

TEER for Atrial Functional MR: A New Weapon for Emerging Target

Takashi Matsumoto, MD, PhD, FSCAI, FACC

Department of Cardiology and Catheterization Laboratory

Shonan Kamakura General Hospital

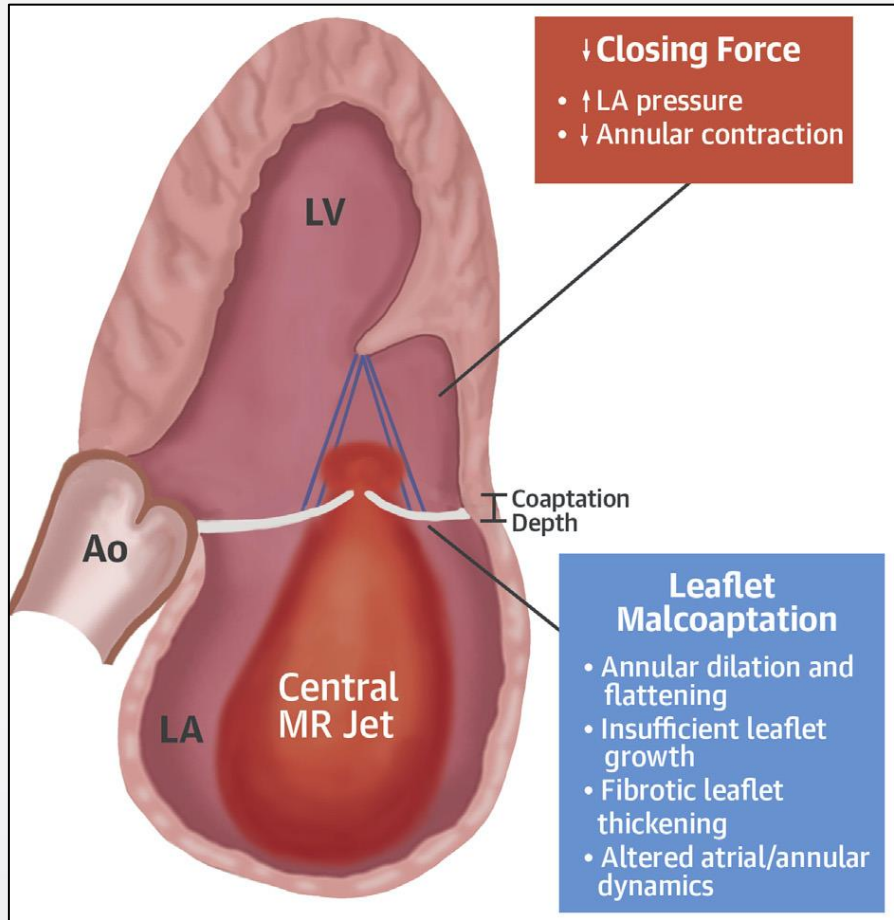
Disclosure

- Speaker's name: Takashi Matsumoto

I have the following potential conflicts of interest to report:

- Receipt of honoraria or consultation fees: Abbott Medical Japan, Boston Scientific Japan

Atrial Functional MR



- Significant atrial FMR was present in 6-7% of patients with AF.
- The proportion of atrial FMR with HFpEF varied in 3 epidemiological cohort studies according to baseline age, and was up to 53%.

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

- Intervention of Patients with Secondary MR -

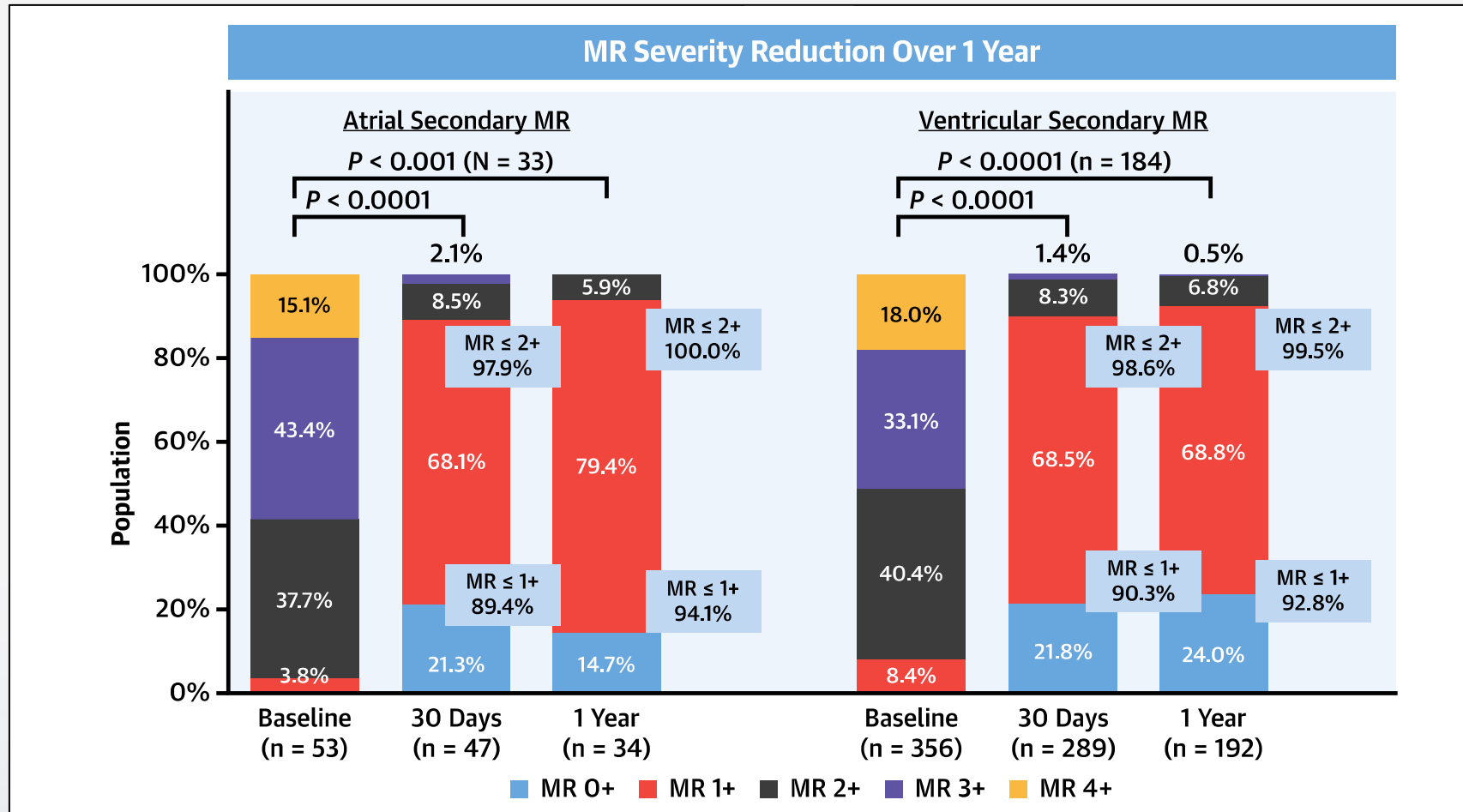


COR	LOE	Recommendations
2a	B-R	<p>1. In patients with chronic severe secondary MR related to LV systolic dysfunction (LVEF <50%) who have persistent symptoms (NYHA class II, III, or IV) while on optimal GDMT for HF (Stage D), transcatheter edge-to-edge mitral valve repair (TEER) is reasonable in patients with appropriate anatomy as defined on TEE and with LVEF between 20% and 50%, LVESD ≤70 mm, and pulmonary artery systolic pressure ≤70 mm Hg.</p>
2a	B-NR	<p>2. In patients with severe secondary MR (Stages C and D), mitral valve surgery is reasonable when CABG is undertaken for the treatment of myocardial ischemia.</p>
2b	B-NR	<p>3. In patients with chronic severe secondary MR from atrial annular dilation with preserved LV systolic function (LVEF ≥50%) who have severe persistent symptoms (NYHA class III or IV) despite therapy for HF and therapy for associated AF or other comorbidities (Stage D), mitral valve surgery may be considered.</p>

Mitral valve surgery

TEER for Atrial Functional MR

- EXPAND study -



Patient characteristics

82 y.o. Female

Height 148.0 cm Weight 37.0 kg BSA 1.25 m²

【PMH】

➤ HT(+), DM(-), HL(-), HU(+), CKD(+)

【HPI】

2015 Moderate MR p/o

2022 HF admission

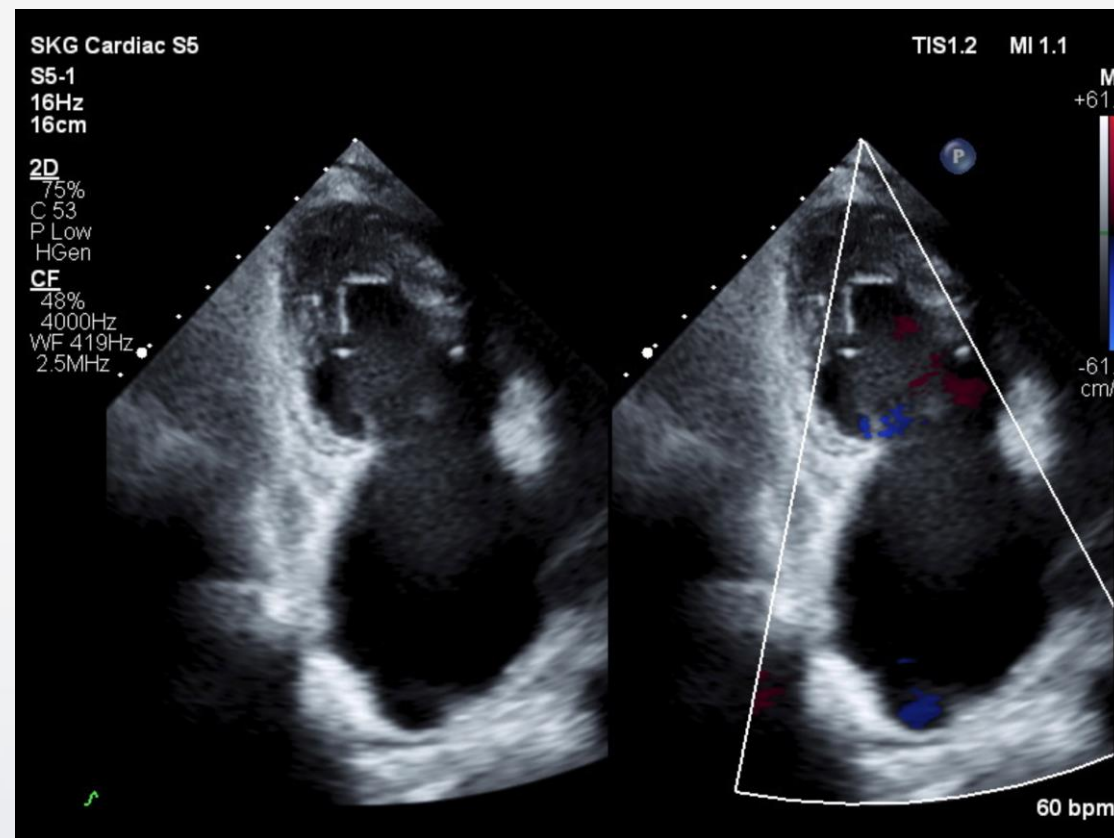
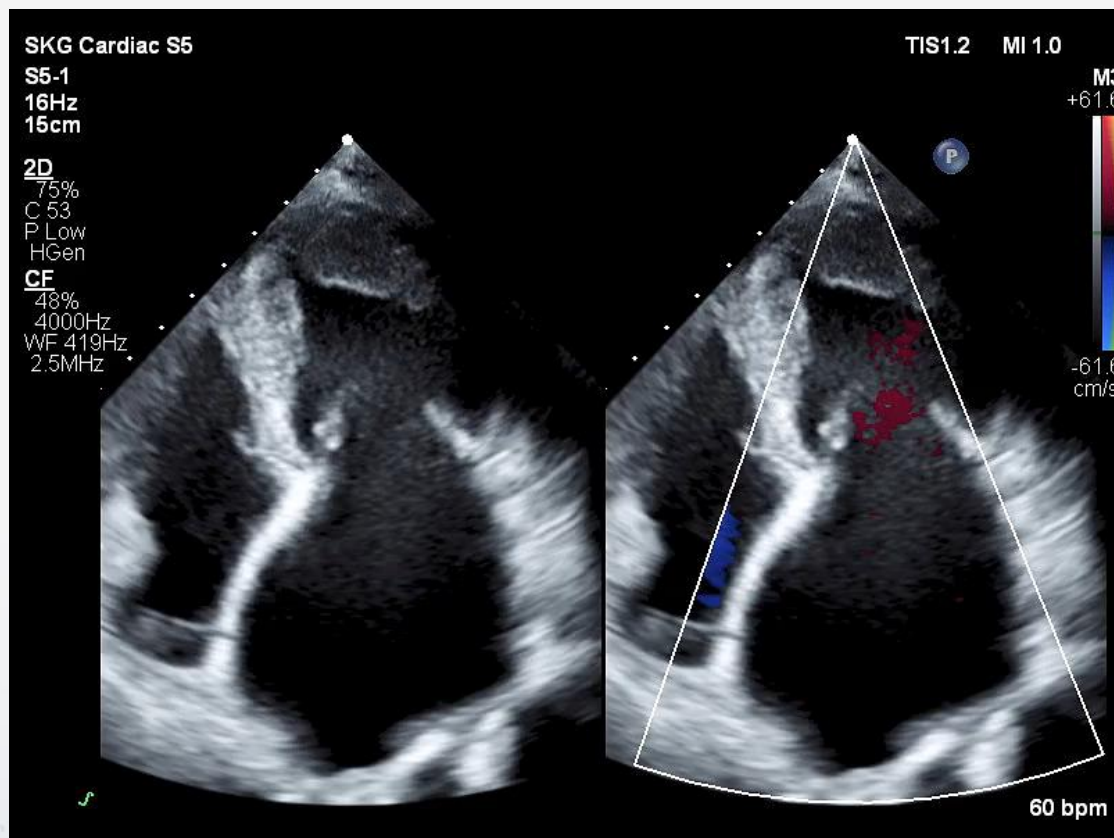
【STS score for MV replacement】

Mortality: 8.8%

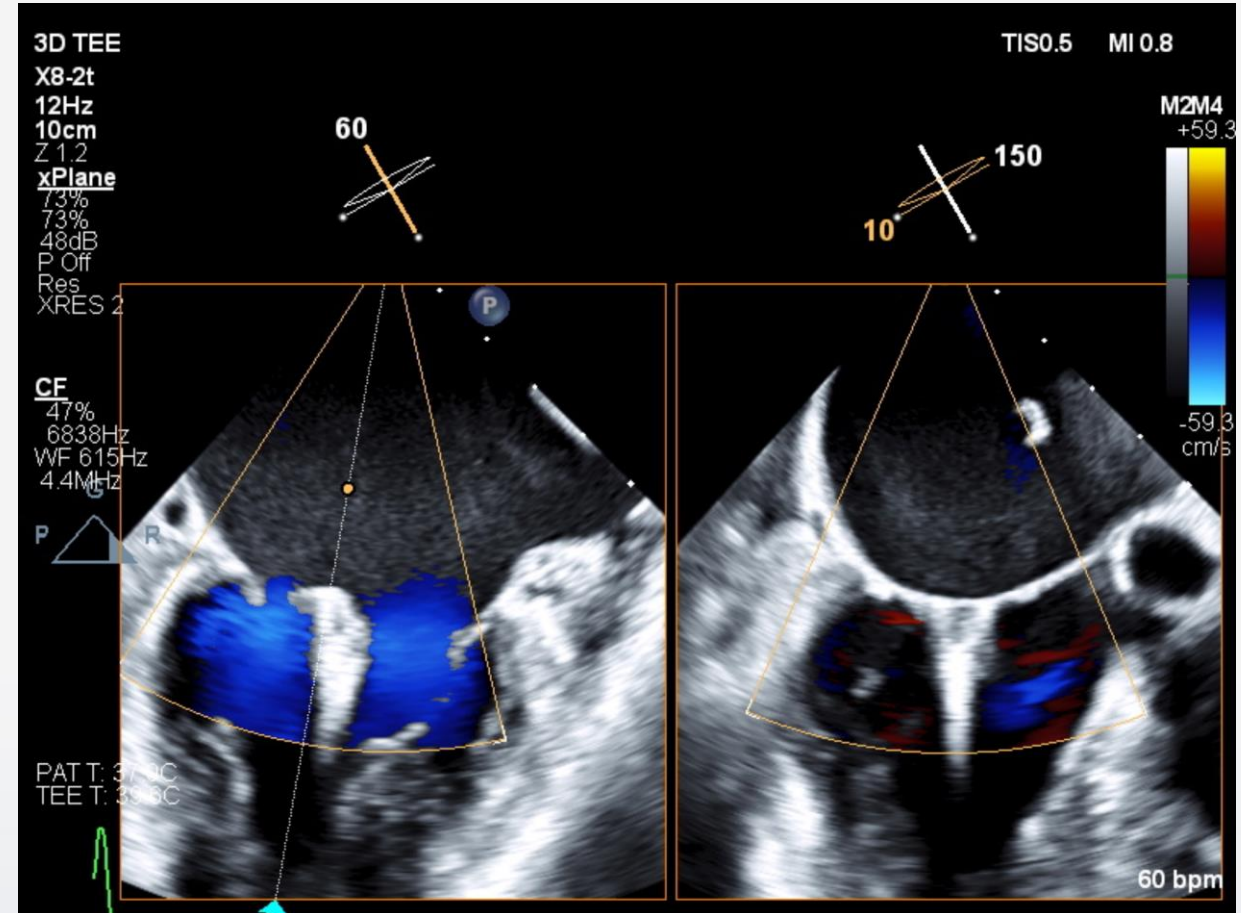
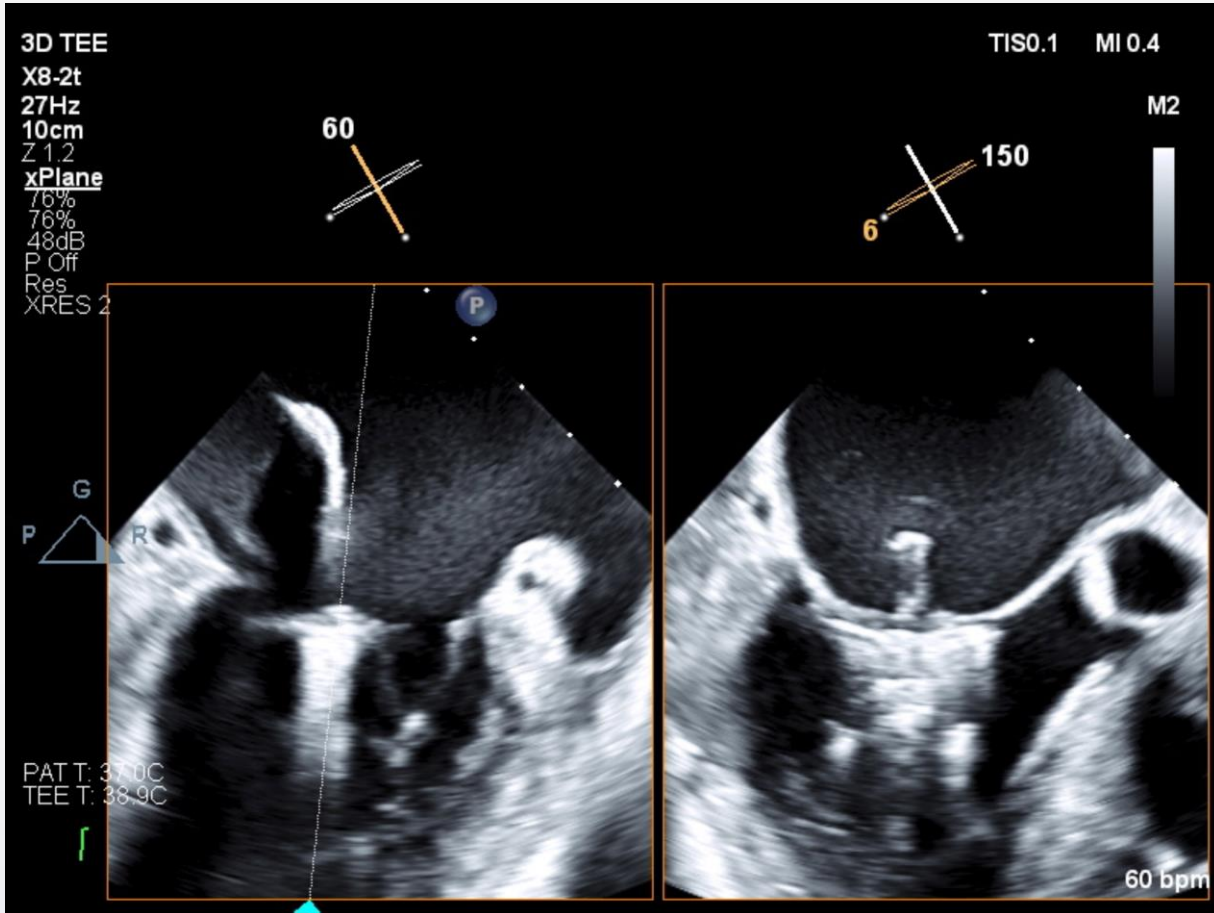
Morbidity & Mortality: 26.9%

Baseline TTE

- ✓ LVID d/s = 45/23 mm, LVEF = 58.7%
- ✓ LA diameter = 53.7 mm, MVOA = 5.5 cm²
- ✓ EROA = 0.35 cm², Rvol = 60 ml



Procedural TEE



TEER for Atrial Functional MR

- Topics -

- Definition of Atrial Functional MR
- Subtype of Atrial Functional MR & Clip selection
- Atrial Functional TR

Definition of Atrial Functional MR

- Echocardiographic criteria across different studies -

First author	Afib	Anular size	LA size	LV size	LVEF	Normal LV wall motion	Mitral Valve
Chen et al ¹	+	-	-	LVEDd <60mm or LVESd <45mm	>50%	+	Structurally normal leaflets
Kim et al ²	+	-	-	LVEDV <75ml/m ²	>50%	+	No organic valve disease
Hirji et al ³	+	-	LAD >40mm	-	>50%	-	No rheumatic disease, prolapse, endocarditis, prior surgery, carcinoid, HOCM, or trauma
Carino et al ⁴	+	AP diameter >35mm	-	-	>45%	+	Normal leaflet motion, coaptation depth <10mm, and central MR
Rottlander et al ⁵	+	-	LAVI >34ml/m ²	LVEDd <55mm	>50%	+	Normal leaflet motion

1. Ann Transl Med. 2020;8(21):1420.

2. J Am Coll Cardiol Img. 2019;12(4):665–677.

3. J Thorac Cardiovasc Surg. 2022;164(6):1808–1815.e4.

4. J Cardiac Surg. 2021;36(2):596–602.

5. Catheter Cardiovasc Interv. 2022;99(6):1839–1847.

Definition of Atrial Functional MR

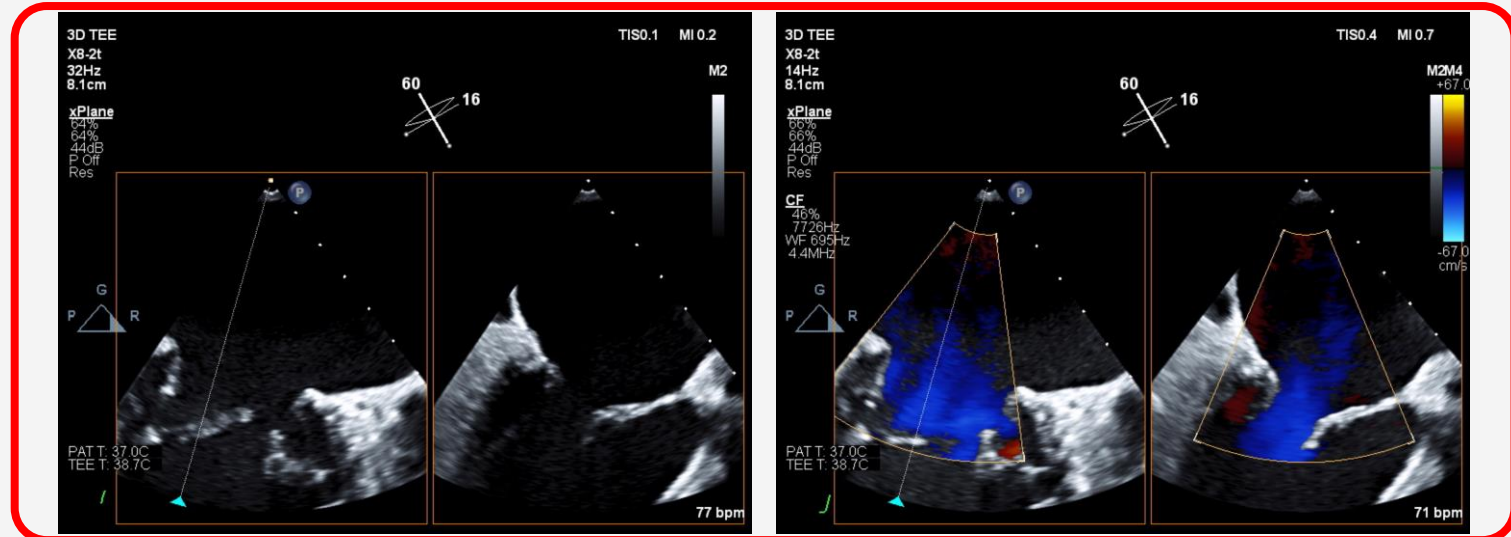
- Suggested definition -

- MR with structurally **normal mitral valve leaflets** without mitral annular calcification (which could potentially interfere with ALT).
- LA enlargement, defined as **indexed LA volume of >34 mL/m²** that is secondary to Afib and/or elevated mean LA pressure caused by LV diastolic dysfunction.
- **Normal indexed LV end-diastolic volume** for age and sex.
- **LVEF of ≥60%** (by the biplane method of disks) without regional wall motion abnormalities.

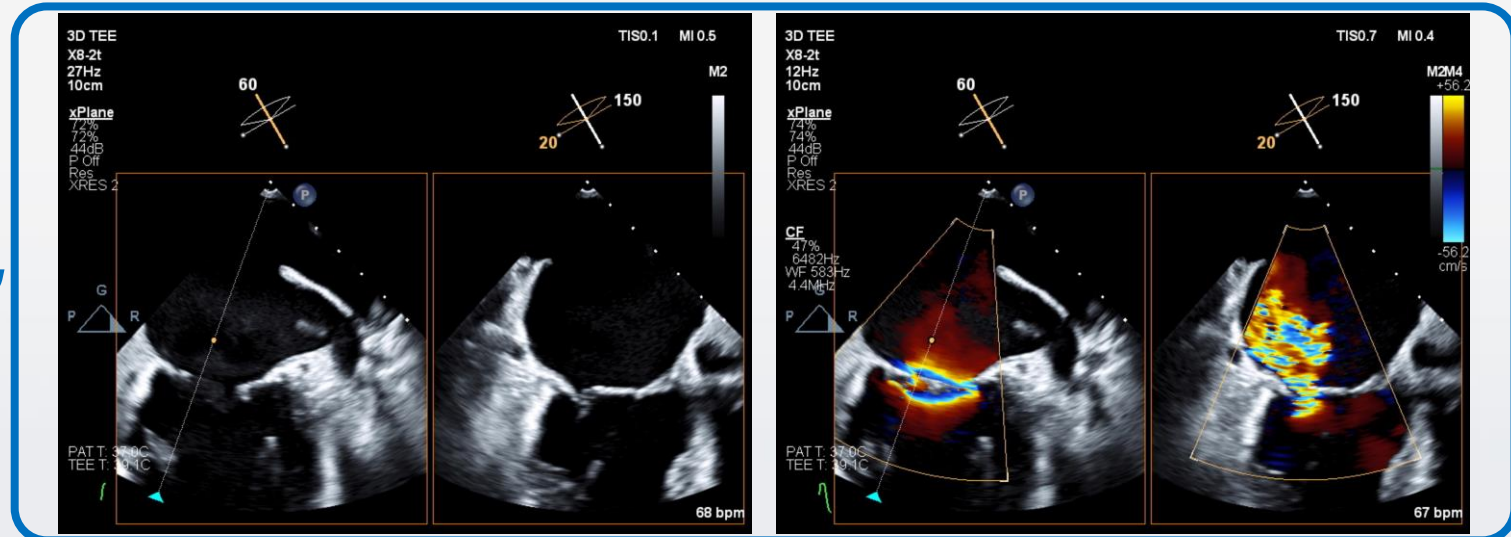
Subtype of Atrial Functional MR

- Flat valve type vs. Hamstring type -

“Flat valve type”

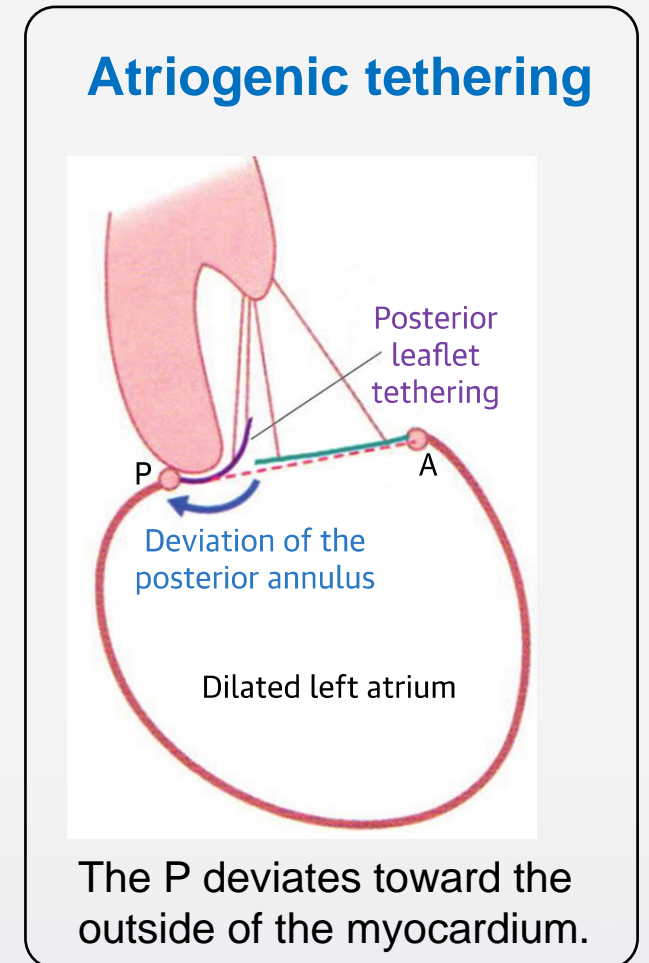
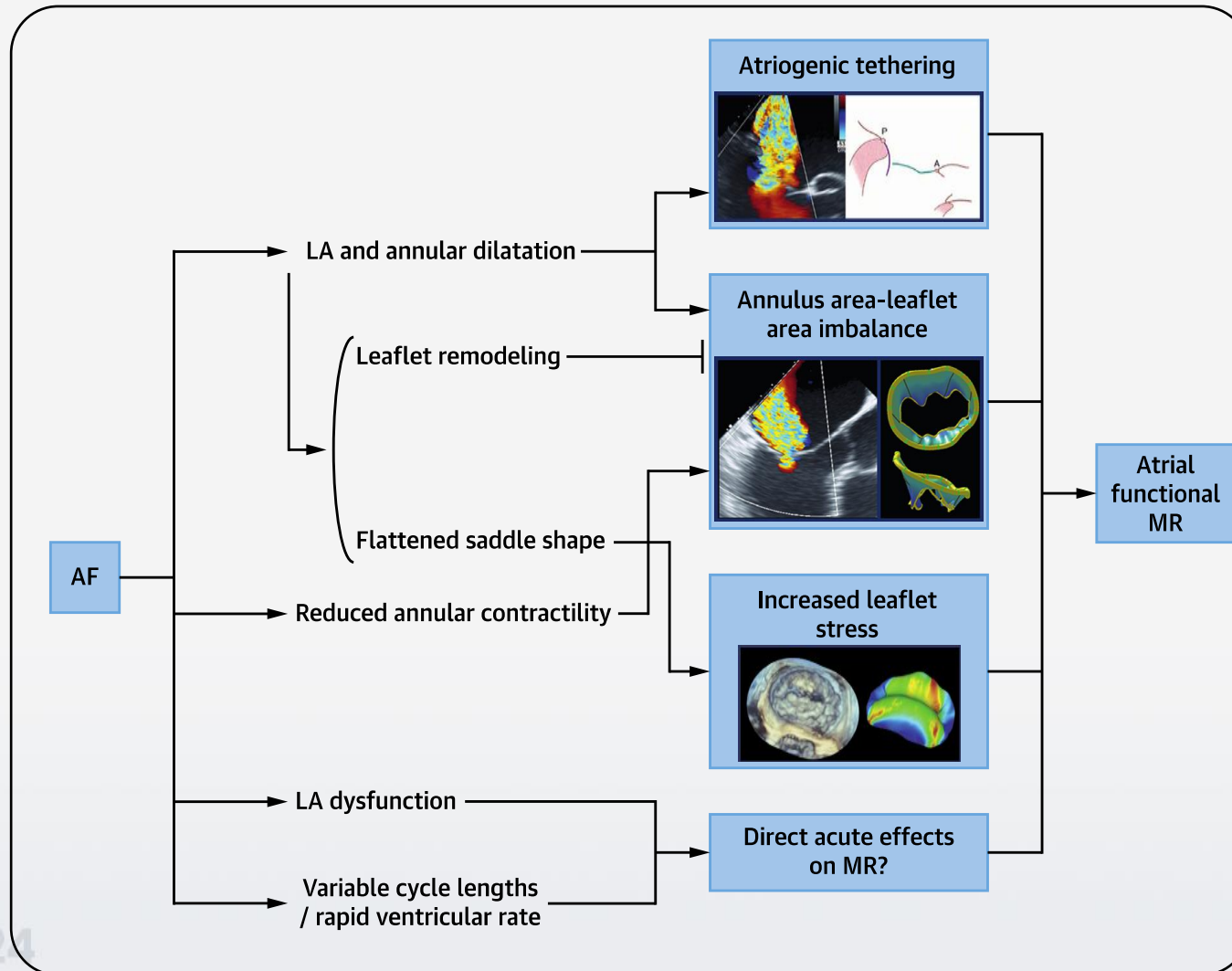


“Hamstring type”



Subtype of Atrial Functional MR

- Combination of Atriogenic tethering, Leaflet remodeling, & Annular dilatation -

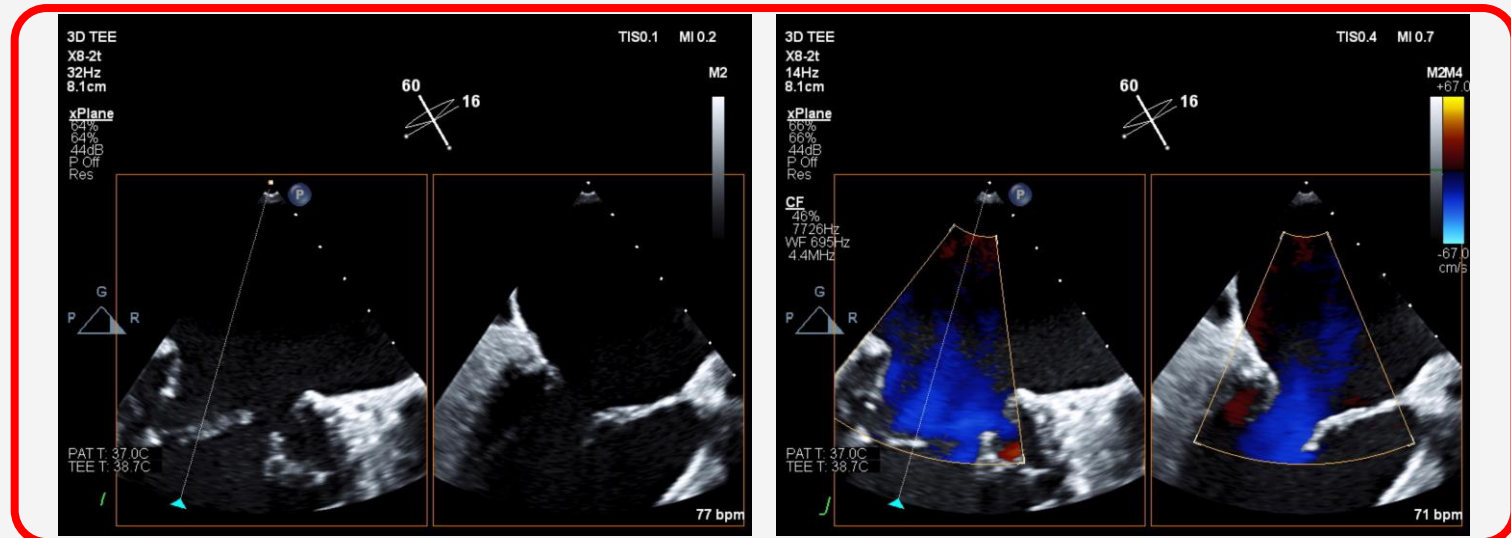


Clip selection for Atrial Functional MR

- Shonan Kamakura General Hospital -

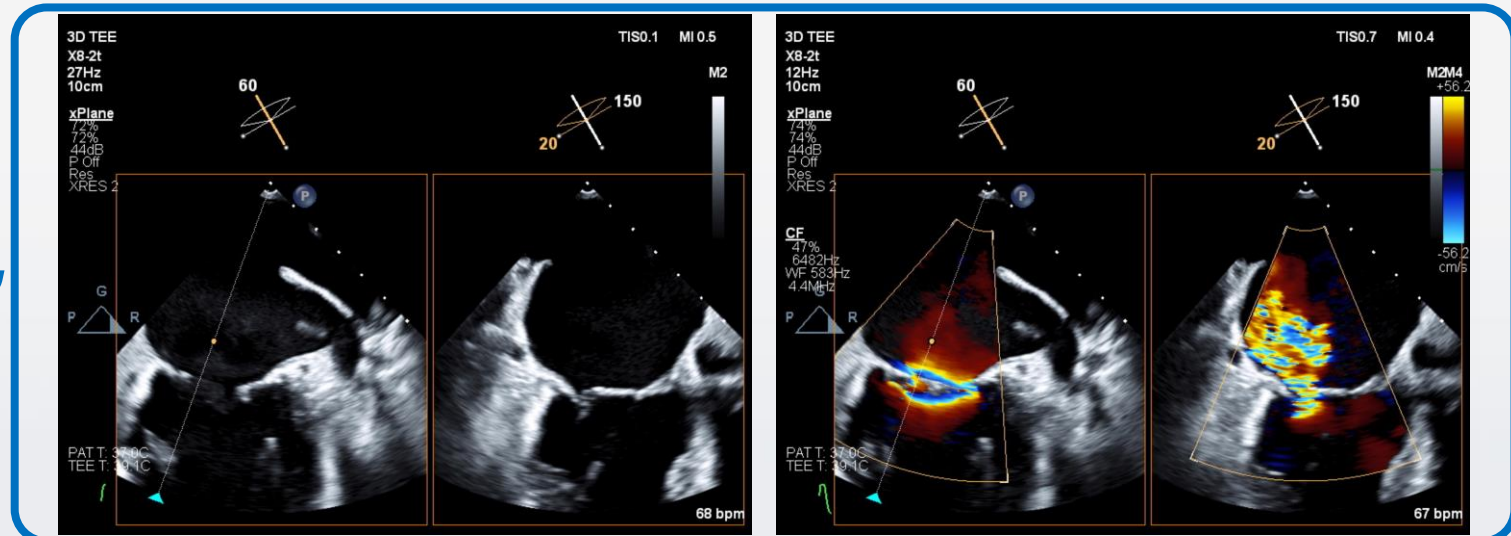
“Flat valve type”

 **NTW or XTW**

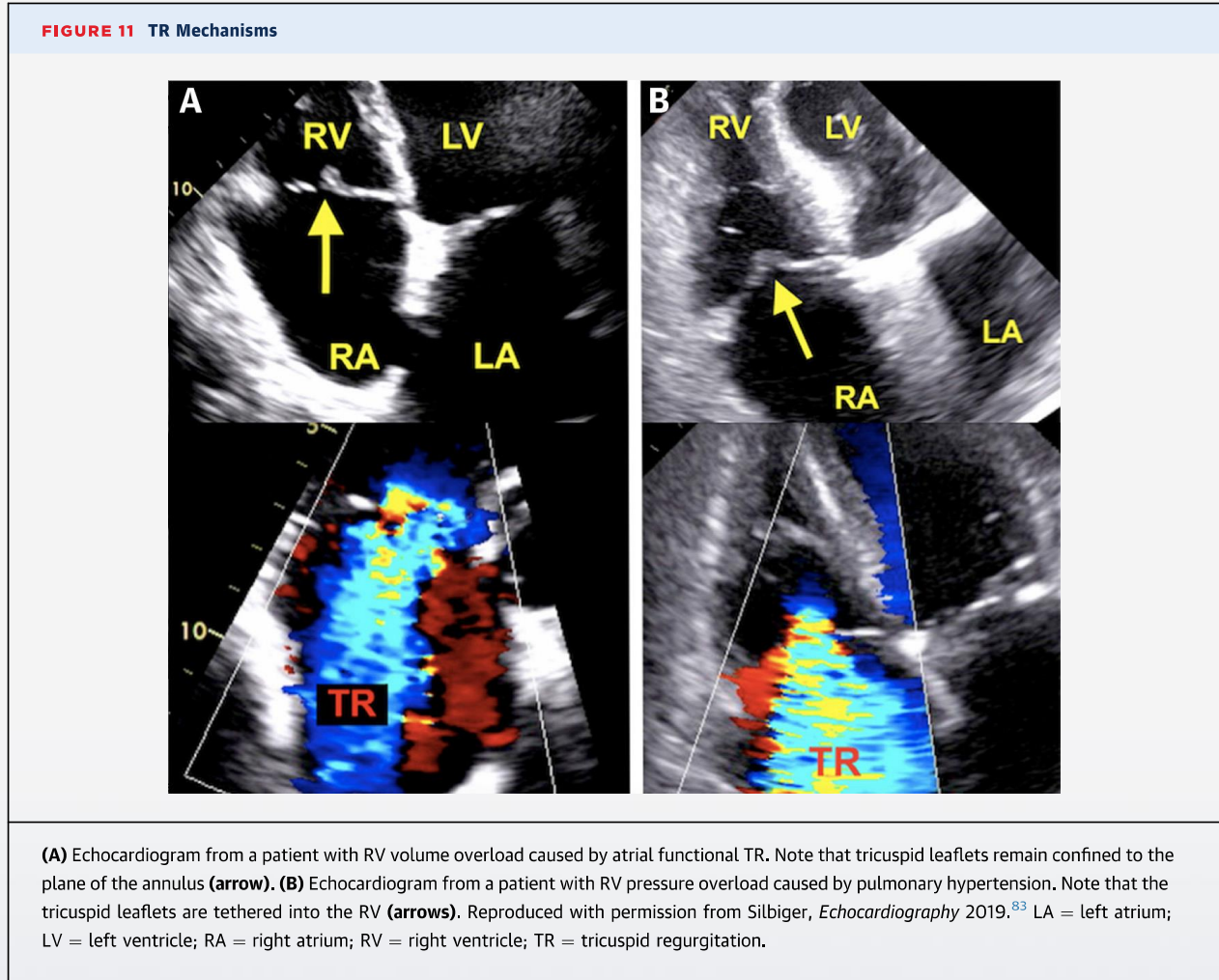


“Hamstring type”

 **NTW**



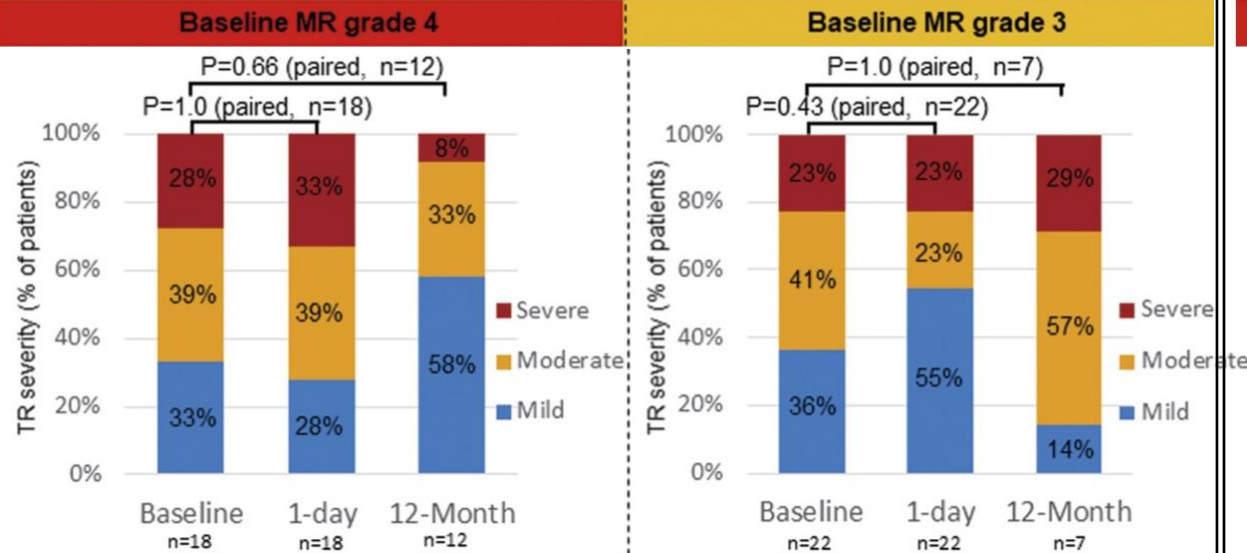
Atrial Functional TR



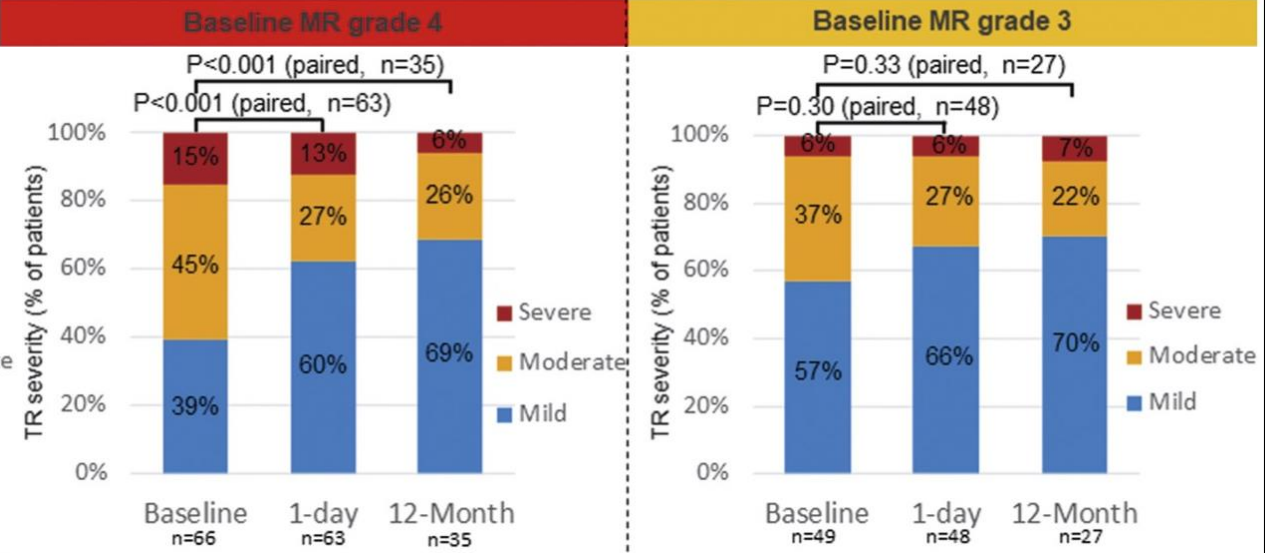
Severity of TR post TEER

- Atrial vs. Ventricular Functional MR -

Atrial-FMR



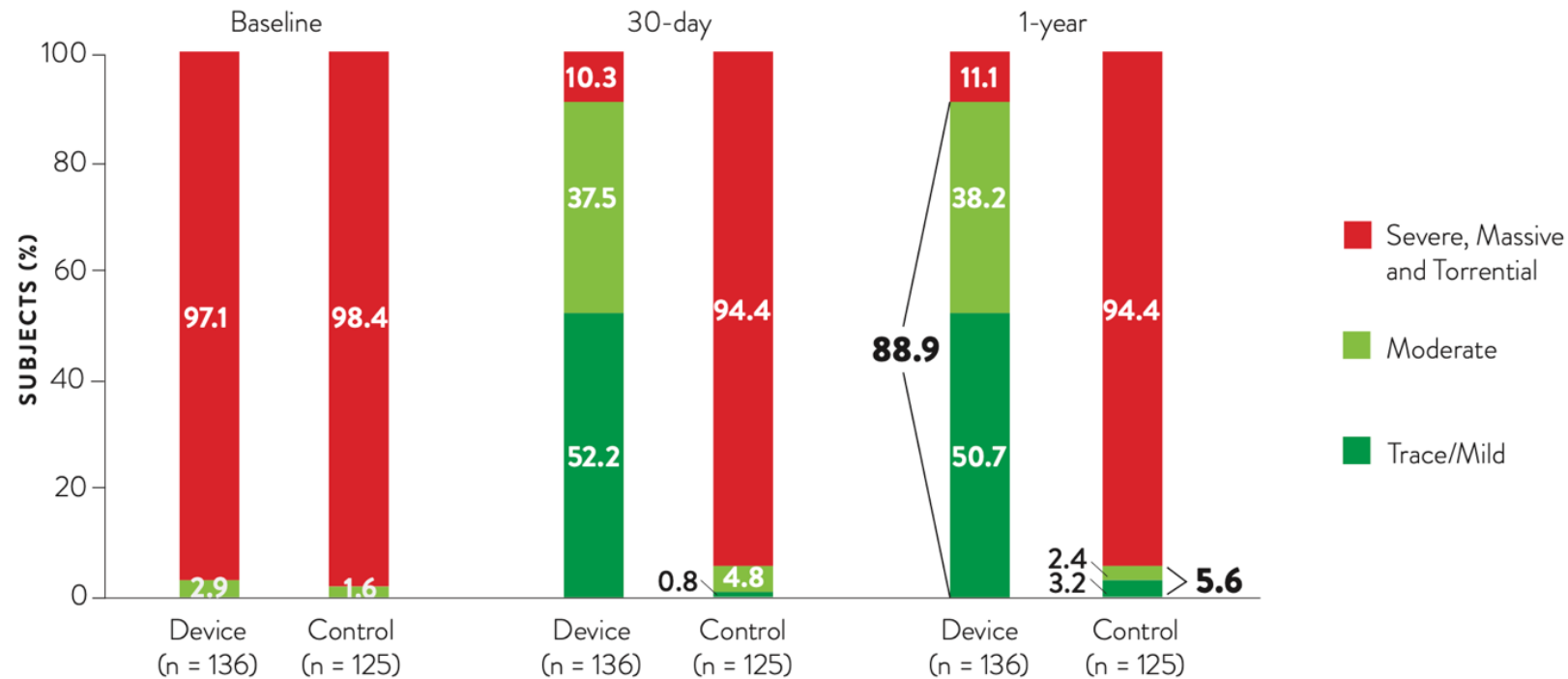
Sinus-FMR



TRILUMINATE Pivotal Trial

TriClip vs. Medical therapy

Remarkable and Sustained TR Reduction



- Sorajja P, Whisenant B, Hamid N, et al. TRILUMINATE Pivotal: A Landmark Randomized Clinical Trial of Transcatheter Tricuspid Valve Edge-to-Edge Repair For Tricuspid Regurgitation." Presented at ACC; March 4, 2023; New Orleans, LA; USA. CVRF
- N Engl J Med. 2023 Mar 4. doi: 10.1056/NEJMoa2300525. Online ahead of print.

Conclusions

- Atrial functional MR, which has remained largely unspoken, is mechanically linked to isolated annular dilation, insufficient leaflet growth, and impaired annular dynamics.
- TEER is a new treatment option for patients with atrial functional MR and high surgical risk. This indication may be expanded by TriClip.