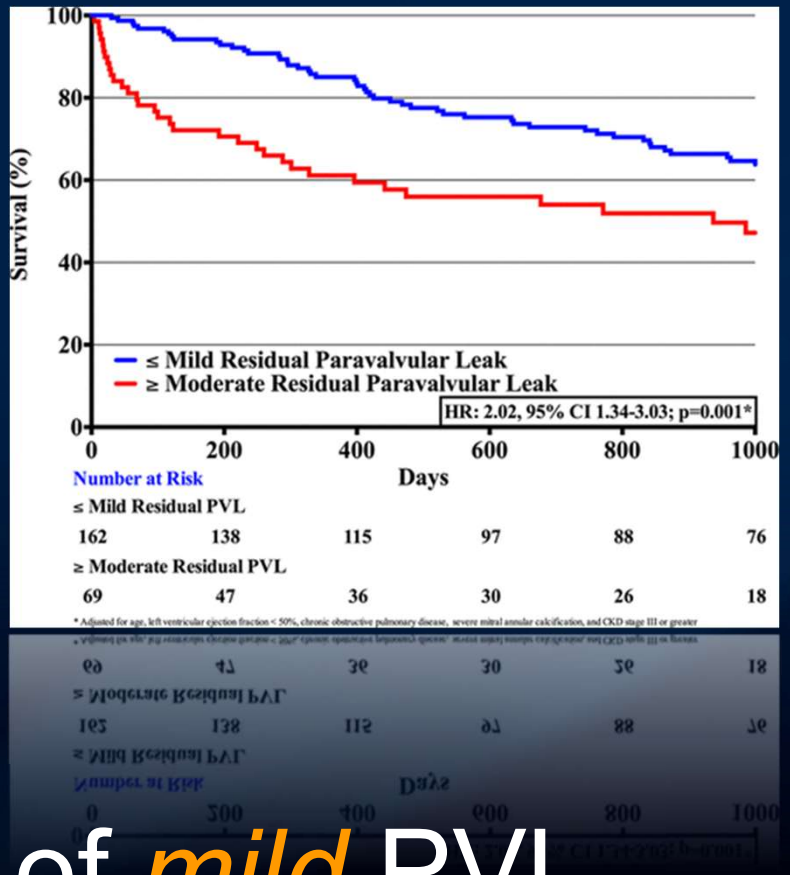
Successful Percutaneous Mitral Paravalvular Leak Closure Is Associated With Improved Midterm Survival

Mohamad Alkhouli, MD; Chad J. Zack, MD; Mohammad Sarraf, MD; Mackram F. Eleid, MD; Allison K. Cabalka, MD; Guy S. Reeder, MD; Donald J. Hagler, MD; Joseph F. Maalouf, MD; Vuyisile T. Nkomo, MD, MPH; Charanjit S. Rihal, MD

Background—Percutaneous closure of prosthetic mitral valve paravalvular leak (PVL) has emerged as an alternative to surgical treatment in high-risk patients. Limited data exist on the impact of successful percutaneous PVL closure on midterm outcomes.

Methods and Results—We examined consecutive patients who underwent percutaneous mitral PVL closure at Mayo Clinic, Rochester, MN, between January 2006 and January 2017. Procedural success, in-hospital outcomes, and midterm mortality were assessed. A total of 231 patients underwent percutaneous mitral PVL repair at a mean age of 67±12 years. Mean time from mitral valve replacement to percutaneous PVL repair was 1.25 (0.31–7.25) years. One hundred sixty-two patients (70%) had ≤mild PVL after the procedure. Compared with those who had >mild residual PVL, patients with ≤mild residual PVL had lower rates of repeat surgical interventions (6% versus 17%; *P*=0.004) and lower all-cause mortality at 30 days (1% versus 14%; *P*<0.001) and 1 year (15% versus 39%; *P*<0.001). Survival at 3 years was 61% in patients who had ≤mild residual leak and 47% in patients with higher grade of residual PVL (*P*=0.002).

Conclusions—In a large consecutive cohort of patients undergoing percutaneous mitral PVL closure, successful percutaneous reduction of the PVL to mild or less was associated with significant midterm survival benefit. (***Circ Cardiovasc Interv*. 2017;10:e005730. DOI: 10.1161/CIRCINTERVENTIONS.117.005730.**)



- Survival advantage of *mild* PVL

Mitral Valve Interventions

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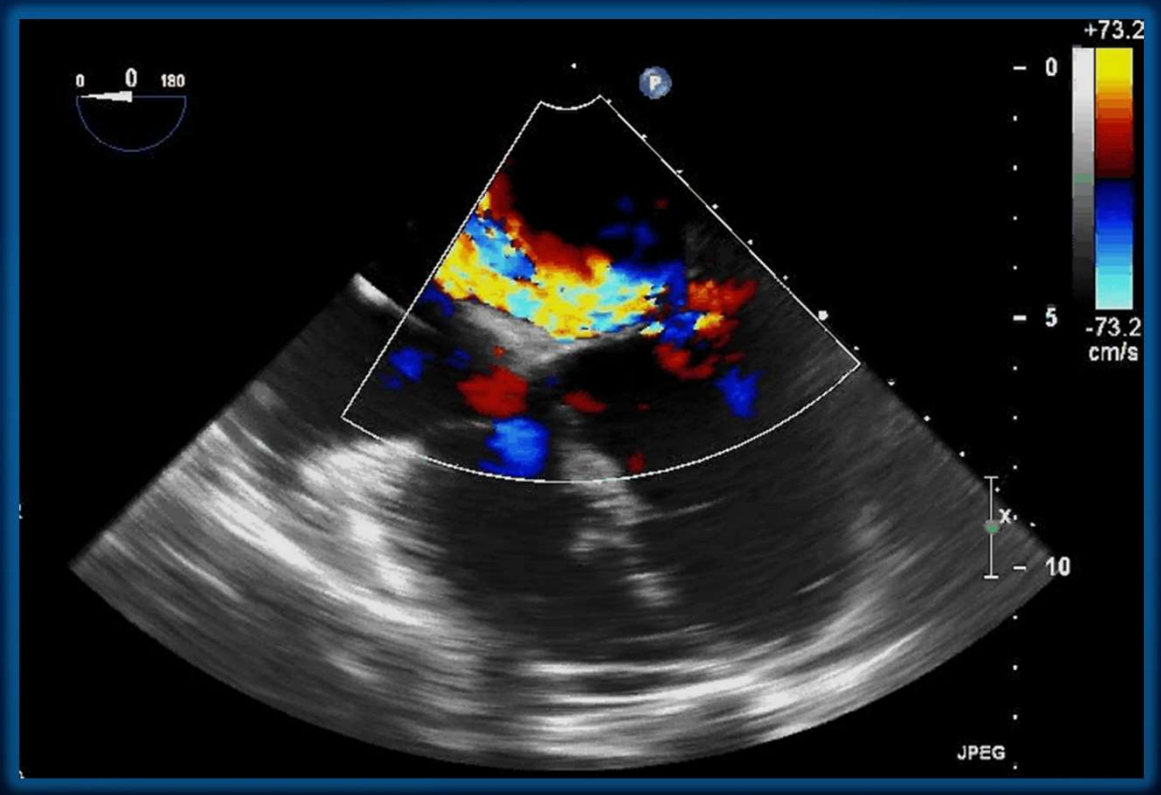

- 94 yo with acute pulmonary edema
- STS for mitral repair 18% mortality

- Gardening until previous week
- Primary care giver for wife
- Wants to beat father's record of 107 years

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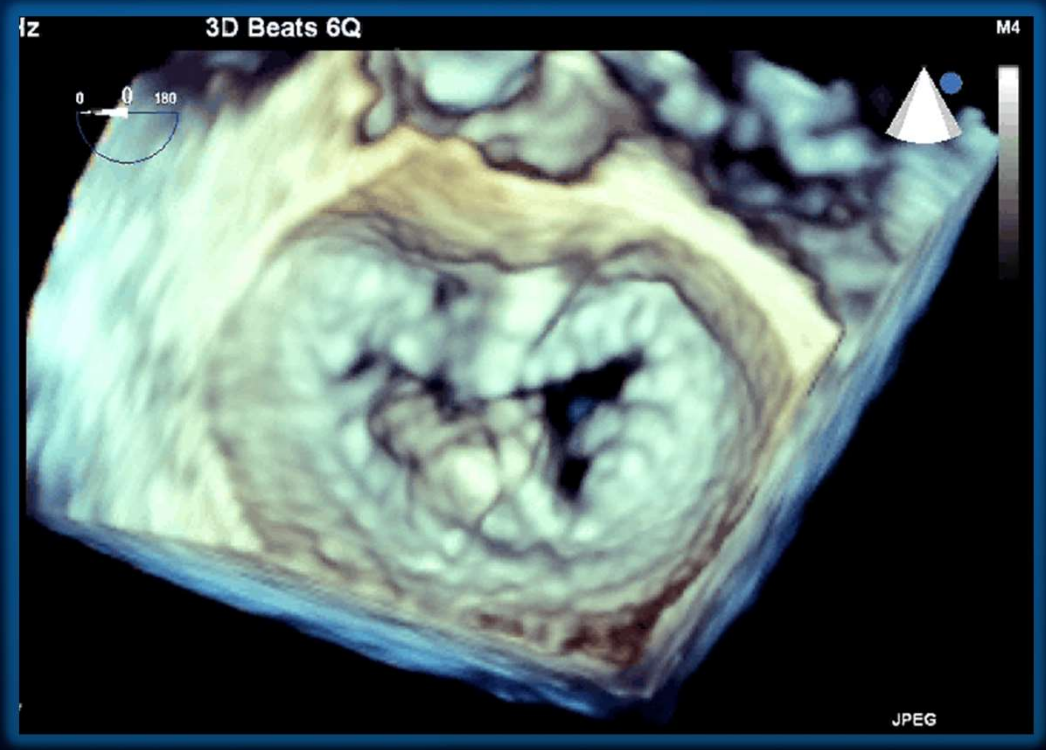

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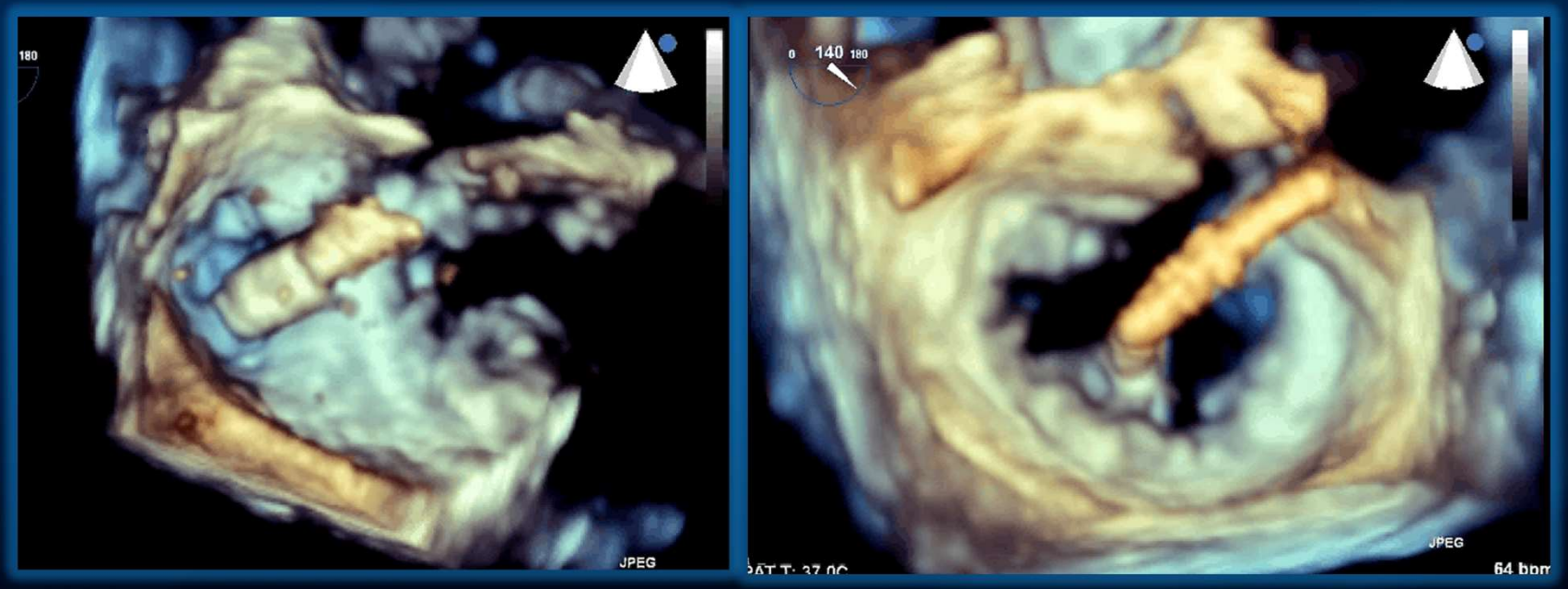
MitraClip: Guidance in LA



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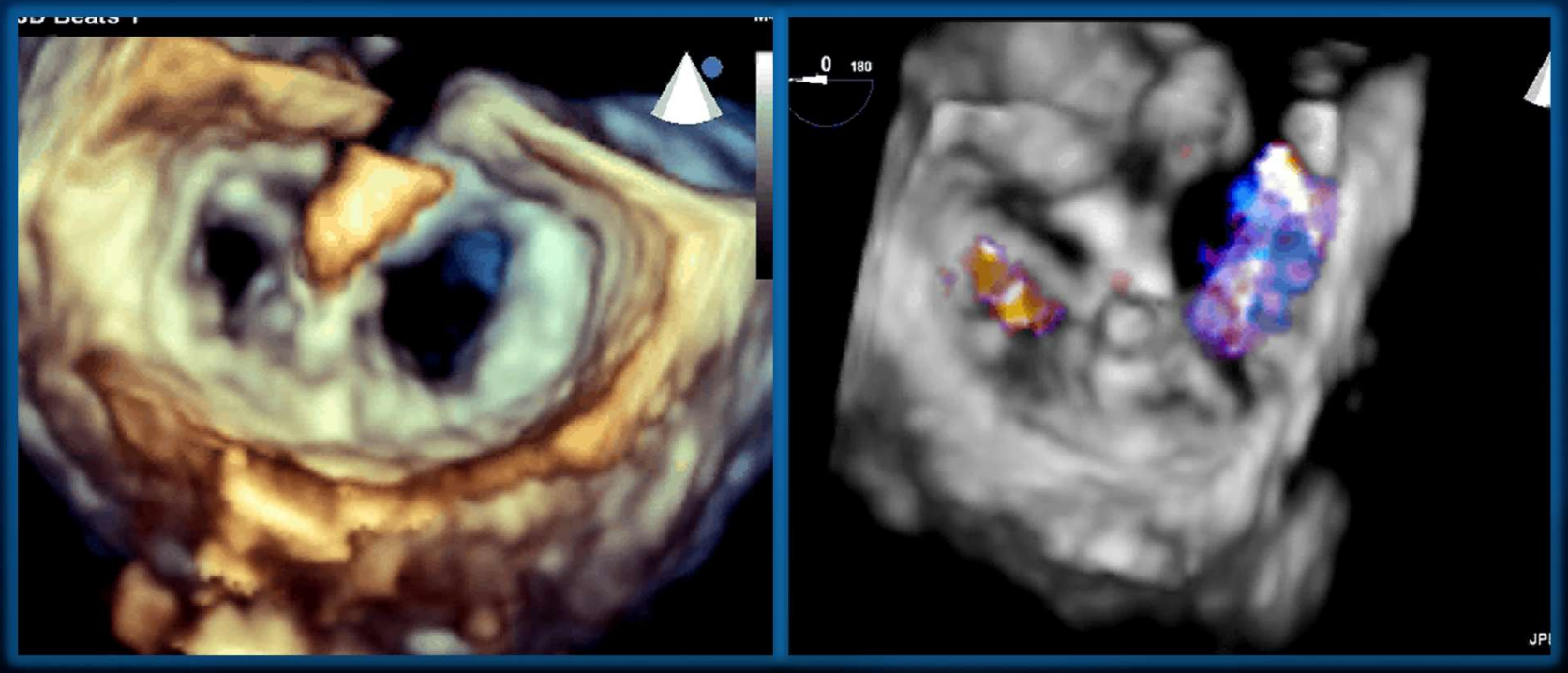
MitraClip: Positioning and Post-deployment Assessment



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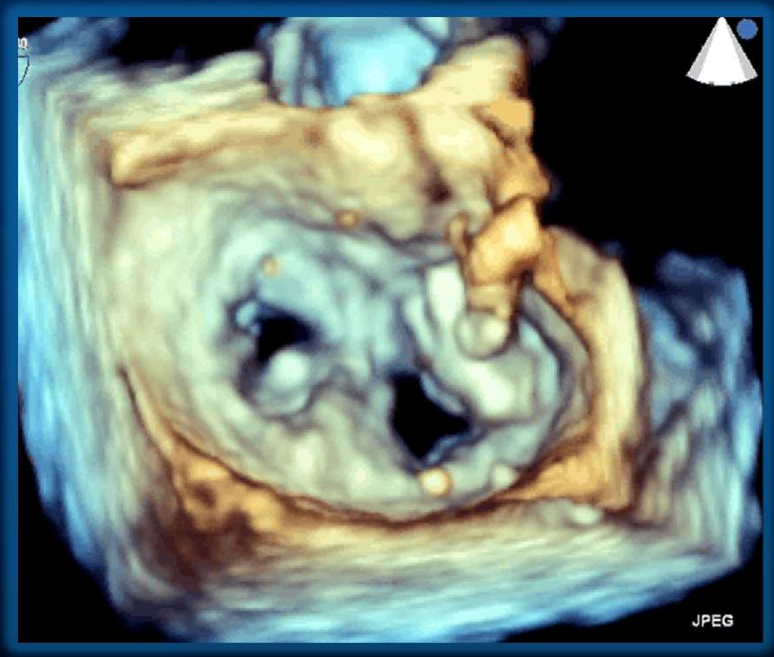
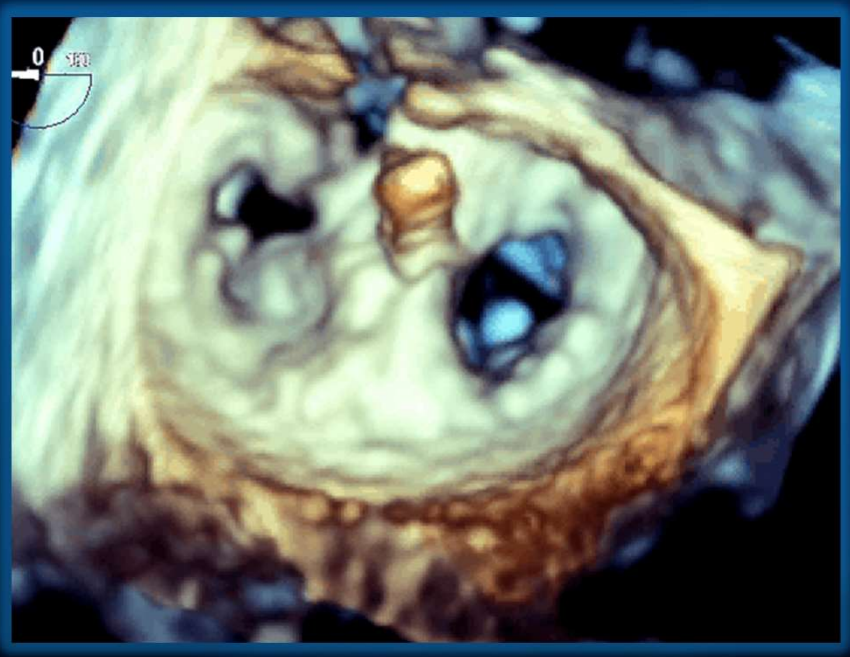
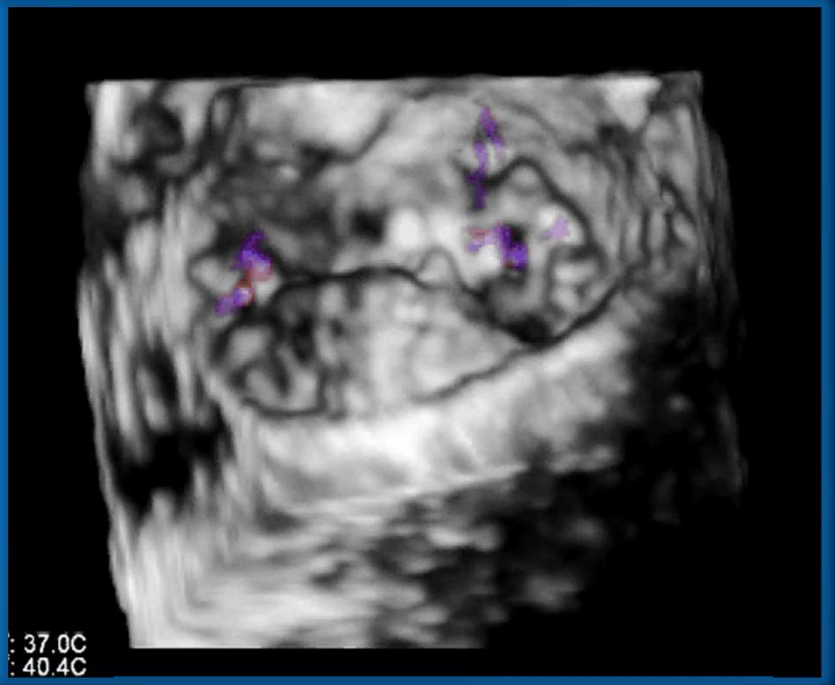
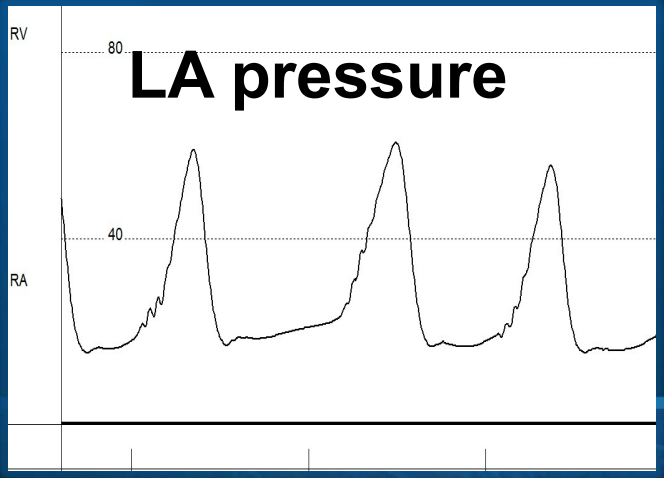
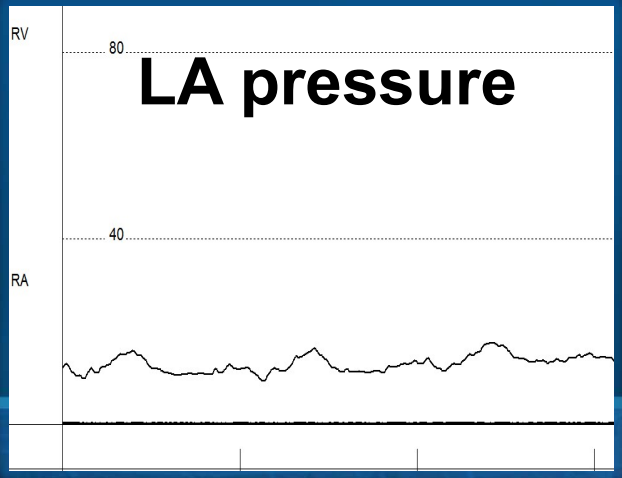
MitraClip: Second Clip











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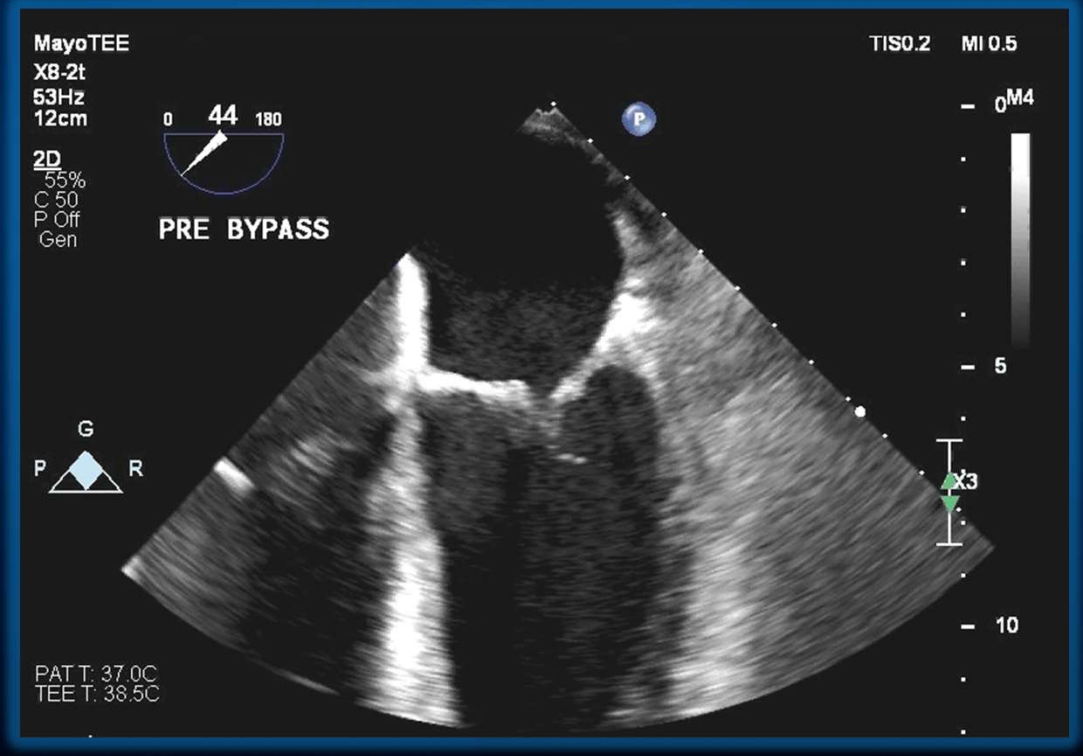
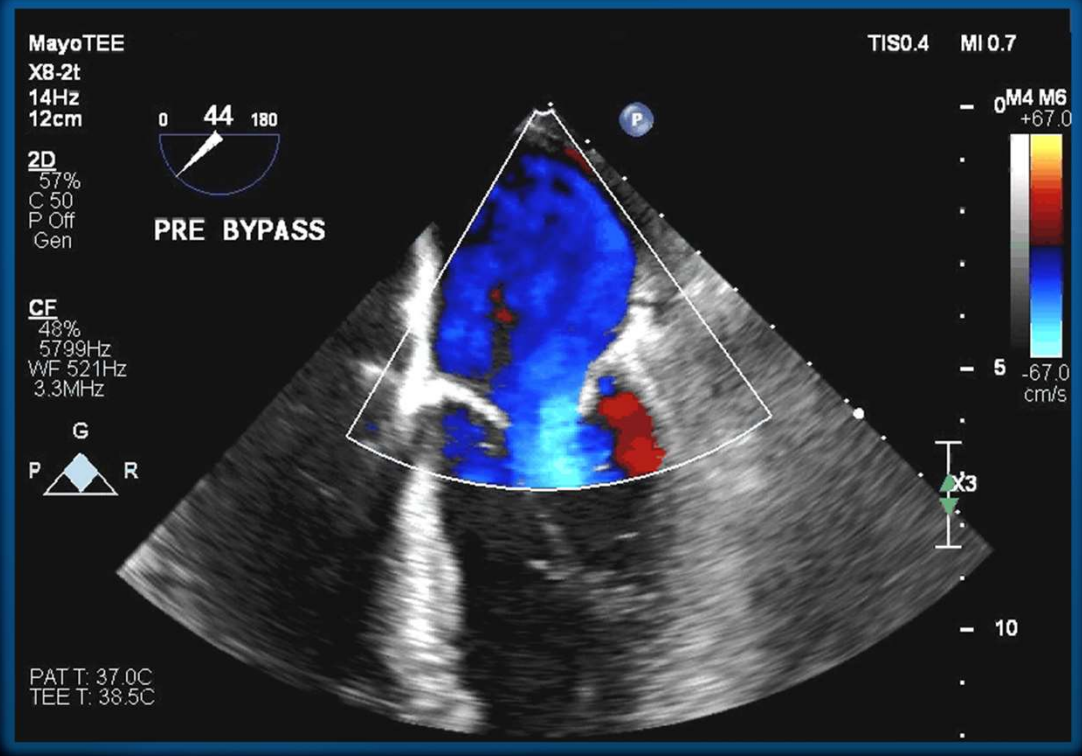
84 year old with worsening dyspnea





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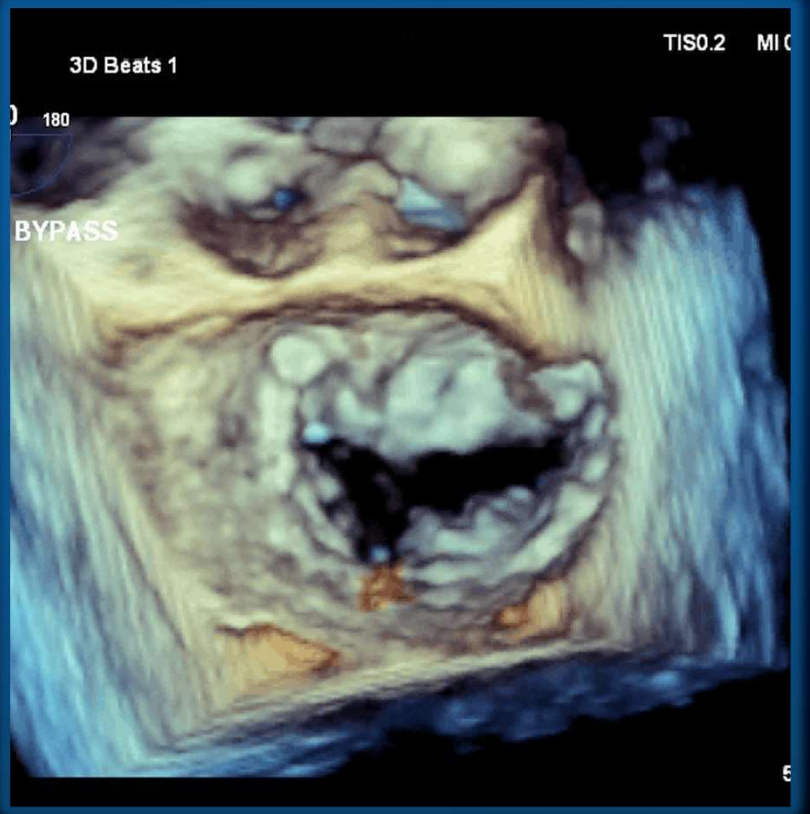
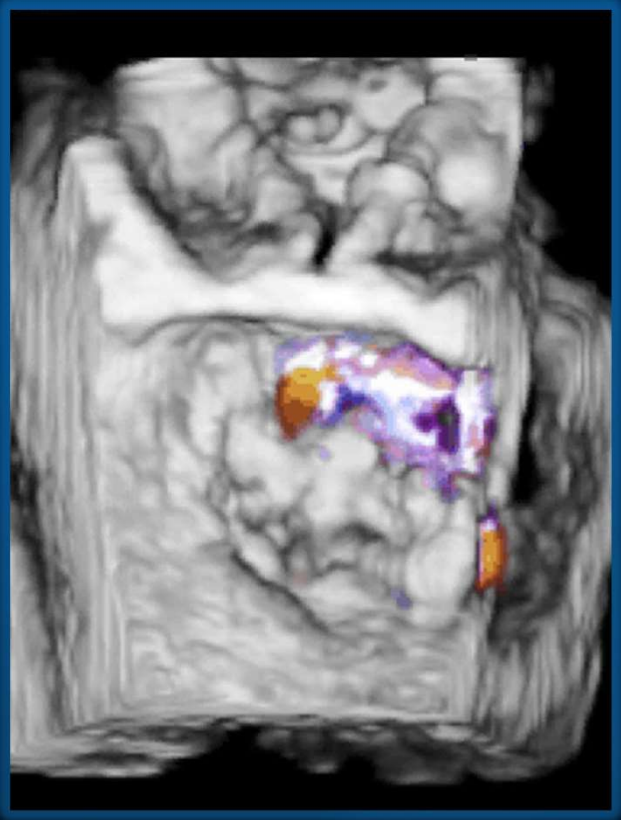
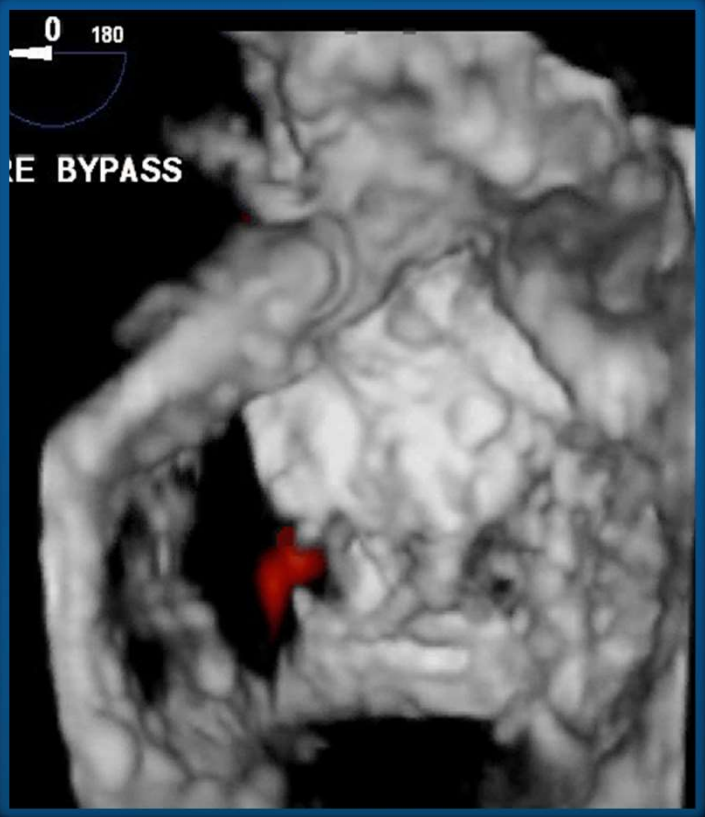
The 3D touch







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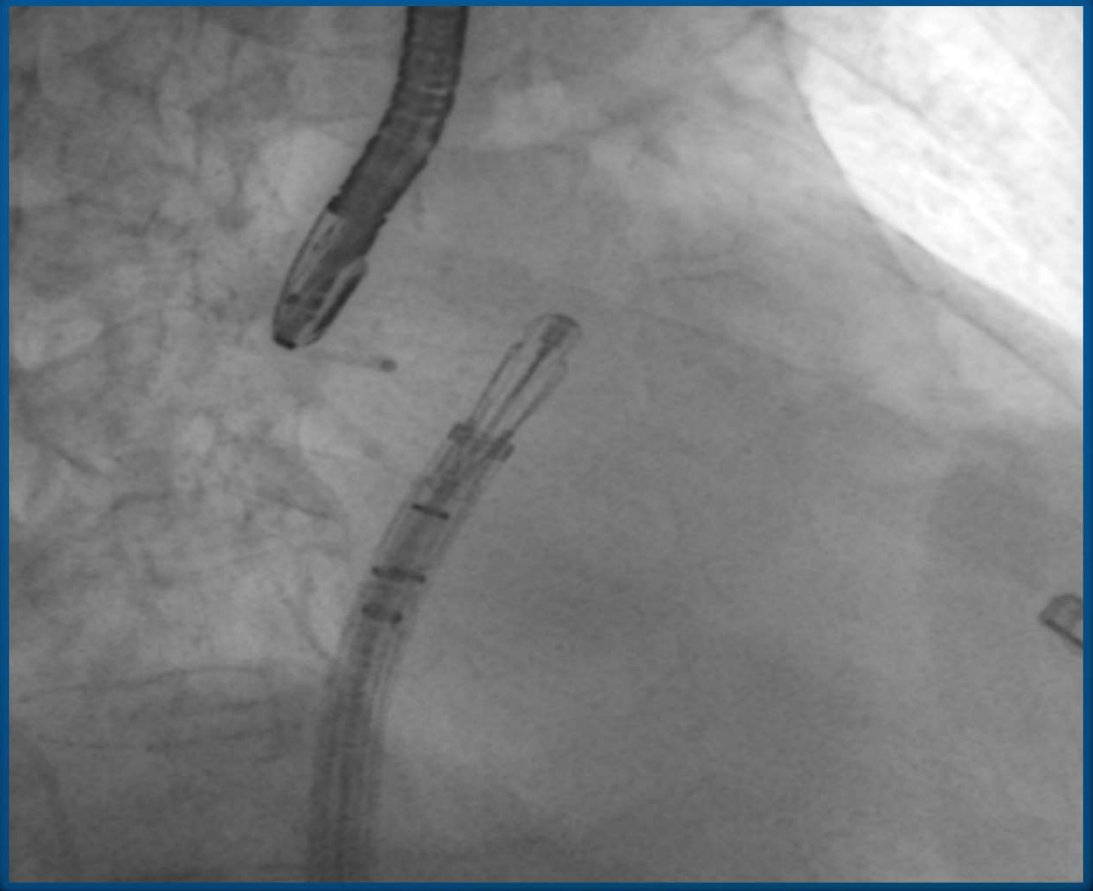
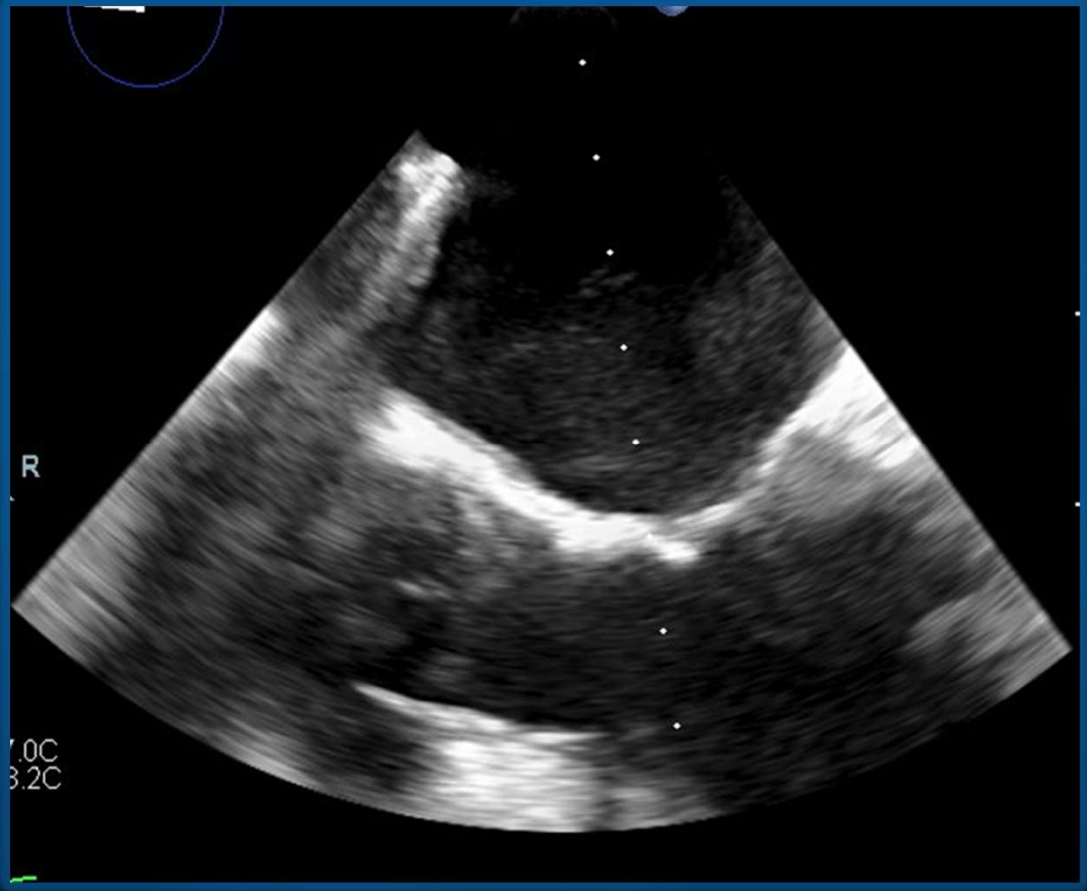
TMVR: Caisson Valve, anchor delivery





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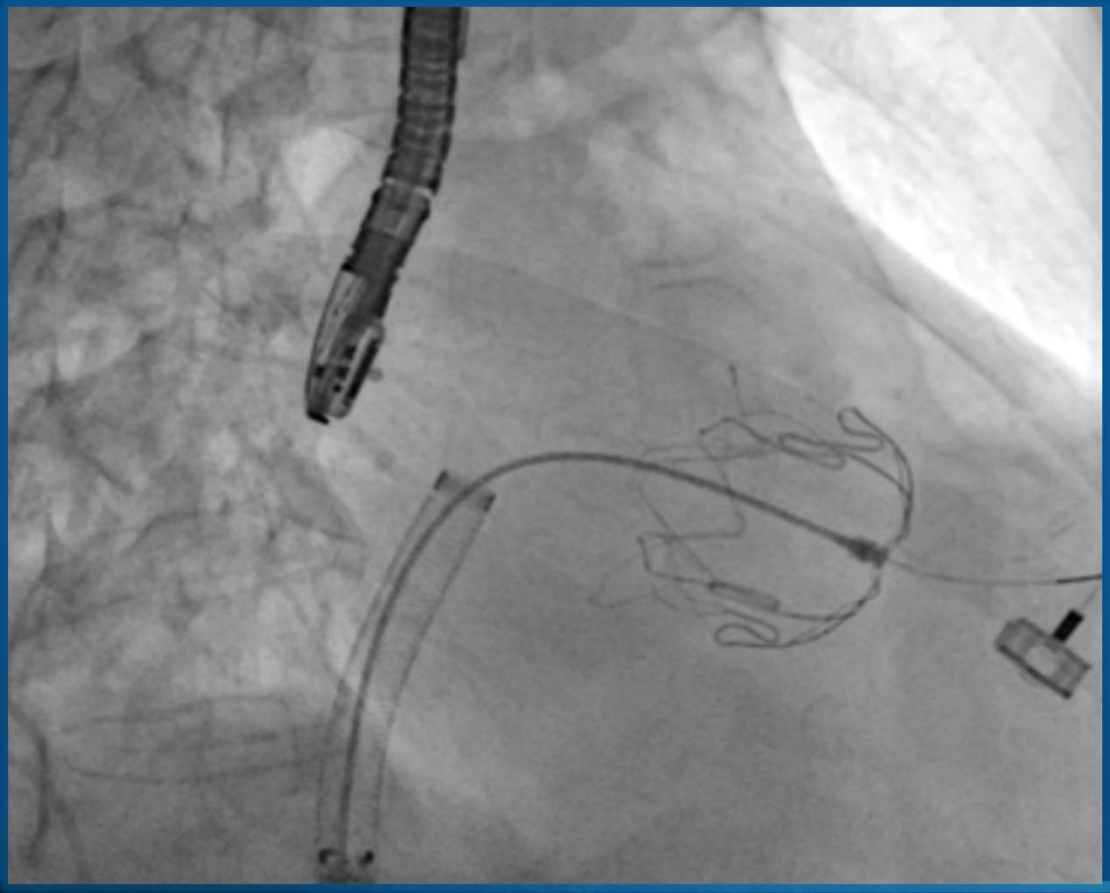
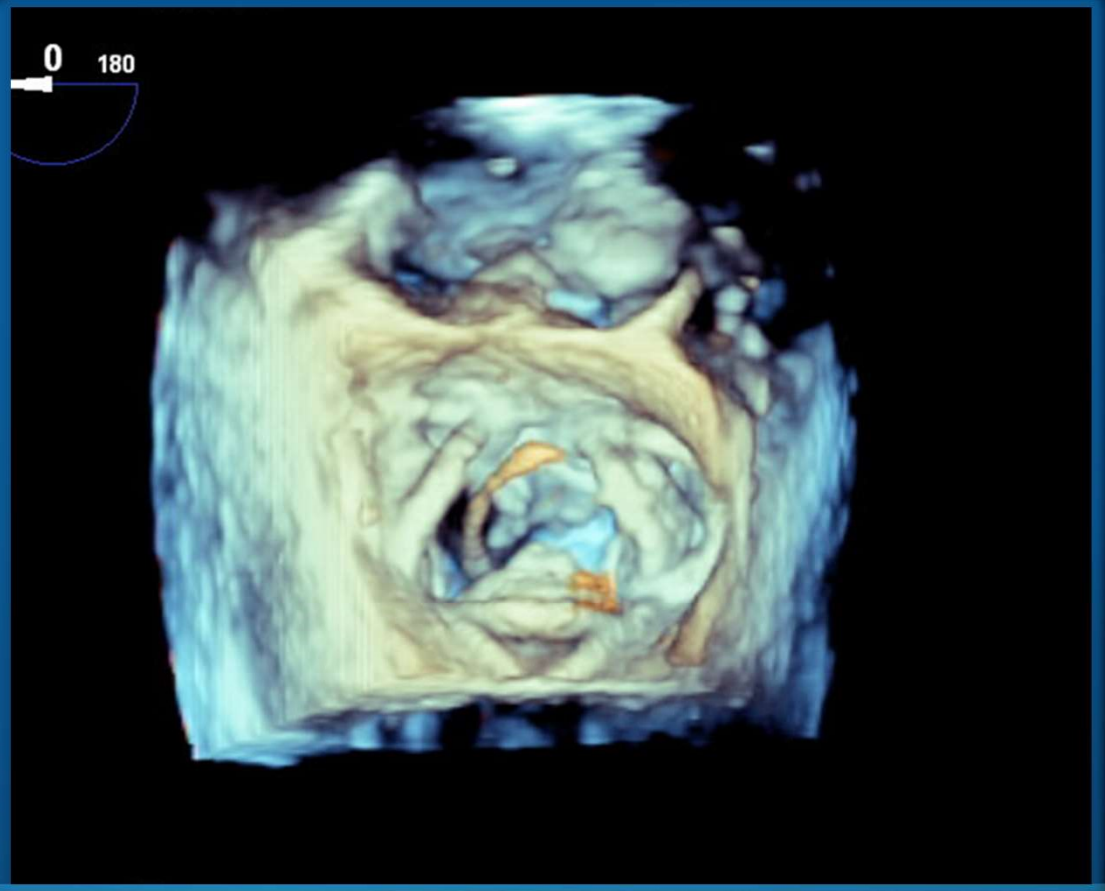
TMVR: Valve Delivery and Deployment





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The Future

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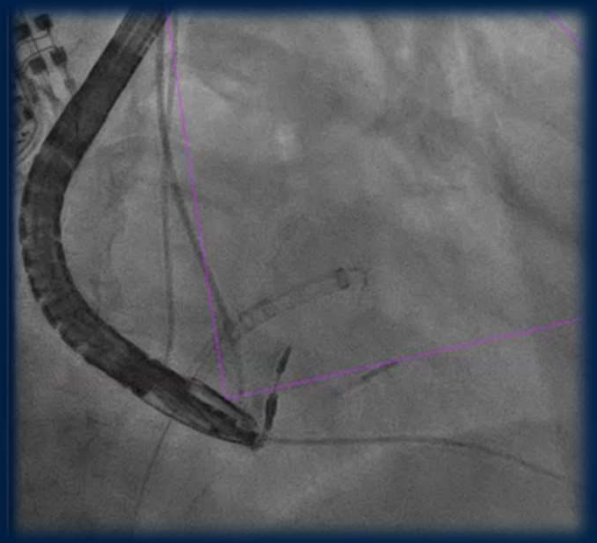
Structural Heart Interventions
Live Imaging Modalities

- Fluoroscopy (X-ray)
  - Excellent for catheters, devices
  - Limited visualization of soft tissues



- Echocardiography (Ultrasound)
  - Excellent for soft tissues
  - Often suboptimal for catheters, devices

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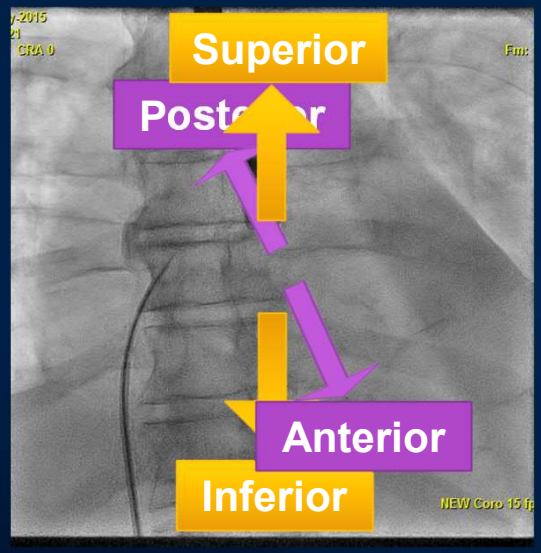
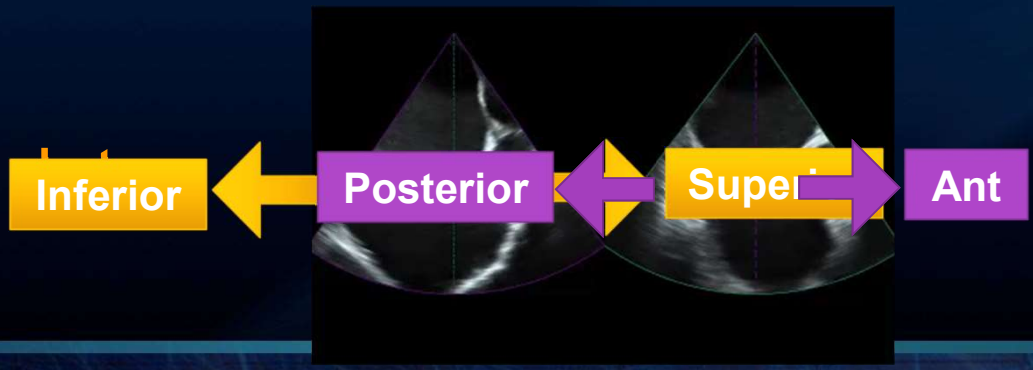
Cardiac Percutaneous Structural Interventions
Live Image Guidance

Current practice:

- Echo and fluoro images:
  - Viewed separately
  - Different orientations
- Mental reorientation
- Integration of imaging





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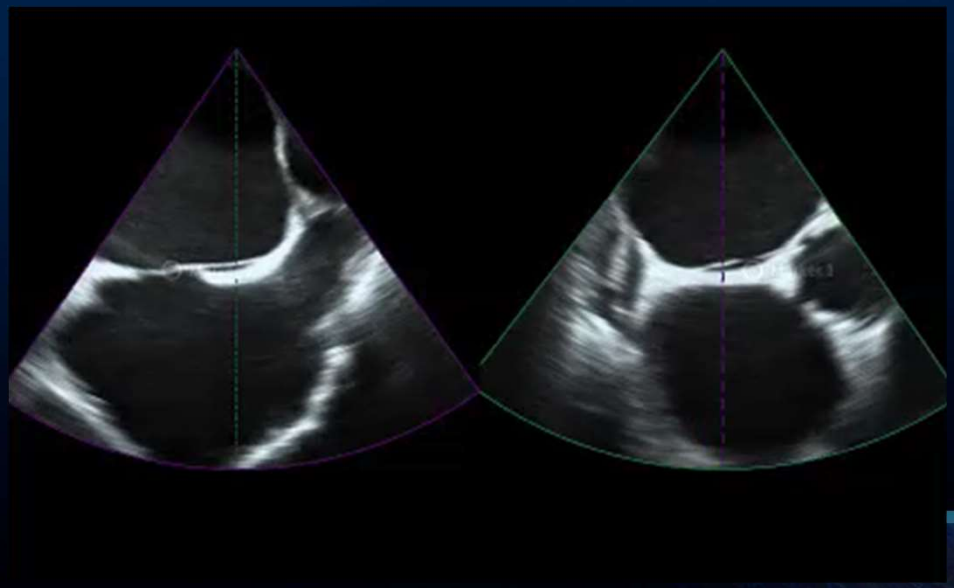
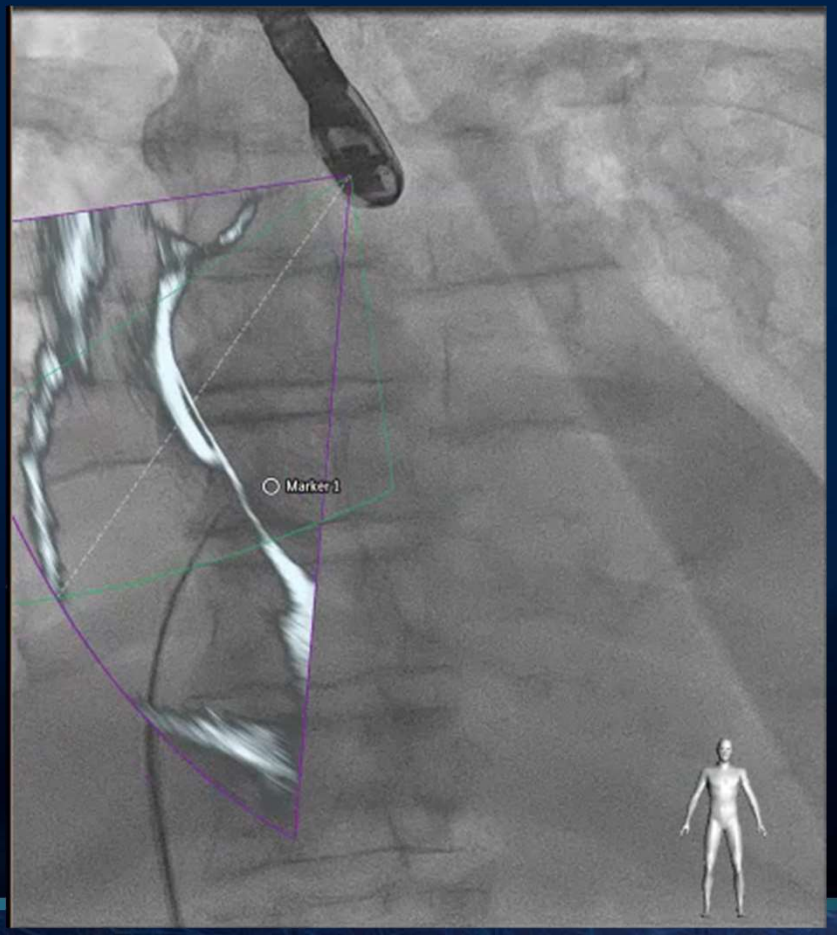
Echo-Fluoro fusion imaging

- Transpose markers from echo space to fluoro space
- Combines of the strengths of both imaging modalities





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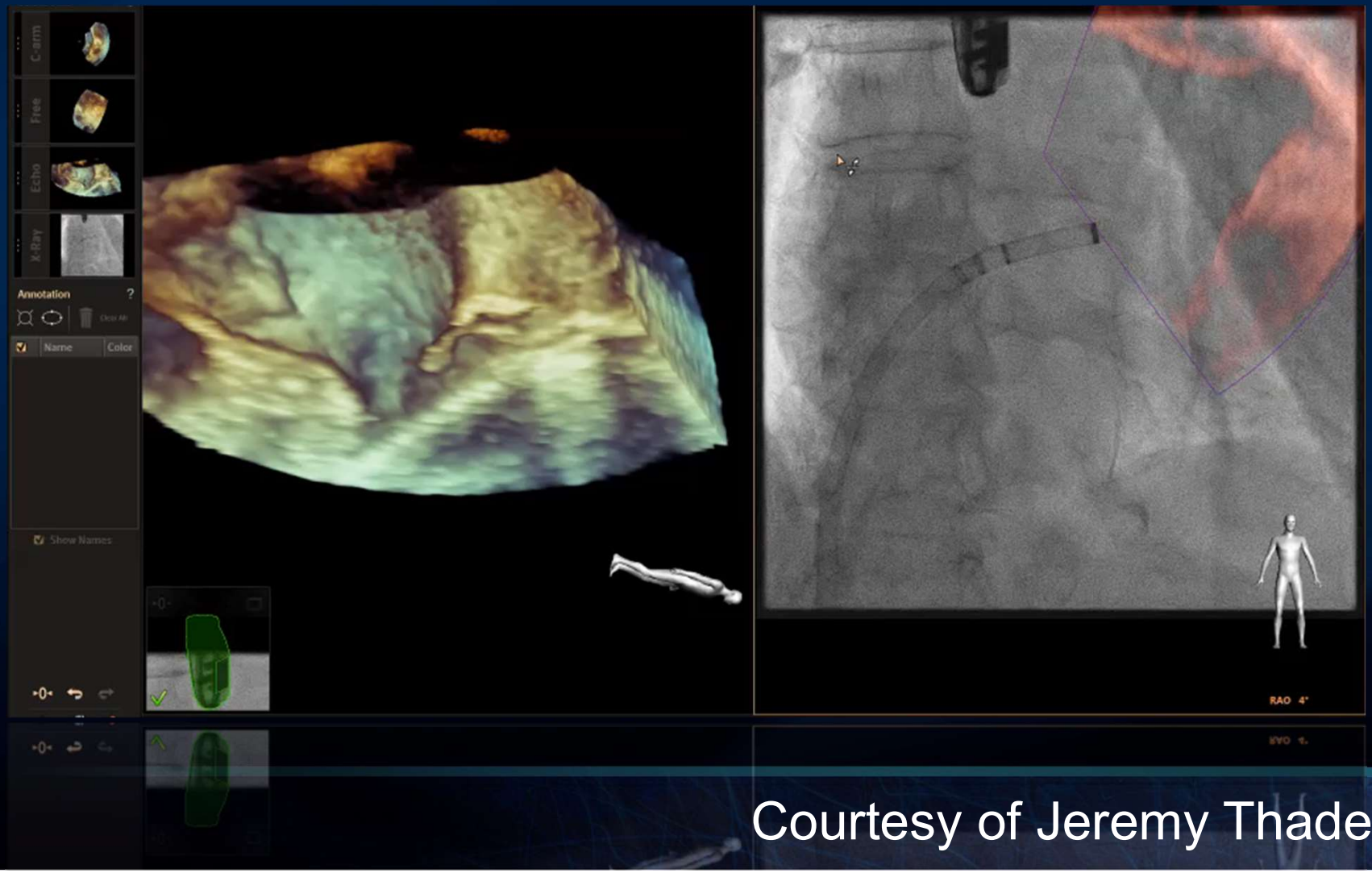
LAA closure



Courtesy of Jeremy Thaden

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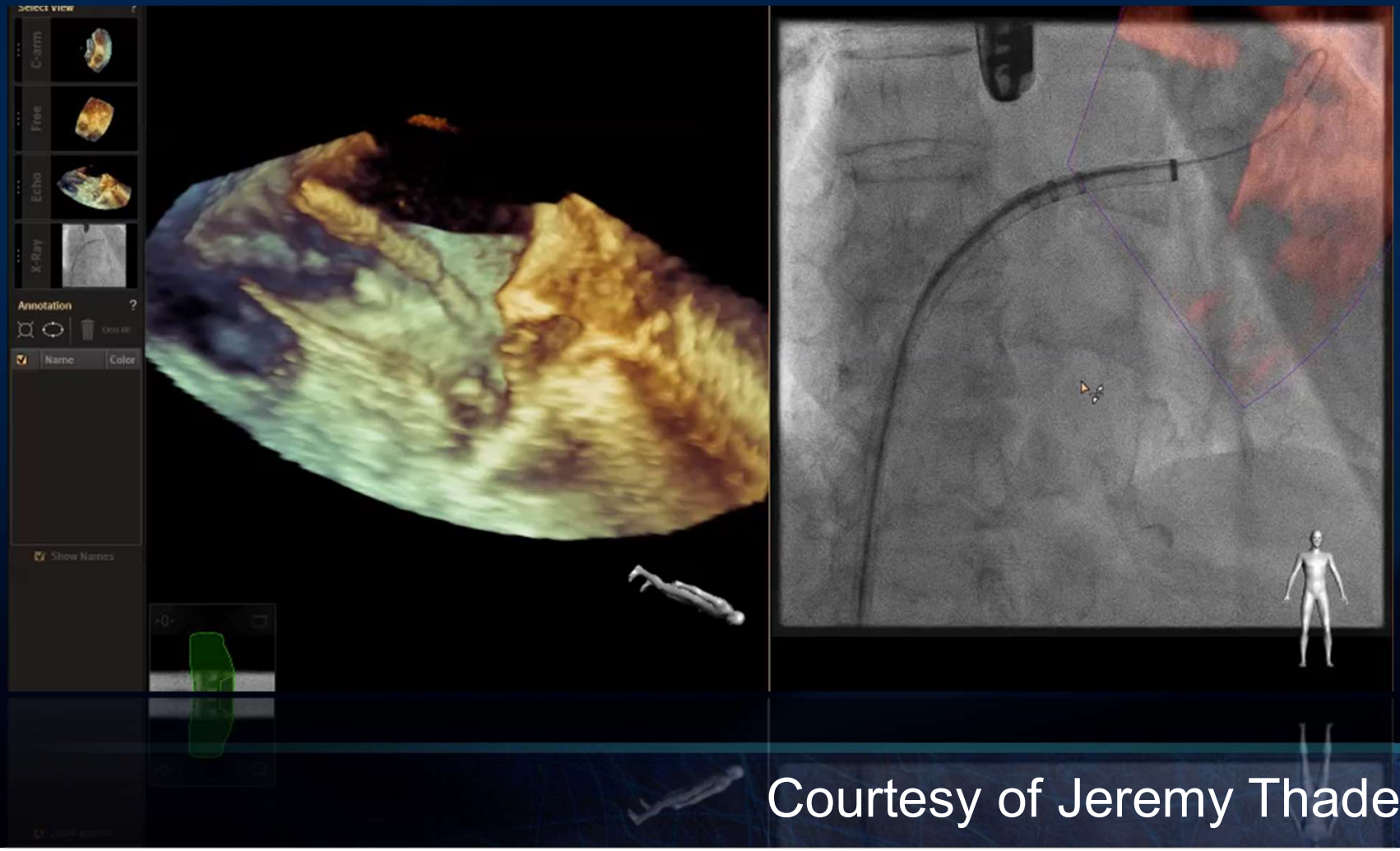
LAA closure



Courtesy of Jeremy Thaden

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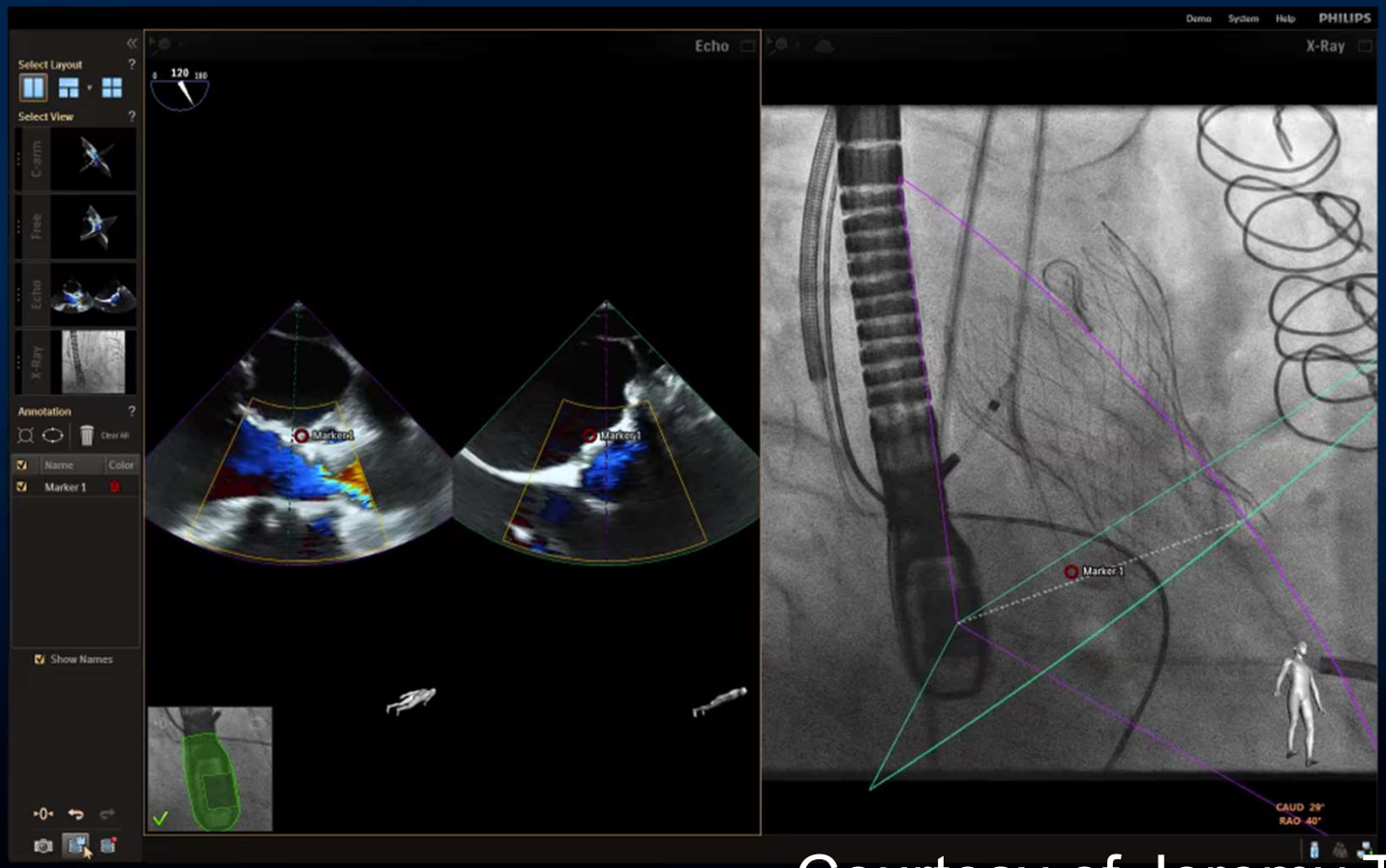
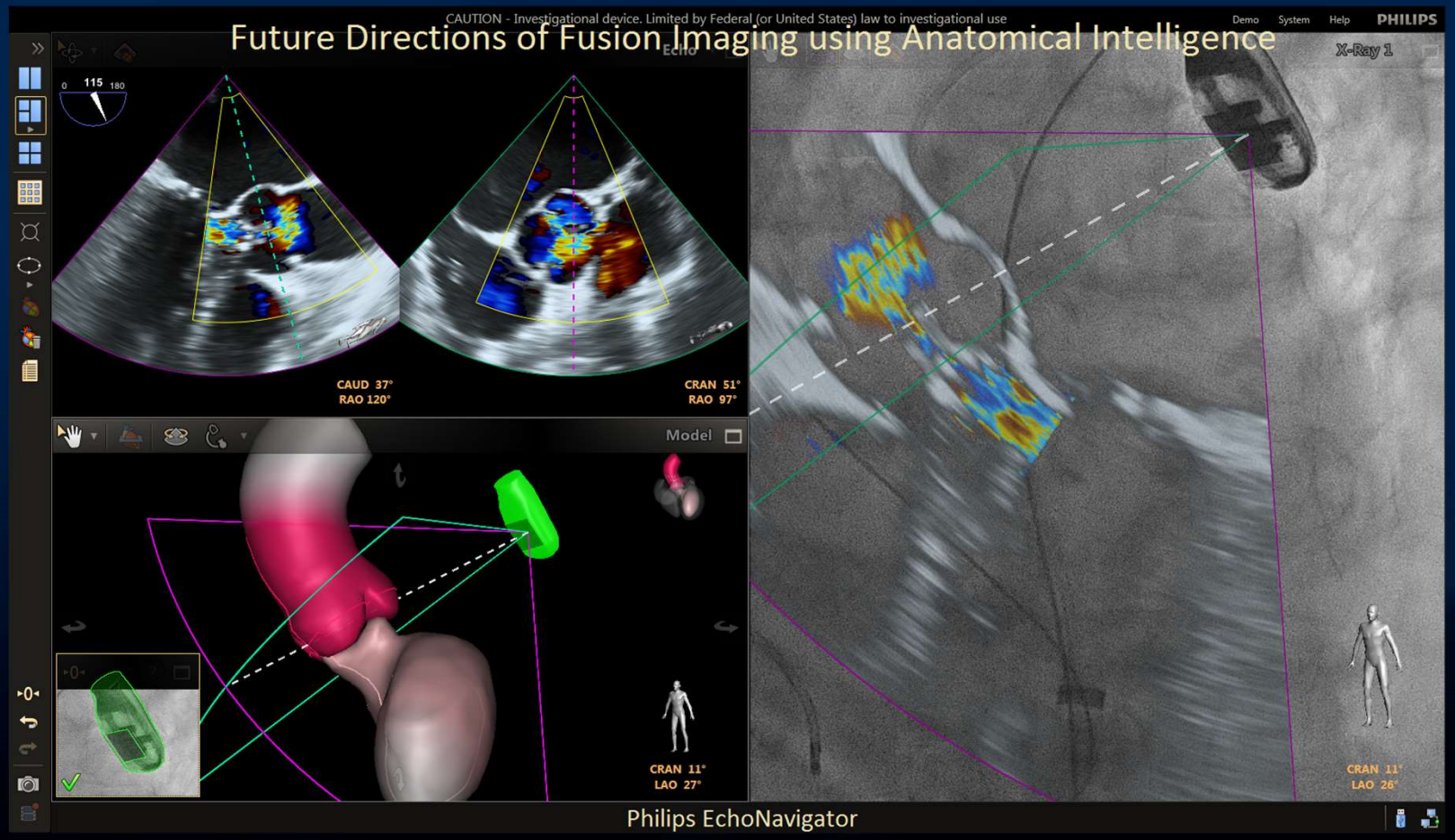
Paravalvular Regurgitation Closure



Courtesy of Jeremy Thaden

Echo-Fluoro-CT Fusion Imaging



(3D) Echo rules!

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Thank you!
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