



# Expanding M-TEER Treatable Anatomies: What can our current devices do?

**Edwin Ho, MD**

Assistant Professor of Medicine  
Director, Structural Heart Imaging  
Director, Echocardiography Lab  
Co-Director, Heart Valve Center

Montefiore Medical Center, New York, USA

**Montefiore**

 **EINSTEIN**  
Albert Einstein College of Medicine

# Disclosure of Relevant Financial Relationships

**Edwin Ho, MD**

Within the prior 24 months, I have had a relevant financial relationship(s) with an ineligible company(ies) listed below.

## Nature of Financial Relationship

Advisor (not reimbursed)

Consultant (institutional contract, not directly reimbursed)

Research grant/support

## Ineligible Company

Medtronic, Neochord, Half Moon, VDyne,  
Valgen, Anteris, Shifamed

GE, Edwards Lifesciences, Abbott

Philips

# Outline

Anatomic “suitability” for M-TEER

Case examples

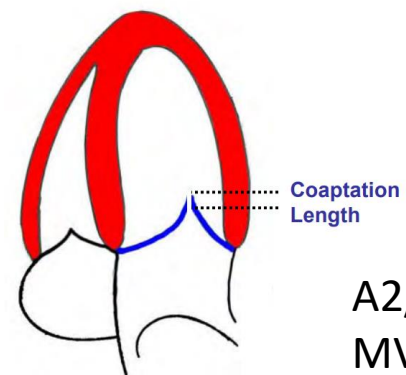
Data on outcomes in suboptimal anatomy

M-TEER unmet needs

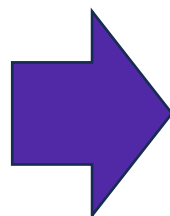
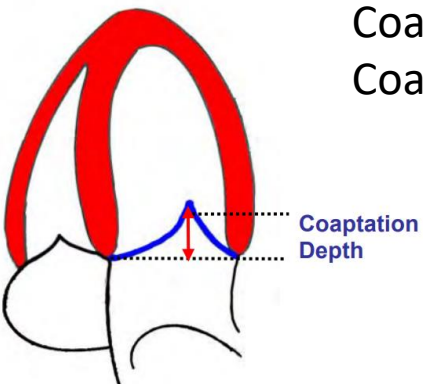
# Mitral TEER “suitable” vs “non-suitable”

EVEREST

2023



A2/P2  
 MVA >4cm<sup>2</sup> (2D)  
 Coaptation depth ≤ 11mm  
 Coaptation length ≥ 2mm



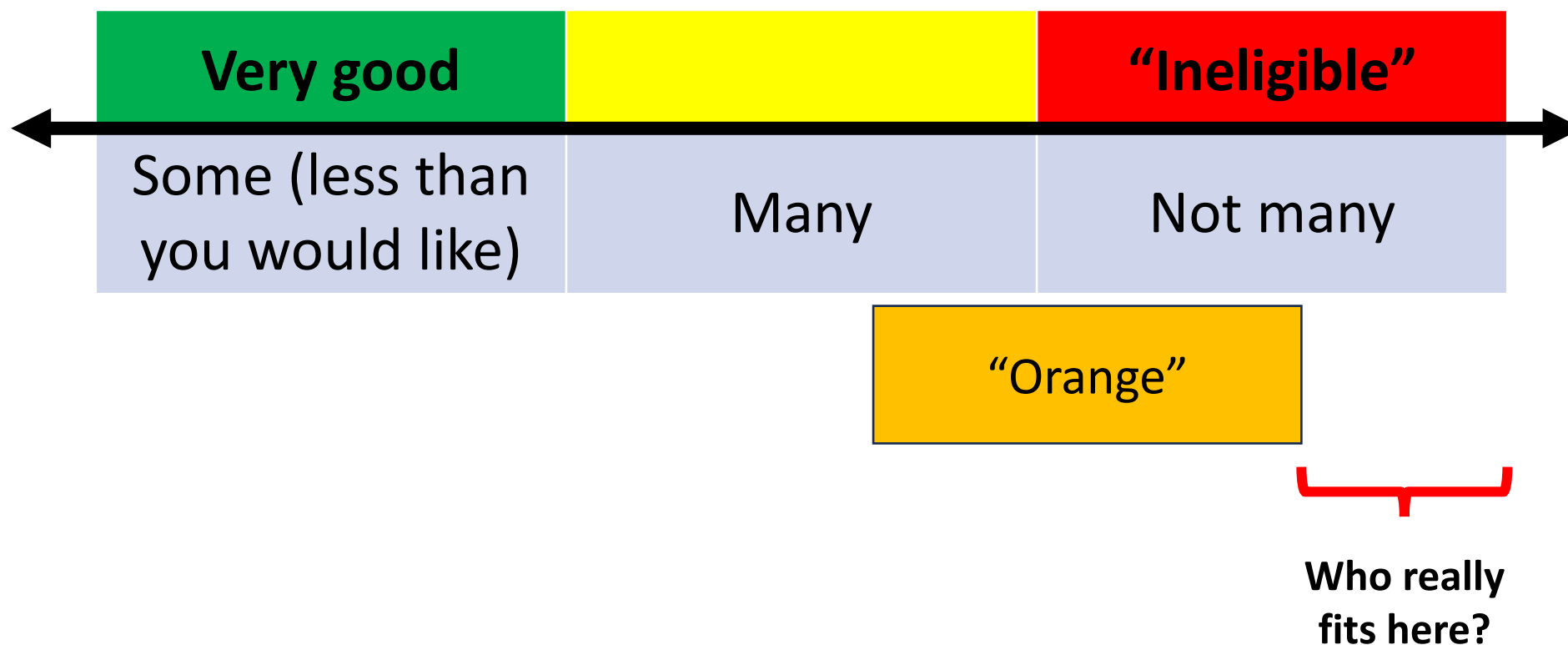
Repair!			Replacement?
Anatomical suitability for M-TEER		Centre experience	
Non-complex Ideal for M-TEER	Complex Suitable for M-TEER	Very complex Challenging for M-TEER	Criteria favouring replacement M-TEER hard or impossible
<ul style="list-style-type: none"> <li>- Central pathology</li> <li>- No calcification</li> <li>- MVA &gt;4.0 cm<sup>2</sup></li> <li>- Posterior leaflet &gt;10 mm</li> <li>- Tenting height &lt;10 mm</li> <li>- Flail gap &lt;10 mm</li> <li>- Flail width &lt;15 mm</li> </ul>	<ul style="list-style-type: none"> <li>- Isolated commissural lesion (A1/P1 or A3/P3)</li> <li>- Annular calcification without leaflet involvement</li> <li>- MVA 3.5-4.0 cm<sup>2</sup></li> <li>- Posterior leaflet length 7-10 mm</li> <li>- Tenting height &gt;10 mm</li> <li>- Asymmetric tethering<sup>26</sup></li> <li>- Coaptation reserve &lt;3 mm<sup>24</sup></li> <li>- Leaflet-to-anulus index &lt;1.2<sup>25</sup></li> <li>- Flail width &gt;15 mm</li> <li>- Flail gap &gt;10 mm</li> <li>- Two jets from leaflet indentations</li> </ul>	<ul style="list-style-type: none"> <li>- Commissural lesion with multiple jets</li> <li>- Annular calcification with leaflet involvement</li> <li>- Fibrotic leaflets</li> <li>- Wide jet involving the whole coaptation</li> <li>- MVA 3.0-3.5 cm<sup>2</sup></li> <li>- Posterior leaflet length 5-7 mm</li> <li>- Barlow's disease</li> <li>- Cleft</li> <li>- Failed surgical annuloplasty</li> </ul>	<ul style="list-style-type: none"> <li>- Concentric MAC with stenosis</li> <li>- MVA &lt;3.0 cm<sup>2</sup></li> <li>- Relevant mitral valve stenosis (mean gradient &gt;5 mmHg)</li> <li>- Posterior leaflet &lt;5 mm</li> <li>- Calcification in the grasping zone</li> <li>- Deep regurgitant cleft</li> <li>- Leaflet perforation</li> <li>- Multiple/wide jets</li> <li>- Rheumatic mitral stenosis</li> </ul>

Hausleiter J, et al., EuroIntervention 2023;18:957

Feldman T, et al. NEJM 2011; 364:1395



# Mitral TEER “suitable” vs “non-suitable”



# Mitral TEER “suitable” vs “non-suitable”

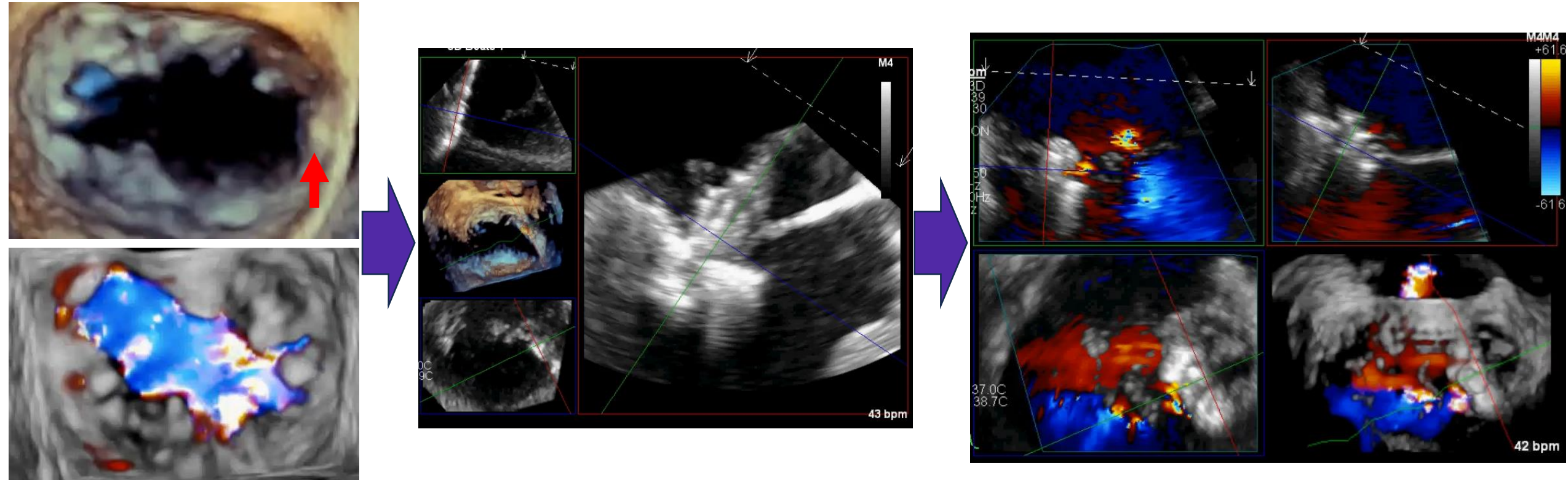
## Consensus Document on Non-Suitability for Transcatheter Mitral Valve Repair by Edge-to-Edge Therapy

D. Scott Lim, MD<sup>a</sup>, Howard C. Herrmann, MD<sup>b</sup>, Paul Grayburn, MD<sup>c</sup>, Konstantinos Koulogiannis, MD<sup>d</sup>, Gorav Ailawadi, MD<sup>e</sup>, Mathew Williams, MD<sup>f</sup>, Vivian G. Ng, MD<sup>g</sup>, Katherine H. Chau, MD, MS<sup>g</sup>, Paul Sorajja, MD<sup>h</sup>, Robert L. Smith II, MD<sup>i</sup>, Mayra Guerrero, MD<sup>j</sup>, David Daniels, MD<sup>k</sup>, Juan F. Granada, MD<sup>g,j</sup>, Michael J. Mack, MD<sup>c</sup>, Martin B. Leon, MD<sup>g,j</sup>, and Patrick McCarthy, MD<sup>m</sup>

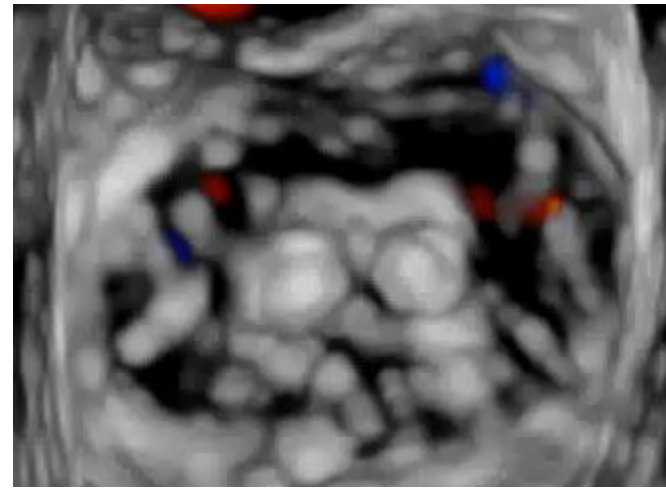
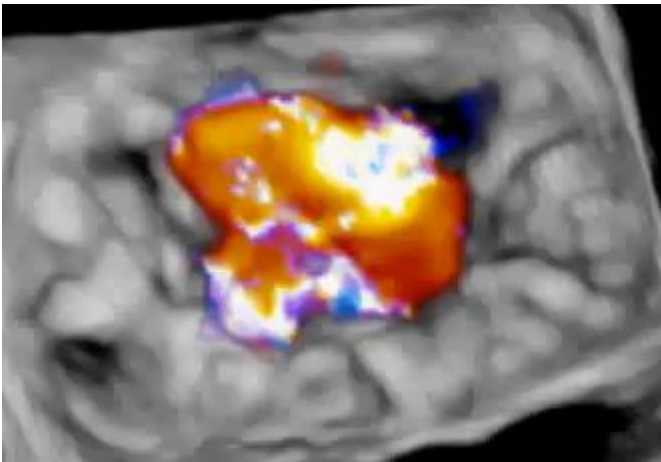
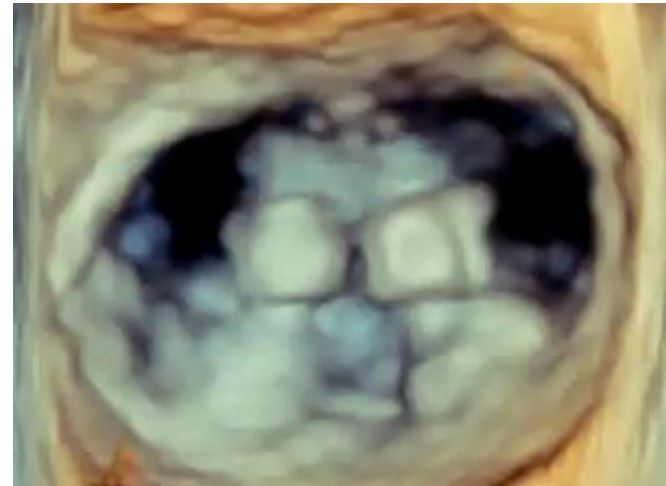
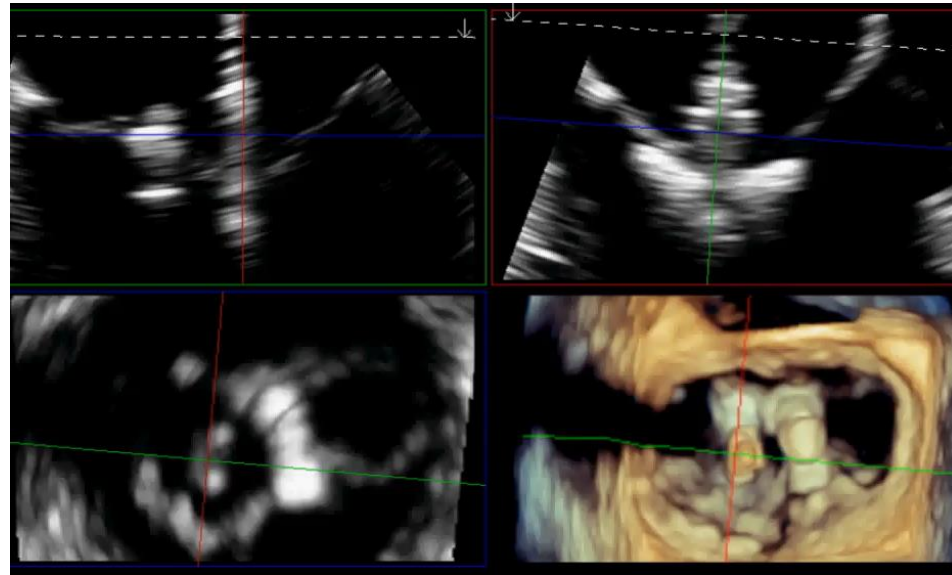
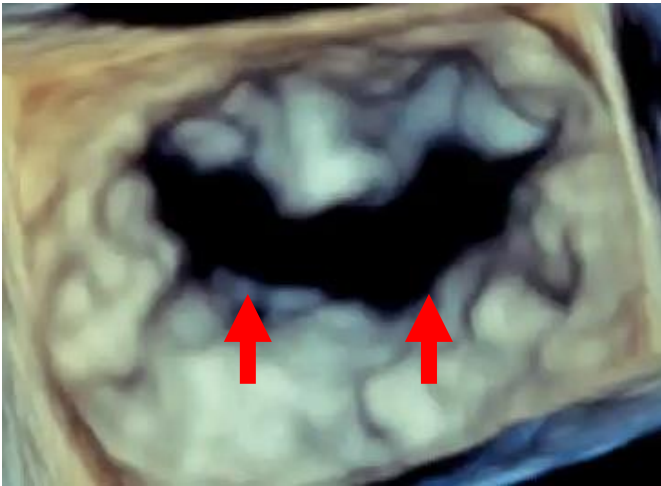
Structural Heart 2021; 5(3):227

Success risk	Stenosis risk	Other factors
Extreme complexity Free leaflet <5mm Clefts Perforation/endocarditis	Rheumatic/radiation Severe MAC MVA <3.5cm <sup>2</sup>	Access Imaging

# Commissural lesions

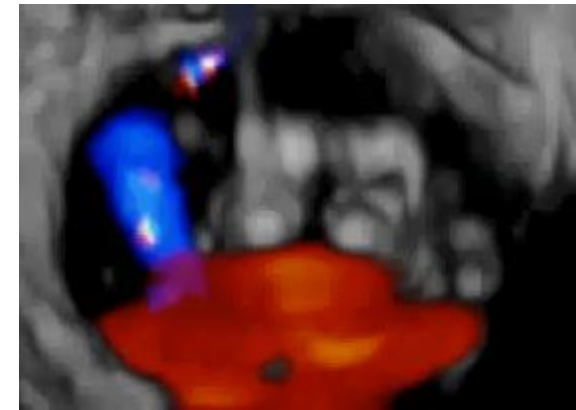
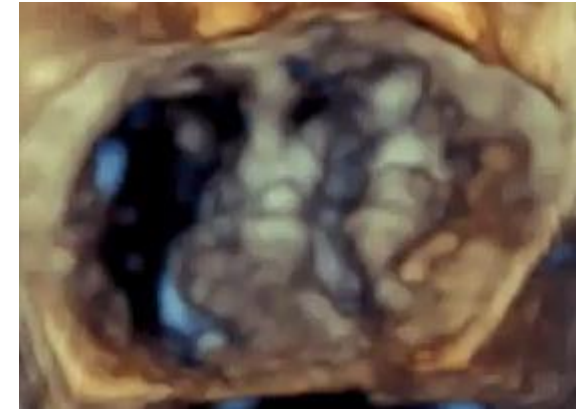
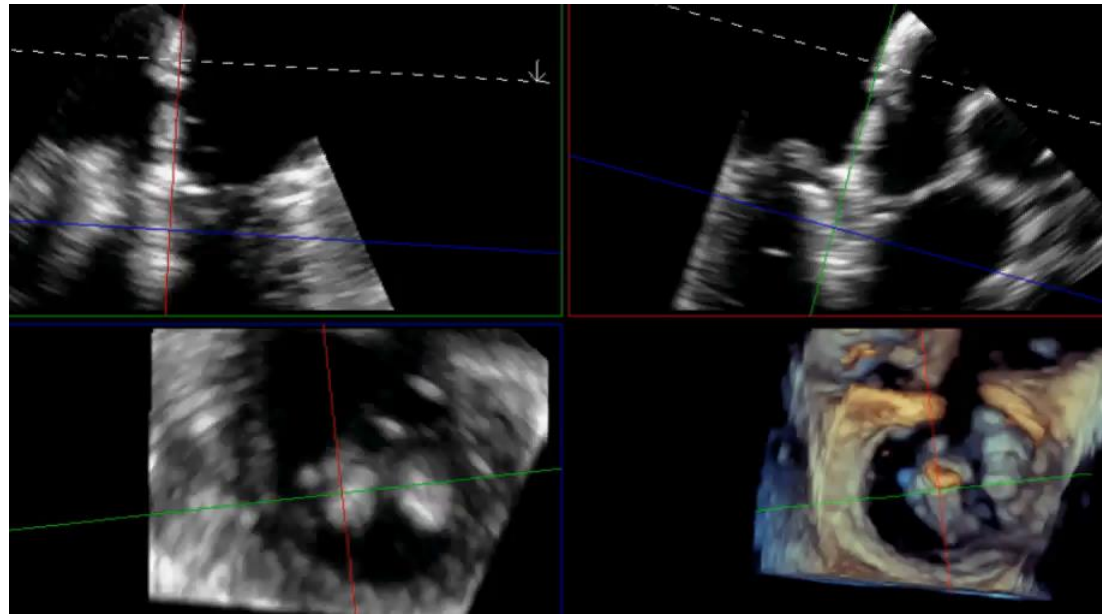
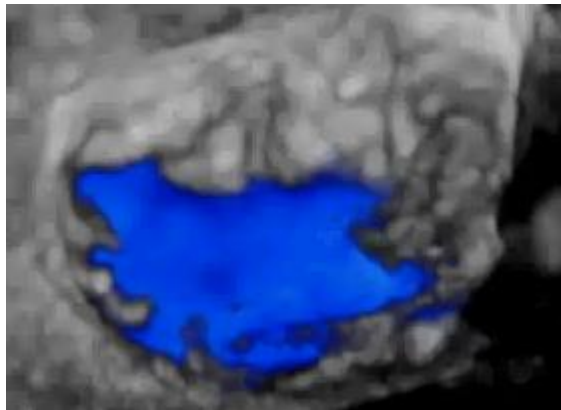
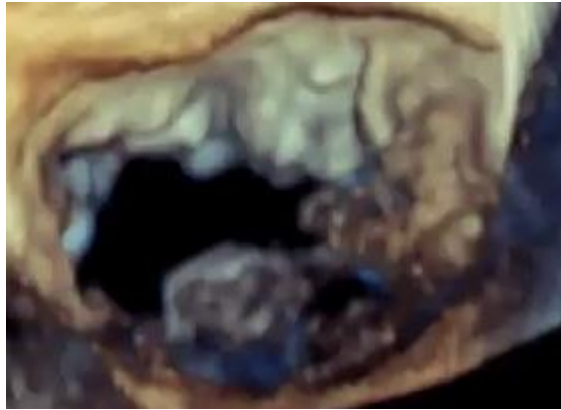


# Split/multiple jets

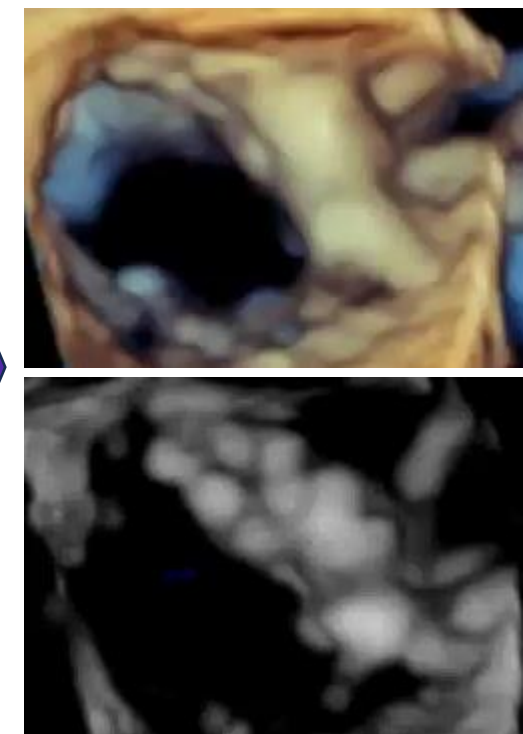
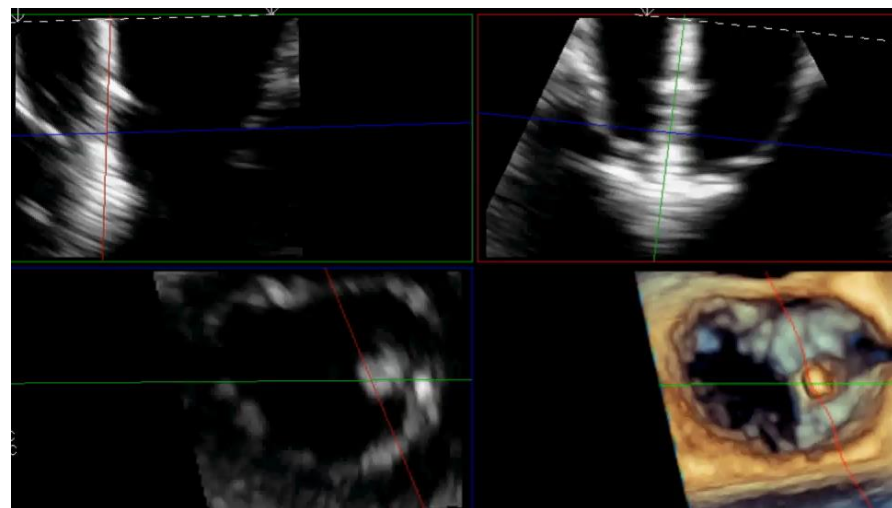
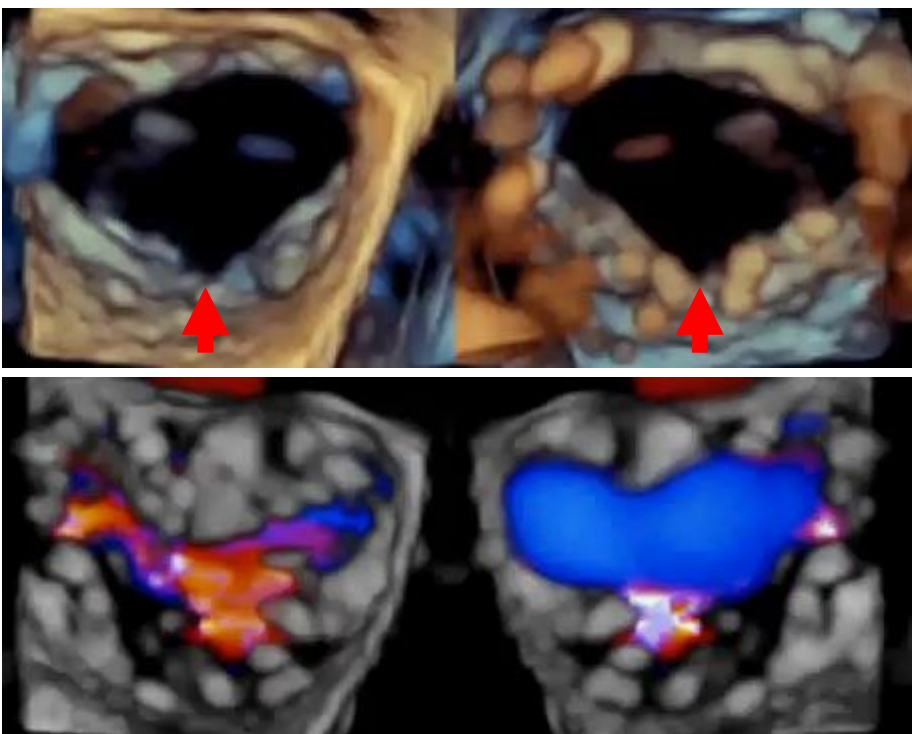




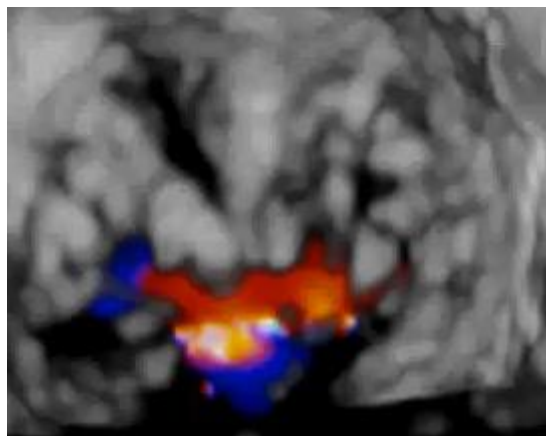
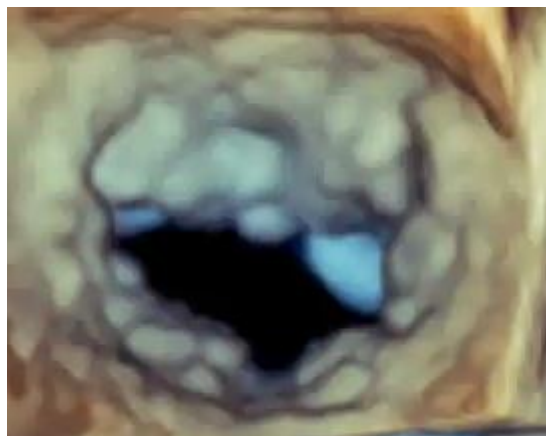
# Severe prolapse/Barlow's



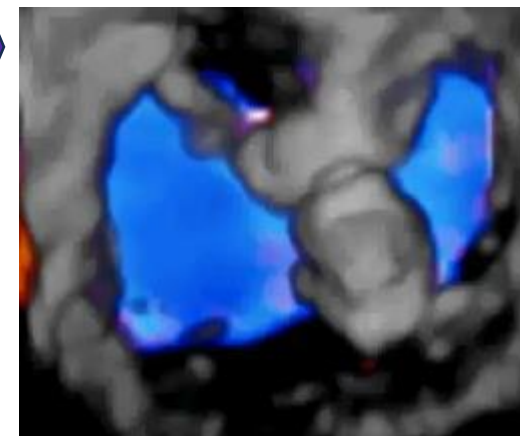
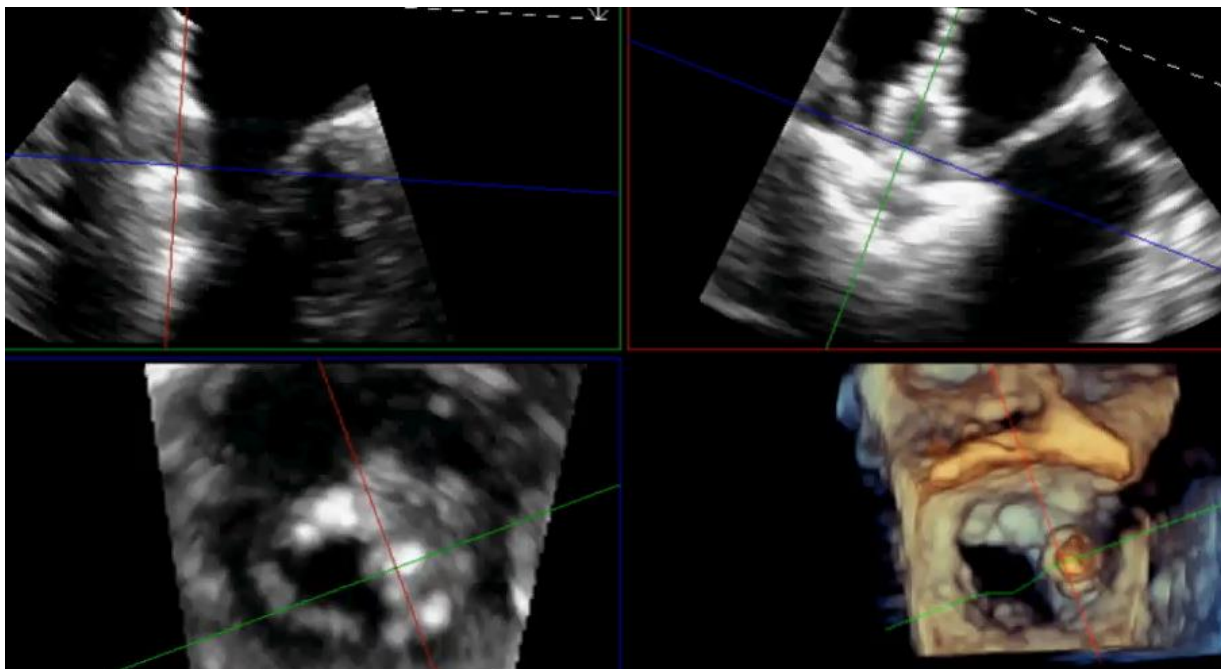
# Clefts



# Small(ish) MVA



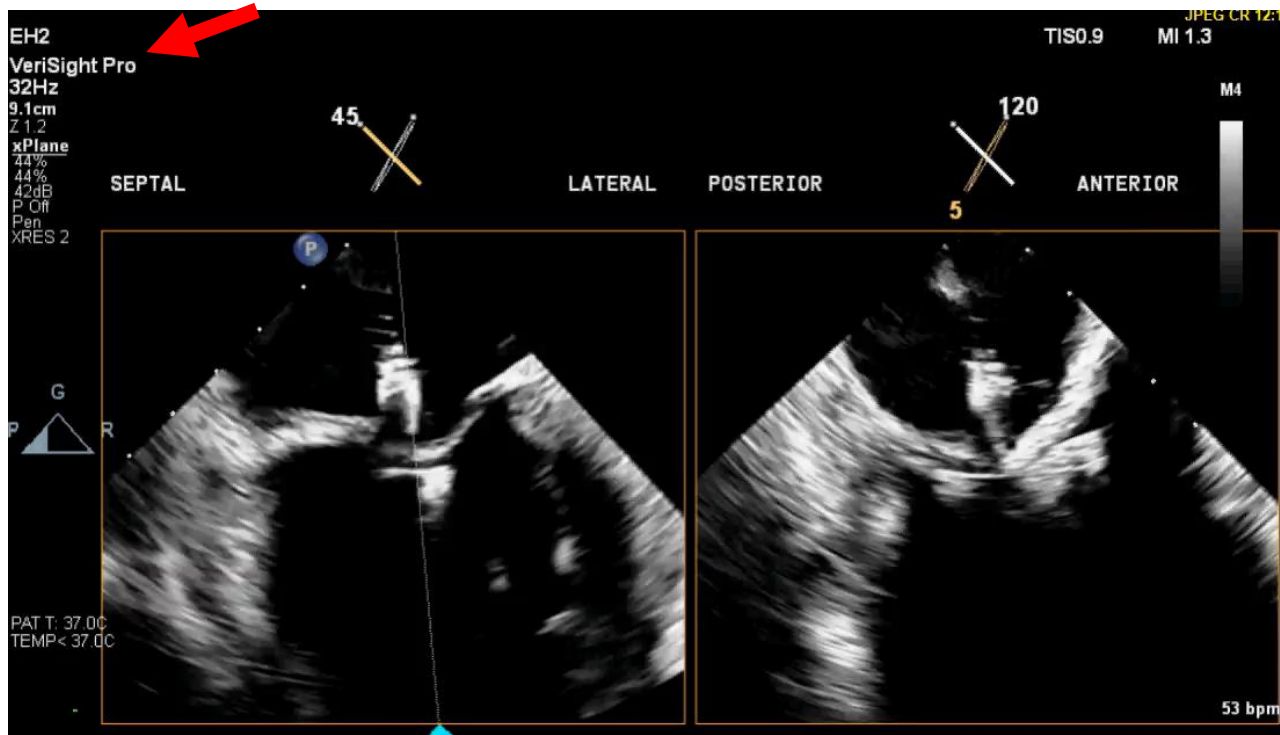
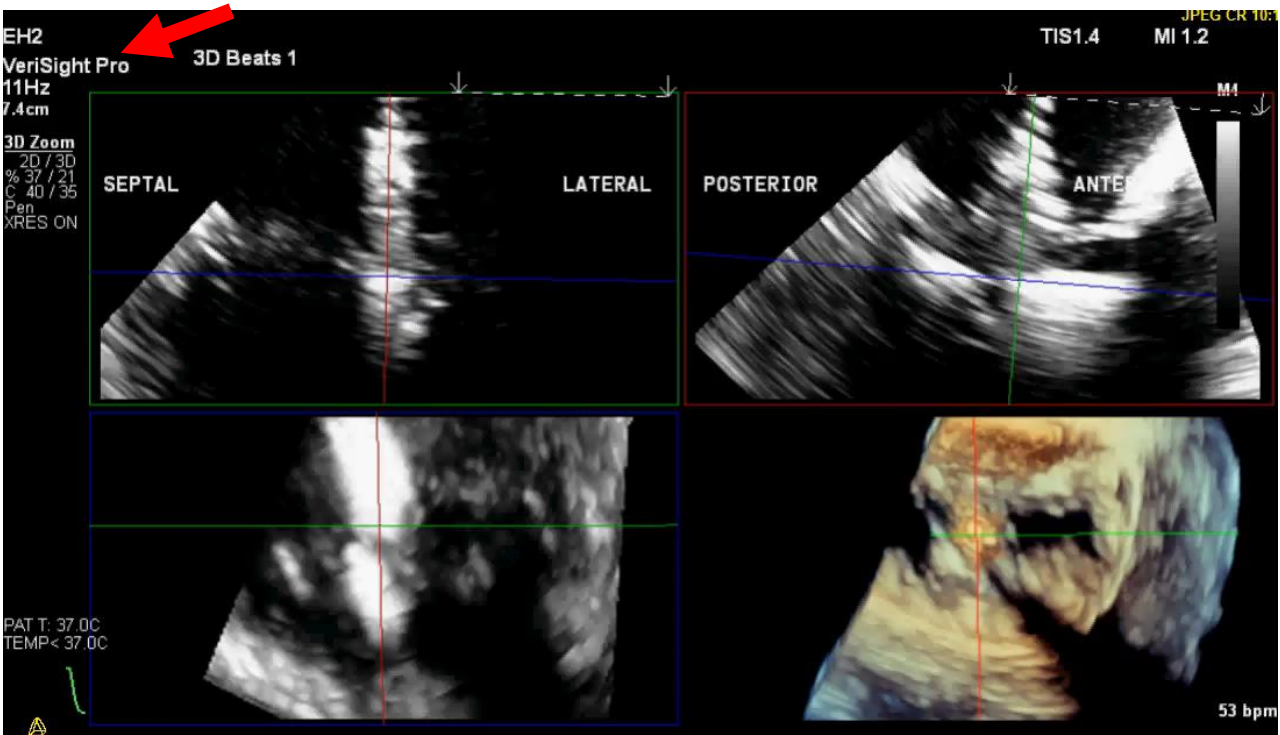
MVA 2.9cm<sup>2</sup>



MG 3mmHg (HR 60bpm)

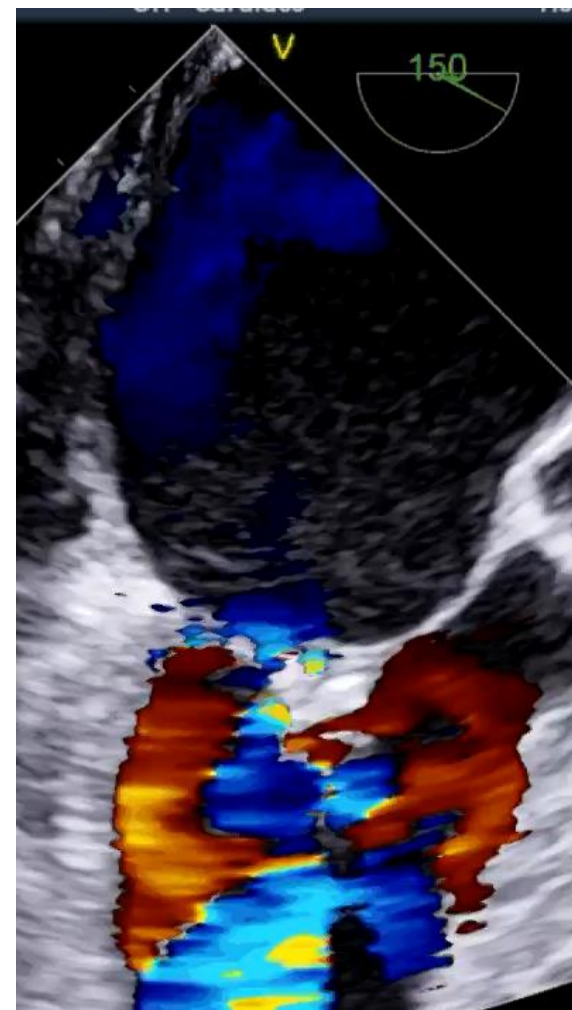
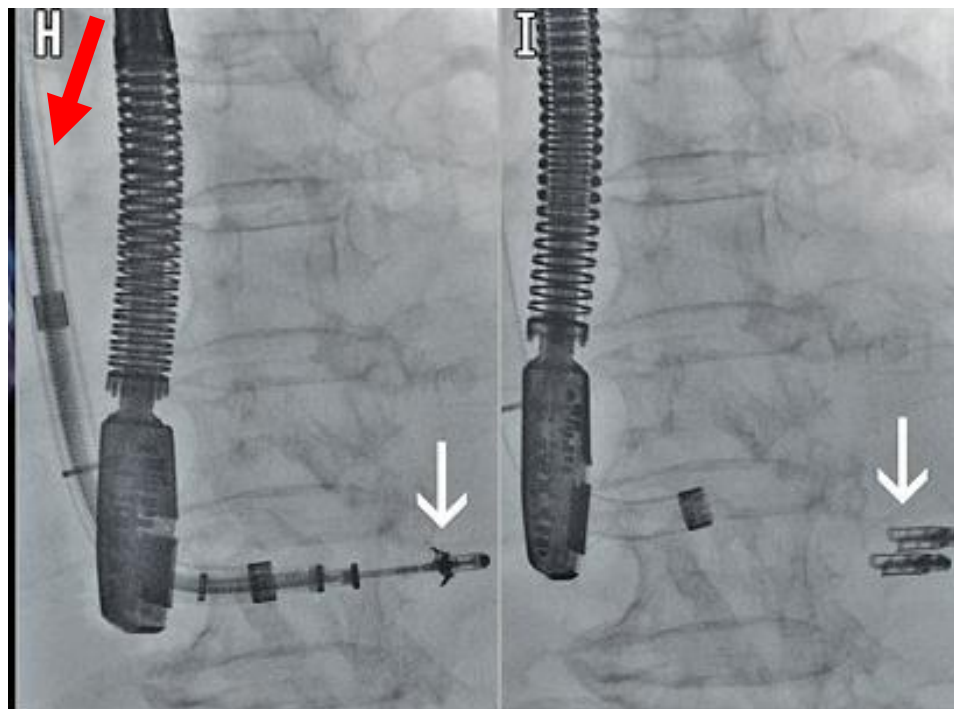
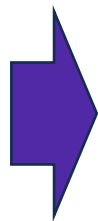
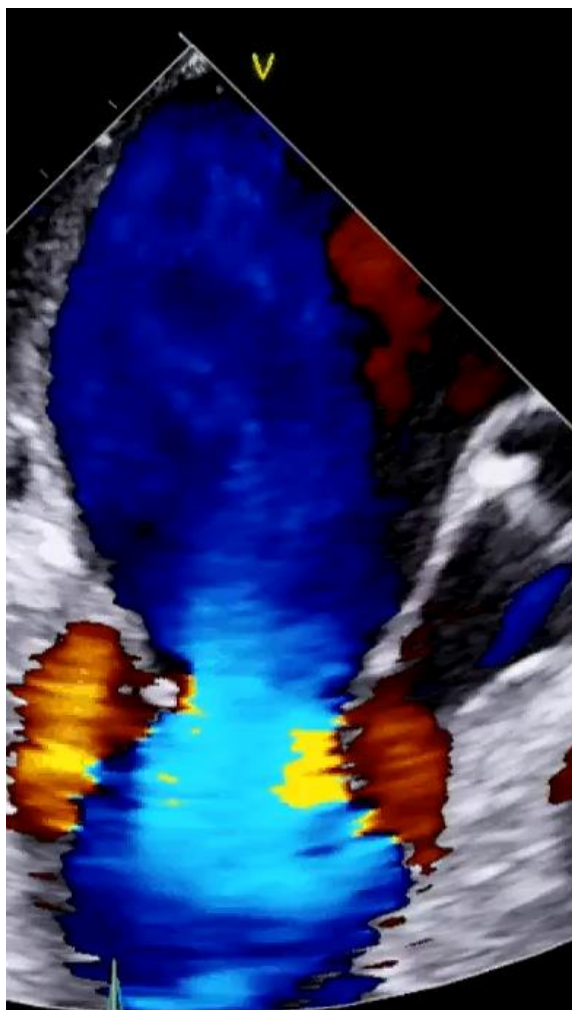


# No/poor TEE





# No femoral access

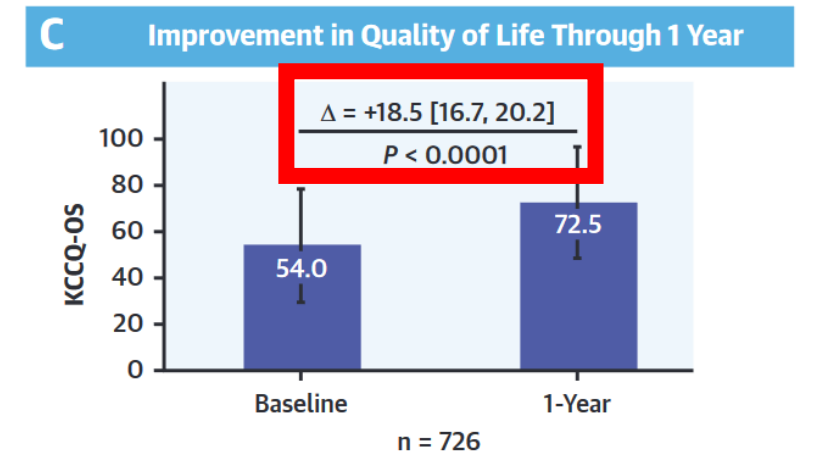
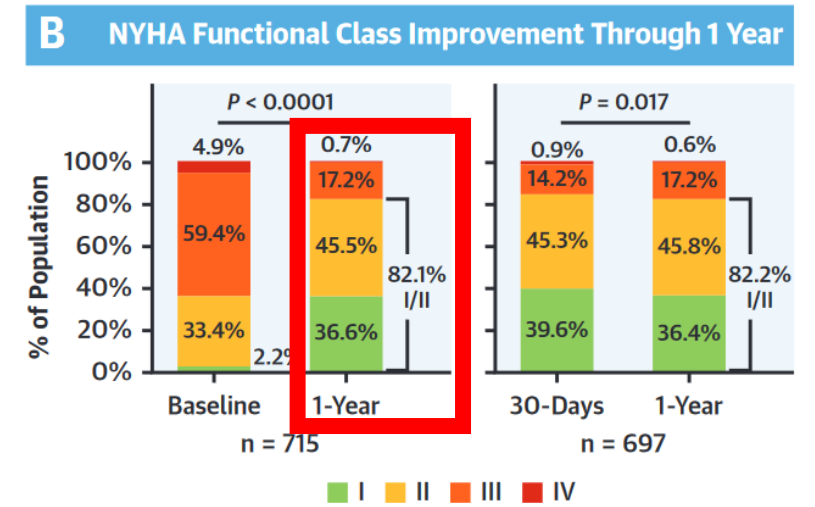
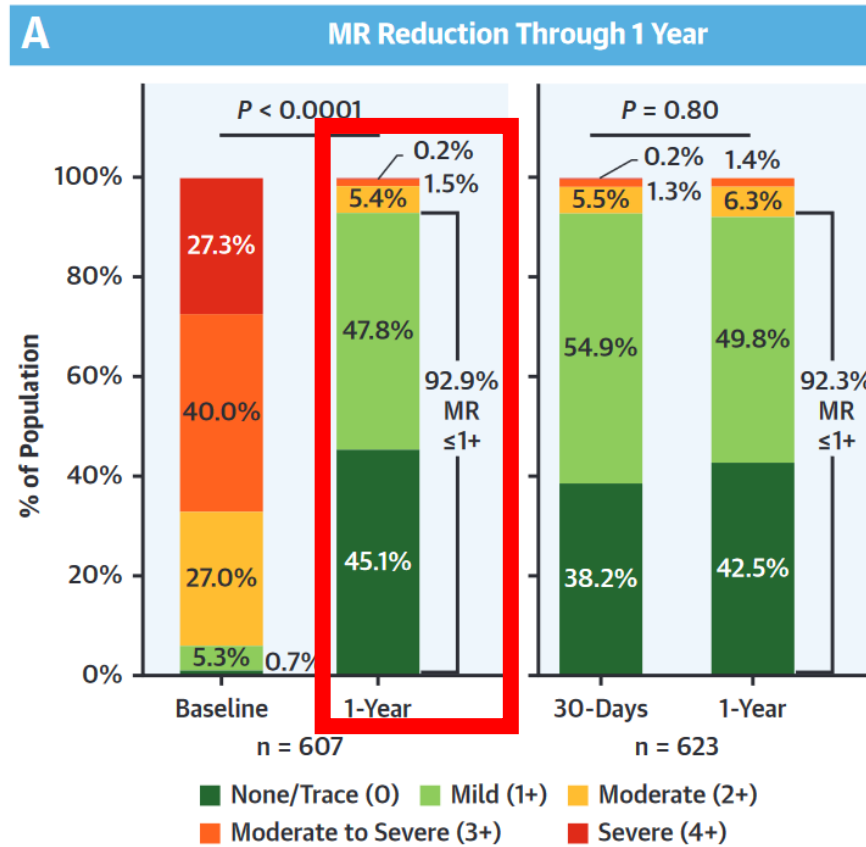


What does the data say?

# What does that data say? (EXPAND G4)

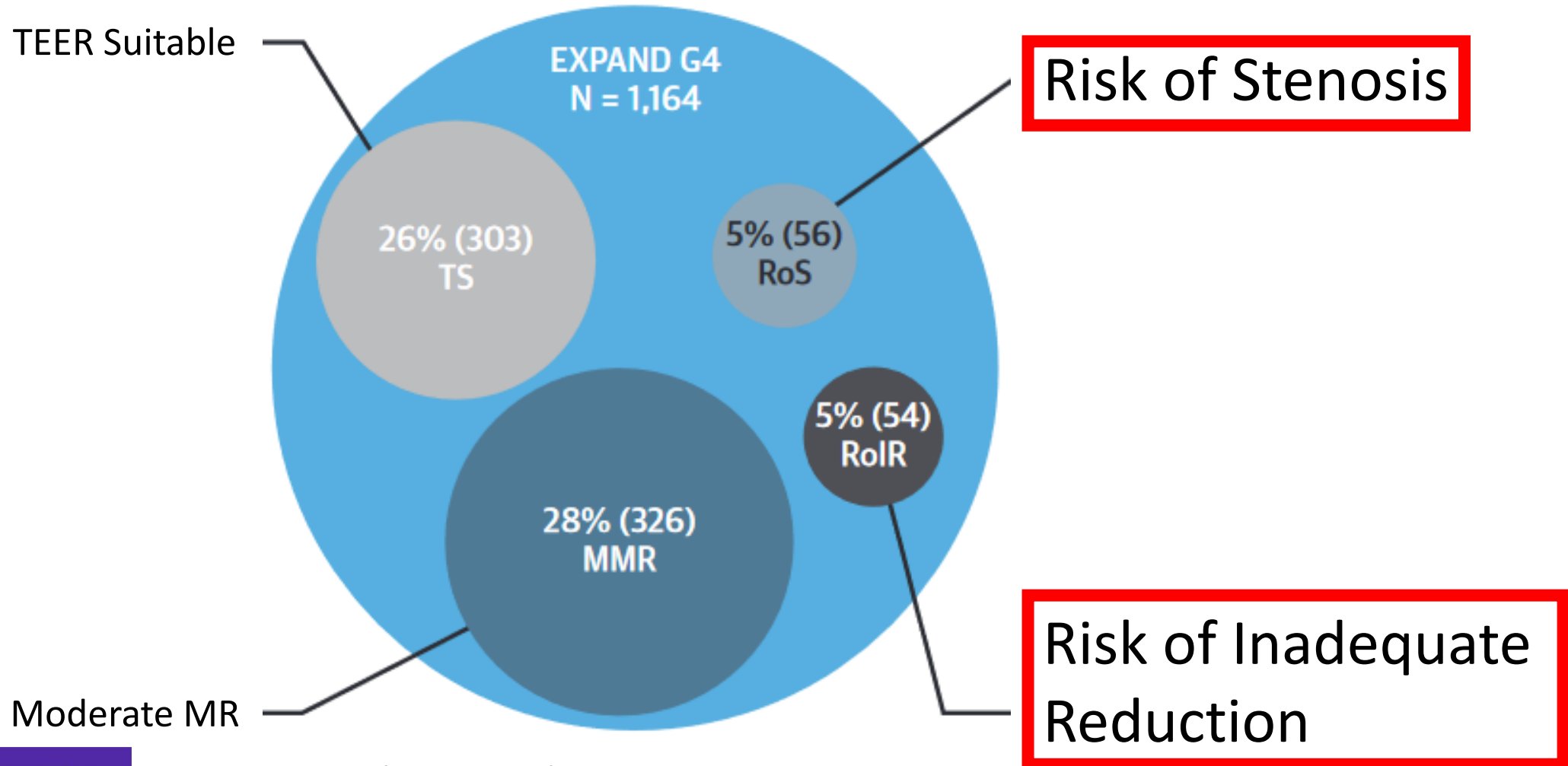
EXPAND G4

N=1164



von Bardeleben RS, et al. J Am Coll Cardiol Intv. 2023;16(21):2600-2610.

# What does that data say? (EXPAND G4)



Rogers J, et al. JACC Card Int 2023; 16:1474



# What does that data say? (EXPAND G4)

## Risk of Stenosis

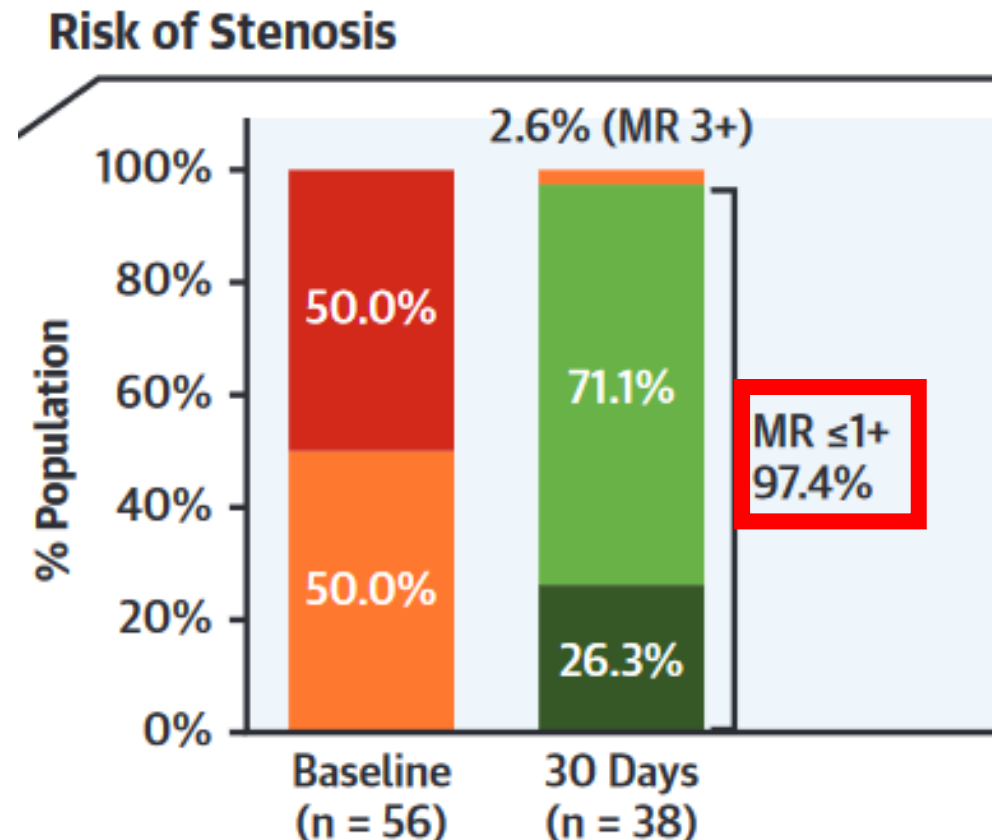
One of:

Severe MAC

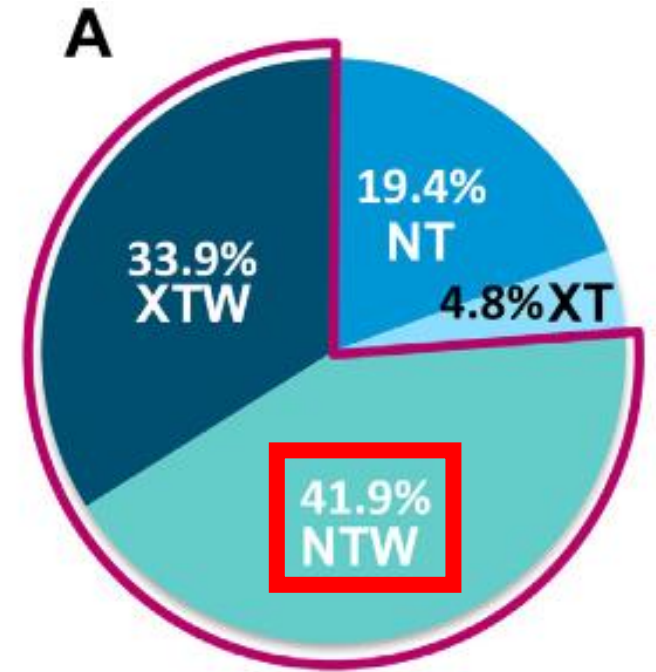
Severe leaflet calcium

Annuloplasty

MVA <3.5cm<sup>2</sup>

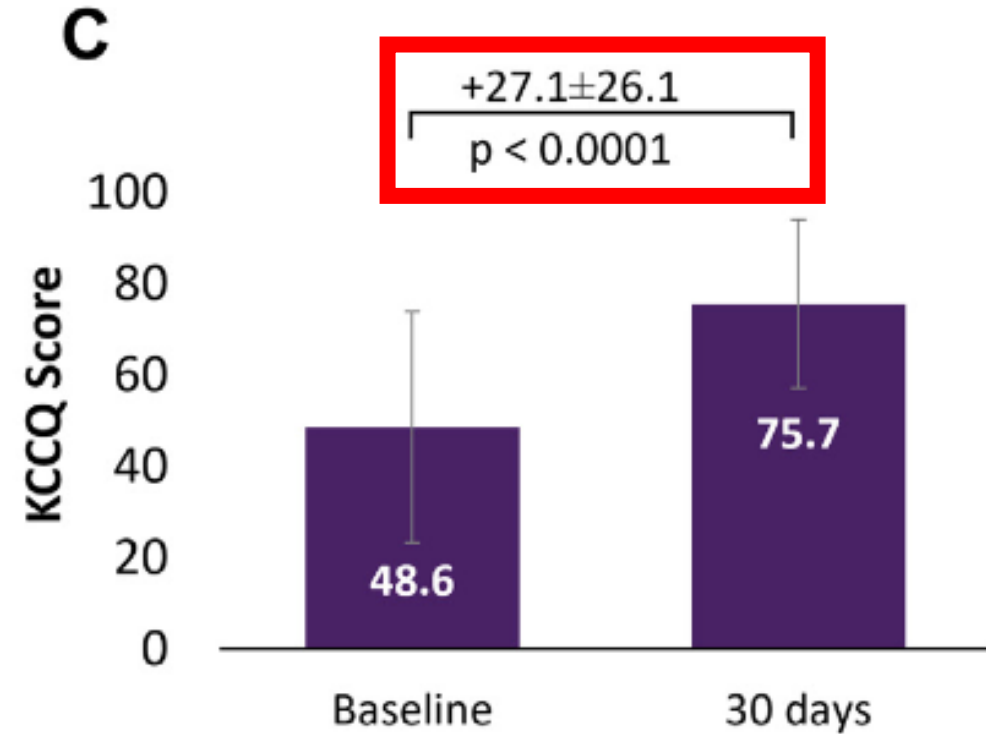
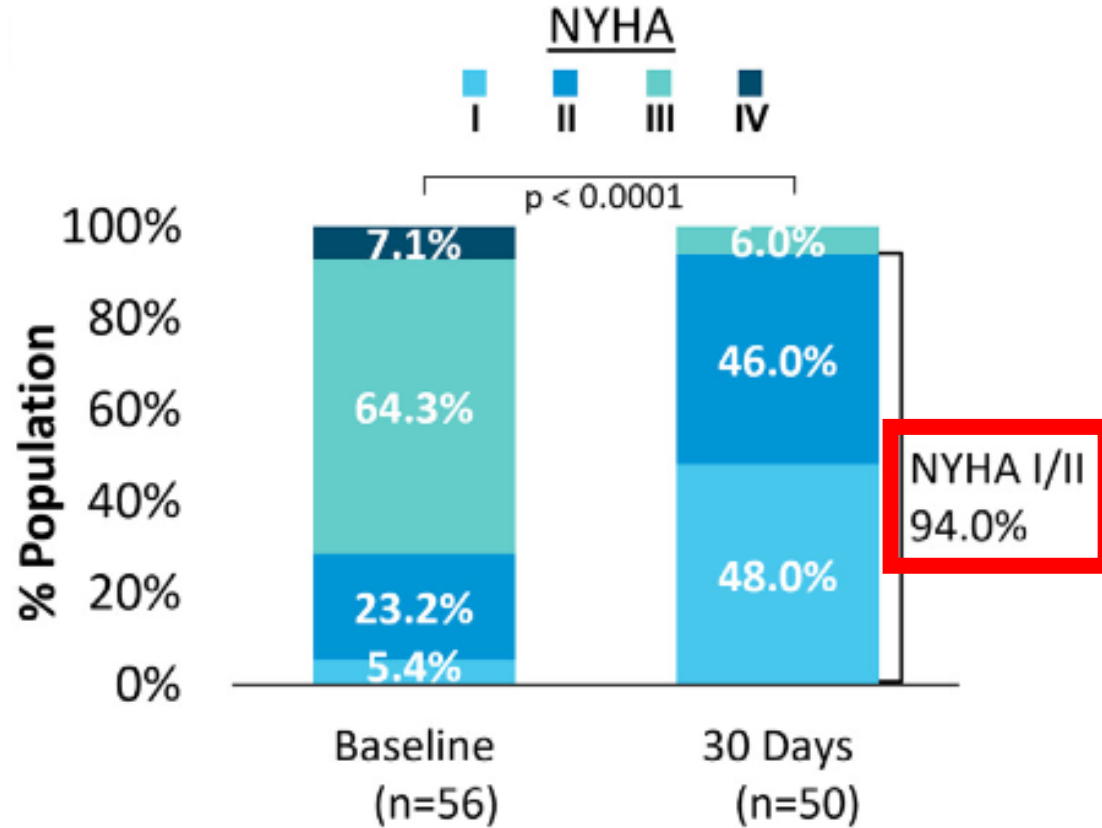


Mean gradient 4.5 +/- 1.6 mmHg



Median clips = 1

# What does that data say? (EXPAND G4)



# What does that data say? (EXPAND G4)

## Risk of Residual MR

One of:

Barlow's

Bileaflet prolapse/flail

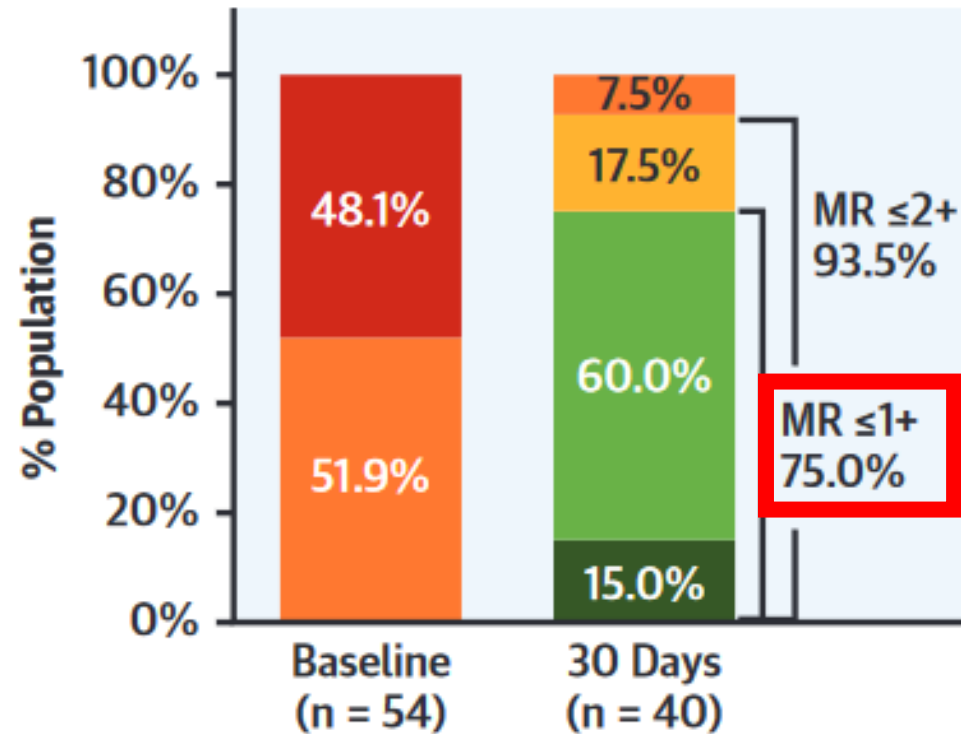
2 significant jets

Large gaps

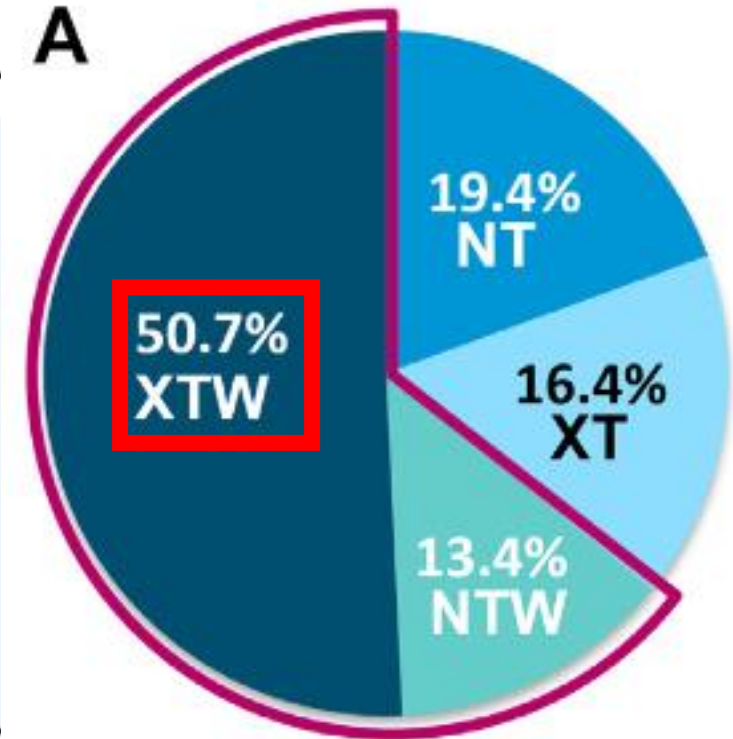
Minimal leaflet tissue

Significant cleft

## Risk of Inadequate MR Reduction

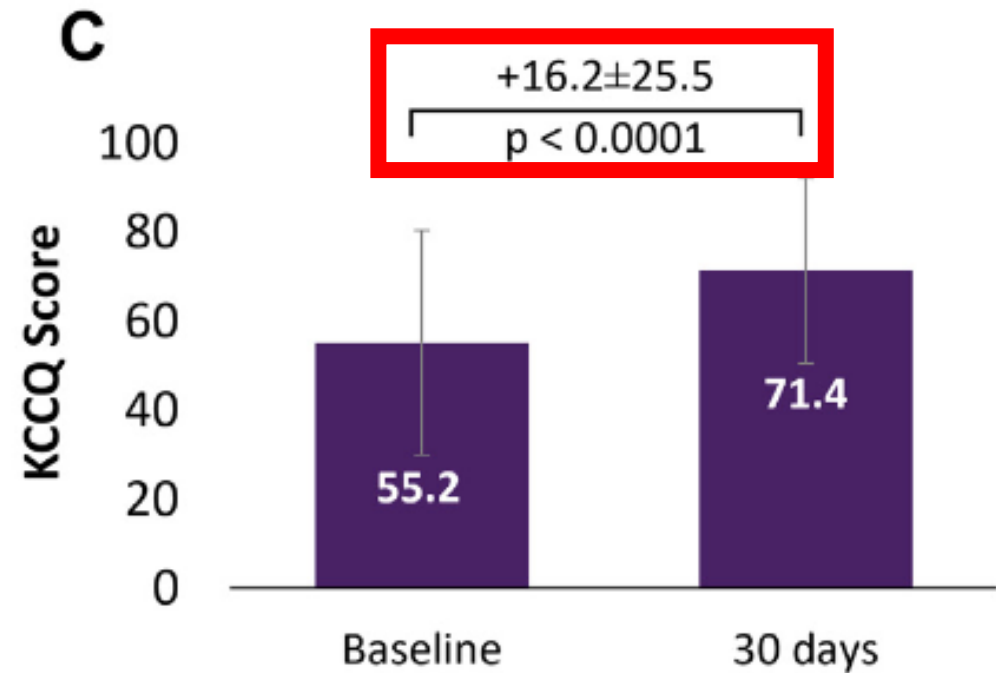
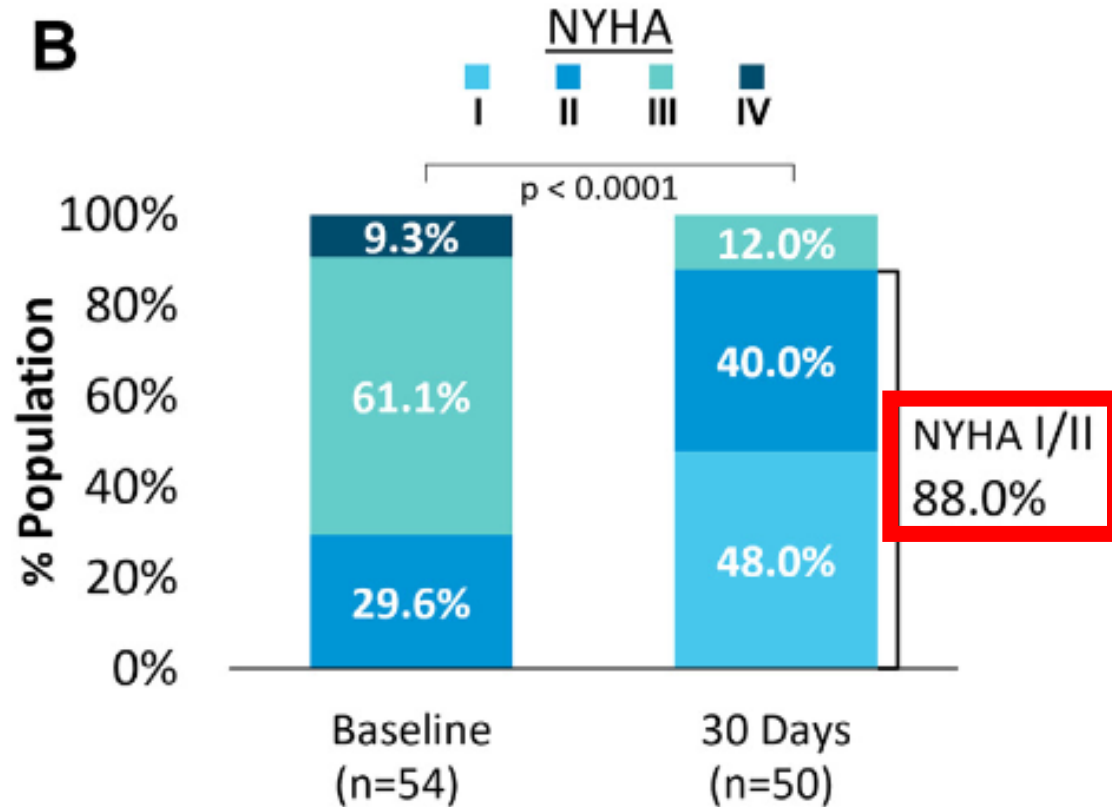


A



Median clips = 2

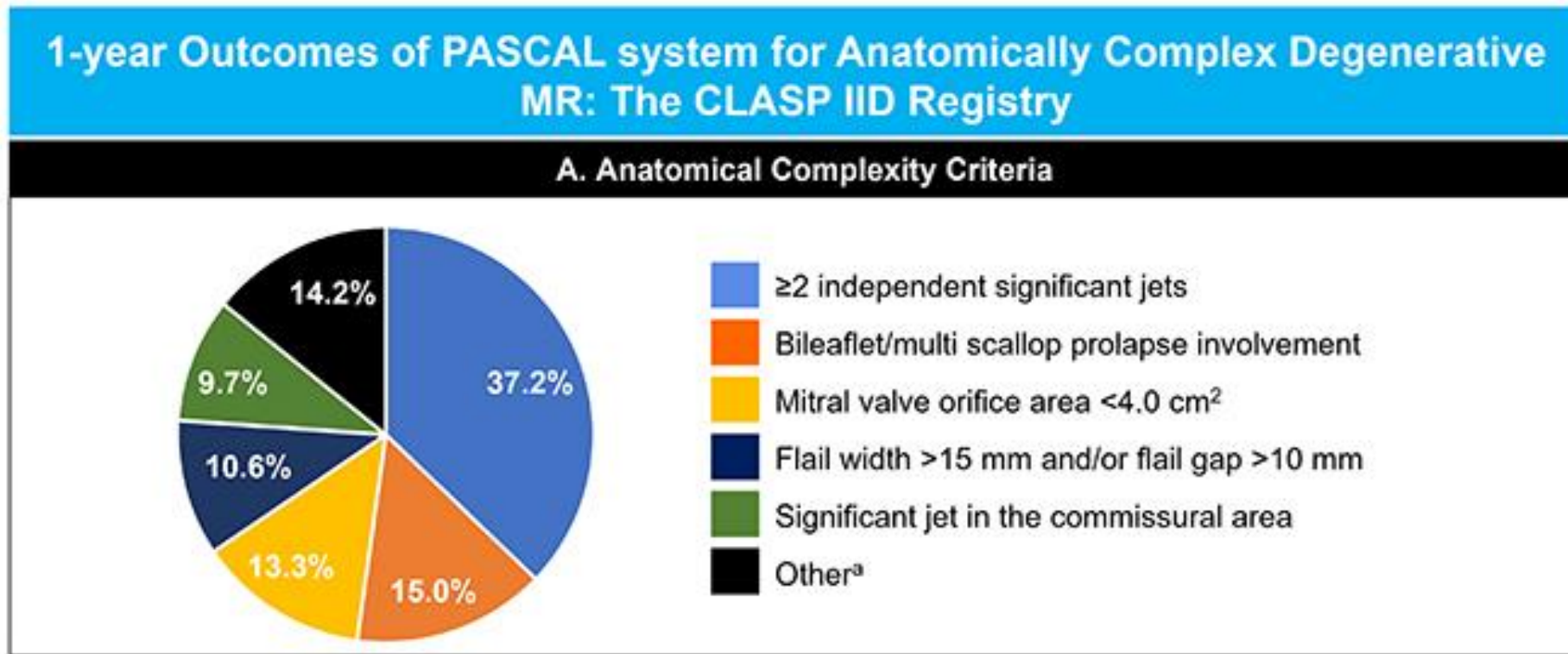
# What does that data say? (EXPAND G4)



Rogers J, et al. JACC Card Int 2023; 16:1474



# What does that data say? (CLASP IID)

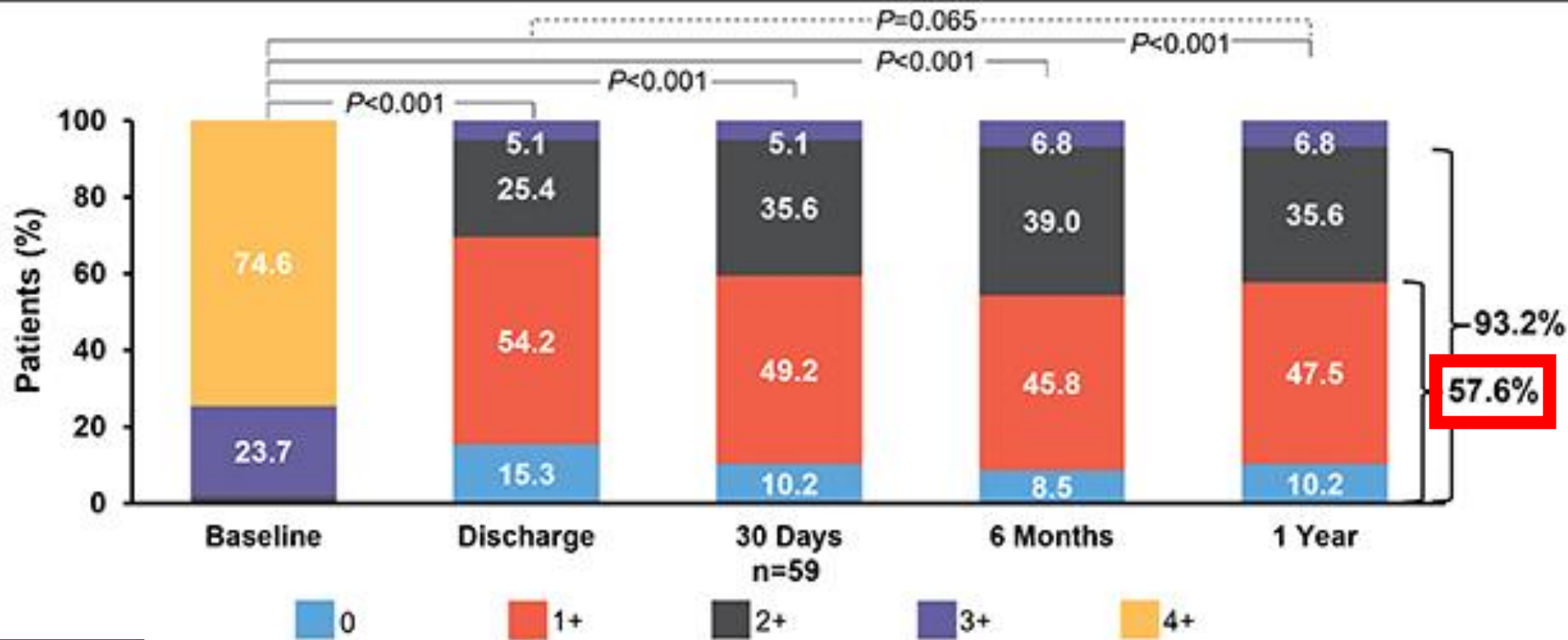


Smith et al., JACC CI 2023; JCIN 7208

# What does that data say? (CLASP IID)

## 1-year Outcomes of PASCAL system for Anatomically Complex Degenerative MR: The CLASP IID Registry

### C. MR Reduction



Moderate or less  
Mild or less

57.6%

# What does the data say? (CHOICE-MI)

## Characteristics and outcomes of patients screened for transcatheter mitral valve implantation: 1-year results from the CHOICE-MI registry

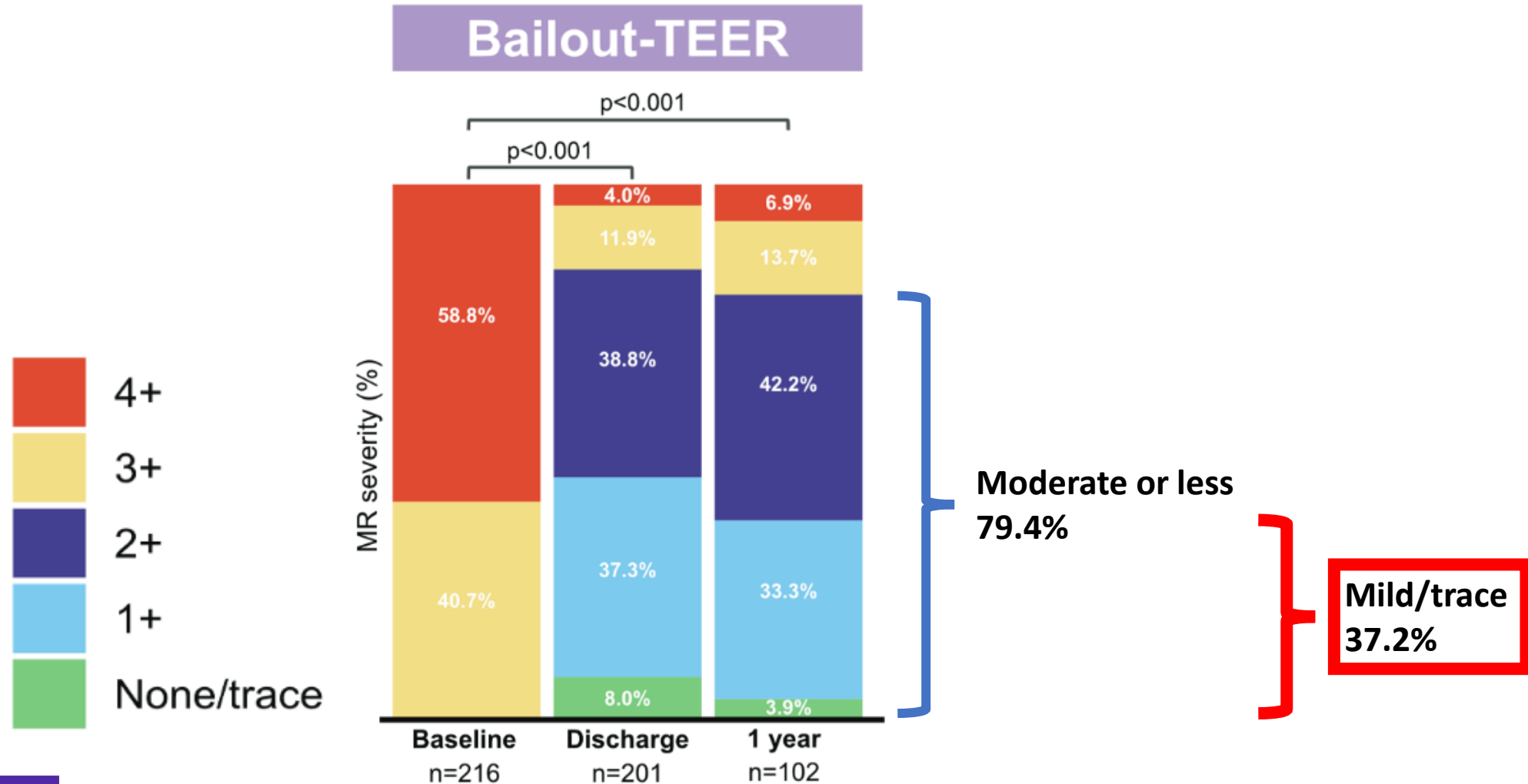
n = 767

high-prohibitive surgical risk

suboptimal TEER anatomy

216 had “bailout TEER”

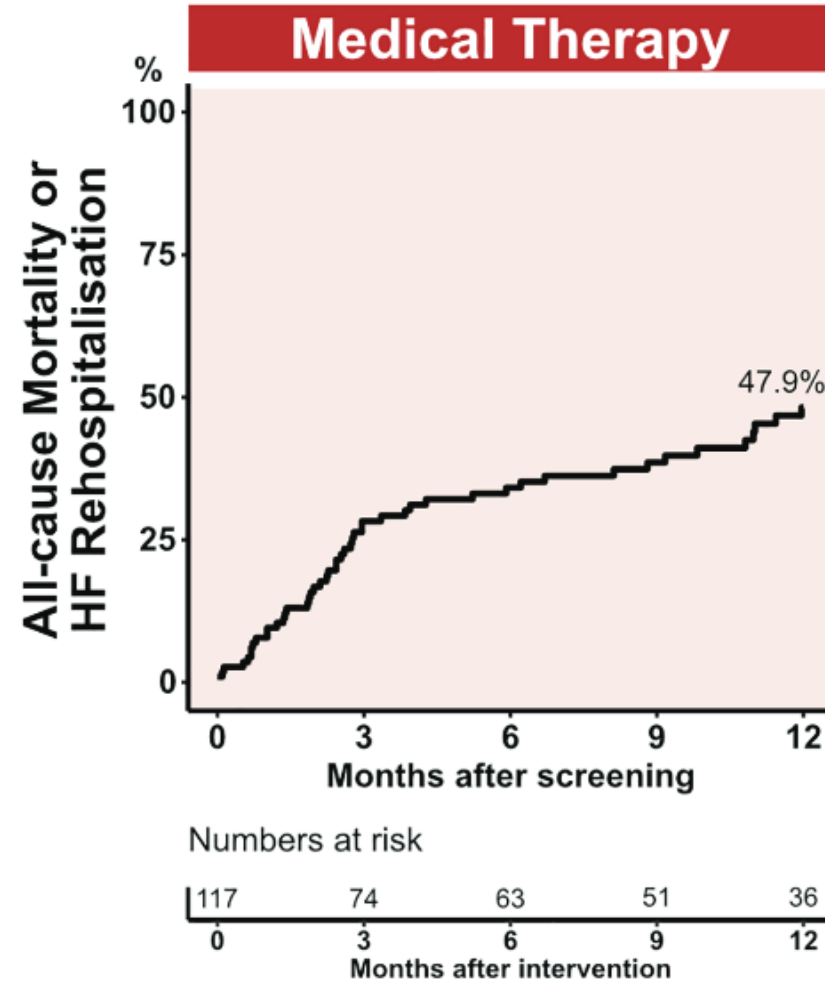
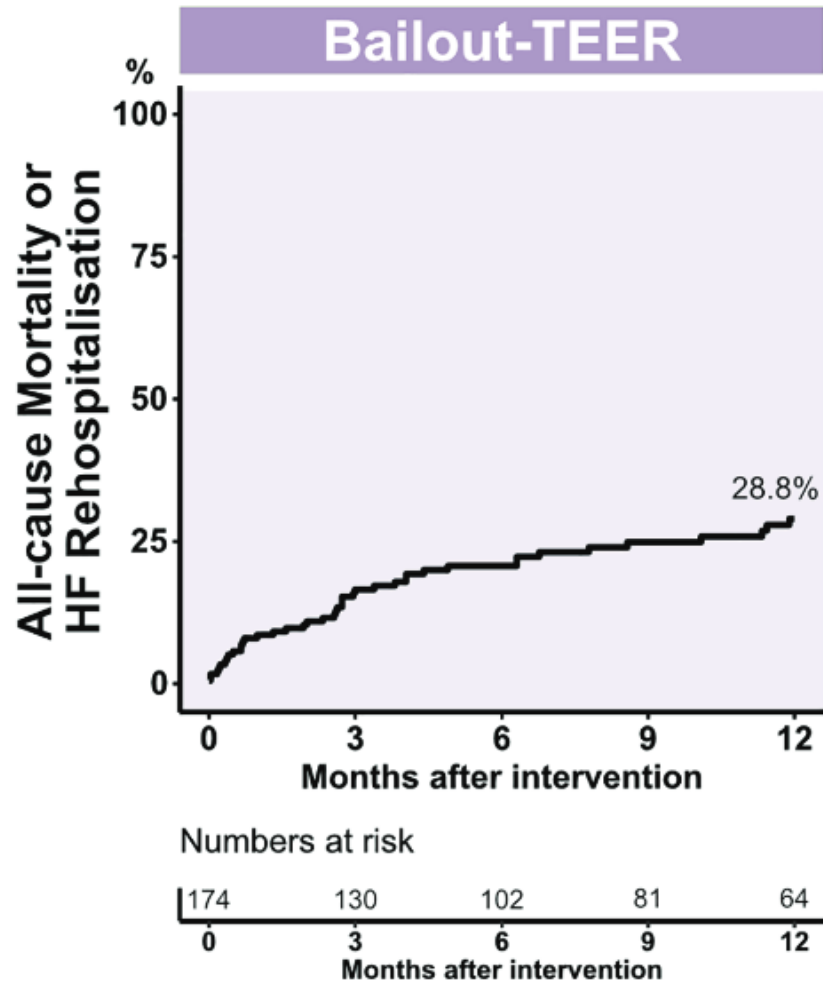
# What does the data say? (CHOICE-MI)



Ben Ali W, et al. EJHF 2022; 24:887



# What does the data say? (CHOICE-MI)



Ben Ali W, et al. EJHF 2022; 24:887

# M-TEER unmet needs

## Not enough tissue

Leaflet:annulus

## Tissue quality

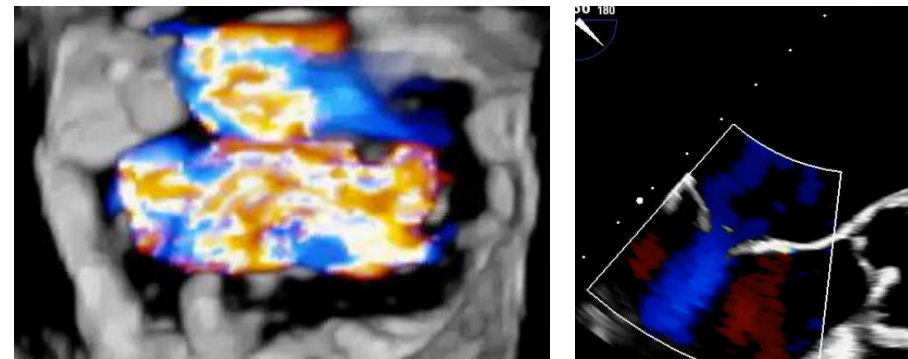
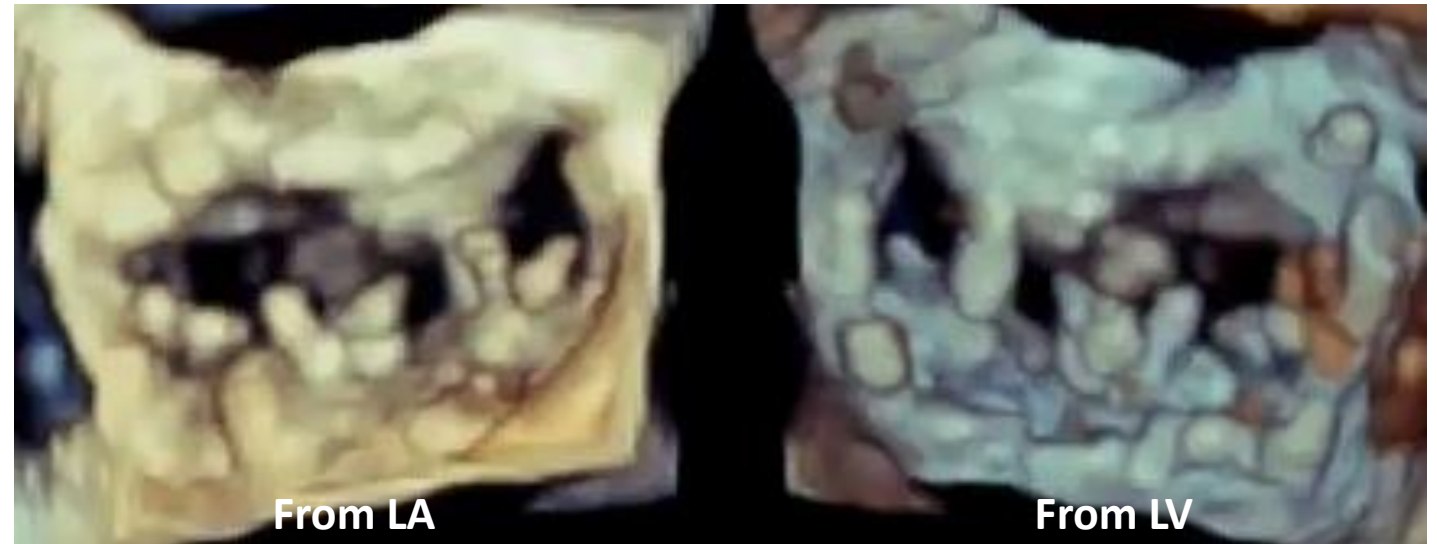
Degenerative

Endocarditis

## Clear stenosis/stenosis risk

Rheumatic

Severe MAC/leaflet calcium



Residual MVA 2.7cm<sup>2</sup>

Mean gradient 7mmHg  
(HR 83bpm)

# Summary

Anatomy treatable by M-TEER continues to expand

Supported by reasonable observational outcomes

There is still an unmet need in truly M-TEER ineligible

Not enough tissue

Poor leaflet quality

Clear stenosis

Thank you!