Intervencionismo de Insuficiencia Mitral Rol de la imagen

Dr. Fabián Martínez

CardioSUC 2025
41º Congreso Uruguayo de Cardiología
El paciente en el corazón de cada decisión

7 al 9 de mayo
Radisson Montevideo Victoria Plaza Hotel

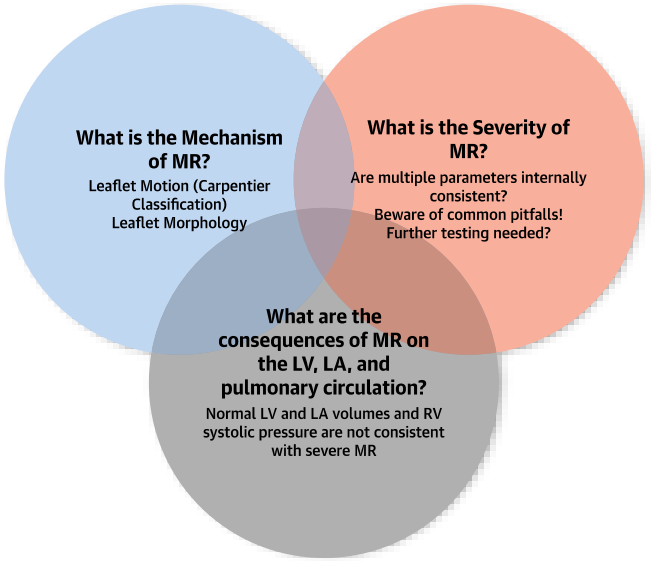
Sociedad Uruguaya de Cardiología

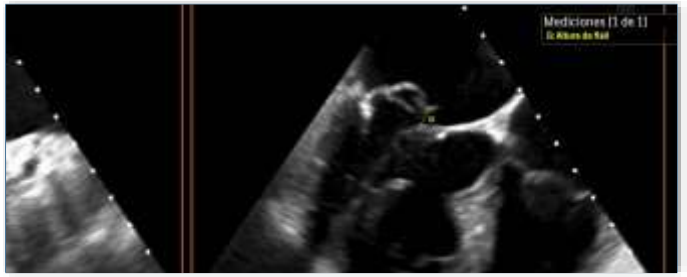
El ecocardiograma como protagonista:

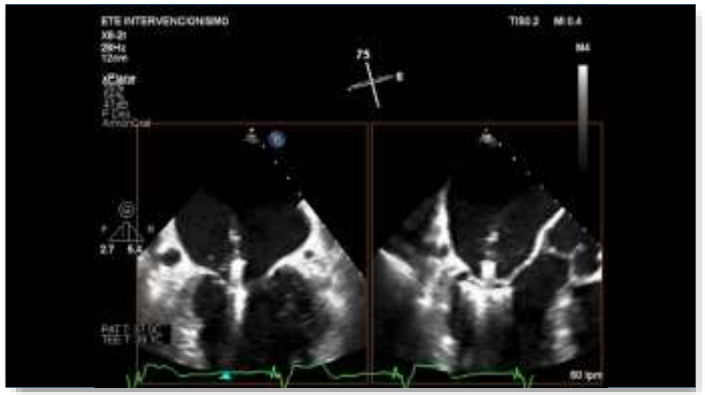
Diagnóstico preciso de IM

Selección de candidatos a intervencionismo

Guía intra-procedimiento
Resultado final



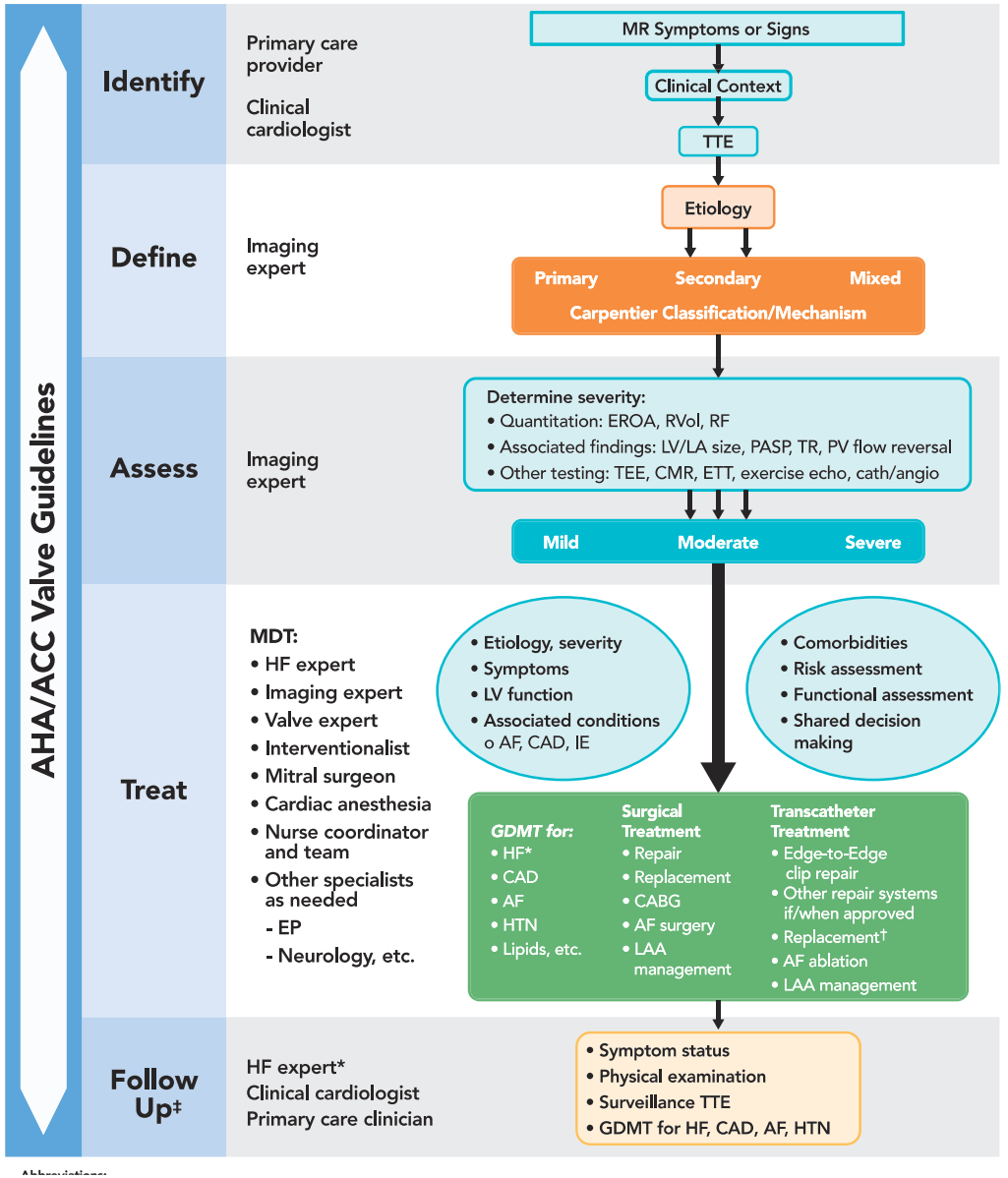




Encare ecocardiográfico de IM:

Evaluación de IM

- Etiología y mecanismo
- Severidad
- Repercusión hemodinámica
- Planificar intervencionismo

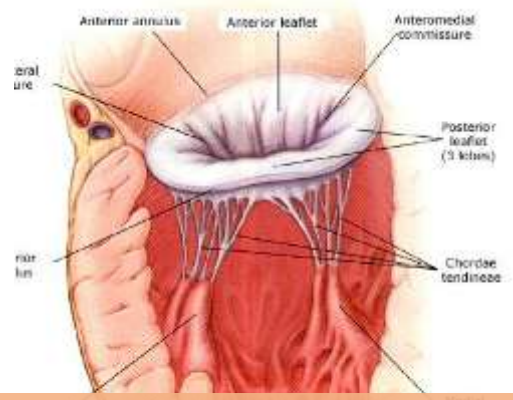


2020 Focused Update of the 2017 ACC. Expert Consensus Decision Pathway on the Management of Mitral Regurgitation. Bonow R.

Etiología de IM

Insuficiencia Mitral Primaria

- Enfermedad de Barlow avanzada
- Degeneración fibroelástica
- Prolapso valvular:
  - Elongación o deformación de CT
  - Ruptura de cuerdas tendinosas
  - Rotura de MP

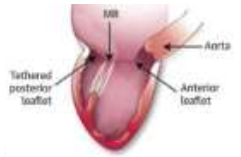


Insuficiencia Mitral Funcional

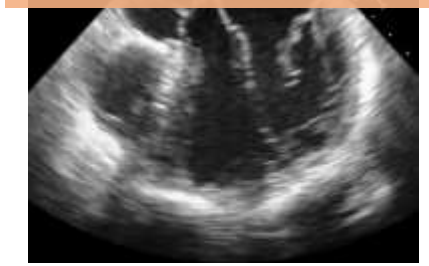
Dilatación de anillo

Dilatación de VI

Dilatación de AI



Propuesta terapéutica diferente



- Disfunción/dilatación VI (cardiopatía isquémica o no isquémica)
- Disfunción auricular izquierda

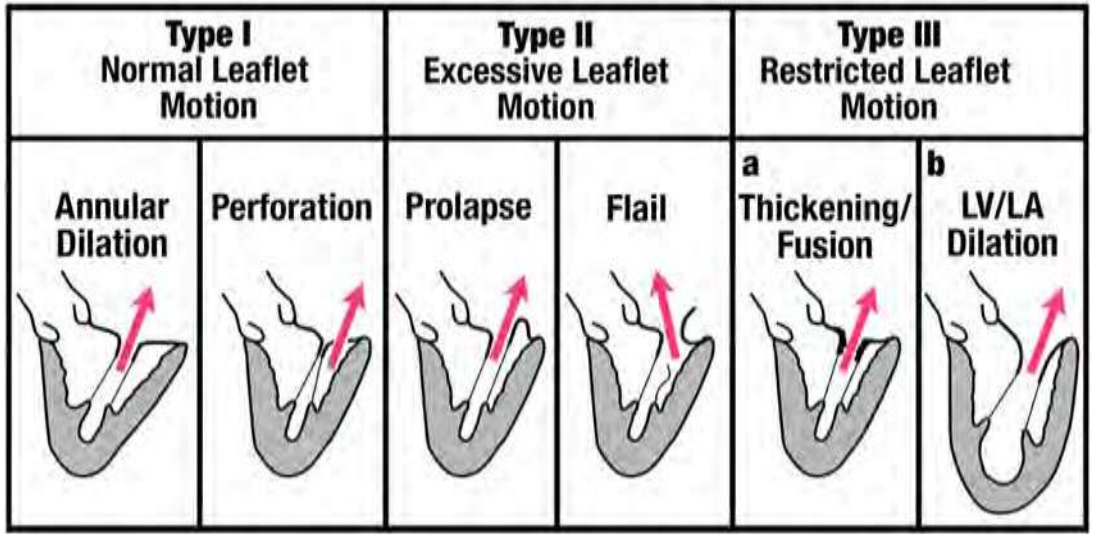
- Dilatación anular debido a
  - Pérdida de coaptación de velos secundario:
  - Aumento del tamaño del anillo mitral
  - Desplazamiento de MP y tethering/tenting de velos

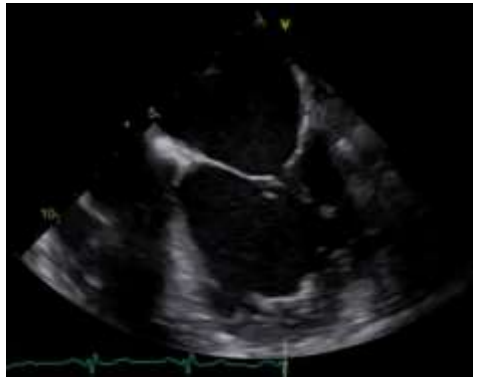
Lowie M, Functional Mitral Regurgitation. An Interventional Cardiologist's Perspective

Insuficiencia Mitral:
Etiología y mecanismo

Tipo	Causa	Descripción
Primaria	Prolapso de la válvula mitral	Valvas elongadas o rotas, prolapso hacia AI
	Cambios degenerativos	Engrosamiento, calcificación valvular
	Endocarditis infecciosa	Vegetaciones, perforaciones, aneurismas
	Inflamatoria	Reumática, colagenopatías, drogas, radiación
	Congénita	Valva hendida, válvula en paracaídas
Secundaria	Isquémica (post-enfermedad coronaria)	Disfunción del músculo papilar por remodelado VI
	Miocardiopatía no isquémica	Dilatación ventricular con tracción de valvas
	Dilatación anular	FA, miocardiopatía restrictiva

Clasificación de Carpentier:

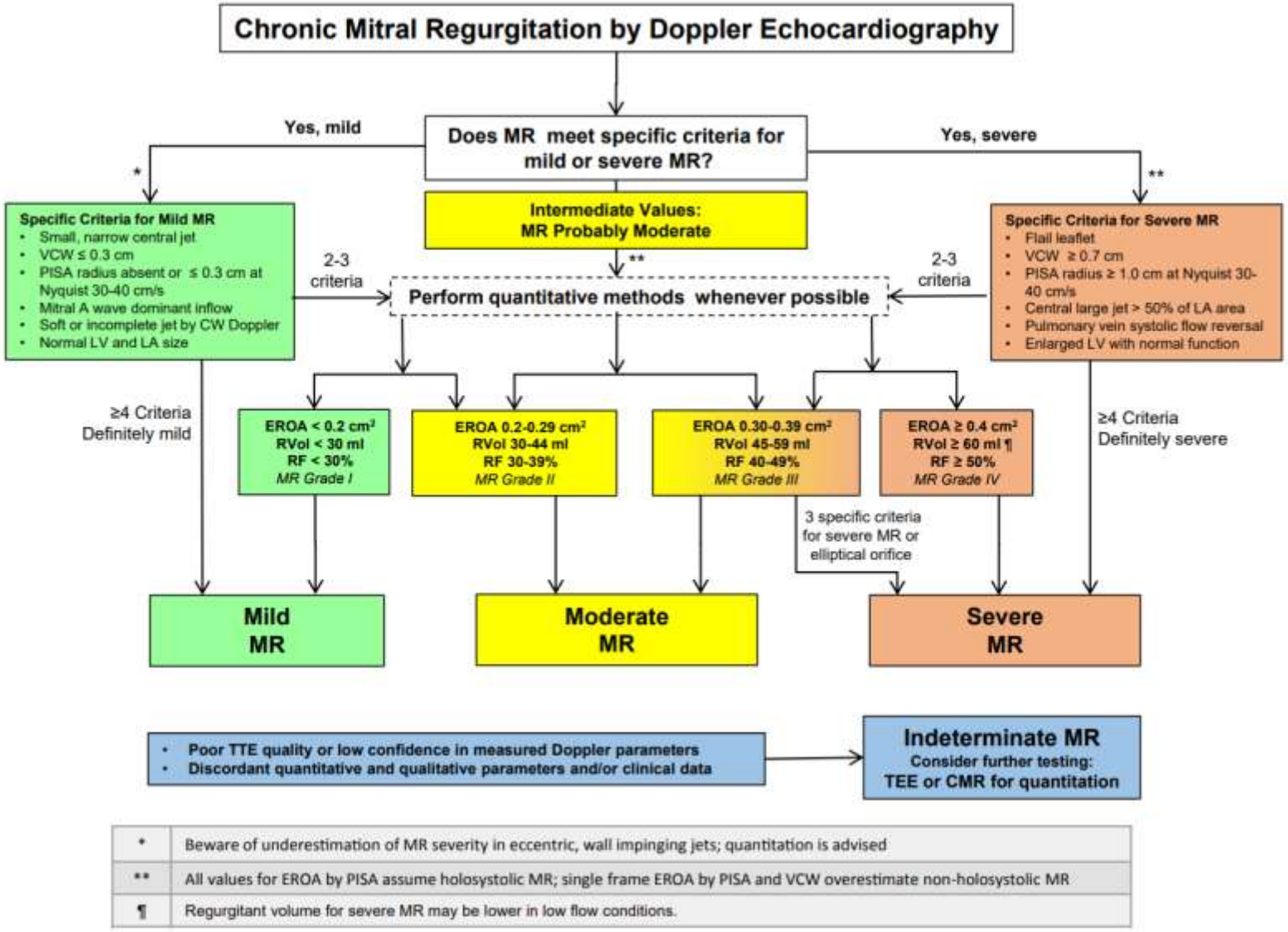




Del Forno, B., De Bonis, M., Agricola, E. *et al.* Mitral valve regurgitation: a disease with a wide spectrum of therapeutic options. *Nat Rev Cardiol* **17**, 807–827 (2020). https://doi.org/10.1038/s41569-020-0395-7

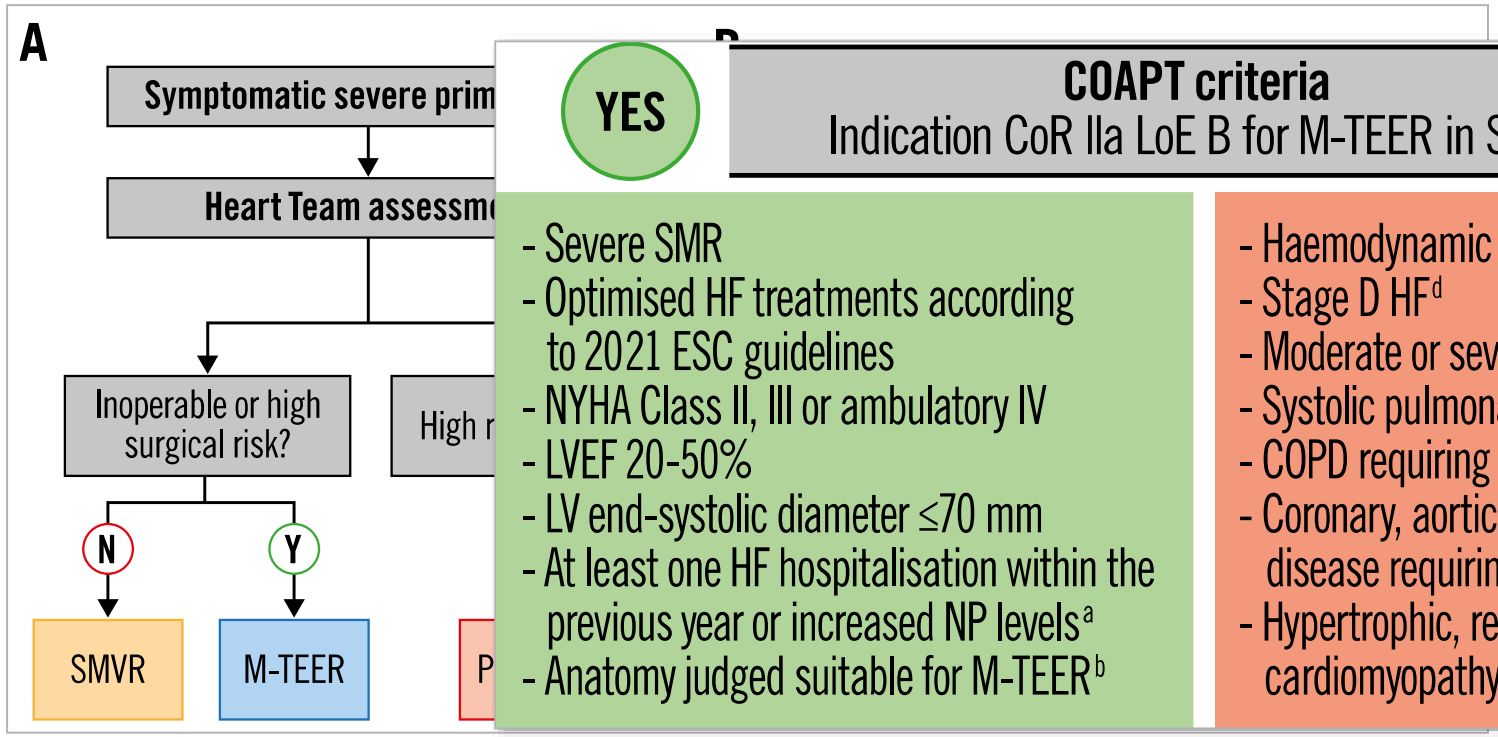
Evaluación integrativa de Severidad de IM

- Integra múltiples parámetros
  - Cualitativos
  - Semicuantitativos: VC ≥7 mm
  - Cuantitativos: ORE≥ 0,4 cm2, VR 60 ml, FR >50%
- Tener encuenta condiciones de carga
- Contemplar la anatomía valvar, etiología y el mecanismo de IM
- Correlación entre severidad y repercusión HD
  - Remodelado de VI con FEVI conservada es hallazgo espefífico de severidad



Zoghbi et al; Recommendations for Noninvasive Evaluation of Native Valvular Regurgitation

Terapia borde a borde percutaneo (M-TEER): indicación



YES

COAPT criteria
Indication CoR IIa LoE B for M-TEER in SMR

- Severe SMR
- Optimised HF treatments according to 2021 ESC guidelines
- NYHA Class II, III or ambulatory IV
- LVEF 20-50%
- LV end-systolic diameter ≤70 mm
- At least one HF hospitalisation within the previous year or increased NP levels[a]
- Anatomy judged suitable for M-TEER[b]

NO

- Haemodynamic instability[c]
- Stage D HF[d]
- Moderate or severe RV dysfunction
- Systolic pulmonary pressure >70 mmHg
- COPD requiring oxygen or steroid
- Coronary, aortic or tricuspid valve disease requiring surgery
- Hypertrophic, restrictive or infiltrative cardiomyopathy

Recommendations on indications for intervention in severe primary mitral regurgitation

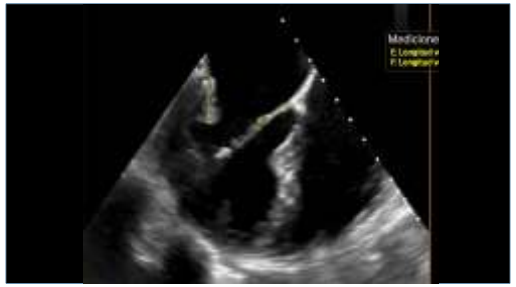
	Class	Level
TEER may be considered in symptomatic patients who fulfil the echocardiographic criteria of eligibility, are judged inoperable or at high surgical risk by the Heart Team and for whom the procedure is not considered futile.[299–302]	IIb	B

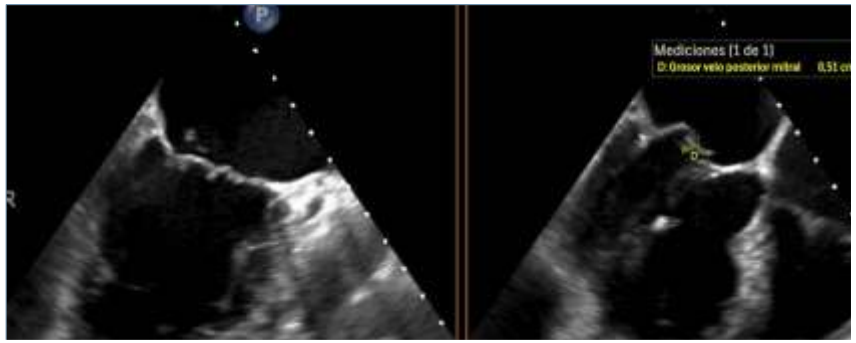
Recommendations on indications for mitral valve inter- … severe secondary mitral regurgitation[a]

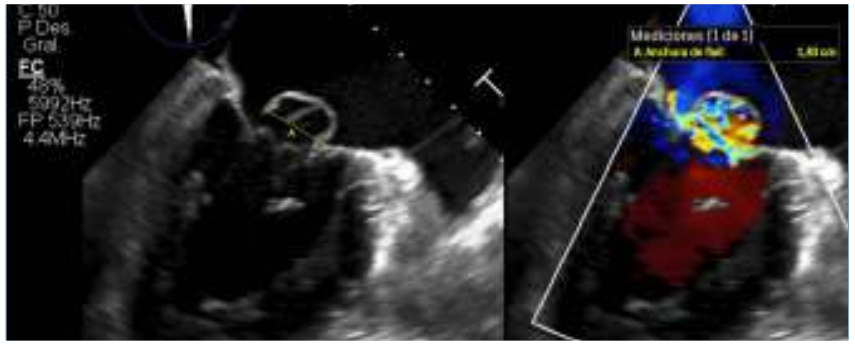
	Class[b]	Level[c]
… is recommended …e SMR who remain …MT (including CRT if …ecided by a structured …247,323,336,337	I	B
…tant coronary artery or other cardiac …tment		
…who are judged not … the Heart Team on …l characteristics,[d] PCI …lowed by TEER (in …MR) should be	IIa	C
…omitant coronary artery or other cardiac …tment		
TEER should be considered in selected symptomatic patients, not eligible for surgery and fulfilling criteria suggesting an increased chance of responding to the treatment.[337,338,356,357 e]	IIa	B

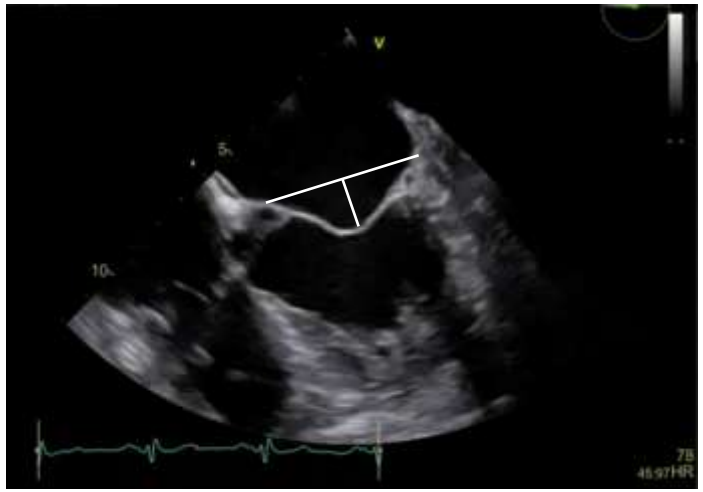
2021 ESC/EACTS Guidelines for the management of valvular heart disease

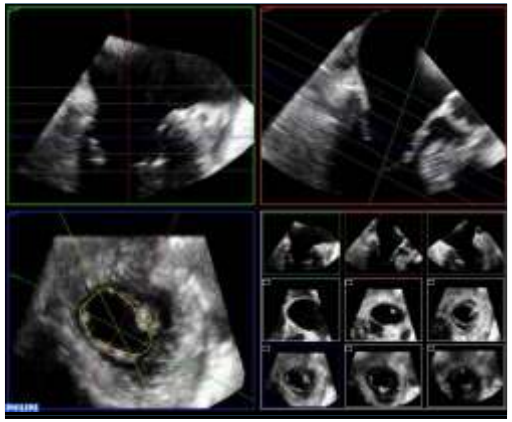
Selección de paciente candidato a TEER:











Repair!

Anatomical suitability for M-TEER

Centre experience

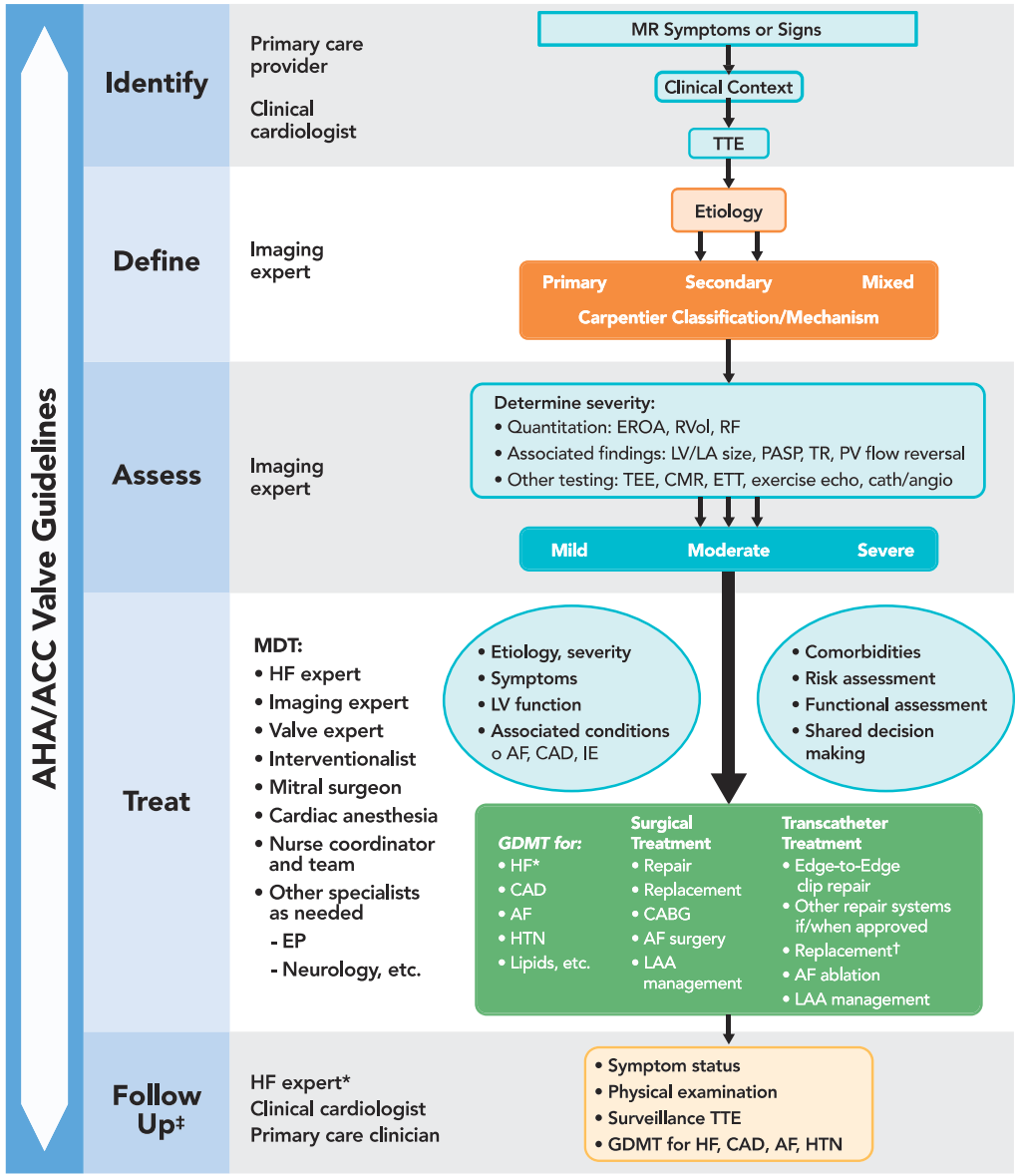
Replacement?

Non-complex Ideal for M-TEER	Complex Suitable for M-TEER	Very complex Challenging for M-TEER	Criteria favouring replacement M-TEER hard or impossible
- Central pathology - No calcification - MVA >4.0 cm^2 - Posterior leaflet >10 mm - Tenting height <10 mm - Flail gap <10 mm - Flail width <15 mm	- Isolated commissural lesion (A1/P1 or A3/P3) - Annular calcification without leaflet involvement - MVA 3.5-4.0 cm^2 - Posterior leaflet length 7-10 mm - Tenting height >10 mm - Asymmetric tethering[26] - Coaptation reserve <3 mm[24] - Leaflet-to-anulus index <1.2[25] - Flail width >15 mm - Flail gap >10 mm - Two jets from leaflet indentations	- Commissural lesion with multiple jets - Annular calcification with leaflet involvement - Fibrotic leaflets - Wide jet involving the whole coaptation - MVA 3.0-3.5 cm^2 - Posterior leaflet length 5-7 mm - Barlow's disease - Cleft - Failed surgical annuloplasty	- Concentric MAC with stenosis - MVA <3.0 cm^2 - Relevant mitral valve stenosis (mean gradient >5 mmHg) - Posterior leaflet <5 mm - Calcification in the grasping zone - Deep regurgitant cleft - Leaflet perforation - Multiple/wide jets - Rheumatic mitral stenosis

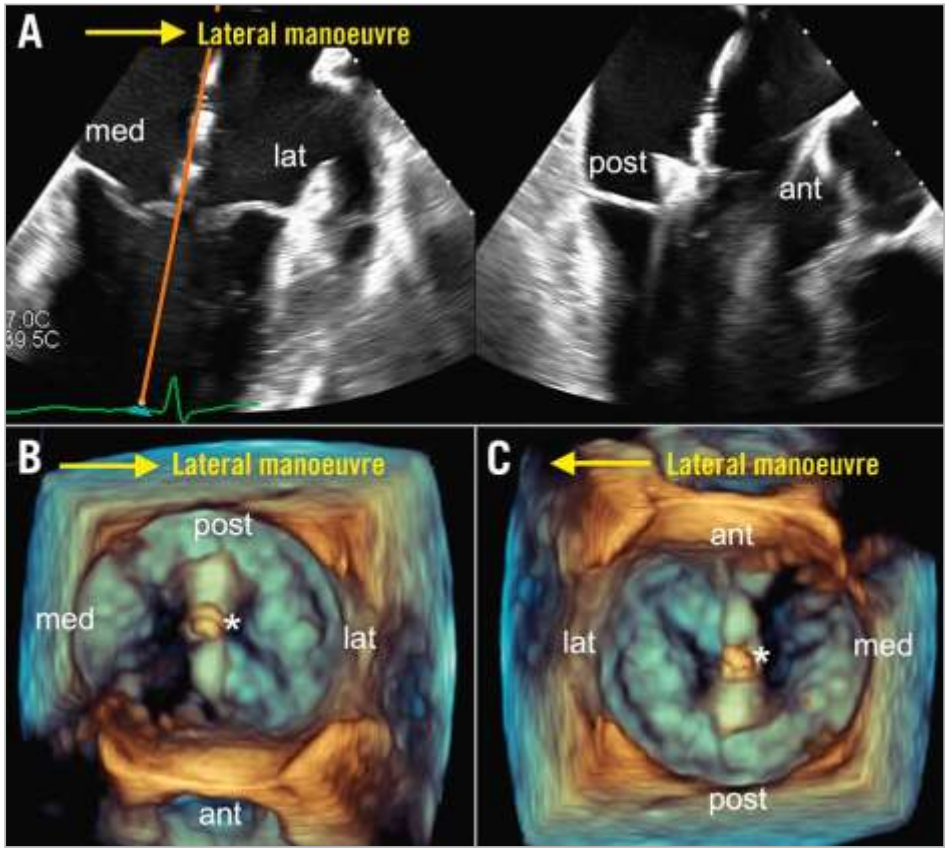
EuroIntervention 2023;18:957-976

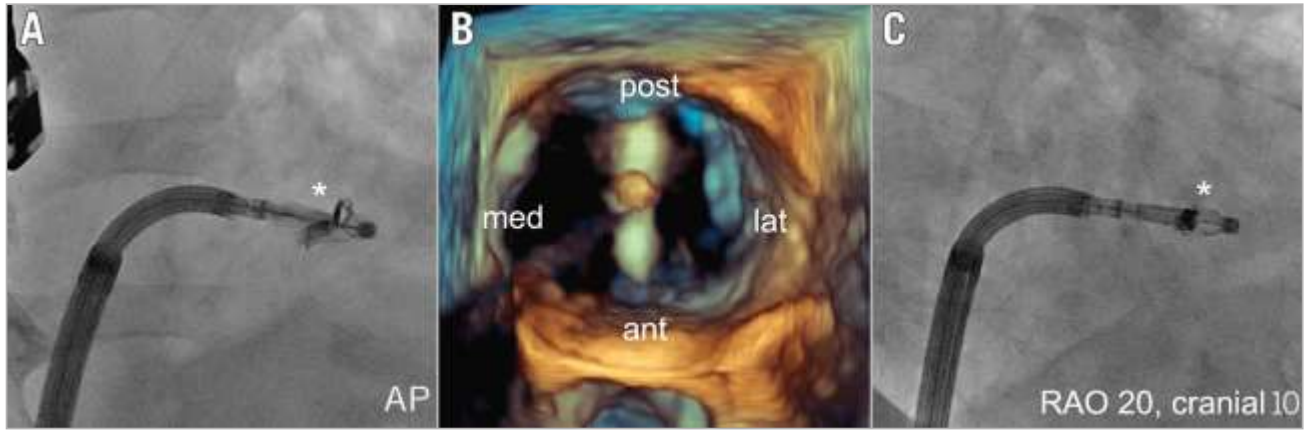
¿Que no puede faltar en la evaluación de IM candidatos a M-TEER?

- Evaluación integral de IM
  - Etiología
  - Mecanismo
  - Severidad y que criterios
  - Repercusión de IM:
    - Dilatación de cavidades, VI-AI
    - FEVI
    - HTP
- Características anatómicas para M-TEER



Guía del implante: la imagen cardíaca-los ojos del Heart Team

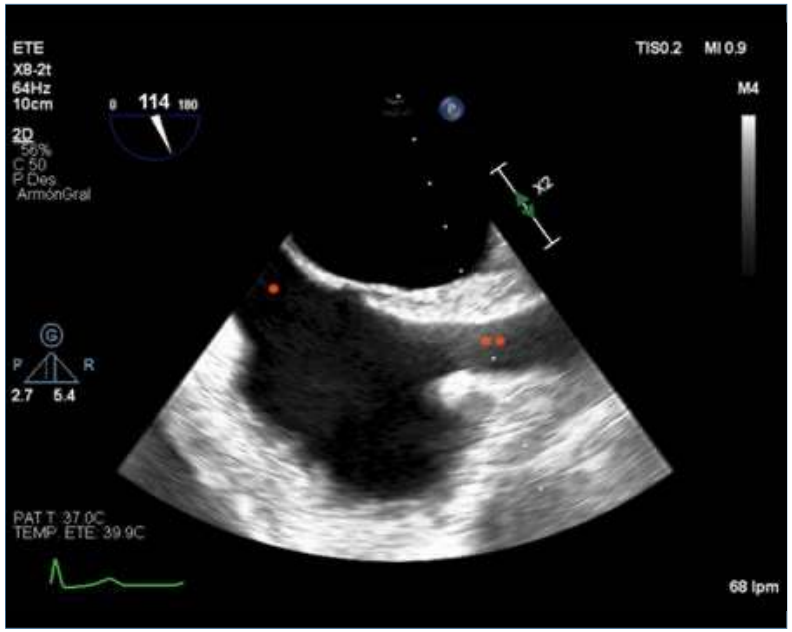


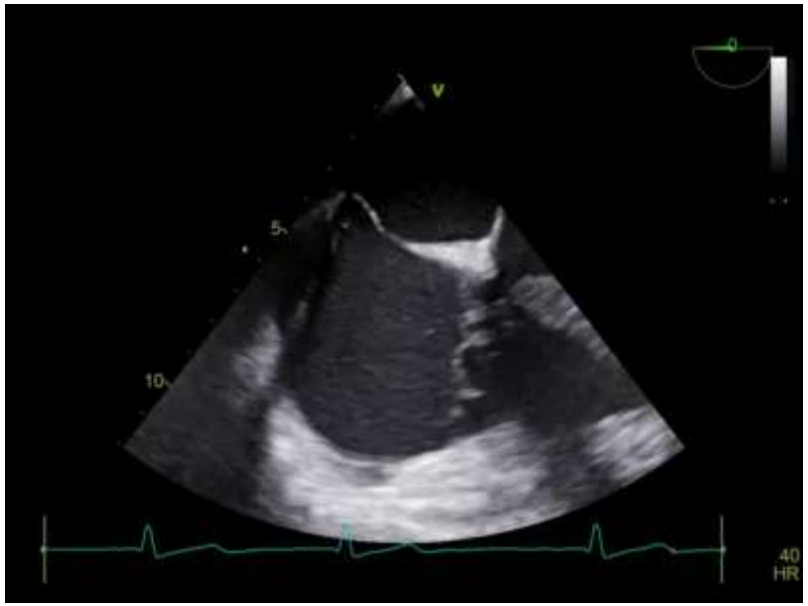


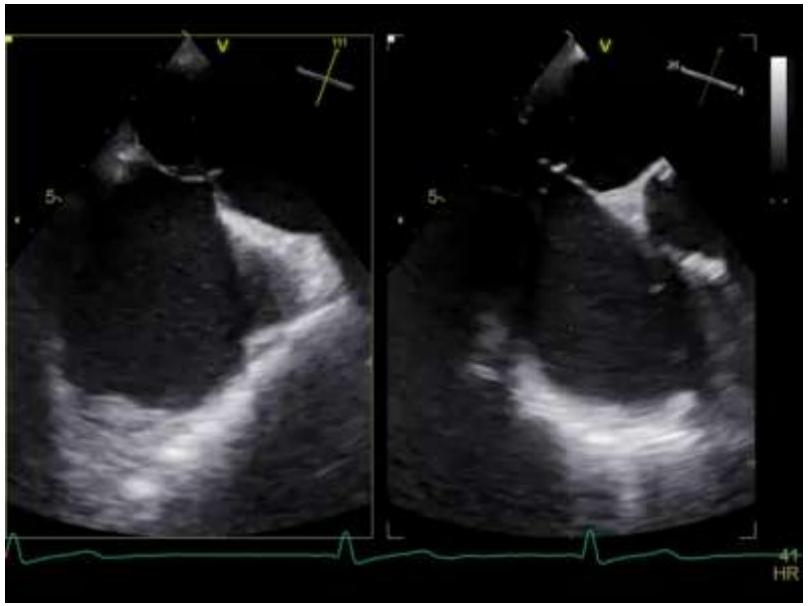
Ecocardiograma 4D

- Imagen multiplanar
- Volumétrico en face de VM

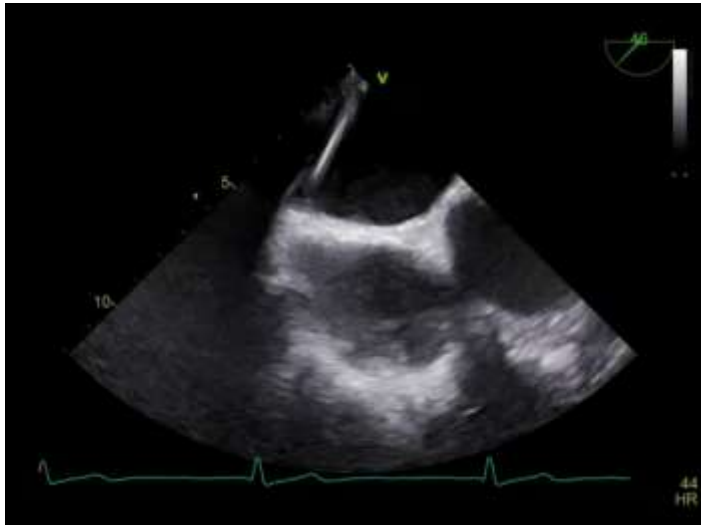
Punción Transeptal:

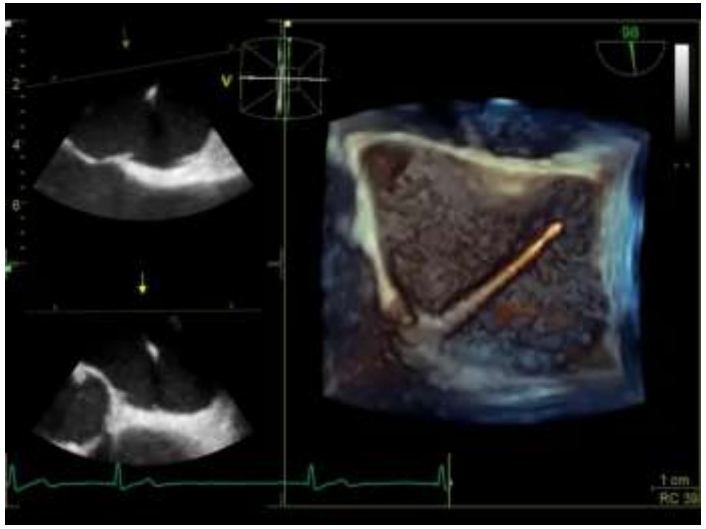


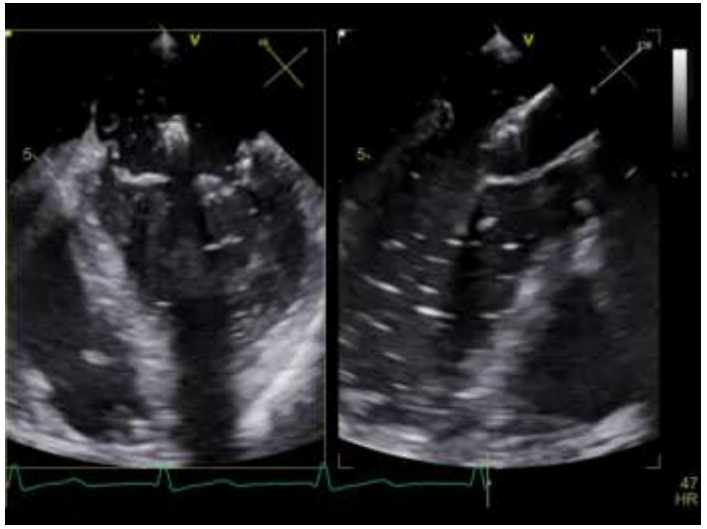




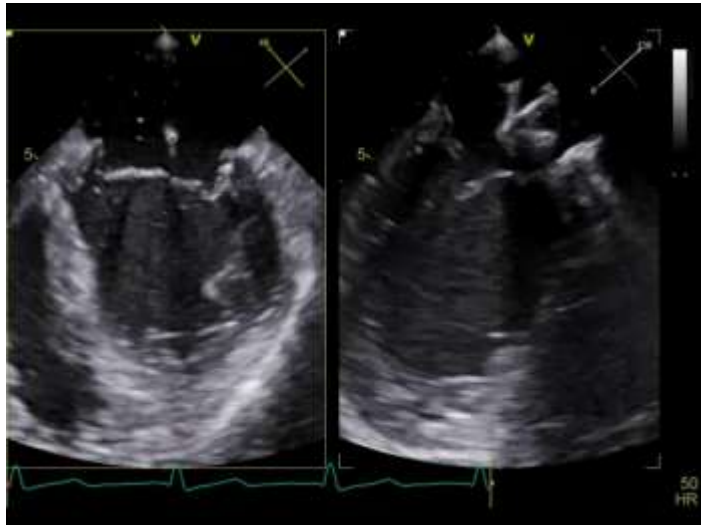
- Introducción del catéter guía y del sistema liberador del clip
- Avance del CDS
- Grasping de los velos

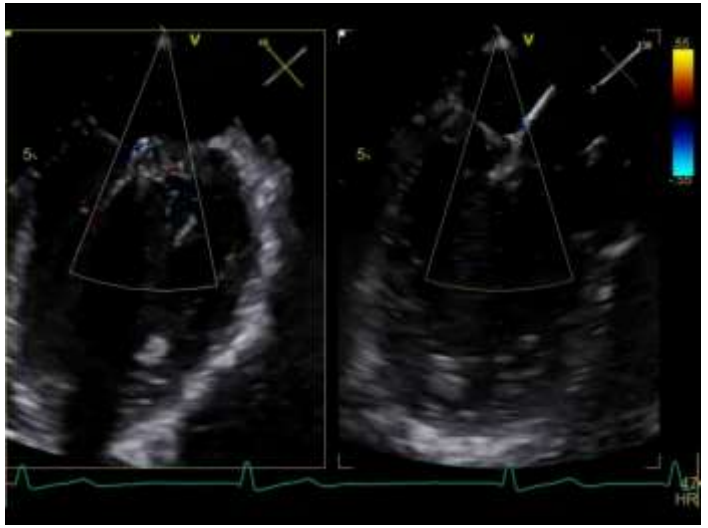


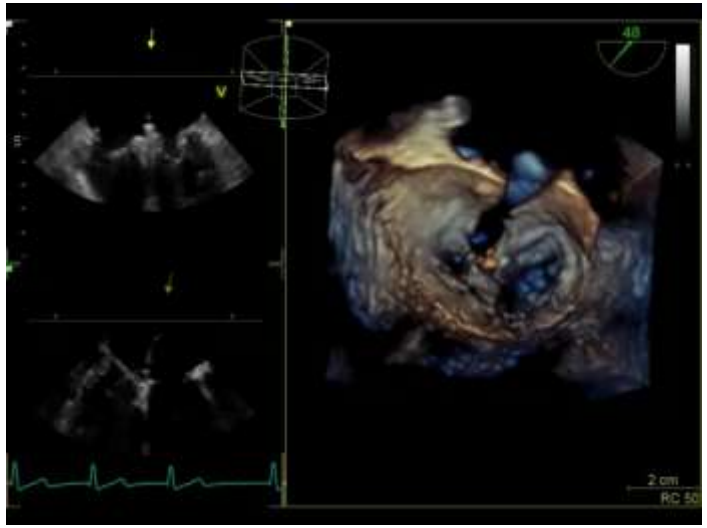


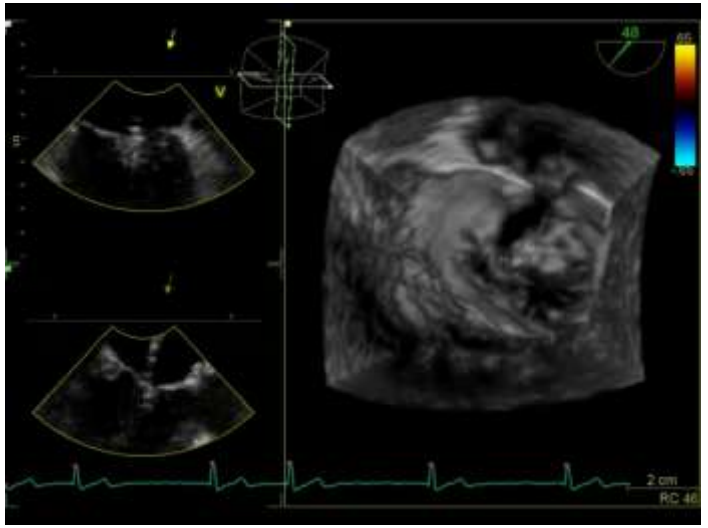


- Avance del CDS y grasping de los velos
- Valoración del resultado
  - Captura de velos
  - Movilidad de velos
  - Imagen de las pirámides
  - Longitud de velo retenido, 5 mm
- Liberación del dispositivo

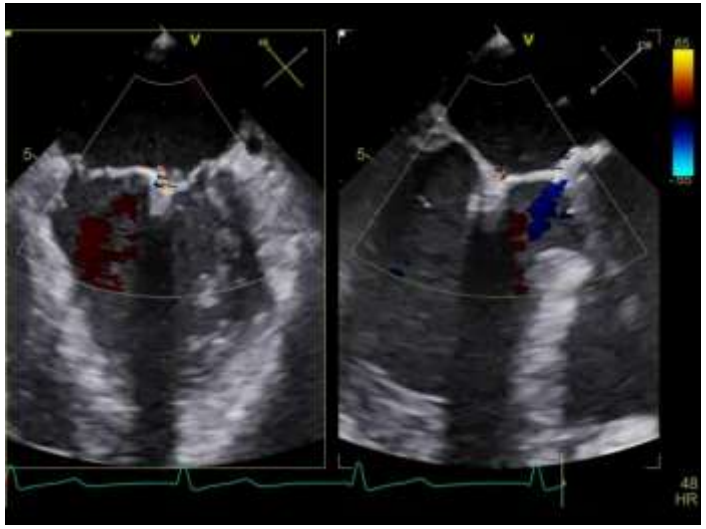






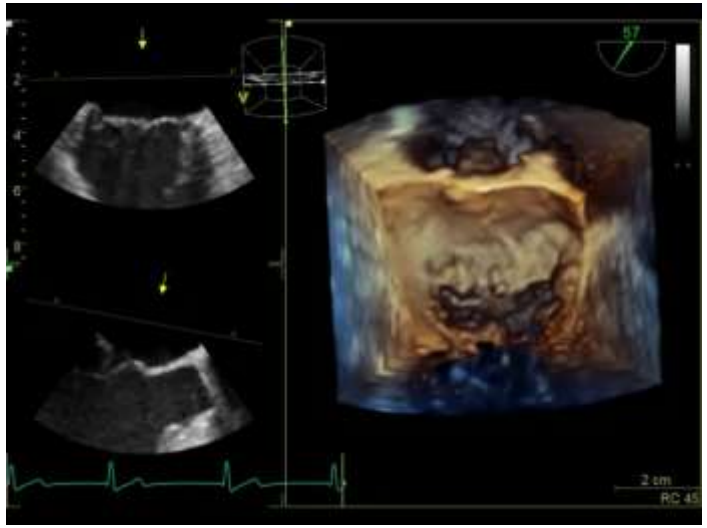


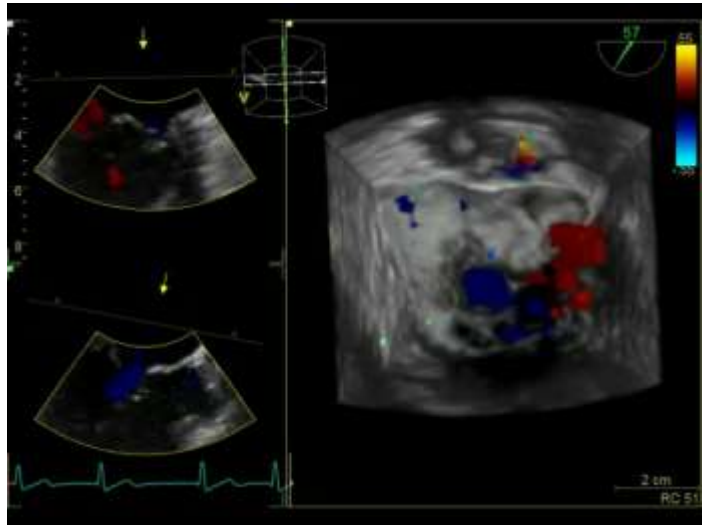
- Necesidad de Clip adicional:
  - Grado de IM
  - Estenosis mitral
    - GM> 5mmHg
    - AVM
  - Mejoría hemodinamica
  - Dificultad técnica de implantar 2° – 3er Clip

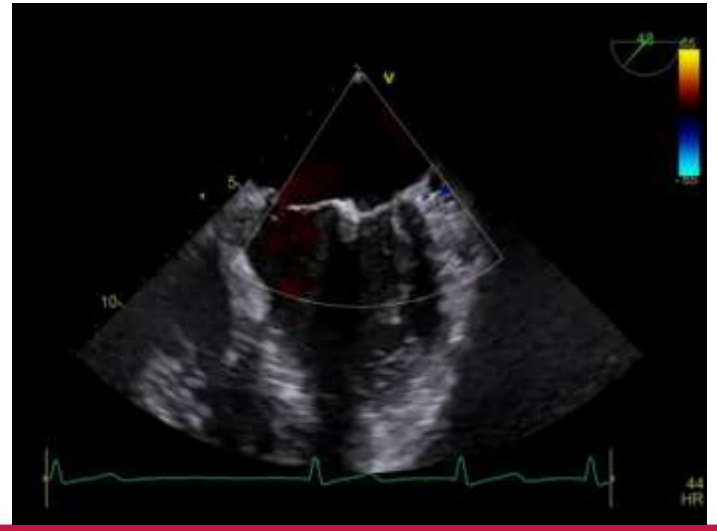


Antes y después: ¿Cómo evaluamos éxito del procedimiento?

- Estenosis mitral residual
- Regurgitación residual



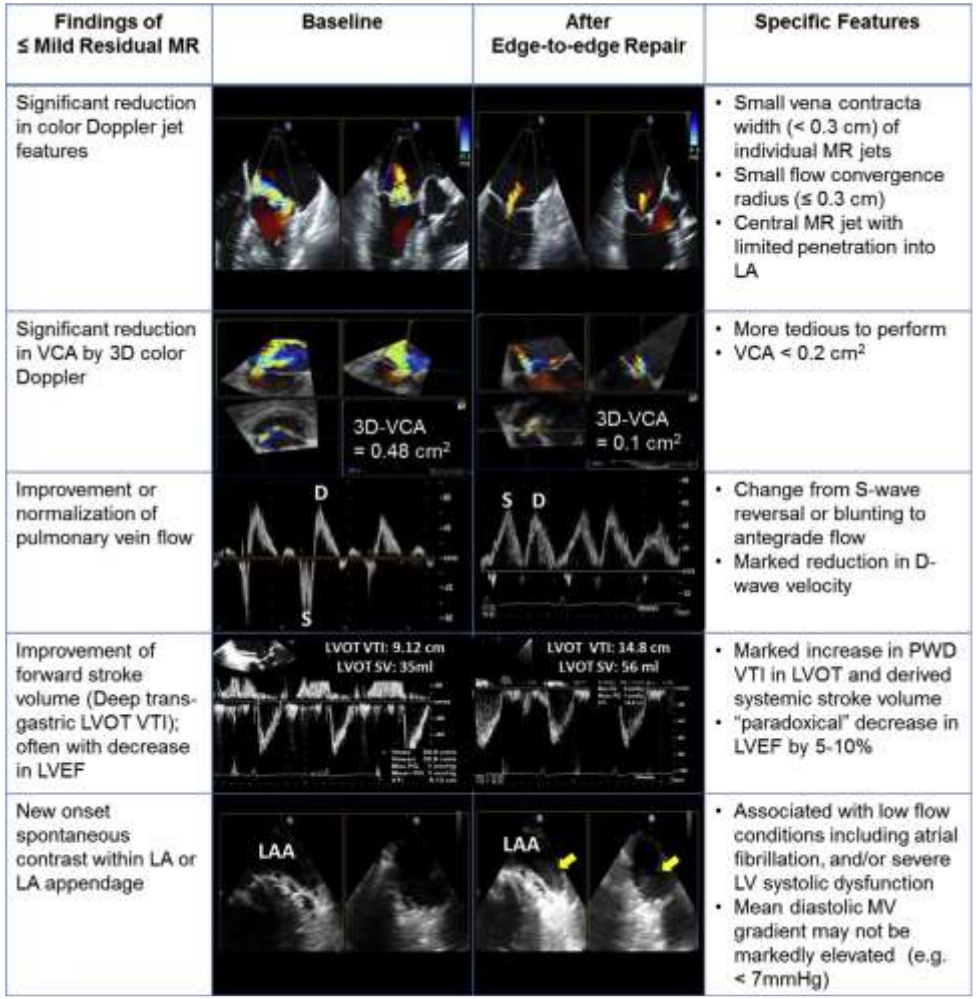




Evaluación de los resultados: Regurgitación residual

Table 5 Hemodynamics and TEE parameters useful in determining residual MR severity during MV interventions in the catheterization laboratory

Parameter	Assessing severity of residual MR
Invasive hemodynamics	Decrease in regurgitant *v* wave, LA pressure, and pulmonary pressures are specific signs of reduction in MR severity; Consider effects of general anesthesia on MR severity
General echocardiographic findings	
Spontaneous echo contrast in LA	Appearance of spontaneous contrast after MV intervention suggests significant reduction in MR severity
LVEF	Decline in LVEF after MV intervention suggests significant MR reduction in the absence of other causes (ischemia, pacemaker-related, etc.)
Color Doppler	
Color Doppler jet (size, number, location, eccentricity)	- Easy to obtain with a comprehensive, systematic approach - Difficult to assess multiple and eccentric jets - Jet area affected by eccentricity, technical and hemodynamic factors (especially driving velocity)
Flow convergence	- Large flow convergence denotes significant residual MR whereas a small or no flow convergence suggests mild MR - Difficult to use in presence of multiple jets or very eccentric jets, or may be masked by the device
Vena contracta width	- VCW ≥0.7 cm specific for severe MR - Difficult to use in presence of multiple small jets or very eccentric jets for which orifice shape is not well delineated
Vena contracta area (3D planimetry)	- Allows better delineation of eccentric orifice shape and possibly the addition of VCA of multiple jets - Prone to blooming artifacts
Spectral Doppler	
Pulmonary vein flow pattern	- Systolic flow reversal in >1 vein specific for severe MR - Increase in forward systolic velocity after MV intervention helps confirm MR reduction
MR jet profile by CWD (contour, density, peak velocity)	- Dense, triangular pattern suggests severe MR - May be hard to line up CWD properly in flail leaflet or very eccentric jet after intervention
Mitral inflow pattern	- In sinus rhythm, mitral A-wave-dominant flow excludes severe MR - Decrease in mitral E velocity and VTI suggests reduction in MR severity
Pulsed Doppler of LVOT (deep transgastric view)	Increase in LVOT velocity and VTI after procedure suggests MR reduction
Quantitative parameters	In general, more difficult to perform; some procedure-specific limitations in quantitation
EROA by PISA	- Not recommended after edge-to-edge repair because assumption of hemispheric proximal flow convergence is violated by the device. - PISA often underestimates MR severity in the presence of multiple jets or markedly eccentric jets. - Not feasible in PVR of mechanical prosthetic MV or possibly TMVR (flow masking in LV by TEE)
Regurgitant volume	- Difficult to perform volumetric RVol with pulsed Doppler by TEE



Guidelines for the Evaluation of Valvular Regurgitation After Percutaneous Valve Repair or Replacement. Zoghbi, William A. et al. Journal of the American Society of Echocardiography, Volume 32, Issue 4, 431 - 475

Mensajes finales: Rol del ecocardiograma en intervencionismo de Insuficiencia mitral

- Evaluación ecocardiográfica de IM debe ser integral.
- Debe contemplar:
  - Etiología y mecanismo
  - Evaluación integrativa de la severidad
  - Repercusión funcional
  - Datos anatómicos que aporten a la evaluación de tratamiento intervencionista
- La imagen reprensenta los ojos del intervencionismo
  - Guia visual del procedimiento
- Evaluar adecuadamente los resultados post M-TEER

Gracias!!