



MitraClip Cases

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DISCLOSURE

Relevant Financial Relationship(s)

None

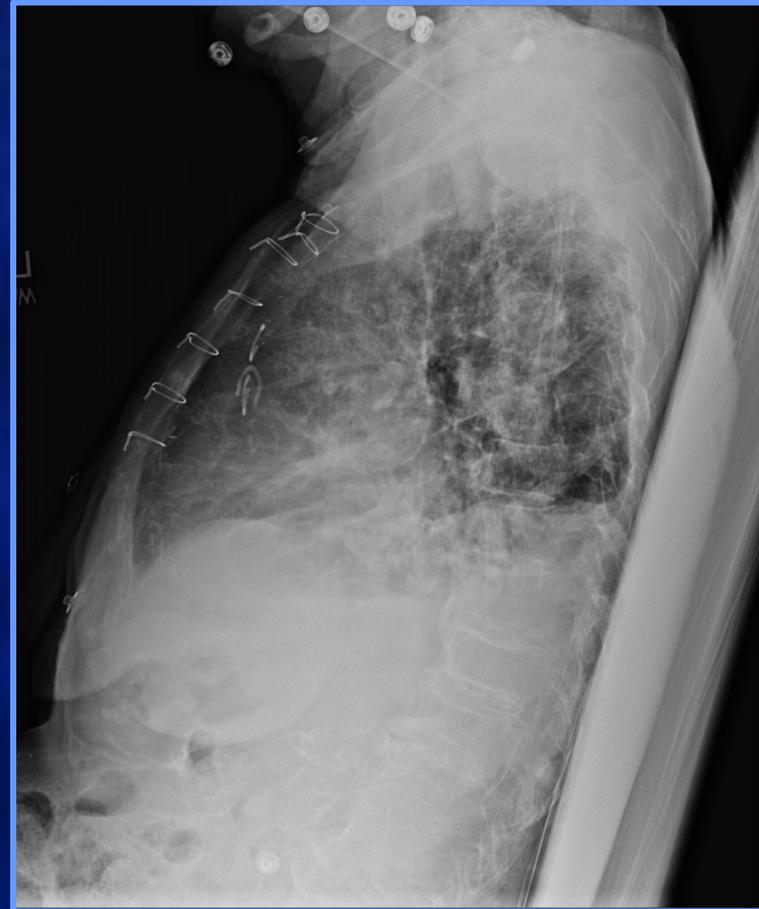
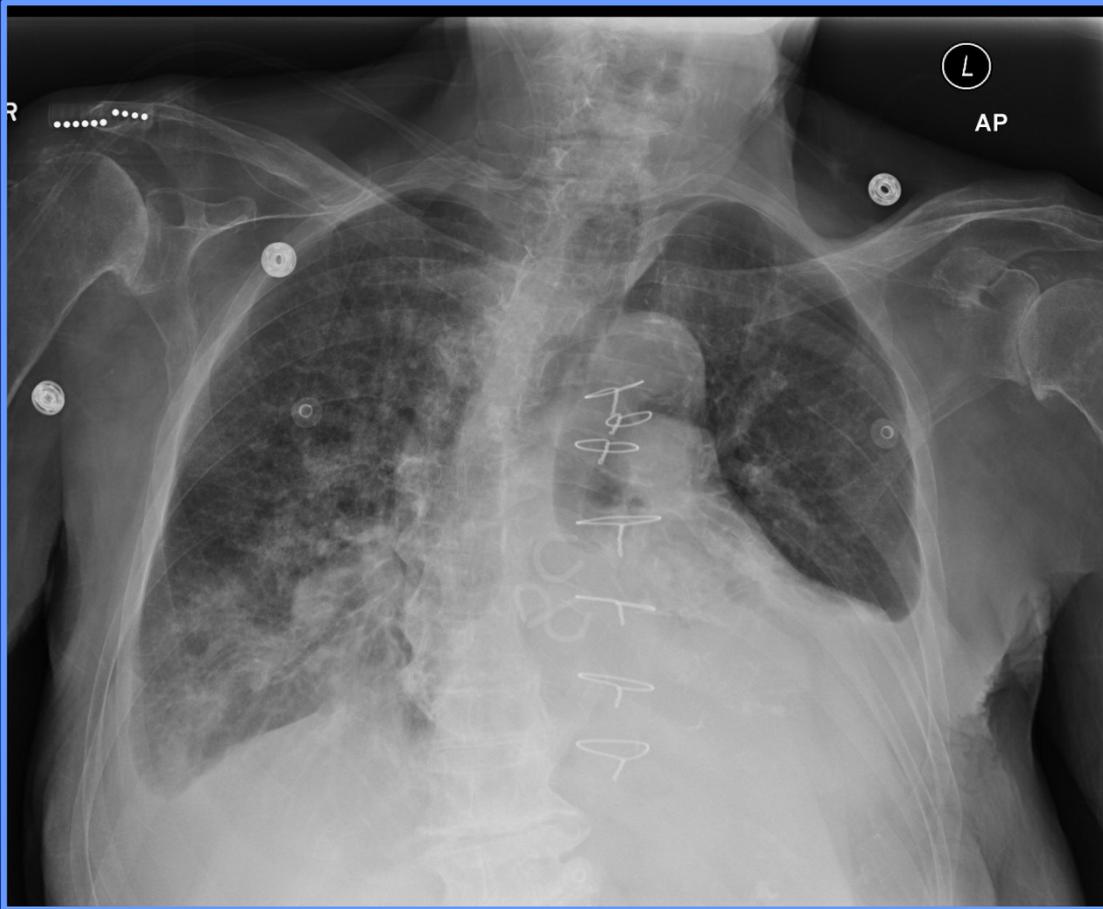
Off Label Usage

None

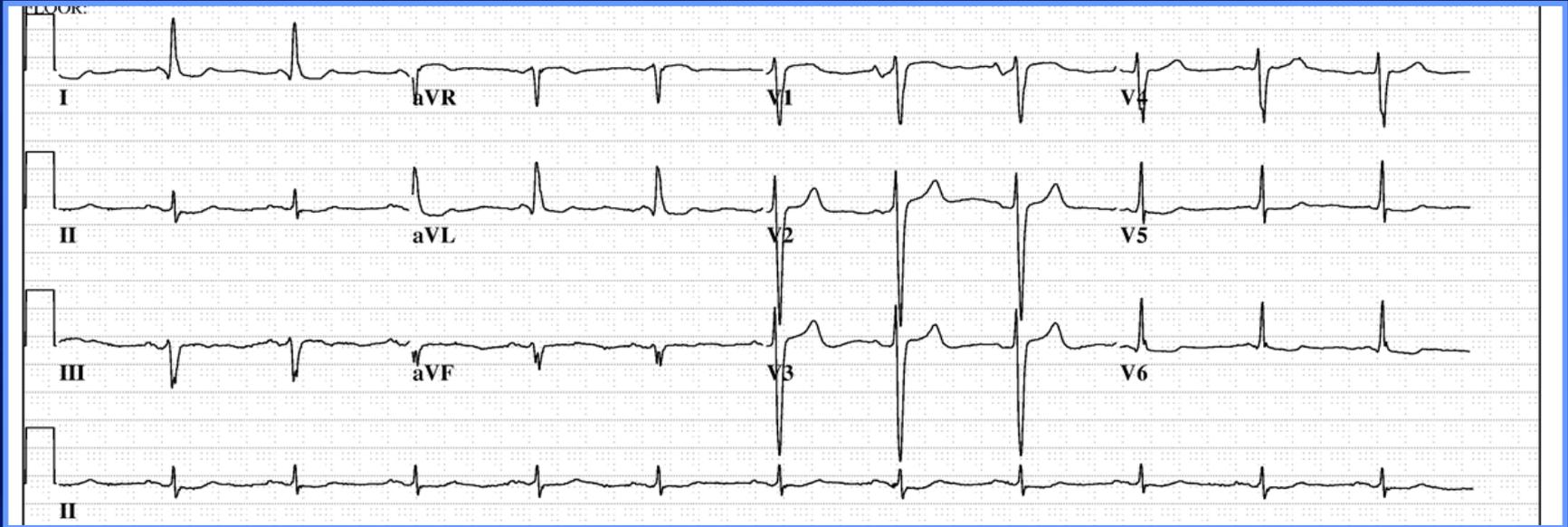
Case 1

- 86 year old female
- Acute onset dyspnea from pulmonary edema
- History of prior CABG
- CKD (creatinine 2.0 mg/dl)
- Paroxysmal atrial fibrillation
- Physical exam
 - 3/6 holosystolic murmur
- TTE
 - Flail MV with severe mitral regurgitation
 - LV EF 60%

CXR

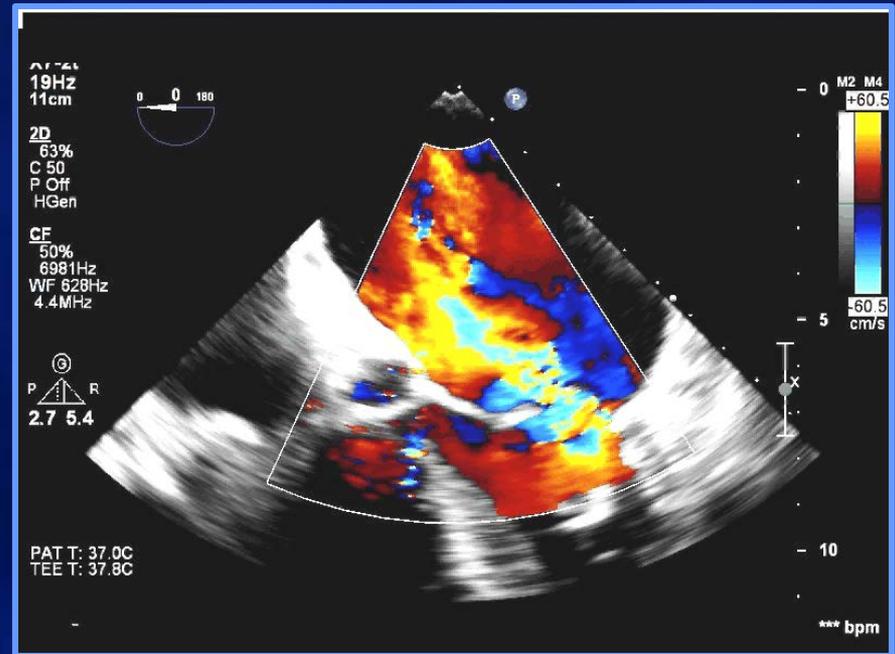
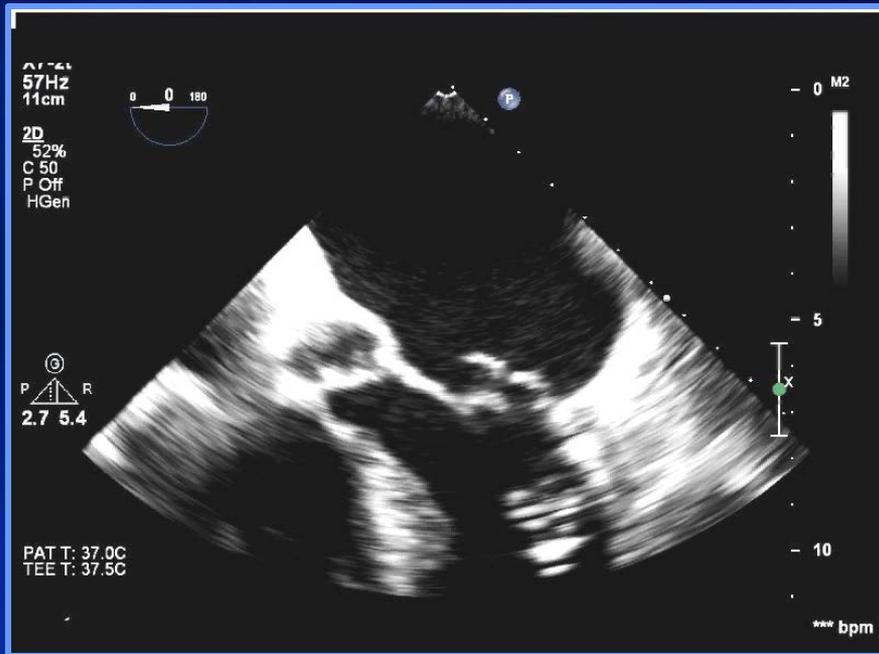


EKG



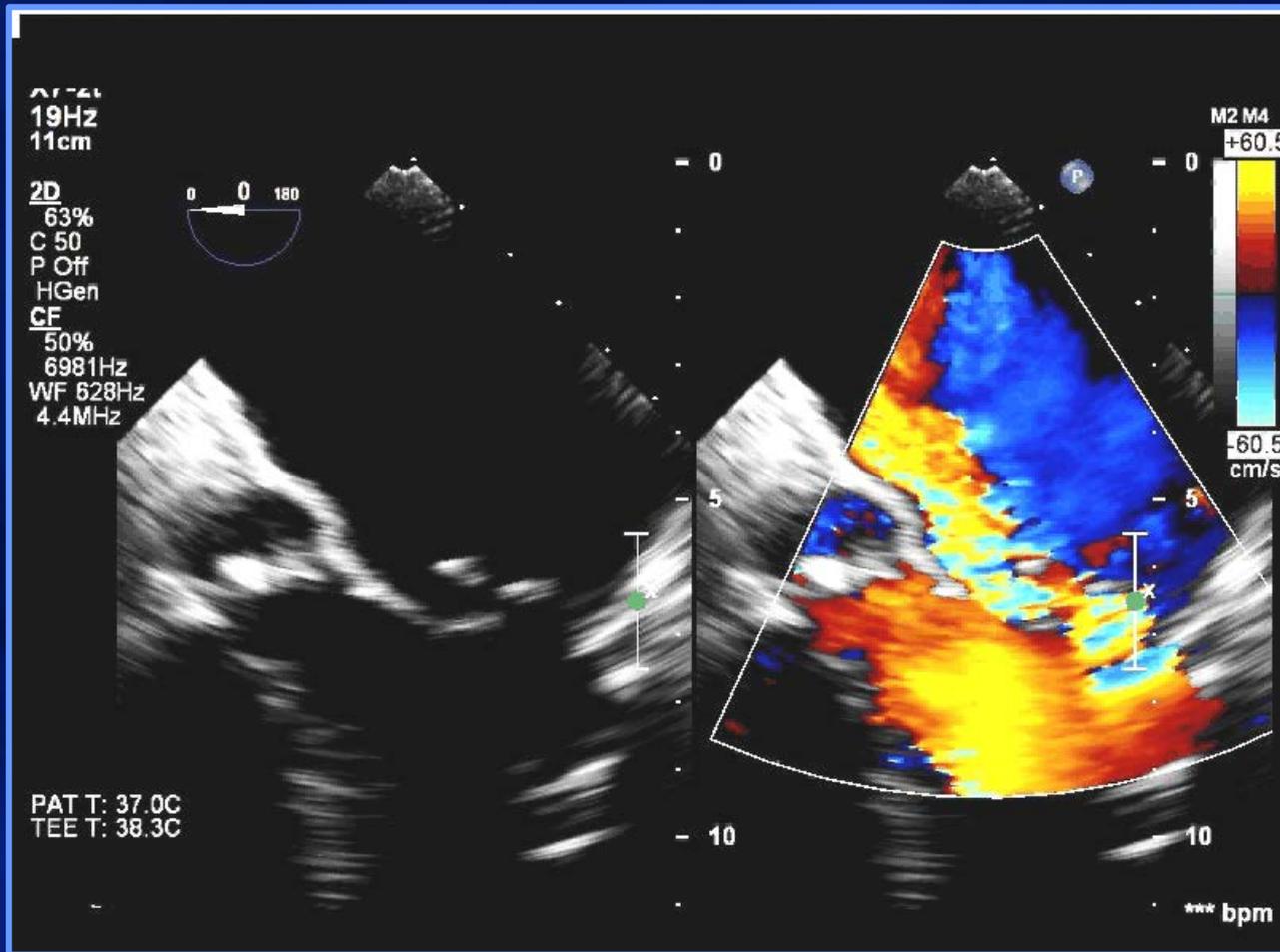
- Catheterization: Patent Grafts

TEE



TEE: Flail MV Posterior Leaflet

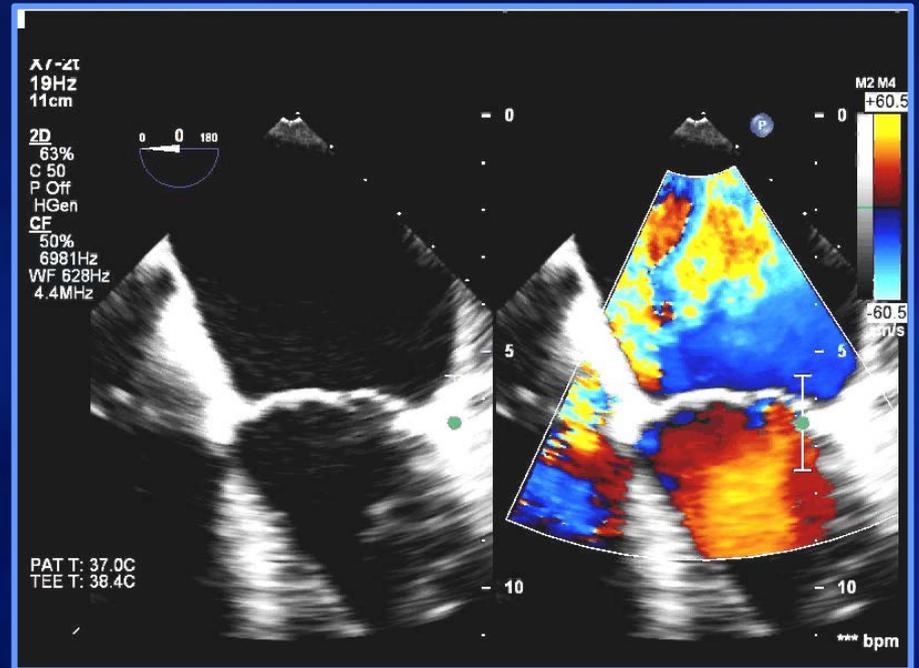
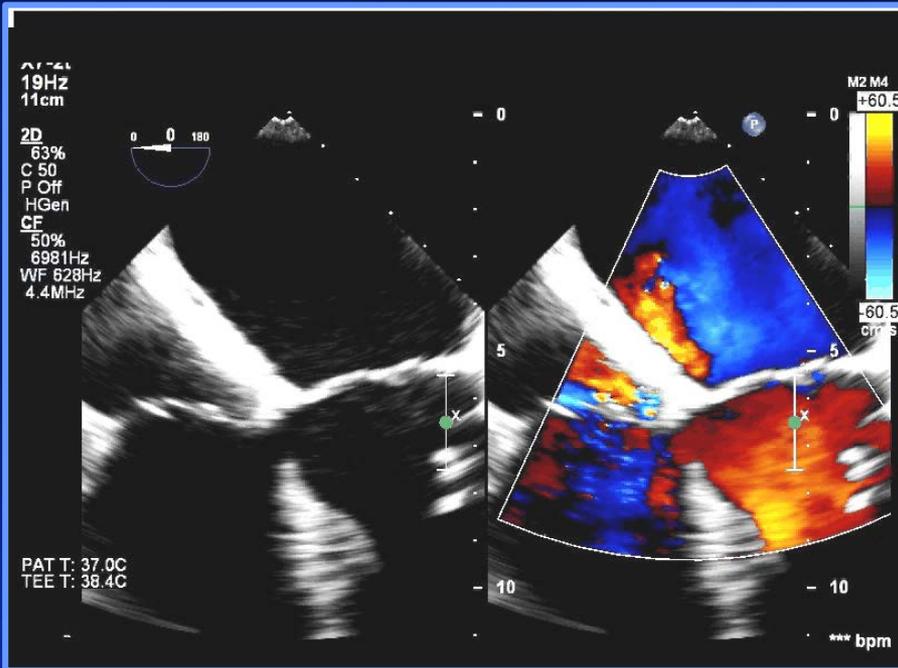
A1-P1/lateral portion of P2



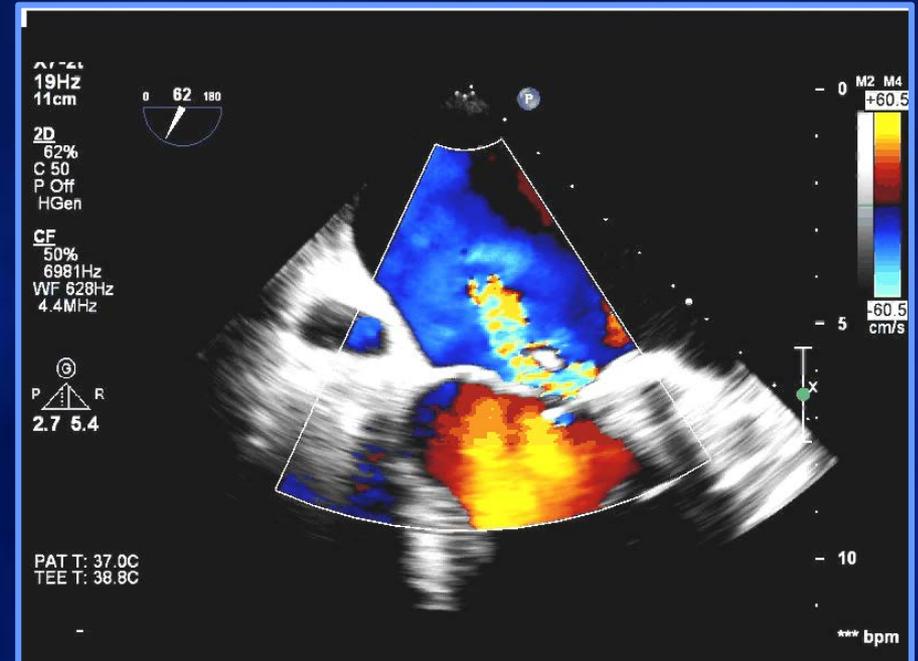
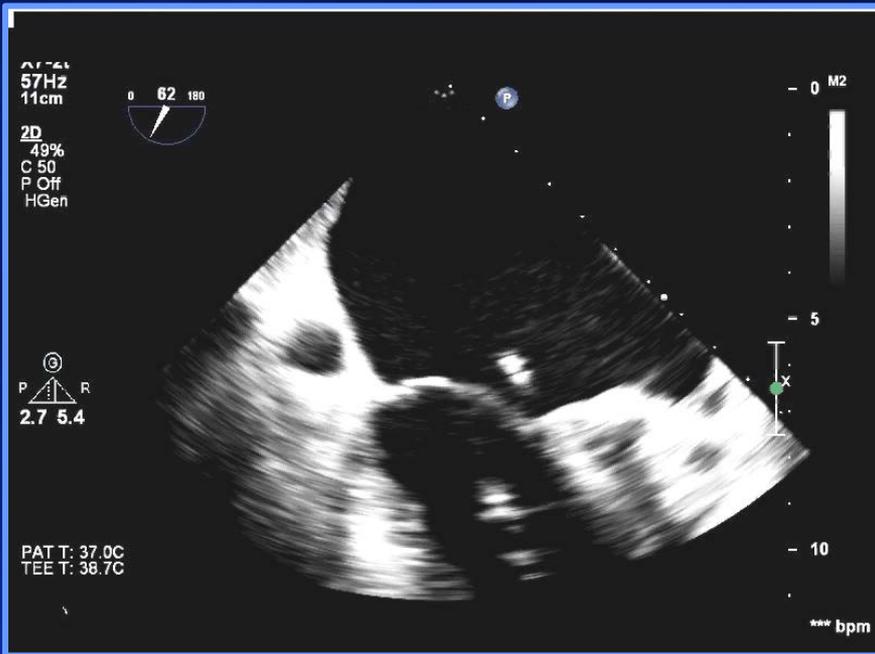
TEE

A2-medial portion P2

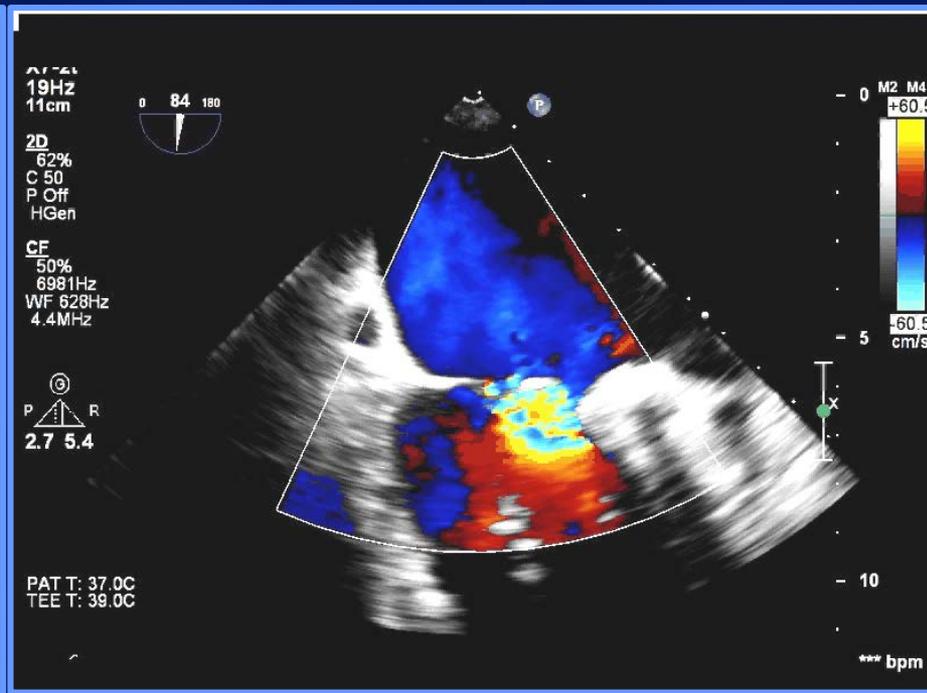
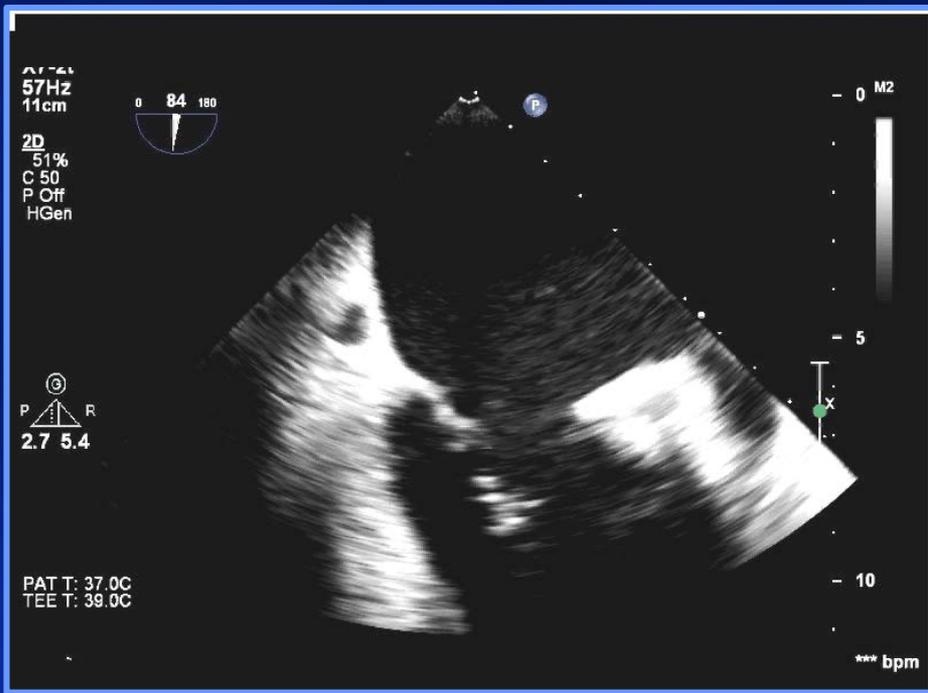
A3-P3



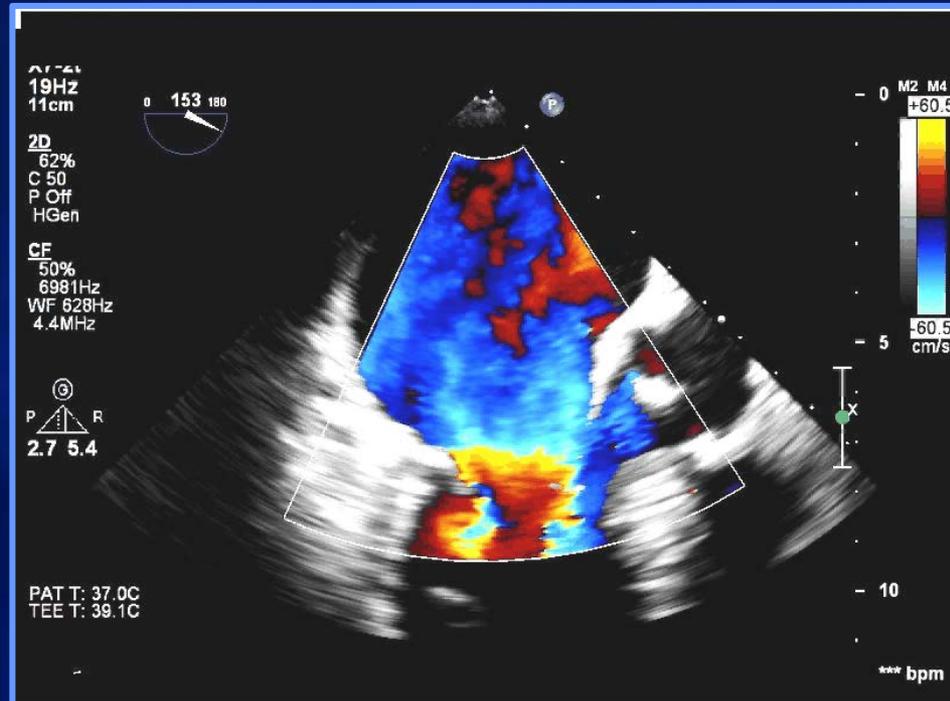
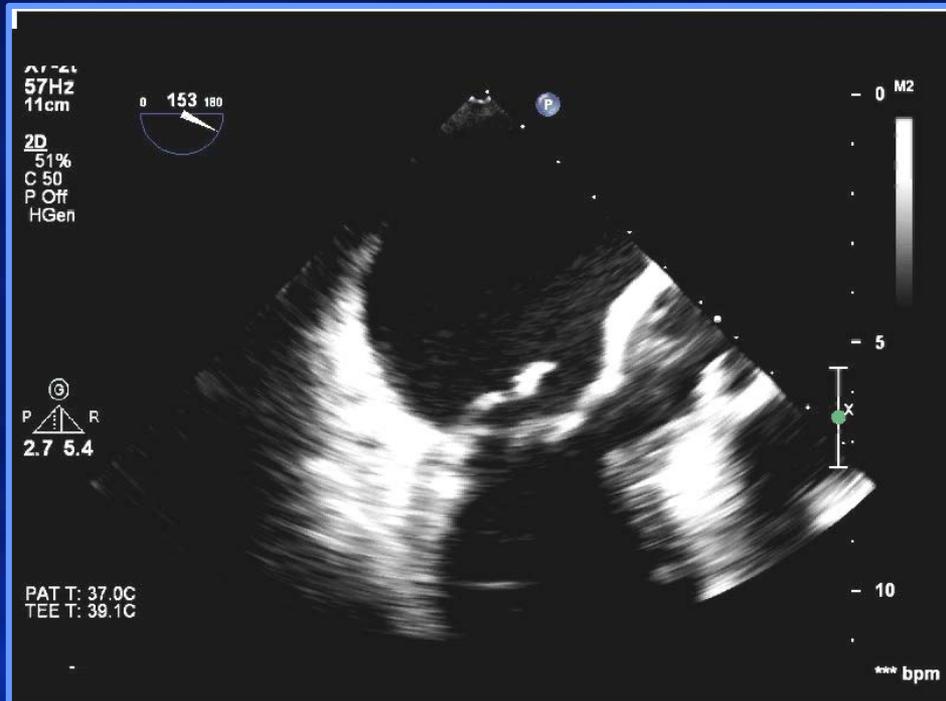
TEE: Commissural View



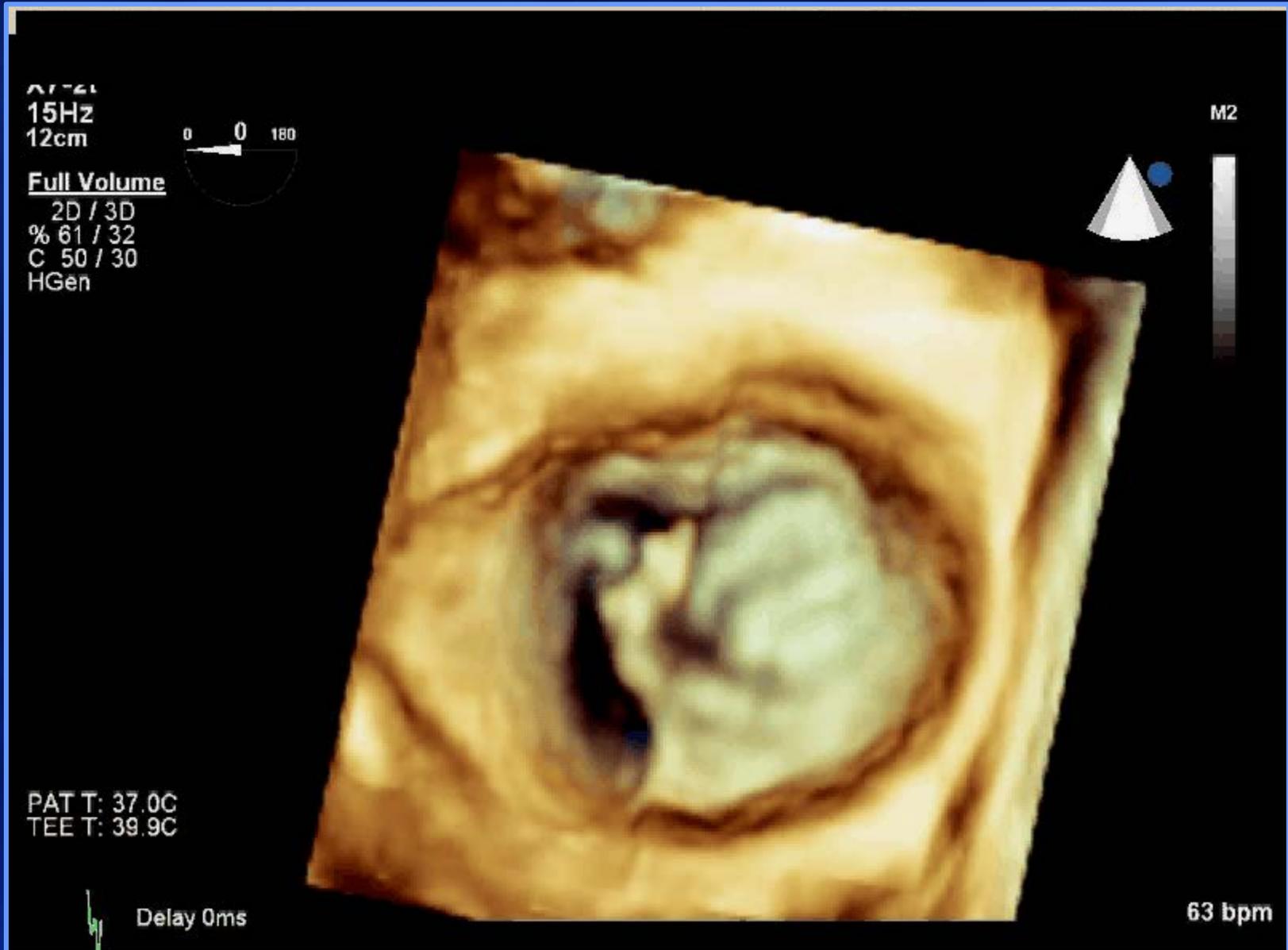
TEE



TEE

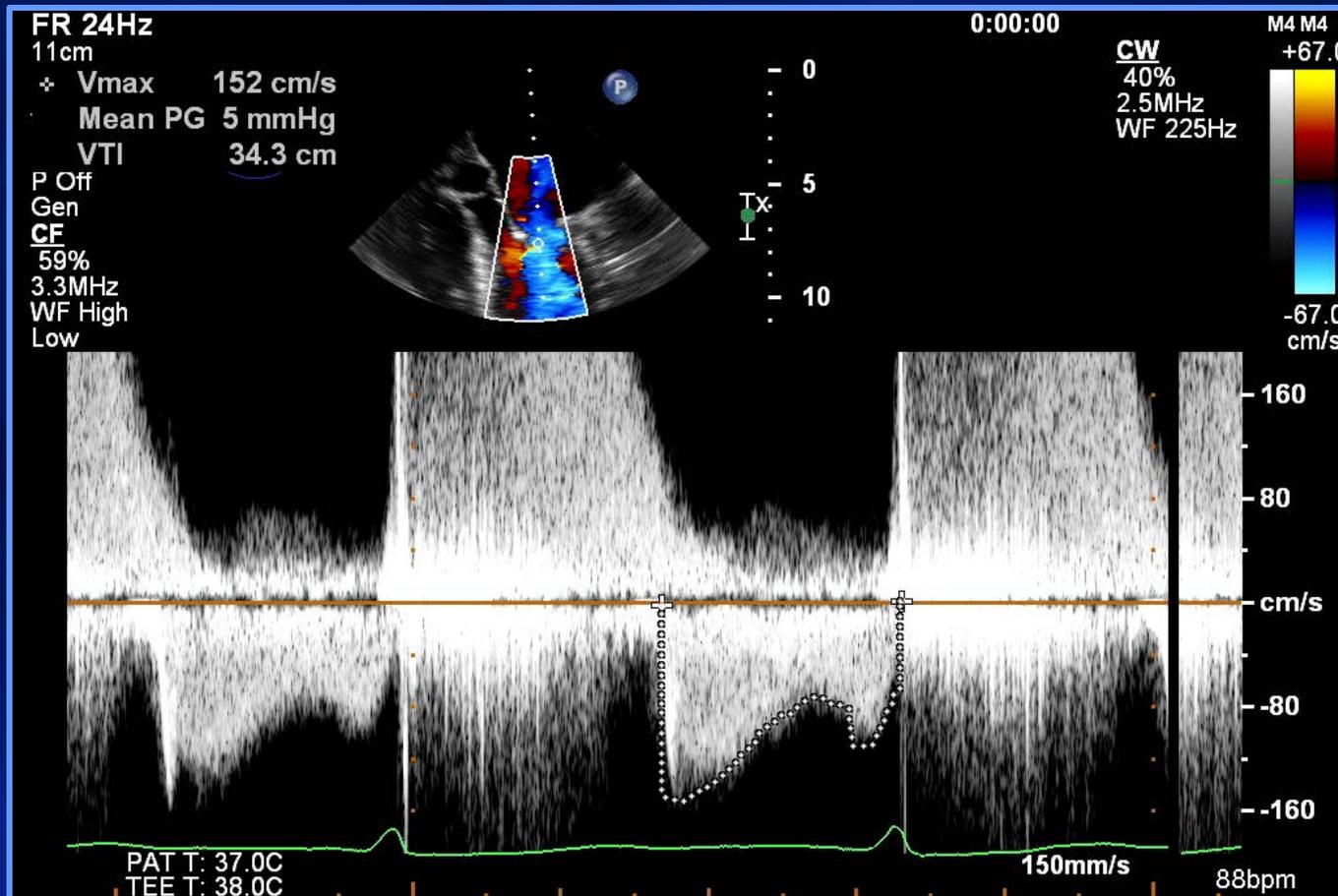


3D TEE: View from LA



Mitral Valve

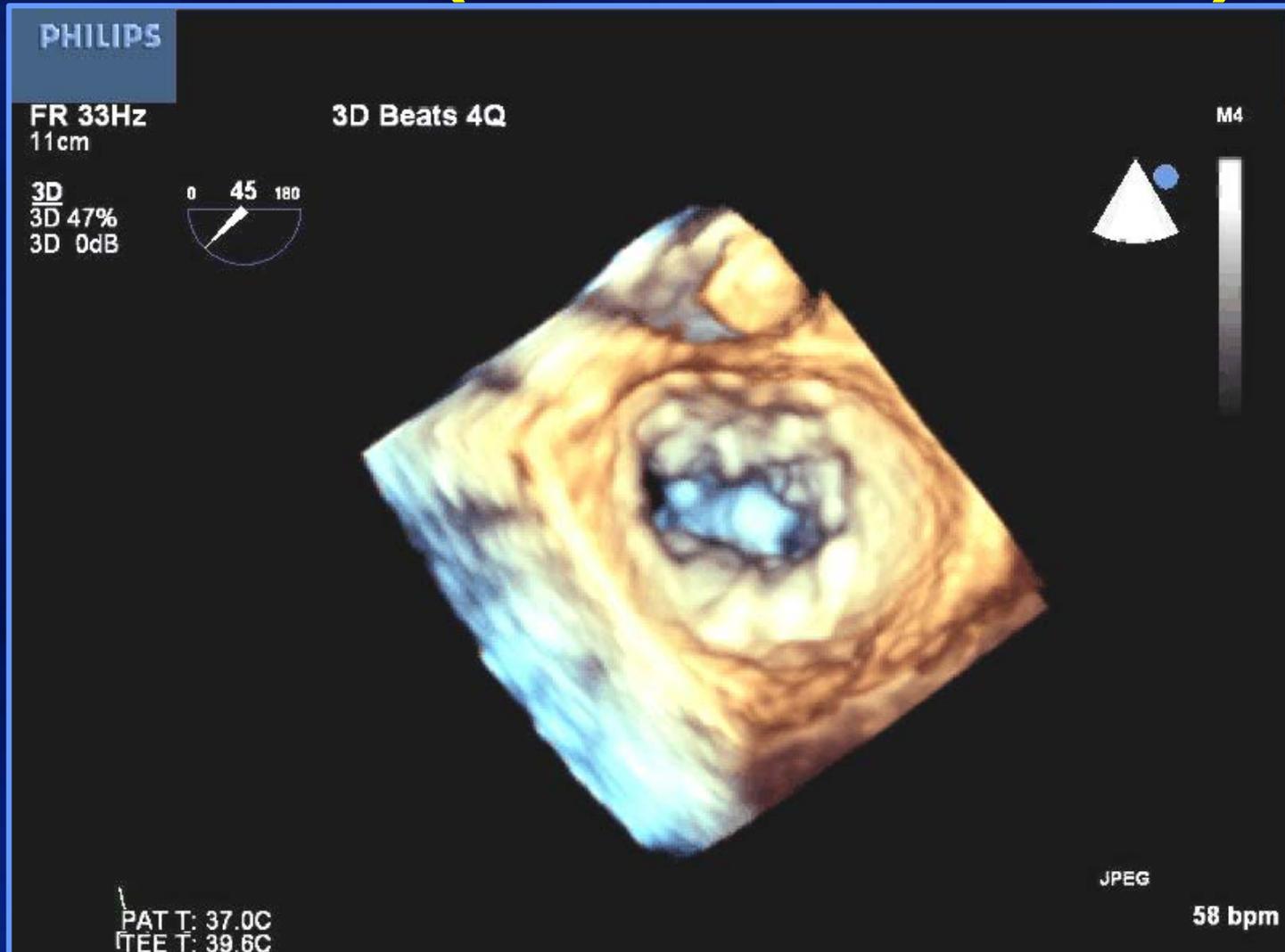
- Mean Gradient 5 mmHg at HR of 88 BPM
- Valve area $>4.0 \text{ cm}^2$



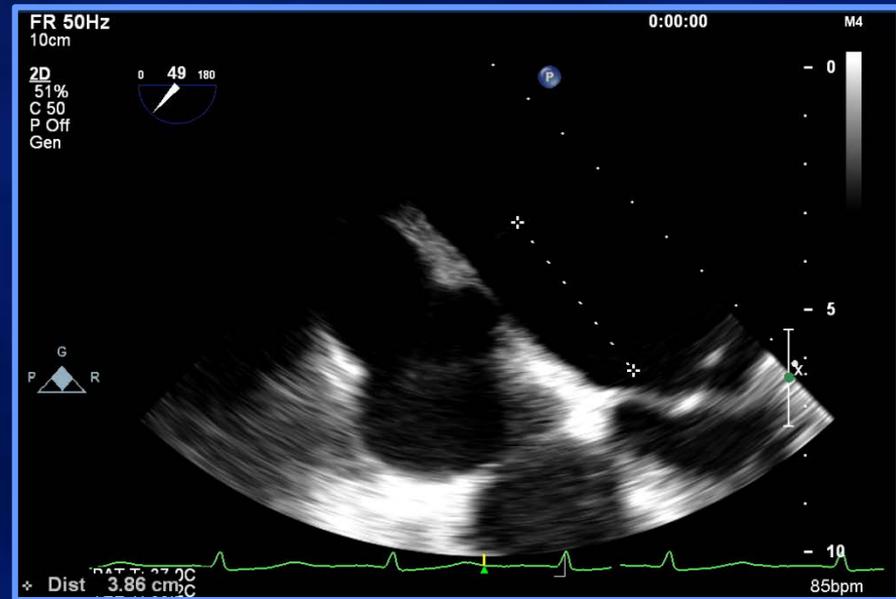
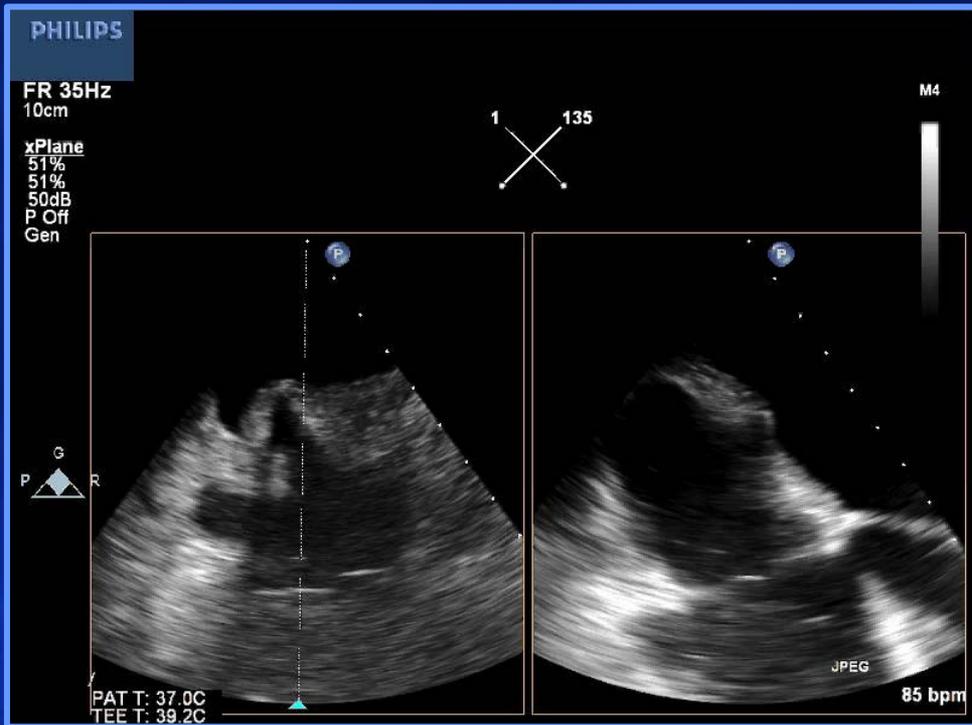
Heart Team Discussion

- CV Surgery, Valve/Imaging Specialist, and Structural Interventionalist
 - Decision made to proceed with MitraClip

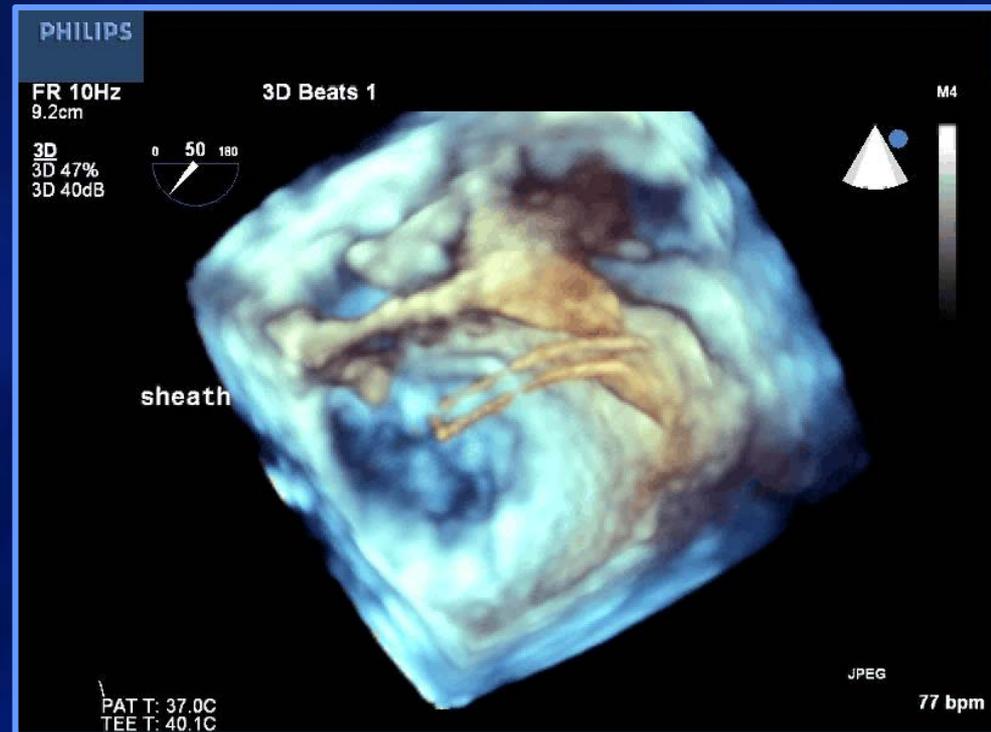
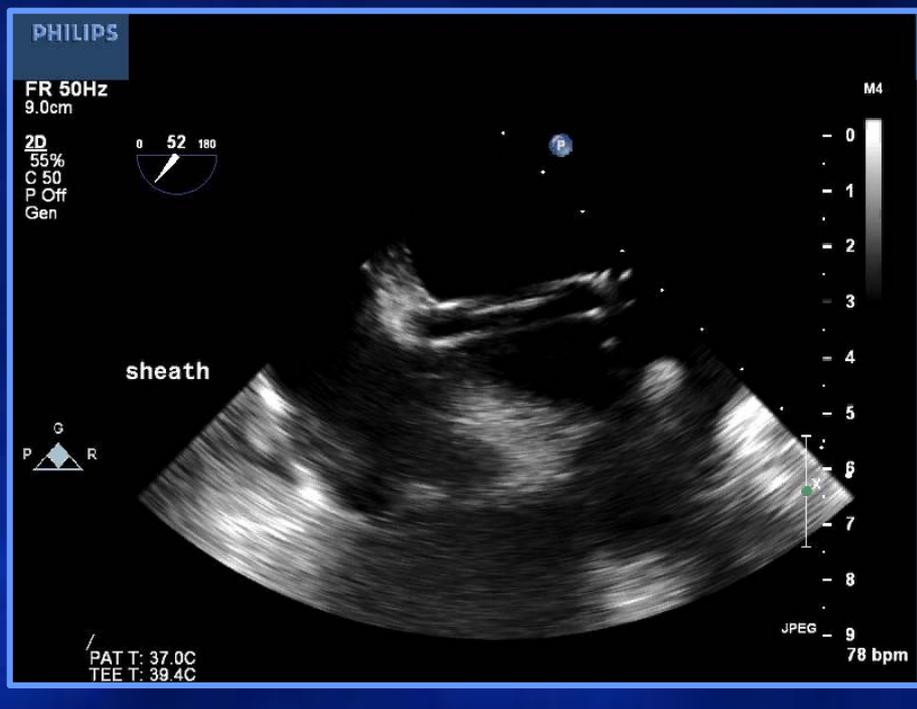
Procedural TEE: Flail P2 (Lateral Portion)



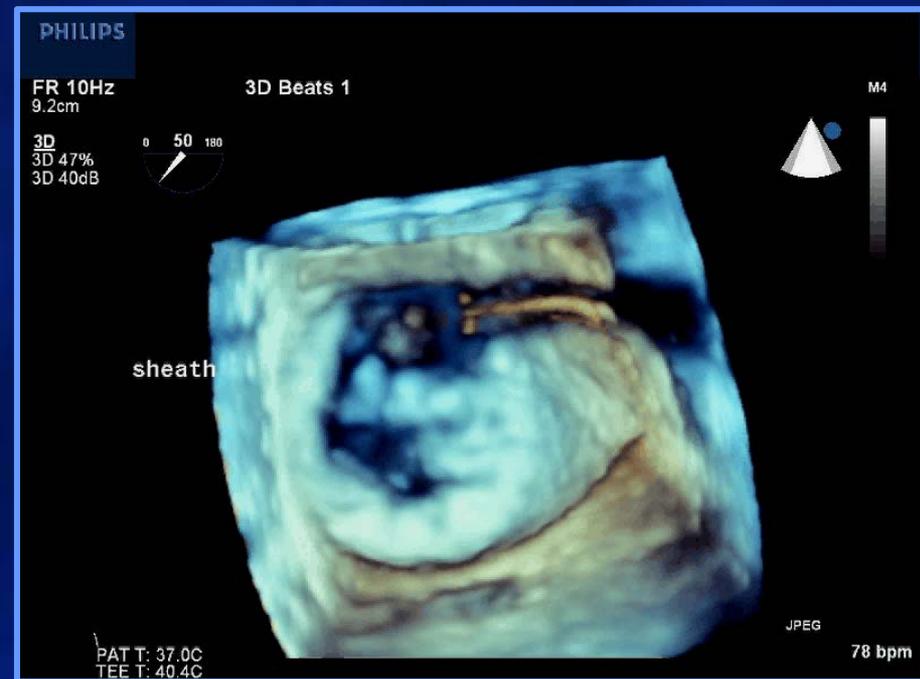
Transeptal Puncture



Sheath in Left Atrium



MitraClip Device in Left Atrium



MitraClip Device Toward MV



Heading Toward Valve

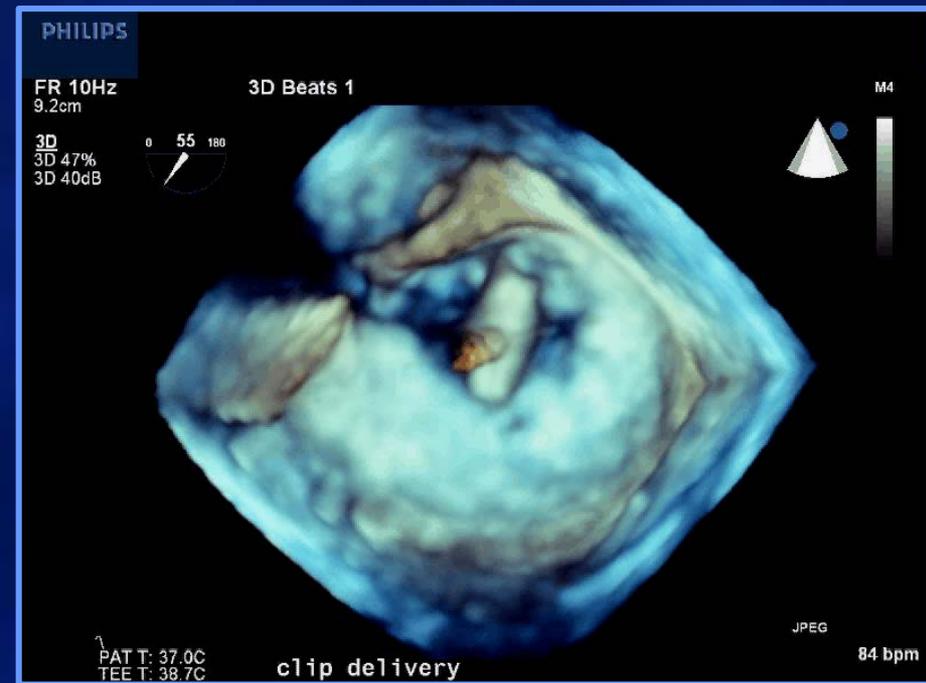


Importance of Clip Orientation

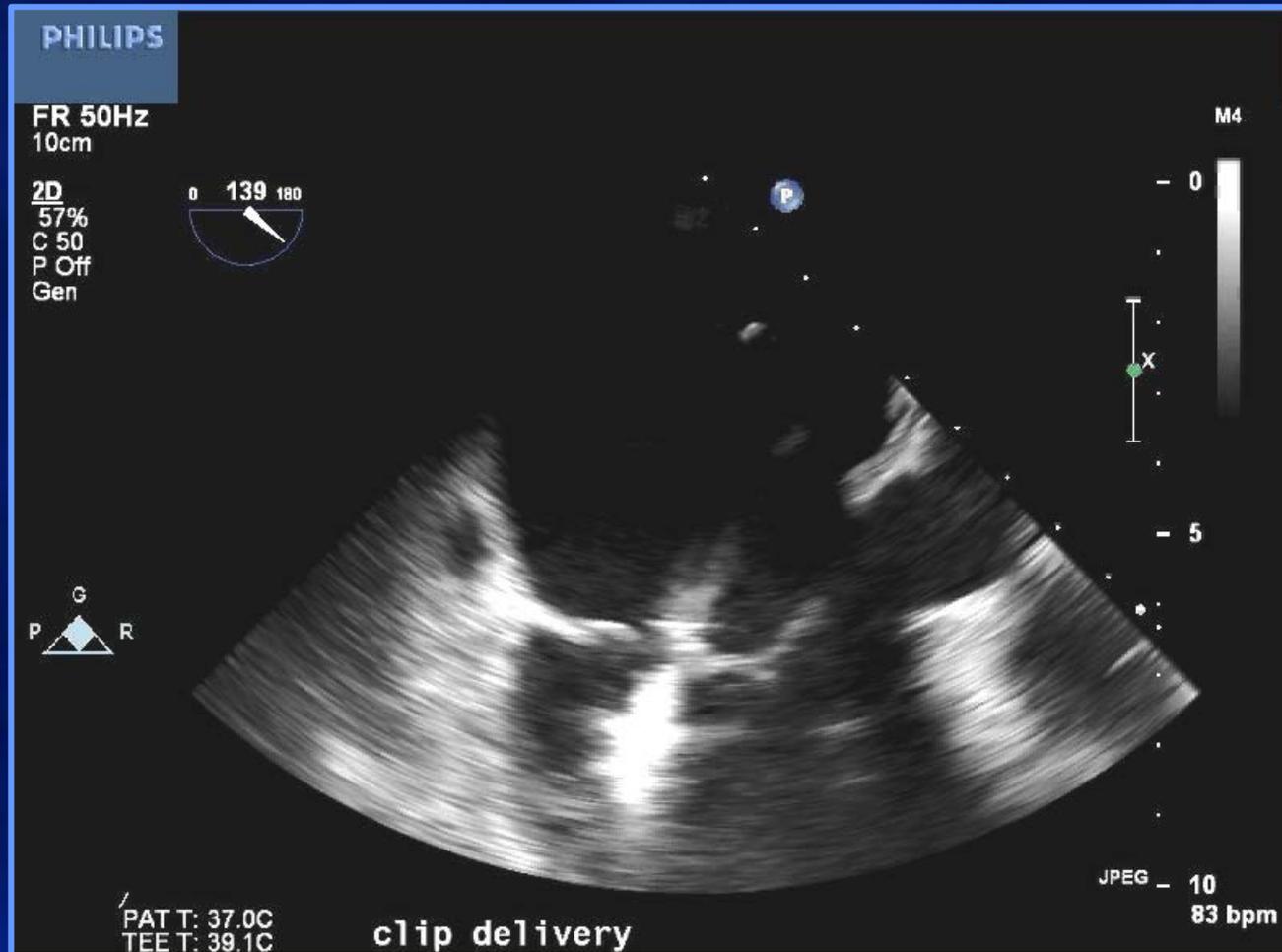
Wrong



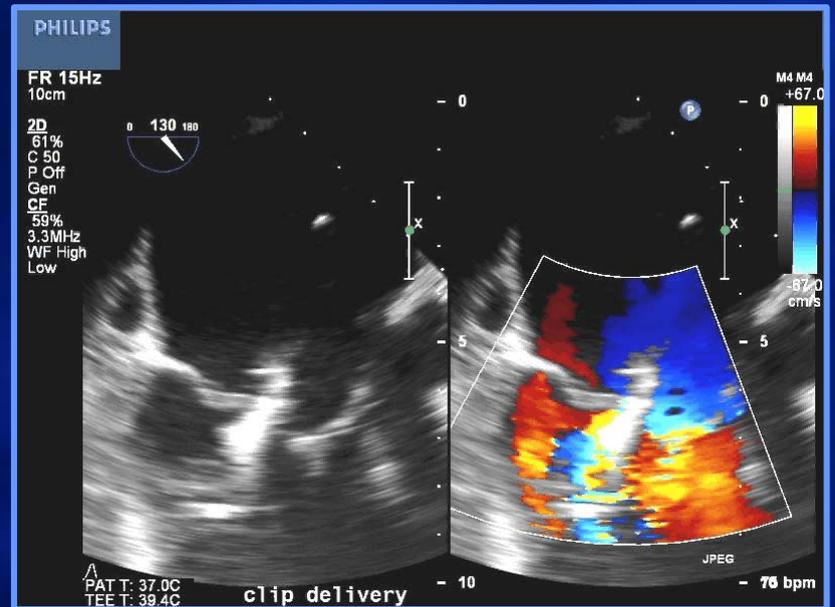
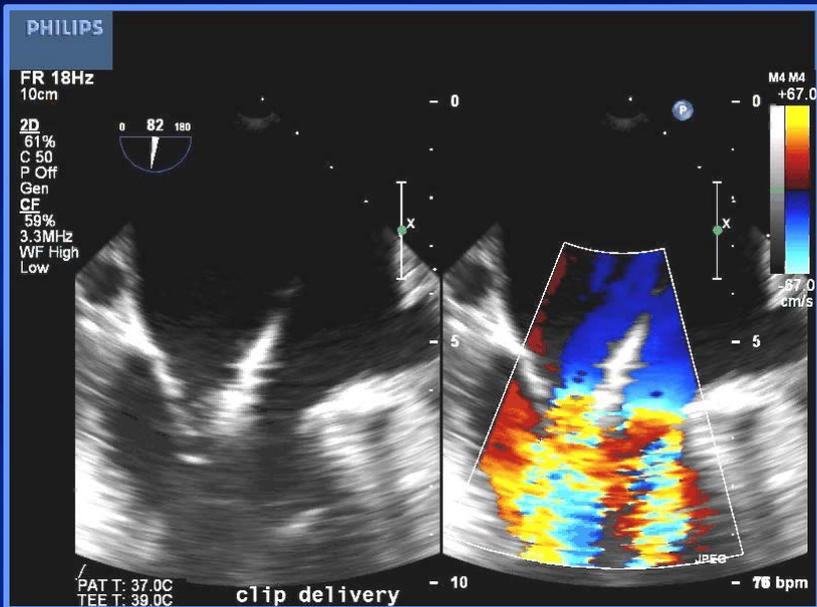
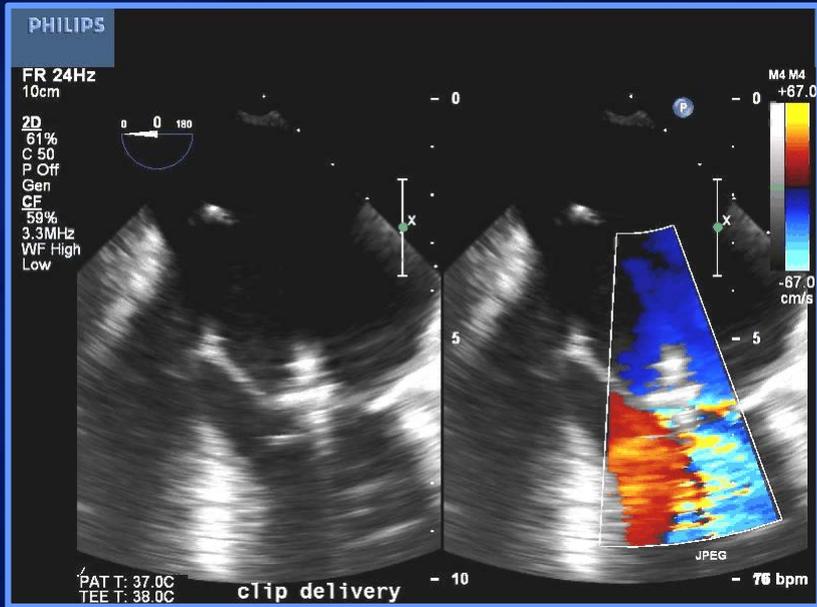
Correct



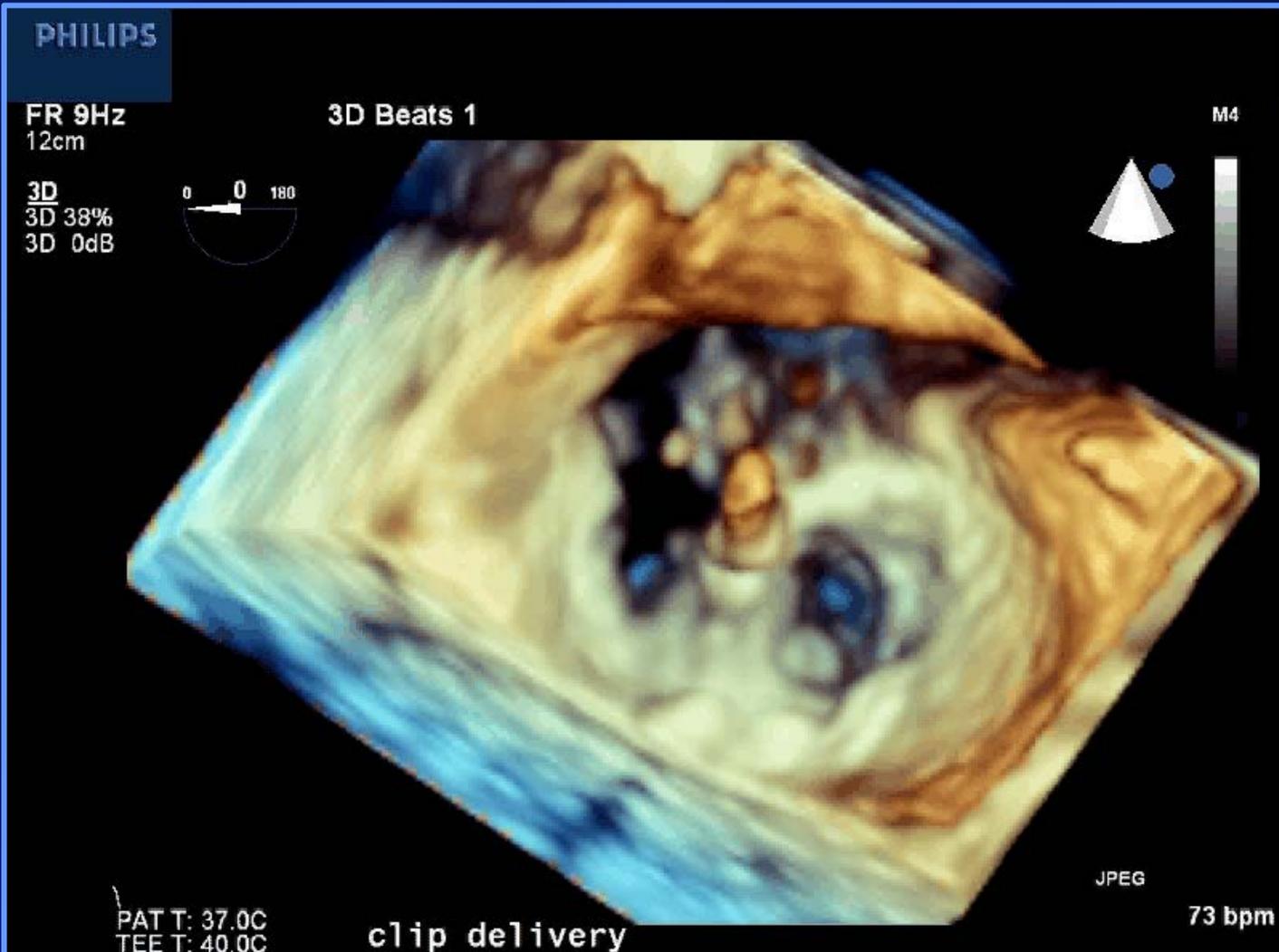
Grasping MV



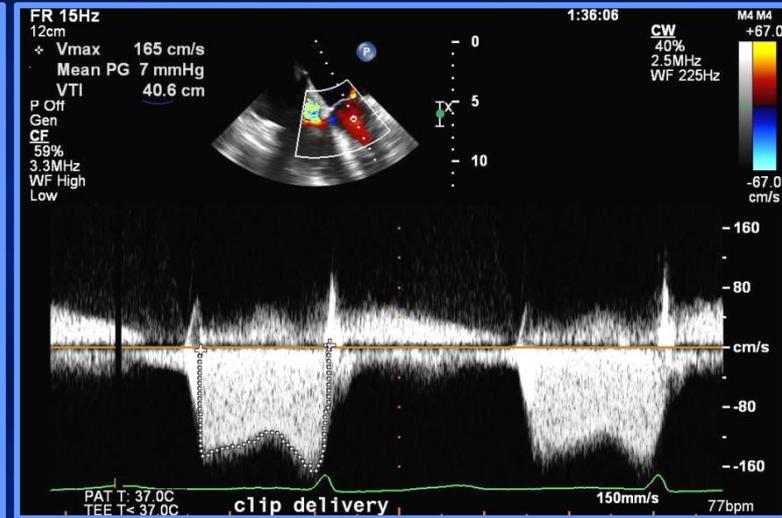
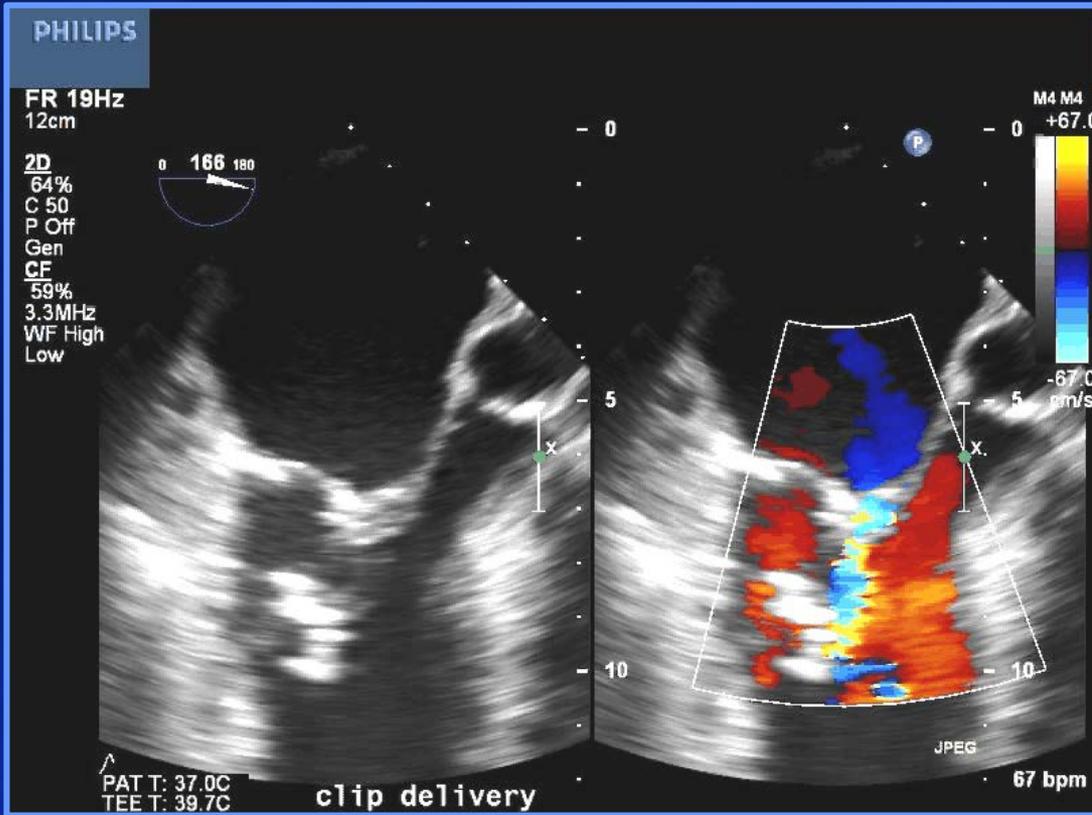
MV Grasped



MV Grasped

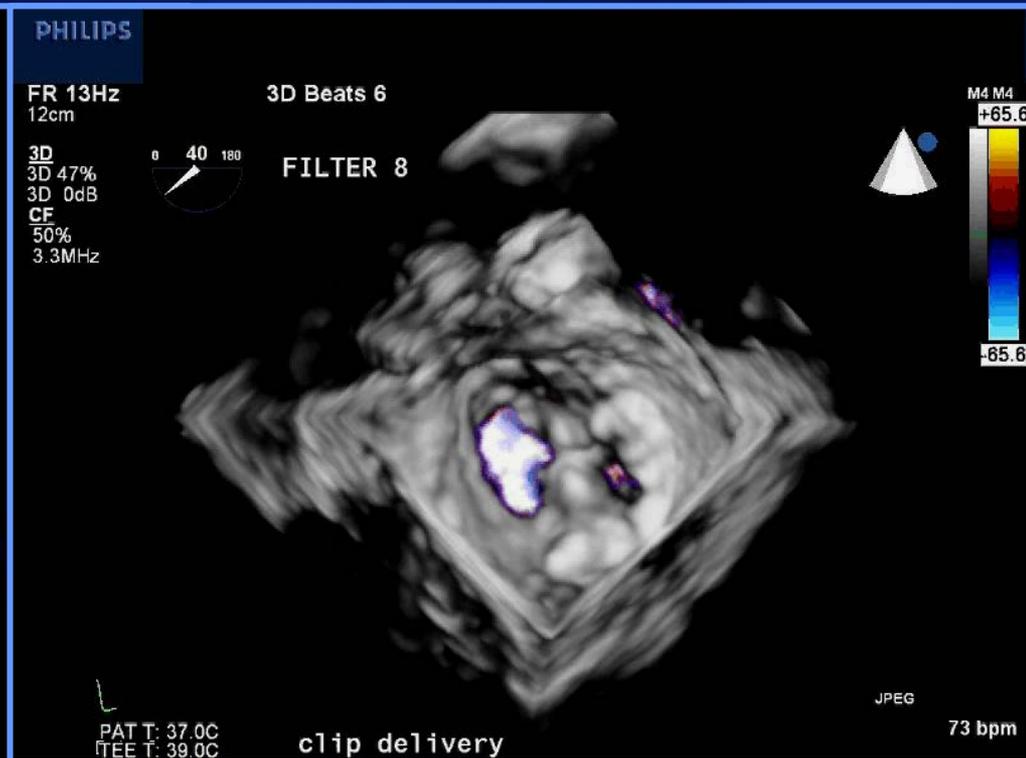
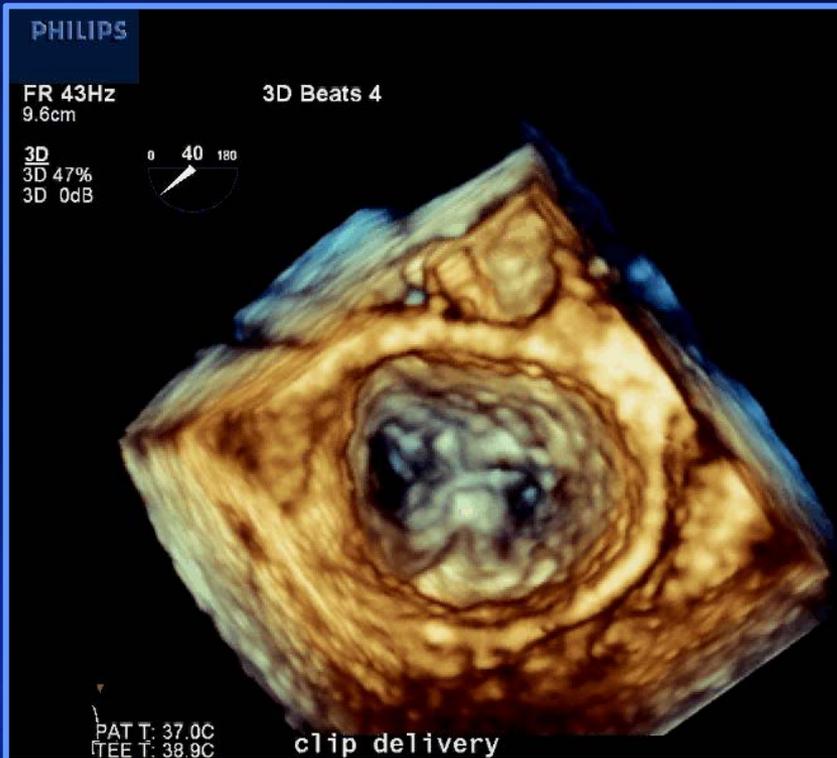


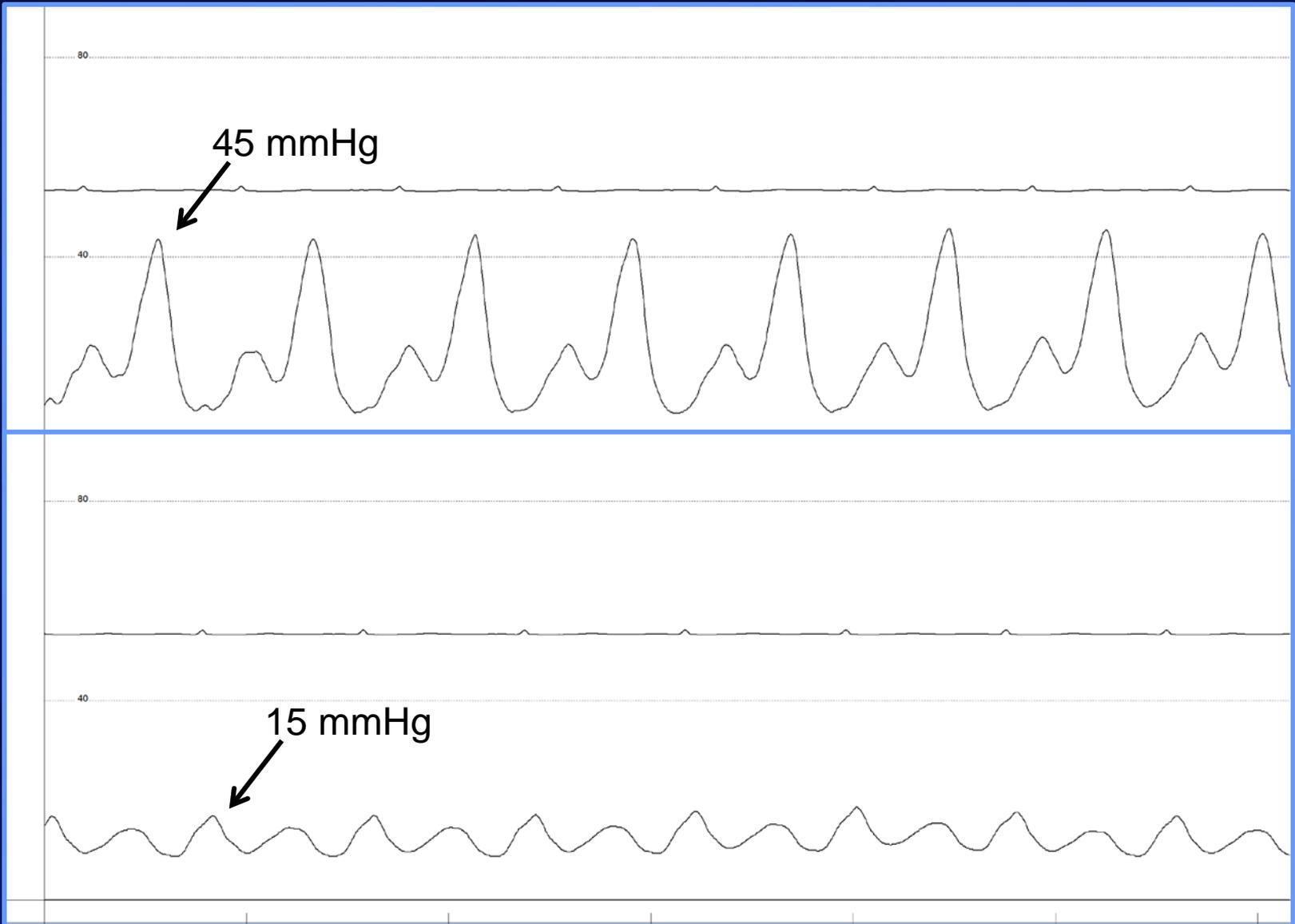
Final Result: Mild MR



Mean Gradient 5 at HR 77 BPM

Final 3D Images





Pre-clip

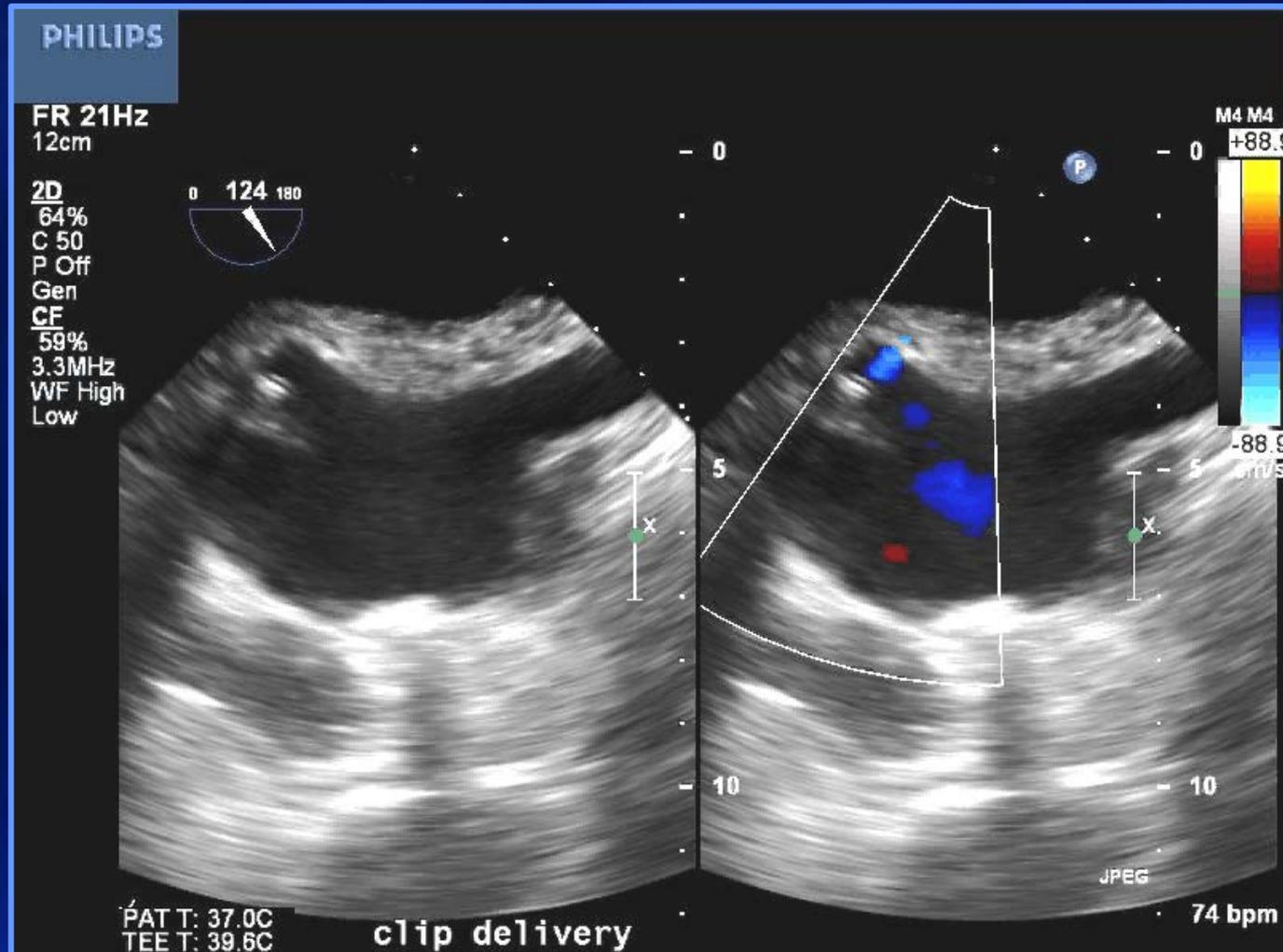
45 mmHg

Post-clip

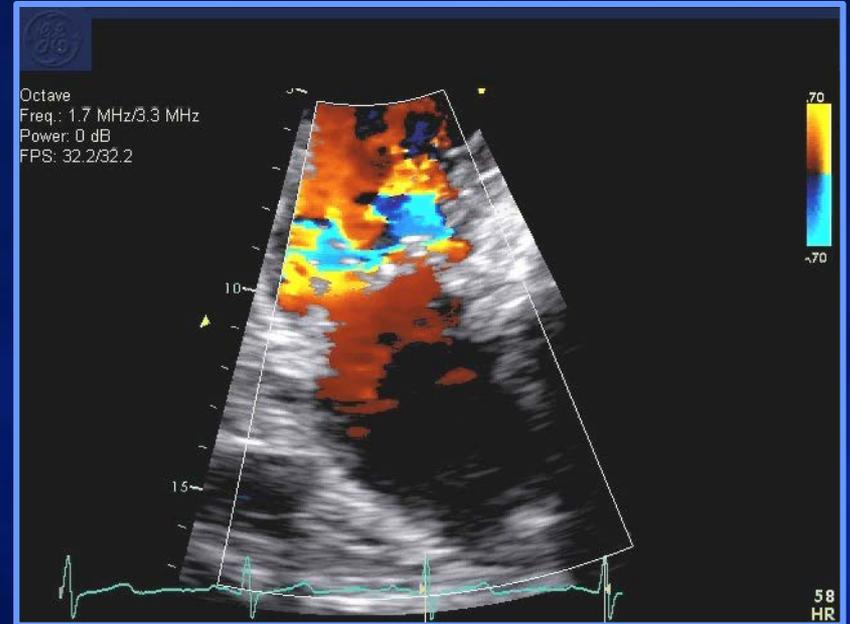
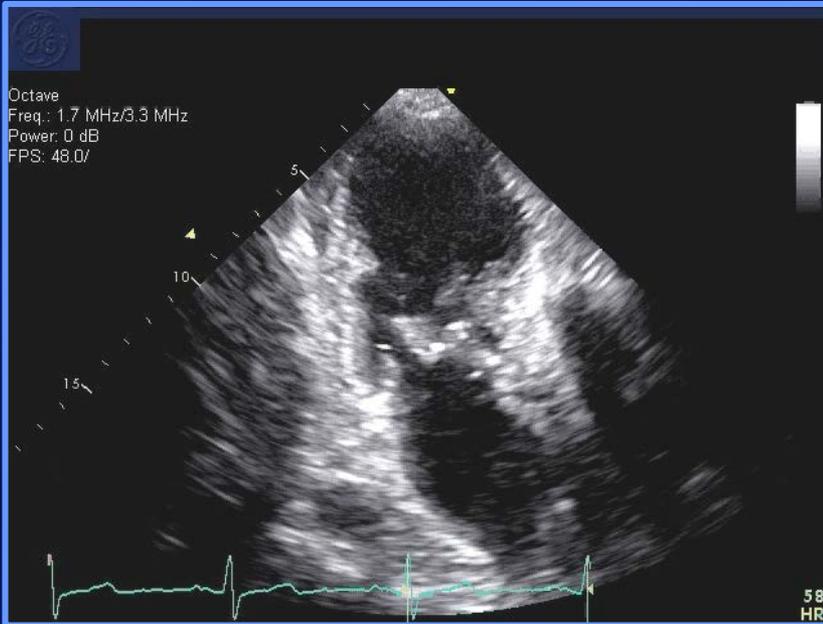
15 mmHg

Left Atrial "V" wave Tracings

Atrial Septum: Small ASD



Pre-discharge TTE: Mild MR



→ Mean Gradient 3 at HR 59 BPM

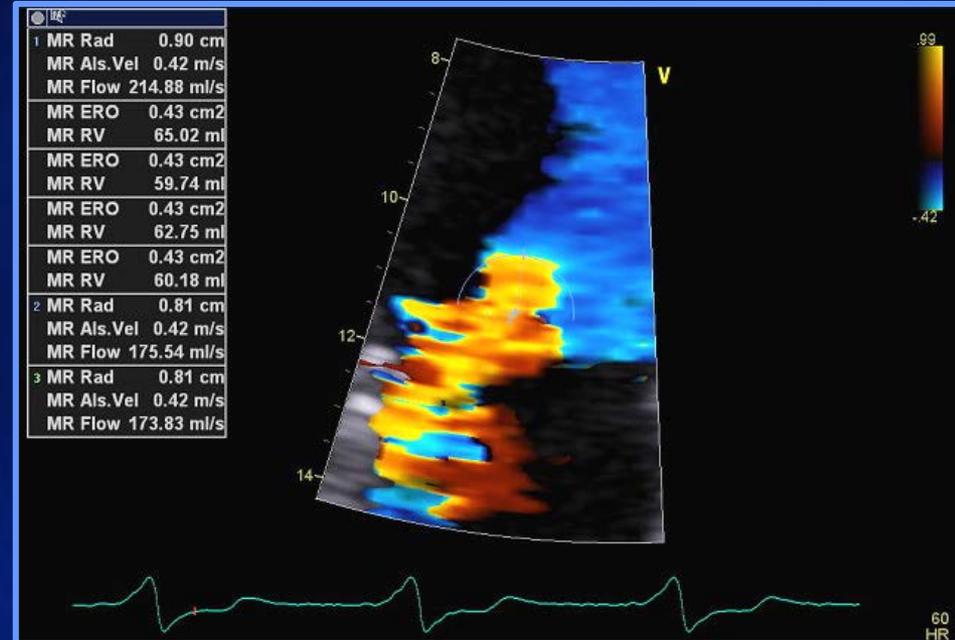
Outcome

- Patient discharged home 4 days post-procedure
- Dyspnea markedly improved
- Continues to do well 18 months post-procedure

Case #2

- 81 year old male with PMH of 3 vessel CABG 20 years prior
 - Inferior MI 2 years ago → PCI to RCA SVG
 - Recent Patent SVG to OM1, patent LIMA to LAD, and patent RCA
- LV EF 51 %
 - inferior regional wall motion abnormality
- Severe “functional” mitral regurgitation
- Progressive dyspnea over last 1 year
 - NYHA class III

TTE

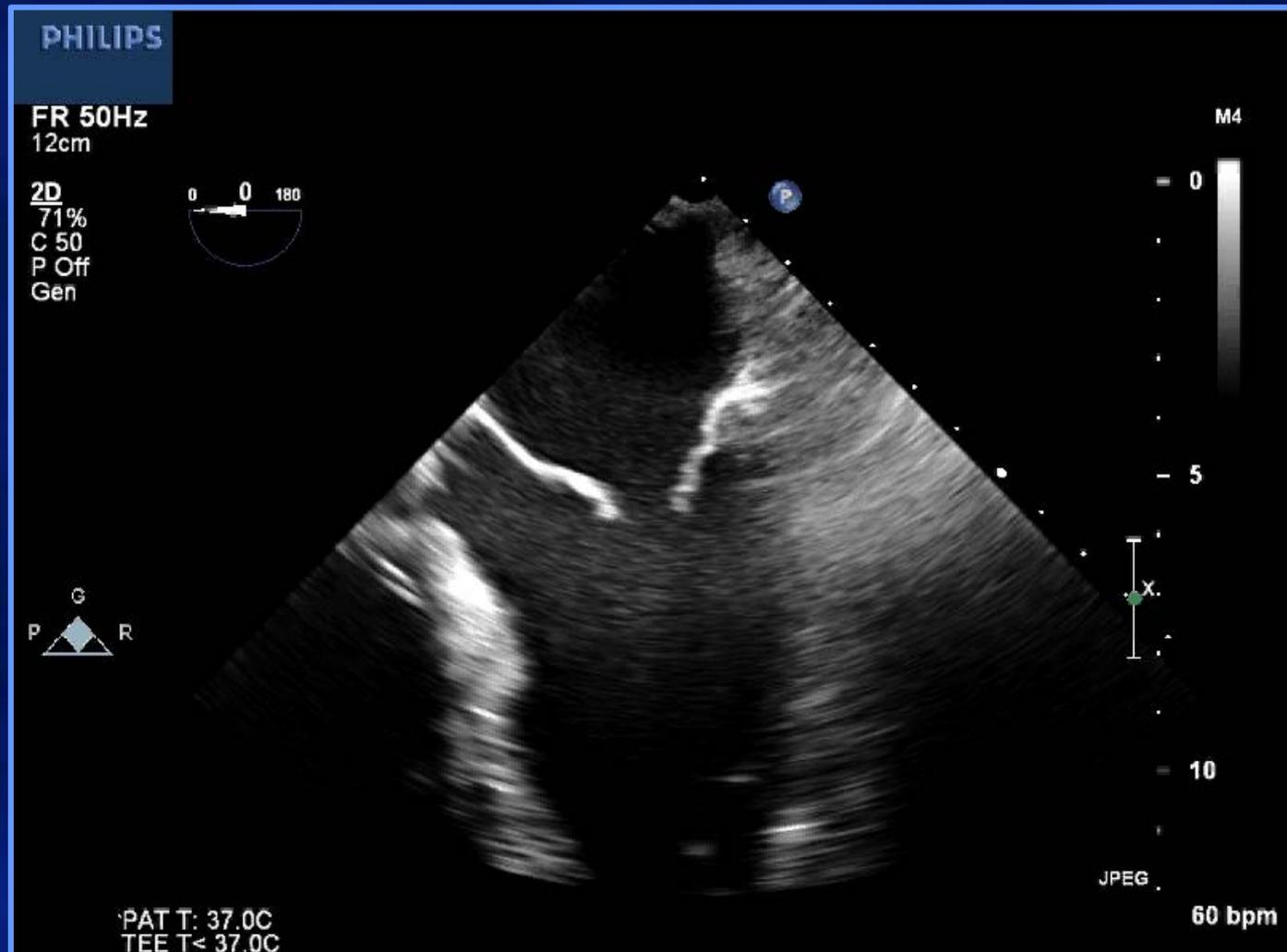


ERO (PISA); 0.39 cm²
Regurgitant volume (PISA); 57 cc

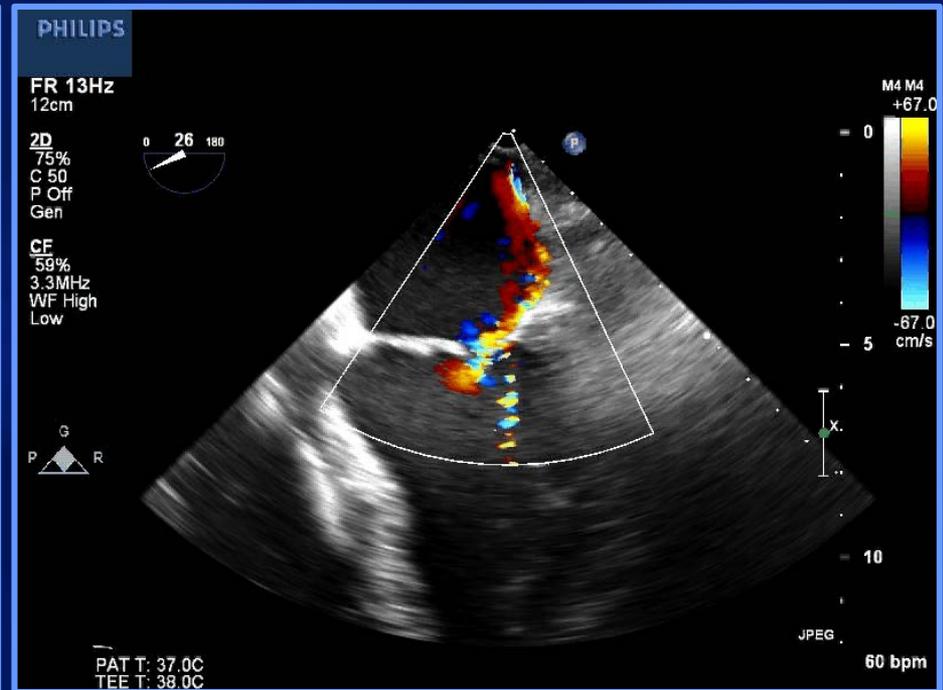
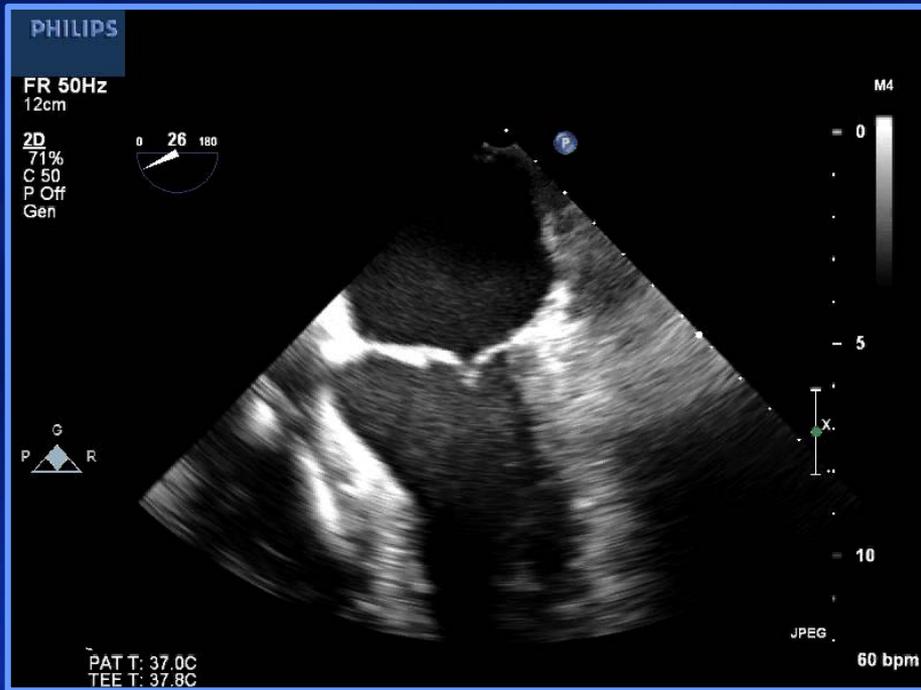
81 year old with severe ischemic (functional) MR

- Recurrent hospitalizations despite optimal medical therapy
 - Quality of life diminishing
- Multidisciplinary Heart Team Evaluation
- Discussion with patient
 - MitraClip

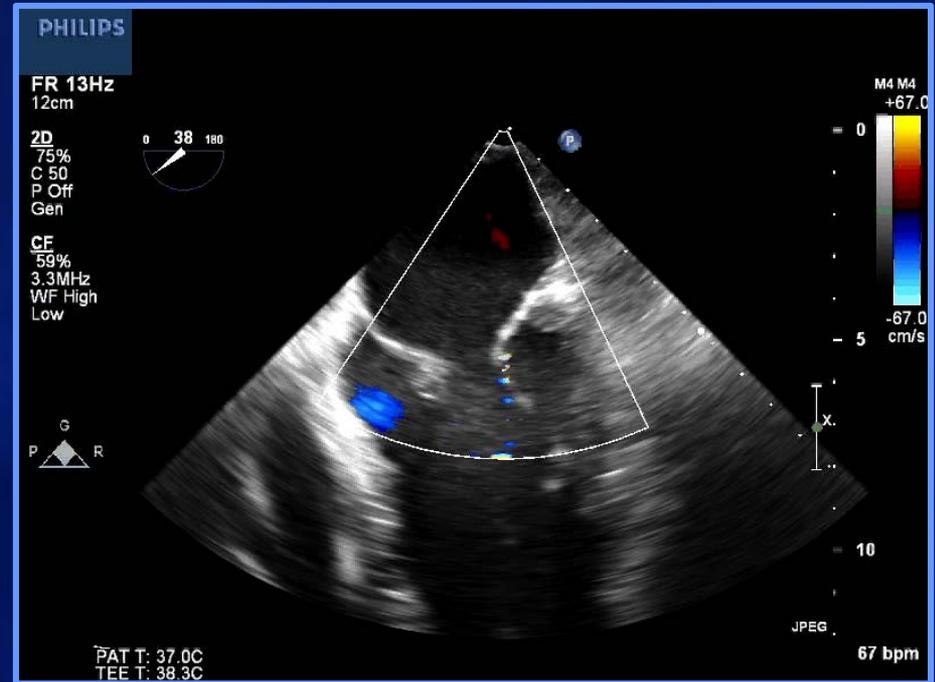
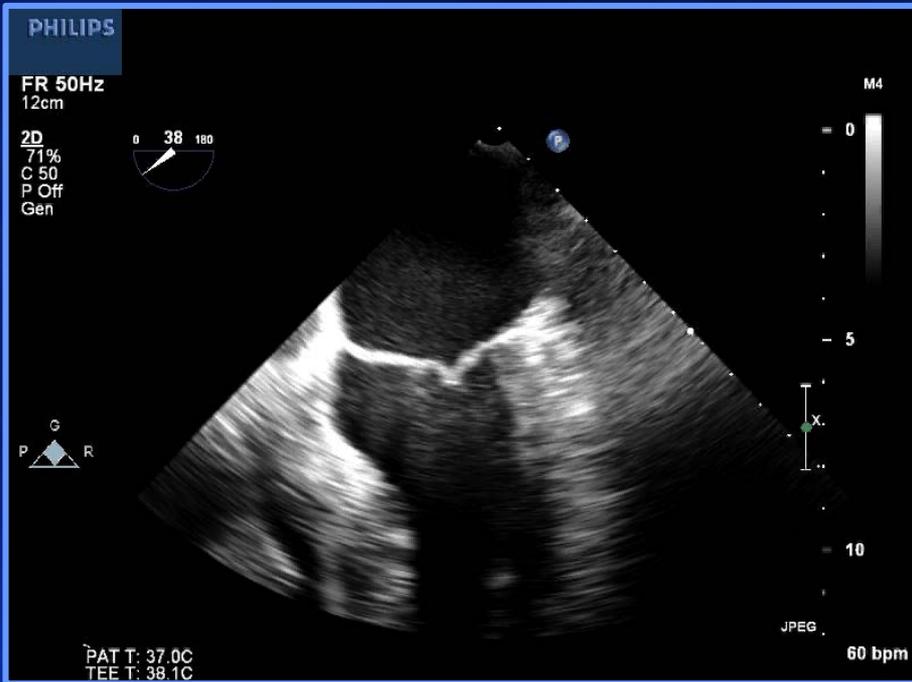
Procedural TEE



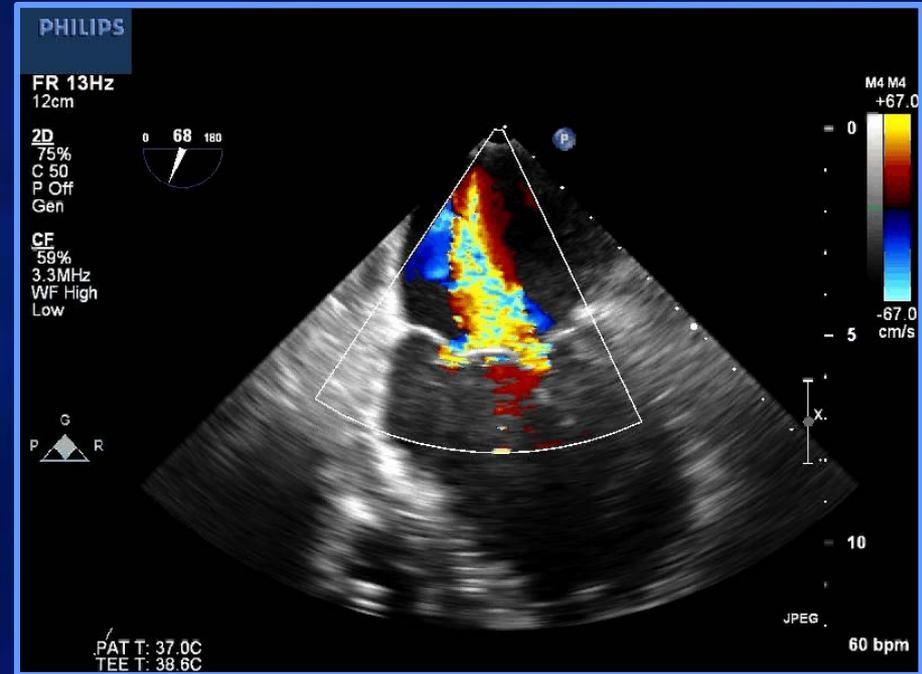
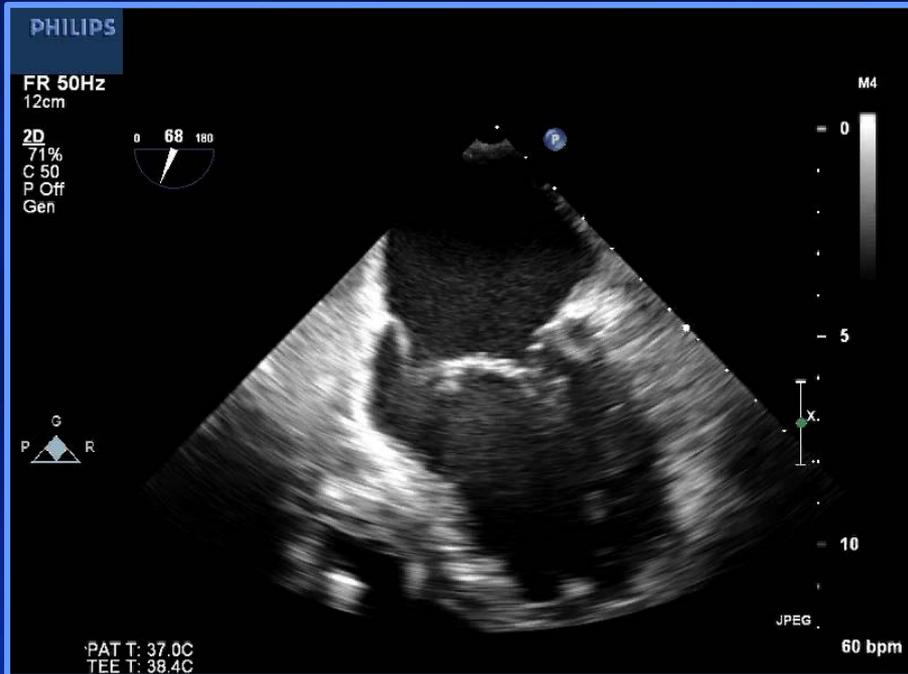
Procedural TEE



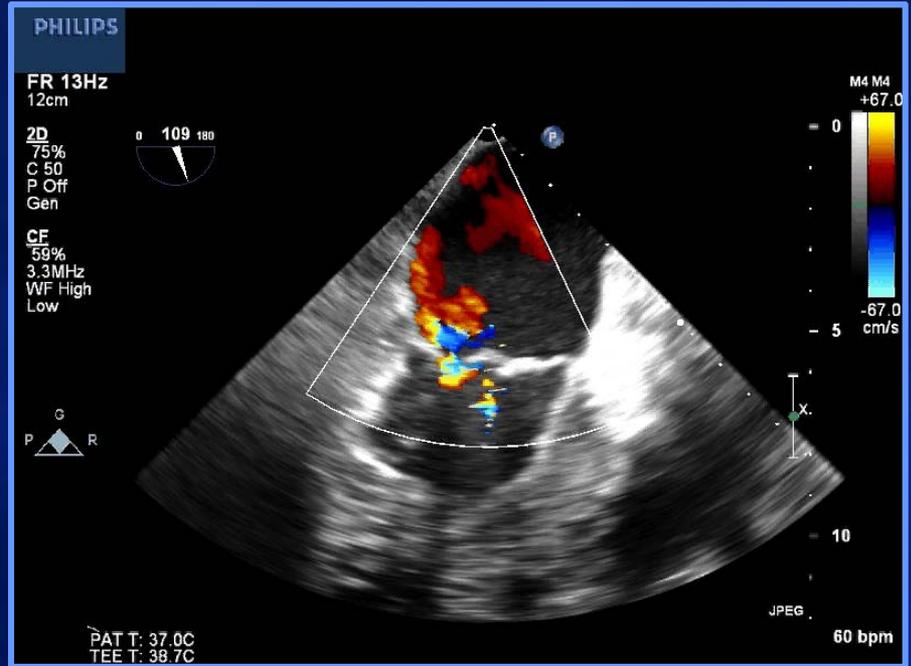
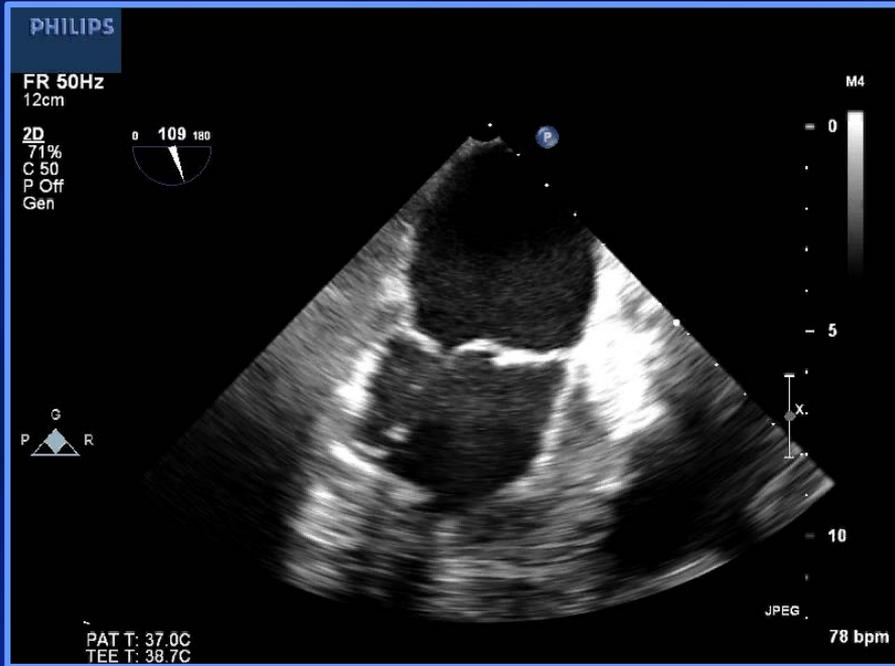
Procedural TEE



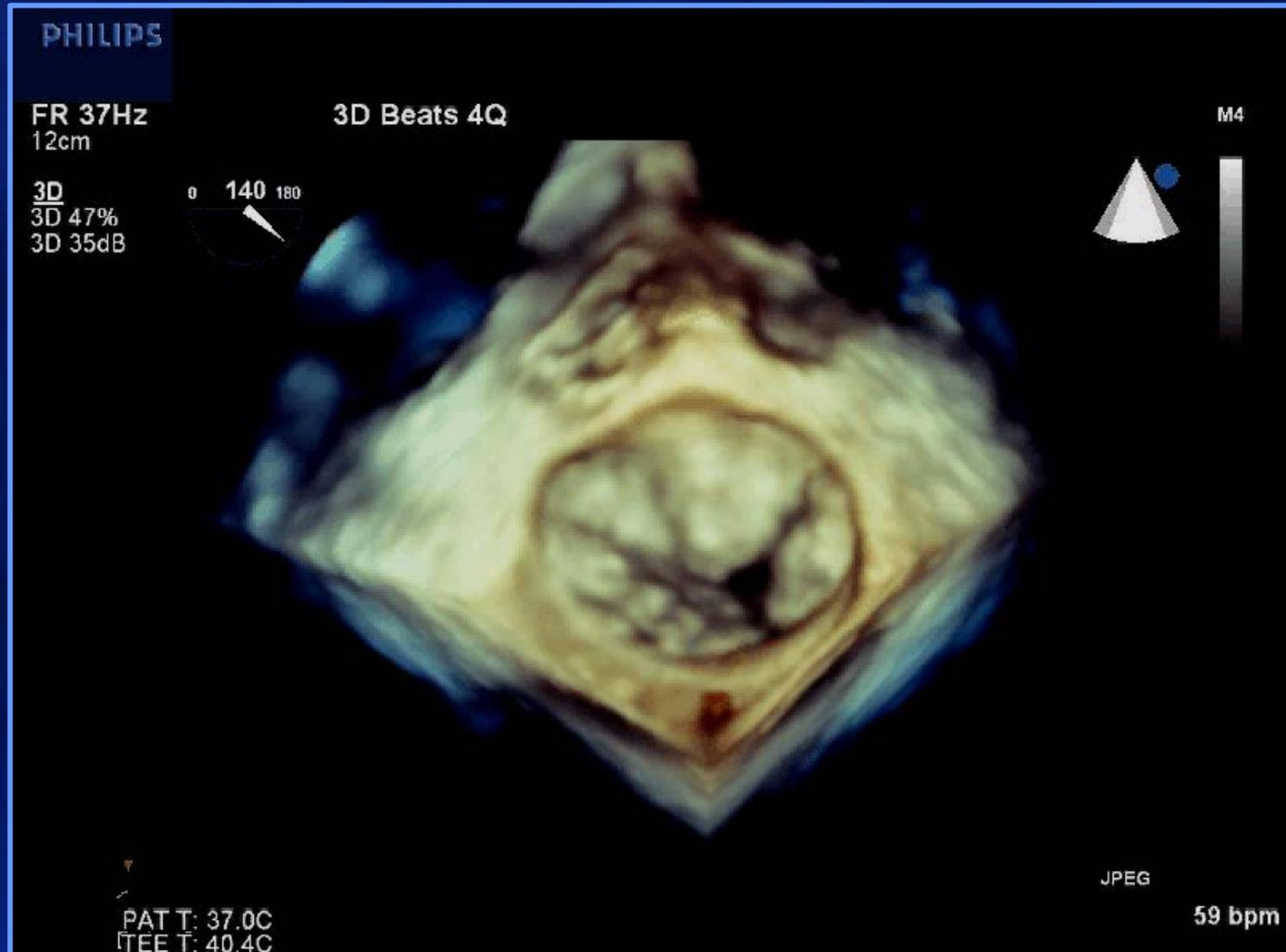
Procedural TEE



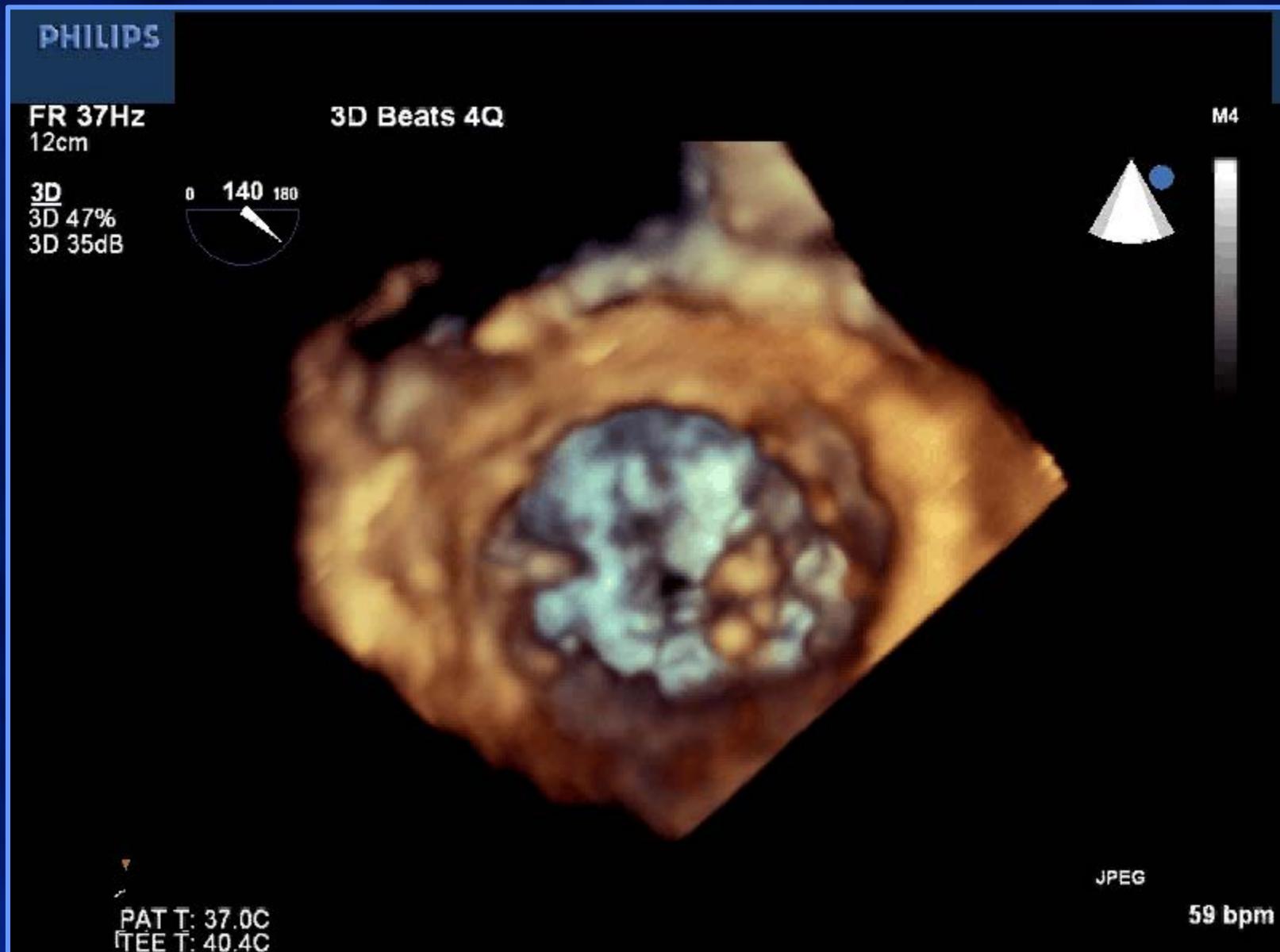
Procedural TEE



3D LA View



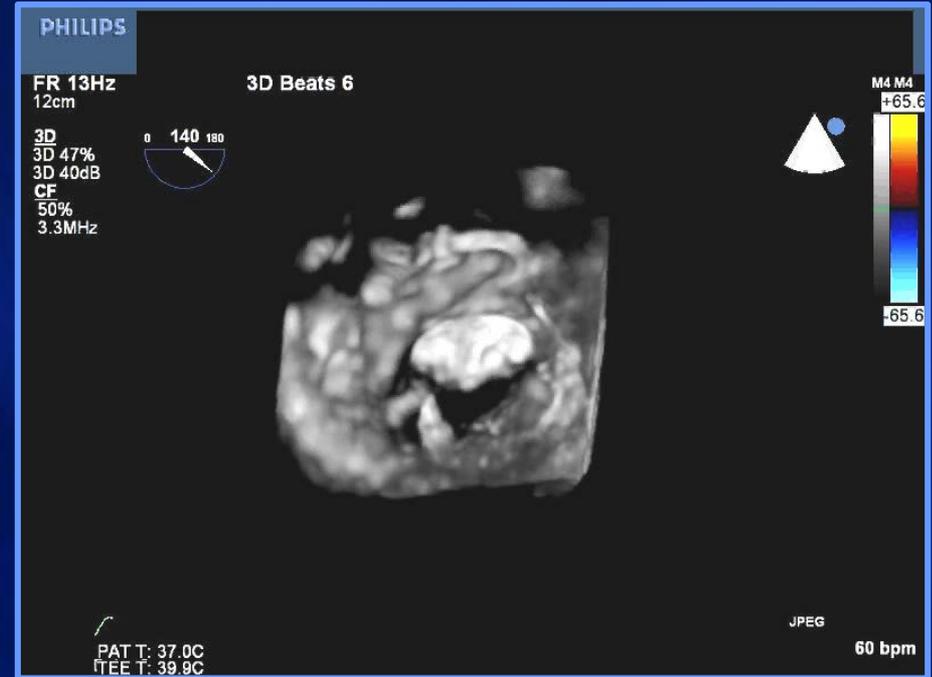
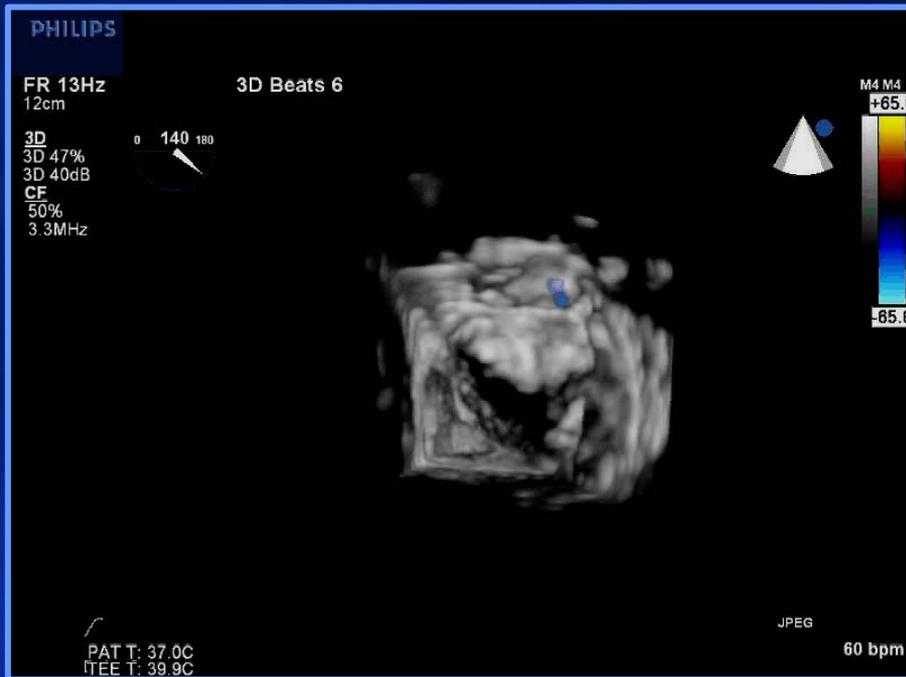
3D LV View



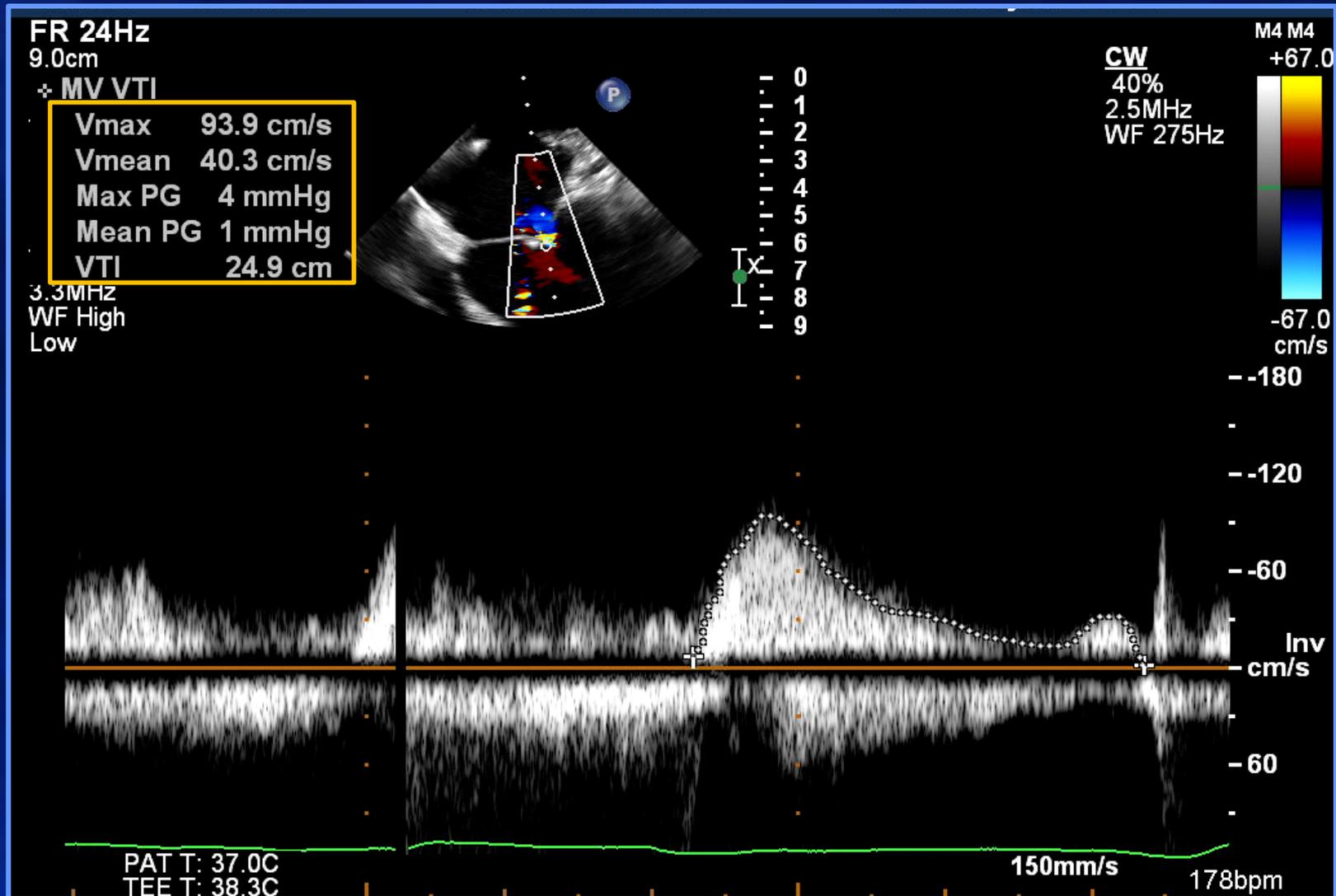
3D Color Doppler

LA View

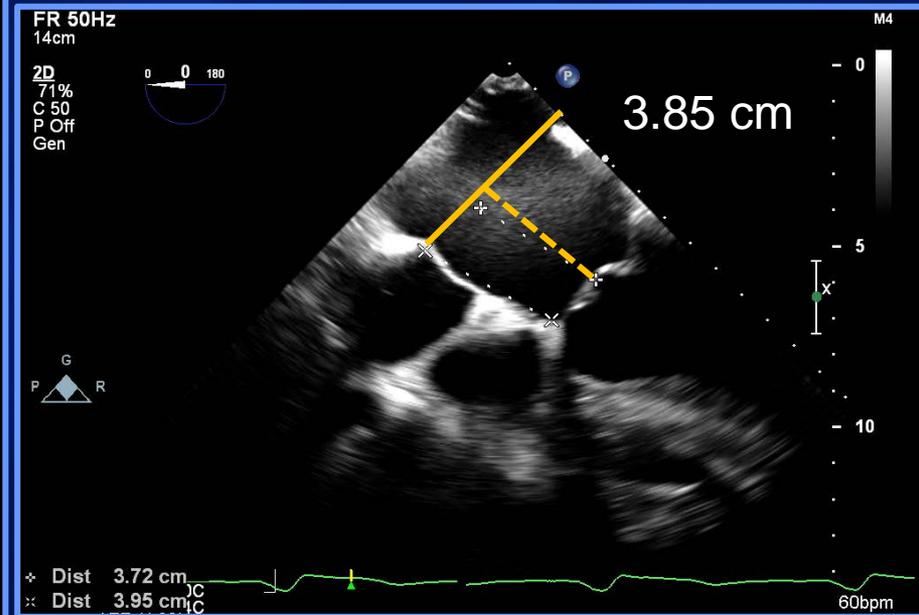
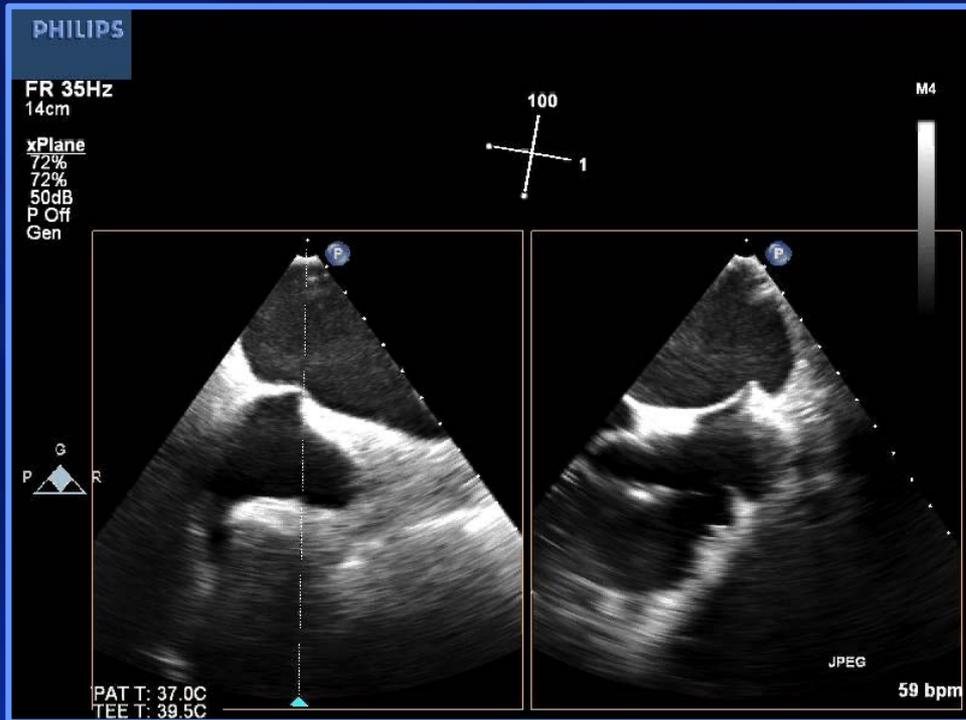
LV View



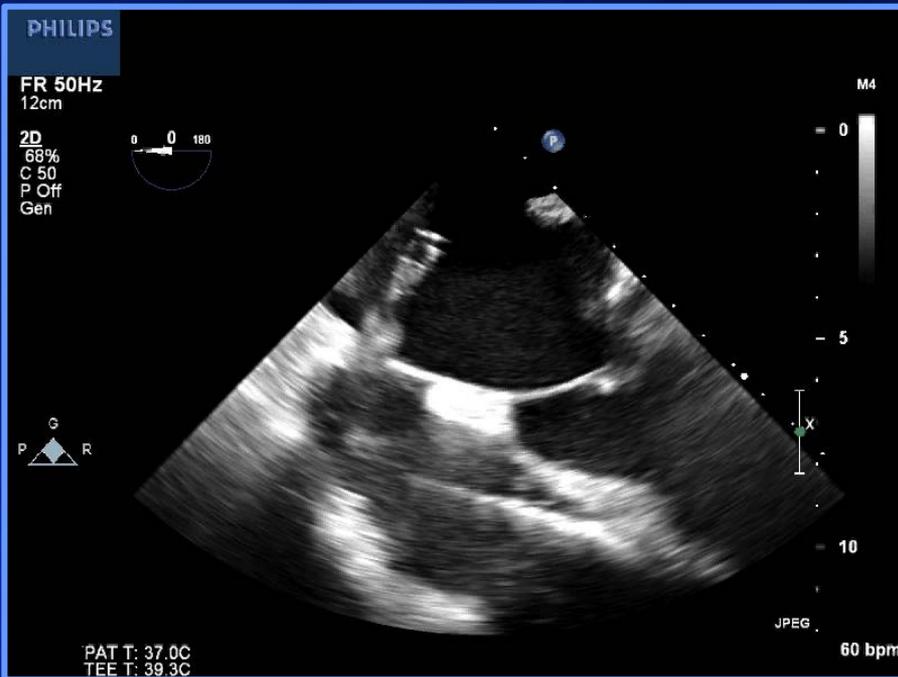
No Mitral Stenosis



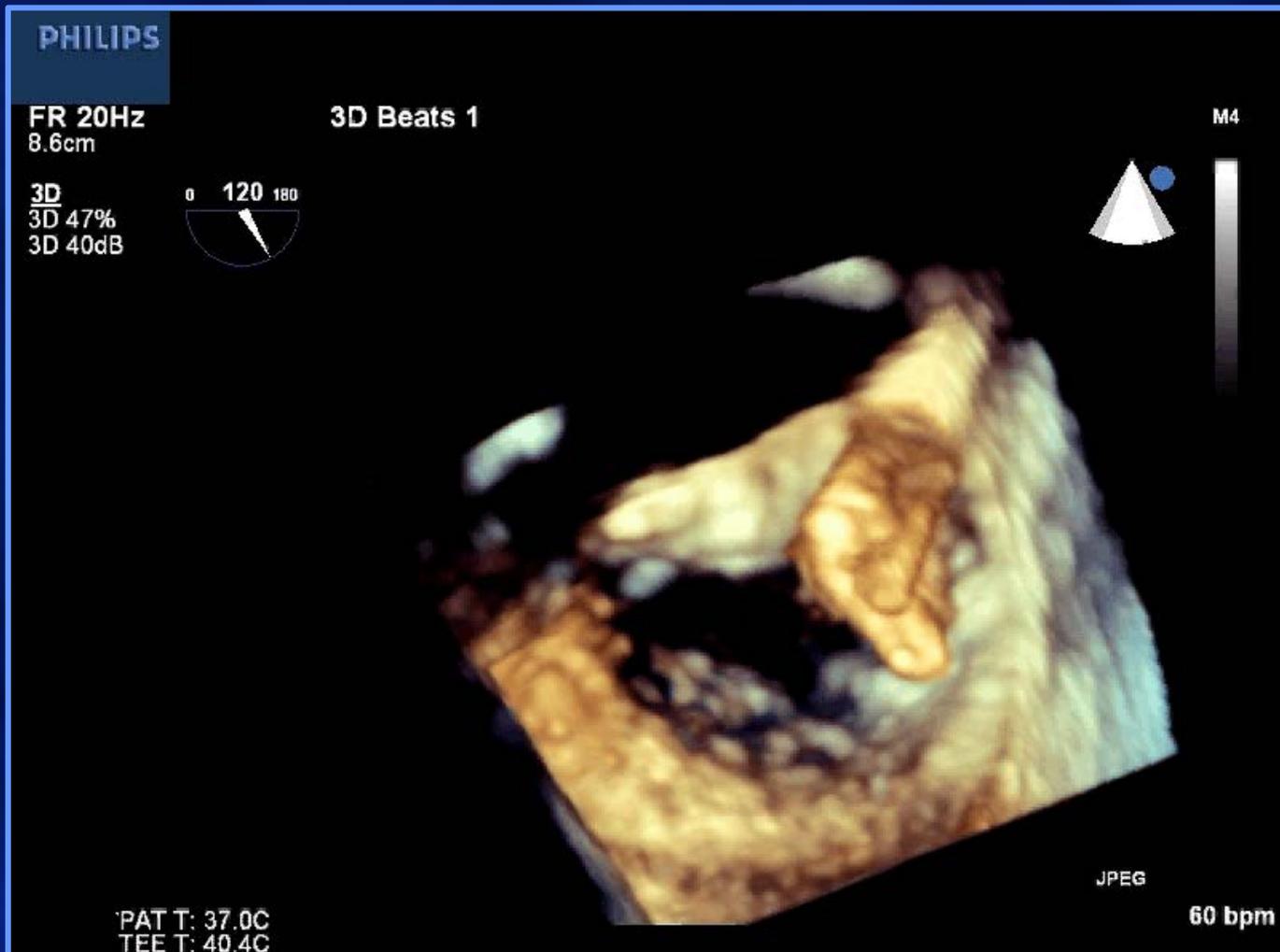
Transeptal Puncture



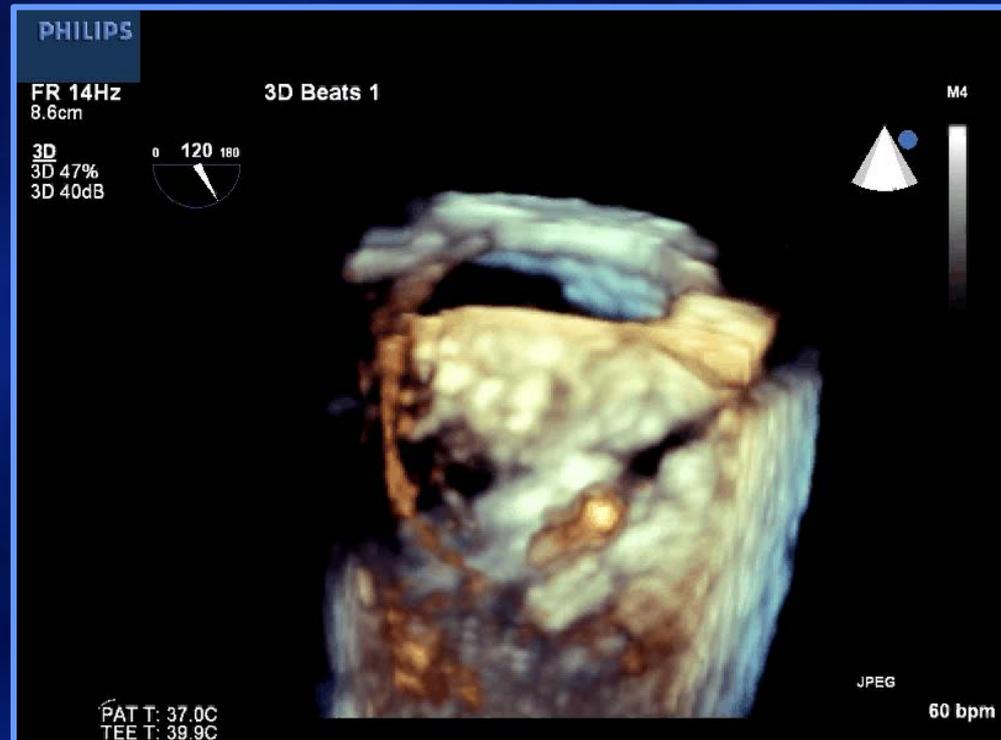
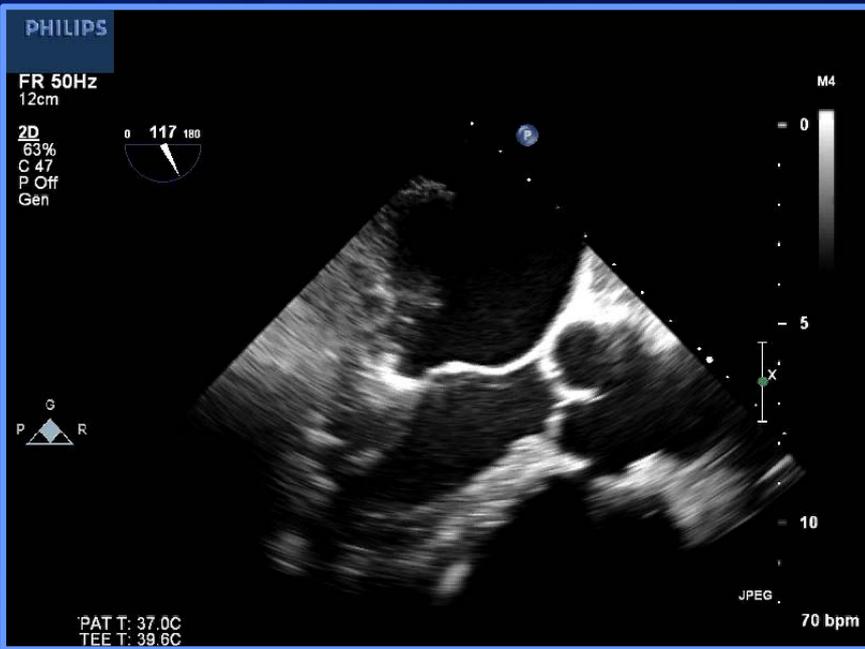
Device Across Atrial Septum



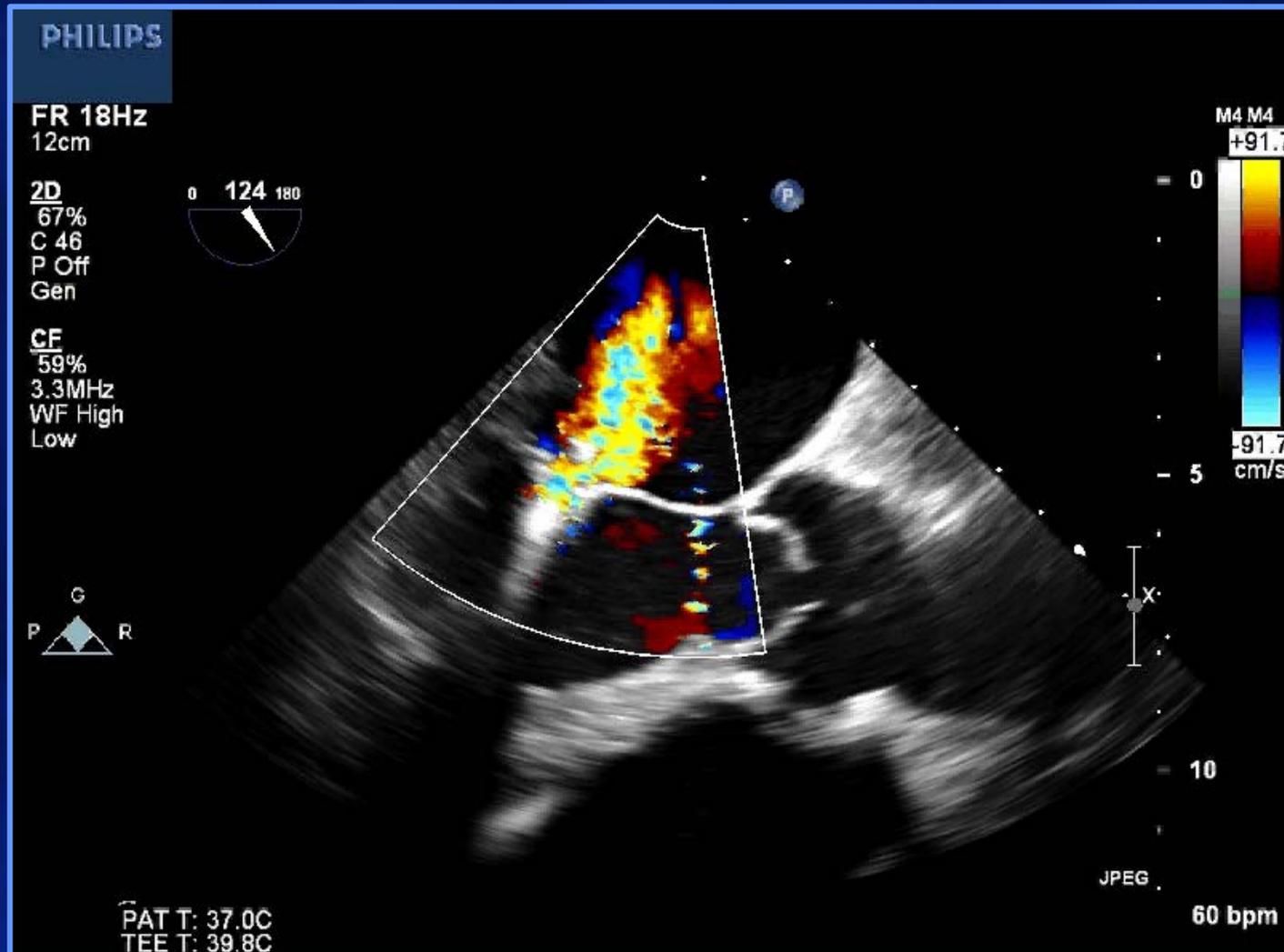
Guiding Toward MV



MV Grasped



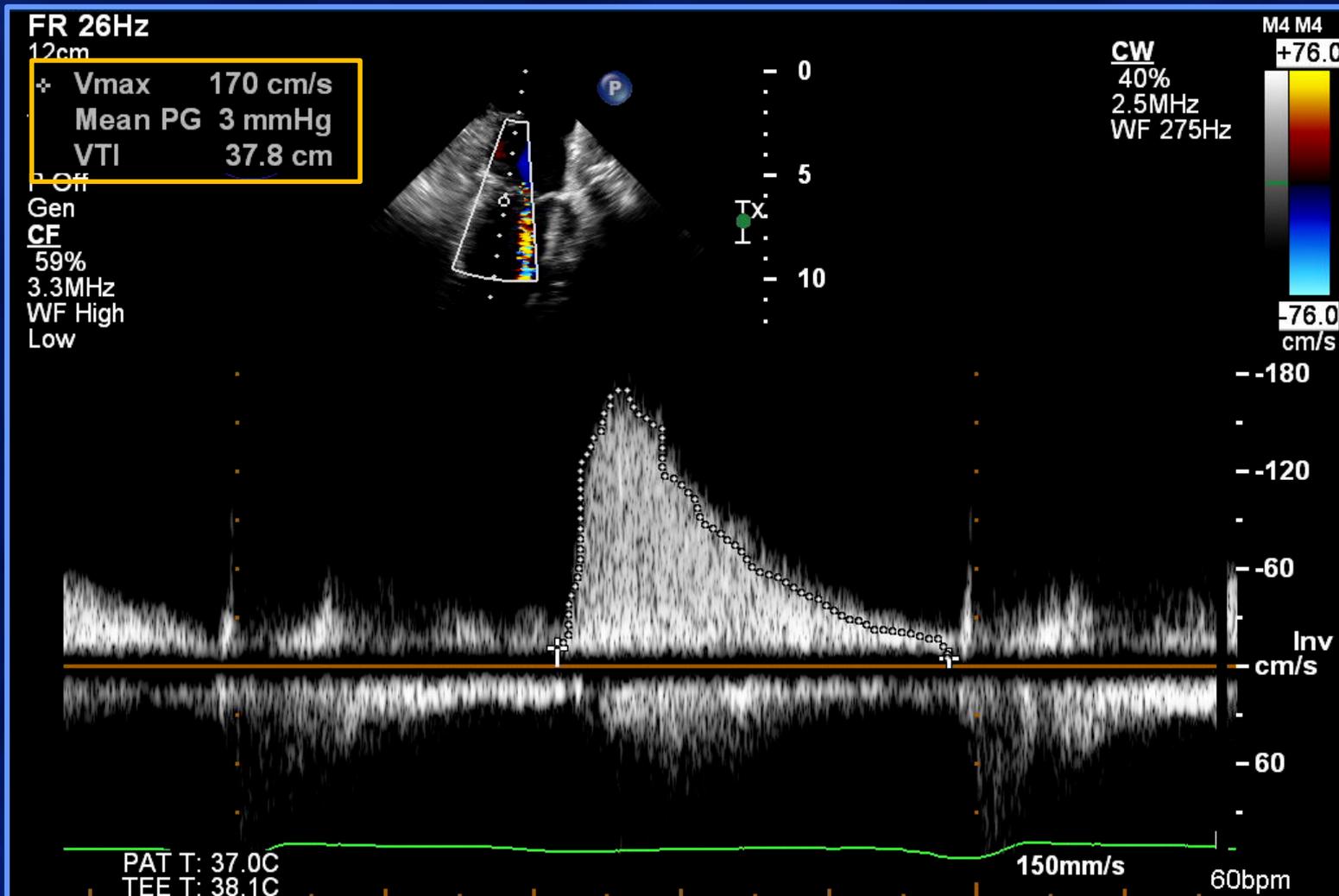
Color with MV Grasped



3D Color with MV Grasped



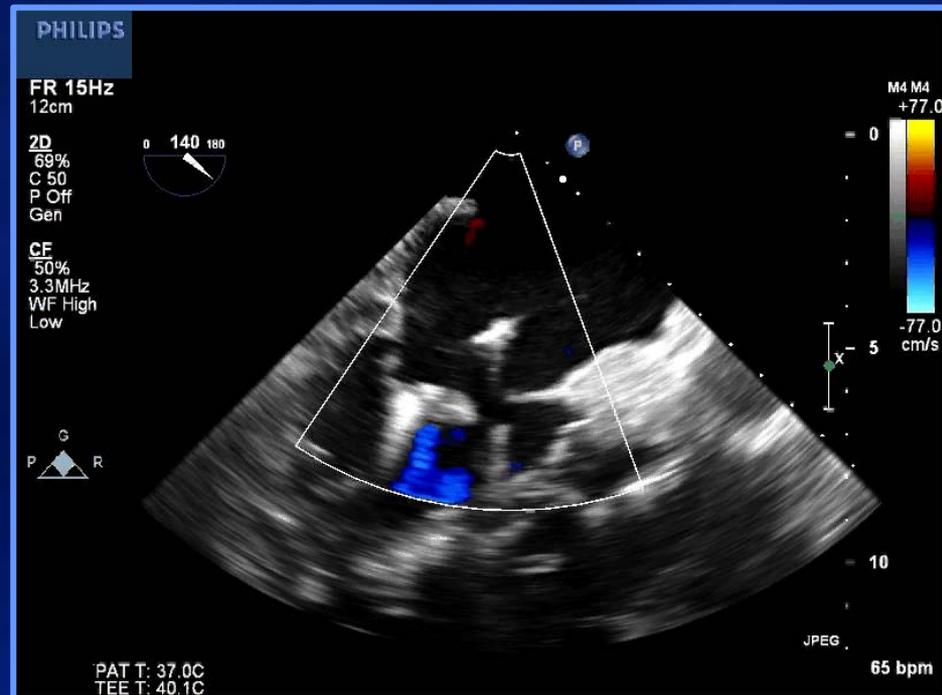
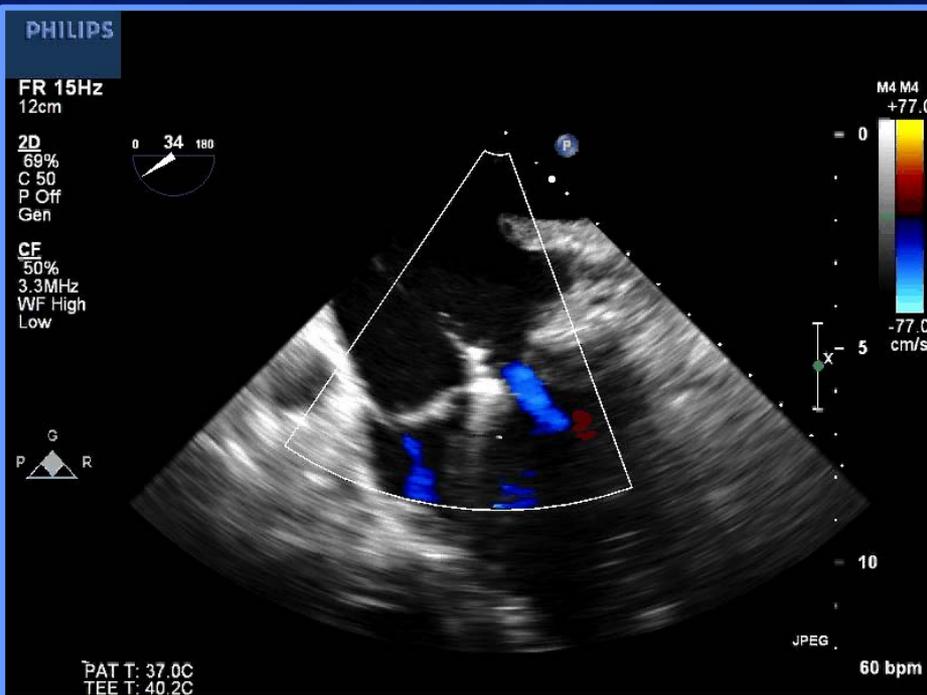
Decision Made to Place 2nd MitraClip



2nd MitraClip in Place with Grasped MV Leaflets



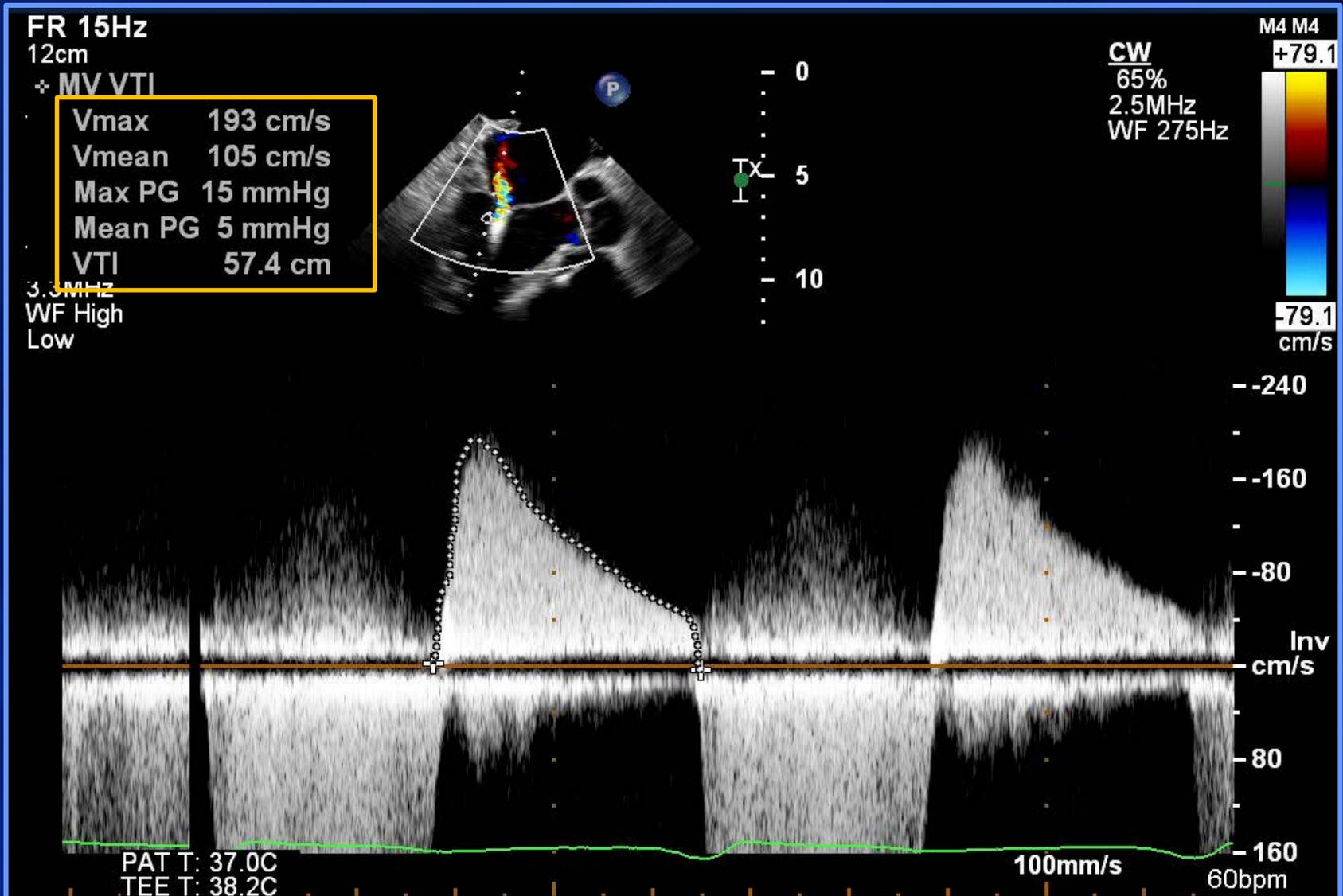
2nd MitraClip with Grasped MV Leaflets → Improved MR



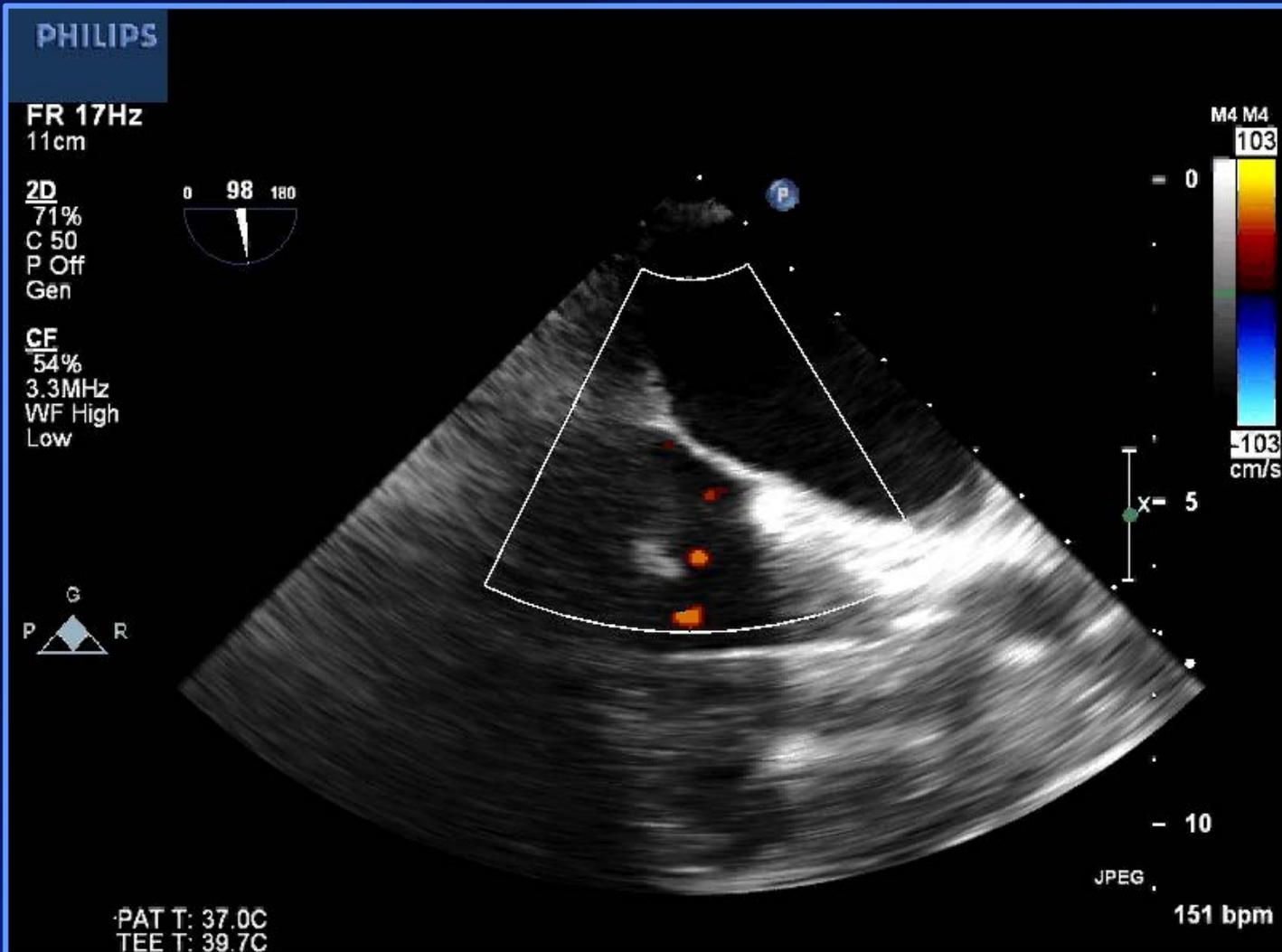
3D Color After 2nd Clip



Gradient after 2nd Clip



Small ASD Post-Procedure



Outcome

- Patient extubated
- Much less dyspnea 1 day later
- Discharge to home

1 Month Follow-up TTE

Final Impressions

1. Clinical MitraClip Transcatheter Mitral Valve Repair (TMVR)
2. Mitral valve diastolic mean Doppler gradient; 6 mmHg (heart rate 60 BPM).
3. Mild mitral valve regurgitation, central jet originating between the two clips. ERO 0.12 cm² RVol 21 mL

SIX-MINUTE WALK DATA

Total time walked: 6 minutes

Total distance walked: 1400 feet; 426.7 meters, which is 99% for age and gender.

Rest Stops: No

O₂ usage: None

Case #3

89 year old man with dyspnea

- Very active (digs potatoes) but gets quite short of breath
- Flail mitral leaflet noted 1.5 years prior
- Past History:
 - HTN
 - CKD stage 4 (Cr 2.0)
 - Depression
 - OSA on CPAP
 - Anemia of chronic disease
 - Spinal stenosis s/p surgery

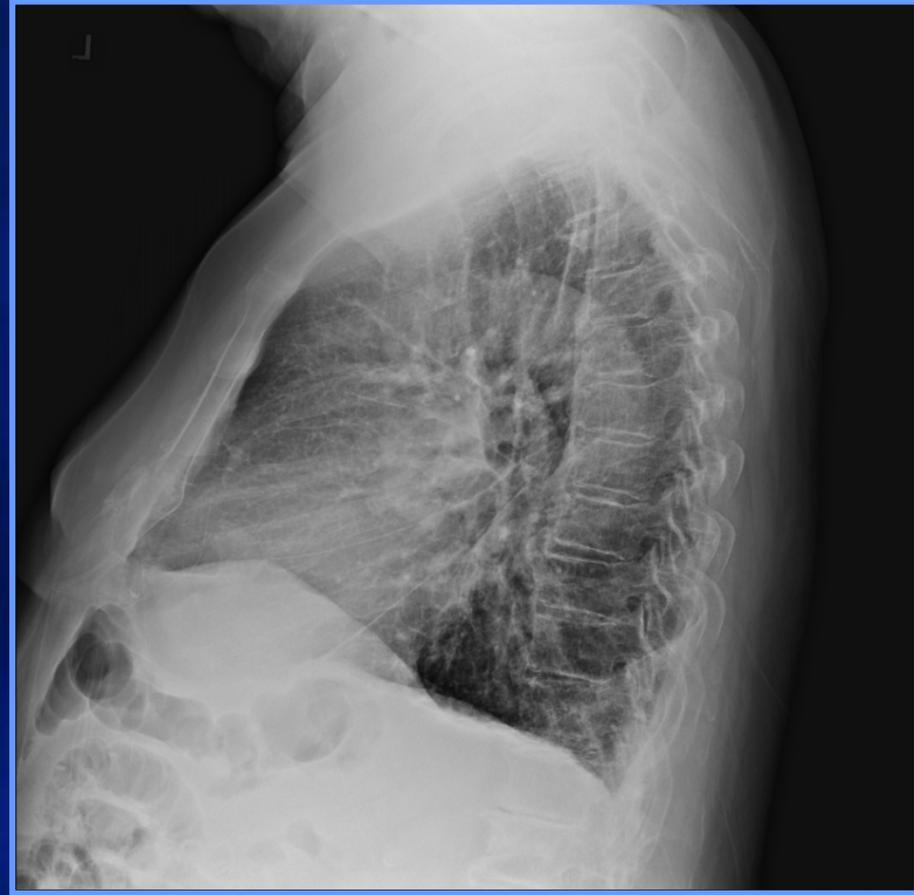
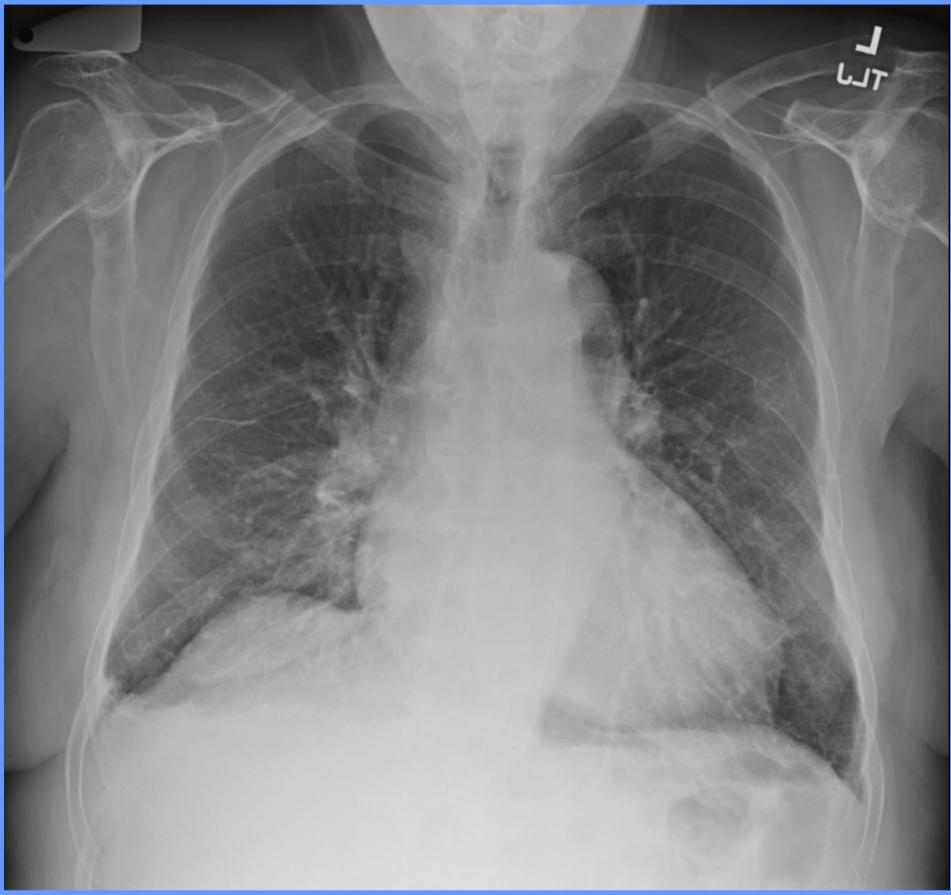
89 year old man with dyspnea

- 1.5 years ago: exertional dyspnea and chest discomfort
- LVEDD: 60mm, LVESD: 35 mm
- EF: 69%, RVSP 57 mmHg
- Flail posterior leaflet w/severe MR
- Conservative management recommended to avoid surgery

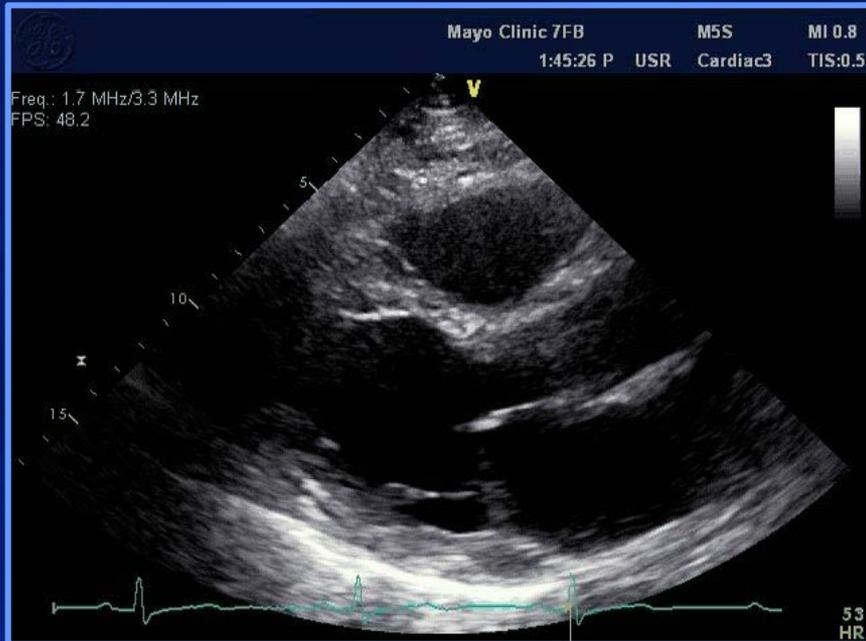
89 year old man with dyspnea

- Physical Examination:
 - HR 49, BP 126/78, BMI 36
 - Normal JVP
 - Decreased breath sounds in bases
 - Laterally displaced PMI, 3/6 blowing holosystolic murmur at apex
 - Abdomen soft, nondistended, no hepatomegaly
 - 2+ bilateral lower extremity pitting edema
- Laboratory Data:
 - Hgb 9.4
 - Cr 1.9
 - NT pro BNP 5681

89 year old man with dyspnea



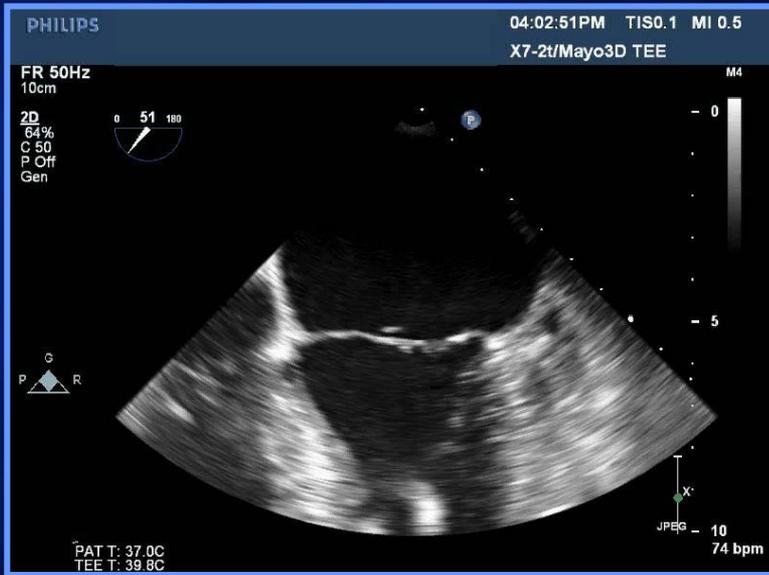
Transthoracic Echocardiogram



Severe Eccentric MR



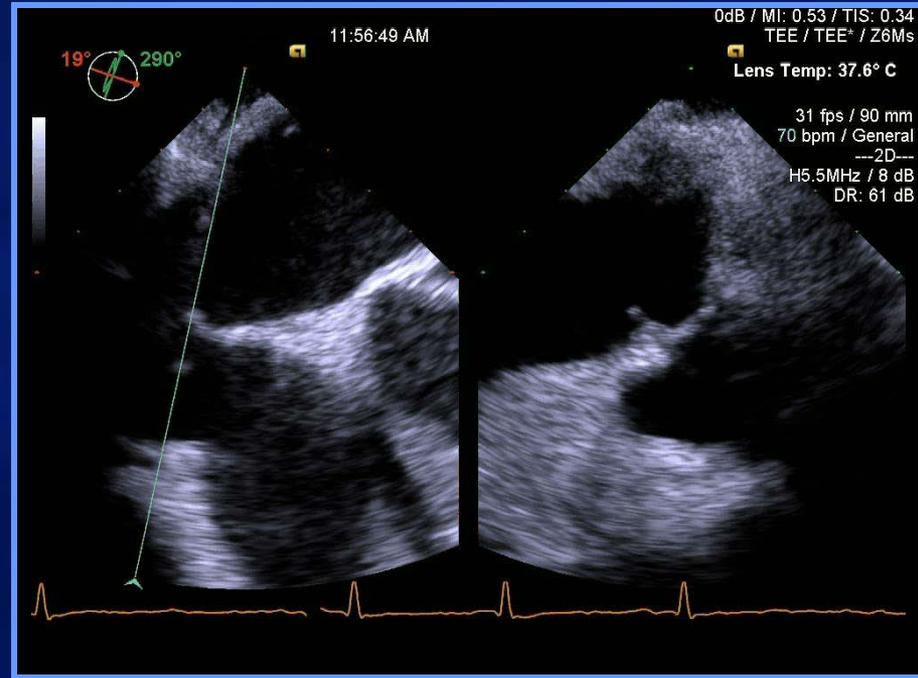
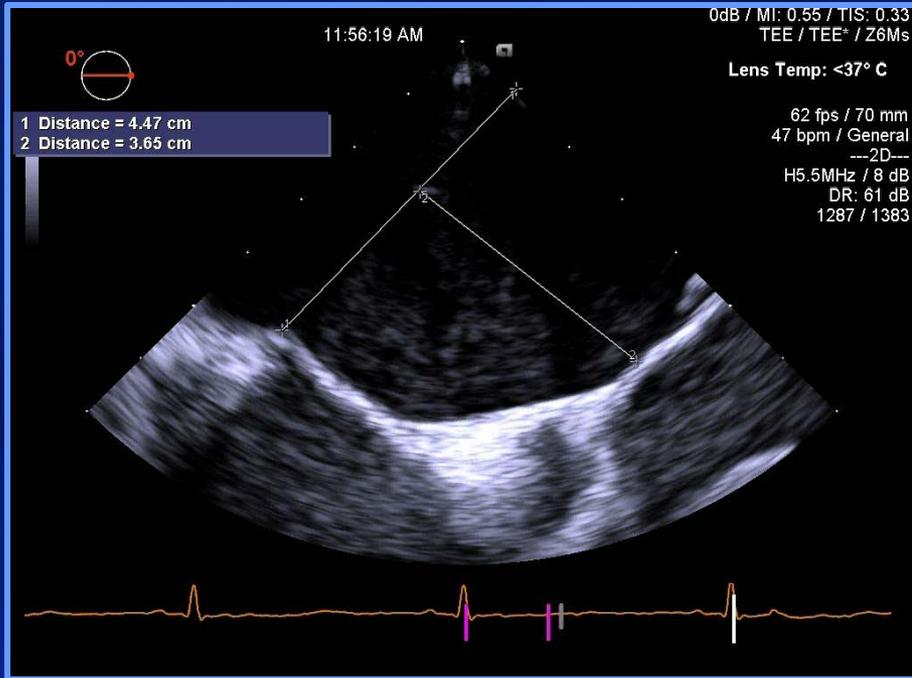
TEE: Flail P2



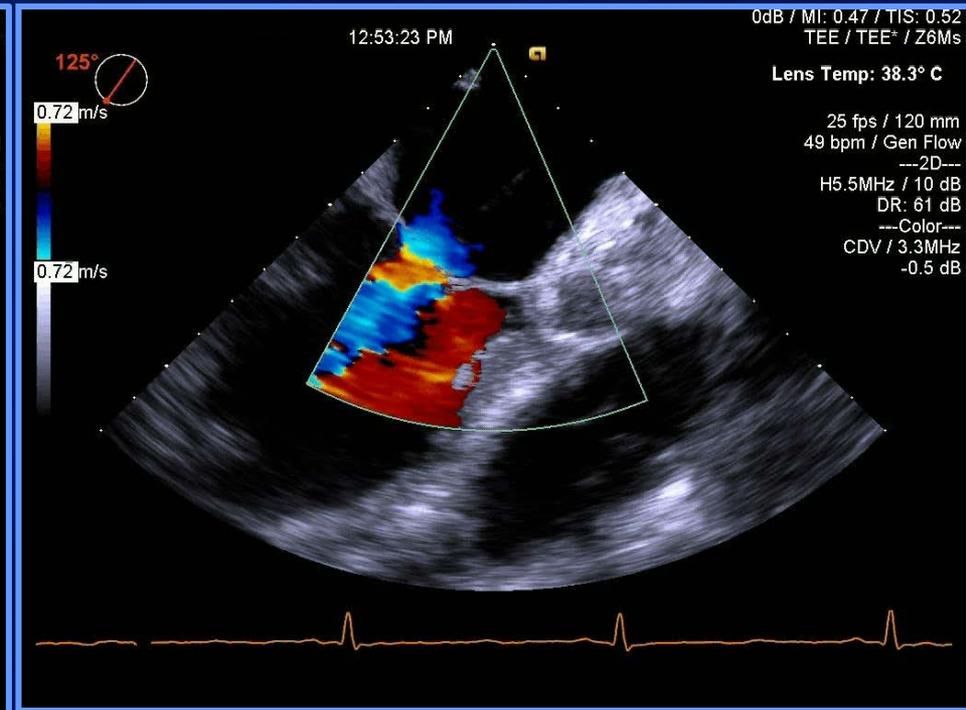
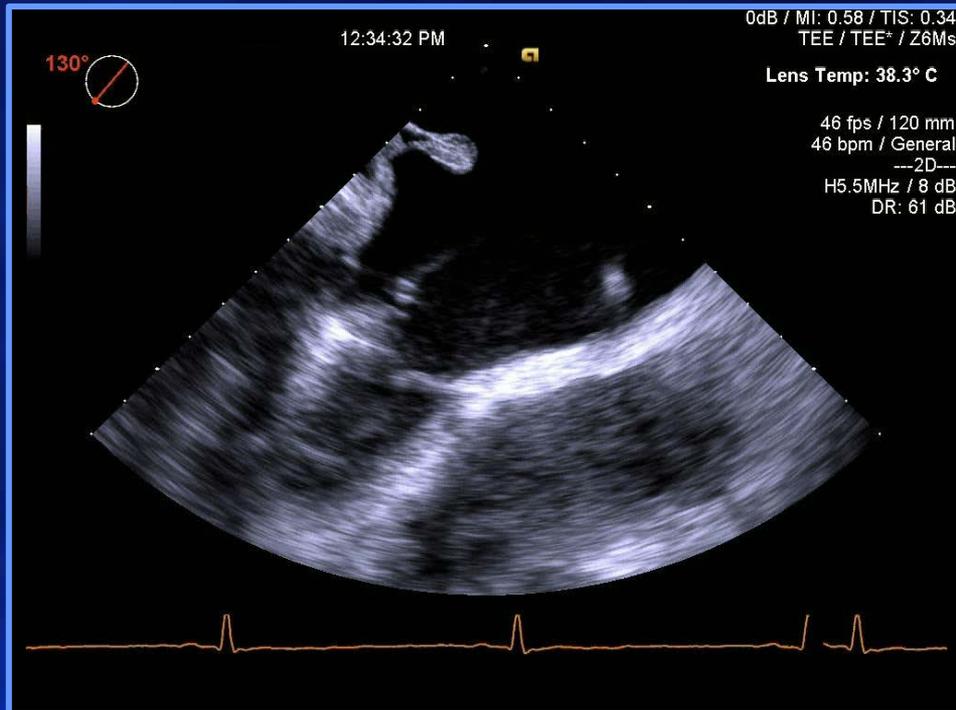
89 year old man with dyspnea

- 6 minute walk: 213 m, 65% predicted
- STS risk 6.7% repair, 8.5% replacement
- Not Frail
- CV Surgery: high risk
- Heart Team Discussion
 - MitraClip Recommended

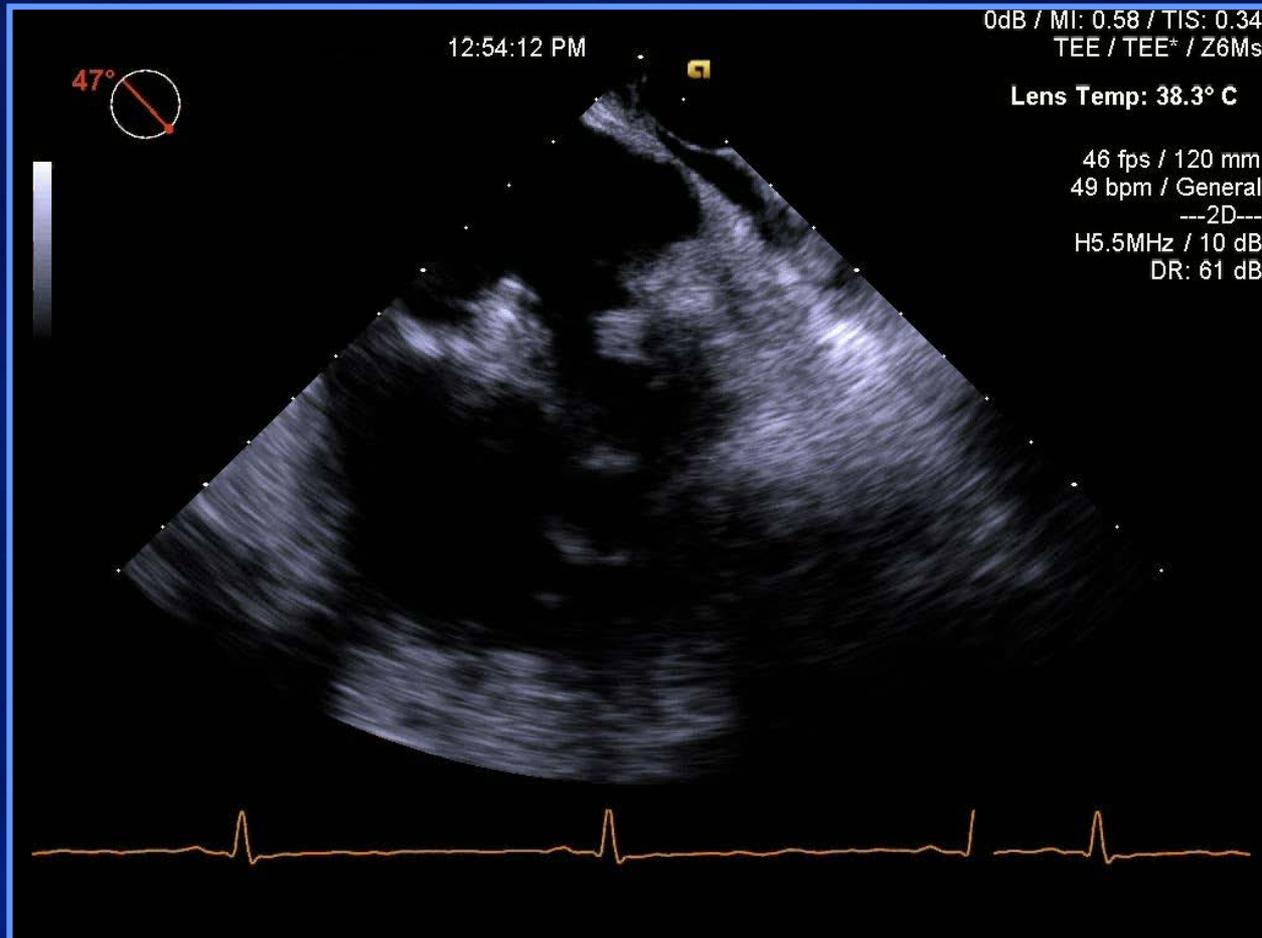
TEE-guided Transseptal



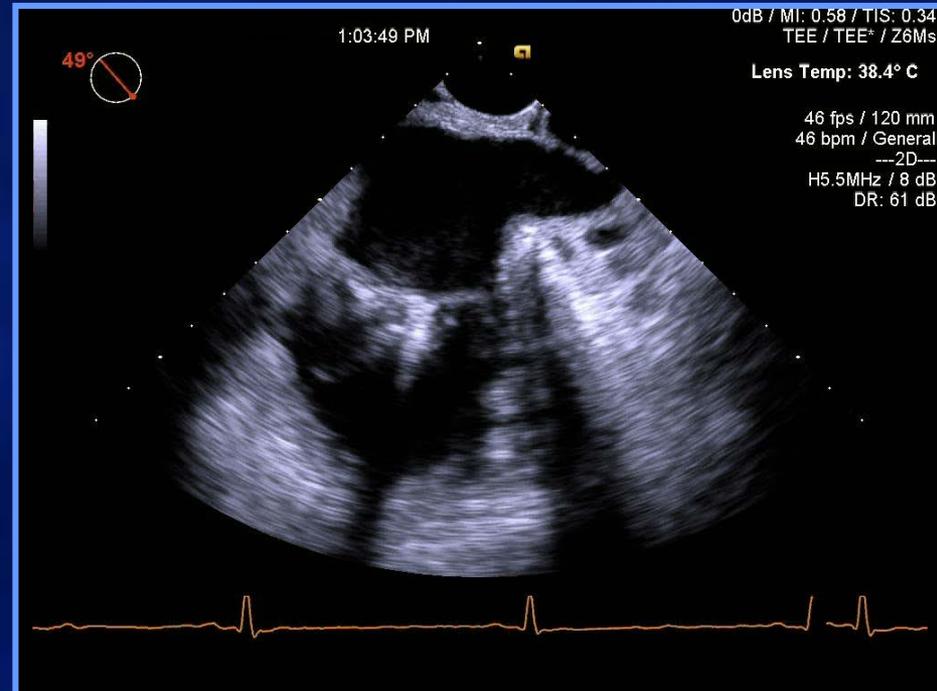
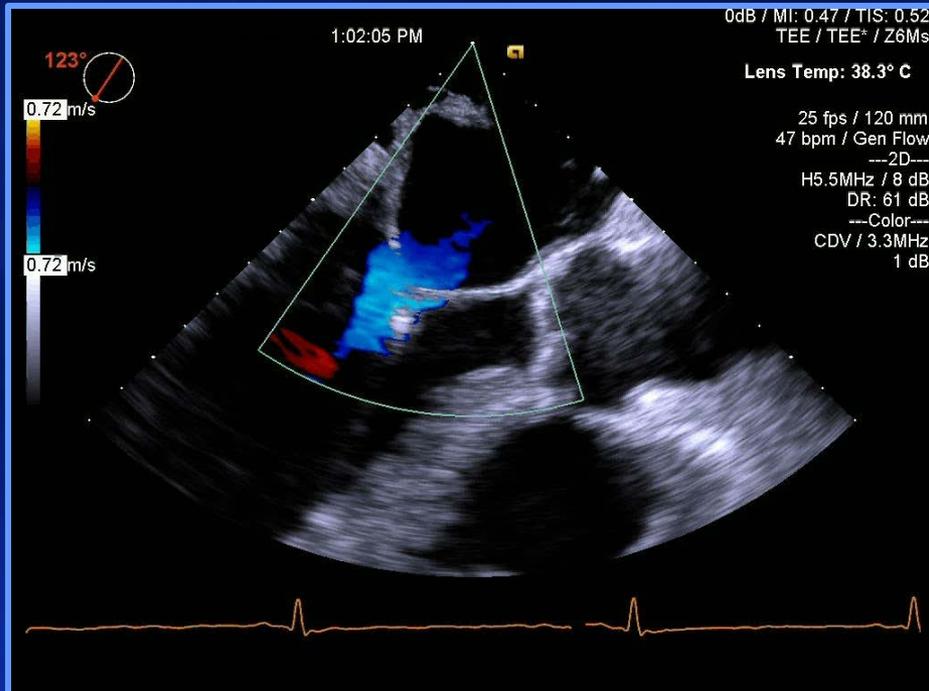
Leaflets Grasped



Grasp Confirmed: Multiple Views



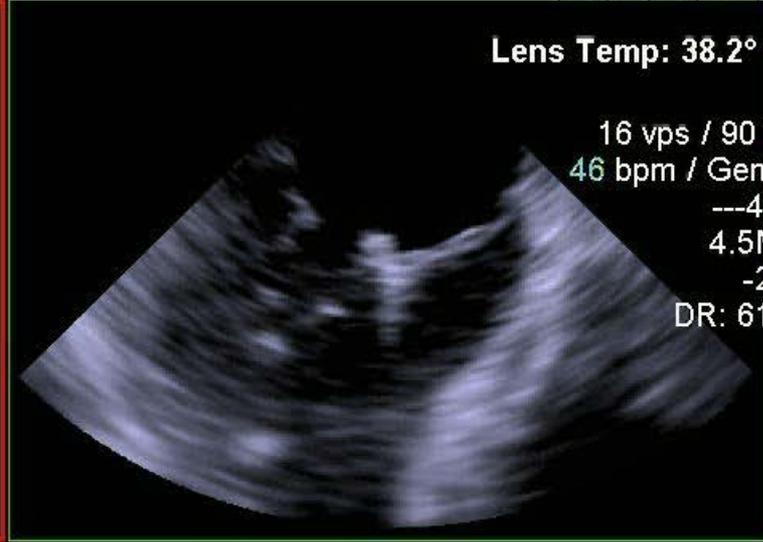
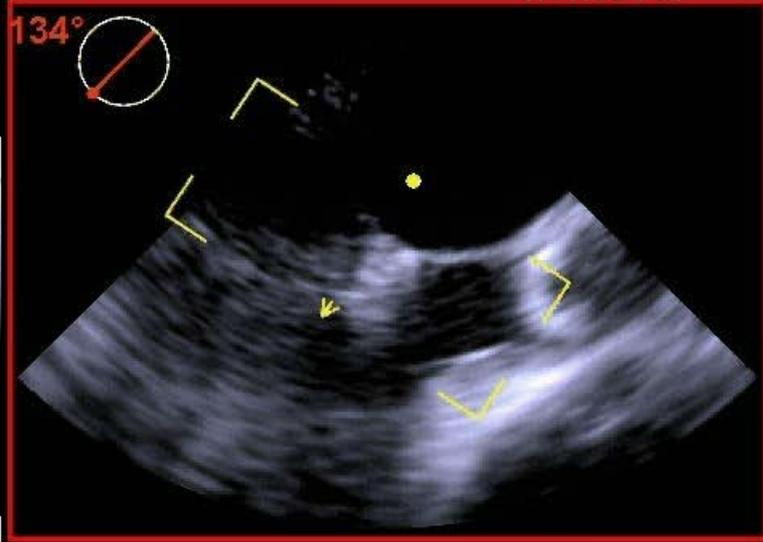
MitraClip Deployed: Mild Residual MR



3D TEE

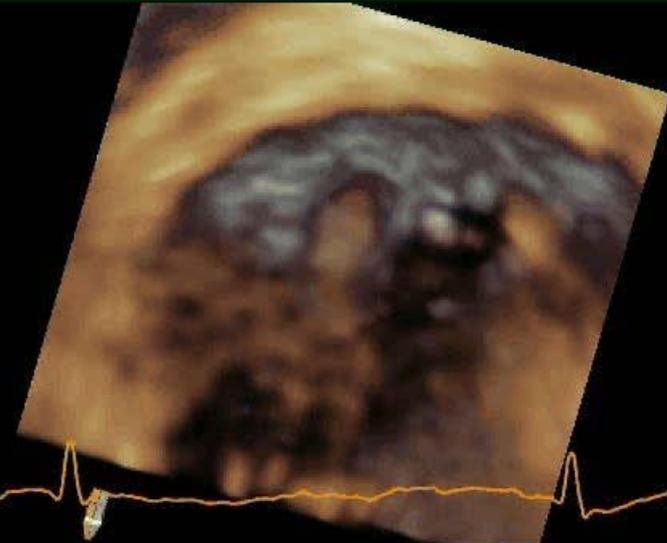
0dB / MI: 0.78 / TIS: 0.33
TEE / TEE* / Z6Ms

1:11:16 PM

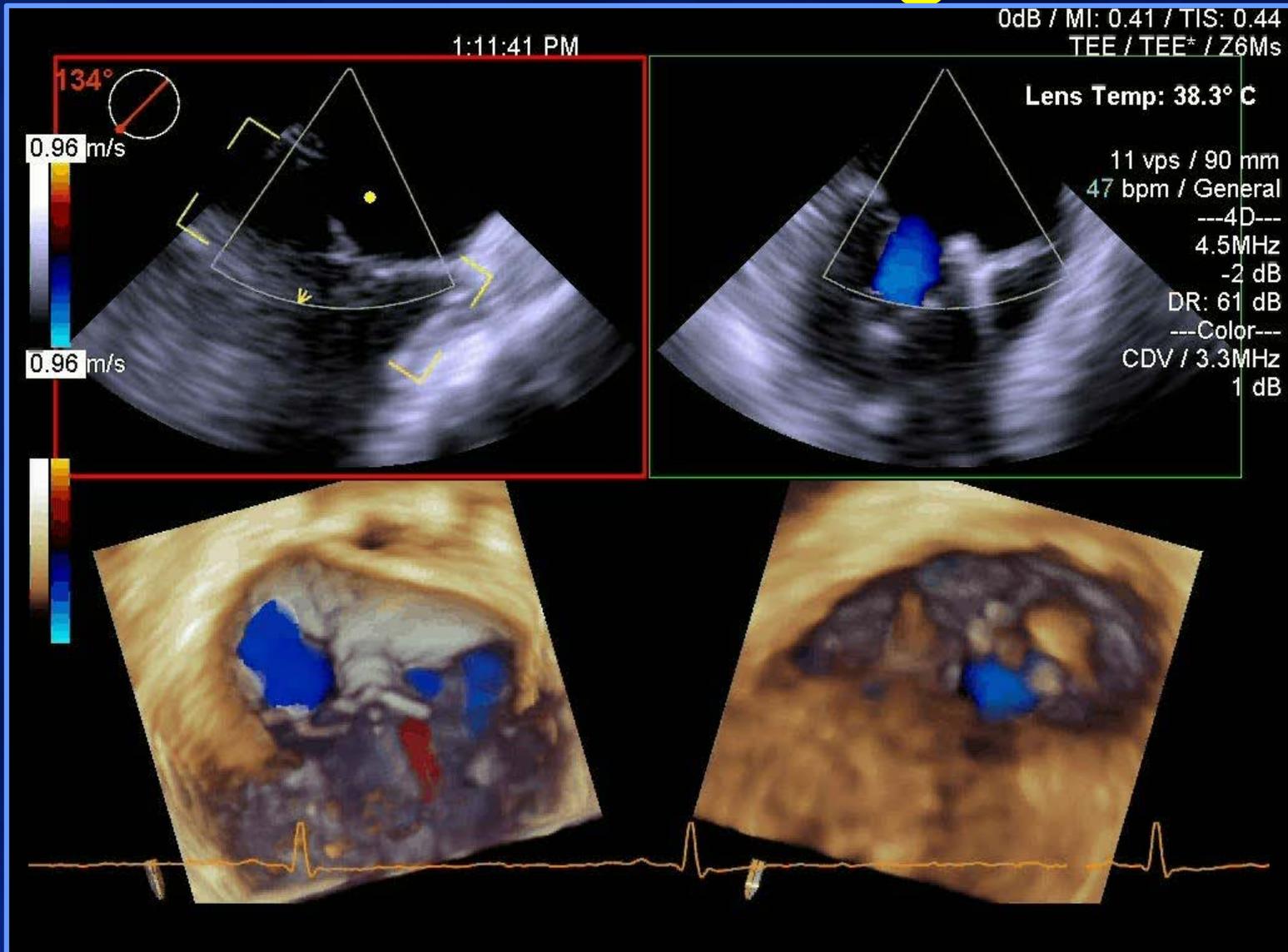


Lens Temp: 38.2° C

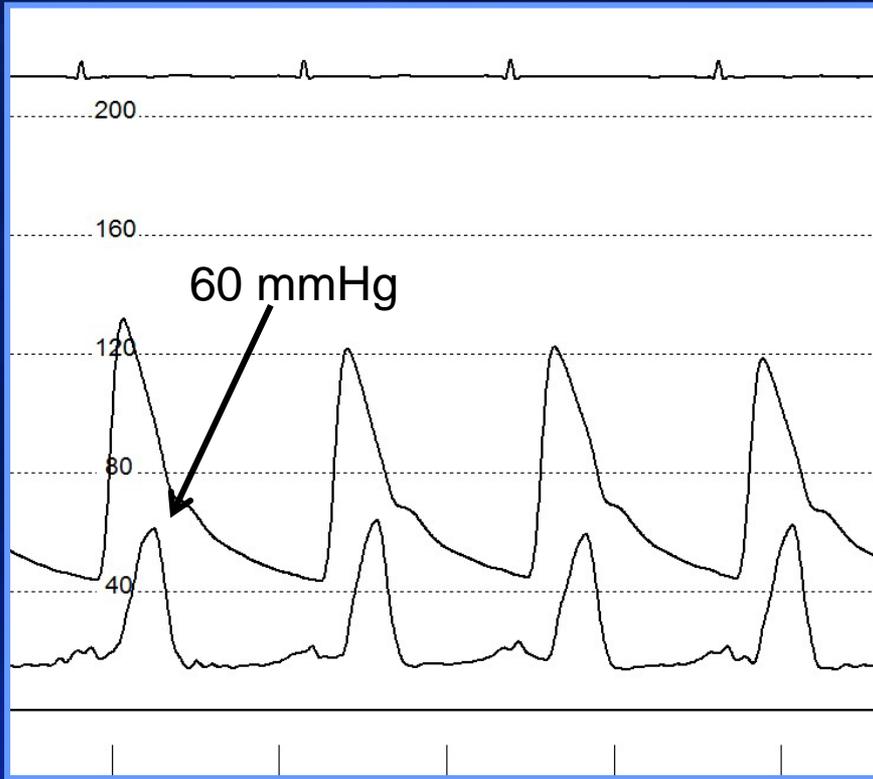
16 vps / 90 mm
46 bpm / General
---4D---
4.5MHz
-2 dB
DR: 61 dB



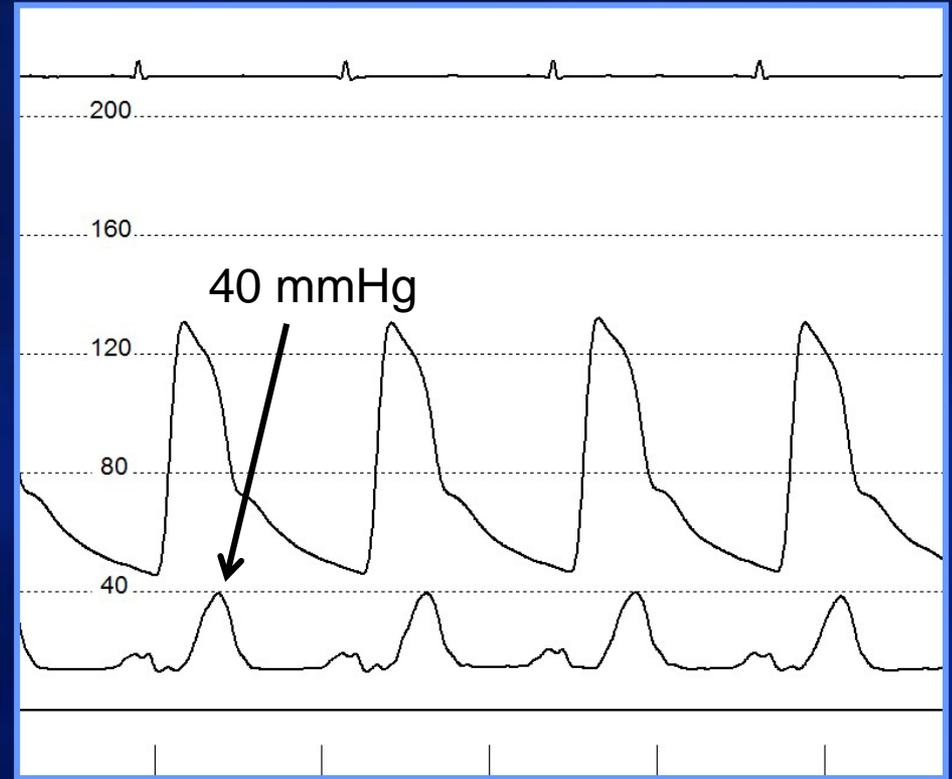
3D Color TEE: Single Beat



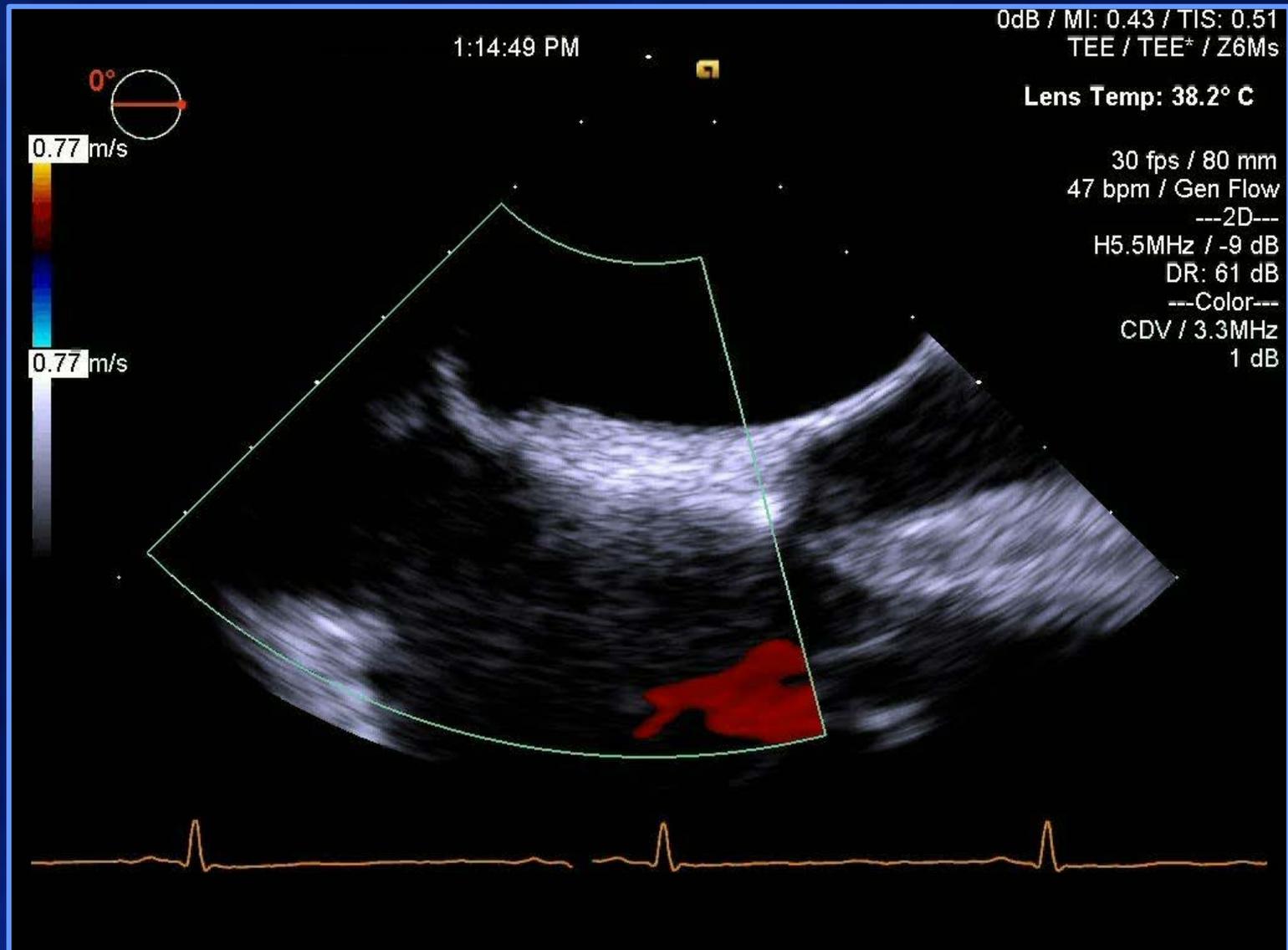
Pre



Post



Small Residual ASD



89 year old man with dyspnea

- Postprocedure:
 - Extubated uneventfully
 - Discharged to home the next day

89 year old man with dyspnea

Baseline

30 day f/u

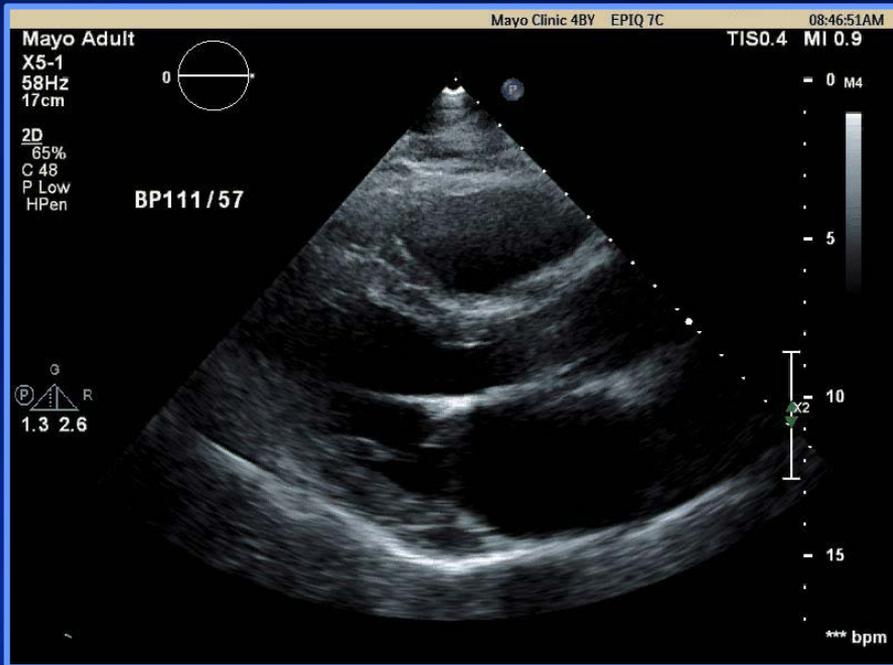


Case #3

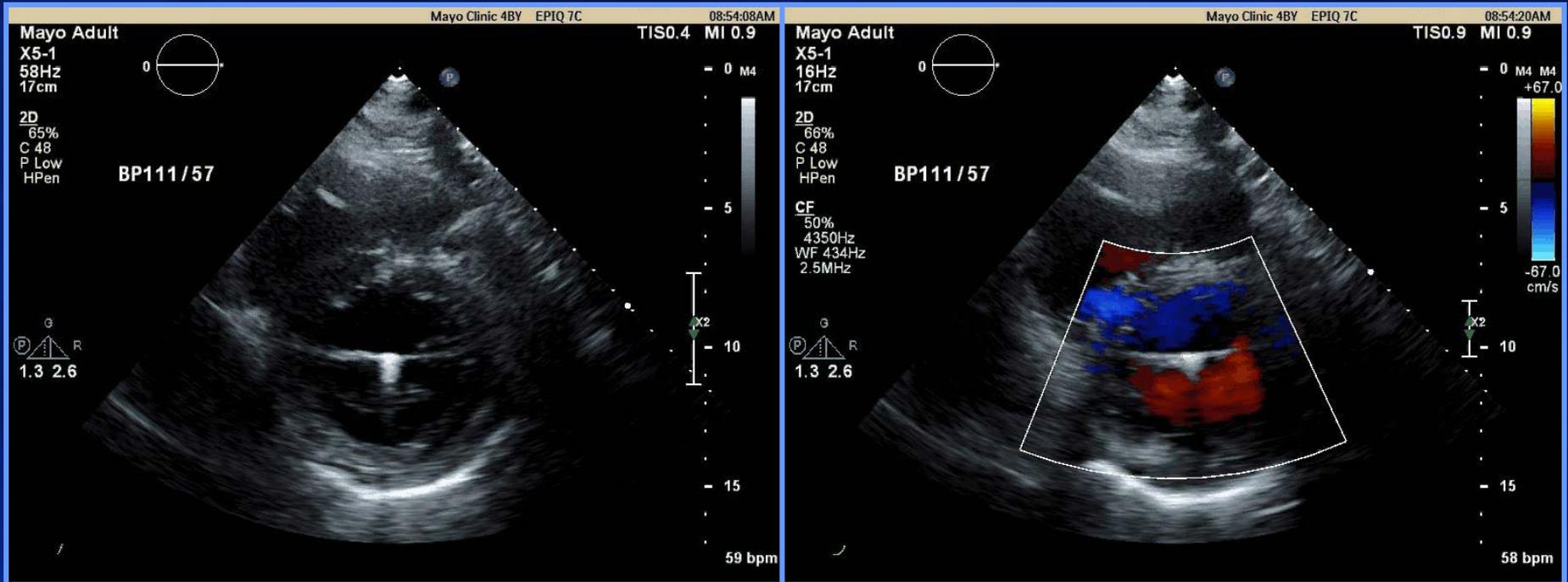
89 year old man with dyspnea

- 30 day follow-up: dyspnea resolved
- 6 min walk: 277 m, 83% predicted
- Participating in cardiac rehab
- TTE: LVEDD 57mm, LVESD 37 mm
- EF: 68%
- RVSP: 56 mmHg
- NT pro BNP 1714

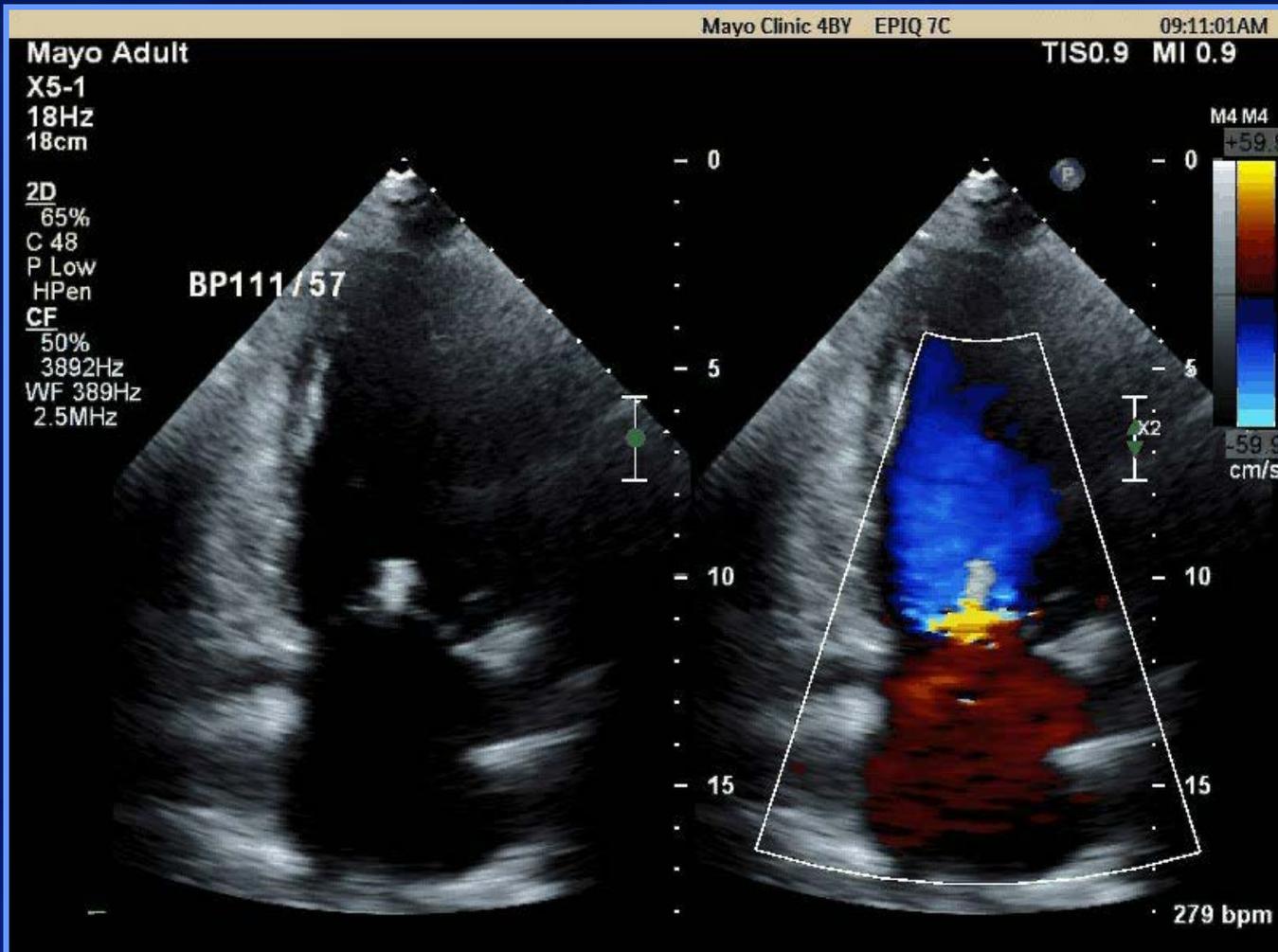
Follow-up TTE



Follow-up TTE



Follow-up TTE: Mild MR





Thank You!

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Backup Slides

MitraClip Procedure

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doi:10.1016/j.jacc.2009.03.077

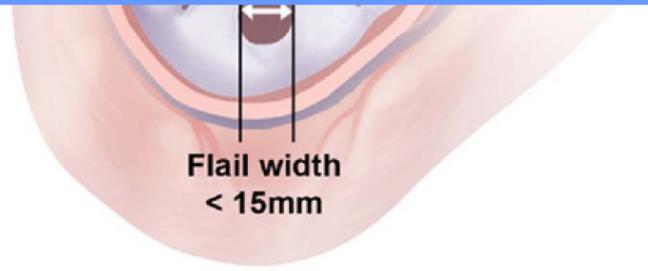
Valvular Heart Disease

Percutaneous Mitral Repair With the MitraClip System

Safety and Midterm Durability in the Initial EVEREST
(Endovascular Valve Edge-to-Edge REpair Study) Cohort

Ted Feldman, MD,* Saibal Kar, MD,† Michael Rinaldi, MD,‡ Peter Fail, MD,§
James Hermiller, MD,|| Richard Smalling, MD, PhD,¶ Patrick L. Whitlow, MD,#
William Gray, MD,** Reginald Low, MD,†† Howard C. Herrmann, MD,‡‡ Scott Lim, MD,§§
Elyse Foster, MD,|||| Donald Glower, MD,¶¶ for the EVEREST Investigators

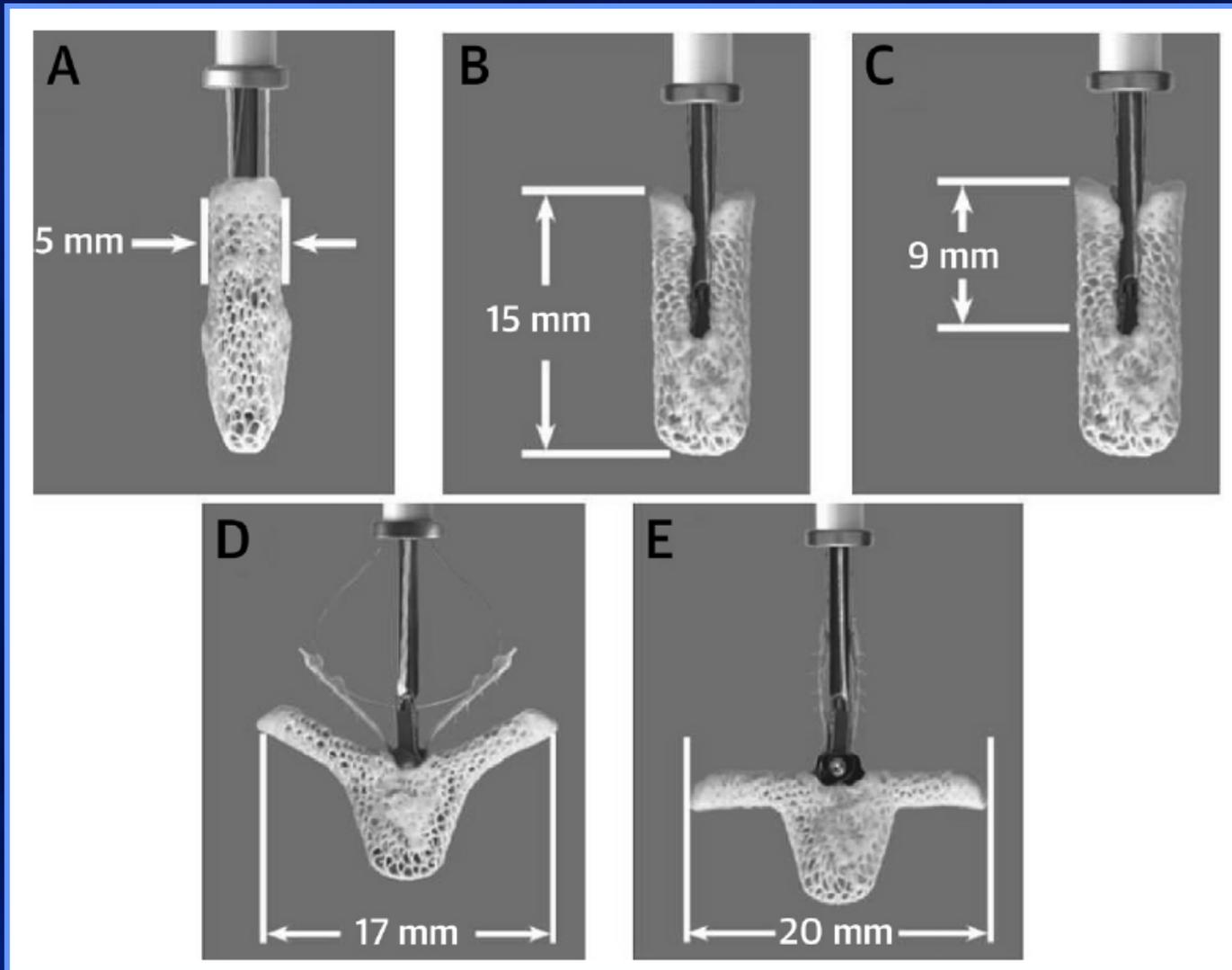
*Evanston, Illinois; Los Angeles, Sacramento, and San Francisco, California; Charlotte and Durham,
North Carolina; Houma, Louisiana; Indianapolis, Indiana; Houston, Texas; Cleveland, Ohio;
New York, New York; Philadelphia, Pennsylvania; and Charlottesville, Virginia*



Flail width
< 15mm

The diagram shows a cross-section of a mitral valve with a flail leaflet. Two vertical lines are drawn from the leaflet's free edge to the annulus to indicate the flail width. The text below the diagram states 'Flail width < 15mm'.

MitraClip Device



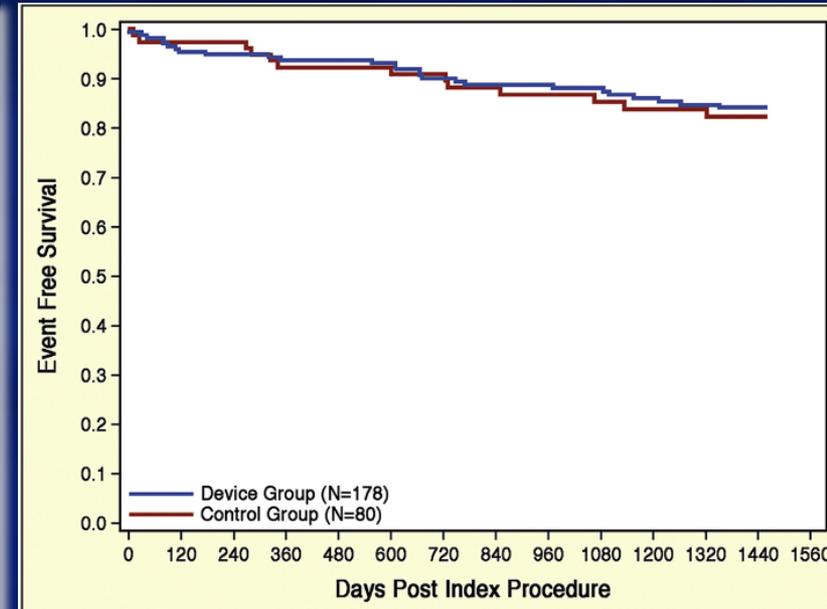
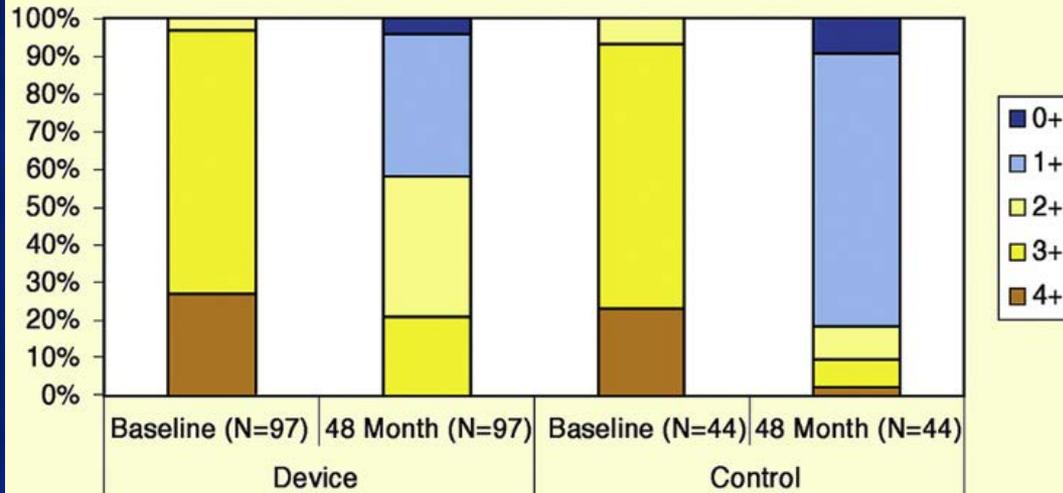
Beigel R...Siegel RJ, MD. *J Am Coll Cardiol* 2014;64:2688–700
(Images provided courtesy of Abbott Vascular^a 2014. All rights reserved.)

3-D Navigation System



EVEREST II Trial 4 Year Results

MR Severity at Baseline and 48 Months



- No difference in 3-4+ MR
- No difference in death or repeat surgery

2014 ACC/AHA Guidelines

Percutaneous Mitral Valve Repair

Recommendations	COR	LOE
Percutaneous MV repair may be considered for severely symptomatic patients (NYHA class III-IV) with chronic severe primary MR (stage D) who have a reasonable life expectancy, but a prohibitive surgical risk because of severe comorbidities	IIb	B

Nishimura RA et al. *JACC* 2014; 63:e57-e185.

TVT Outcomes

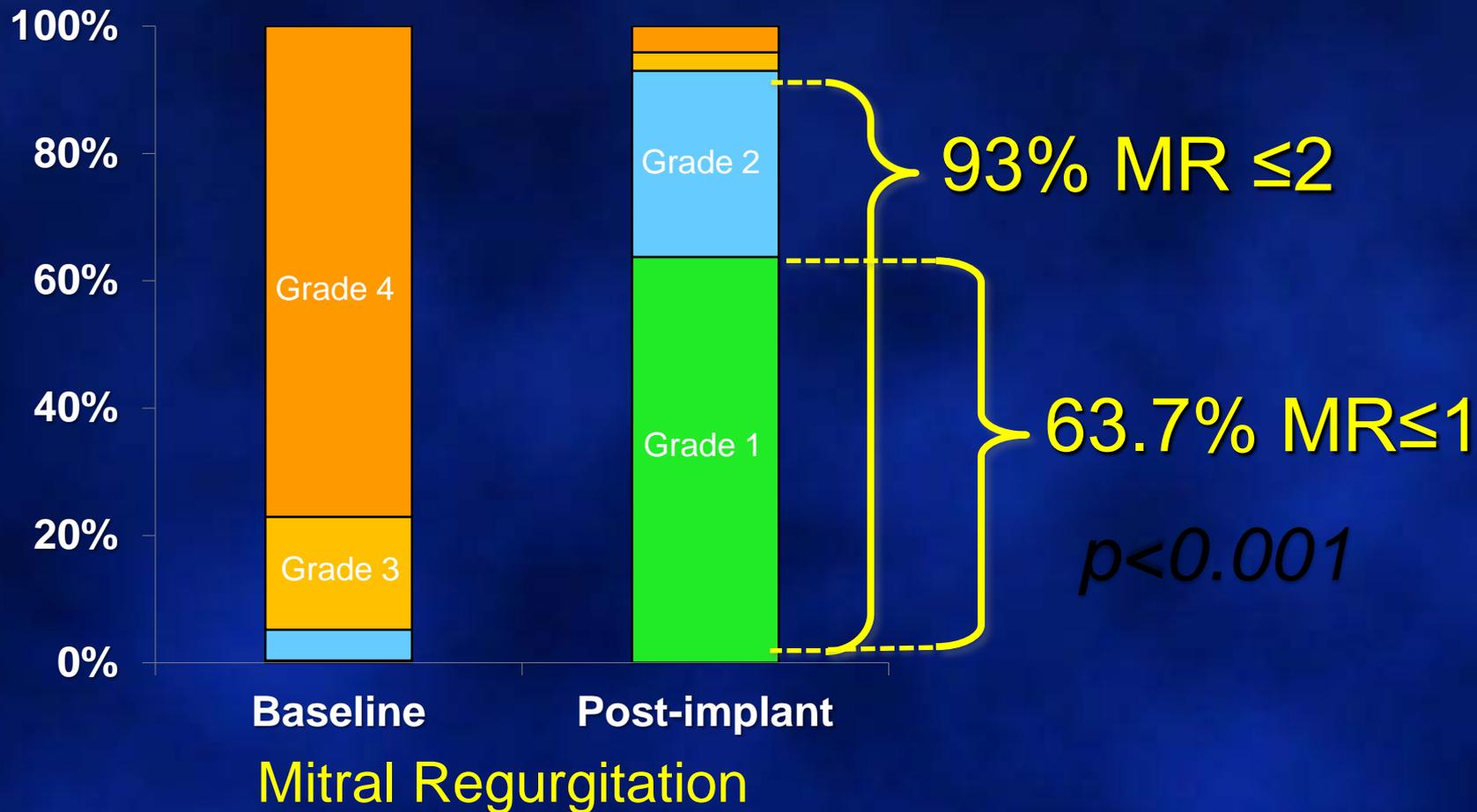
N = 564

- Procedure success.... 91.8%
- Complications..... 7.8%
- Length-of-stay..... 3 d (1.6 d)
- Home discharge..... 81.9%

Adverse Events

Change in Mitral Regurgitation

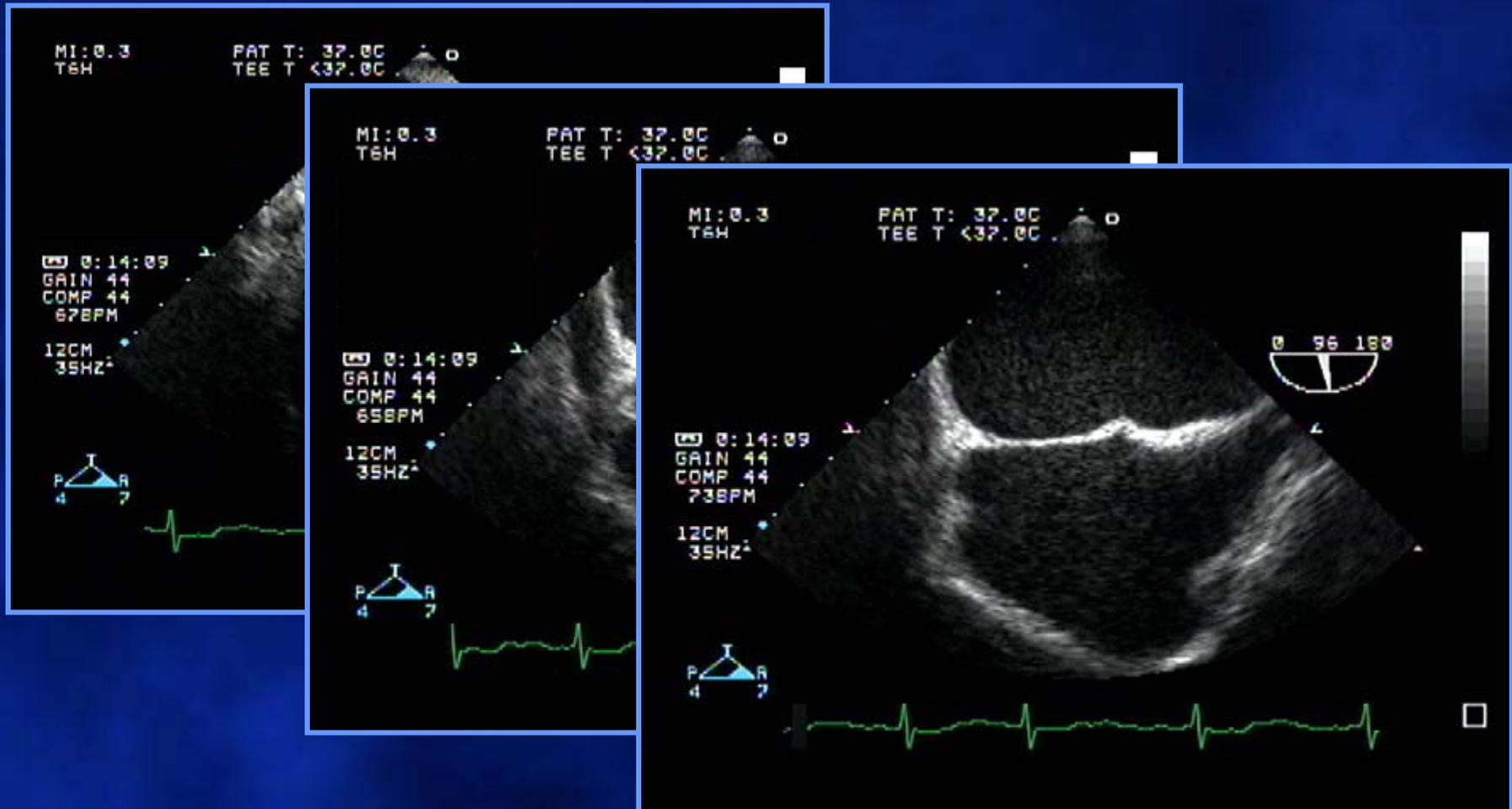
Clip implantation occurred in 94%



Transseptal Puncture

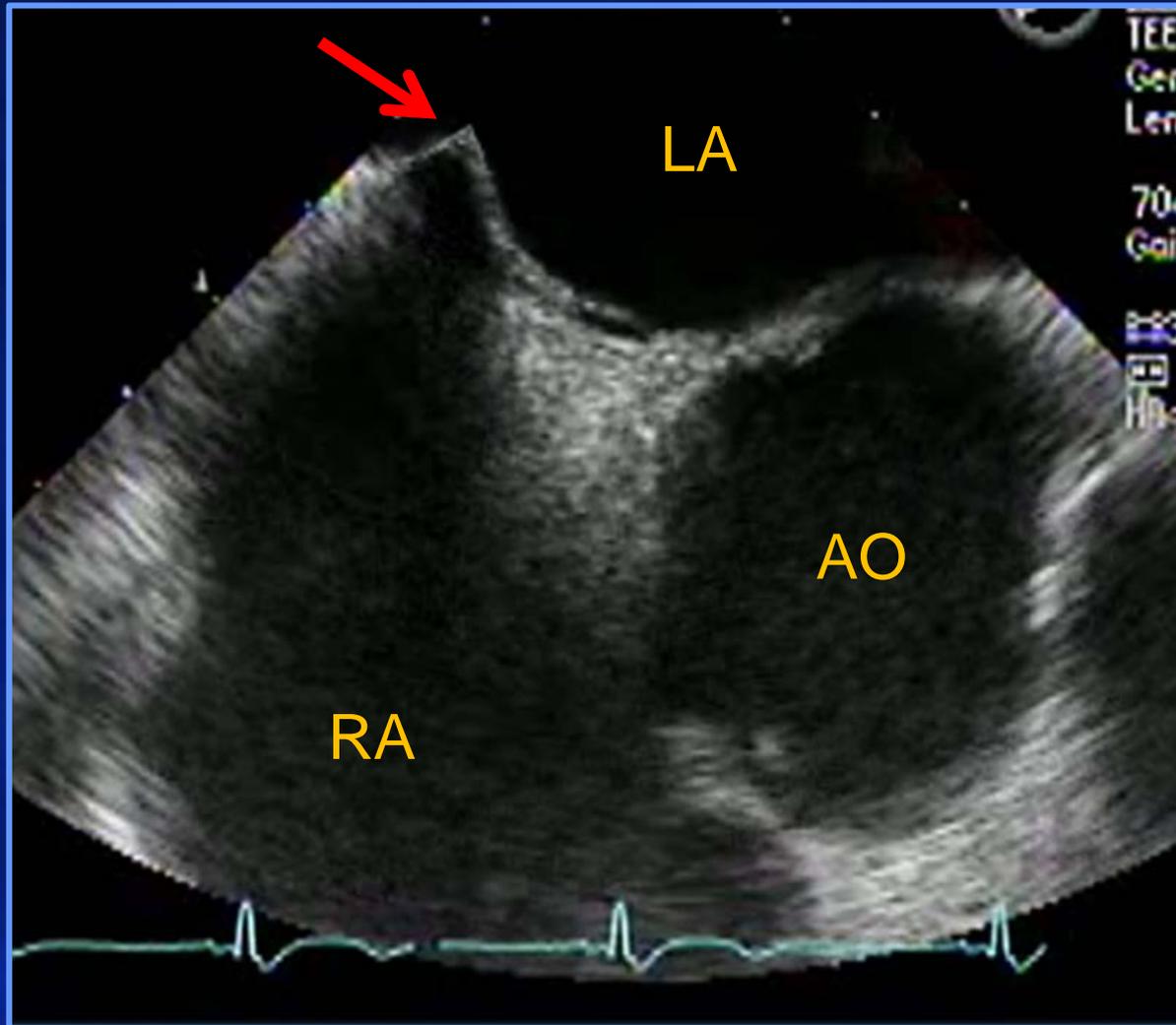
Imaging: Bi-caval, X-Plane

- Pull-Back Technique

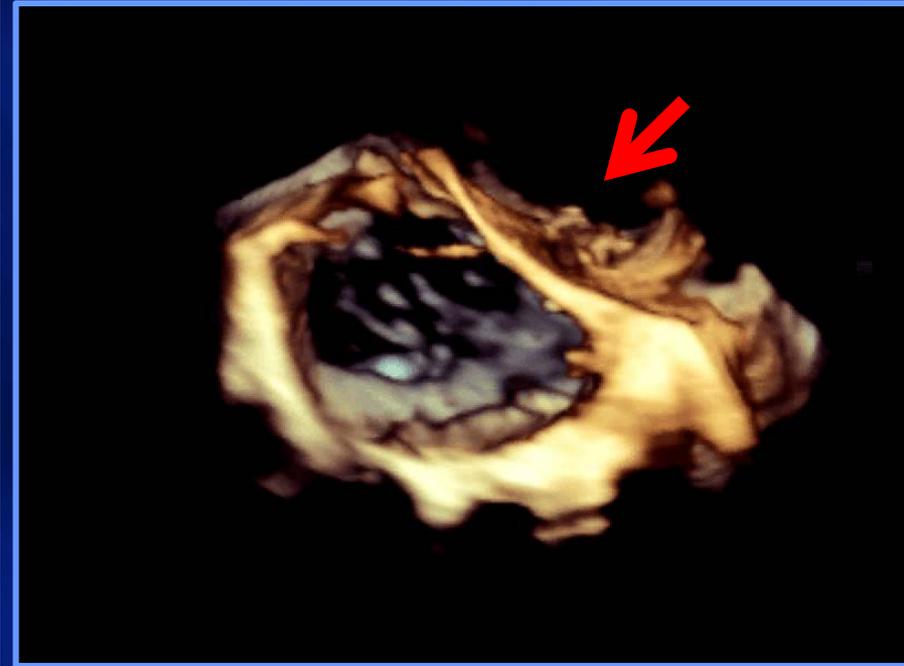
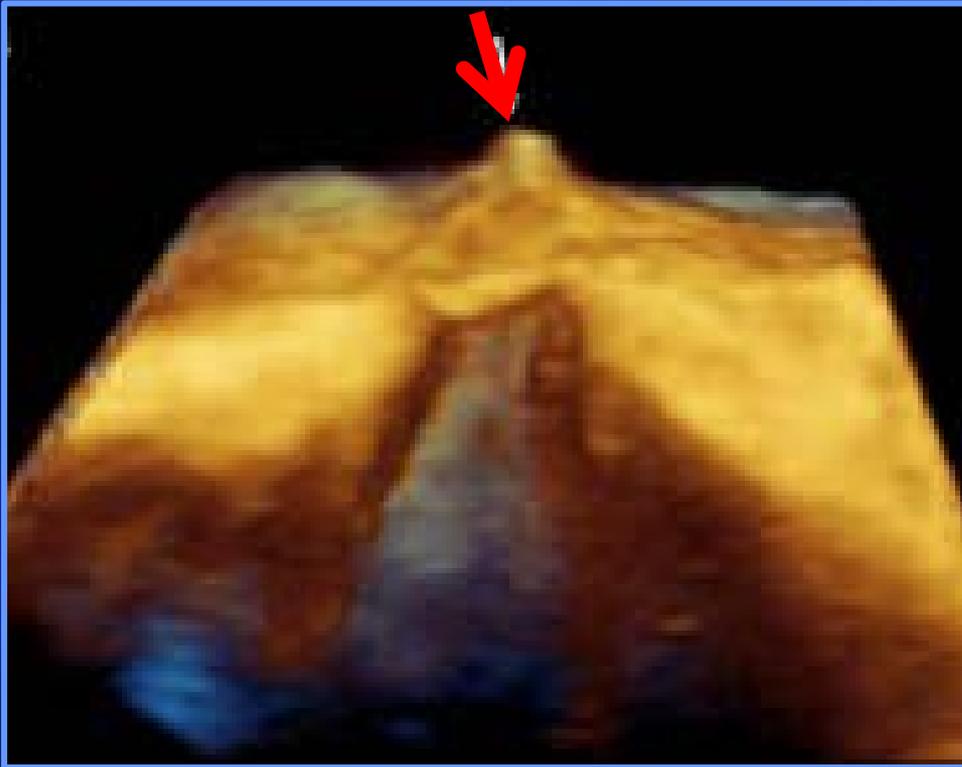


Transseptal Puncture

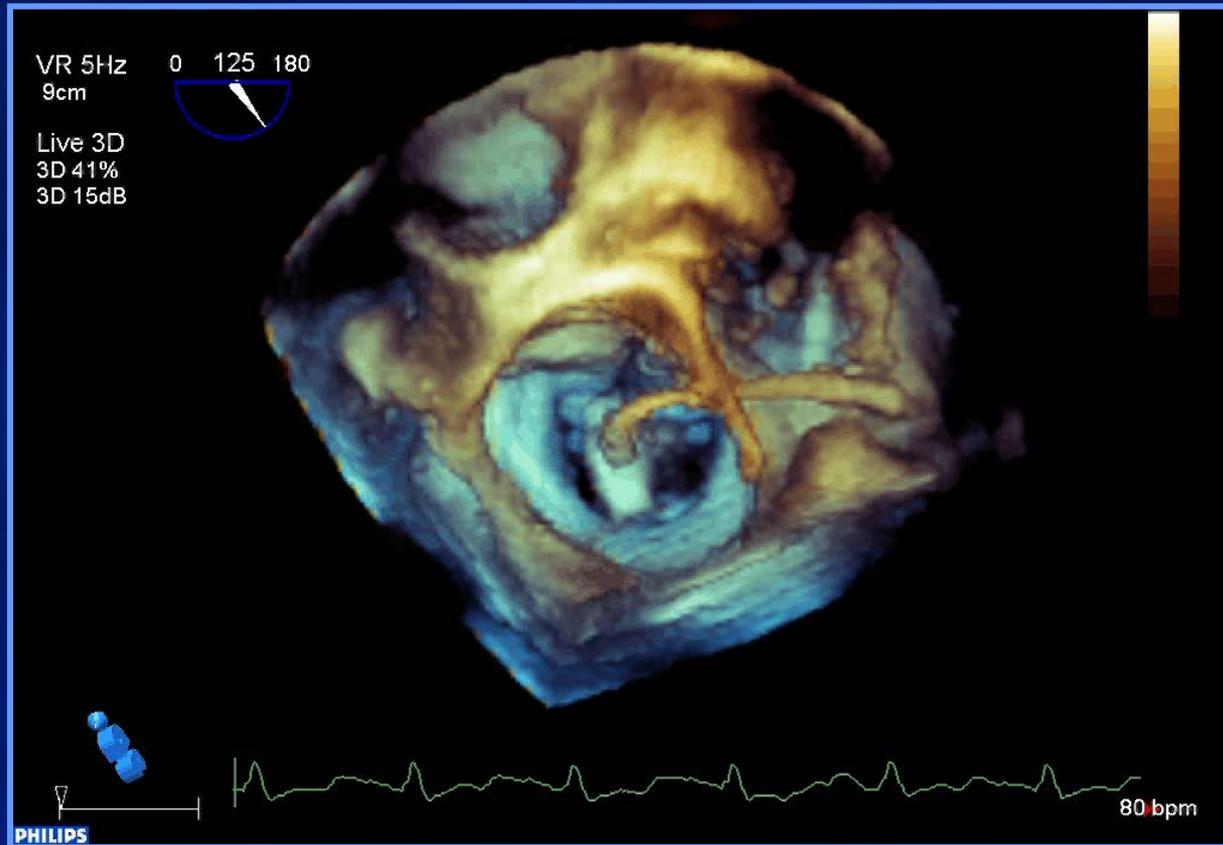
Short Axis at the Base → Posterior Direction



Transeptal Puncture by 3D Echocardiography



Trans-septal Puncture



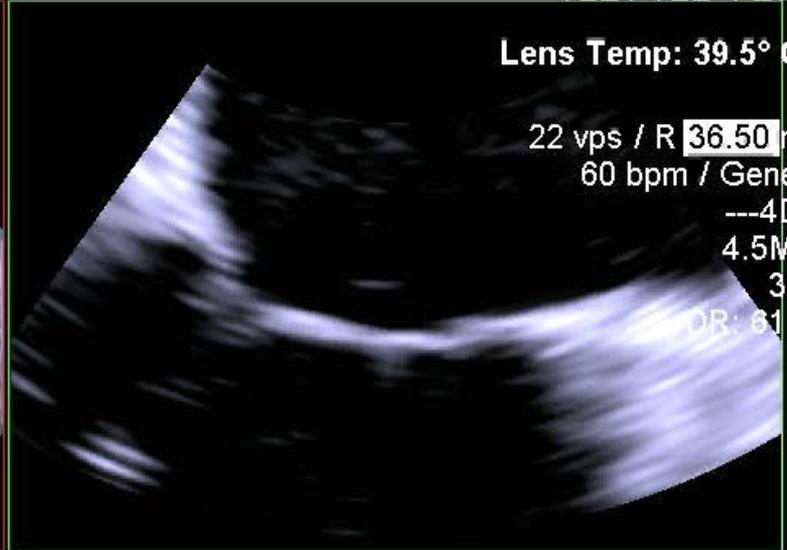
Grasping → Imaging: LVOT



08/11/2015 11:05:03 AM

0dB / MI: 0.77 / TIS: 0.32

TEE / TEE* / Z6Ms



Lens Temp: 39.5° C

22 vps / R 36.50 mm

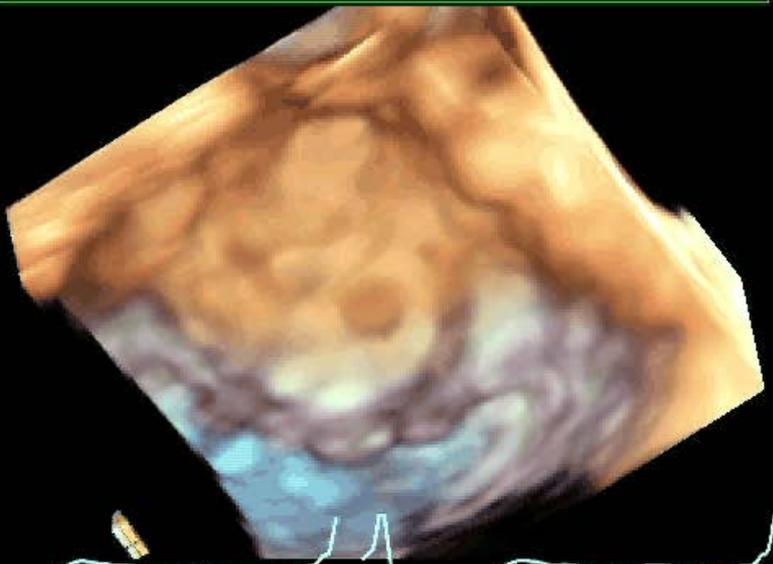
60 bpm / General

---4D---

4.5MHz

3 dB

DR: 61 dB



08/11/2015 11:09:34 AM

0dB / MI: 1.06 / TIS: 0.40

TEE / TEE* / Z6Ms

Lens Temp: 39.7° C

13 vps / R 36.50 mm

60 bpm / General

---4D---

4.5MHz

-1 dB

DR: 61 dB

---Color---

CDV / 3.3MHz

2.5 dB



0.77 m/s

0.77 m/s

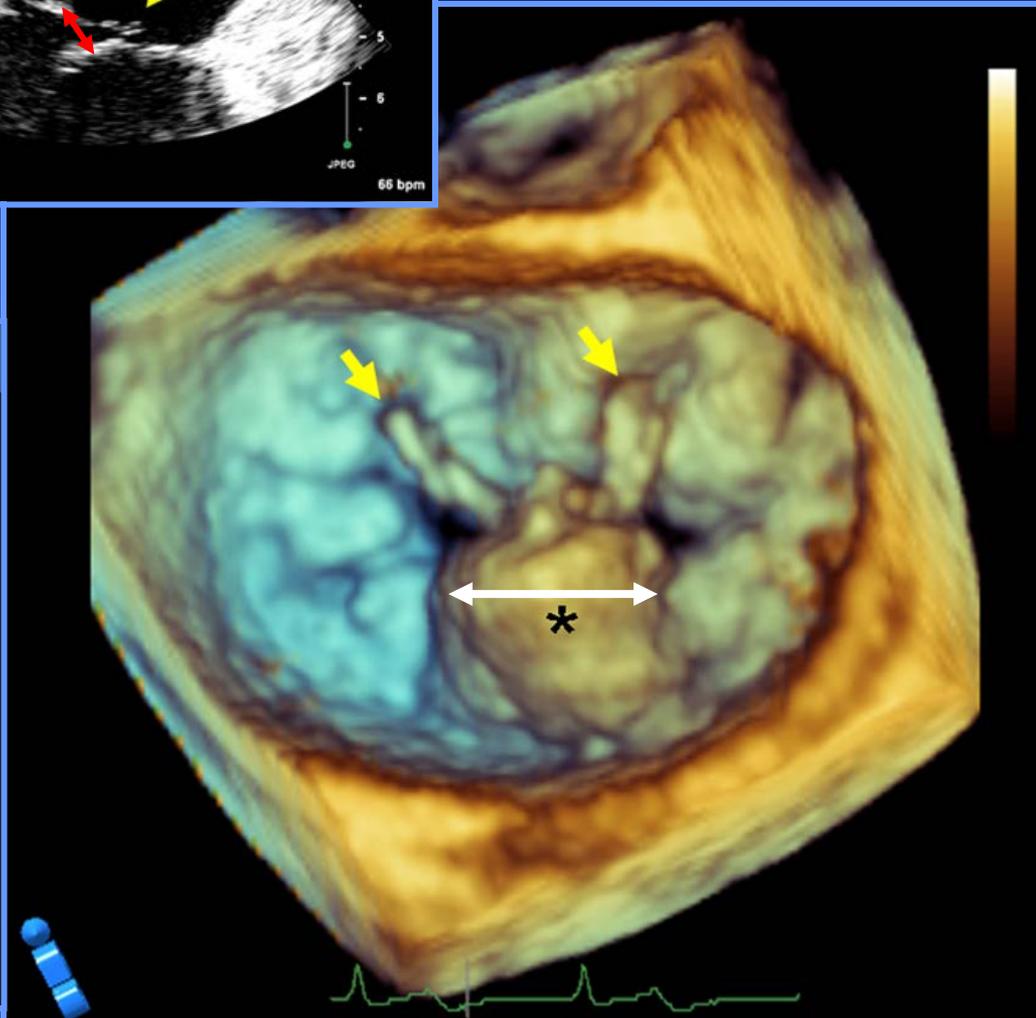


Flail Gap and Width

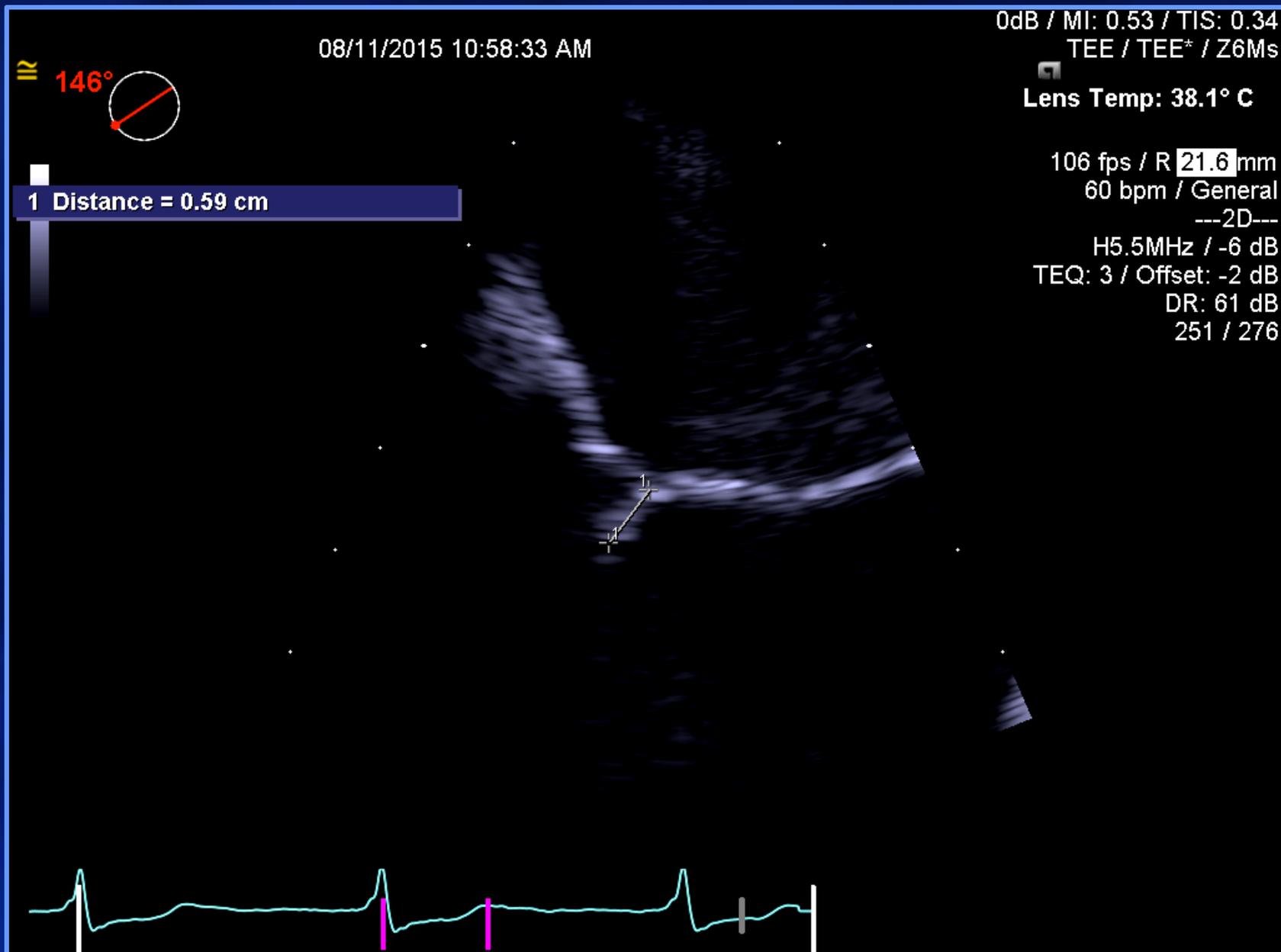


↓ 3D TEE ↓

↓ 3D TEE ↓



Coaptation Length



Large Atrial Shunt → ASD Occluder Placed

