

AP VALVES & STRUCTURAL HEART 2022

새로 시작하는 센터를 위한 MitraClip 가이드
대상환자찾기: 심초음파 스크리닝의 모든 것

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Disclosure

- I have no financial relationships to disclose

Contents

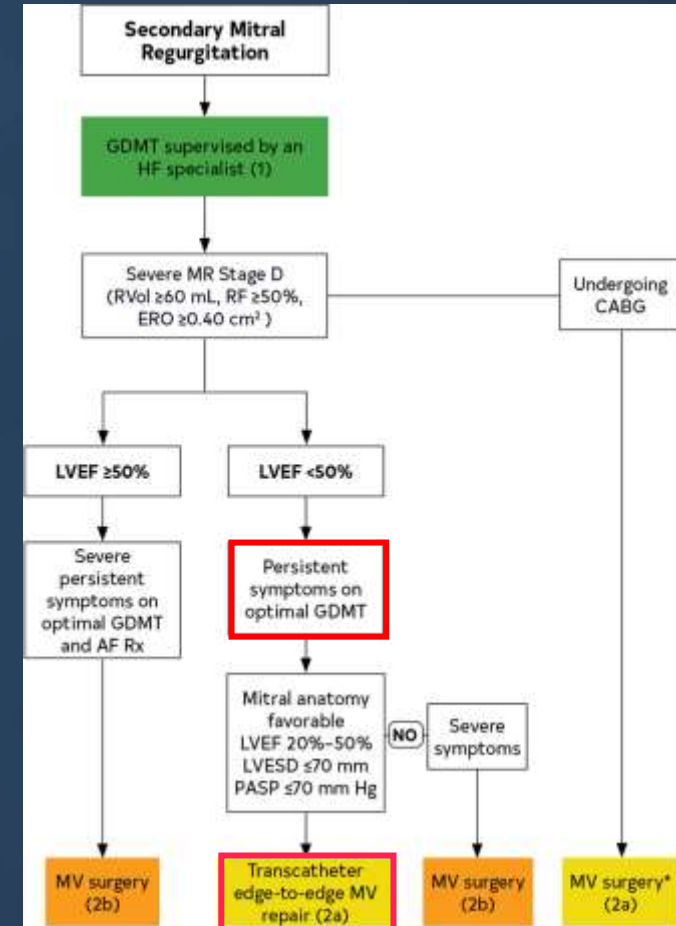
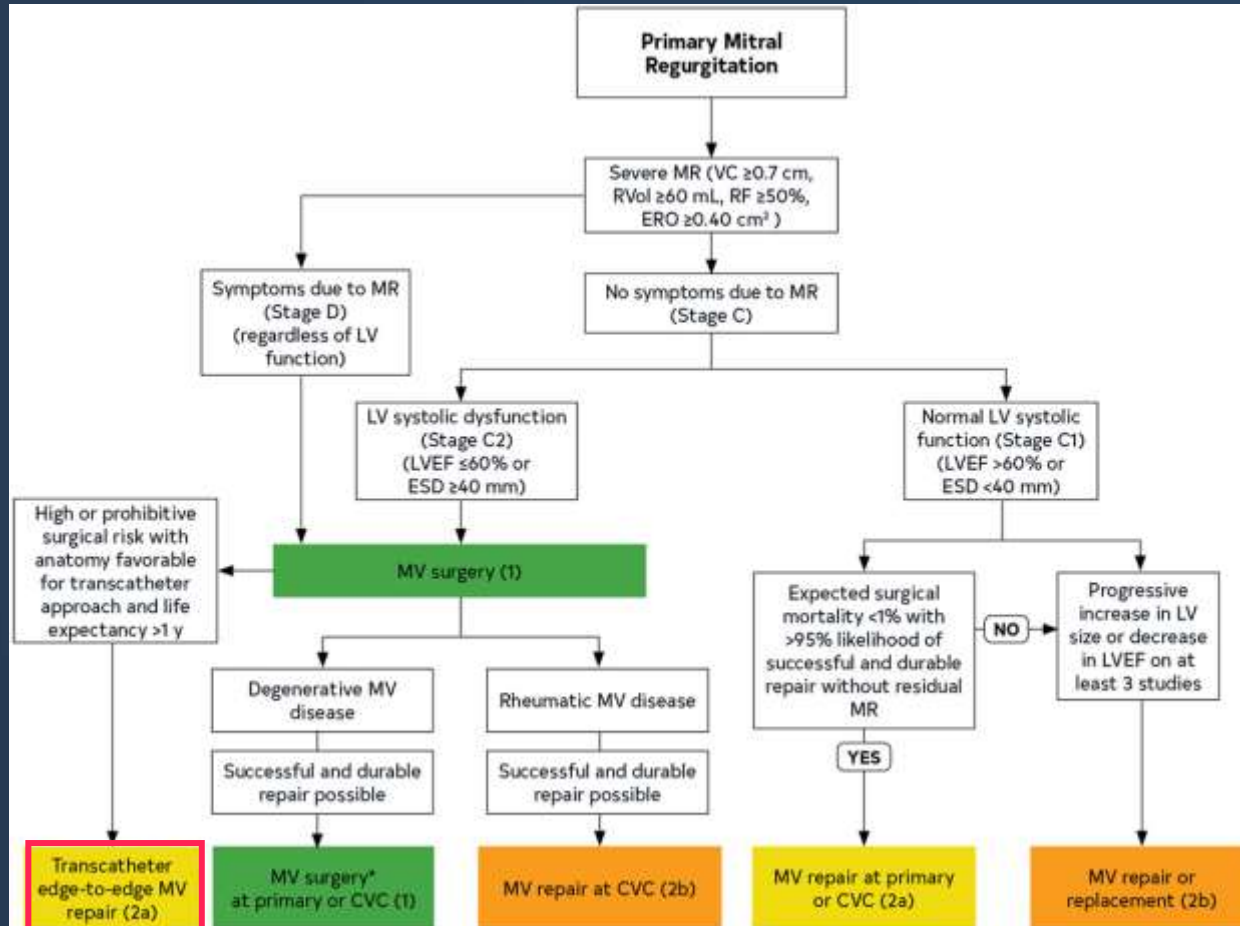
- **Optimal Candidate to TEER – clinical perspectives**
- **Anatomically suitable MV anatomy for TEER**
- **Proper assessment of MR severity**

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The Guideline says..

2020 ACC/AHA Guideline for the Management of Valvular Heart Disease

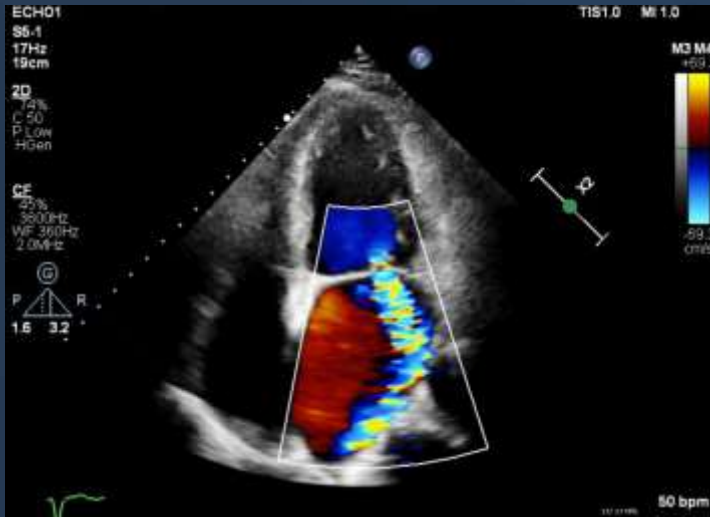


TEER Highlights from ACC/AHA VHD Guidelines

- TEER for primary MR
 - 2014 Class 2b → 2020 Class 2A
 - Recommendation of TEER expanded to include *surgical high-risk* patients
 - Condition for optimal GDMT for patient is removed
- TEER for secondary MR
 - New 2020 Class 2A
 - Recommended for a COAPT-like subset of severe secondary MR patients
 - *20% < LVEF < 50%, LVESD ≤ 70mm, PASP ≤ 70mmHg*
 - Persistent symptoms while GDMT
 - Optimal GDMT by a cardiologist expert

COAPT vs. MITRA-FR trial

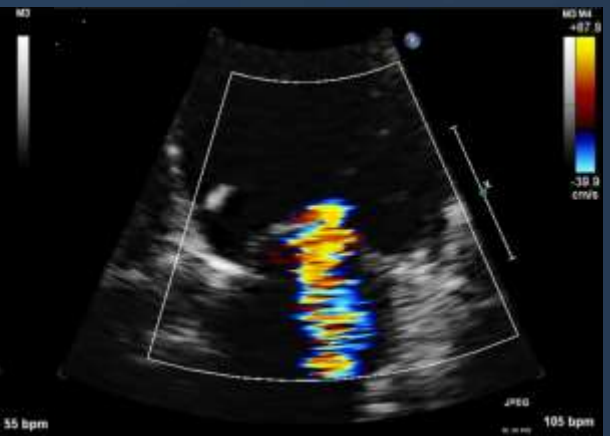
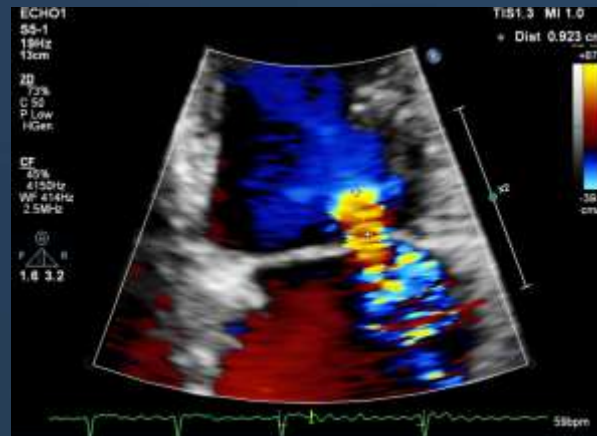
Disproportionate vs. Proportionate MR



LVEDD = 63 mm
LVESD = 47 mm
LVEF = 47%
LVEDV = 198 cc
LVESV = 102 cc
ERO = 0.42 cm²



LVEDD = 72 mm
LVESD = 65 mm
LVEF = 30%
LVEDV = 265 cc
LVESV = 185 cc
ERO = 0.39 cm²



Determinants of TEER efficacy in 2ndary MR

Optimal	Conditionally suitable	Unsuitable
NYHA class II-III Non-ischemic CMP Disproportionate MR EROA/LVEDV ratio >0.14 LVEDV index <96mL/m ² Preserved RV function No pulmonary hypertension ECV on cardiac MR <30%	NYHA class IV Ischemic CMP Proportionate MR RV dysfunction with contractile reserve Reversible pulmonary hypertension ECV on cardiac MR >30%	NYHA class IV, frequent HHF ICMP with large infarct size (>30%) Advanced LV disease (pVO ₂ <10ml/kg/min) EROA/LVEDV ratio <0.12 RV dysfunction without contractile reserve Irreversible pulmonary hypertension NT pro BNP >10,000 pg/mL

Adapted from Tanya Salvatore et al. Front Cardiovasc Med. 2021 Feb 3;8:585415

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Suitable MV morphology for TEER

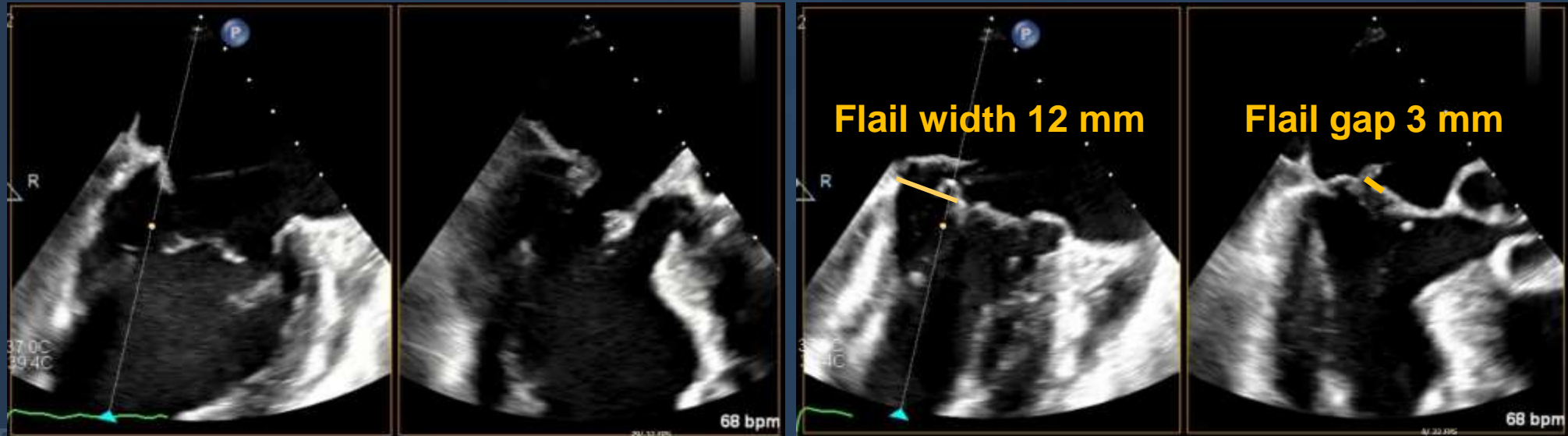
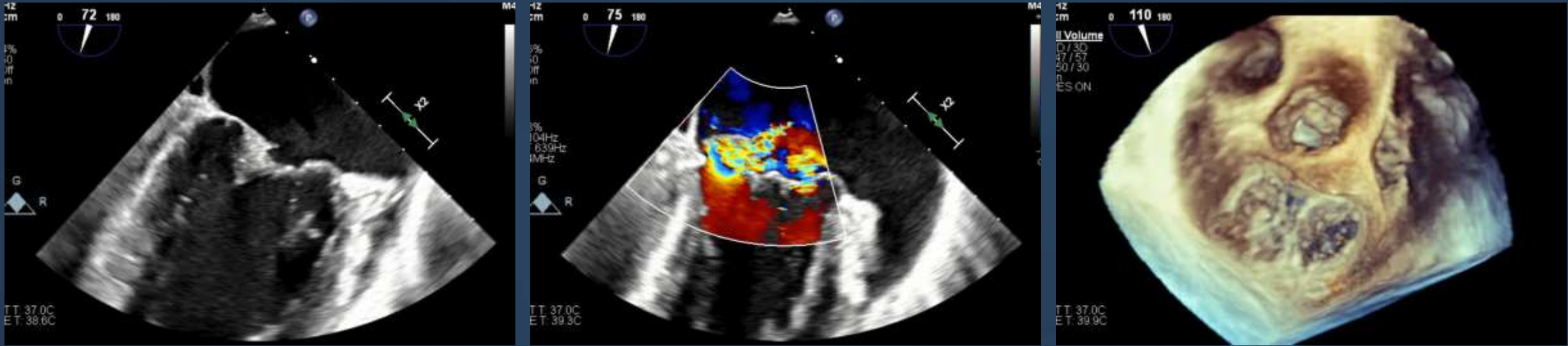
2020 Focused Update of 2017 ACC expert consensus decision pathway

	Favorable Features*	Less Favorable or Unfavorable Features*
Location of Leaflet Pathology	Noncommissural pathology (medial, middle, lateral segments)	Commissural segments, leaflet perforations, or clefts
Calcification	No or minimal calcification	<ul style="list-style-type: none"> ■ Severe leaflet calcification or calcification in area of grasping zone ■ Severe annular calcification
Mean MV Gradient	Transmitral gradient <4 mm	Mitral stenosis (rheumatic or calcific; mean mitral gradient >5 mm Hg)
MVA	MVA ≥4.0 cm ²	MVA <4.0 cm ²
Grasping Zone Length	>10 mm	<7 mm
Primary MR	Flail width <15 mm; flail gap <10 mm; single segment pathology Normal leaflet thickness	<ul style="list-style-type: none"> ■ Flail width >15 mm and flail gap >10 mm ■ Multisegment pathology; highly mobile flail leaflet with multiple ruptured chords ■ Severely and diffusely thickened (5 mm in diastole) and redundant leaflets (Barlow's type valve); LVESD >55 mm
Secondary MR	Coaptation depth <11 mm; coaptation length (overlap length) ≥2 mm	LVESD >70 mm

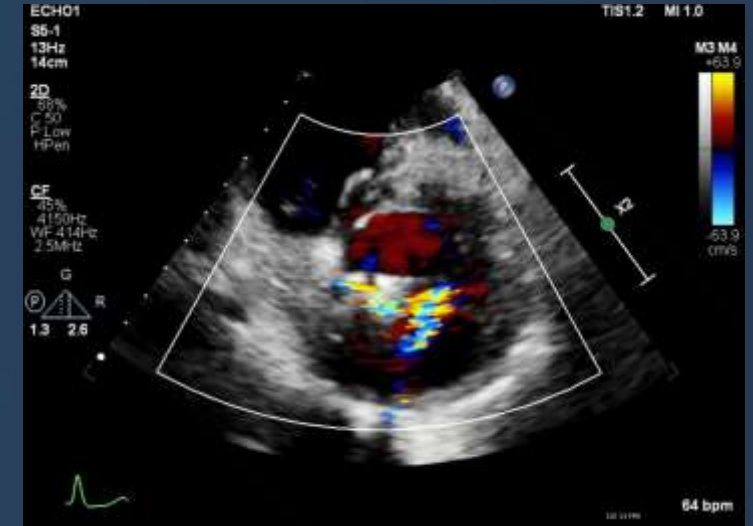
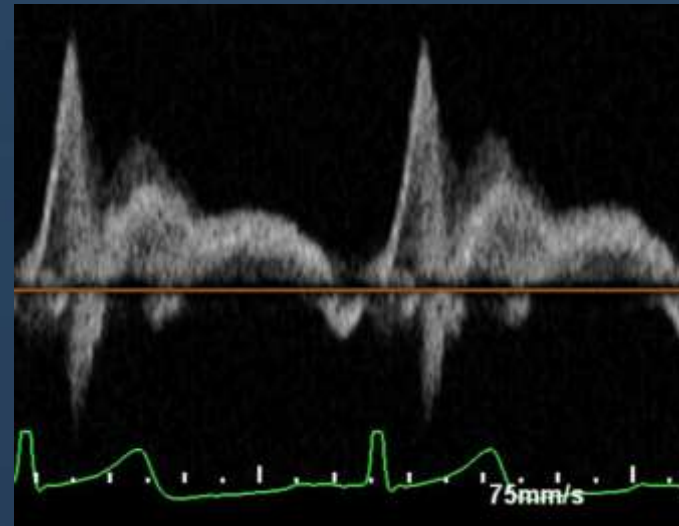
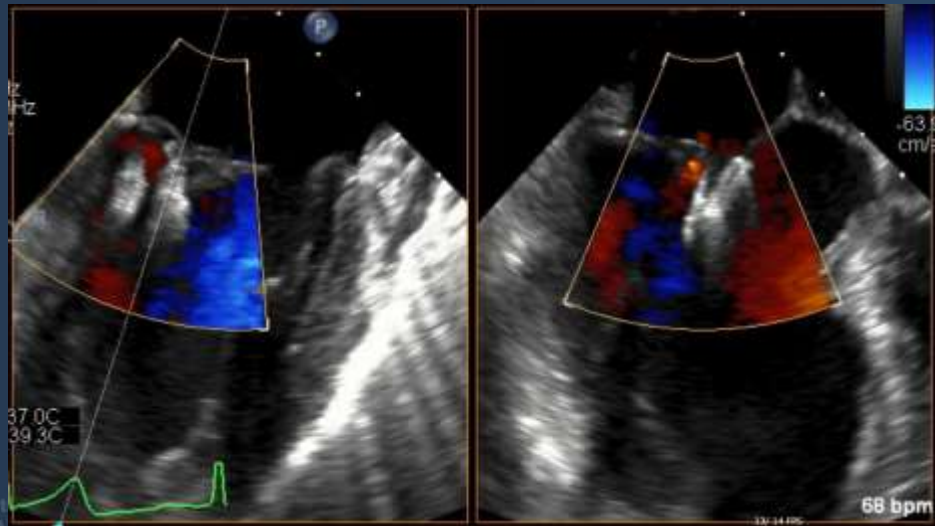
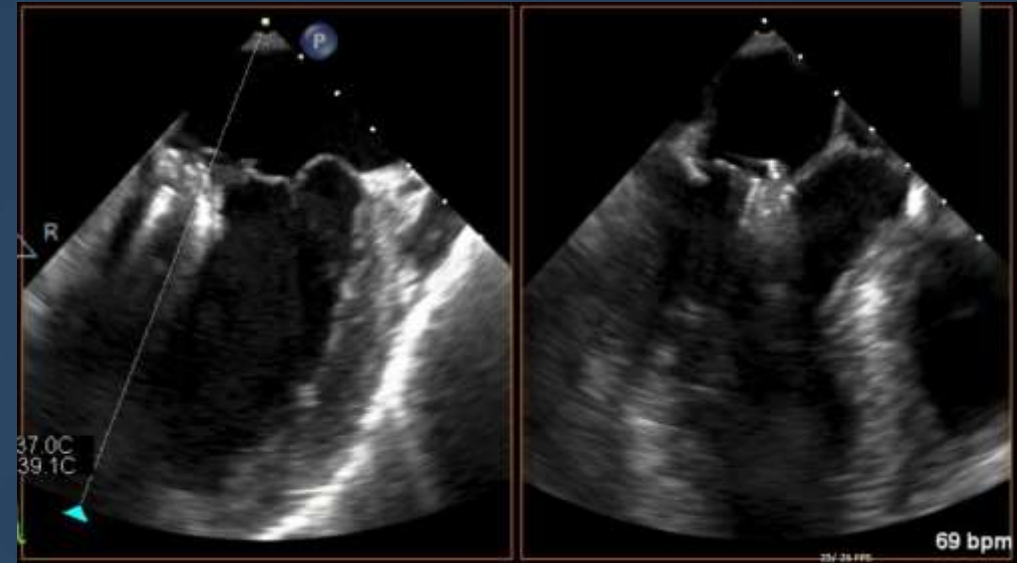
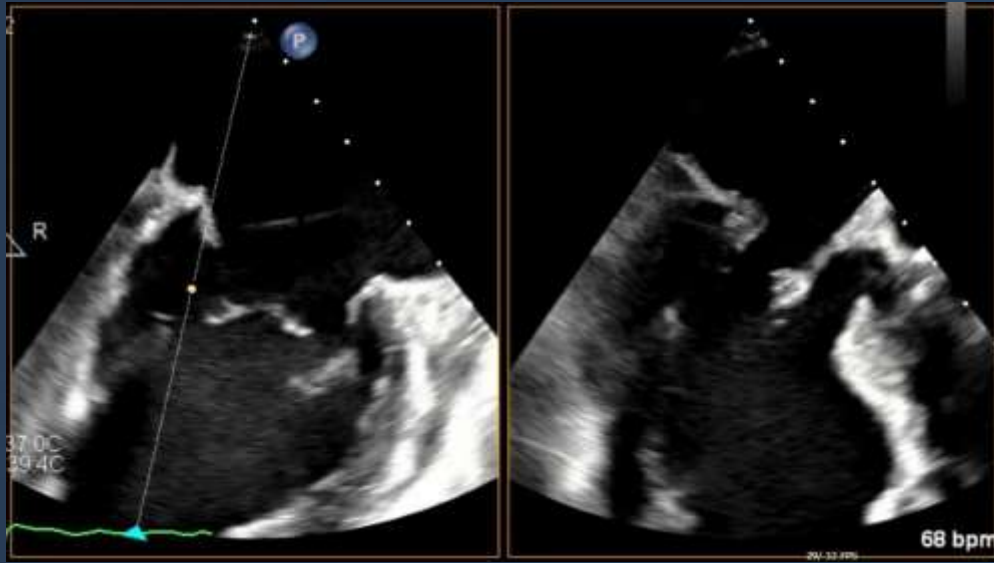
*Knowledge continues to evolve regarding case selection; highly experienced operators at comprehensive valve centers may achieve good procedural results in selected cases with unfavorable anatomic features.

LVESD = left ventricular end-diastolic dimension; MR = mitral regurgitation; MV = mitral valve; MVA = mitral valve area.

80 / M, NYHA class IV

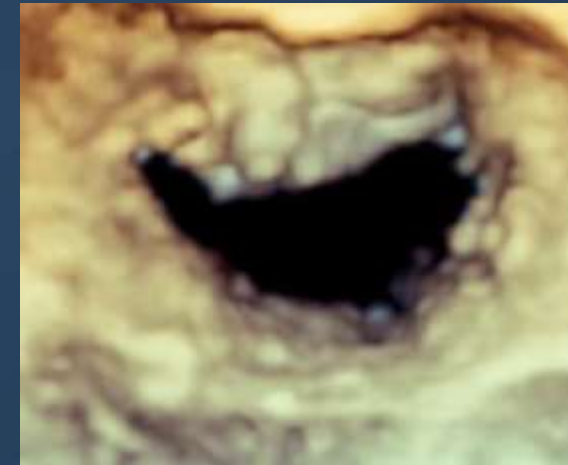
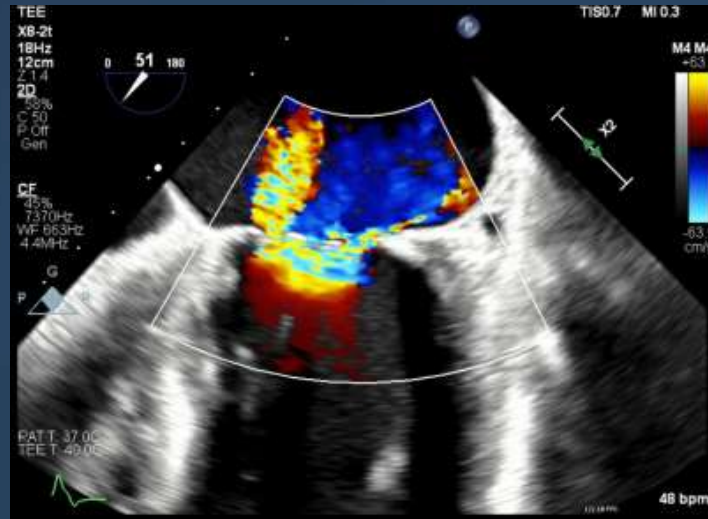


Intra- and Post-TEER

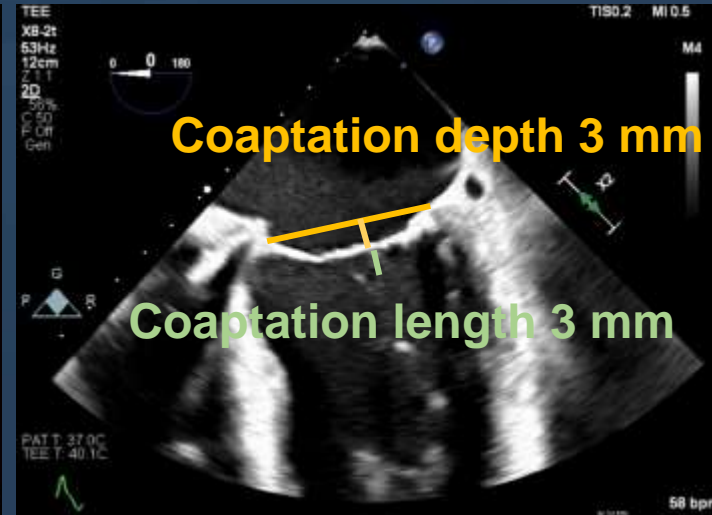


79 / M, NYHA class III

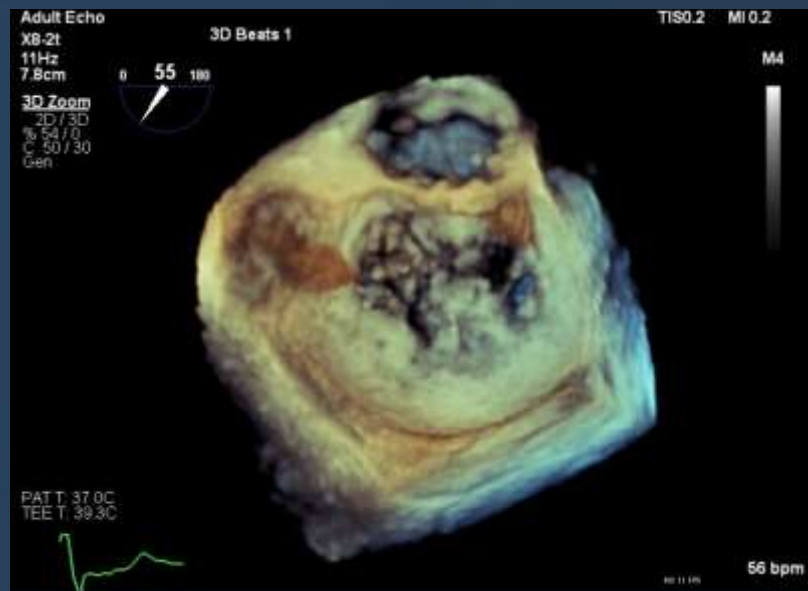
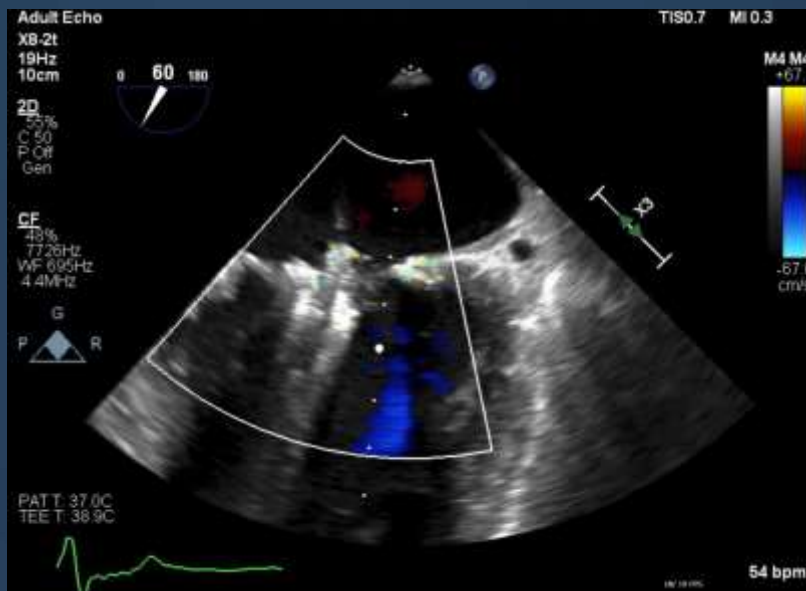
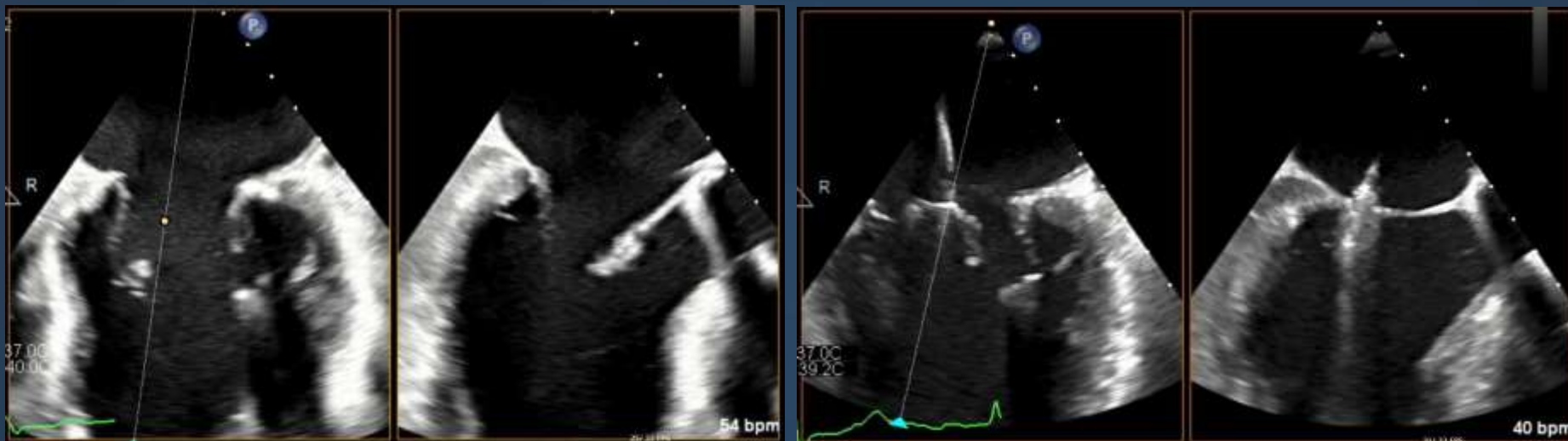
s/p AVR (1997), cardiac cirrhosis, A.fib, 1 VD (pRCA 60% tubular lesion)



LVEDD = 62 mm
LVESD = 44 mm
LVEF = 43%
LVEDV = 192 cc
LVESV = 110 cc
ERO = 0.48 cm²



Intra- and Post-TEER

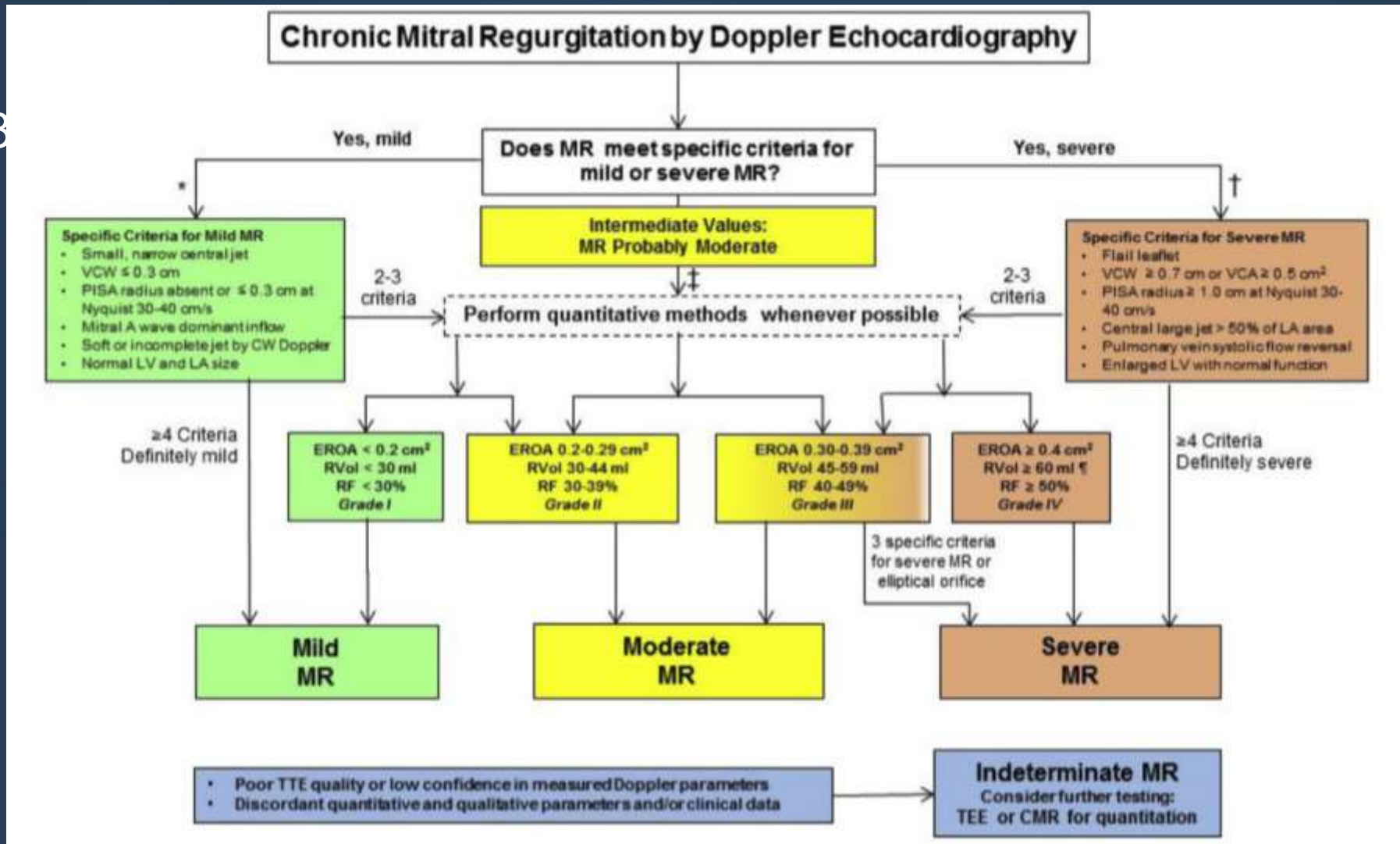


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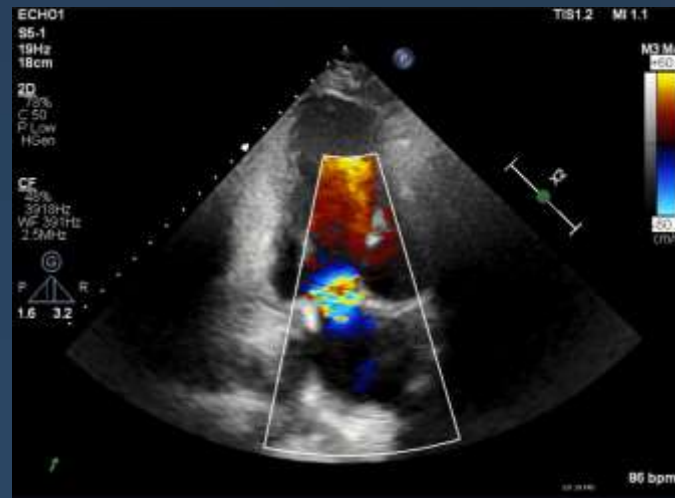
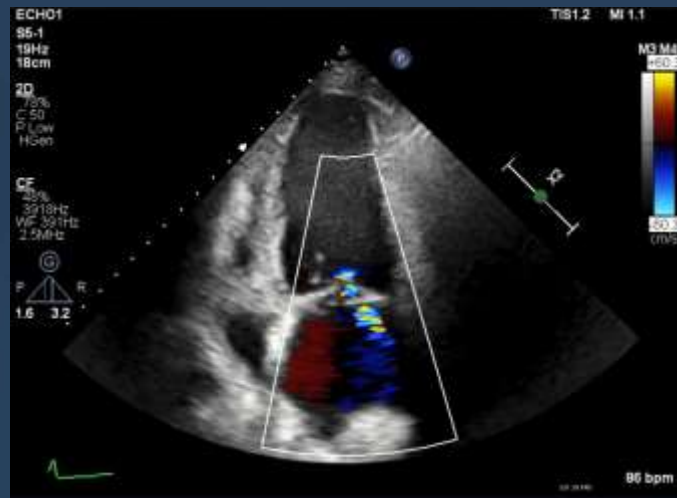
True Severe MR?

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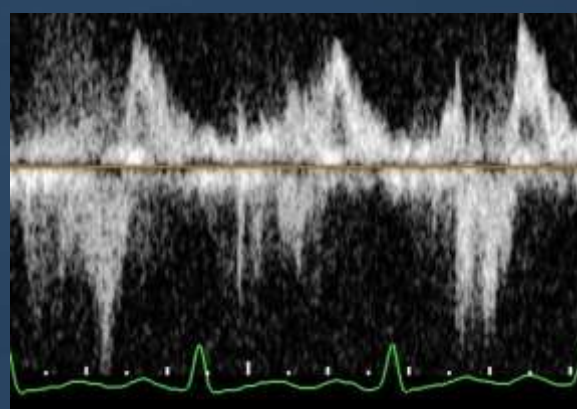
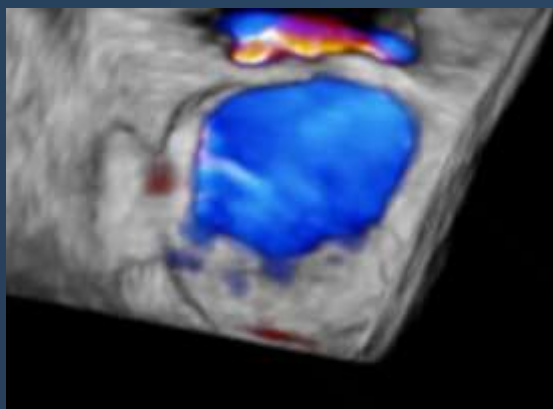
Over- and Under-estimated MR

- Overestimation
 - High blood pressure, high LV systolic pressure (AS, LVOTO), MR Vmax >6.0 m/s
 - Single frame measurements (PISA, VCW, VCA) in non-holosystolic MR
- Underestimation
 - High LA pressure, low LV ejection fraction or Large LA and LV volumes
- ***Adjunctive criteria supporting severe MR***
 - Dense triangular CW Doppler profile, a well-aligned CW MR jet velocity <4.5 m/s
 - Dilated LA and LV, PASP >50mmHg with no other cause, systolic PV flow reversal and significant mitral inflow E wave dominance with high velocity (>1.2 to 1.5 m/s)



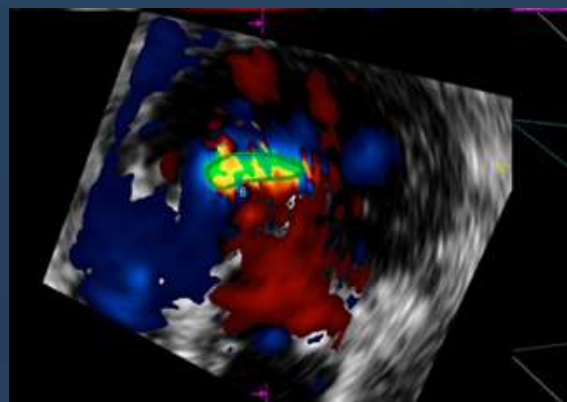
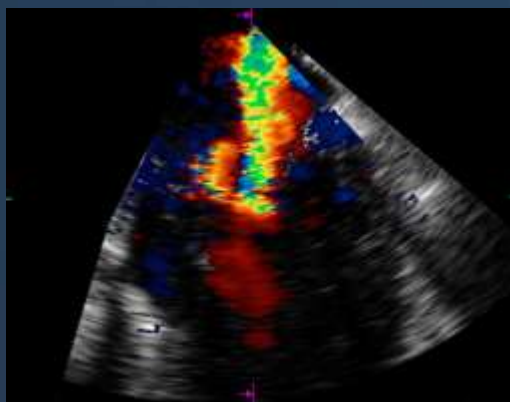
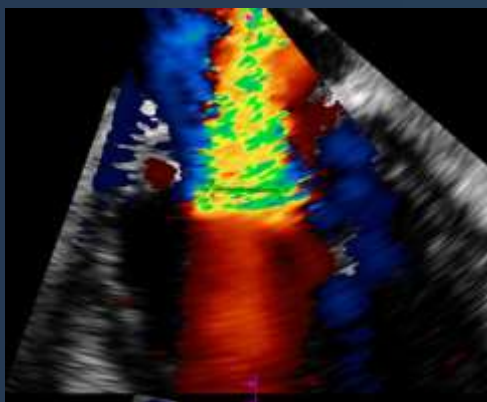
LVEDD = 72 mm
LVEDS = 65 mm
LVEF = 28%
LVEDV = 265 cc
LVESV = 185 cc

ERO = 0.26 cm²



3D MR flow

**Pulmonary venous
systolic flow reversal**



VCW = 12 x 5 mm
VCA = 0.71 cm²

TTE

- Quantitation of MR using integrated method*; confirm moderately severe or severe MR
 - Distinguish mechanism of MR: primary versus secondary (versus mixed)
 - Measure MVA on short axis images at mitral valve level, confirm MVA $\geq 4.0 \text{ cm}^2$
- Exclude mitral stenosis (calcific or rheumatic) with mean transmitral gradient $>5 \text{ mm Hg}$



Clinical Assessment

- Confirm NYHA status
- Assess adequacy of GDMT, as well as CRT and revascularization when indicated
- Confirm MDT consensus recommendation for transcatheter treatment



TEE (2D and 3D)

- Confirm mechanism of MR and location of MR jet(s); exclude perforations and clefts
- Assess for presence and location of calcification†
- For primary MR, confirm location and number of prolapsed segments; confirm features of favorable pathoanatomy:
 - grasping zone $\geq 10 \text{ mm}$ and without calcification
 - flail width $<15 \text{ mm}$
 - flail gap $<10 \text{ mm}$
 - single middle segment prolapse
- For secondary MR, confirm features of favorable pathoanatomy:
 - grasping zone $\geq 10 \text{ mm}$ and without calcification
 - coaptation depth $<11 \text{ mm}$
 - coaptation length (overlap length) $>2 \text{ mm}$

Conclusion

- **Selection of the optimal candidate for MitraClip is the best way to succeed in the procedure**
- **As the TEER procedure becomes more proficient, the scope of the candidate can also be expanded**
- **Use more metrics to determine MR severity other than PISA or volume methods**