

TCTAP 2023

Pressure Gradient and Clinical Outcome After MitraClip for Severe MR

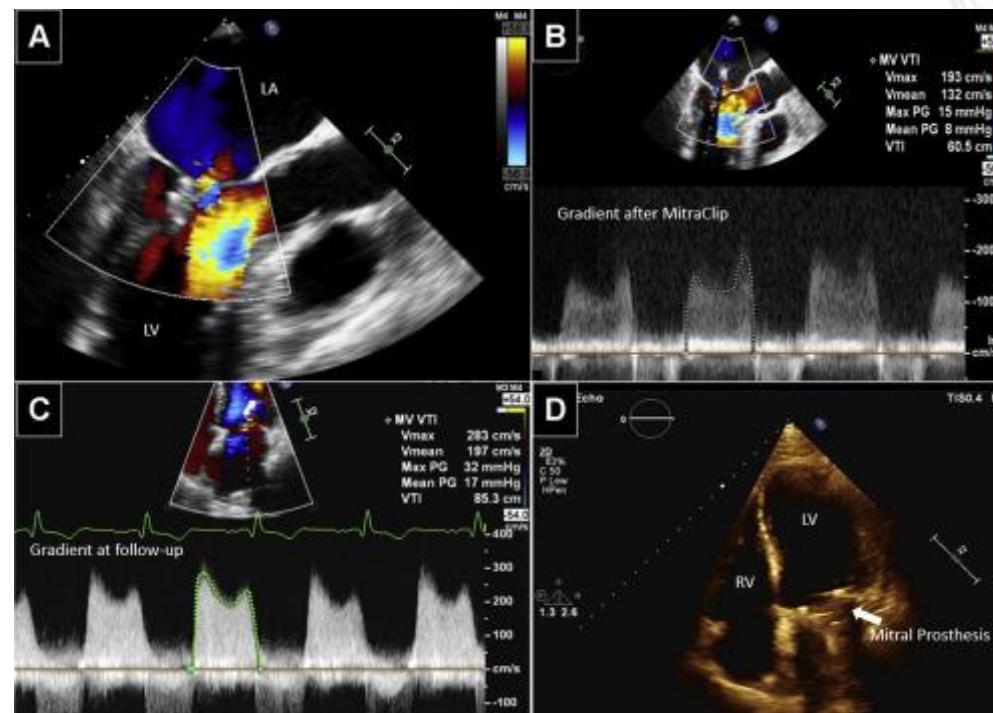
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Disclosure

- I do not have any potential conflict of interest to declare.

Definition of MitraClip procedural success

- Residual MR $\leq 2+$
- Mitral valve gradient $\leq 5\text{mmHg}$
- No complication



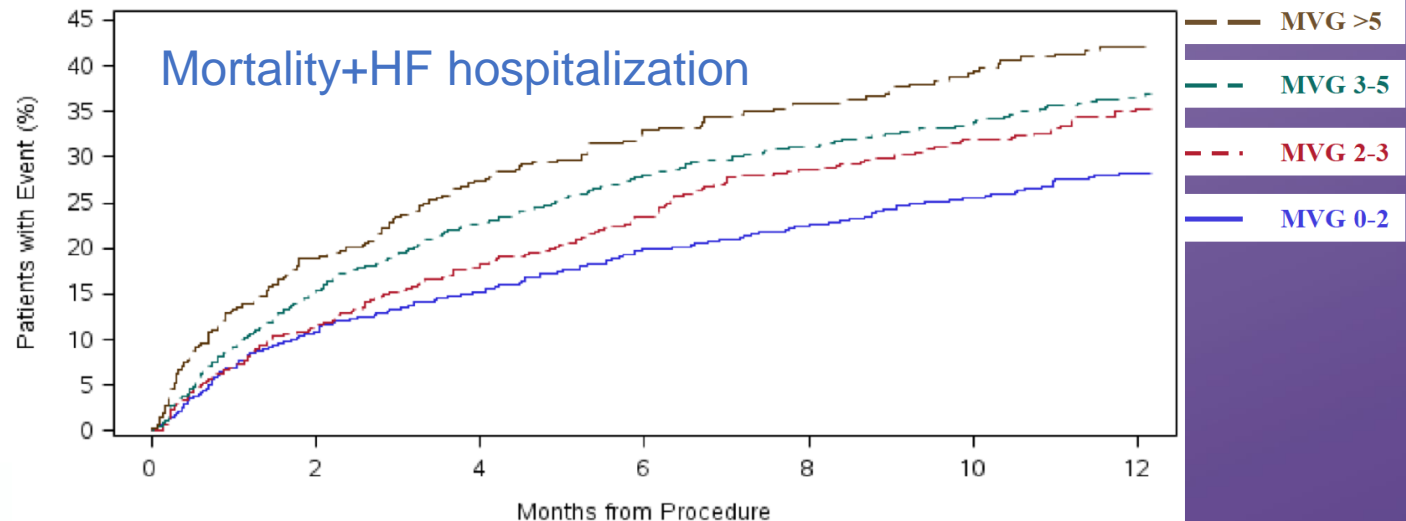
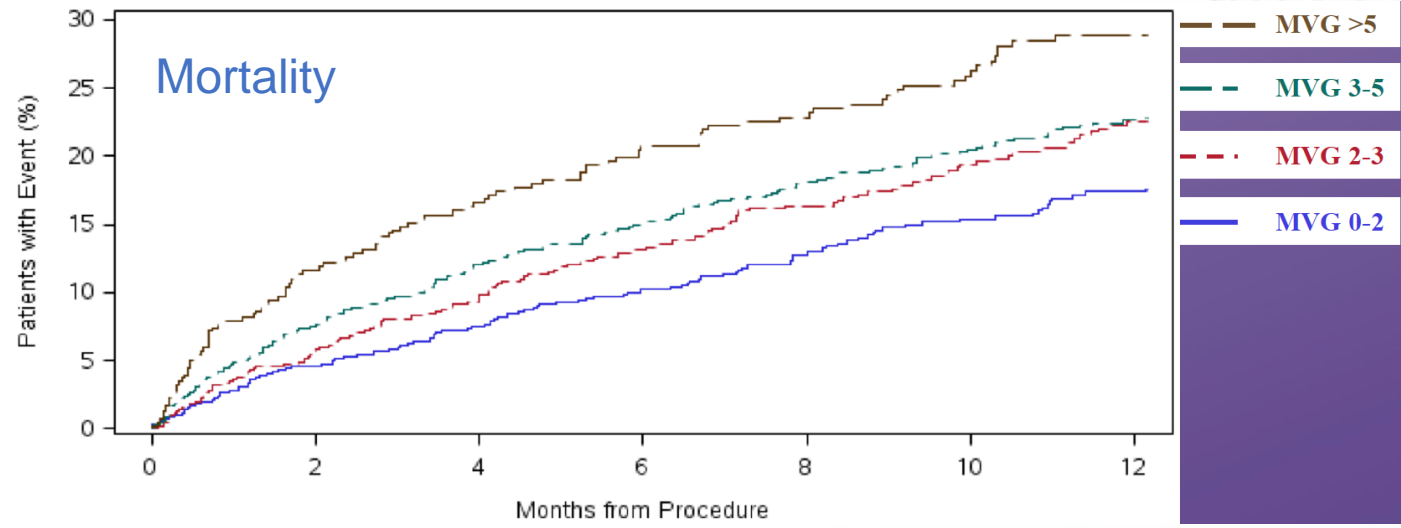
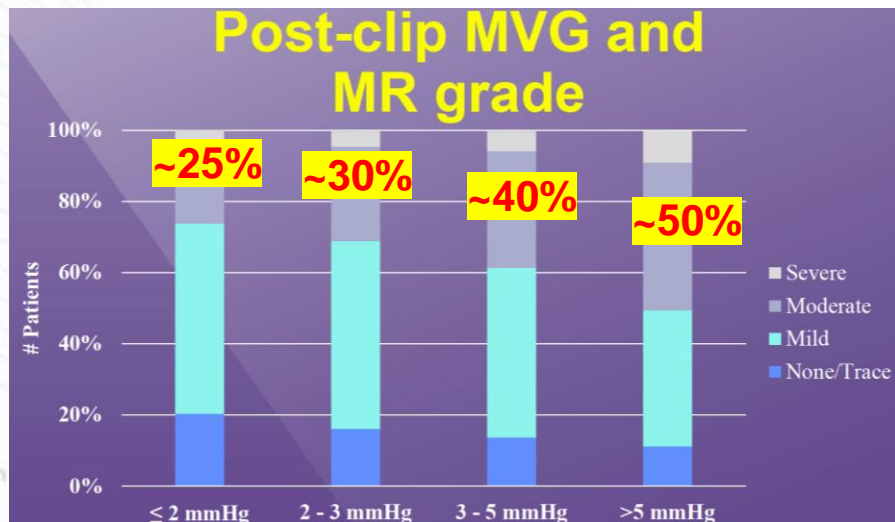
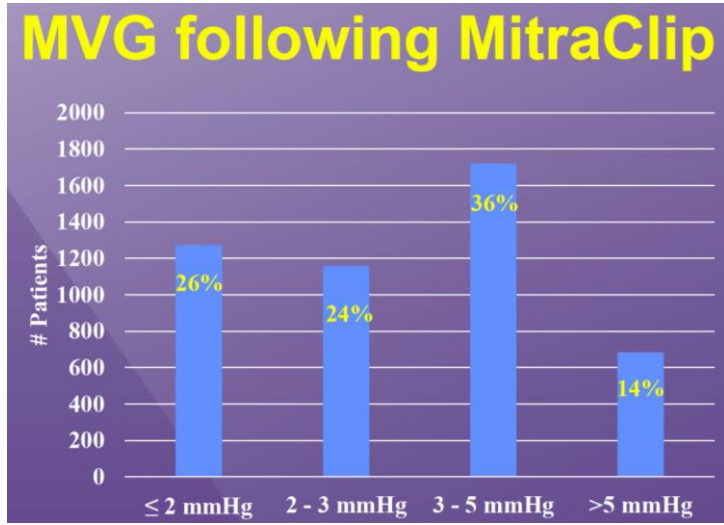
53-year-old man,
mitral valve area was 3.9,
mean gradient of 8 mm Hg after 1 clip
underwent MV replacement after 6 months

Determinants of MVG after MitraClip

- Mitral valve opening area
- MR severity/Clip numbers
- Leaflet pathology/MR etiology
- MR location
- Residual MR

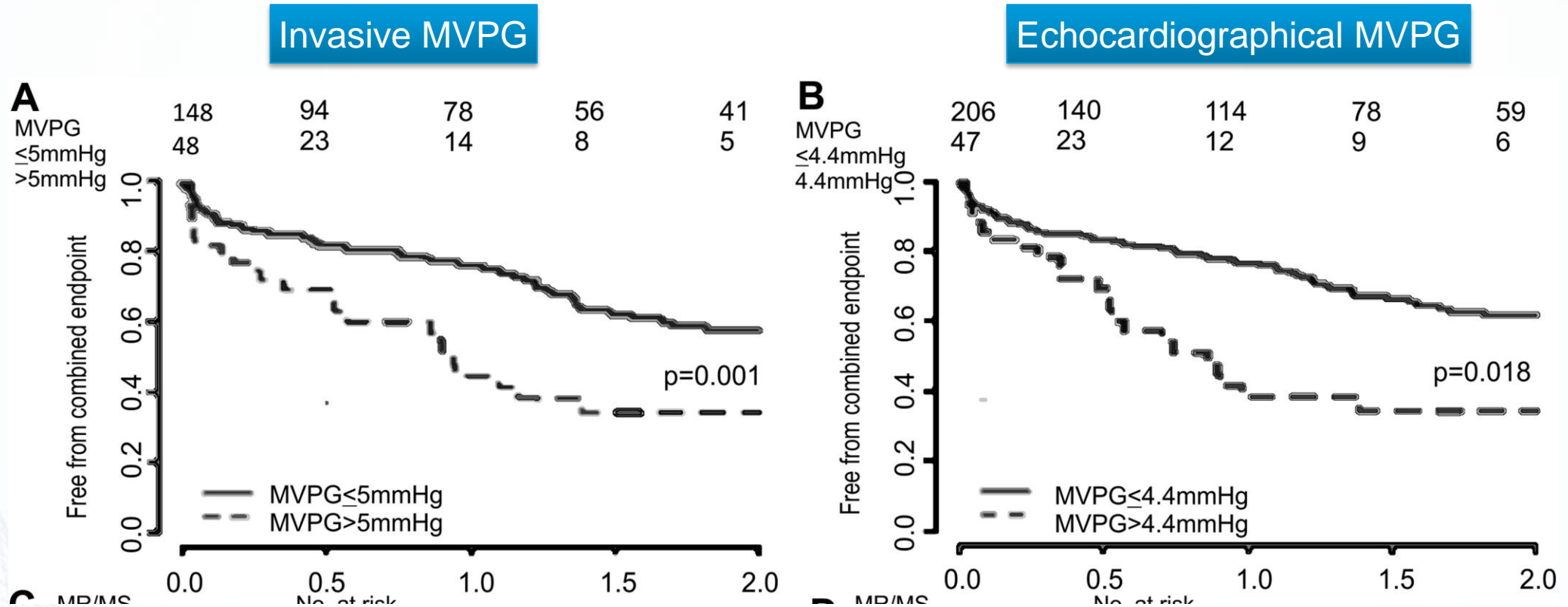
Mitral Valve Gradient and clinical outcomes after MitraClip

TVT registry, 5378 subjects received MitraClip during 11/3/2013 to 6/30/2016, 82% DMR



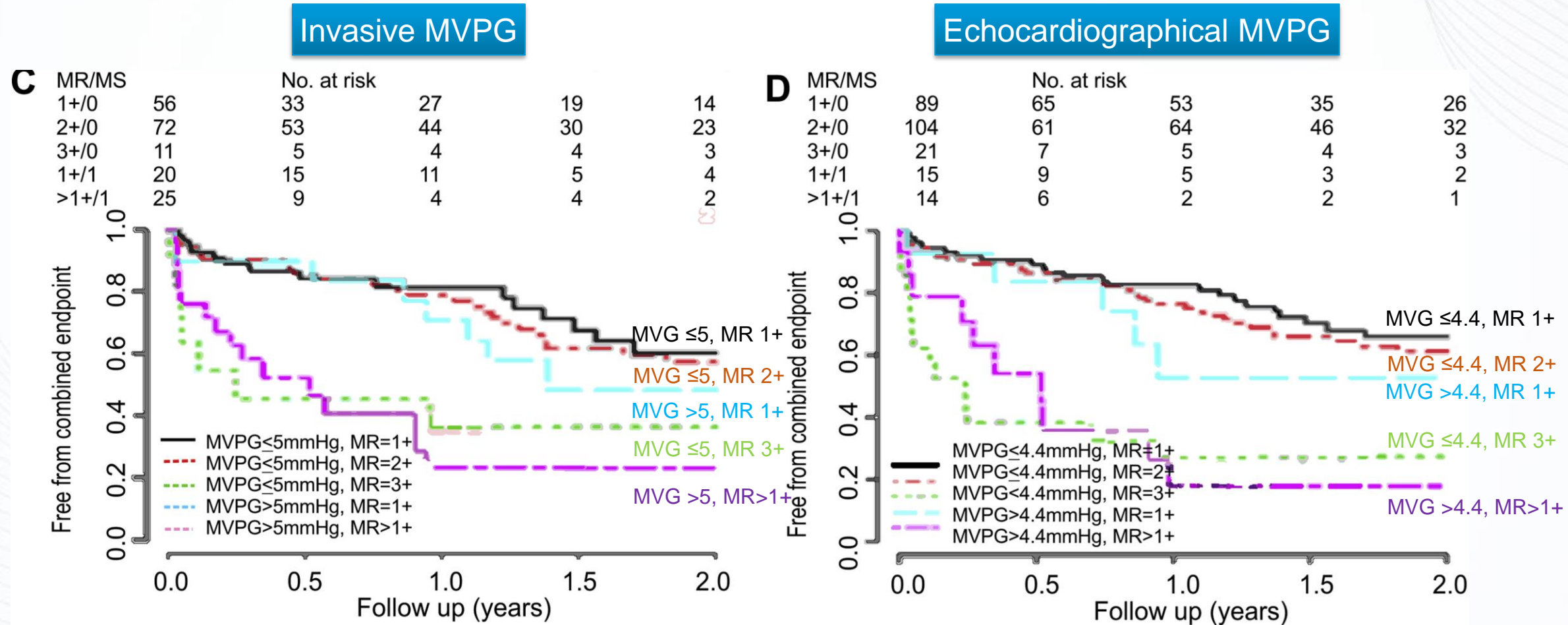
Elevated Mitral Valve Pressure Gradient After MitraClip Deteriorates Long-Term Outcome

Germany: 268 patients (75 ± 9 years, 68% men) received MitraClip, 66.5% FMR



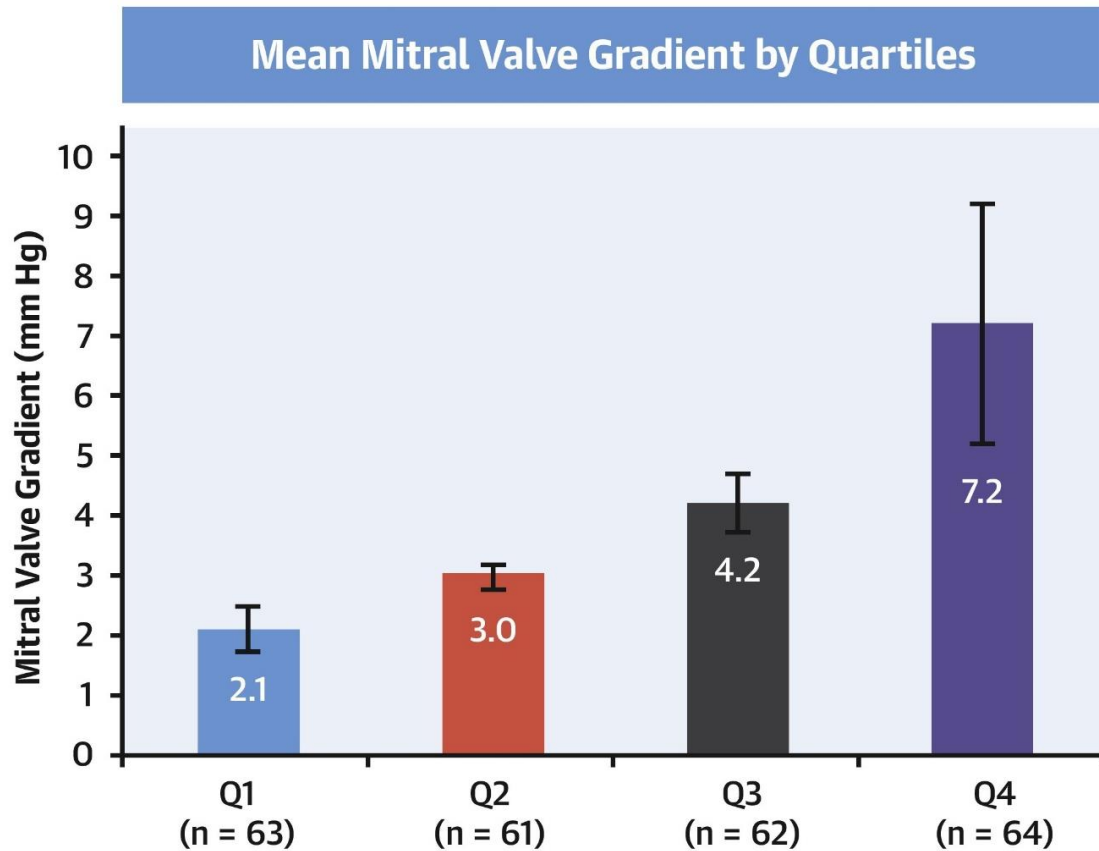
Elevated MVG and residual MR After MitraClip Deteriorates Long-Term Outcome

Germany: 268 patients (75 ± 9 years, 68% men) received MitraClip, 66.5% FMR

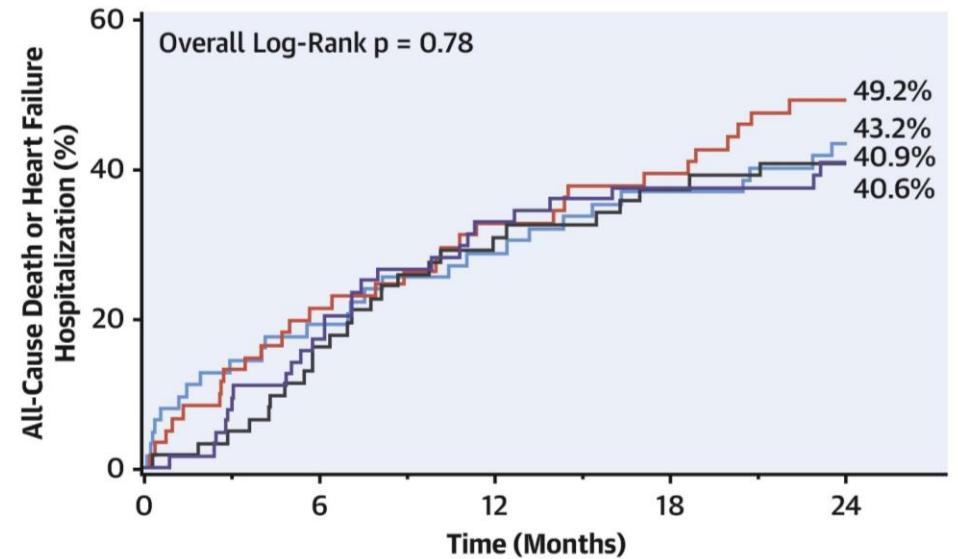


Impact of Post-MitraClip Gradient

Results From the COAPT Trial: Mean MVG in quartiles 2.1 ± 0.4 , 3 ± 0.2 , 4.2 ± 0.5 , and 7.2 ± 2



Death or HF hospitalization

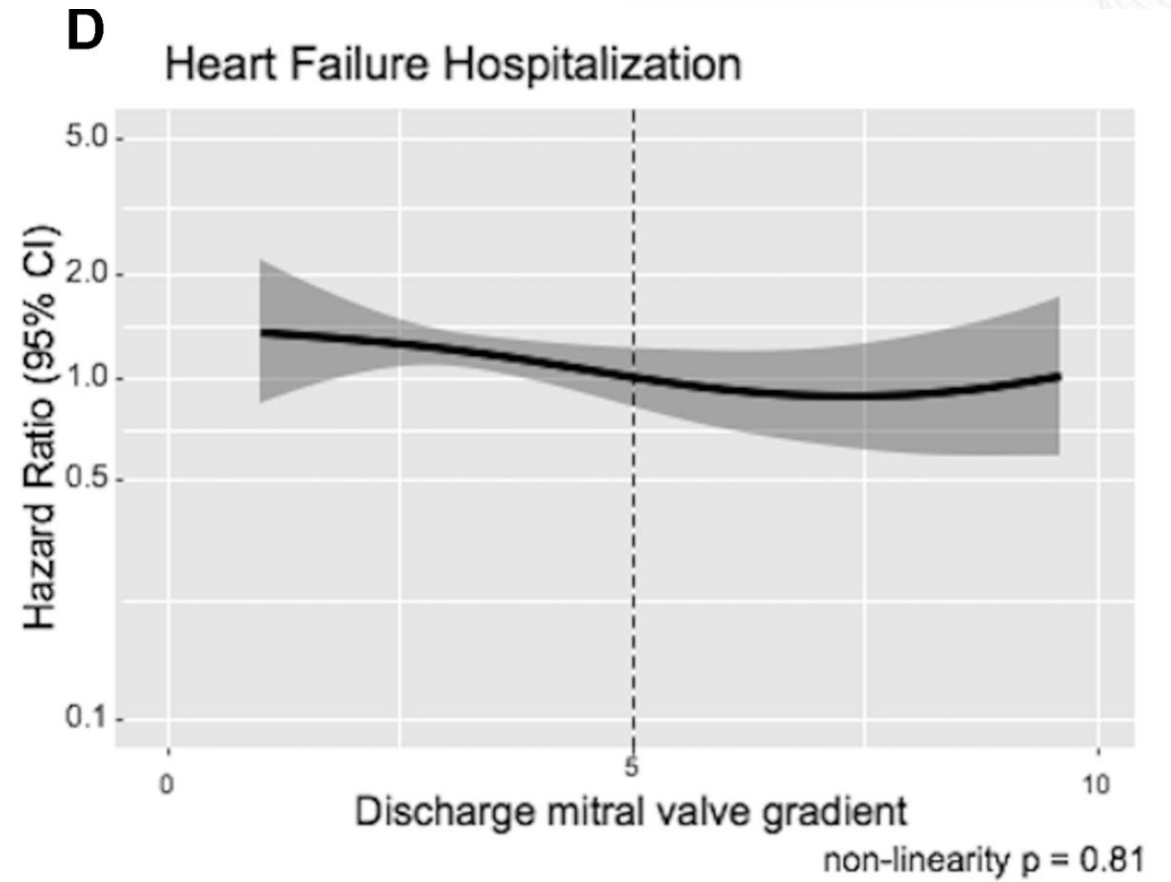
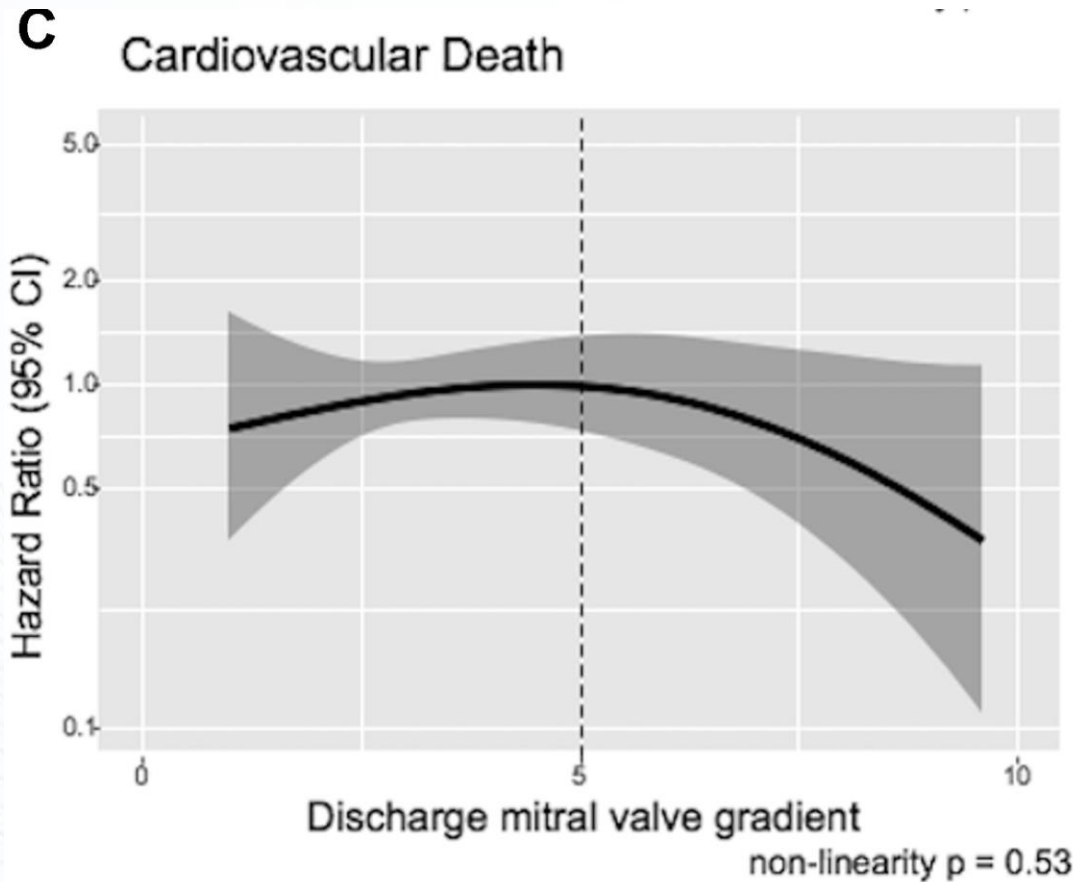


No. at risk:

	0	6	12	18	24
— Quartile 1	63	51	44	39	34
— Quartile 2	61	48	41	37	30
— Quartile 3	62	52	43	38	34
— Quartile 4	64	53	43	40	32

Post MitraClip-Treatment MVG and Clinical Outcome Measures

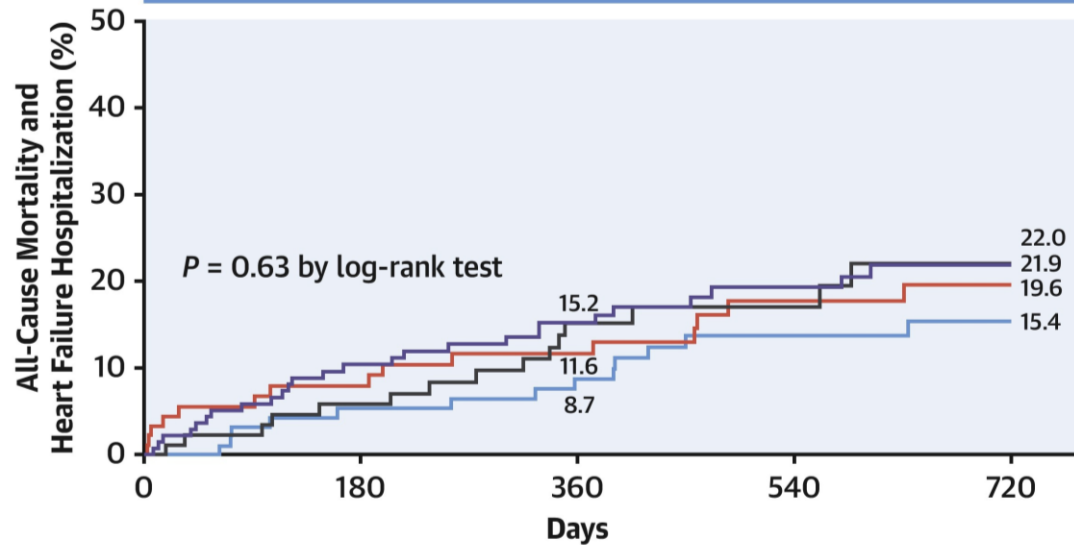
Results From the COAPT Trial: mean discharge TTE MVG 4.2 ± 2.2 mmHg



Prognostic impacts of Mitral Valve Gradient After TEER for Primary MR

419 patients with primary MR (age 80.6 ± 10.4 years; 40.6% female), 54.2% received ≥ 2 clips

Postprocedure Mean Gradient vs Outcome for Primary Mitral Regurgitation, N = 419

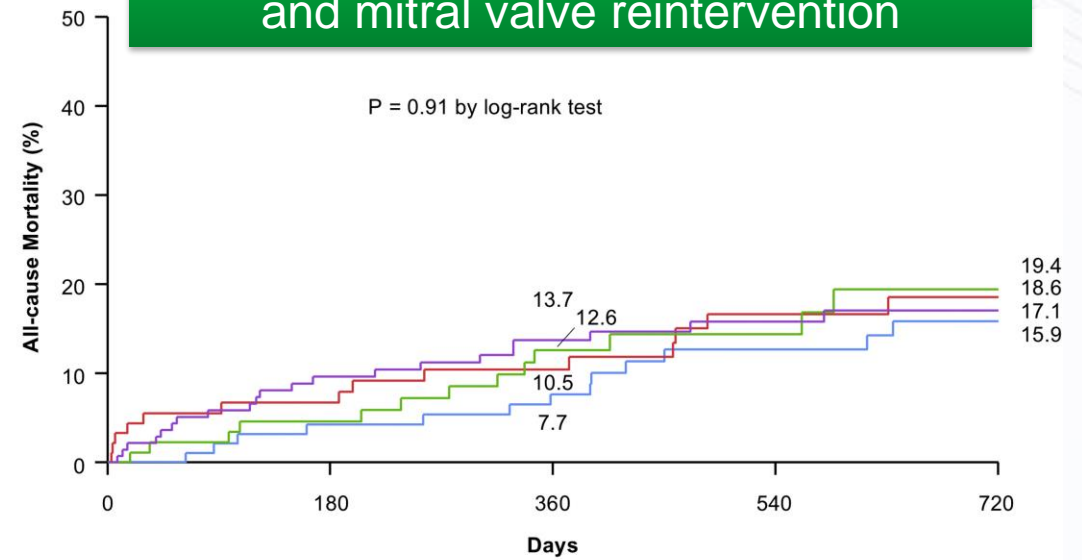


No. at Risk:

Quartile	0	180	360	540	720
Quartile 1	98	82	51		
Quartile 2	91	67	41		
Quartile 3	90	62	29		
Quartile 4	140	100	49		

A

All-cause mortality, HF hospitalization, and mitral valve reintervention



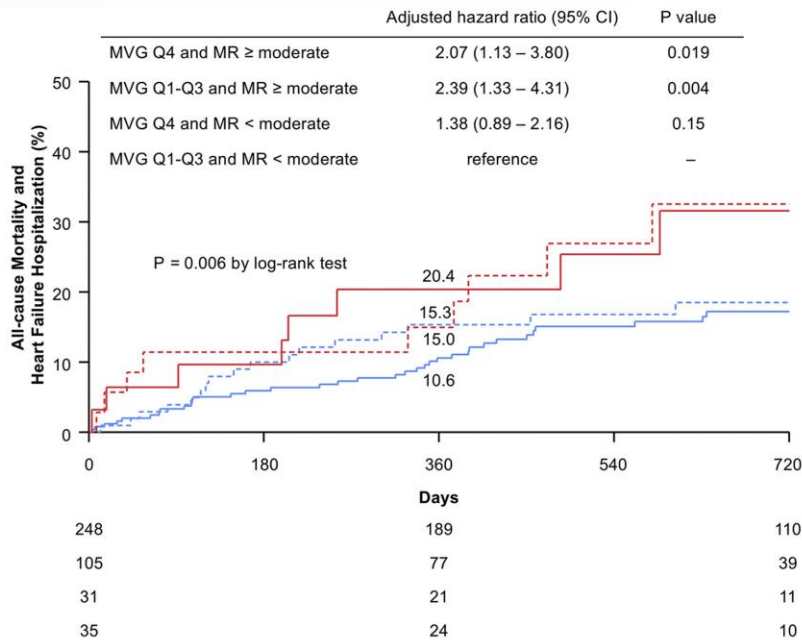
No. at Risk

Quartile	0	180	360	540	720
Quartile 1	98	83	51		
Quartile 2	91	67	41		
Quartile 3	90	64	29		
Quartile 4	140	101	53		

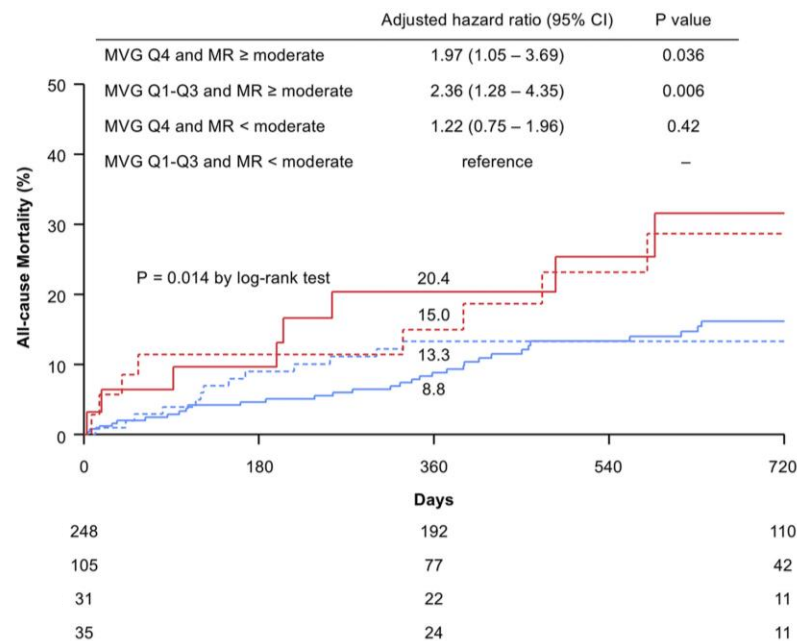
Residual MR outweighed Mitral Valve gradient after TEER on clinical outcomes

419 patients with primary MR (age 80.6 ± 10.4 years; 40.6% female), 54.2% received ≥ 2 clips

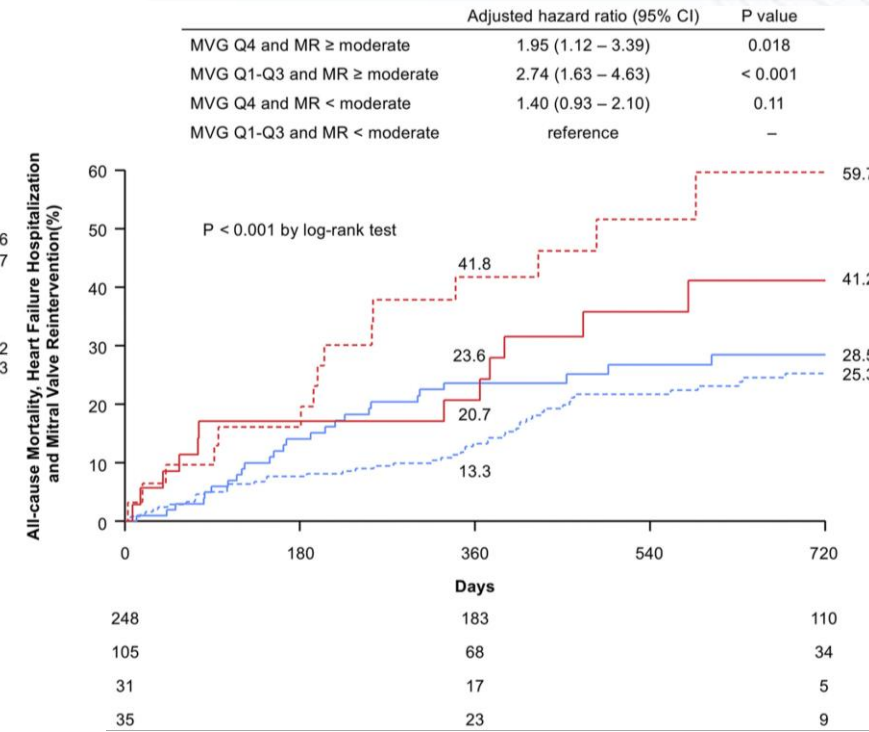
All-cause mortality and HF hospitalization



All-cause mortality



All-cause mortality, HF hospitalization, and mitral valve reintervention

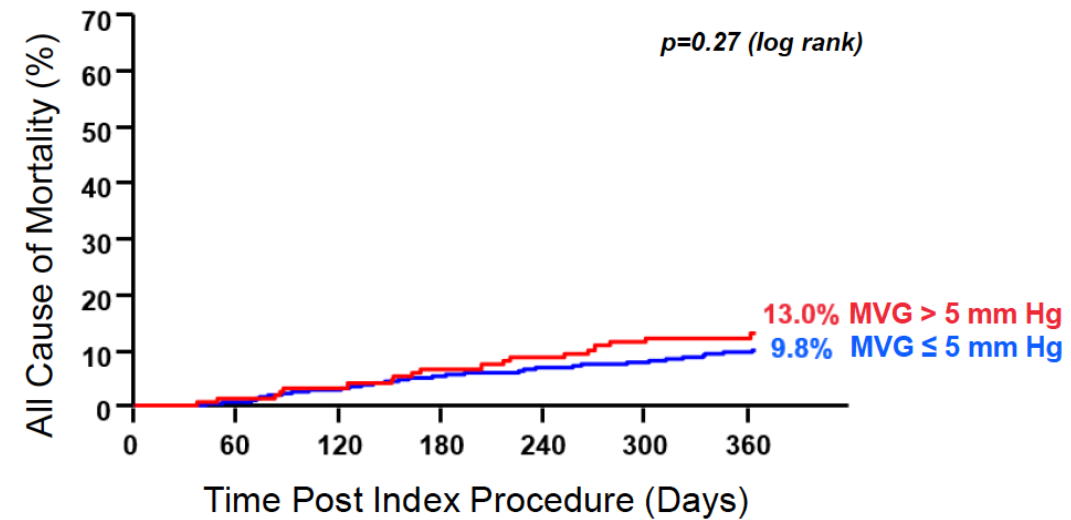
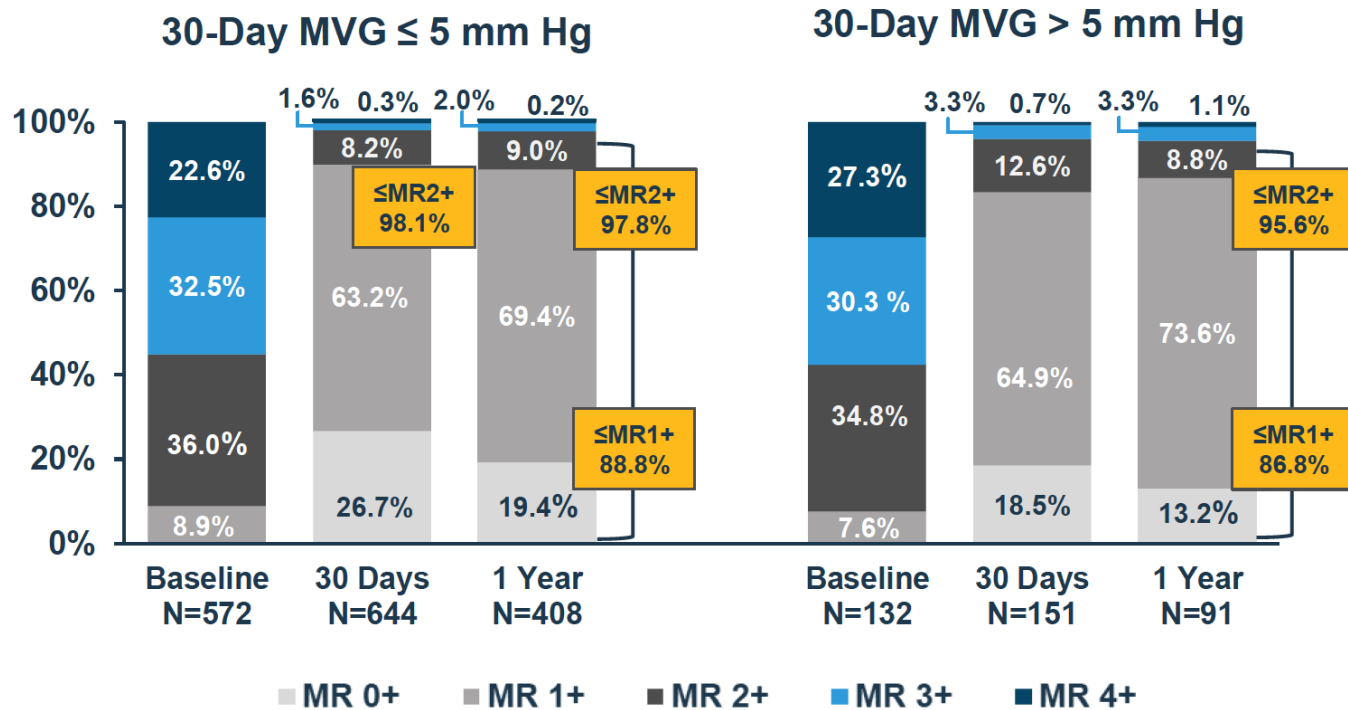


- Group 1: MVG Q1-Q3 and MR < moderate
- - - Group 2: MVG Q4 and MR < moderate
- Group 3: MVG Q1-Q3 and MR \geq moderate
- - - Group 4: MVG Q4 and MR \geq moderate

Impact of MVG on All Cause Mortality: The EXPAND registry

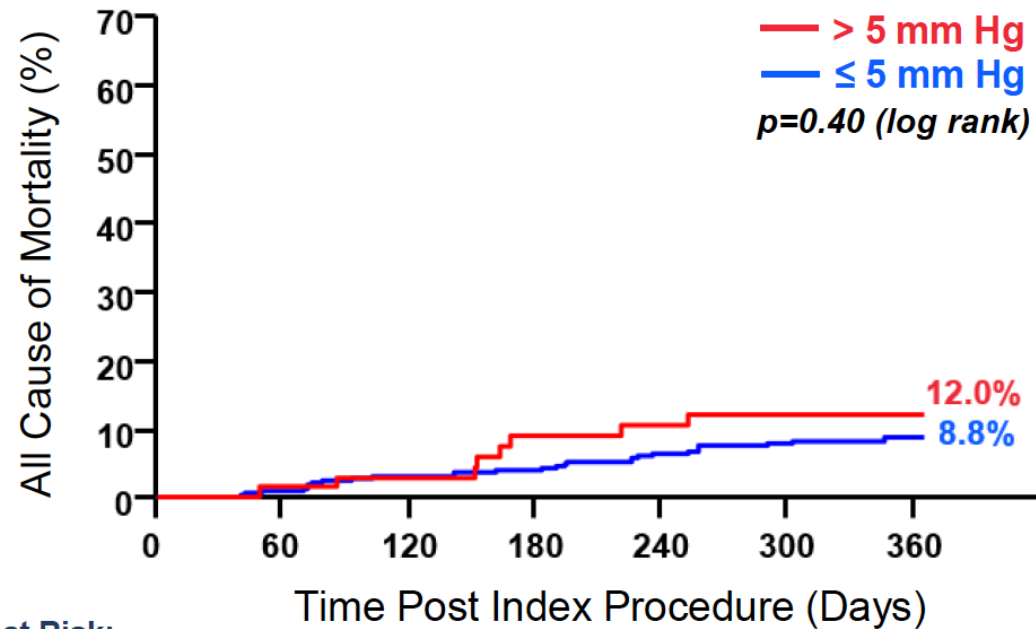
Global EXPAND Study: 803 subjects, 81% with 30d MVG \leq 5 mmHg

ECL Adjudicated MR Severity



Impact of MVG on All Cause Mortality by Etiology: The EXPAND registry

Primary MR



at Risk:

MVG ≤ 5 mm Hg	275	275	264	184
MVG > 5 mm Hg	67	67	61	41

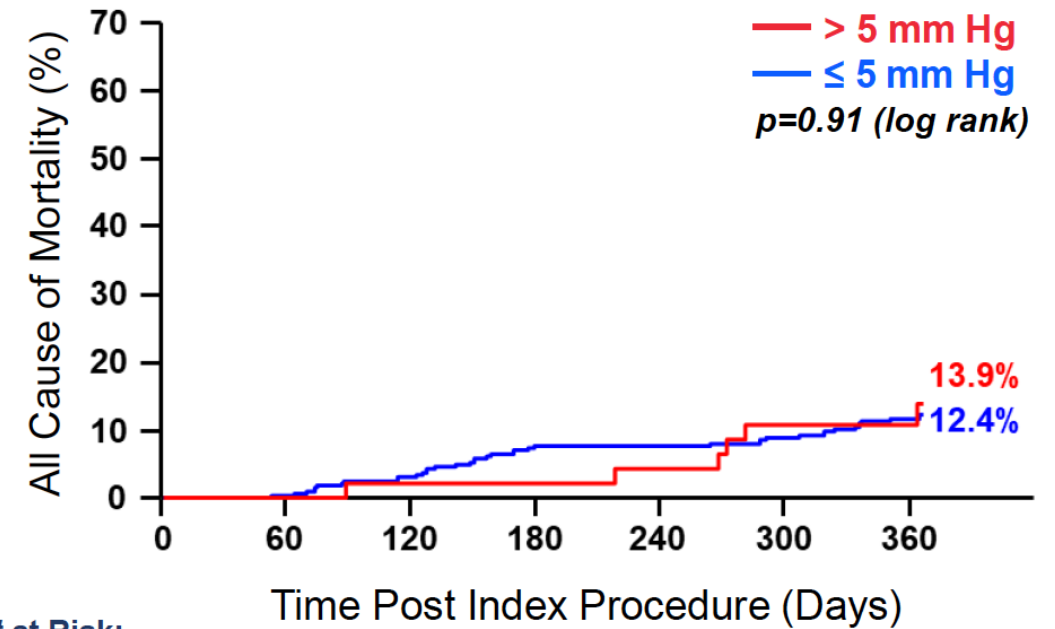
264

184

61

41

Secondary MR



at Risk:

MVG ≤ 5 mm Hg	264	264	235	152
MVG > 5 mm Hg	47	47	46	25

235

152

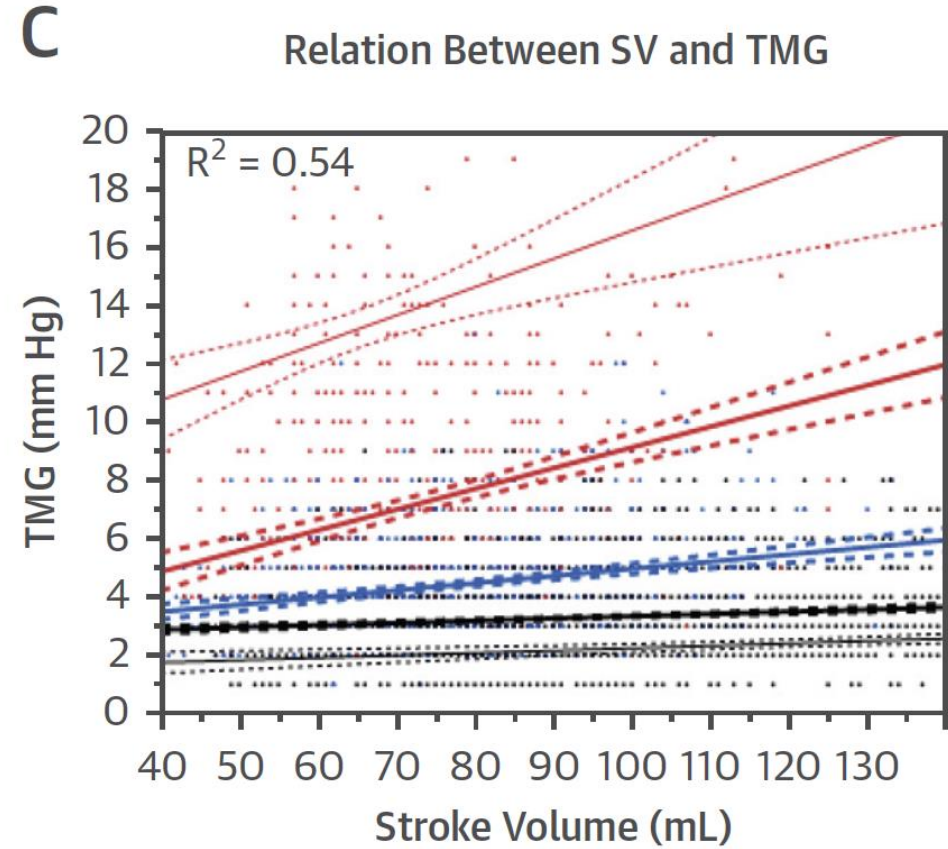
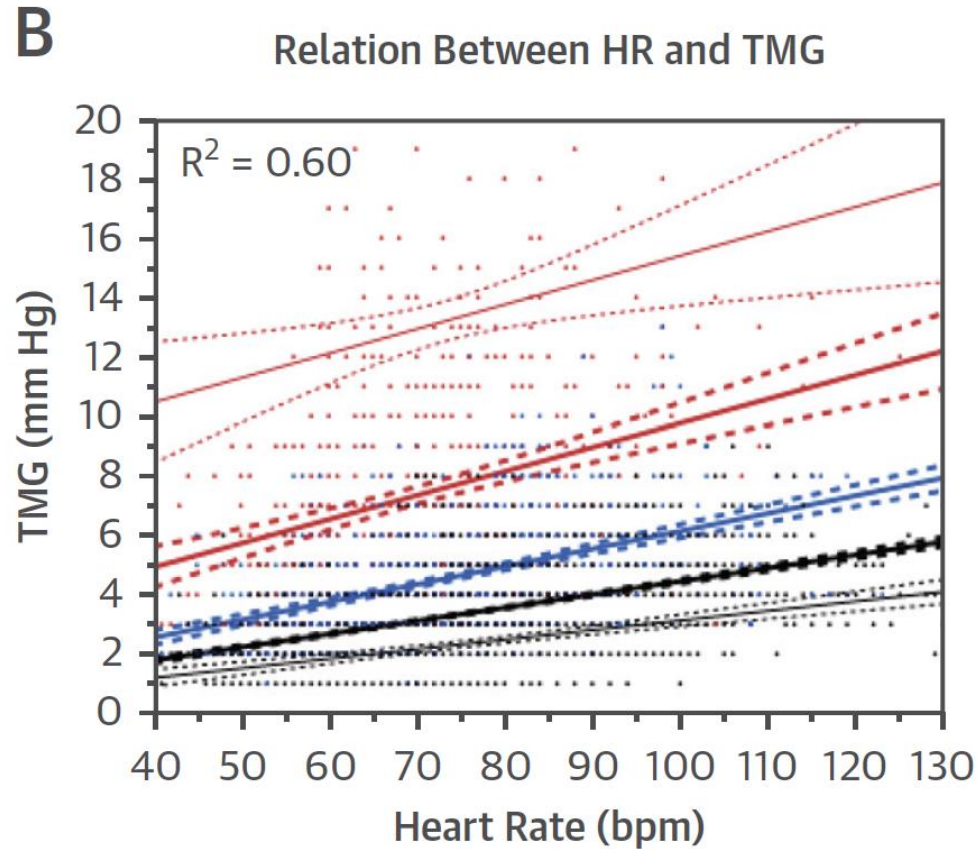
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30-Day MVG has NO significant impact on mortality in PMR and SMR.

Effect of heart rate and stroke volume on TMPG and Doppler measurements of MVA

4,973 patients with isolated rheumatic MS

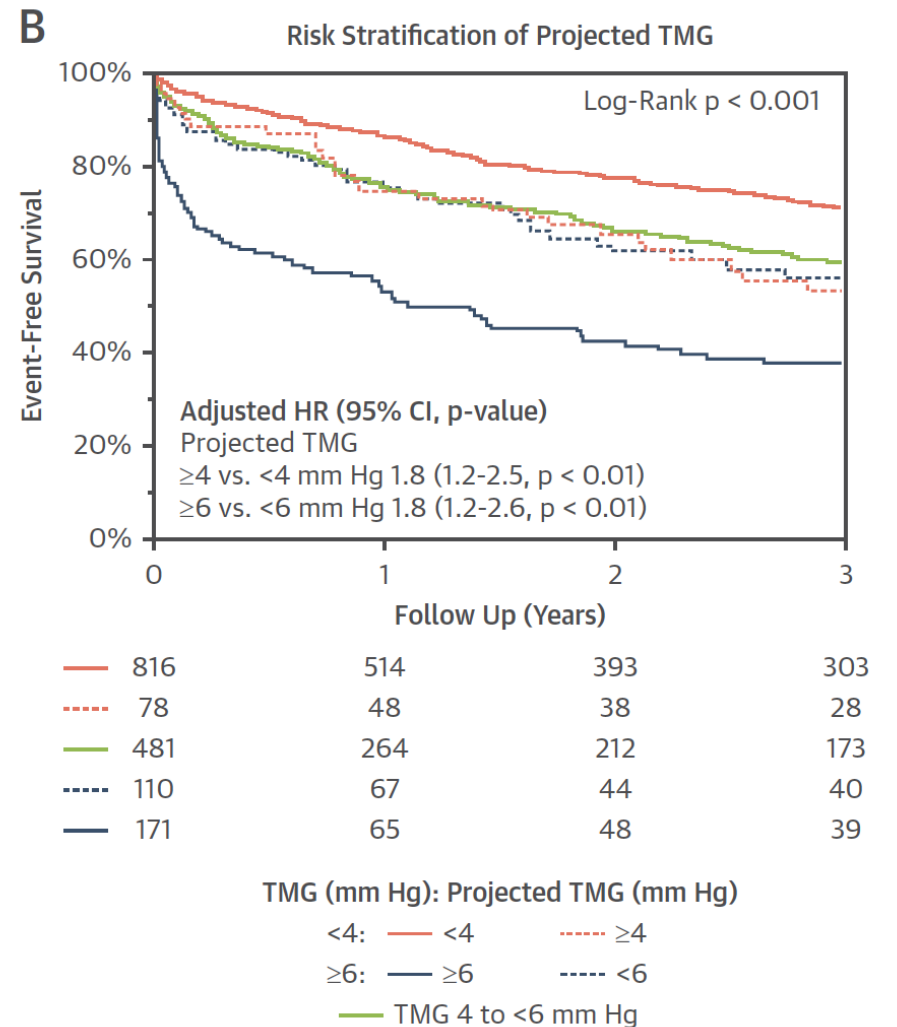
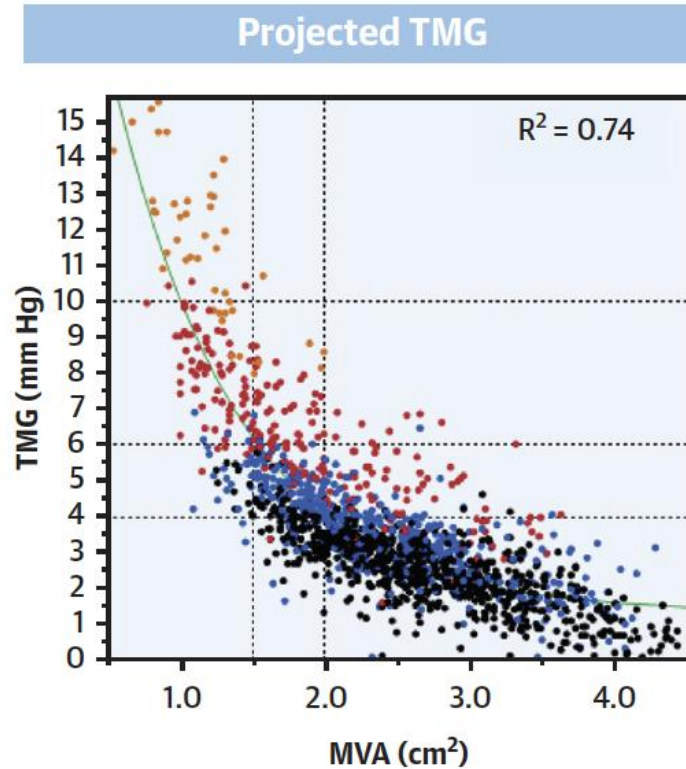
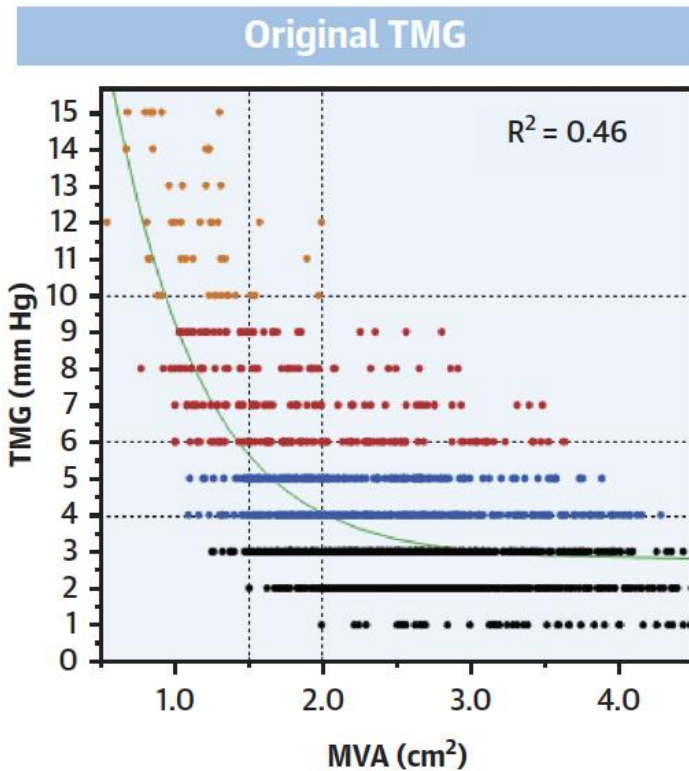


MVA (cm²)

..... ≤1.0 - - - - >1.0-1.5 - - - - >1.5-2.0 - - - - >2.0-4.0 >4.0

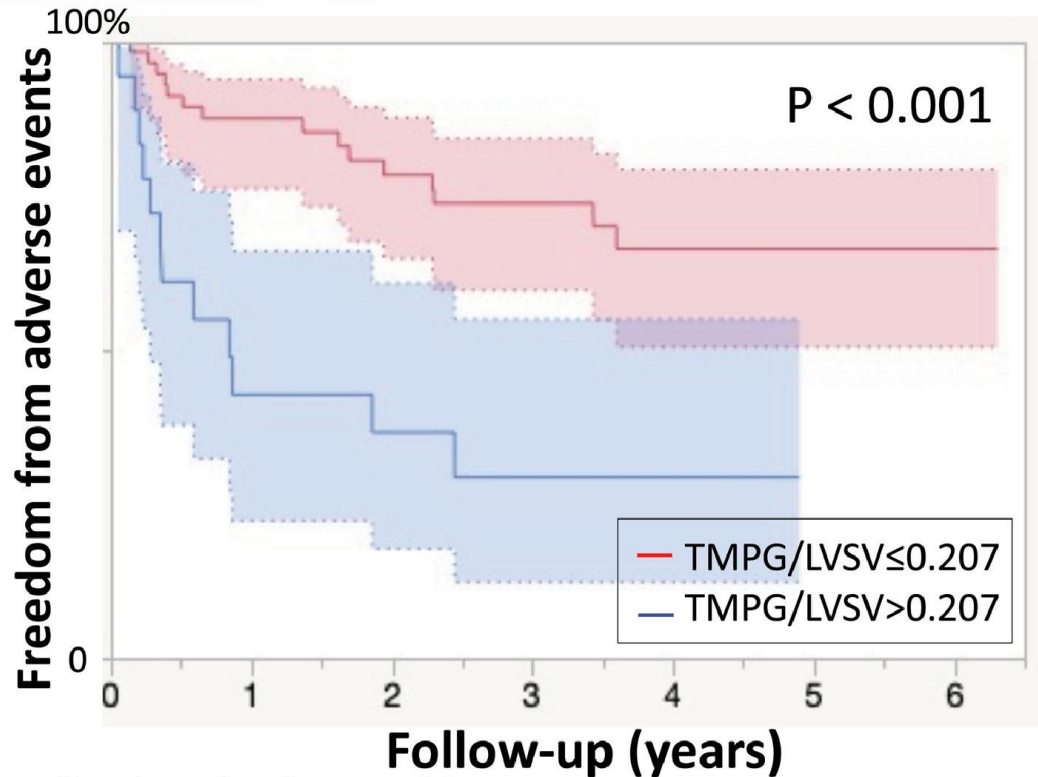
Concordance Between MVA and TMG

$$\text{Projected TMG} = \text{TMG} - 0.07 * (\text{HR-70})$$



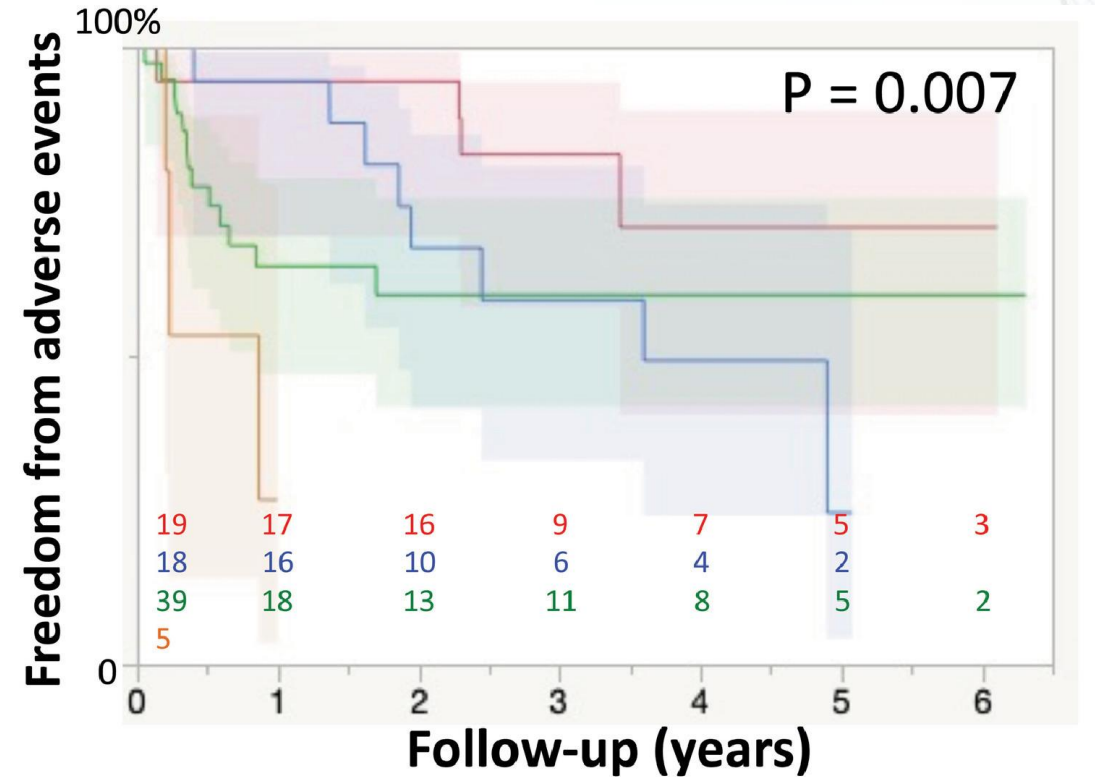
Clinical Impact of Flow Adjusted MVG After Surgical Annuloplasty for FMR

84 patients underwent mitral annuloplasty for ischemic FMR at the Sakakibara Heart Institute of Okayama, Japan



Number of patients at risk

FMS (-)	61	45	34	23	16	11	4
FMS (+)	20	7	6	4	3		



- Normal flow/Low gradient
- Normal flow/High gradient
- Low flow/Low gradient
- Low flow/High gradient

*normal group, LVSV index >35 mL/m² and TMPG <10 mm Hg

Hemodynamic Profiles and Clinical Response to Transcatheter Mitral Repair

378 patients underwent MitraClip, 83% primary MR

<p>"Optimal" Type I</p> <p>Residual MR ≤ 1 and mLAP ≤ 15 mm Hg (n = 148)</p>	<p>"Mixed" Type II</p> <p>Residual MR > 1 or mLAP > 15 mm Hg (n = 187)</p>	<p>"Poor" Type III</p> <p>Residual MR > 1 and mLAP > 15 mm Hg (n = 43)</p>
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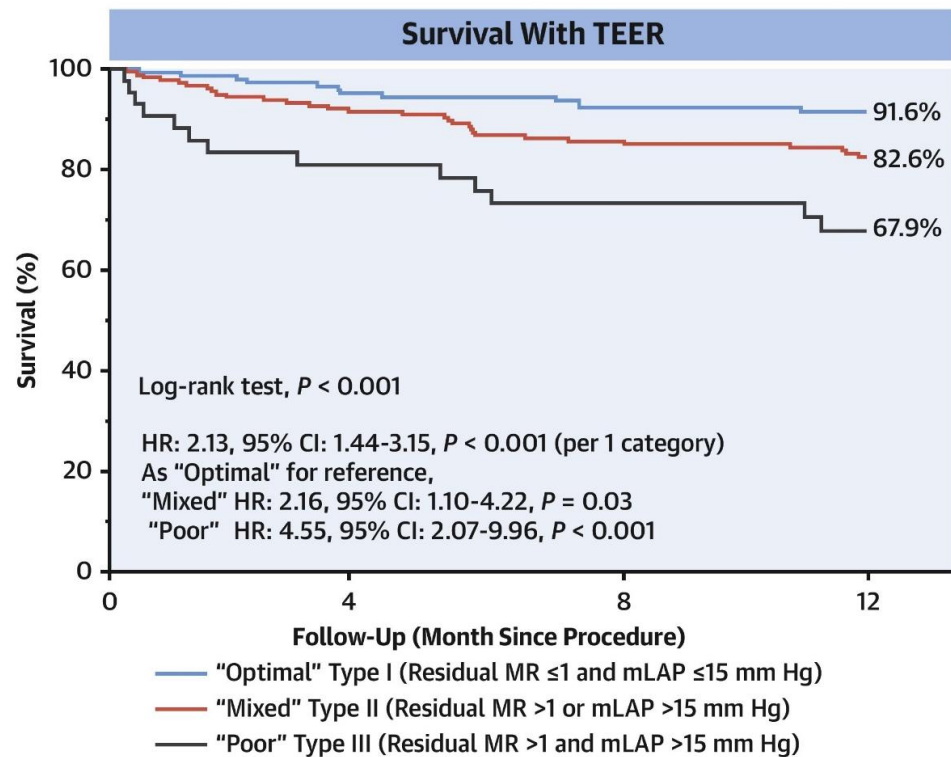
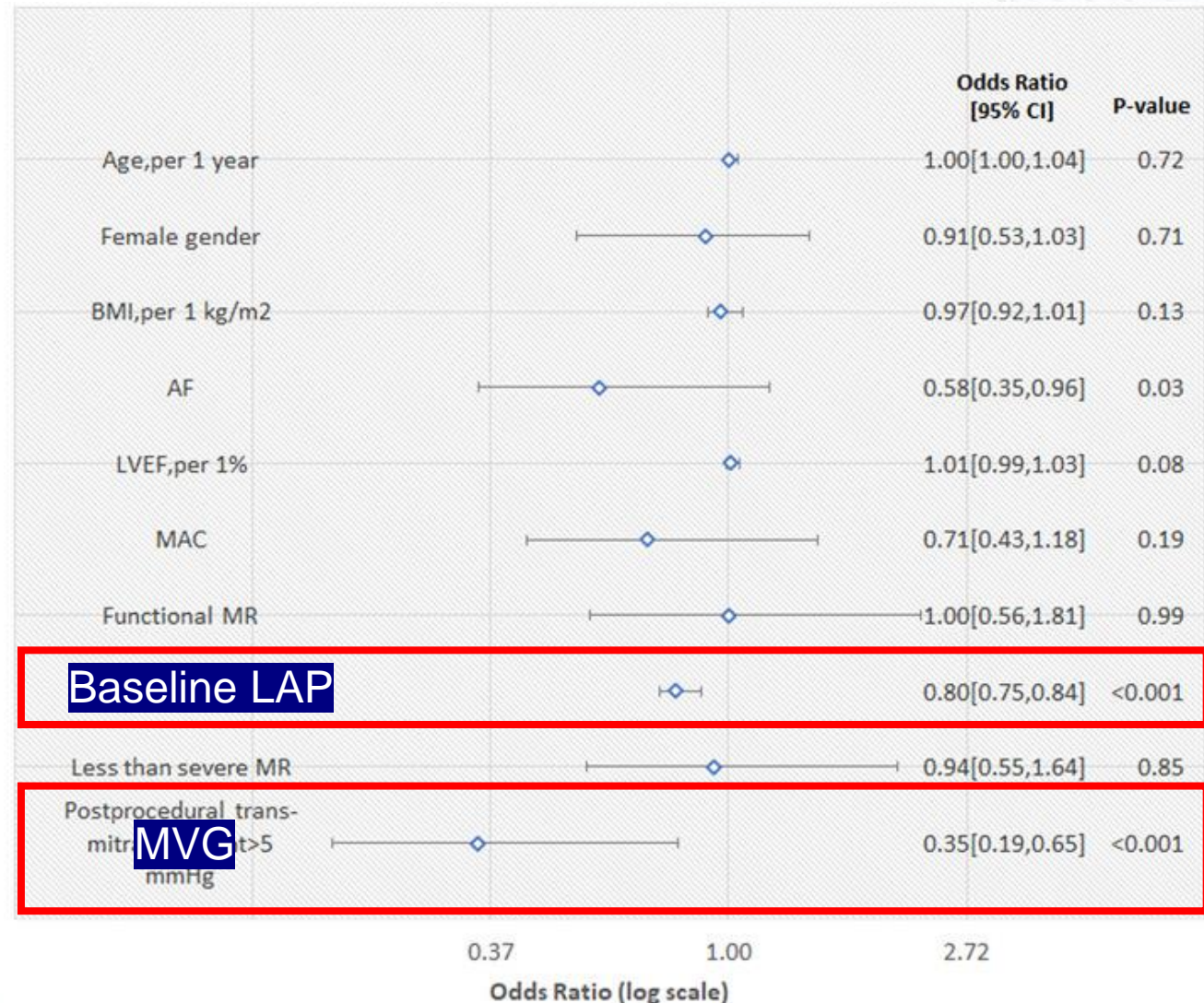
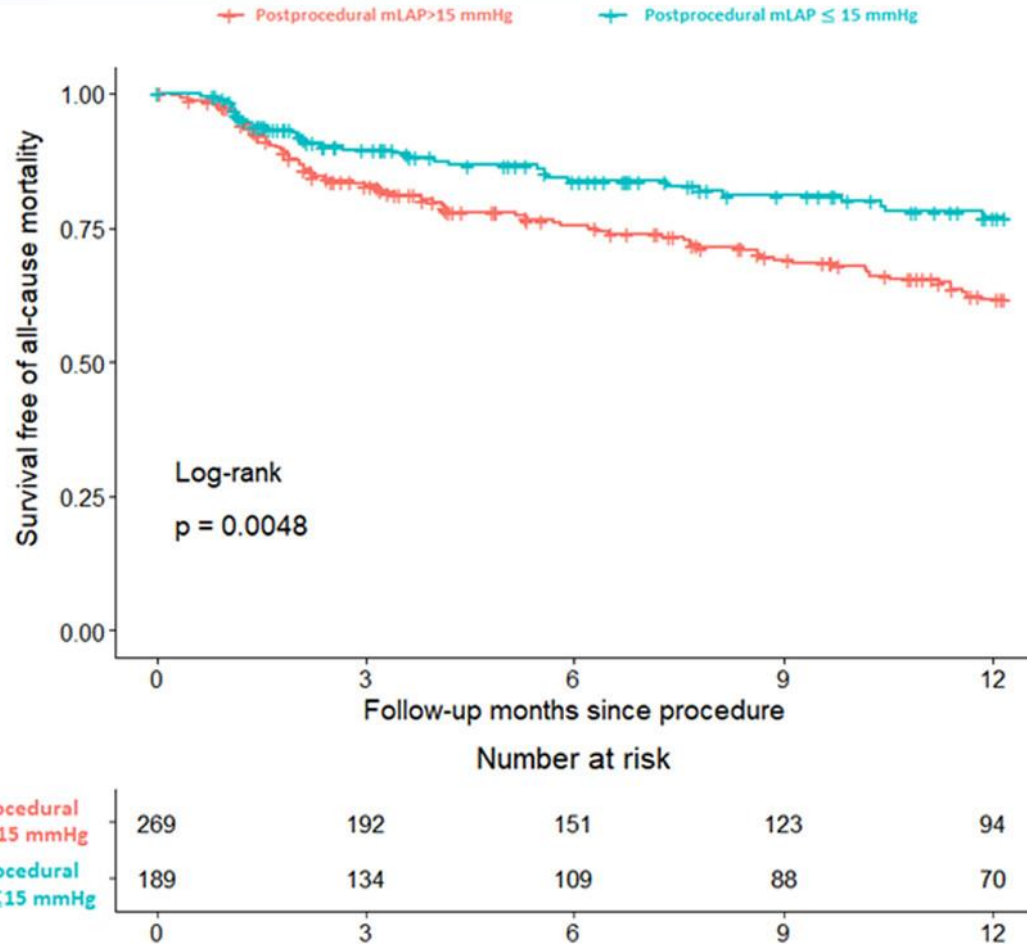


TABLE 4 Predictors of All-Cause Mortality in 1 Year

	Multivariable Results			
	OR	95% CI	P Value	
Age (per 1 y)				
Female				
Moderate or severe TR	TR	2.02	1.09-3.76	0.03
LVEF (per 1%)				
Primary MR				
Baseline mLAP (per 1 mm Hg)				
Baseline LAP V-wave (per 1 mm Hg)				
Baseline mitral valve area (per 1 cm ²)				
Postprocedural mLAP (per 1 mm Hg)				
Postprocedural LAP V-wave (per 1 mm Hg)				
In mLAP (per 1 mm Hg)				
In LAP V-wave (per 1 mm Hg)				
Postprocedural mean mitral gradient (per 1 mm Hg)	MVG			
Residual MR grade (per 1 grade)				
Hemodynamic profile (per increasing type)		1.92	1.21-3.05	0.006

Predictors of hemodynamic response to mitral TEER

41.2% achieved an optimal hemodynamic response (defined as LAP ≤ 15 mmHg)



Conclusion

- Post-TEER MVG may not correlate with the clinical outcomes in the modern era while $\leq 2+$ MR is achieved in more than 95% cases.
- Inotropic agents, blood pressure, and heart rate may affect MVG.
- Better is the enemy of the best.
 - Trivial MR is perfect; Mild MR is excellent; No PV flow reversal is good enough for an elder patient.

Pressure Gradient and Clinical Outcome After MitraClip for Severe MR



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