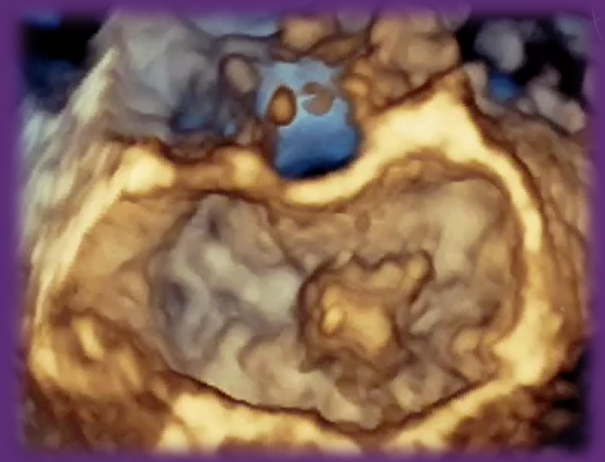
2023 PCR imaging valves madrid

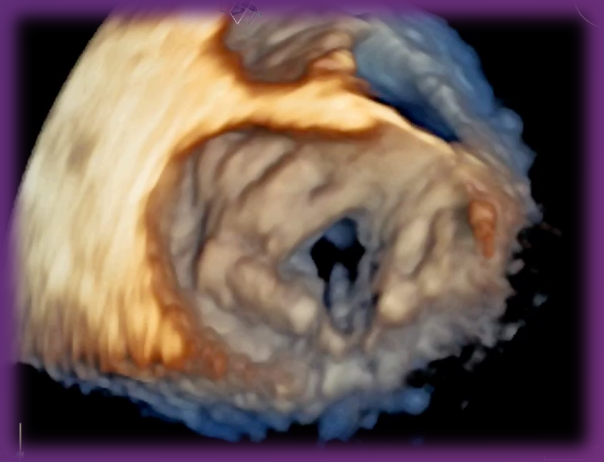
Essentials: Episode 2

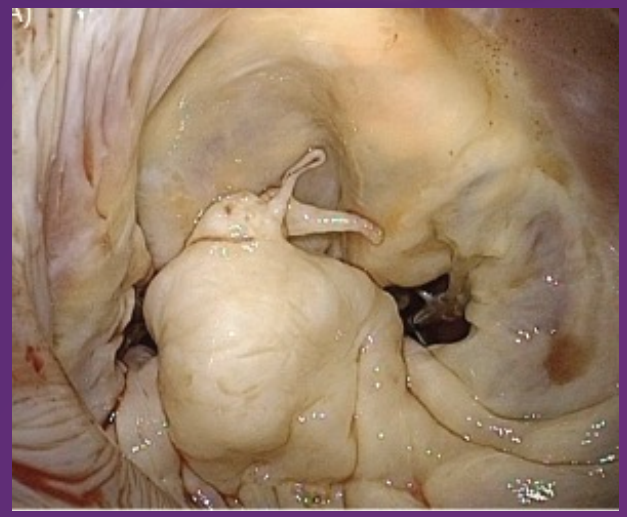
Mitral valve disease: new hopes

Imaging-Based Diagnosis of Mitral Regurgitation Type

Primary MR: FED vs Barlow

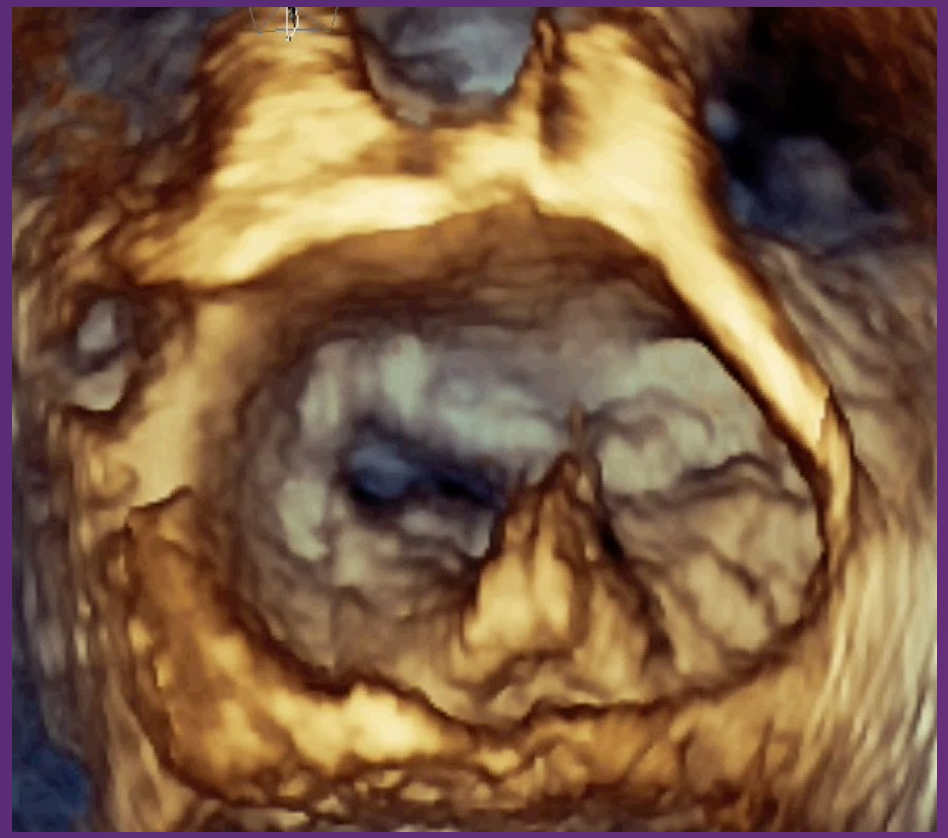




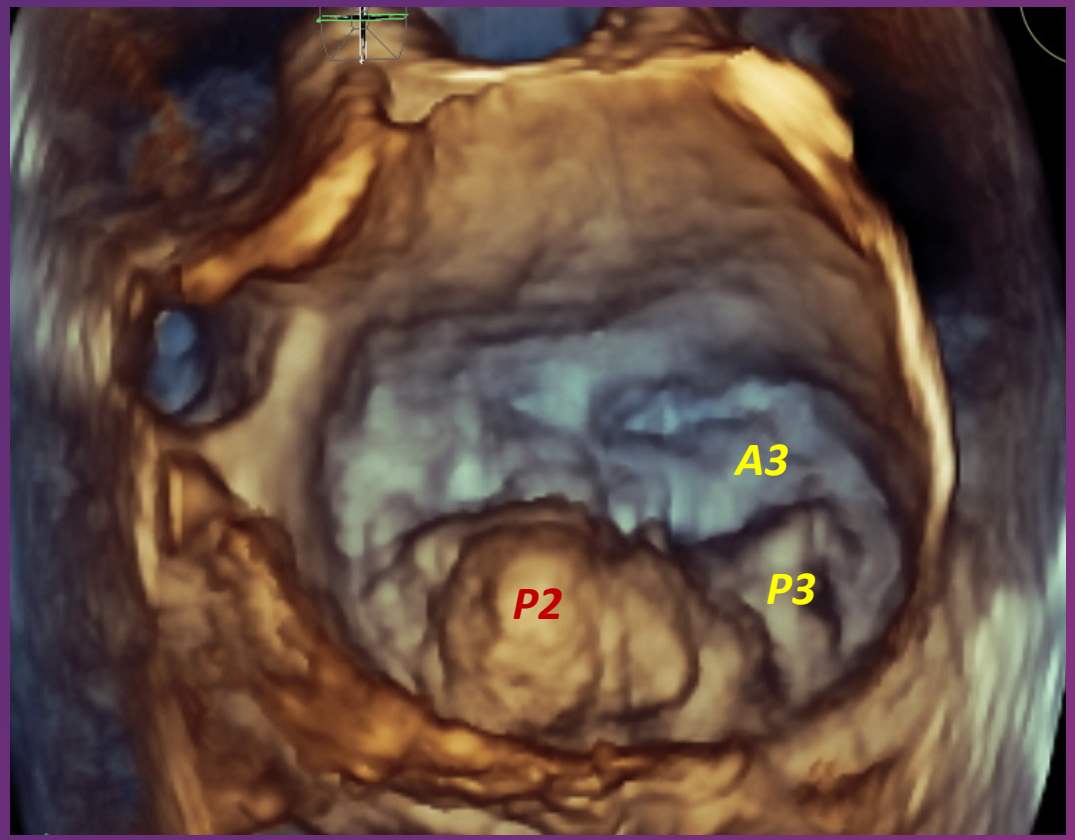


Imaging-Based Diagnosis of Mitral Regurgitation Type

Dominant: ≥5-mm displacement

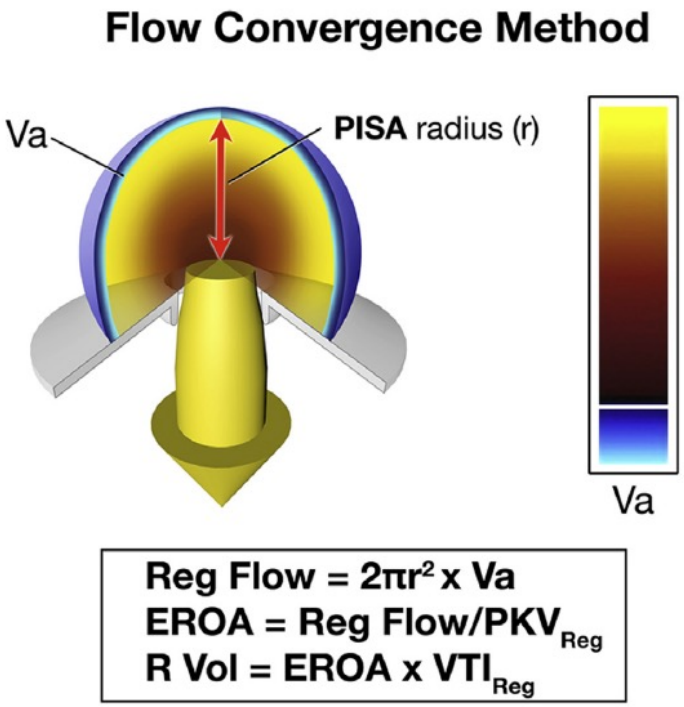


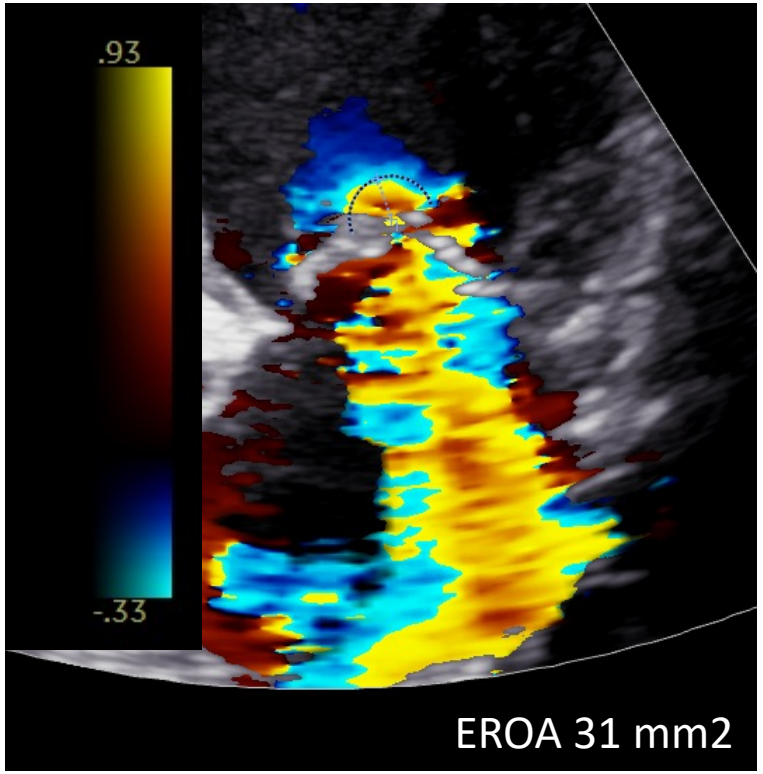
Secondary: 2-4 mm displacement

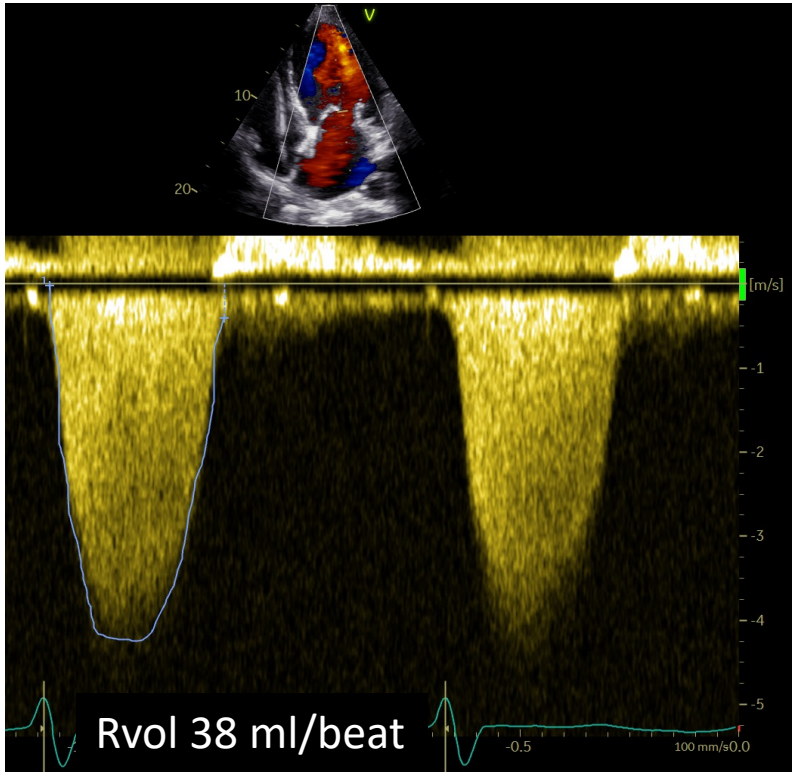


La Canna G et al. Am J Cardiol 2011

Quantitative methods - PISA

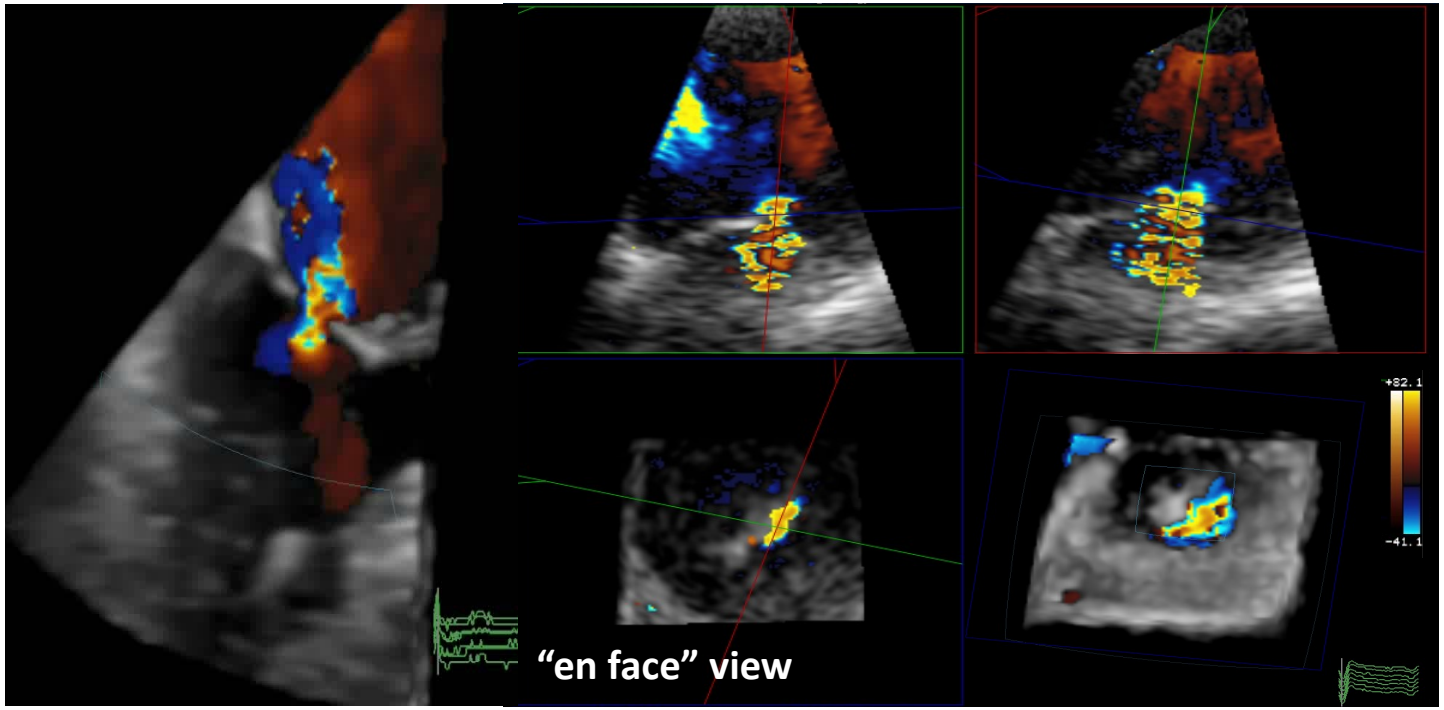






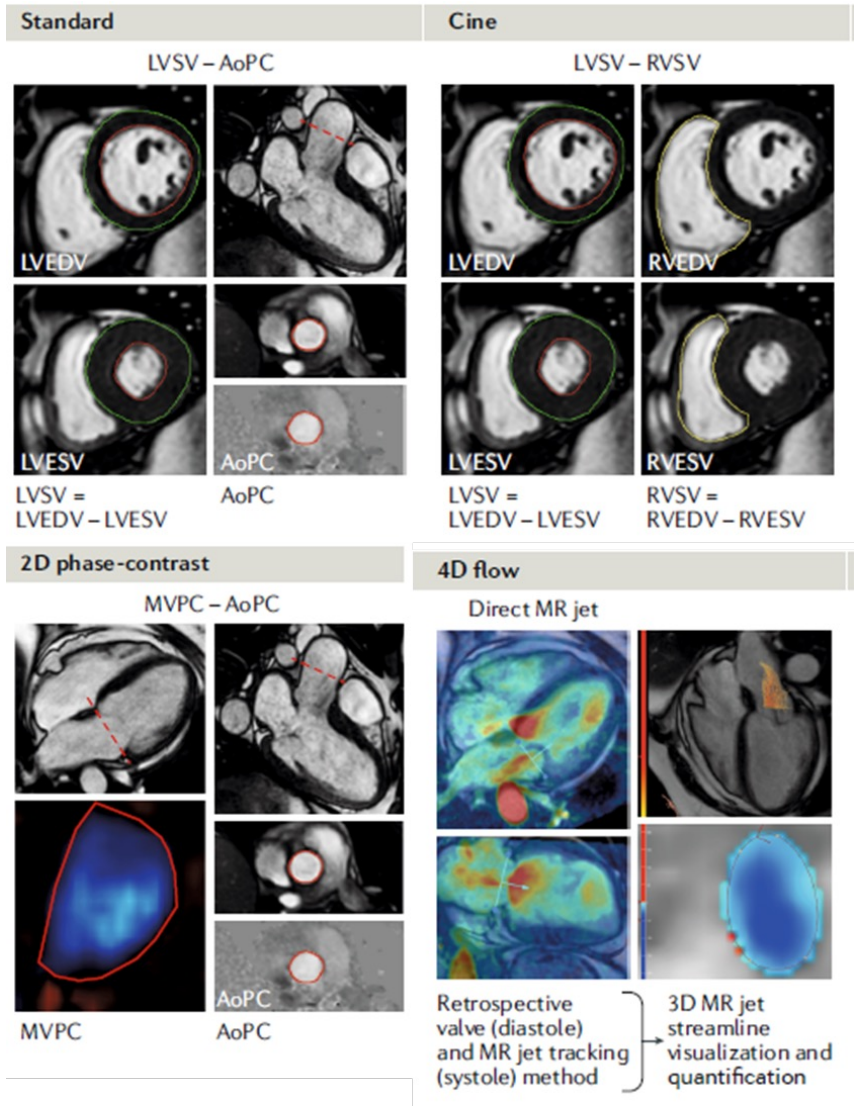
3D imaging techniques

3D Echocardiography

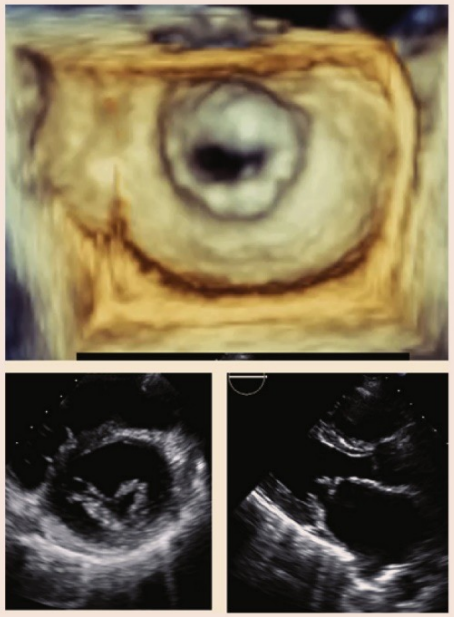
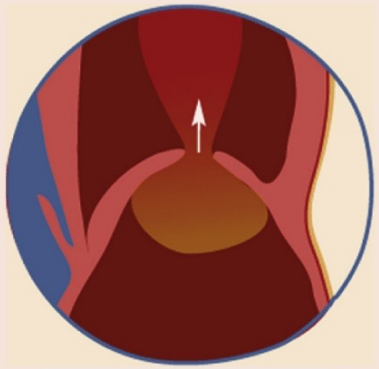
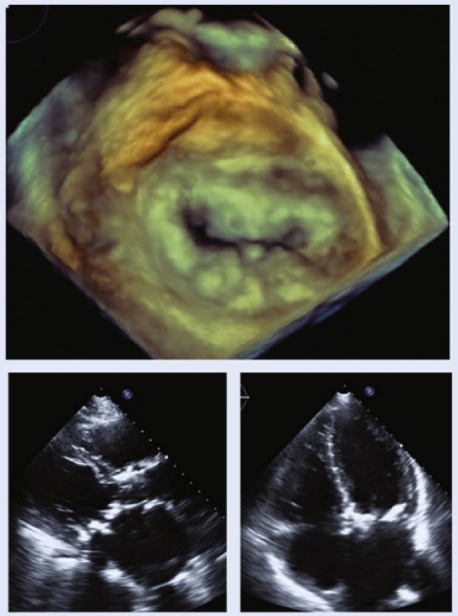


Ajmone Marsan et al. J Am Coll Cardiol Img 2009
Shanks et al. Circ cardiovasc Imag 2010;

CMR



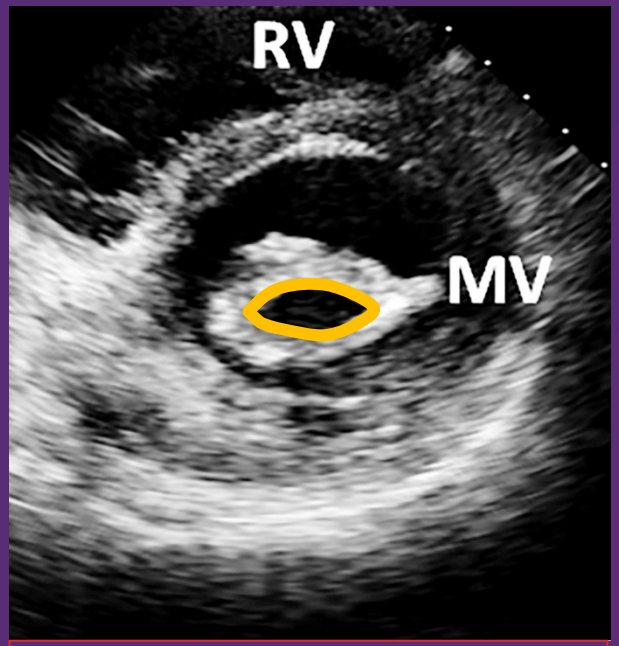
Garg et al Nature Reviews Cardiology https://doi.org/10.1038/s41569-019-0305-z

Rheumatic Mitral Valve Disease		MAC-Related Mitral Valve Dysfunction
  Funnel-shaped geometry	Anatomy	 Tubular orifice geometry 
Commissural fusion Funnel-shaped geometry	Anatomy	Commissures spared Tubular orifice geometry
Younger population	Epidemiology	Elderly, comorbid population
MVA quantification validated	Assessment	MVA quantification challenging
Percutaneous balloon mitral valvuloplasty	Treatment	Poor valvuloplasty candidates; medical therapy vs valve repair or replacement

Churchill TW.. Bertrand PB, J Am Coll Cardiol. 2022;80(7):739-751

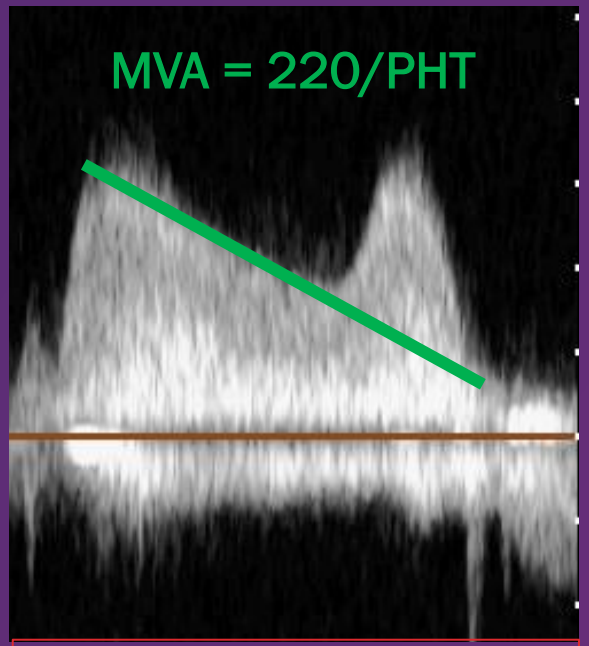
Mitral Valve Area (MVA) in Rheumatic MS

Planimetry (2D/3D)



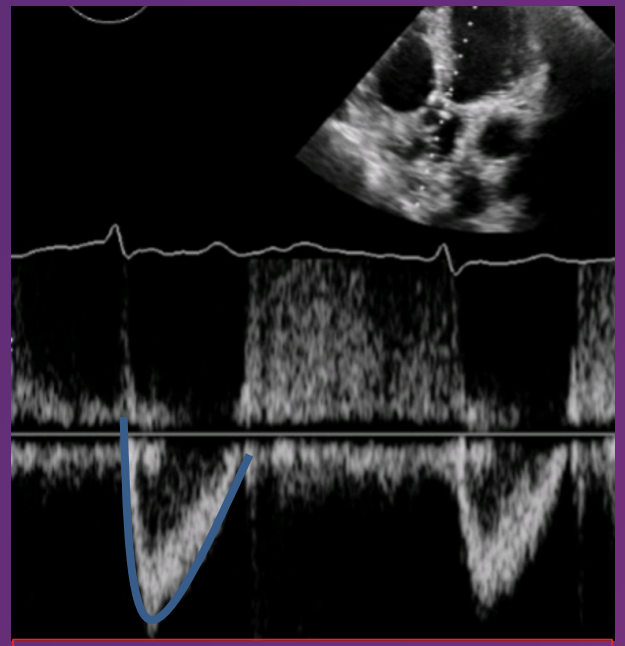
Experience required
Acoustic shadowing

Pressure Half Time



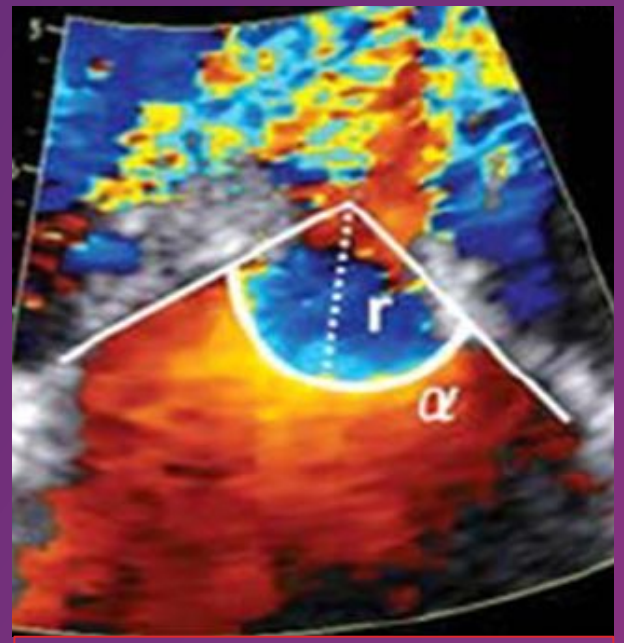
MVA overestimated in poor
LA/LV compliance, AR.

Continuity Equation



MVA underestimated in
≥ moderate MR / AR

PISA method



Technically difficult
Circular orifice assumption

@Ph_Bertrand

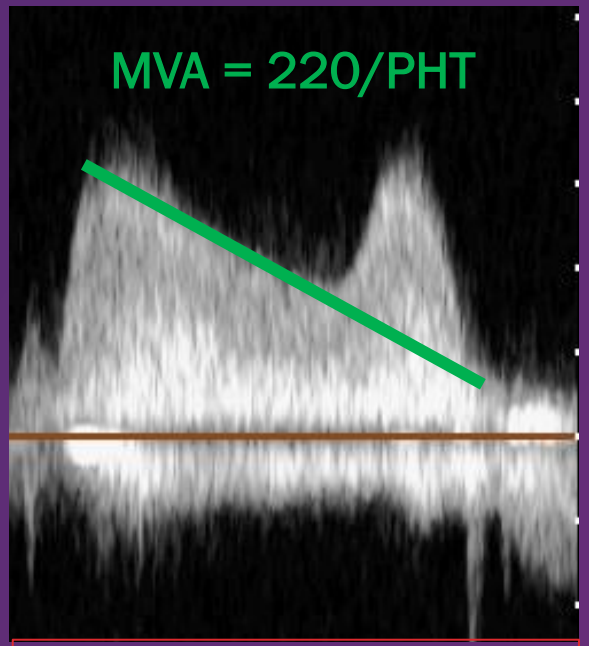
Mitral Valve Area (MVA) in MAC stenosis?

Planimetry (2D/3D)

Experience required.
Acoustic shadowing in MAC

❌

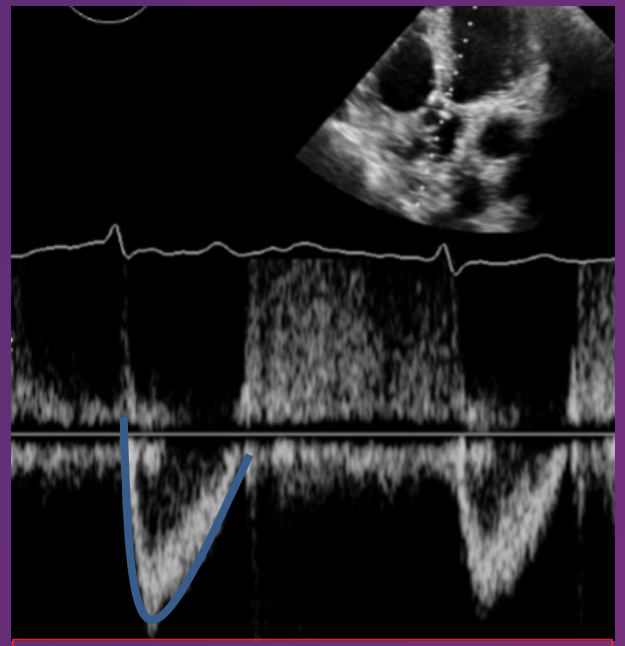
Pressure Half Time



MVA overestimated in poor LA/LV compliance, AR.

❌

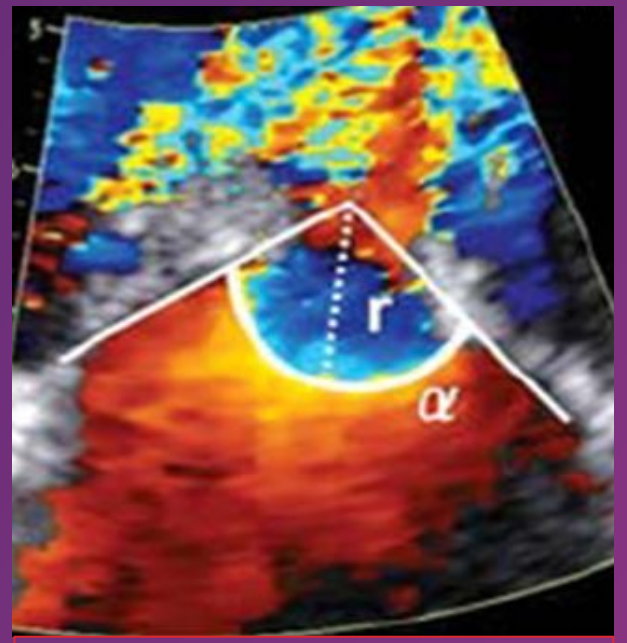
Continuity Equation



MVA underestimated in ≥ moderate MR / AR

✅

PISA method

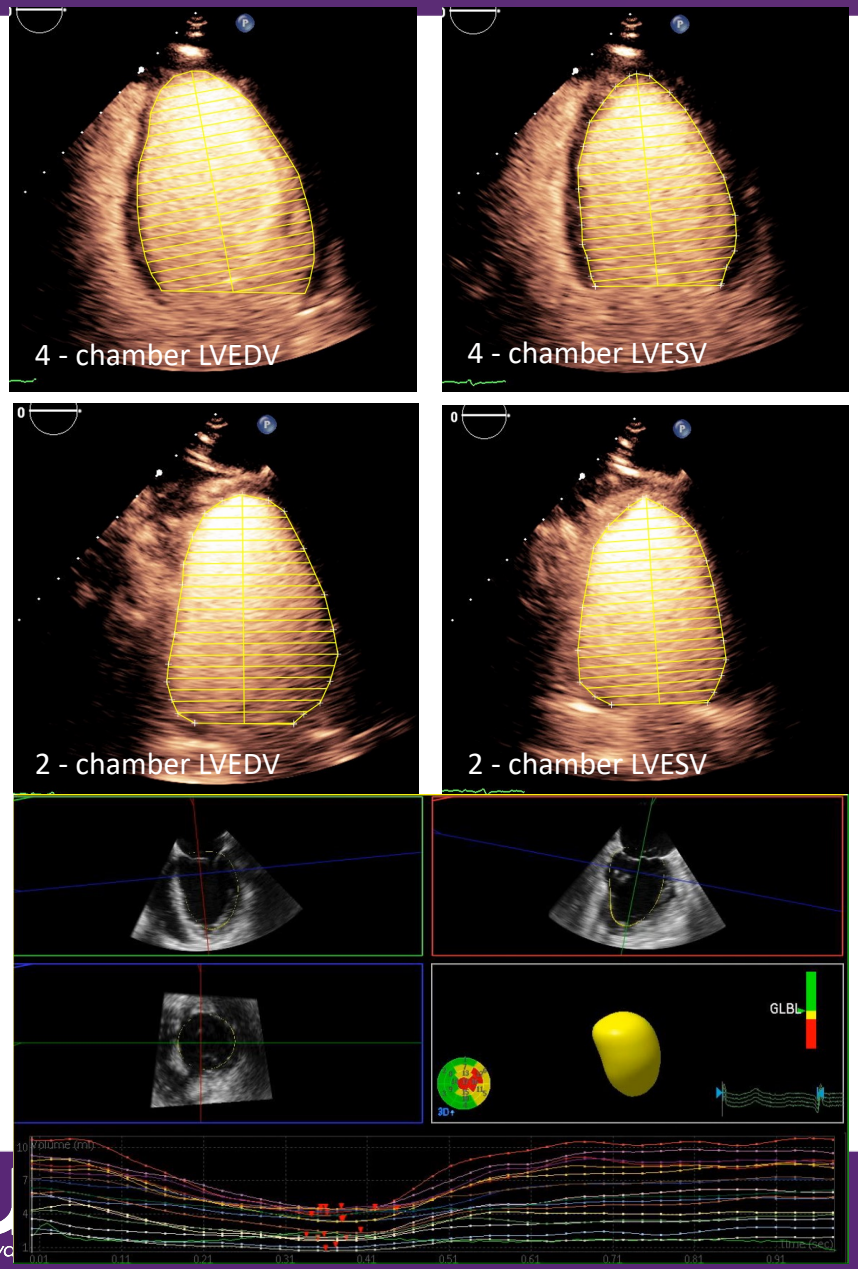


Technically difficult
Circular orifice assumption

❌

@Ph_Bertrand

LV volumes and EF



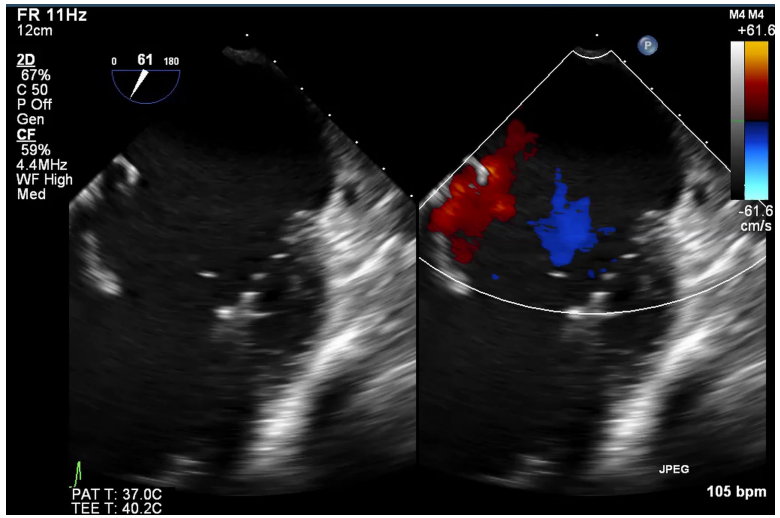
Characteristics associated with favorable outcomes:

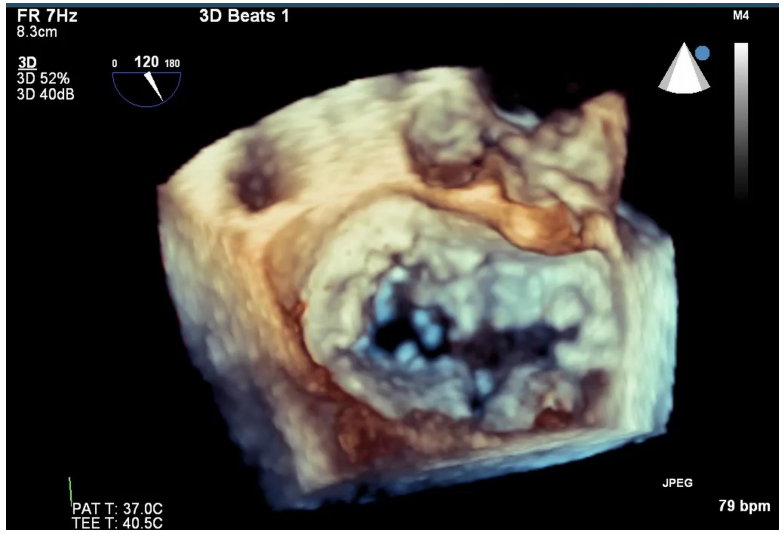
- LVEF 20-50%
- LVESD ≤ 70 mm
- LVEDV < 220 cc or 120 cc/m2.
- MR EROA ≥ 0.4 cm2

Characteristics associated with unfavorable outcomes:

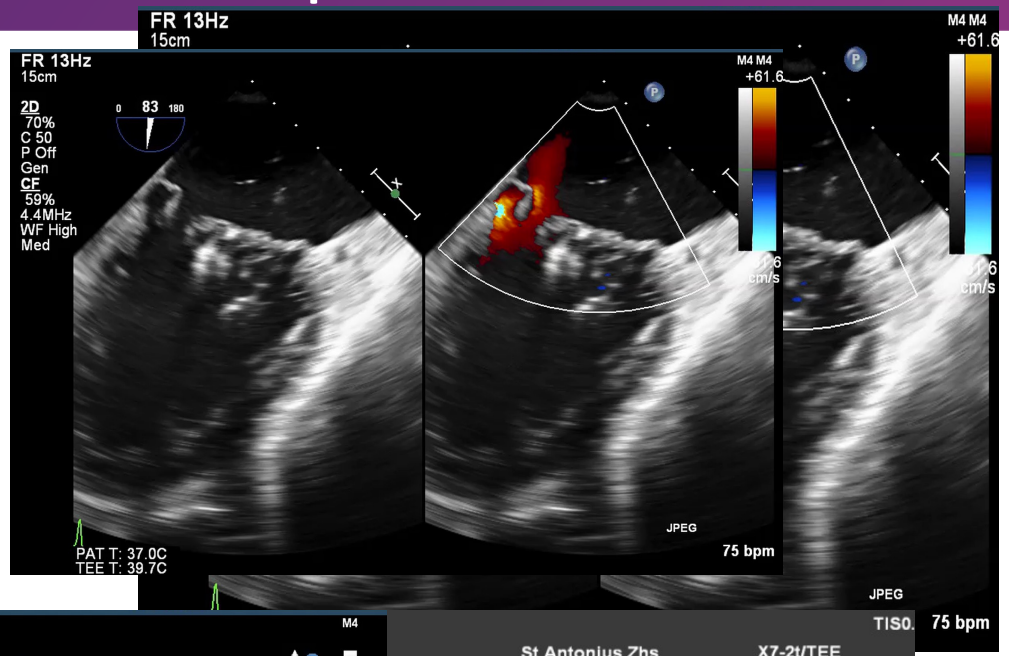
- LVEF < 20%
- LVESD > 70 mm
- LVEDV ≥ 220 cc or ≥ 120 cc/m2
- EROA < 0.3 cm2

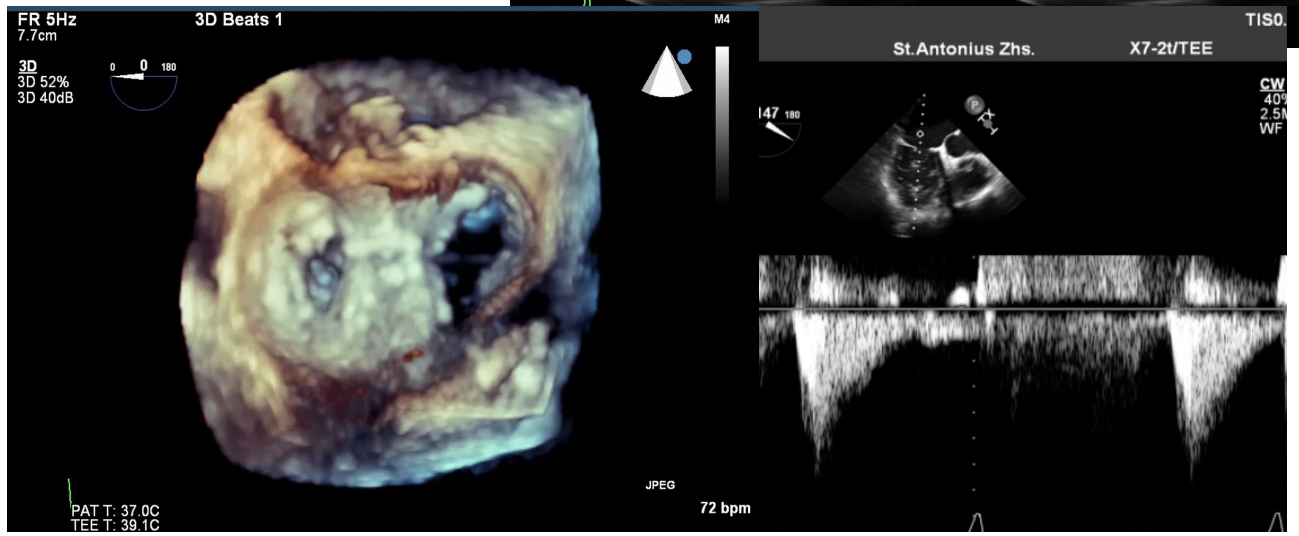
Pre-procedure



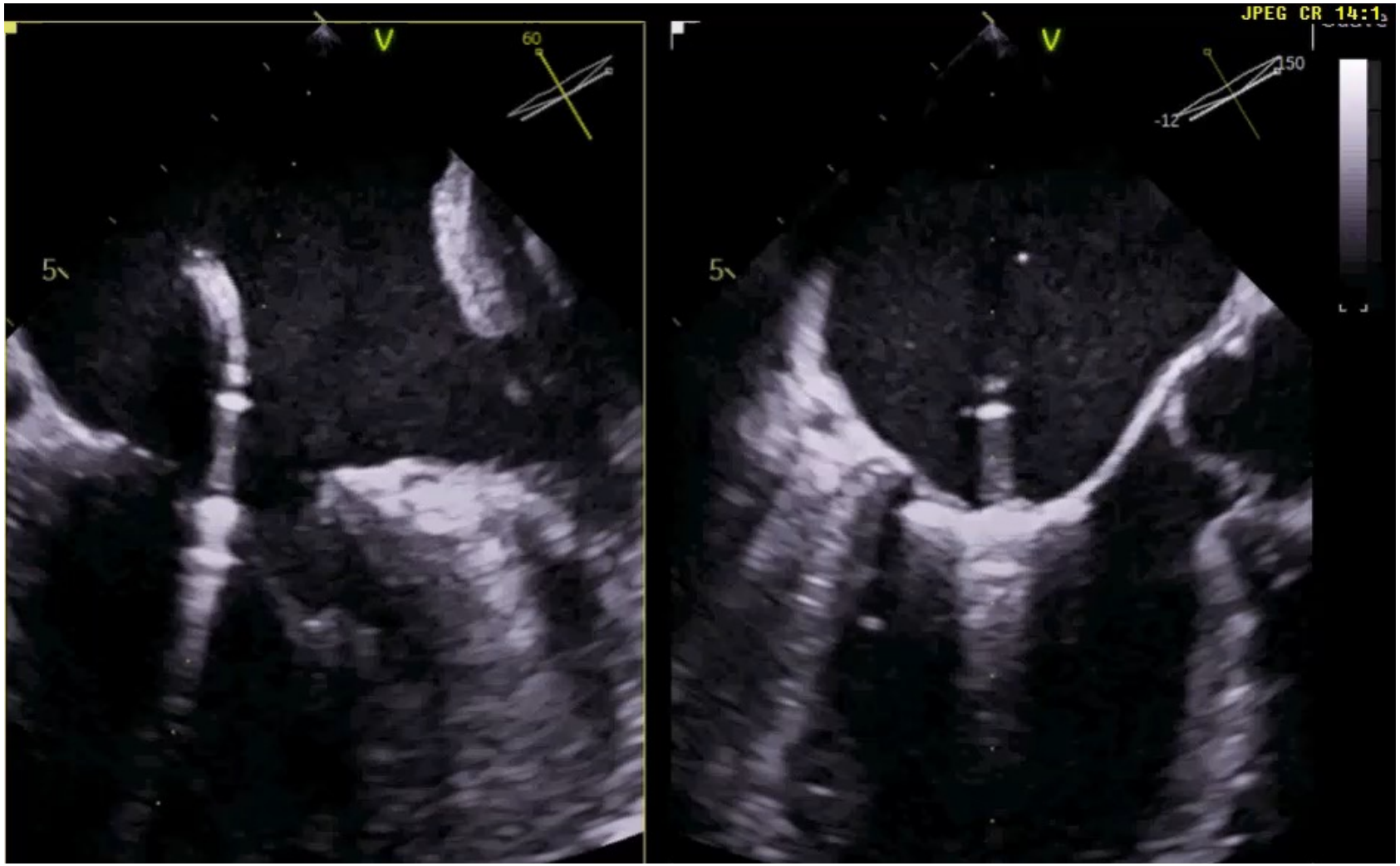


Post-procedure

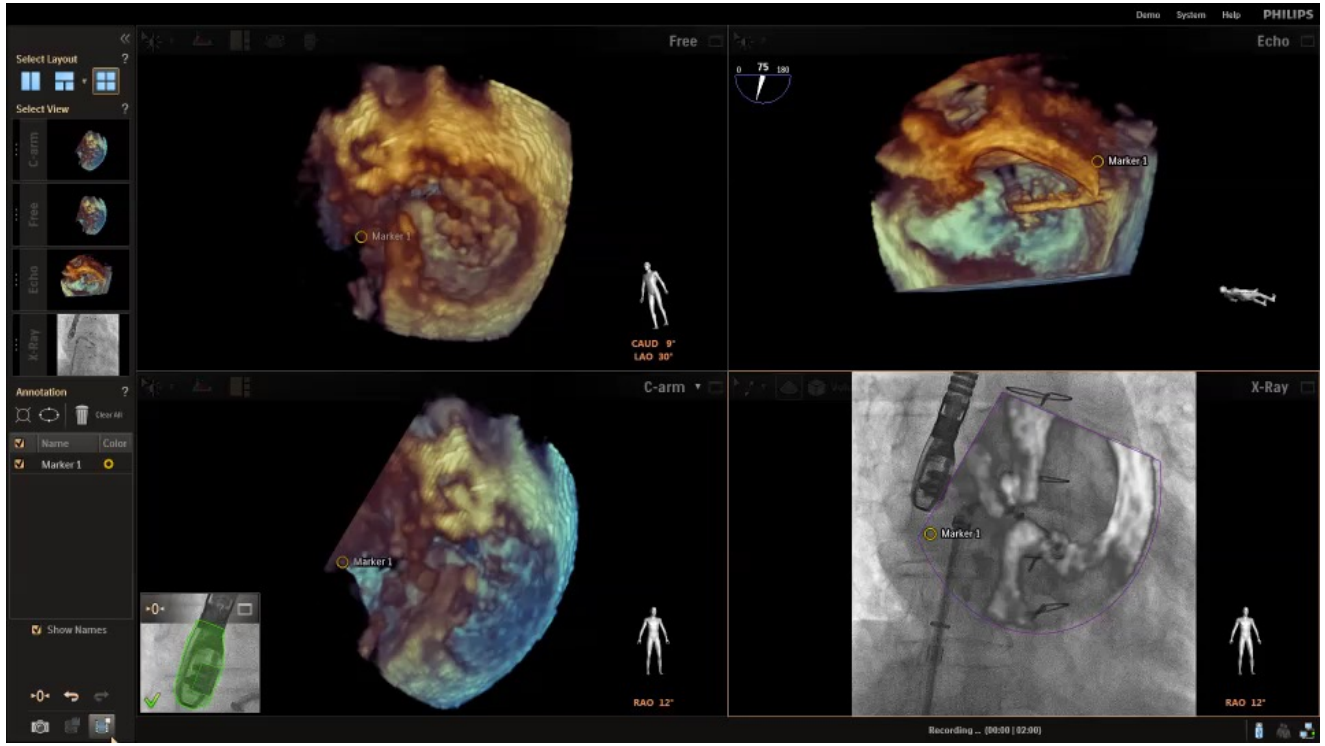


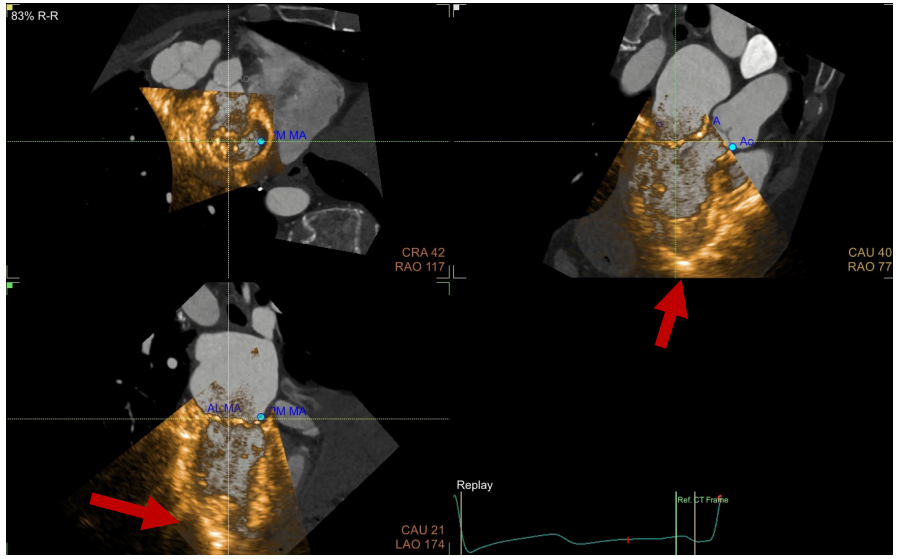


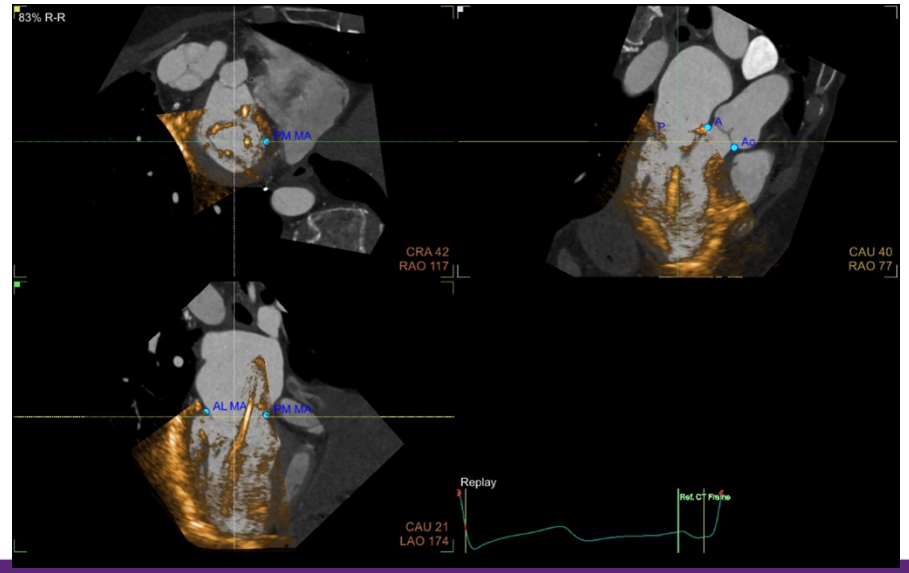
Adequate visualization of leaflets: Key for grasping



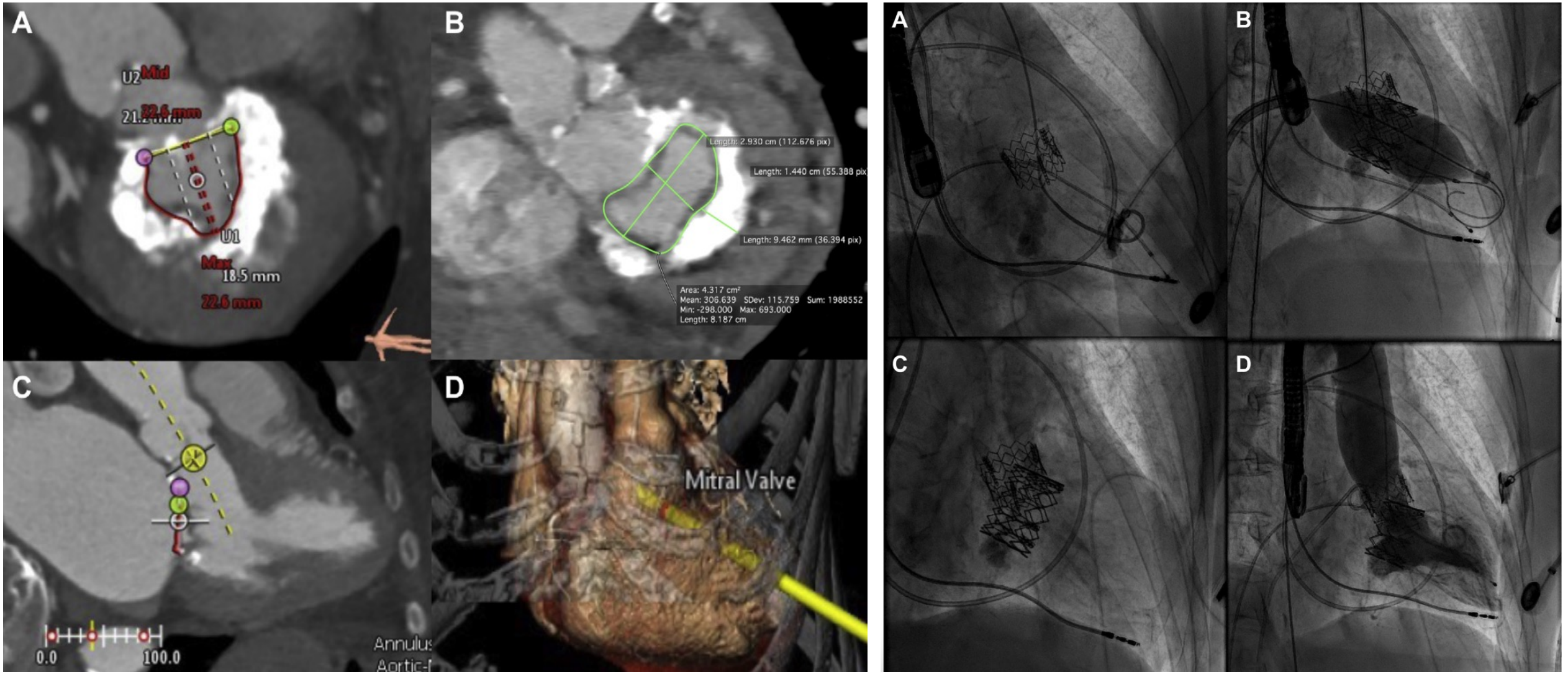
Technology is helping to make it easier







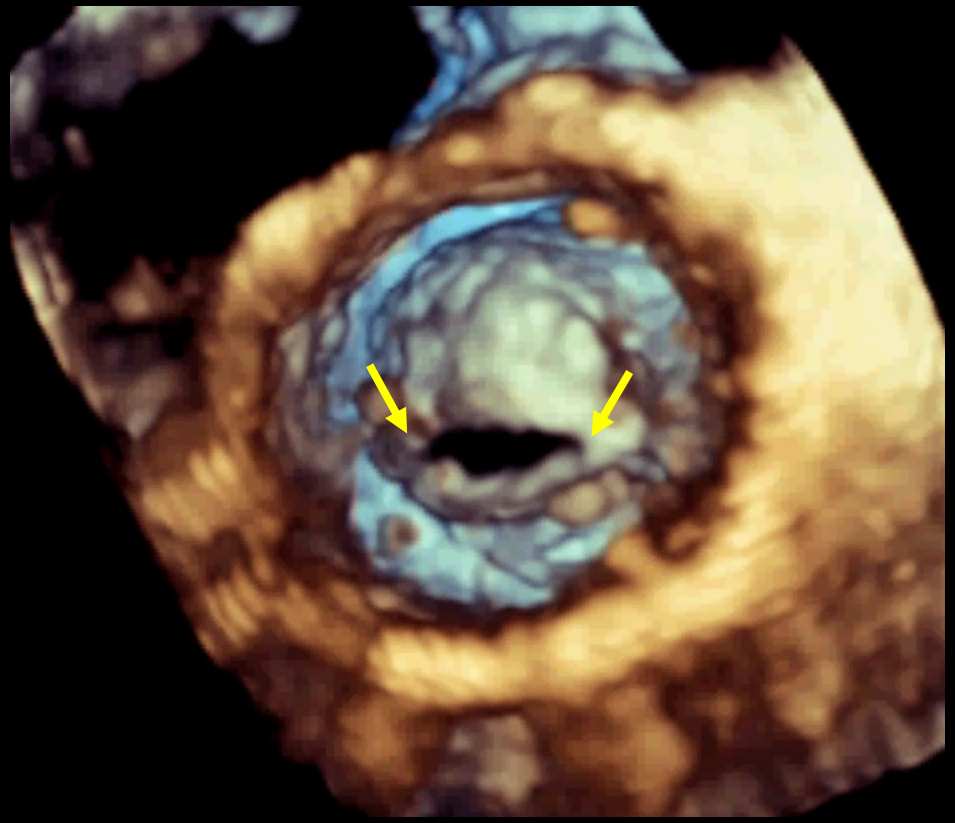
DMS: VALVE IN MAC



Guerrero et al. JACC interventions 2022

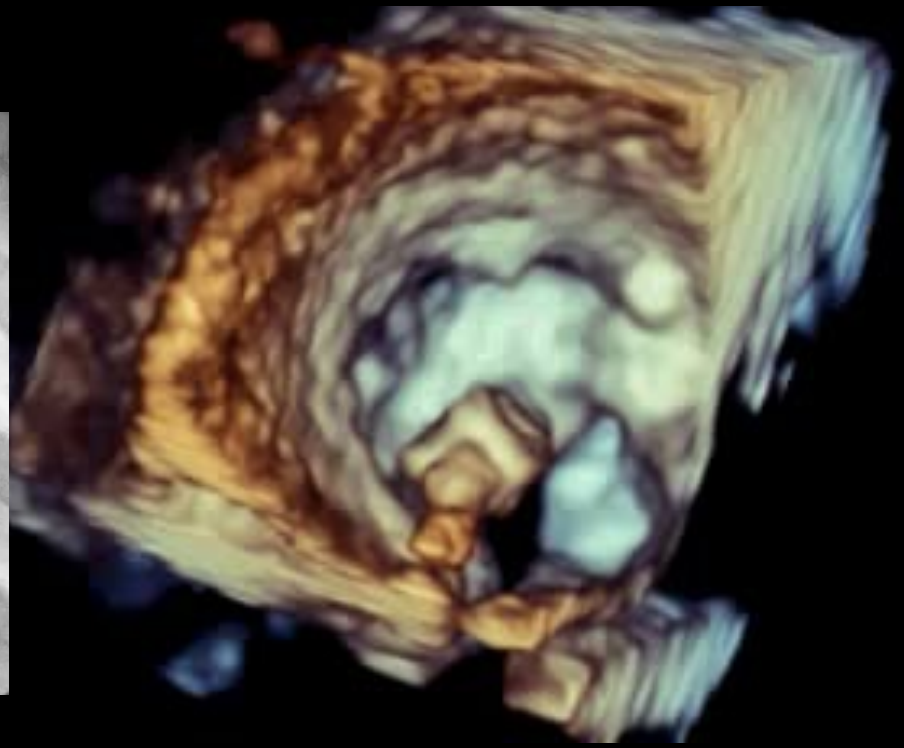
Important to evaluate mitral commissures

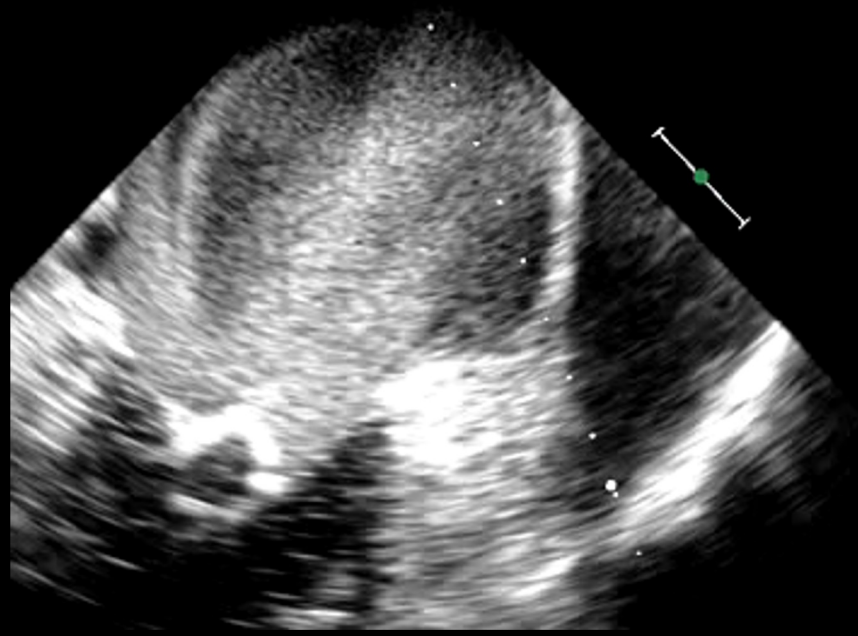
The splitting of commissures is the primary effect of a PMBC



PMBC →step-by-step

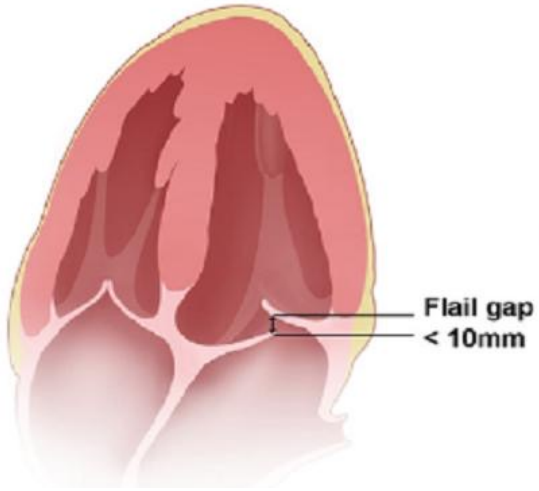
Balloon in LV, partially opened

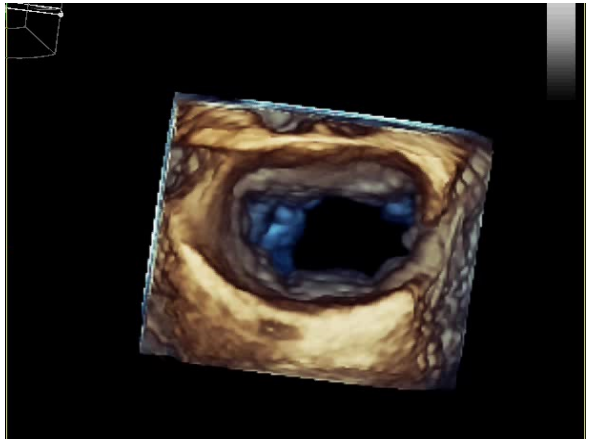


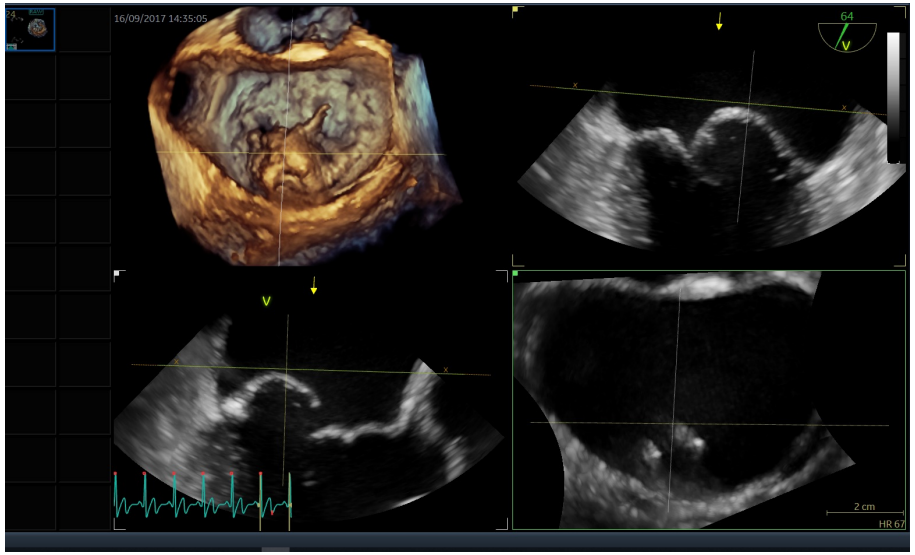


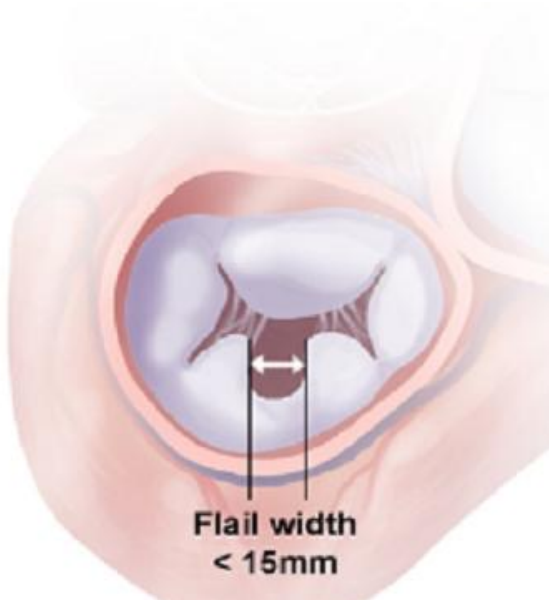
Stasis and/ or hemodynamic deterioration may occur!

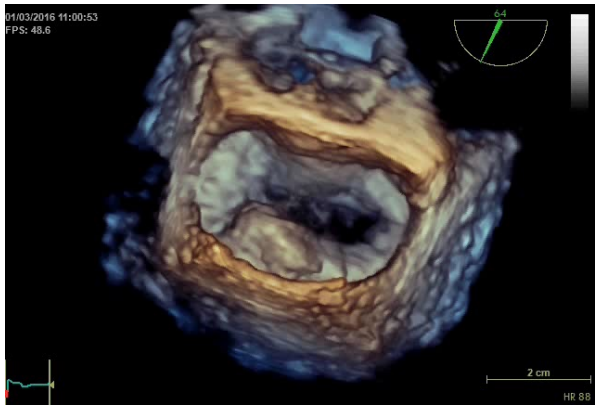
Suitability TEER Primary MR



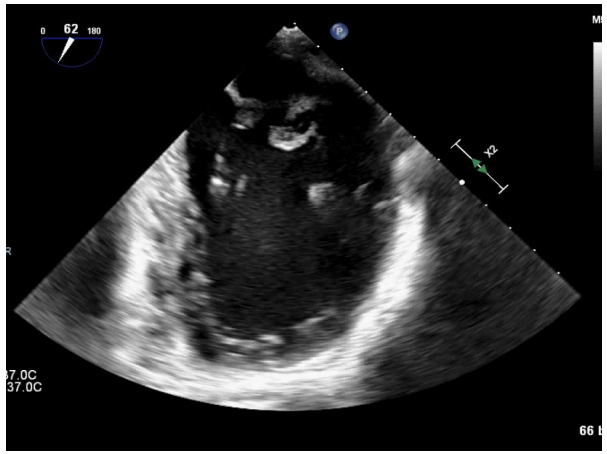


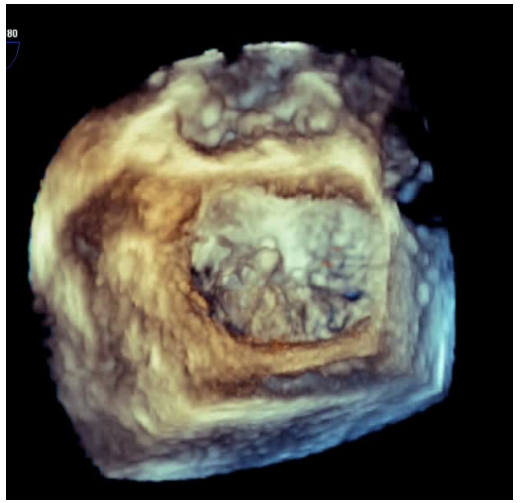


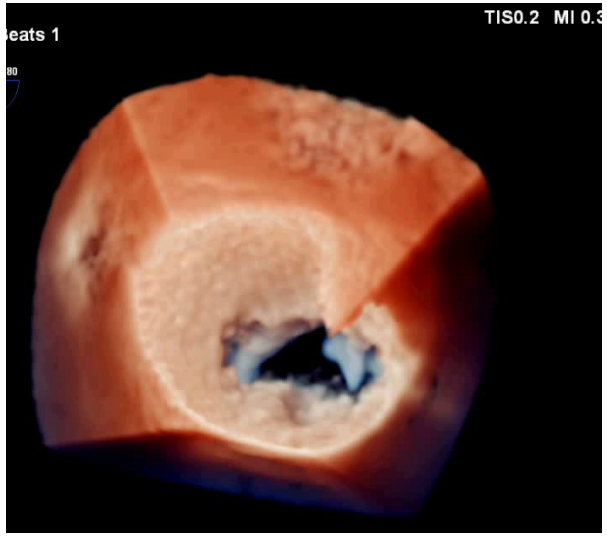


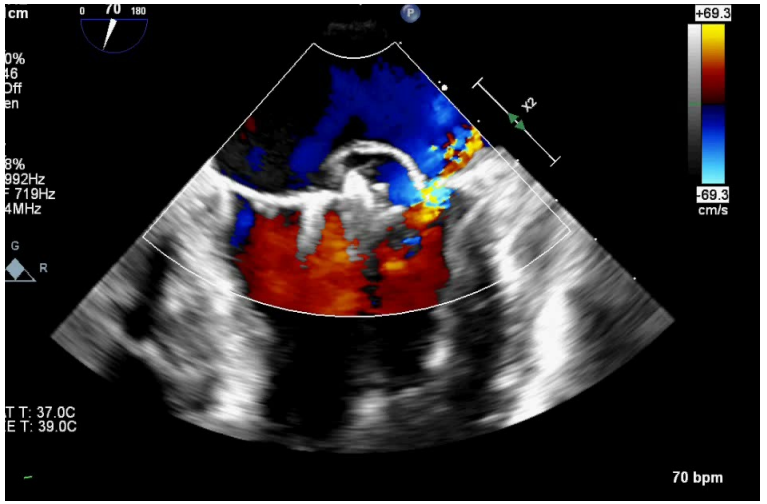


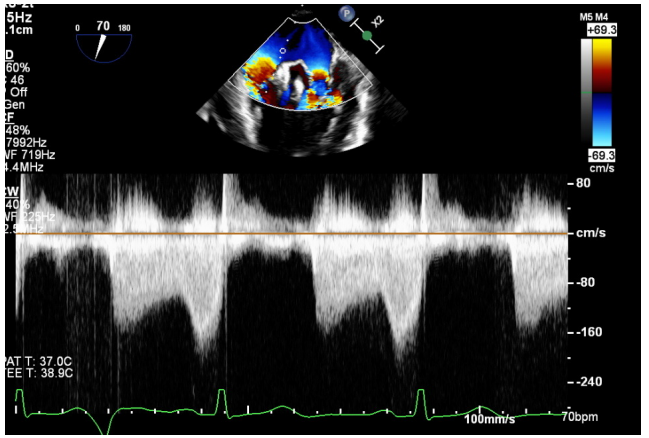
Suitability TEER Primary MR



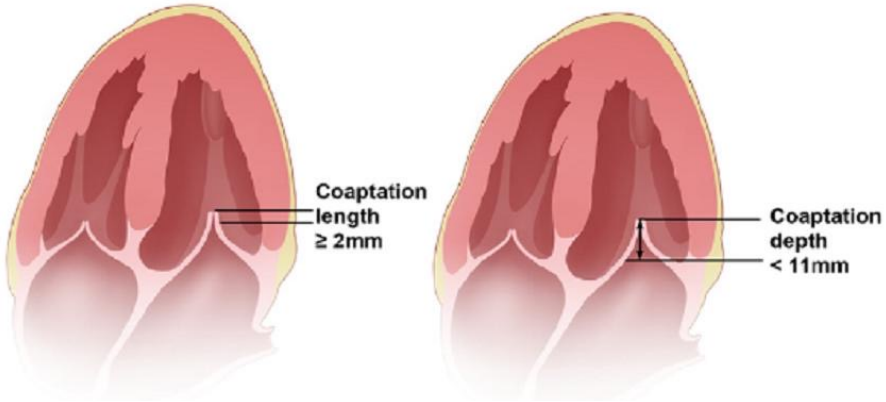


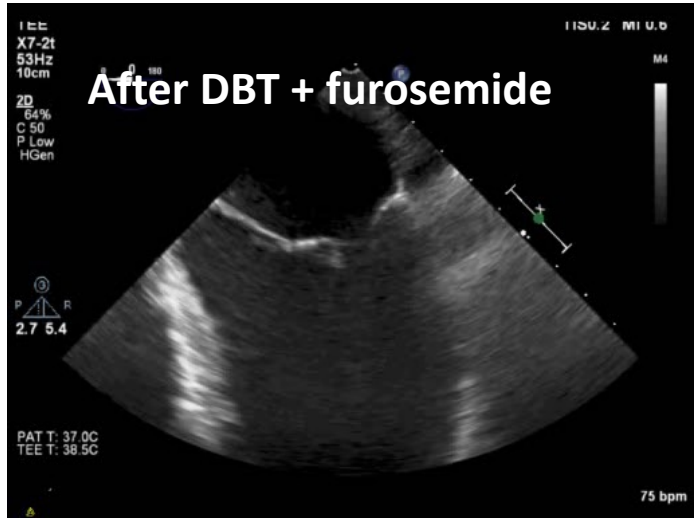


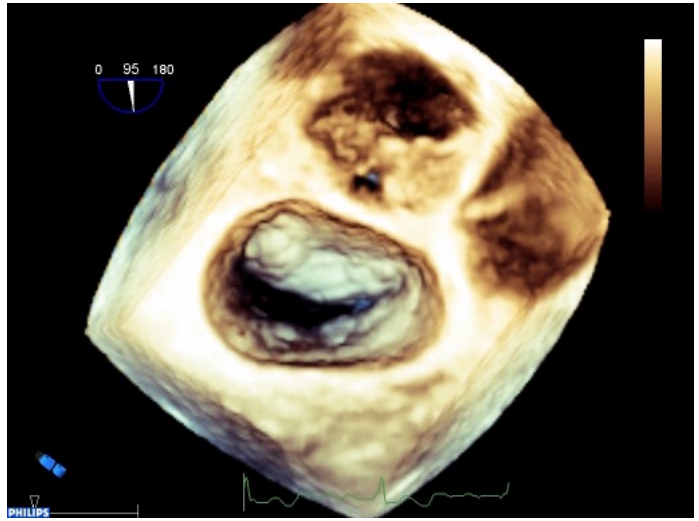




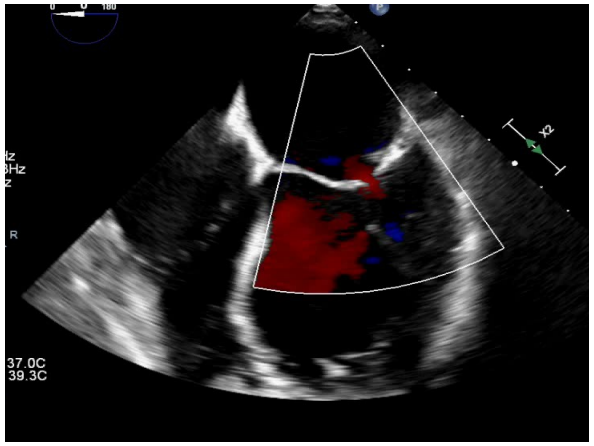
Suitability for secondary MR

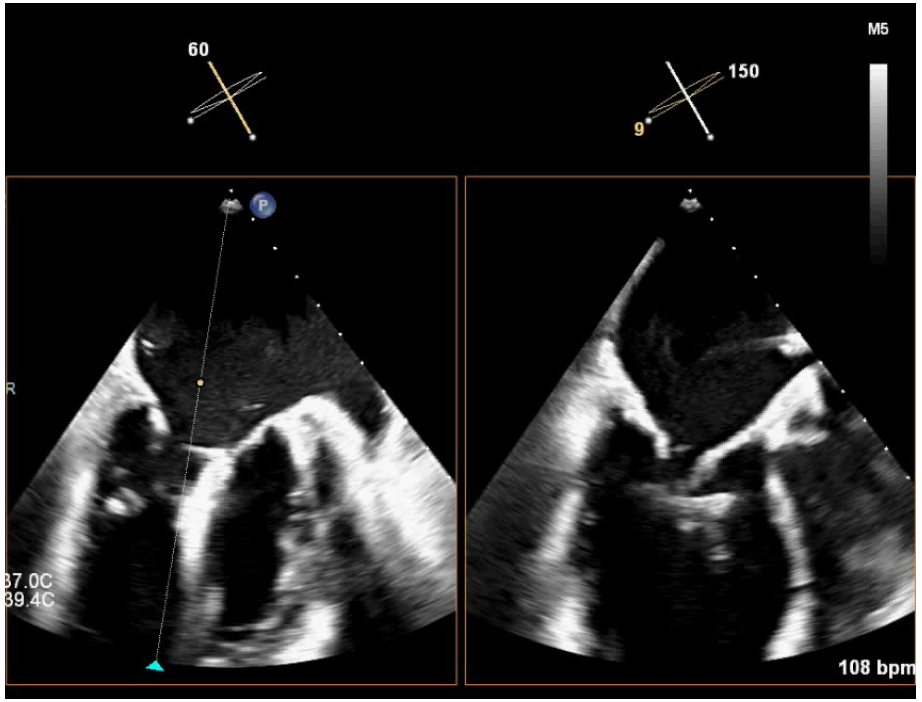


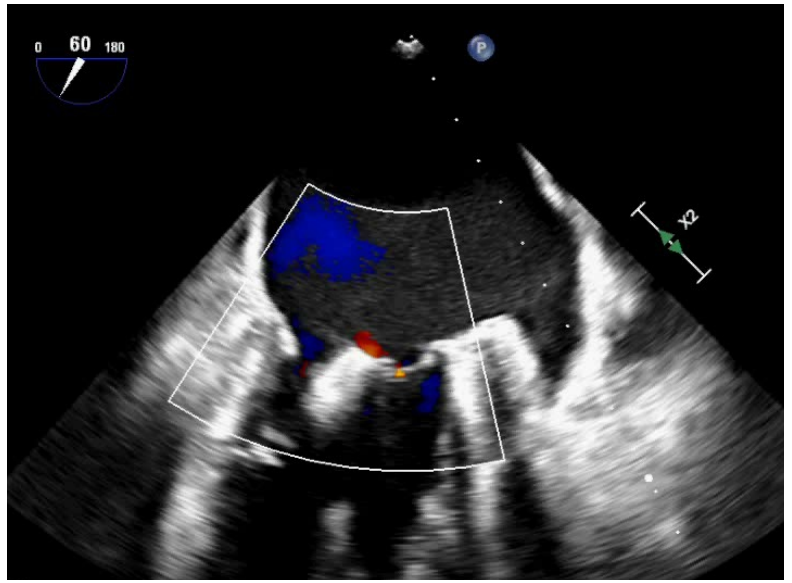


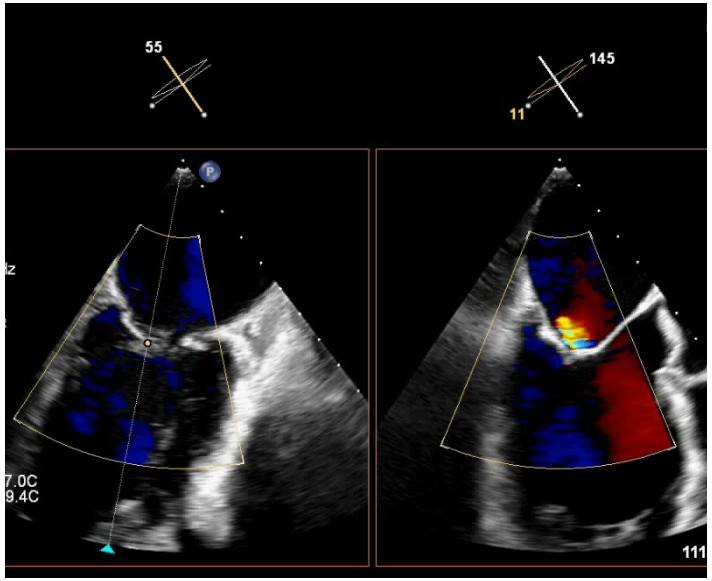


Suitability for secondary MR



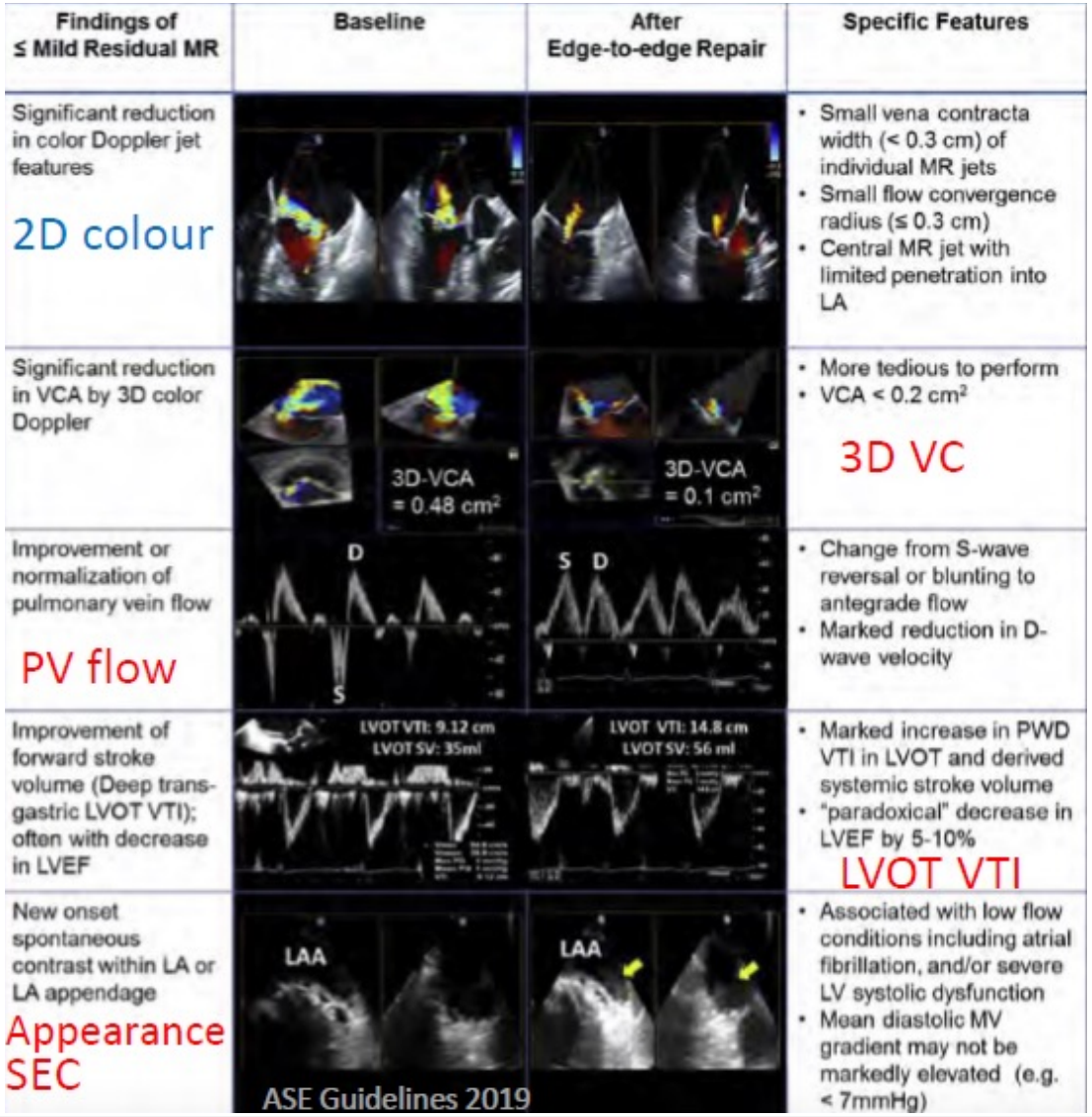




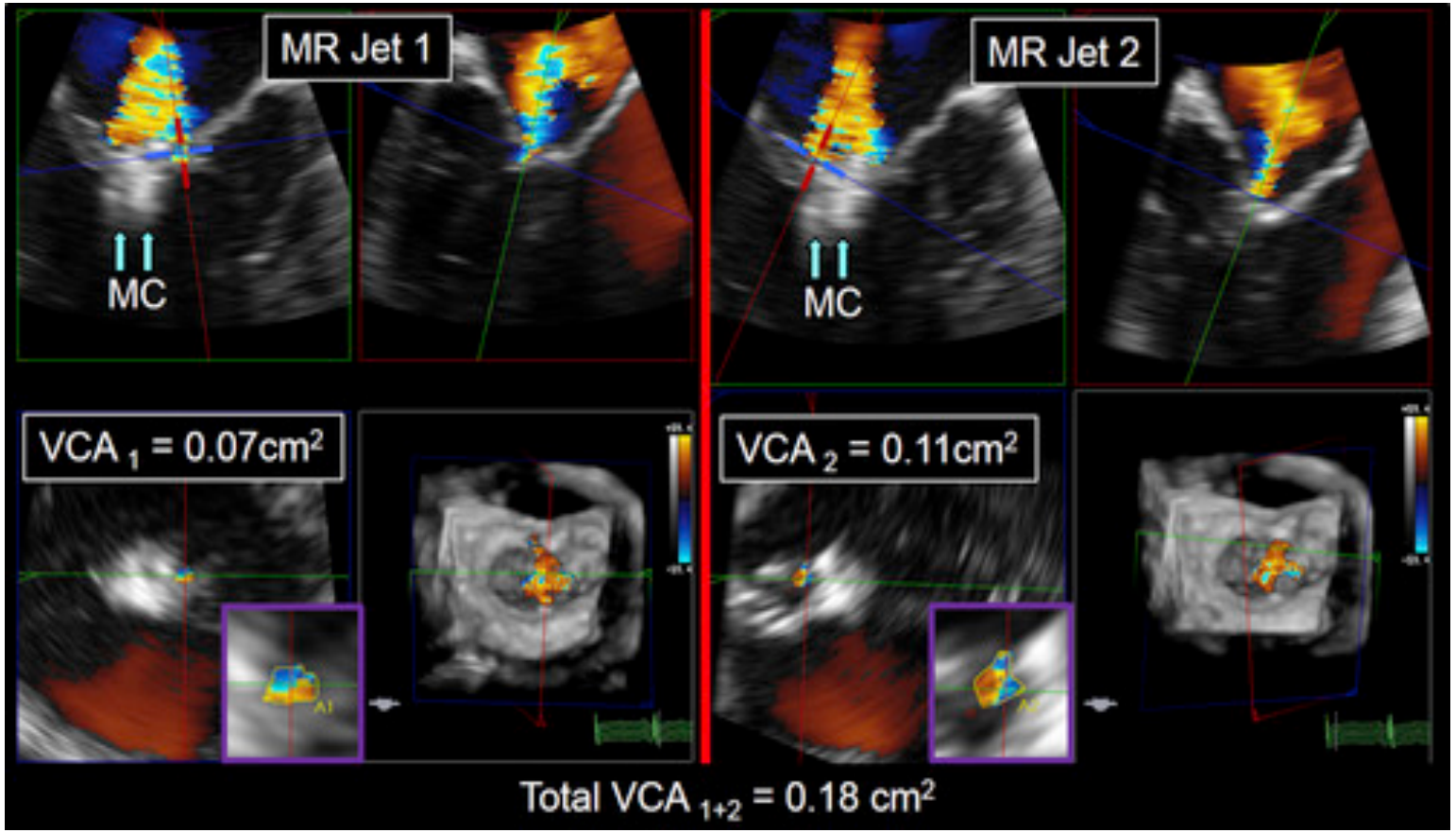


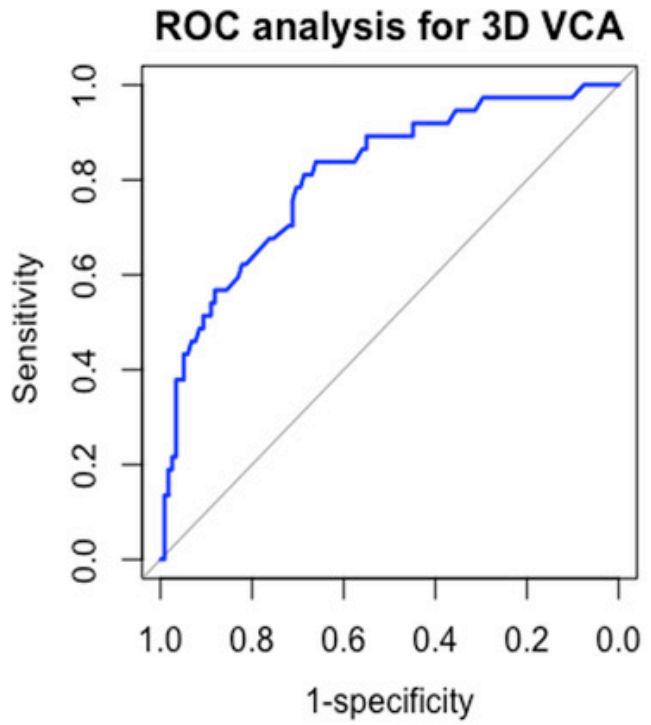
Residual MR Assessment: multi-tiered approach

- COAPT Core Lab
- Integrative approach:
- qualitative and quantitive data
- ASE guidelines



3D Vena Contracta Area

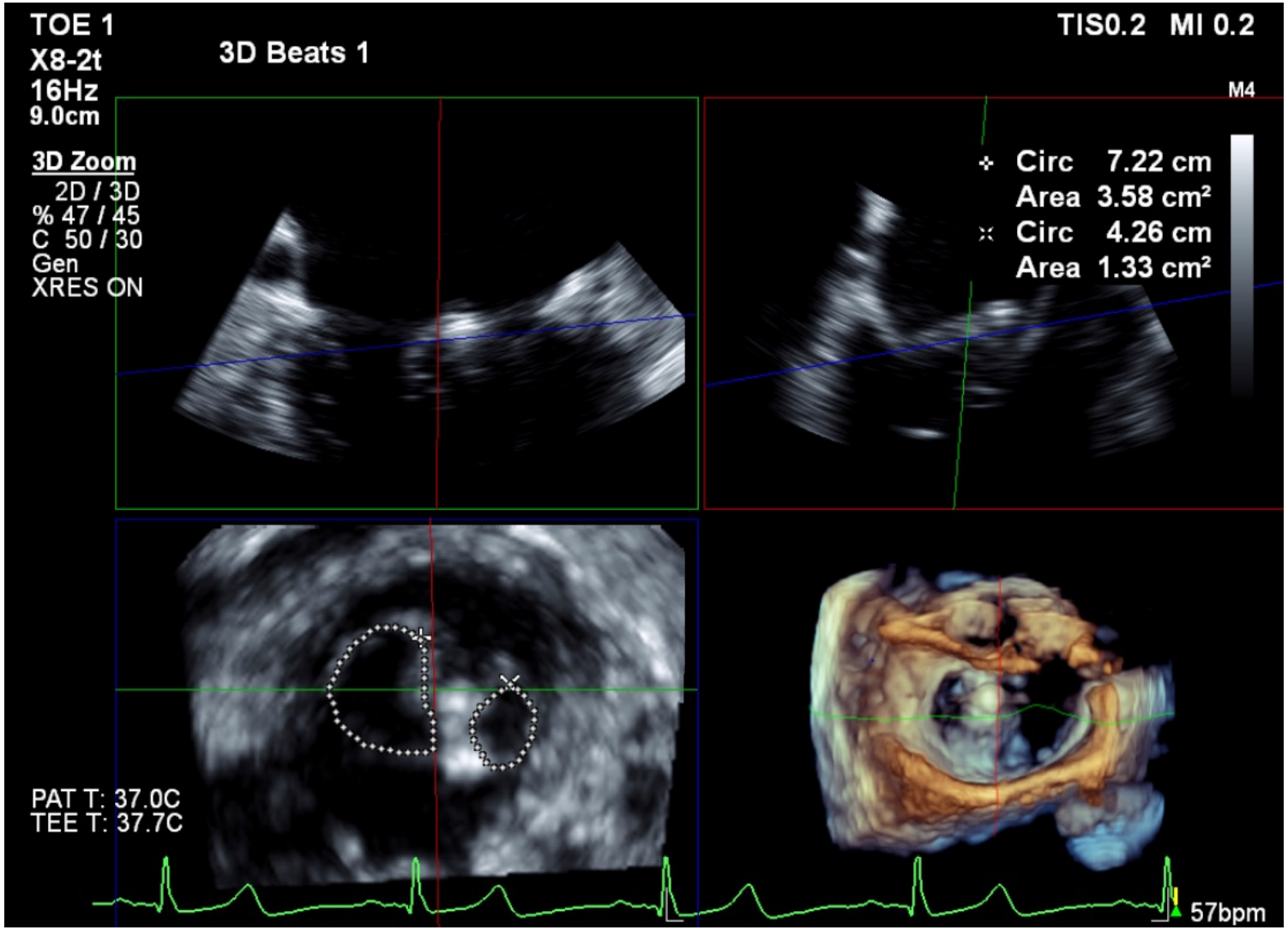




	AUC	CUT OFF	SENS	SPEC	NPV	PPV
<Moderate vs. ≥Moderate	0.81	0.27	83	66	92.8	43.6

***J Am Coll Cardiol Intv* 2019; 12:582-591.**

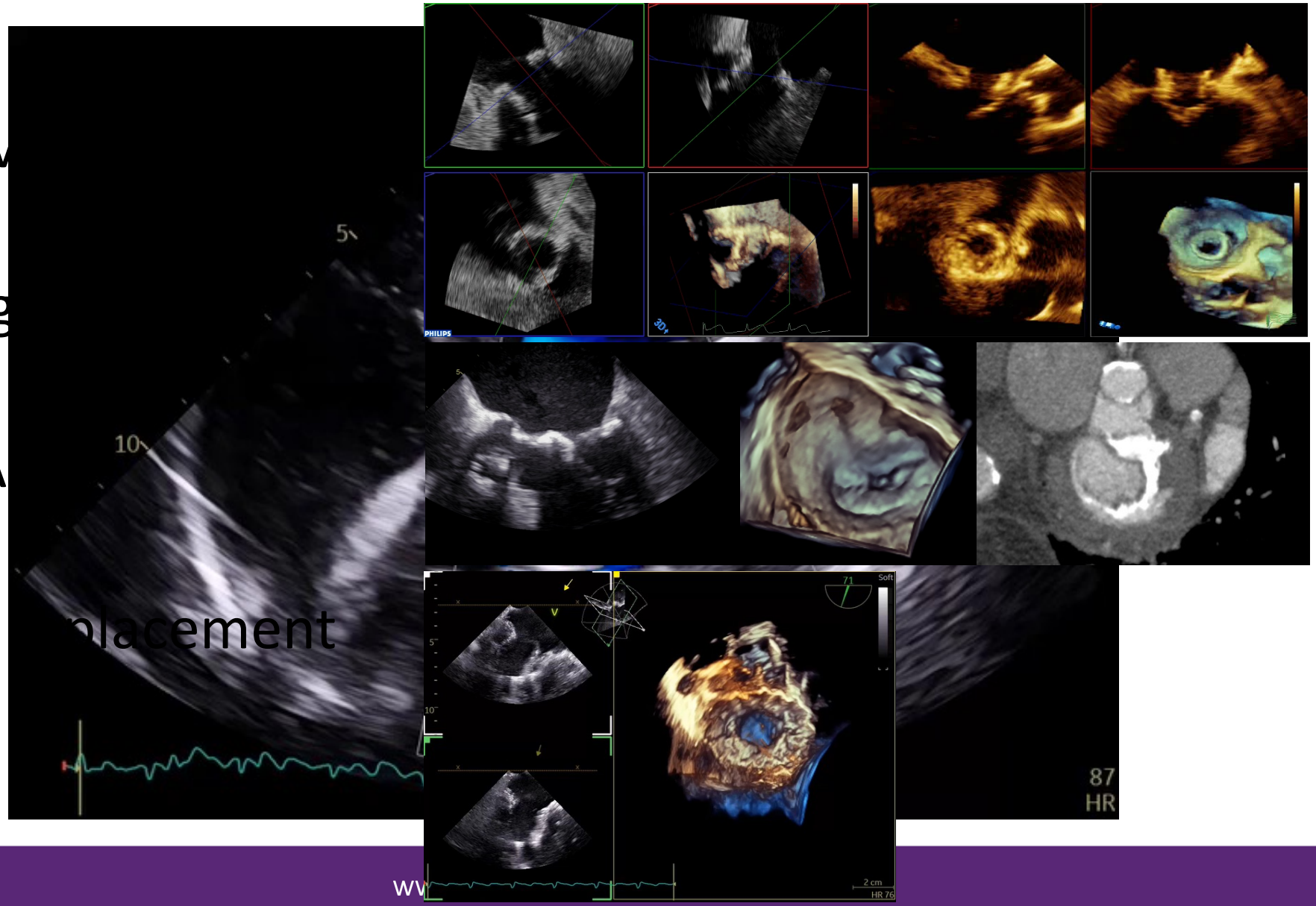
Assessment of MV area after TEER



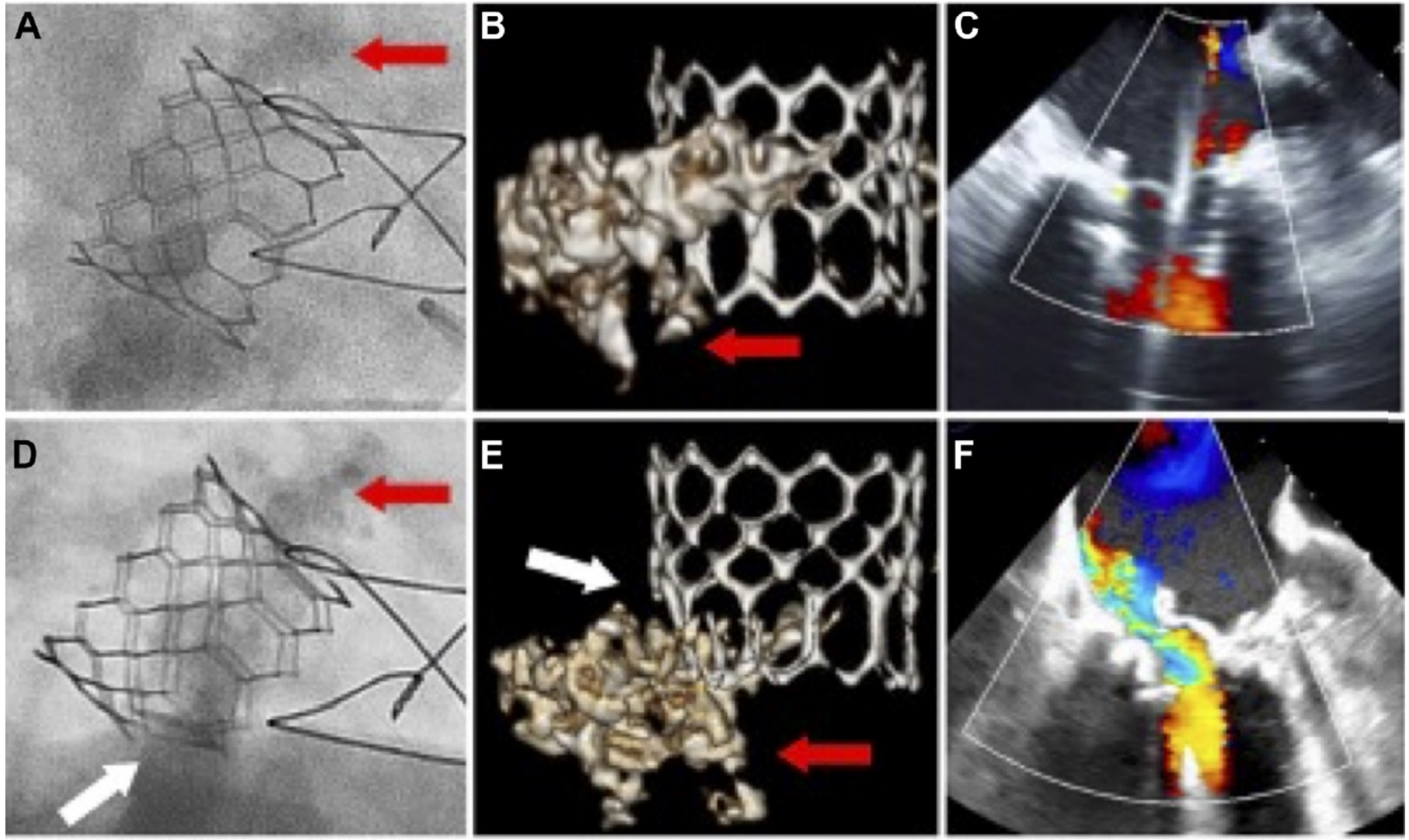
TOTAL 3D MVA
4.91cm²

Post-procedural imaging to assess TMVI

- Valve-in-valv
- Valve-in-ring
- Valve-in-MA
- Mitral valve placement

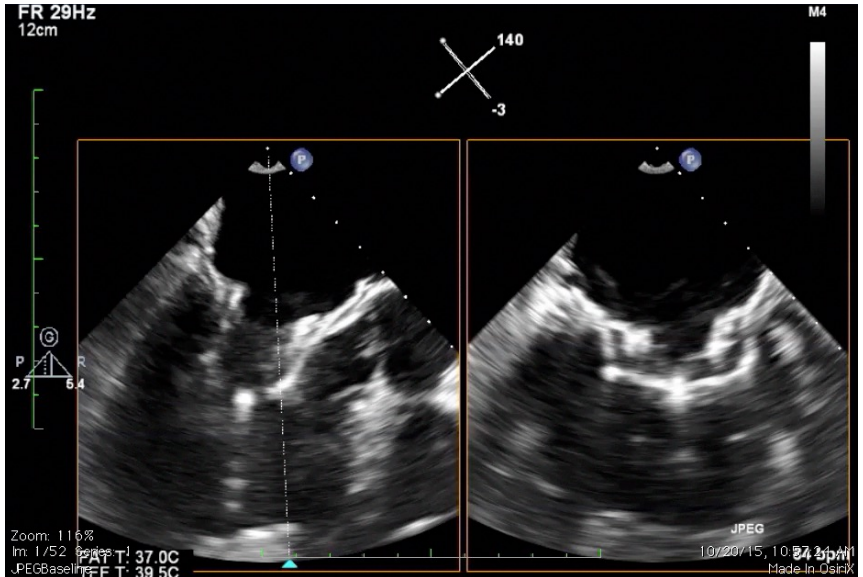


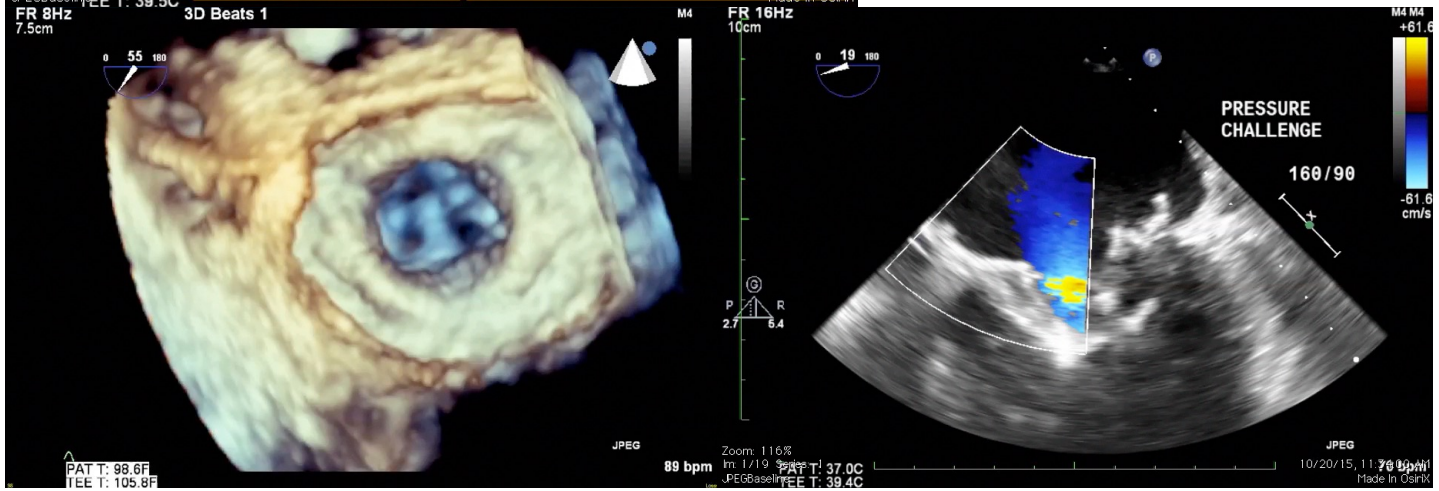
Stent fracture and valve migration after transcatheter mitral V-in-MAC



Chuang et al. JACC CV Interventions 2021

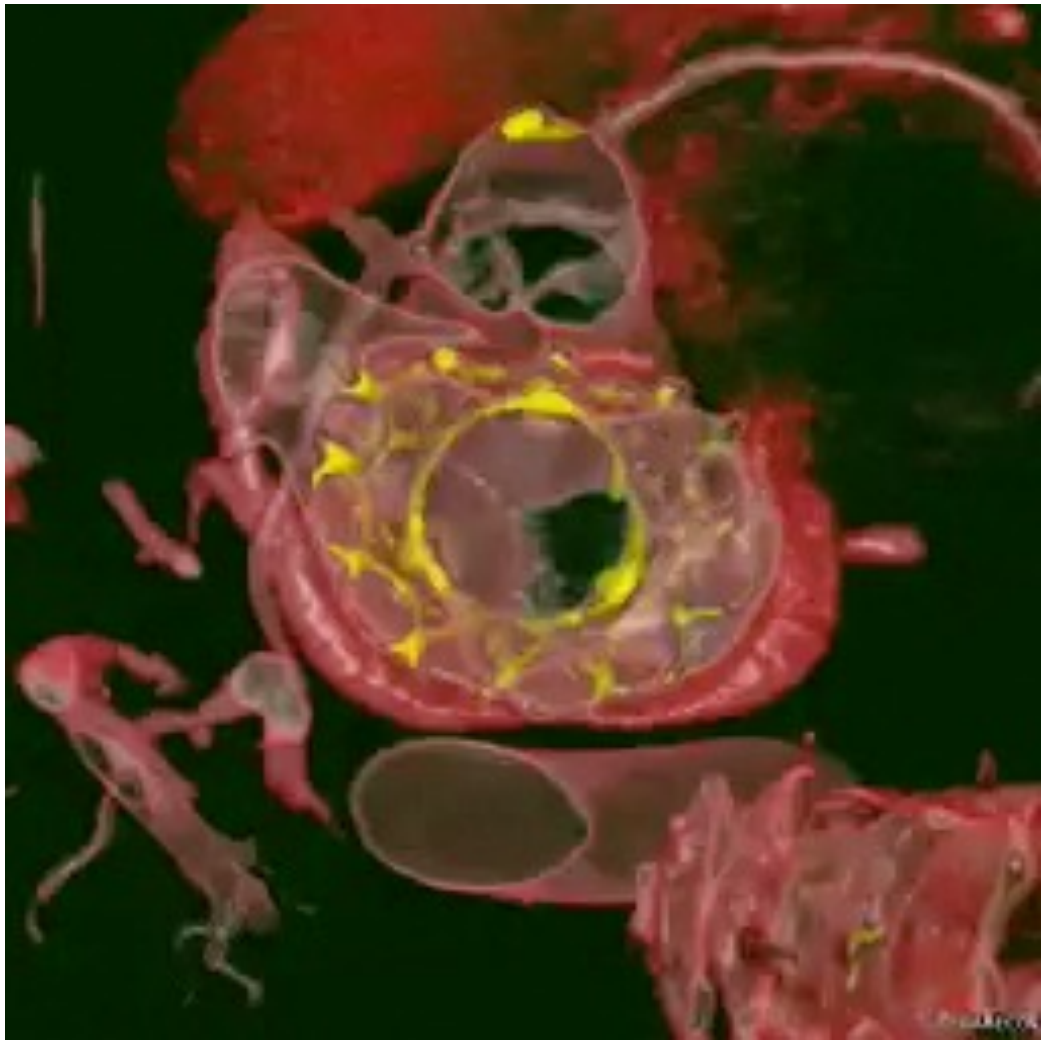
TMVR thrombosis





At 30 days:

- Dyspnea on exertion
- MG from 2 to 10 mmHg
- TTE not good acoustic window



Courtesy of Dr P. Grayburn

Device-related endpoints – imaging role

I. Device failure

Device failure, defined as the absence of device success (*Table 10*), is subclassified as:

- Delivery failure (i.e., technical failure)
- Structural failure: the device does not perform as intended due to a complication related to the device (e.g., fracture, migration or embolization, frozen leaflet, device detachment, and so on)
- Functional failure: the device performs as intended without complication but does not adequately reduce the degree of MR (MR > moderate [2+], or fails to relieve or creates new mitral stenosis [EROA <1.5 cm^2 or transmitral gradient ≥5 mm Hg]).

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