



What defines procedural success in TEER?

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Successful Transcatheter edge-to-edge repair is defined as:



- MR reduction by $\leq 1+$
- Final MR grade of $\leq 2+$
- No significant MS (MG ≤ 5 mmHg)



European Heart Journal (2015) 36, 1878–1891
doi:10.1093/eurheartj/ehv333

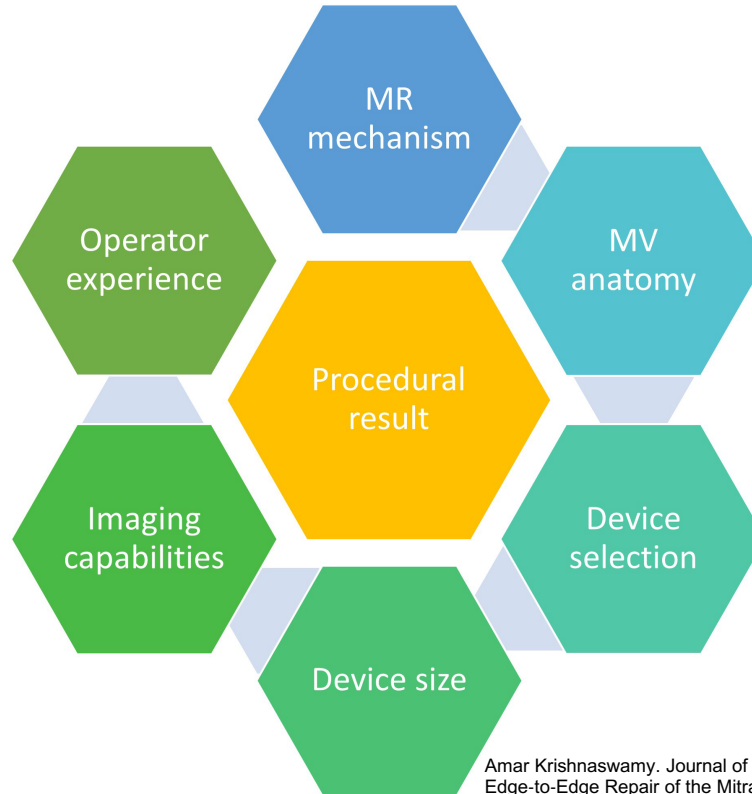
CURRENT OPINION

Clinical trial design principles and endpoint definitions for transcatheter mitral valve repair and replacement: part 2: endpoint definitions

A consensus document from the Mitral Valve Academic Research Consortium

Gregg W. Stone^{1,2*}, David H. Adams³, William T. Abraham⁴, Arie Pieter Kappetein⁵, Philippe Généreux^{1,2,6}, Pascal Vranckx⁷, Roxana Mehran^{2,3}, Karl-Heinz Kuck⁸, Martin B. Leon^{1,2}, Nicolo Piazza⁹, Stuart J. Head⁵, Gerasimos Filippatos¹⁰, and Alec S. Vahanian¹¹, for the Mitral Valve Academic Research Consortium (MVARC)

Factors that contribute to an optimal mitral TEER

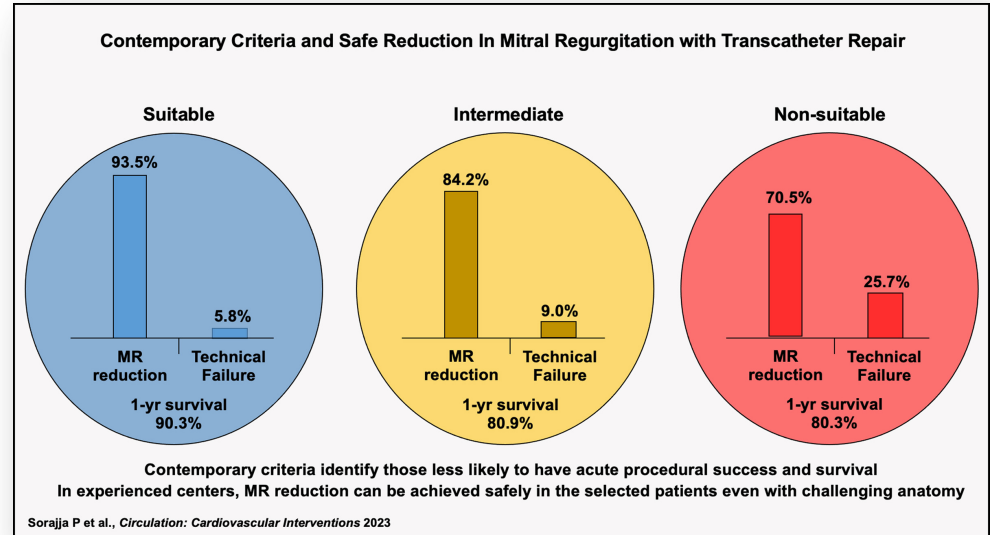


Amar Krishnaswamy. Journal of the American Heart Association. Optimizing Transcatheter Edge-to-Edge Repair of the Mitral Valve: The Relentless Pursuit of Perfection, Volume: 12, Issue: 20, DOI: (10.1161/JAHA.123.031874)



Challenging Anatomies

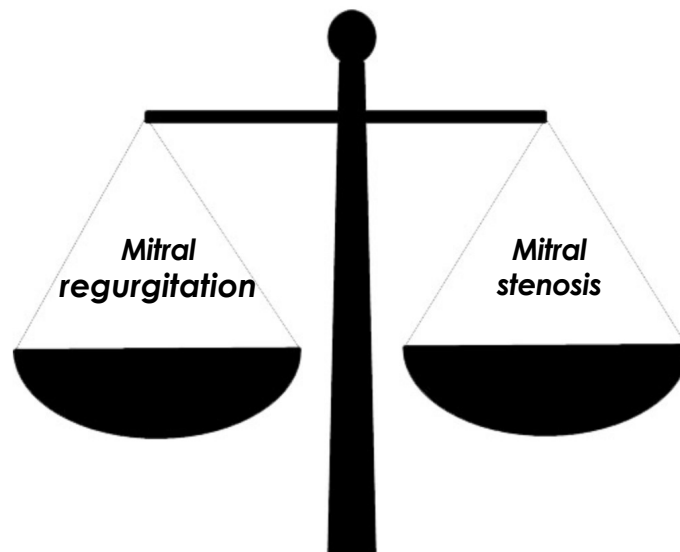
- Broad regurgitant jet
- Calcified Annuli
- Degenerated Small Valve



Success= balancing act between the desire to reduce MR/ the concern for development of MS considering MV complexity

Assessment of TEER success:

- **Echocardiographic**
 - Color Doppler/ 3D/ PW and CW doppler
- **Hemodynamic**
 - Mean LA pressure/ V-Wave/ BP assessment



Impact of post-TEER gradients on outcomes

Data with Primary MR

Elevated Mitral Valve Pressure Gradient After MitraClip Implantation Deteriorates Long-Term Outcome in Patients With Severe Mitral Regurgitation and Severe Heart Failure

Michael Neuss, MD, Thomas Schau, MD, Akihito Iotani, MD, Markus Flitz, Maren Schöpp, MD, Christian Butler, MD

2017:MG > 5mmHg associated with adverse outcome for mixed etiology

Effect of Mitral Valve Gradient After MitraClip on Outcomes in Secondary Mitral Regurgitation

Results From the COAPT Trial

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ABSTRACT

OBJECTIVES The authors sought to evaluate the association between mean mitral valve gradient (MVG) and clinical outcomes among patients who underwent MitraClip treatment for secondary mitral regurgitation (SMR) in the COAPT (Cardiovascular Outcomes Assessment of the MitraClip Percutaneous Therapy for Heart Failure Patients with Functional Mitral Regurgitation) trial.

BACKGROUND In the COAPT trial, patients with heart failure (HF) and severe SMR who remained symptomatic despite guideline-directed medical therapy had marked 2-year reductions in mortality and HF hospitalizations after treatment with MitraClip.

METHODS MitraClip-treated patients were divided into quartiles (Q) based on discharge echocardiographic MVG (n = 250). Endpoints including all-cause mortality, HF hospitalization, and health status measures at 2 years were compared between quartiles.

RESULTS Mean MVG after MitraClip was 2.1 ± 0.4 mm Hg, 3.0 ± 0.2 mm Hg, 4.2 ± 0.5 mm Hg, and 7.2 ± 2.0 mm Hg in Q1 (n = 63), Q2 (n = 63), Q3 (n = 62), and Q4 (n = 64), respectively. There was no difference across quartiles in the 2-year composite endpoint of all-cause mortality or HF hospitalization (43.2%, 49.2%, 40.6%, and 40.9%, respectively; p = 0.80), nor in improvements in New York Heart Association functional class, Kansas City Cardiomyopathy Questionnaire score, or 6-min walk time. Results were similar after adjustment for baseline clinical and echocardiographic characteristics, post-procedure MR grade, and number of clips (all-cause mortality or HF hospitalization Q4 [44.6%] vs. Q1 to Q3 [40.3%], adjusted hazard ratio: 1.23, 95% confidence interval: 0.60 to 2.51; p = 0.57).

CONCLUSIONS Among HF patients with severe SMR, higher MVGs on discharge did not adversely affect clinical outcomes following MitraClip. These findings suggest that in select patients with HF and SMR otherwise meeting the COAPT inclusion criteria, the benefits of MR reduction may outweigh the effects of mild-to-moderate mitral stenosis after MitraClip. (J Am Coll Cardiol Intv 2023;14:879-89) © 2023 by the American College of Cardiology Foundation.

Data in Functional MR

ORIGINAL RESEARCH

Elevated Mitral Valve Pressure Gradient Is Predictive of Long-Term Outcome After Percutaneous Edge-to-Edge Mitral Valve Repair in Patients With Degenerative Mitral Regurgitation (MR), But Not in Functional MR

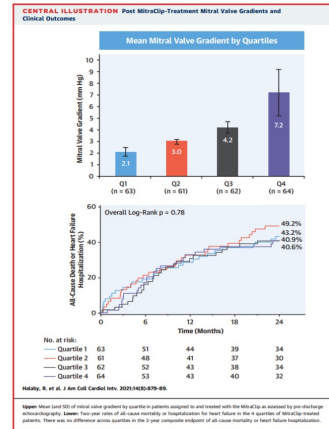
Johannes Patzelt, MD, Wenzhang Zhang, MD, Reinhard Stafer, MD, Matthias Metzger, MD, Henry Nording, MD, Miriam Ulrich, MD, Annika Becker, MD, Tara Patzelt, Dr oec pubi, Volker Rudolph, MD, Ingo Eitel, MD, Mohammed Saad, MD, Fabian Bamberg, MD, Christian Schlenzak, MD, Mehrad Gavaz, MD, Peter Beeksteger, MD, Juergen Schrieck, MD, Peter Seiszer, MD, Harald F. Langer, MD

2019:MG > 4.4mmHg associated with adverse outcome for degenerative MR but not functional MR

Prognostic Value of Increased Mitral Valve Gradient After Transcatheter Edge-to-Edge Repair for Primary Mitral Regurgitation

Sung-Han Yoon, MD,¹ Moody Makar, MD,¹ Sahal Kar, MD,² Tarun Chakravarthy, MD,² Luke Oakley, MD,² Navraj Seehoon, MD,³ Krizia Kowalski, MD,³ Yussuke Enra, MD,³ Mamoru Nakamura, MD,³ Michele Hamilton, MD,³ Jignesh K. Patel, MD,³ Siddharth Singh, MD,³ Sabah Slaif, MD,³ Robert J. Siegel, MD,³ Jeroen J. Bax, MD,^{3,4} Raj R. Makkar, MD³

2022: MG was not associated with adverse outcome for degenerative MR



2021:MG did not adversely affect clinical outcomes

Case 1

- 78 year-old male
- Smoker
- Hypertension
- Atrial fibrillation

- Multiple HF decompensations despite optimal medical therapy

- Echo: LV (55/32mm), LVEF 64%. Severe MR (dilated annulus + A2 pseudo prolapse)

63%
C 46
P Des.
ArmonGral

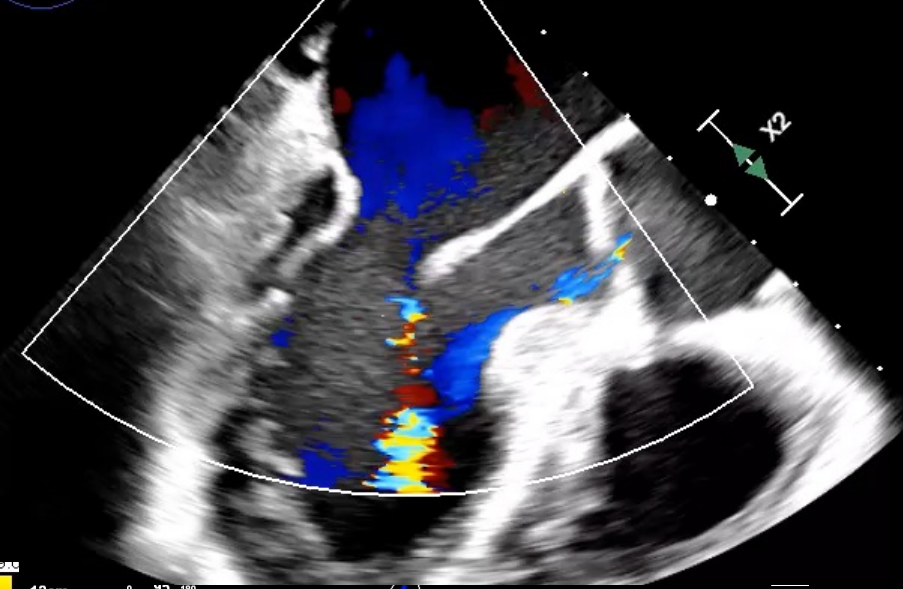
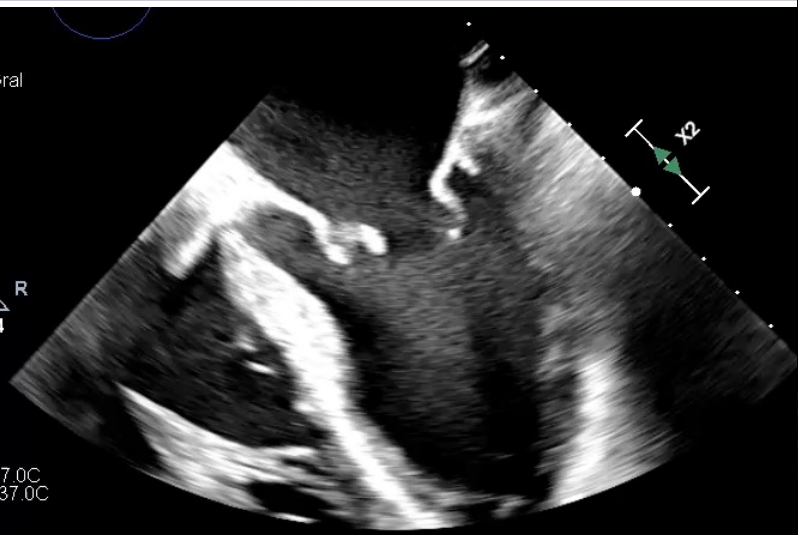
2.7 5.4

PAT T: 37.0C
TEE T: < 37.0C

7.8cm
Zoom 3D
2D / 3D
% 64 / 44
C 46 / 34
ArmonGral
XRES 1

FC
% 51 / 50
7955Hz
FP 795Hz
4.4MHz

PAT T: 37.0C



-57.4
cm/s

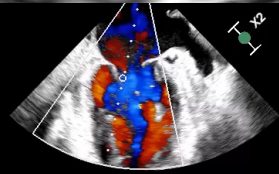


12cm
2D
65%
C 46
P Des.
ArmonGral
FC
48%
5619Hz
FP 505Hz
4.4MHz
-69.0



CW
40%
FP 225Hz
2.5MHz

TEMP. PCTE: 37.0C
TEMP. ETE: 39.4C



-Pseudo prolapse of
A2

due to posterior
leaflet restriction

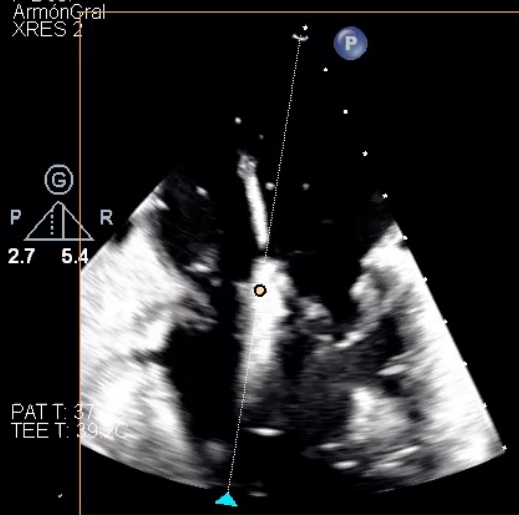
-MG 1mmHg

- Mitraclip

XTW

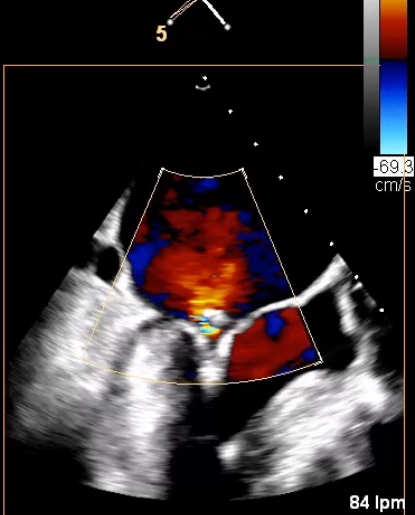
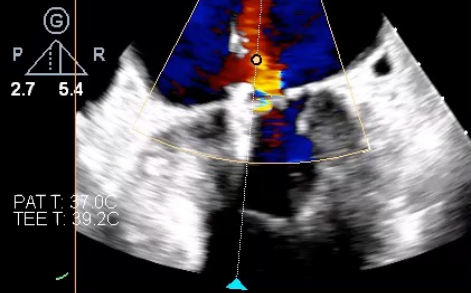
-160

P Des
ArmonGral
XRES 2



xPlane
51%
51%
46dB
P Des.
ArmonGral
XRES 2

FC
48%
7992Hz
FP 719Hz
4.4MHz

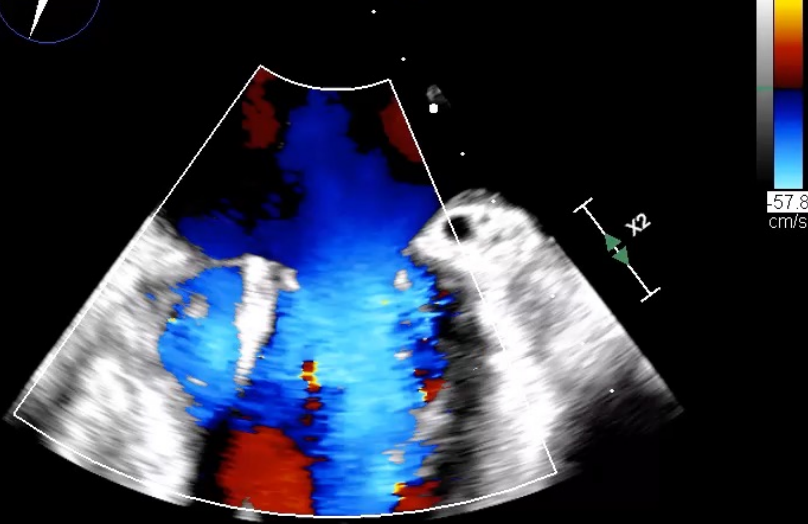


2D
51%
C 46
P Des.
ArmonGral

FC
48%
6660Hz
FP 599Hz
4.4MHz

P
2.7 5.4

PATT: 37.0C
TEE T: 39.0C



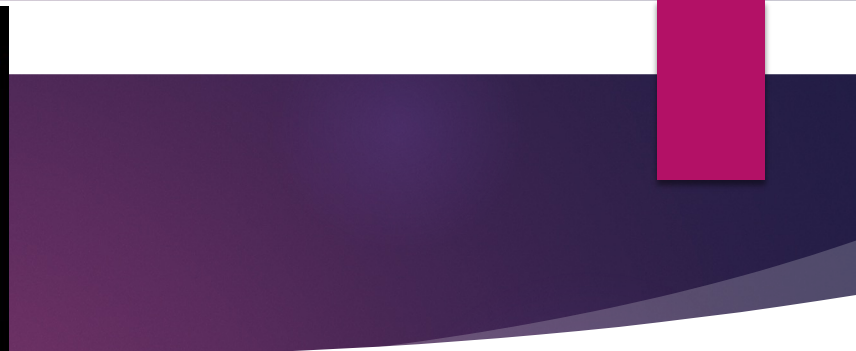
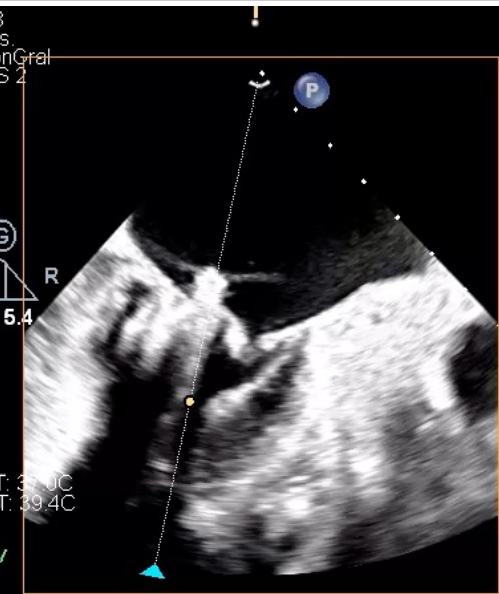
-Residual MR
-MG 1mmHg

Questions

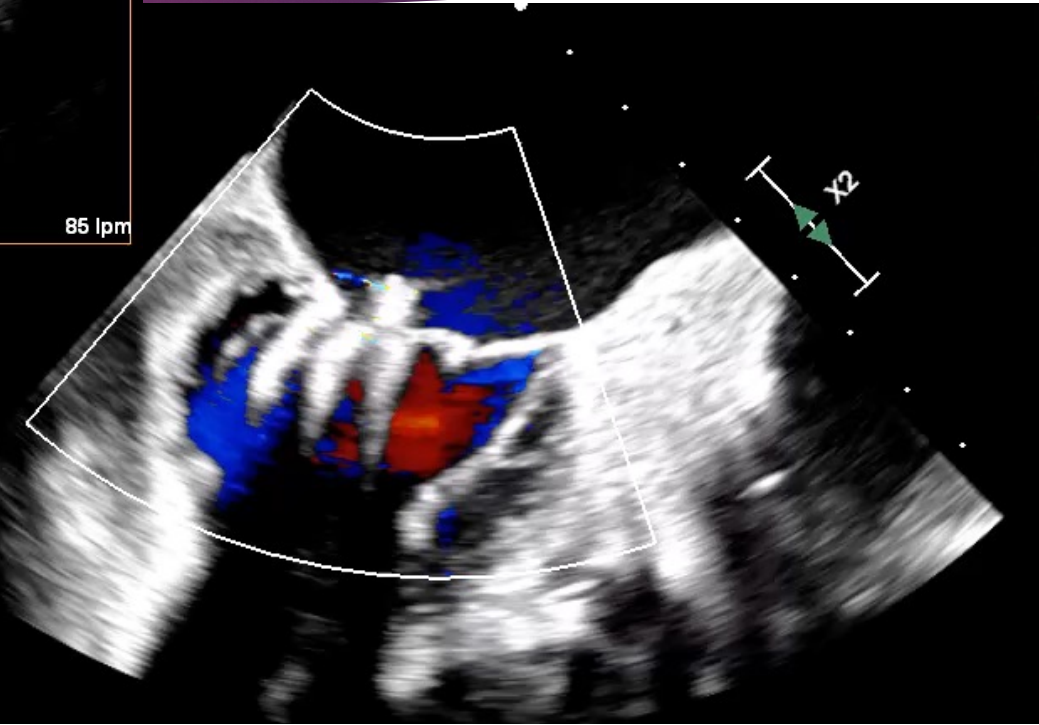
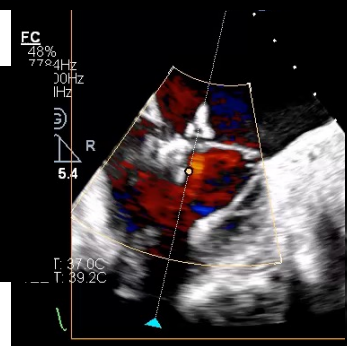
▶ Do you think this is a successful result?

1. Yes, I would leave it like this

2. I would go for a 2nd clip because the gradient is low and we can achieve a greater MR reduction



-Trace MR
-MG 2mmHg

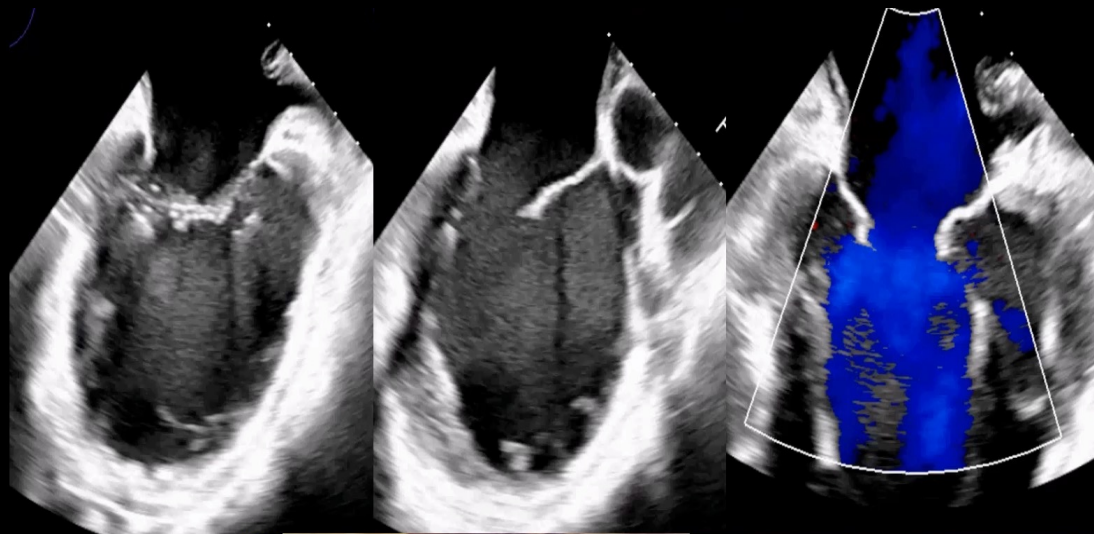


Case 2

- 52 year-old male
- Current smoker
- Hypertension
- Dyslipidemia
- Type 2 diabetes
- Buerger disease that caused ischemia of both legs' arteries → amputations

- Ischemic dilated cardiomyopathy LVEF 26%.
 - Severely dilated LV, LVEF 27%.
 - Severe MR (central jet, ORE 32 mm²). Mean grad 1 mmHg.
 - Mild TR, PAP 50mmHg

- Admitted with HF. Persistent despite optimal medical therapy



CV Intervención

X8-21
20Hz
10cm



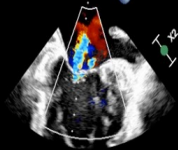
2D
64%
C 46
P Des
ArmónGral
FC
43%
8917Hz
FP 622Hz
4.4MHz

CW
40%
FP 225Hz
2.5MHz

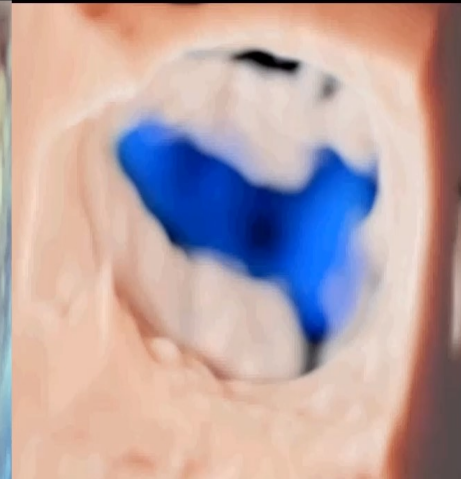
TEMP. PCTE: 37.0C
TEMP. ETE: 39.4C



MG 1mmHg

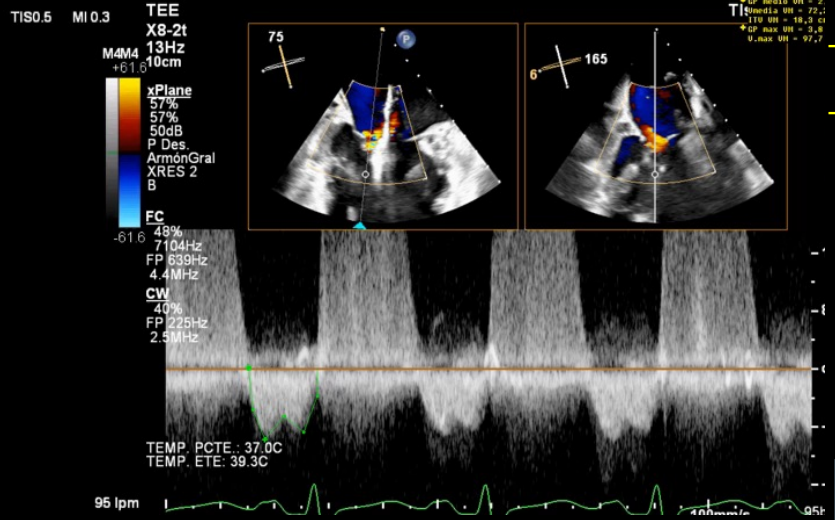
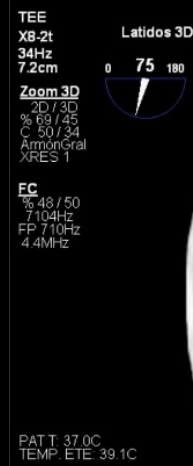
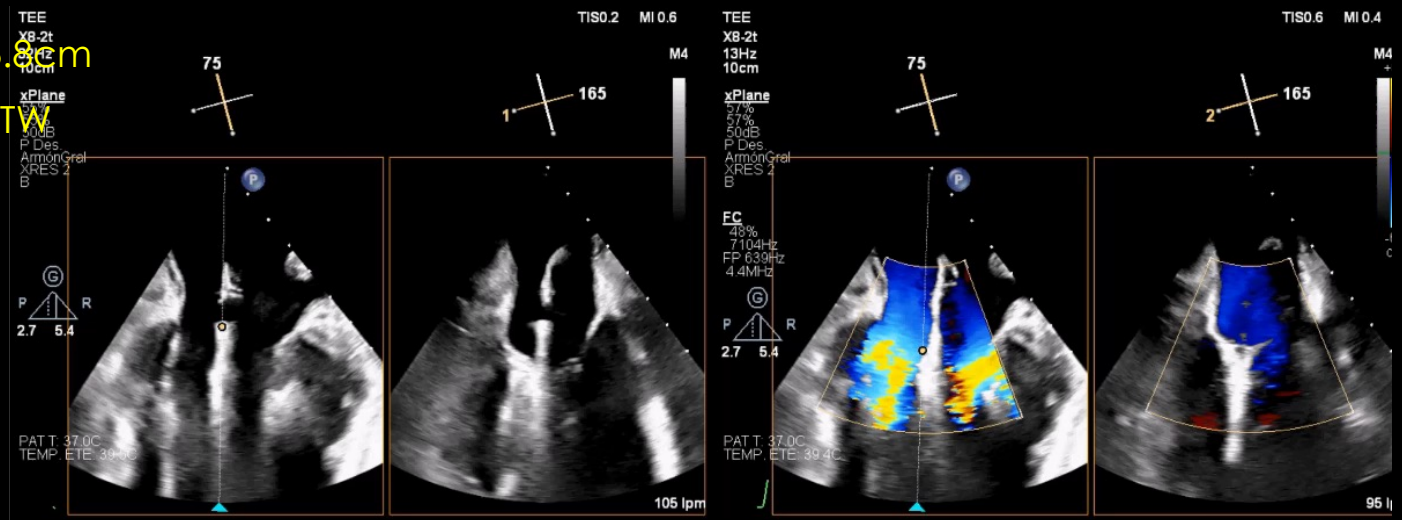


0.07 media
T media 0.0
0.00 min
0.07 max 0.0
T max 0.0



PCRLondonValves.com

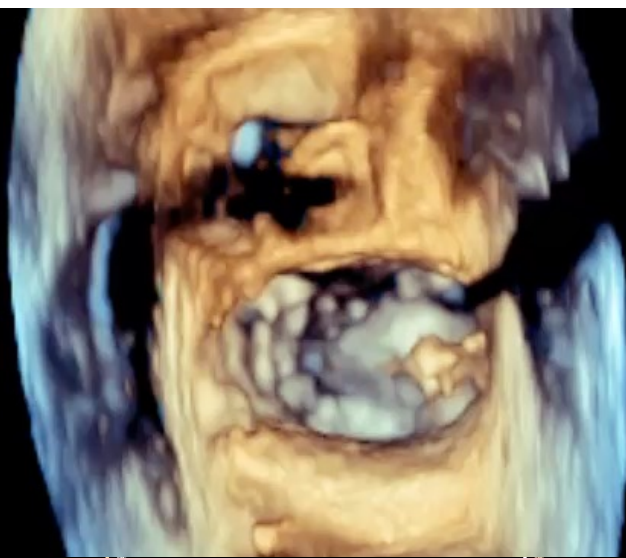
-TS height 3.8cm
 -Mitraclip XTW



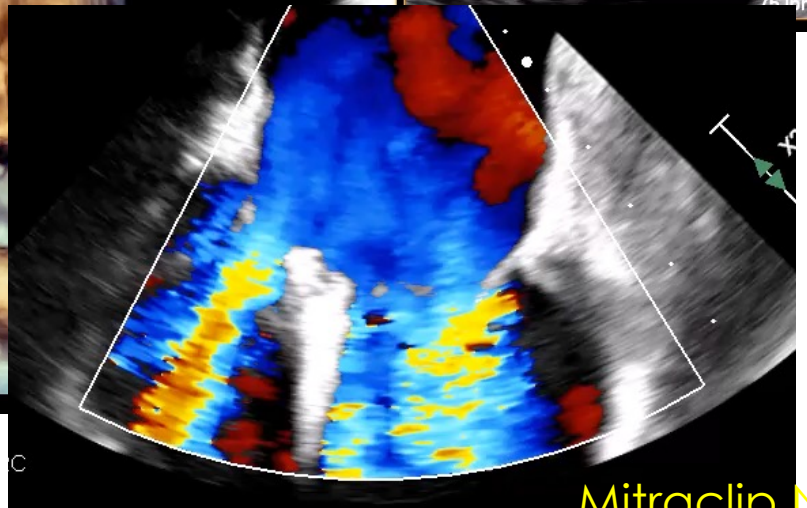
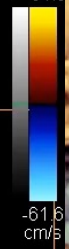
-Moderate MR
 -MG 2mmHg

Questions

- ▶ Do you think this is a successful result?
 1. Yes, considering the challenging anatomy, leave it as it is
 2. No, but considering the anatomy that's the best we can get
 3. No, let's go for a 2nd one because the gradient is low and there is still leaflet



52%
52%
50dB
P Des
ArmónGrat
XRES 2



53%
53%
50dB
P Des
ArmónGrat
XRES 2

FC
48%
7104Hz
FP 639Hz
4.4MHz

P
R
2.7 5.4

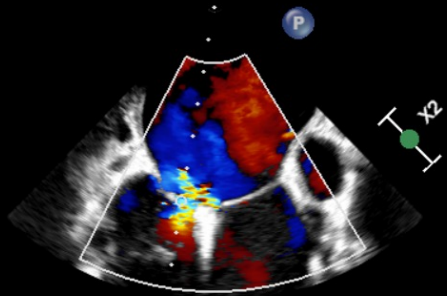
PAT T: 37.0C
TEMP. ETE: 39.6C

Mitraclip NT

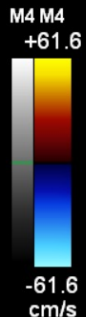
TEE
X8-2t
17Hz
9.0cm



2D
51%
C 50
P Des.
ArmónGral
FC
48%
7104Hz
FP 639Hz
4.4MHz



TIs0.3 MI 0.0



-Moderate-severe mitral
regurgitation

-Mean Gradient 3.7 mmHg

CW
75%
FP 225Hz
2.5MHz



TEMP. PCTE.: 37.0C
TEMP. ETE: 39.3C

What defines TEER success?

- Achieving a good TEER outcome consists of balancing MR reduction ($\leq 2+$) and MS
- Acceptable **MR reduction** (“success”) may vary:
 - Valve **anatomy**
 - **Procedural challenges**
 - **Procedural team experience**
- Mild to moderate mitral stenosis ($MG \leq 5$ mmHg) might be acceptable