



EuroValve 2016

Challenges in the management Secondary MR

Guidelines in perspective?

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European Heart Journal 2012 - doi:10.1093/eurheartj/ehs109 &
European Journal of Cardio-Thoracic Surgery 2012 -
doi:10.1093/ejcts/ezs455).

www.escardio.org/guidelines



Conflict of Interest Disclosure

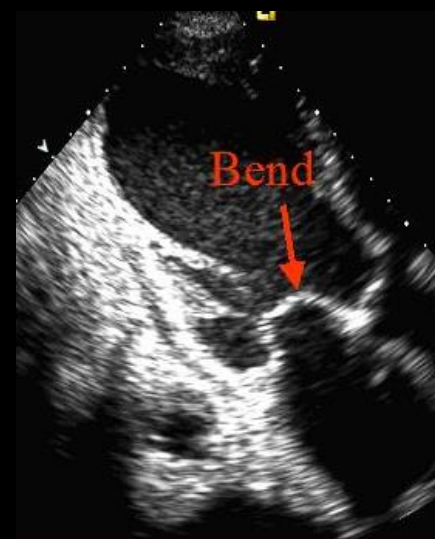
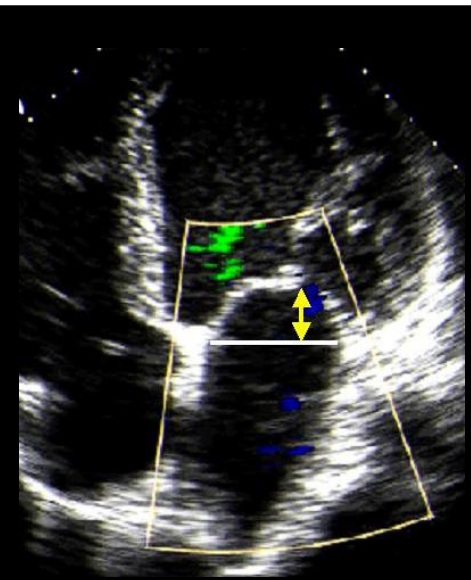
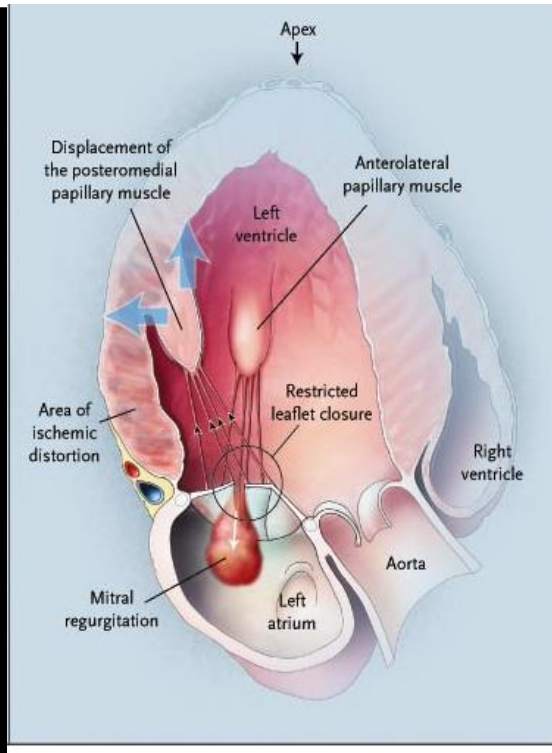
None

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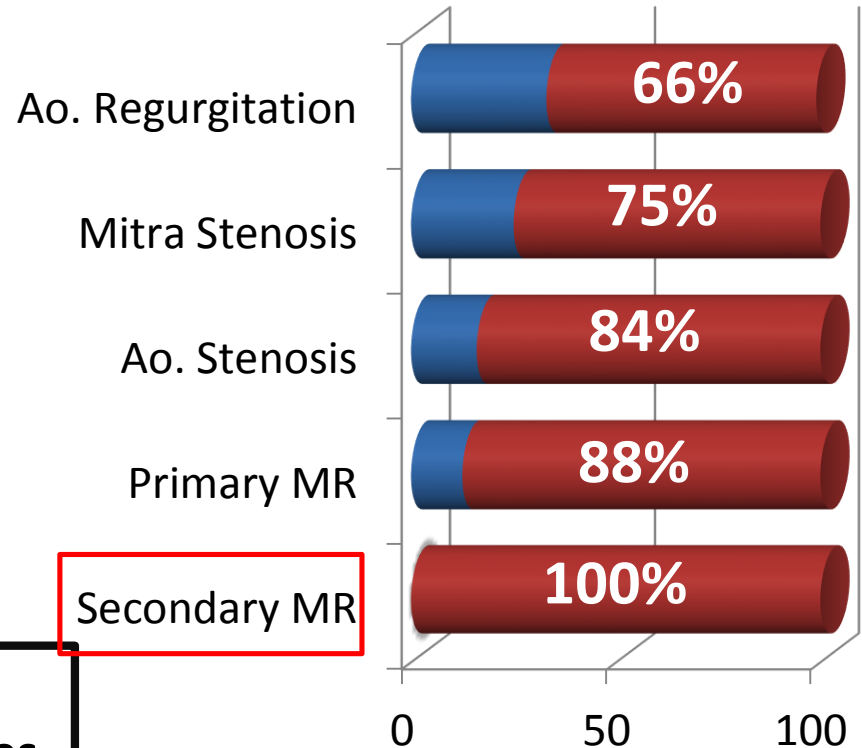
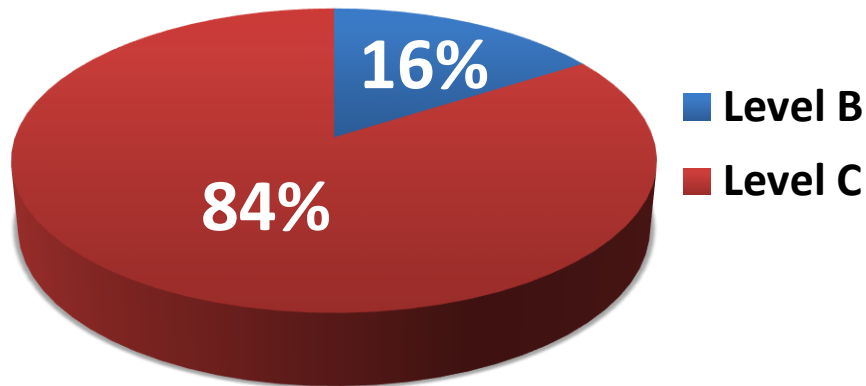


Secondary MR



Level of Evidence in Valvular Heart Disease ESC Guidelines

Indication for Surgery

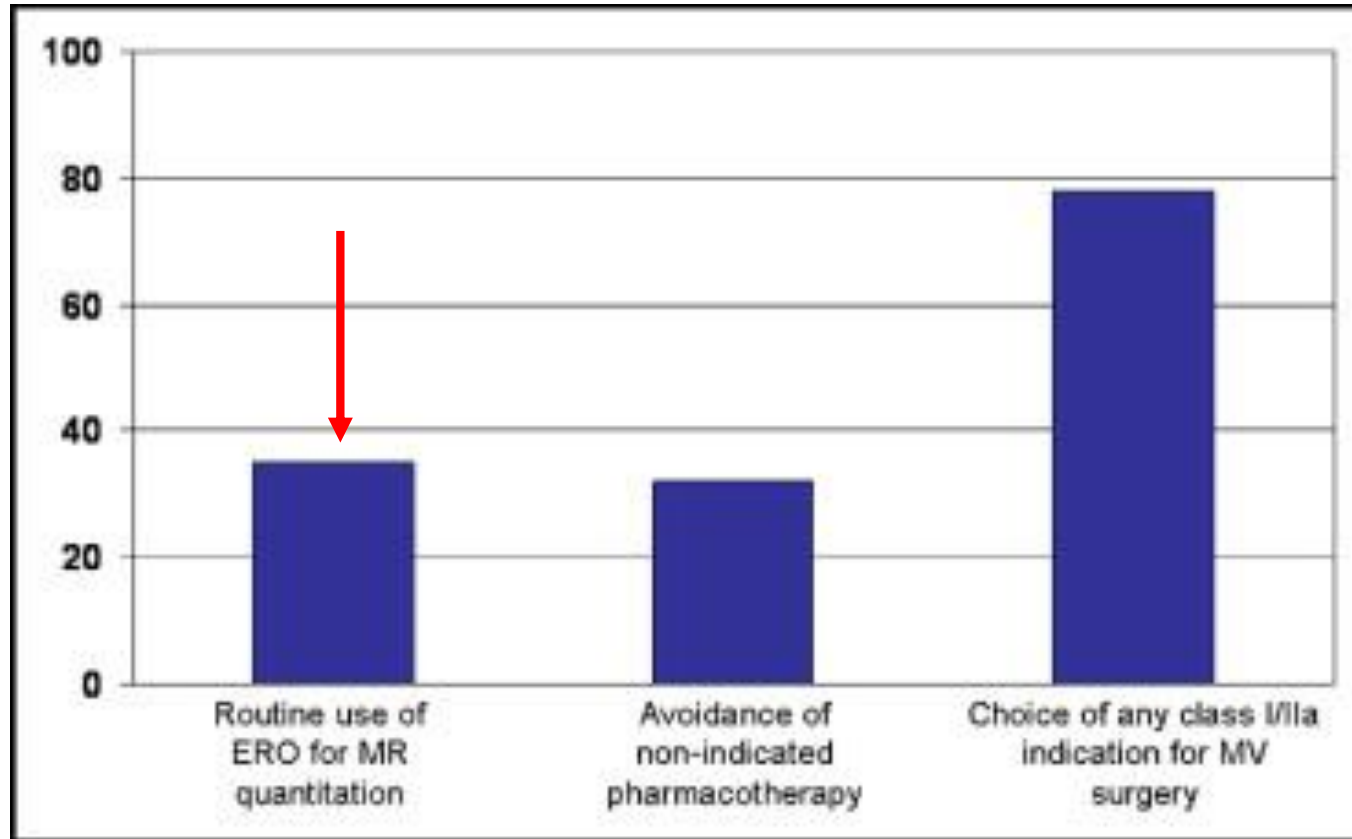


Evidence C: Consensus of opinion and/or small studies, retrospective studies, registries

Indications for mitral valve surgery in secondary mitral regurgitation

	Class	Level
Surgery is indicated in patients with severe MR undergoing CABG, and LVEF > 30%.	I	C
Surgery should be considered in patients with moderate MR undergoing CABG.	IIa	C
Surgery should be considered in symptomatic patients with severe MR, LVEF < 30%, option for revascularization, and evidence of viability.	IIa	C
Surgery may be considered in patients with severe MR, LVEF > 30%, who remain symptomatic despite optimal medical management (including CRT if indicated) and have low comorbidity, when revascularization is not indicated.	IIb	C

MR is unfrequently quantified

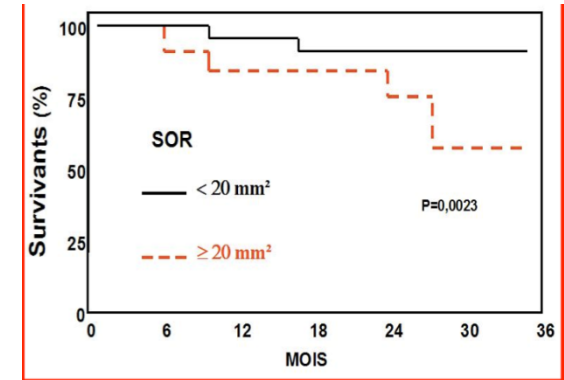


Grading the severity of ischaemic MR: integration of multiple parameters

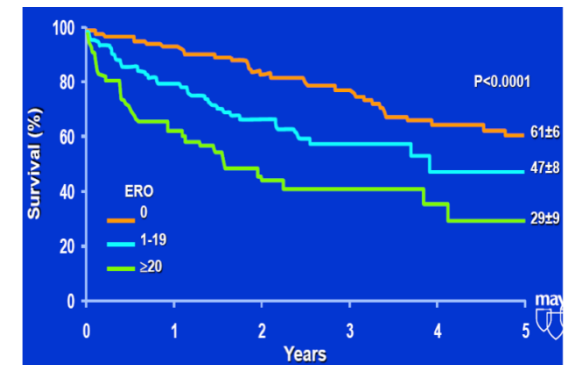
- Colour Doppler jet is inaccurate
- Large FC zone at Niquist limit of 50-60 cm/s
- VC width > 8 mm (biplane)
- E wave > 1.5 m/s
- TVI Mit/TVI Ao > 1.4
- EROA > 0.2 cm² ?
- R Vol > 30 mL ?
- Regurgitant fraction > 50%

Echocardiographic criteria for the definition of severe MR: an integrative approach

Parameters	Severe
<p>Quantitative</p> <p>EROA (mm²)</p> <p>R Vol (ml)</p>	<p>≥ 20 for secondary</p> <p>≥ 30 for secondary</p>

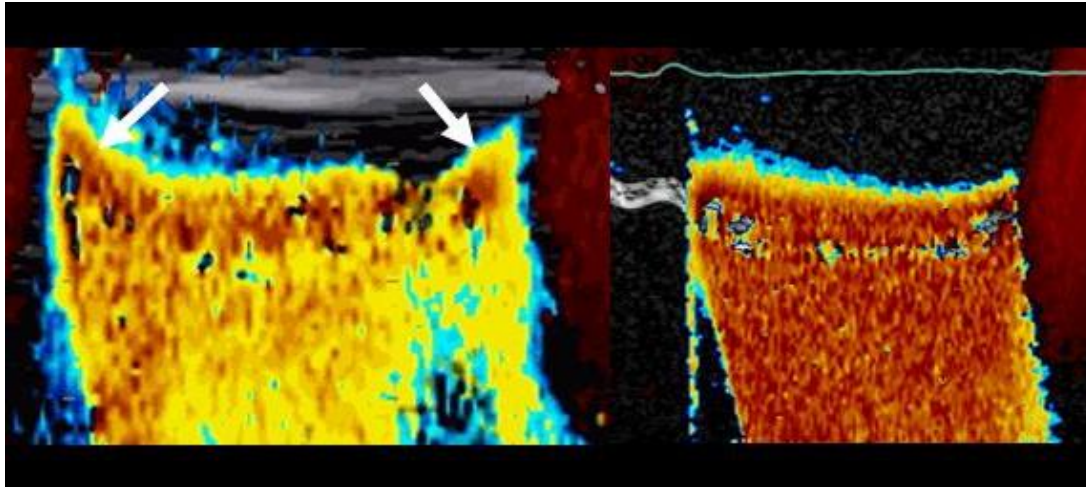


Lancellotti, Pierard Circulation 2003 108

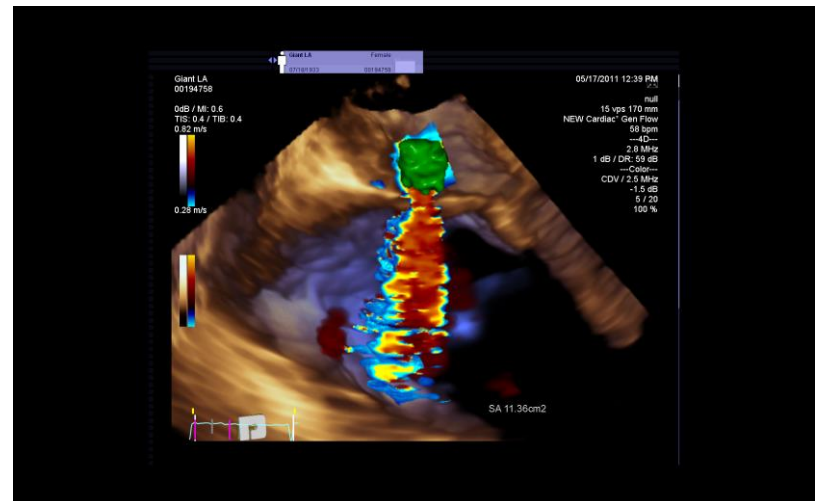
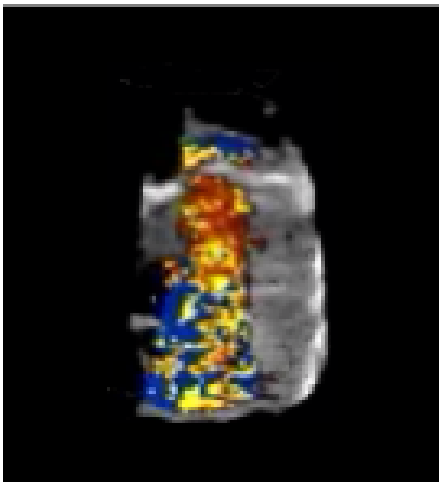
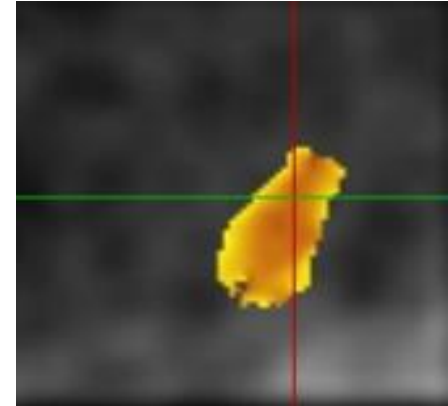


Grigioni, Sarano Circulation 2001 103

Potential pitfalls



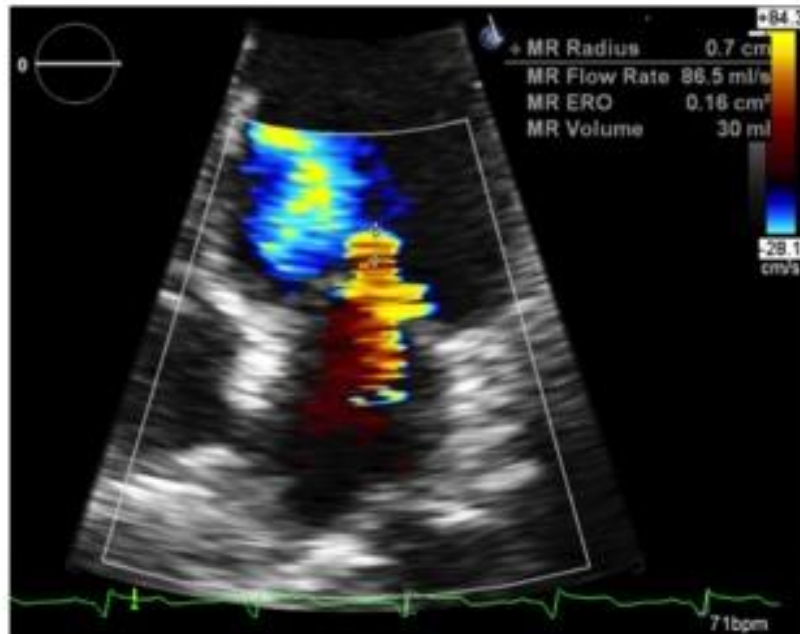
Hemielliptic



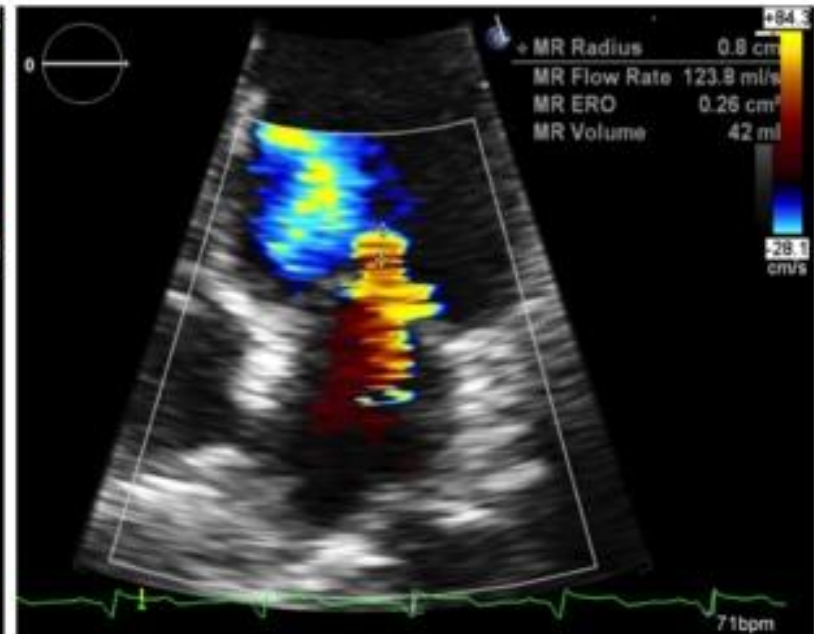
Limitations of the PISA Method

- Assumes a hemispheric jet
- Regurgitant orifice is usually crescent shape
- Flow convergence shape is difficult to judge
- Shape affected by aliasing velocity
- Errors in measurement are squared
- Regurgitation flow changes during systole
- Interobserver variability
- Not valid for multiple jets

Moderate or Severe MR ?

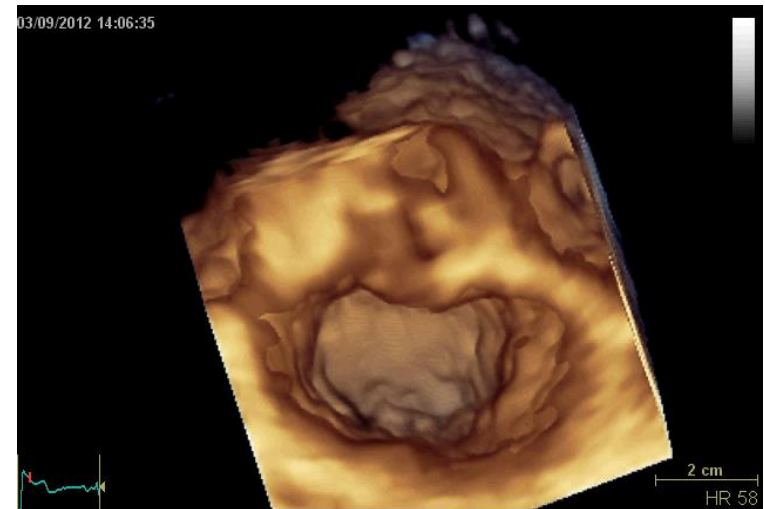
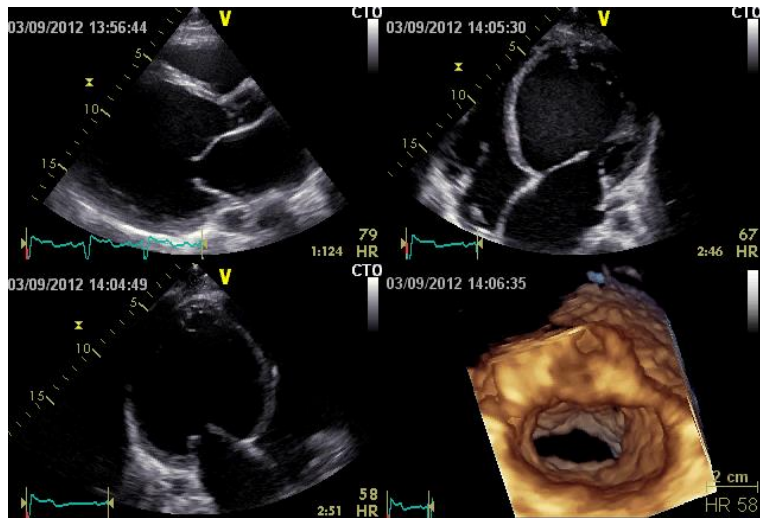


PISA radius = 7 mm
EROA = 0.16 cm²
R Vol = 30 mL



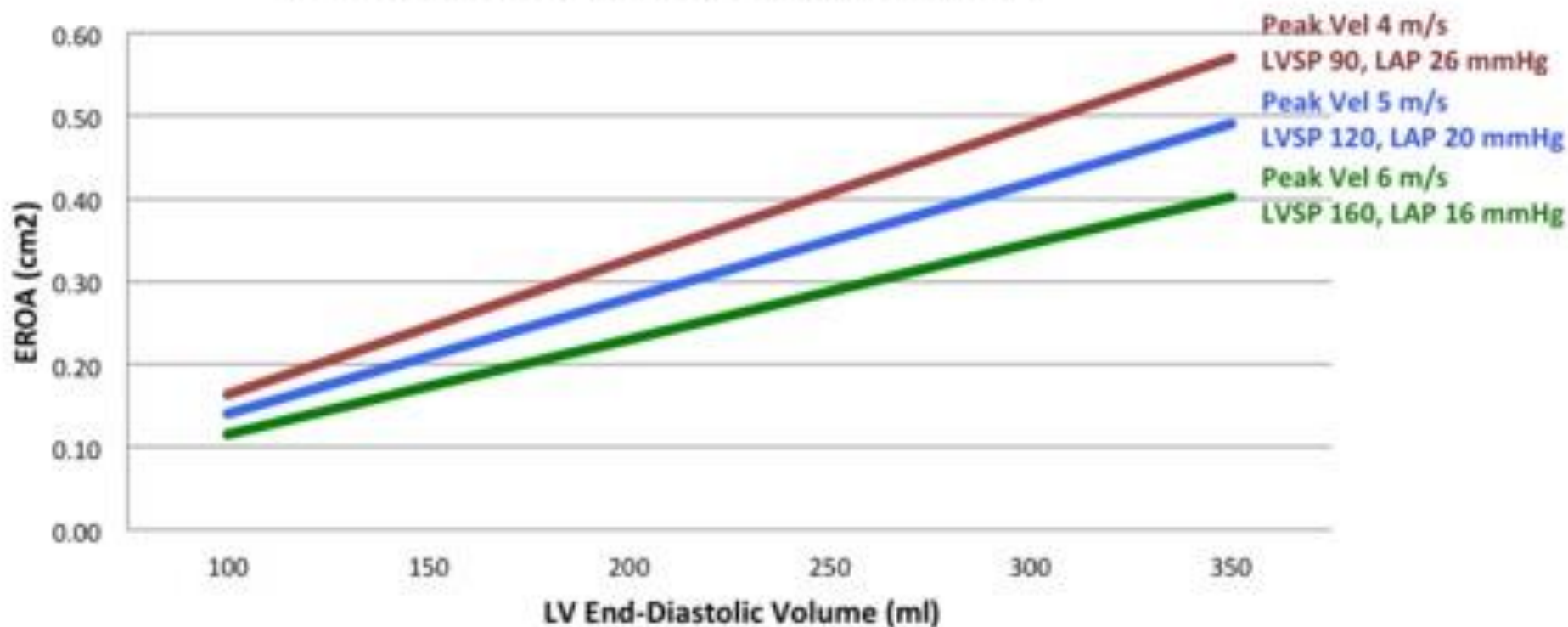
PISA radius = 8 mm
EROA = 0.26 cm²
R Vol = 42 mL

3D parameters: which cut-offs?

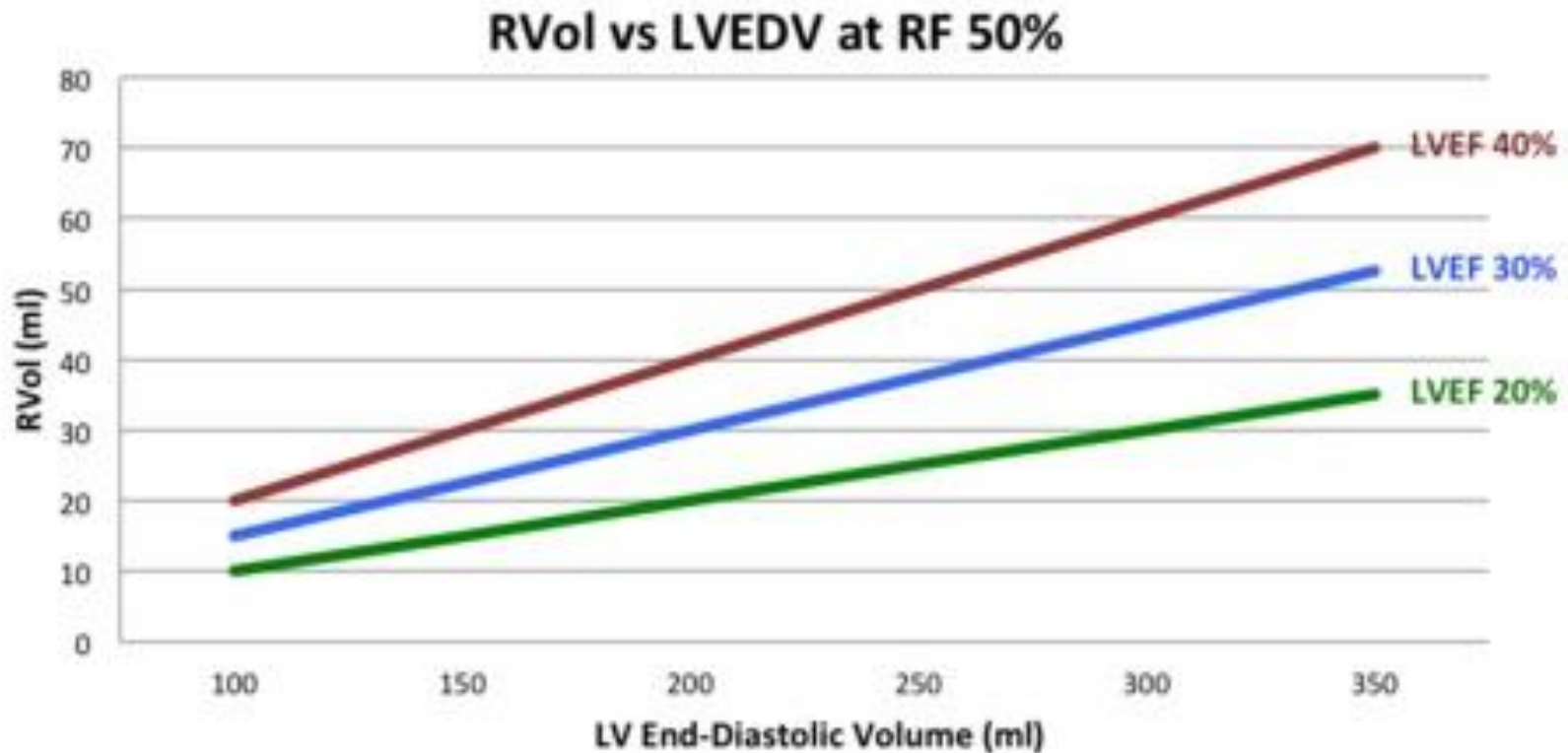


Gorlin hydraulic orifice equation

EROA vs LVEDV at LVEF 30%, RF 50%

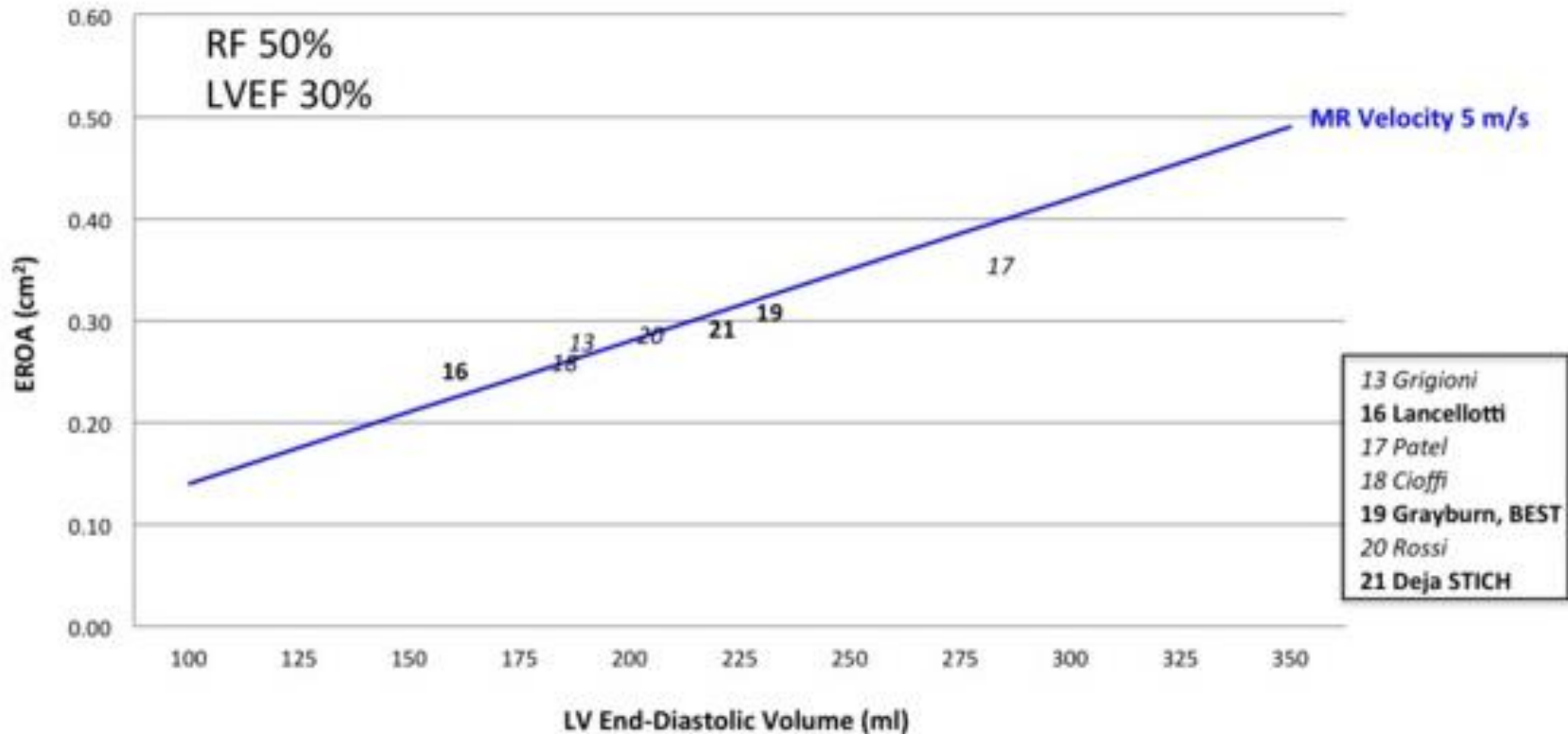


Gorlin hydraulic orifice equation



MR severity

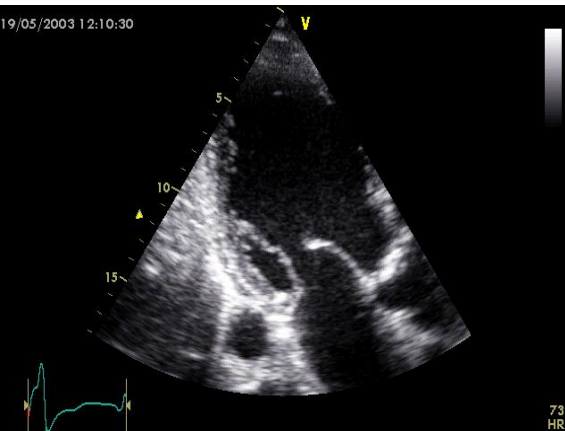
EROA should be indexed to LVEDV



X – LVEDV values given in paper

Y – LVEDV not given in paper, calculated from LVEDD or LVEDVI (Cioffi)

The conundrum of treatment



Medical
CRT

CABG or PCI

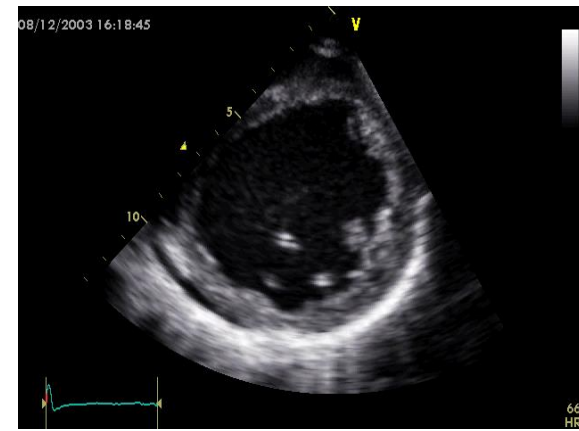
Combined surgery

Surgical MV repair

Surgical MV replacement

MitraClip

TMVI?



Surgical Treatment Options



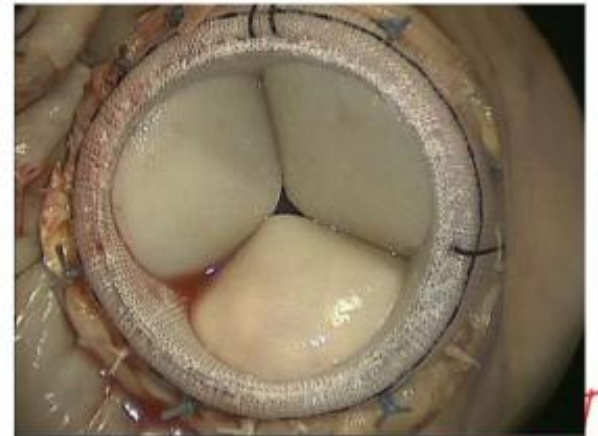
CABG

+

MV Repair



MV Replacement



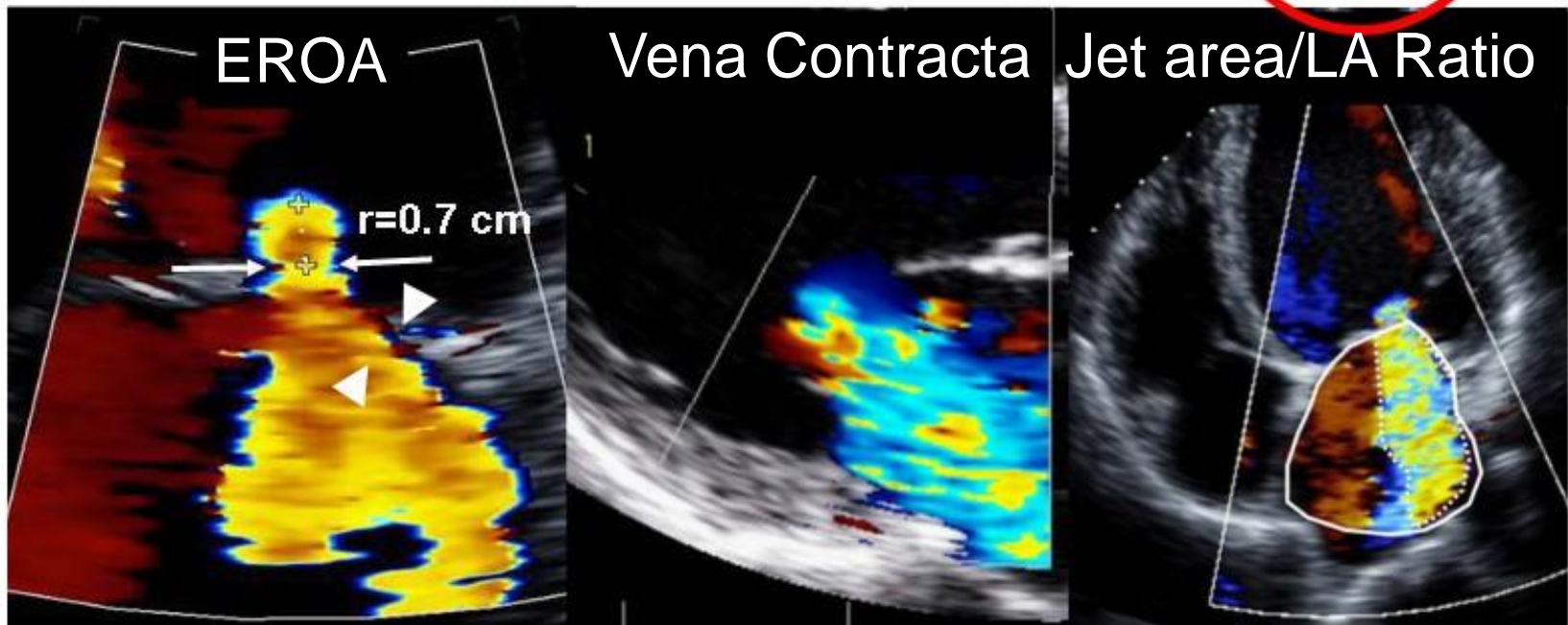
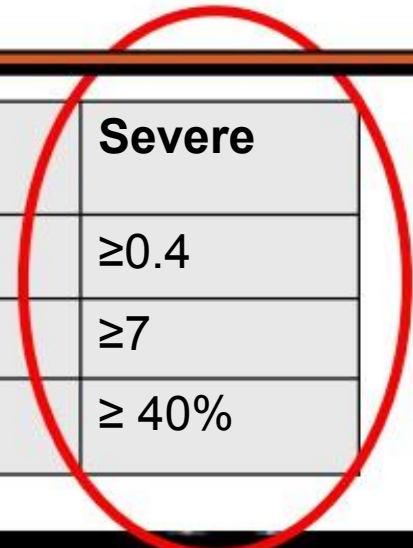
ORIGINAL ARTICLE

Two-Year Outcomes of Surgical Treatment of Severe Ischemic Mitral Regurgitation

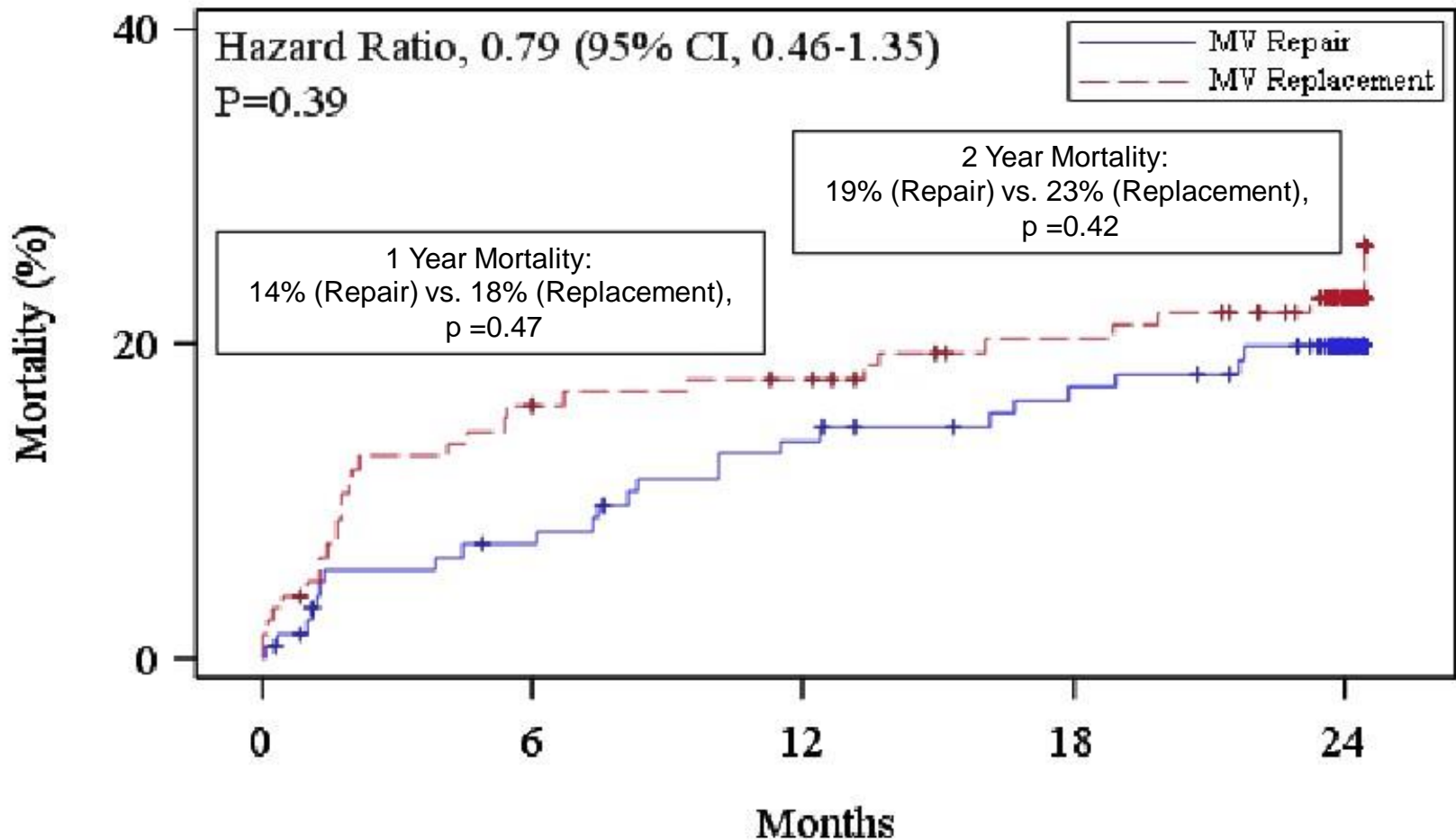
D. Goldstein, A.J. Moskowitz, A.C. Gelijns, G. Ailawadi, M.K. Parides, L.P. Perrault, J.W. Hung, P. Voisine, F. Dagenais, A.M. Gillinov, V. Thourani, M. Argenziano, J.S. Gammie, M. Mack, P. Demers, P. Atluri, E.A. Rose, K. O'Sullivan, D.L. Williams, E. Bagiella, R.E. Michler, R.D. Weisel, M.A. Miller, N.L. Geller, W.C. Taddei-Peters, P.K. Smith, E. Moquete, J.R. Overbey, I.L. Kron, P.T. O'Gara, and M.A. Acker, for the CTSN*

Integrative Method of MR Grading

Parameter	Mild	Moderate	Severe
EROA(cm ²)	<0.2	0.2 - 0.39	≥0.4
VC width (mm)	<3	3 - 6.9	≥7
Jet/LA area	<20%	20-39%	≥ 40%

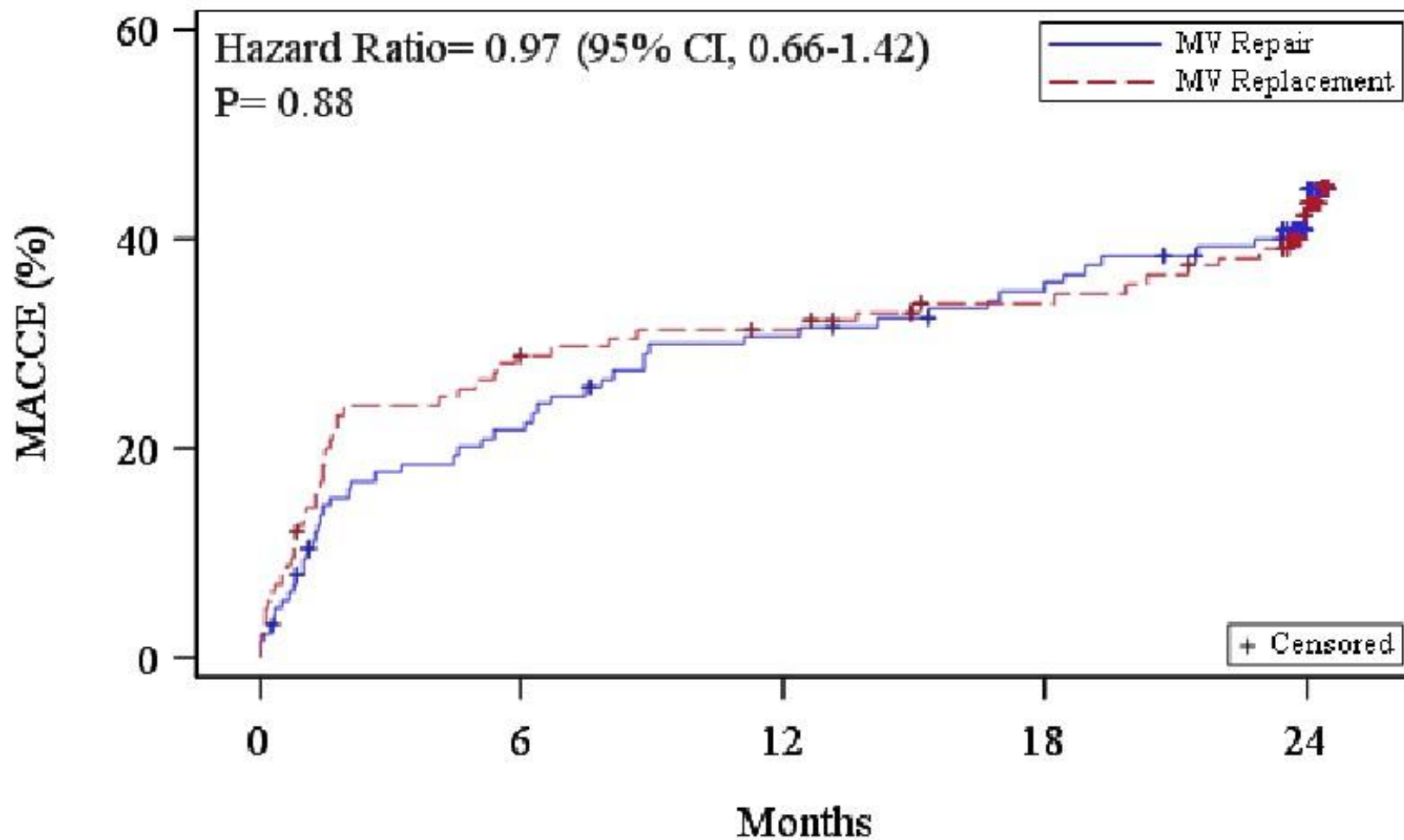


Mortality



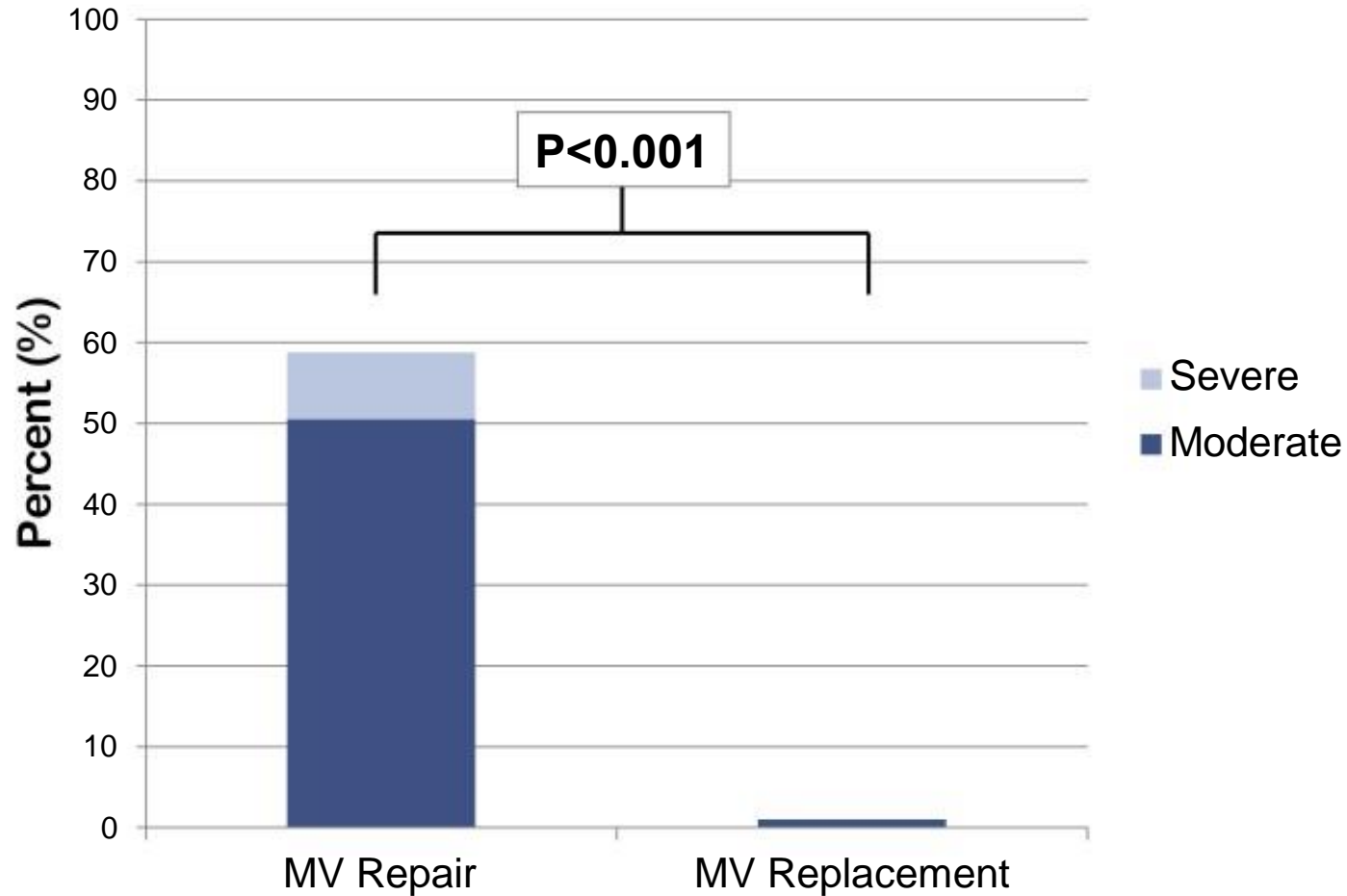
MV Repair	126	113	104	97	64
MV Replacement	125	103	100	92	65

MACCE



MV Repair	126	96	84	77	48
MV Replacement	125	87	83	76	50

MR Recurrence (\geq moderate)



Limitations

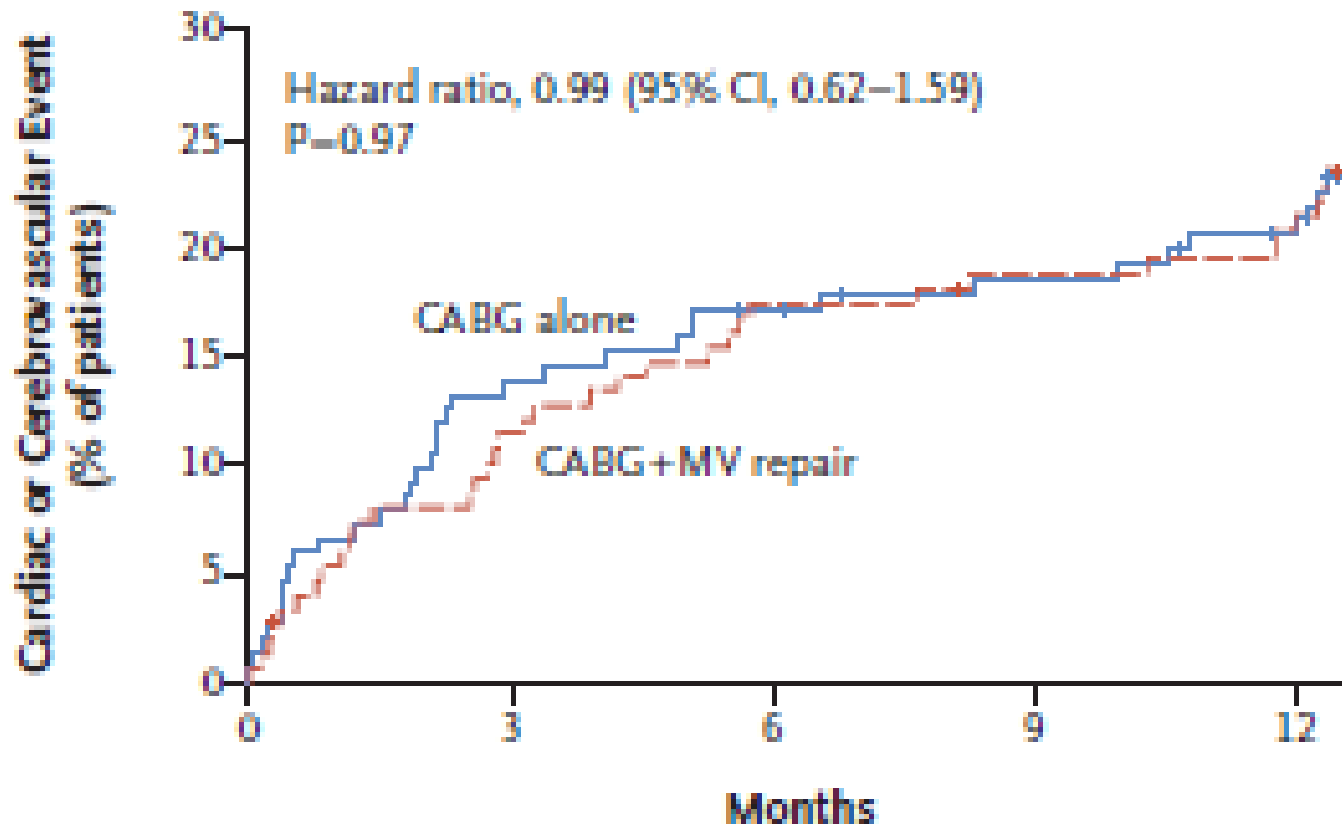
- Tethering was required but simple ring for all repairs
 - Comprehensive imaging to tailor intervention with more complex repair
- Severe MR was defined as $ERO > 40 \text{ mm}^2$
 - Many pts with massive MR, ratio jet area/LA area was used (no longer recommended)
- If no recurrent MR after repair: $\downarrow 22.6\%$ in LV volume vs 6.8%
 - Recurrent MR after repair could be treated with MitraClip

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Combined surgery in moderate MR?

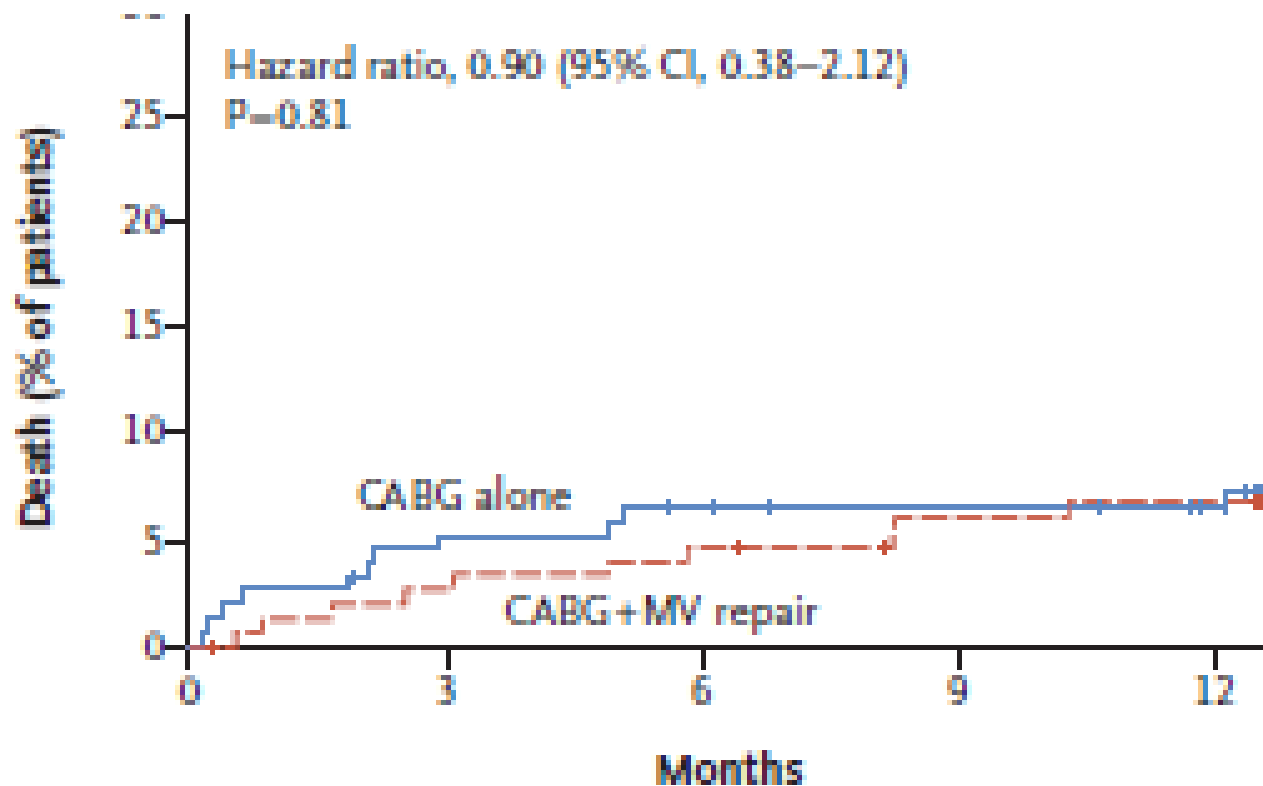
- 301 pts with moderate IMR randomly assigned to CABG alone or CABG + MV repair
- Primary end-point: LVESVI
- Mean change from baseline
 - - 9.4 mL: CABG alone
 - - 9.3 mL: in the combined procedure
- Rate of death
 - 7.3%: CABG alone
 - 6.7%: combined procedure
- Addition of MV repair: longer bypass time, longer hospital stay, more neurological events
- Moderate or severe MR less common in the combined group
 - 31%: CABG alone
 - 11.2%: combined procedure (P<0.001)



No. at Risk

CABG alone	151	130	124	120	114
CABG+MV repair	150	132	123	120	116

Smith et al N Engl J Med 2014;371:2178-88



No. at Risk

CABG alone	151	142	139	137	134
CABG+MV repair	150	145	142	138	137

Smith et al N Engl J Med 2014;371:2178-88

Limitations

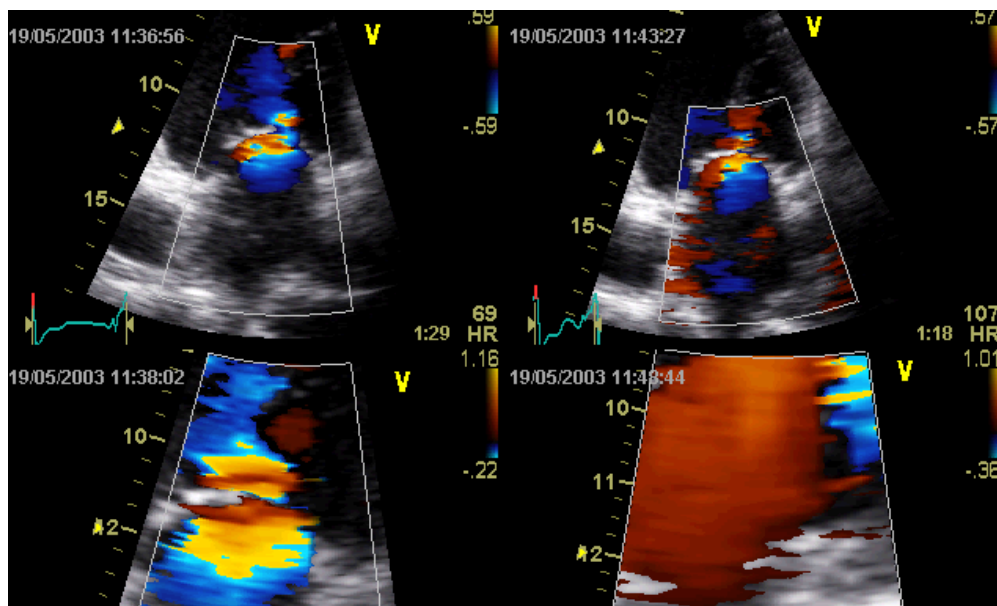
- LVESV lower than assumed
 - $ERO \geq 0.2 \text{ cm}^2$ represents severe, not moderate MR
- No measurements of valve-tethering forces
 - TA, coaptation point, angle predict unfavorable results
- No assessment of viability
 - Benefit of MV repair only when scarred myocardium
- Only measures at rest were evaluated
 - IMR is dynamic, exercise capacity was not evaluated
- Interventions should be anatomically based
 - Simple ring, secondary chord lysis, papillary muscle approximation, leaflet augmentation, valve replacement

Indications for mitral valve surgery in secondary mitral regurgitation

Surgery should be considered in patients with moderate MR undergoing CABG		
Exercise echo is recommended to identify dyspnea, increase in severity of MR and SPAP	IIa	C

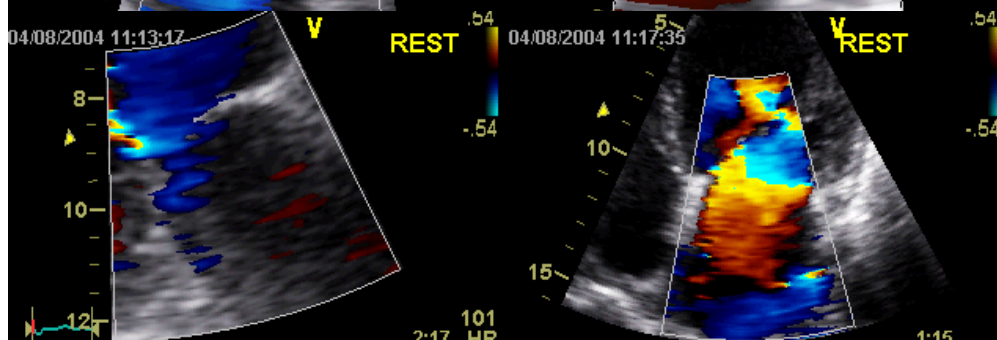
Ischaemic MR is dynamic

Rest

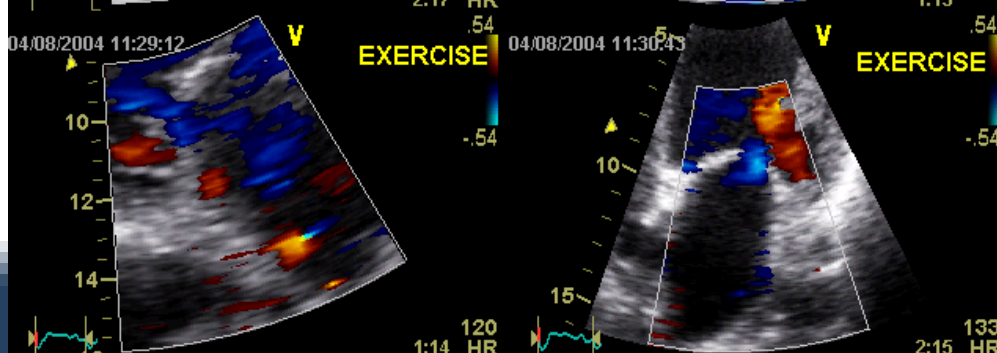


Exercise

Rest



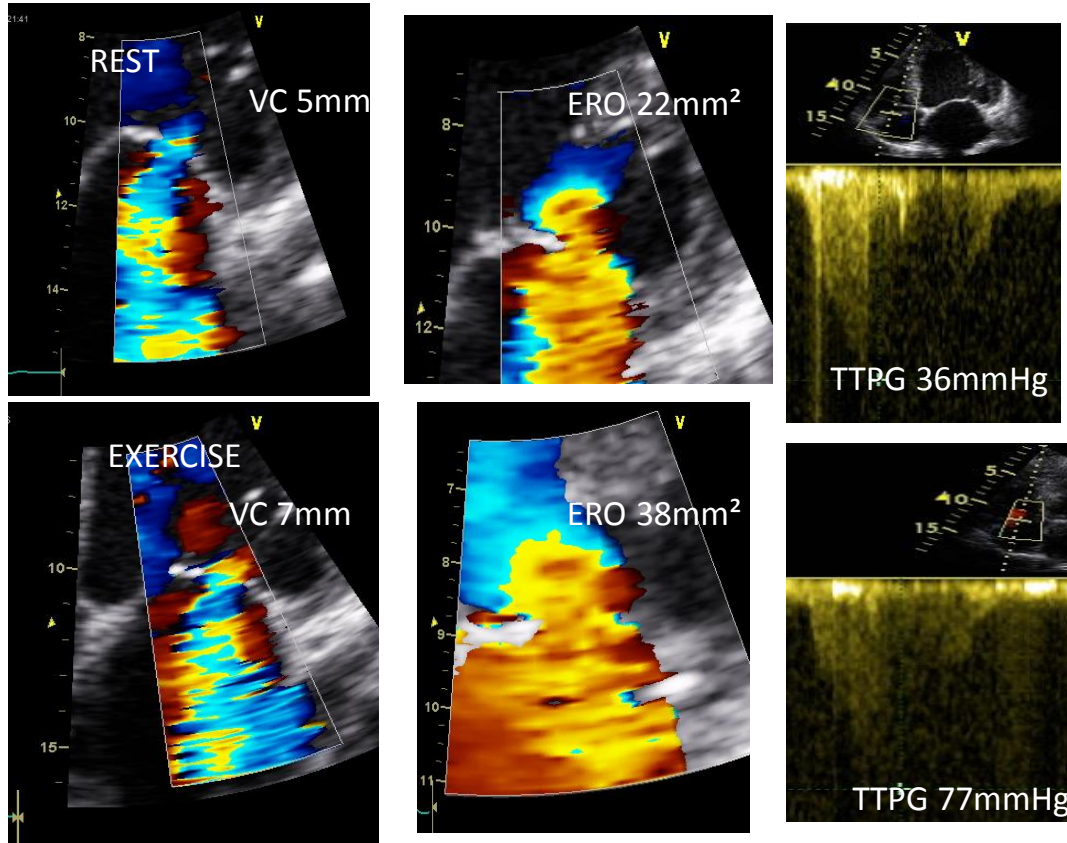
Exercise



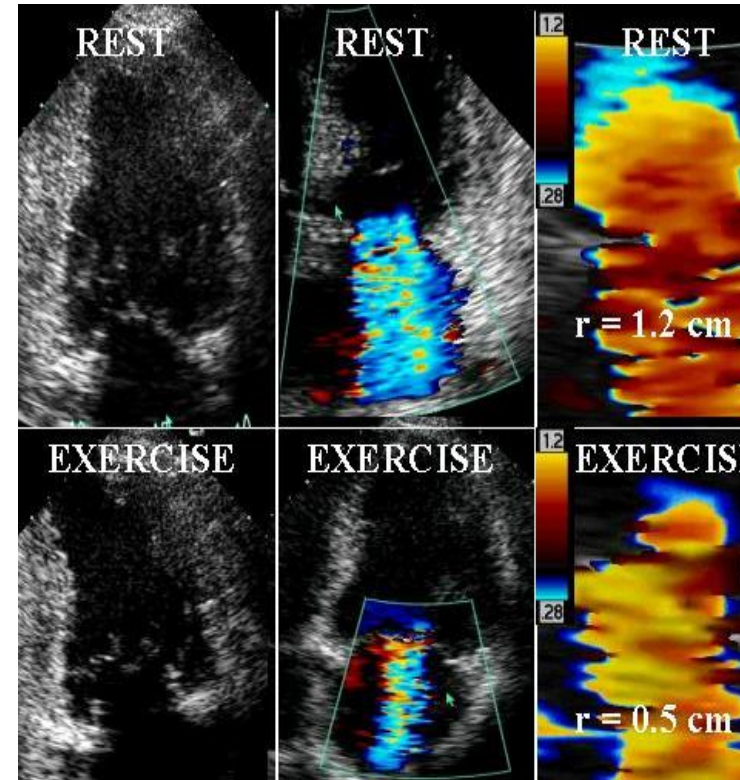
Secondary MR is dynamic

Exercise echo is useful prior to CABG if moderate MR to identify increase (a) or decrease (b) of ischaemic MR

a



b



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Symptomatic pts in whom revascularisation is not indicated but have LVEF < 30% ?

3DE has the best intra- and inter-observer as well as test-retest variability (3DE LVEF is the preferred technique)

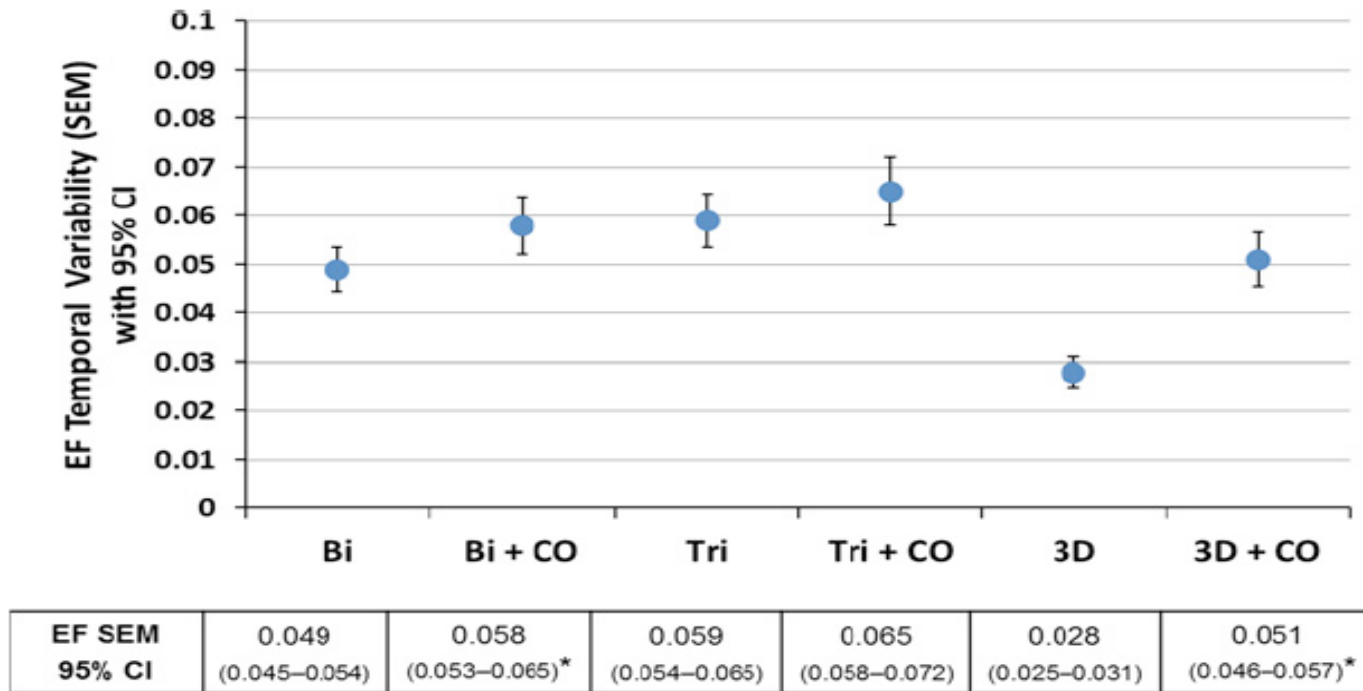


Figure 3 Temporal Variability in EF

2DE LVEF appears to be reliable in the detection of differences close to 10%

3DE LVEF appears to be reliable in the detection of differences close to 5-6%

Guidelines in perspective?

- Accordance between guidelines and real life is insufficient
- Most recommendations in 2012 have a level of evidence C
- Cut-off values for severe and moderate MR ?
- Recent randomized trials should be considered, but have limitations
- Should replacement be preferred to repair?
- Should MitraClip become a IIa indication?
- Do we have still enough evidence for indicating exercise echo?