ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

VIII CONGRESSO NAZIONALE ECOCARDIOCHIRURGIA 2016

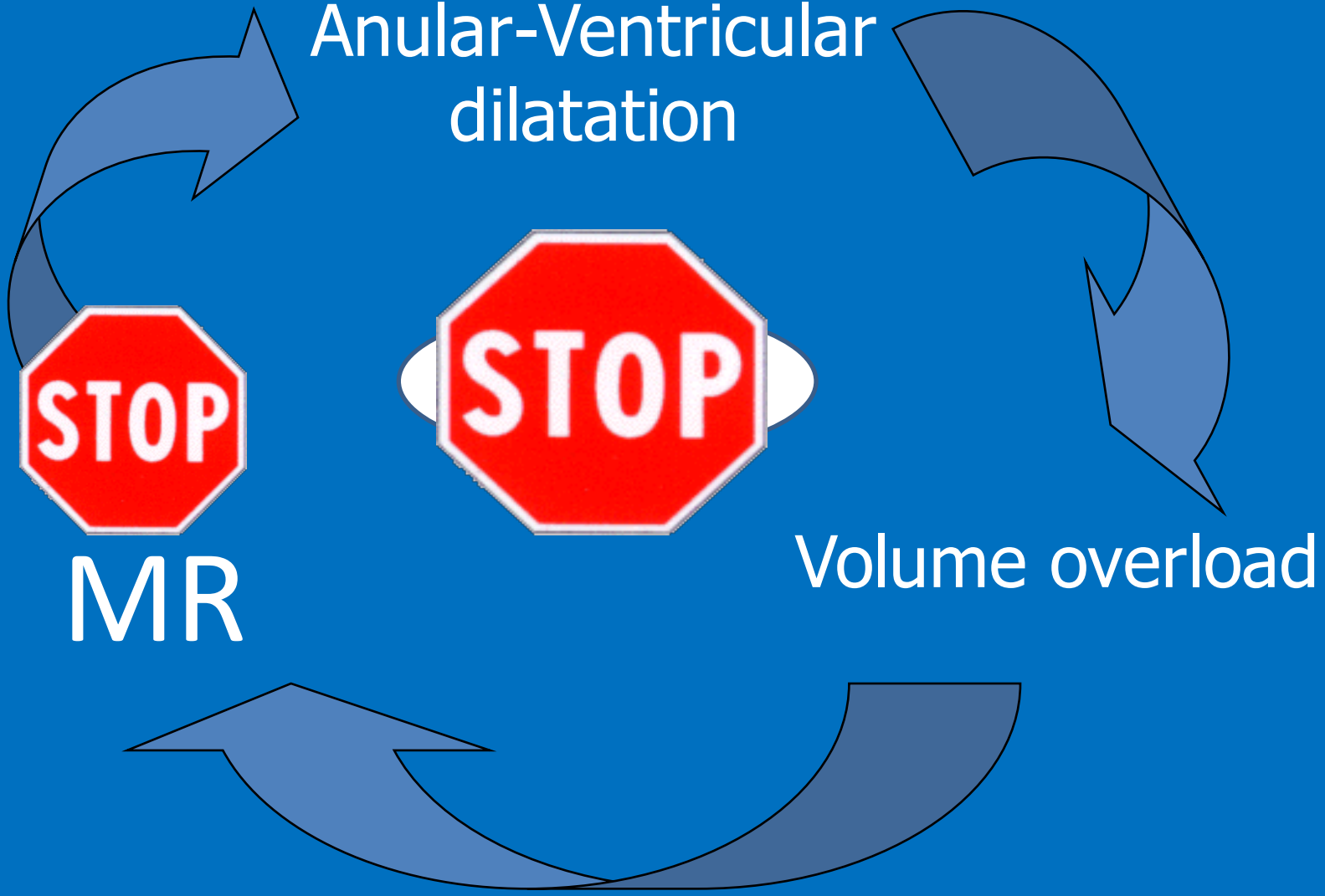
Insufficienza mitralica ischemica: cardiochirurgia?

Carlo de Vincentiis

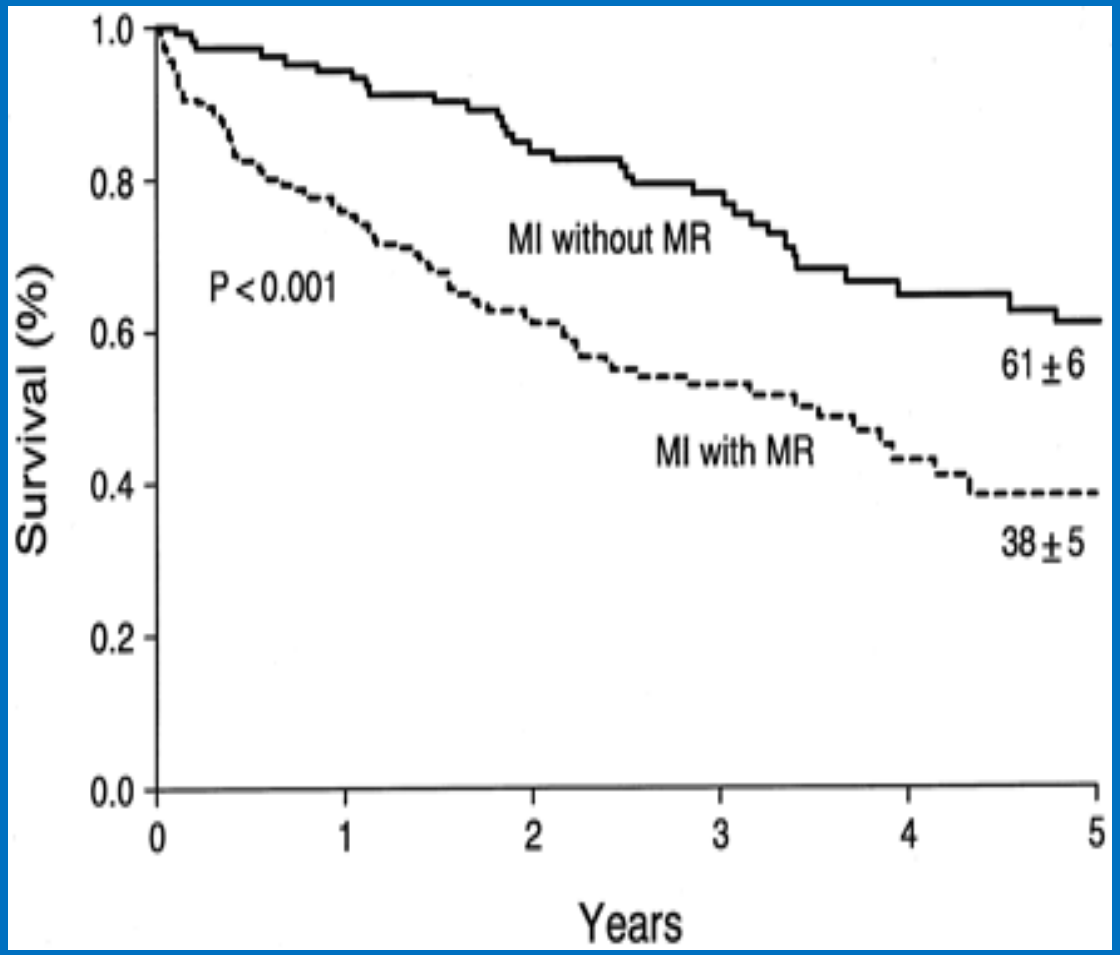
PSD

I.R.C.C.S. POLICLINICO SAN DONATO

Vicious circle



PROGNOSTIC IMPACT of IMV REGURGITATION
Medical hystory



REGURGITATION

↓ Leaves the pts at risk of

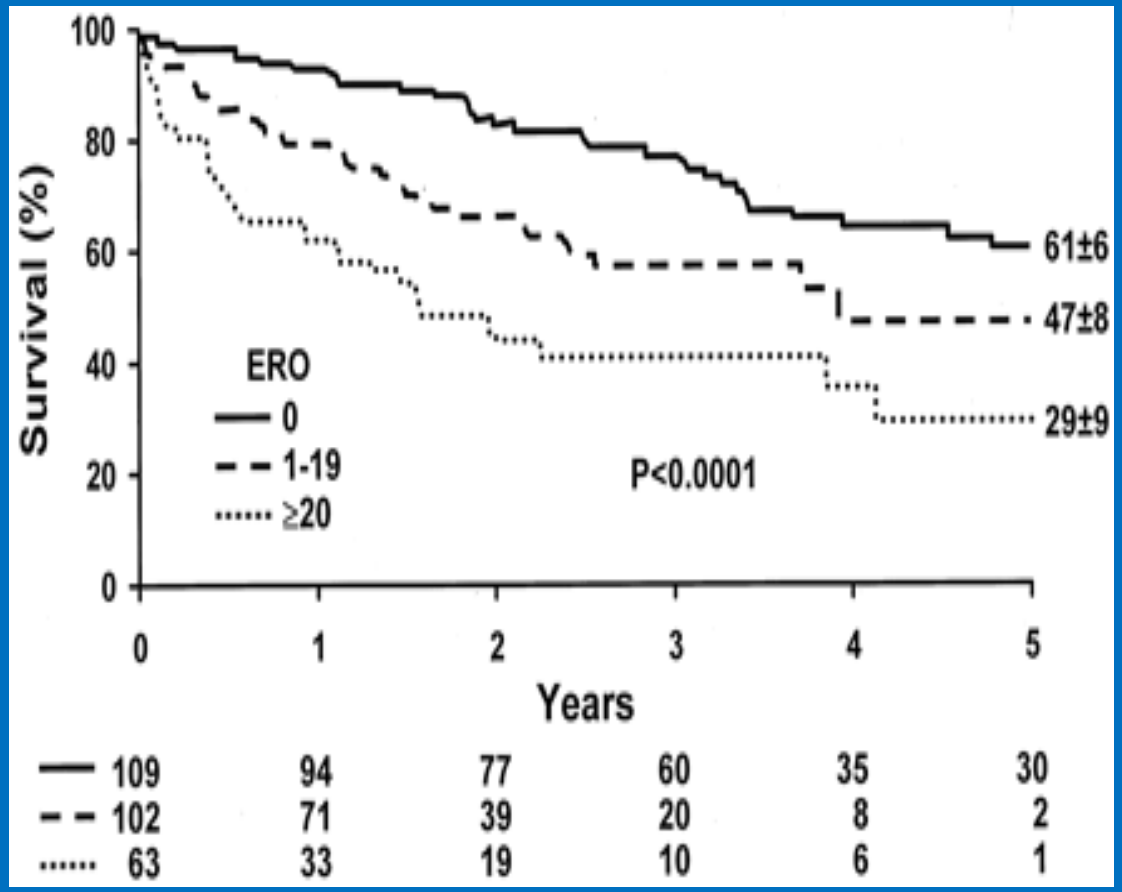
FURTHER VOLUME OVERLOAD

↓

PROGRESSIVE REMODELING

Grigioni Circulation 2001

PROGNOSTIC IMPACT of IMV REGURGITATION
Medical hystory

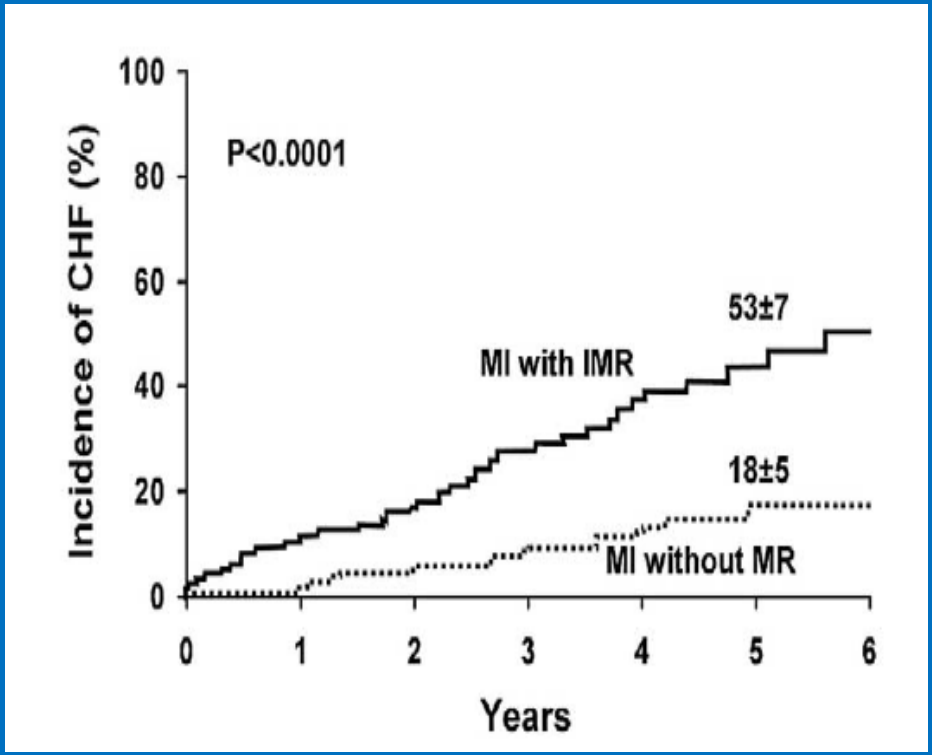


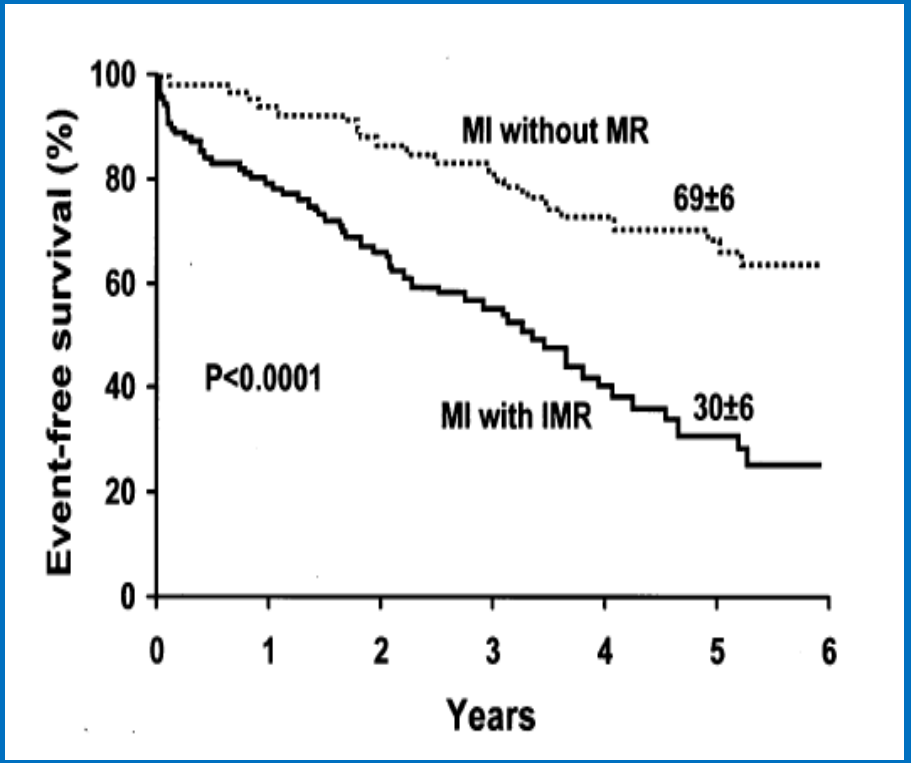
SURVIVAL is INFLUENCED by SEVERITY of REGURGITATION

Also MODERATE INSUFFICIENCY REDUCES the SURVIVAL

Grigioni Circulation 2001

Functional MR and incidence of CHF in NYHA I-II pts





Grigioni F. et al. J Am Coll Cardiol 2005;45:260-7

2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery: Executive Summary : A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

American Heart Association

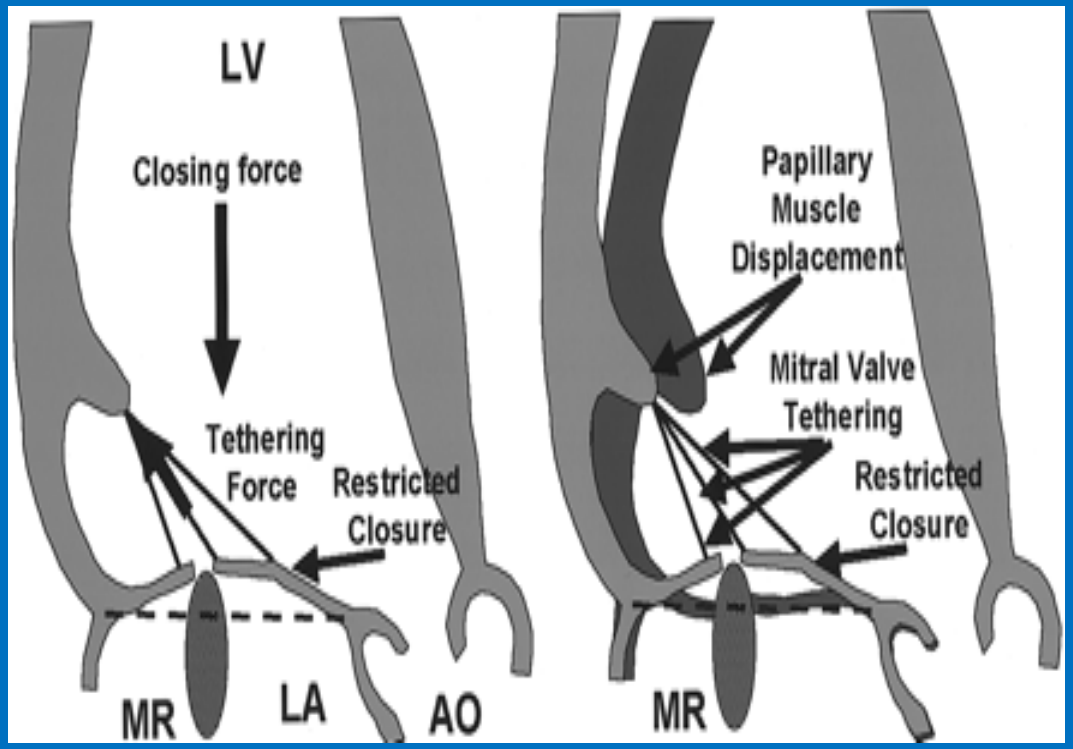
Class I	Patients undergoing CABG who have severe ischemic mitral valve regurgitation not likely to resolve with revascularization should have concomitant mitral valve repair or replacement at the time of CABG.[480–485] *(Level of Evidence: B)*
Class IIa	In patients undergoing CABG who have moderate ischemic mitral valve regurgitation not likely to resolve with revascularization, concomitant mitral valve repair or replacement at the time of CABG is reasonable.[480–485] *(Level of Evidence: B)*

2014 ESC/EACTS Guidelines on myocardial revascularization

EUROPEAN SOCIETY OF CARDIOLOGY

Mitral valve surgery is indicated in patients with severe mitral regurgitation undergoing CABG, and LVEF >30%.	I	C
Mitral valve surgery should be considered in patients with moderate mitral regurgitation undergoing CABG to improve symptoms.	IIa	B
Repair of moderate-to-severe mitral regurgitation should be considered in patients with a primary indication for CABG and LVEF ≤ 35%.	IIa	B
Stress testing should be considered in patients with a primary indication for CABG and moderate mitral regurgitation to determine the extent of ischaemia and regurgitation.	IIa	C

MULTIPLE CAUSEs of MITRAL ISCHEMIC REGURGITATION



TETHERING

↑

LV REMODELING

↑

ISCHEMIA

→ ANNULAR DILATATION

→ REDUCTION of CLOSING FORCE

→ Papillary muscle rupture

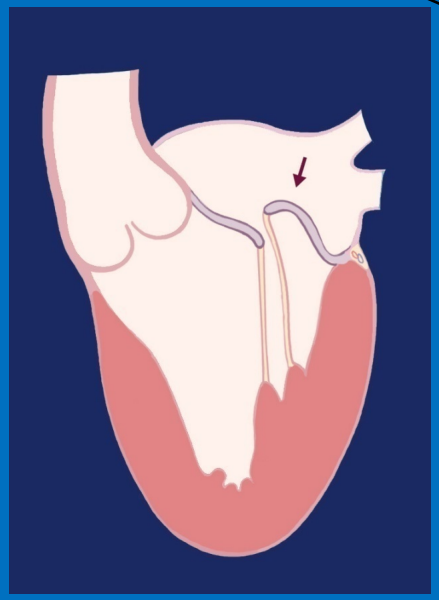
MVR in CAD

ANATOMICAL Prolapse

ISCHEMIC

Papillary muscle rupture

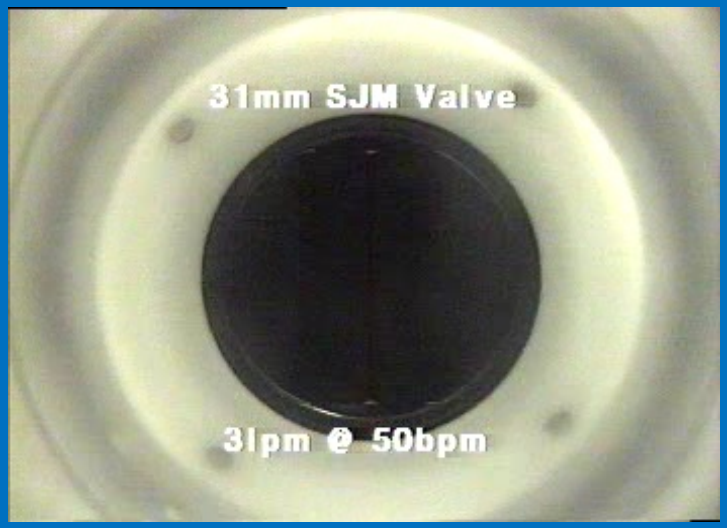
Type II



Natural History
↑Mortality at 3-4 days

Urgent Surgery

VALVE REPLACEMENT



- 15-25 % operative mortality
- Replacement 90% of cases

Surgical management of acute mitral valve regurgitation due to post infarction papillary muscle rupture

Tavakoli R – J Heart Valve Dis. 2002

Perioperative outcome and long-term survival of surgery for acute post-infarction mitral regurgitation

Chevalier P - EJCTS 2004

Mitral valve surgery for acute papillary muscle rupture following myocardial infarction

Chen Q – J Heart Valve Dis. 2002

IMVR

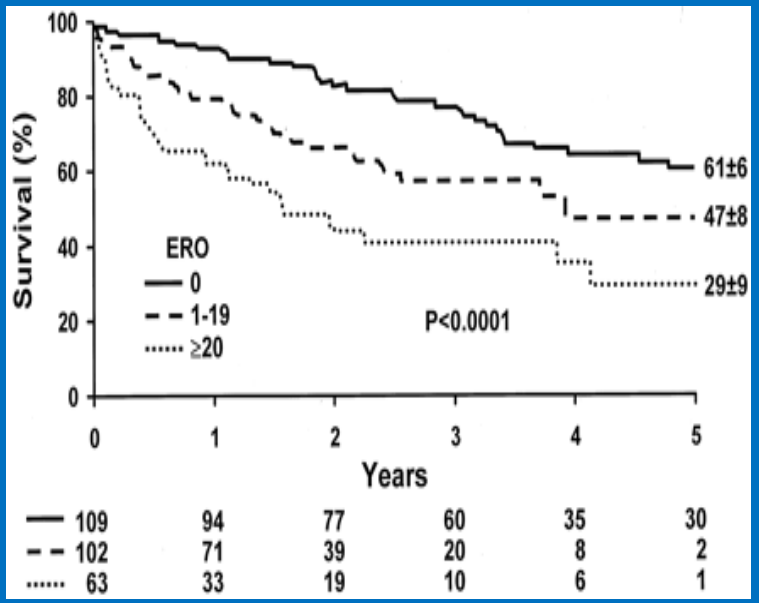
Severe

Moderate

CABG + MV surgery

CABG ONLY ?

CABG + MV surgery ?



Moderate mitral regurgitation may progress In 30-70% of patients who undergo surgical revascularization alone

Malidi HR - J Thorac Cardiovasc Surg 2004
Lam BK – Ann Thorac Surg 2005
Peniccka M – Circulation 2009
Fattouch K – Ann Thorac Surg 2010

IMVR

CABG + MV surgery vs *CABG alone*

+ reduction LVEDV
- Mitral regurgitation volume
- B-type natriuretic peptide levels
+ post-op NHYA
- LV dimention

Chan KM - Circulation 2012
Fattouch K - J. Thorac Cardiovasc Surg 2009

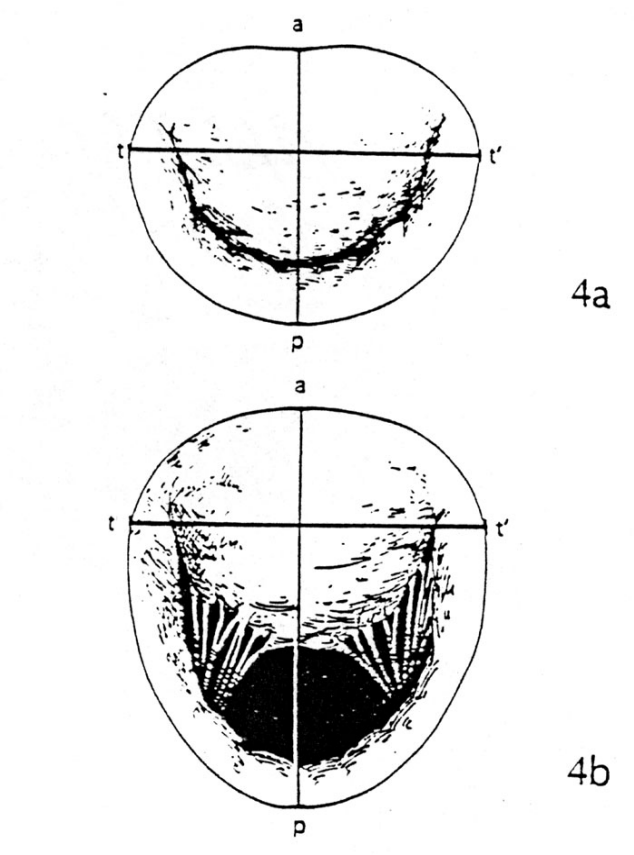
Ischemic mitral regurgitation : Surgery ?

YES

BPAC + Mitral Surgery

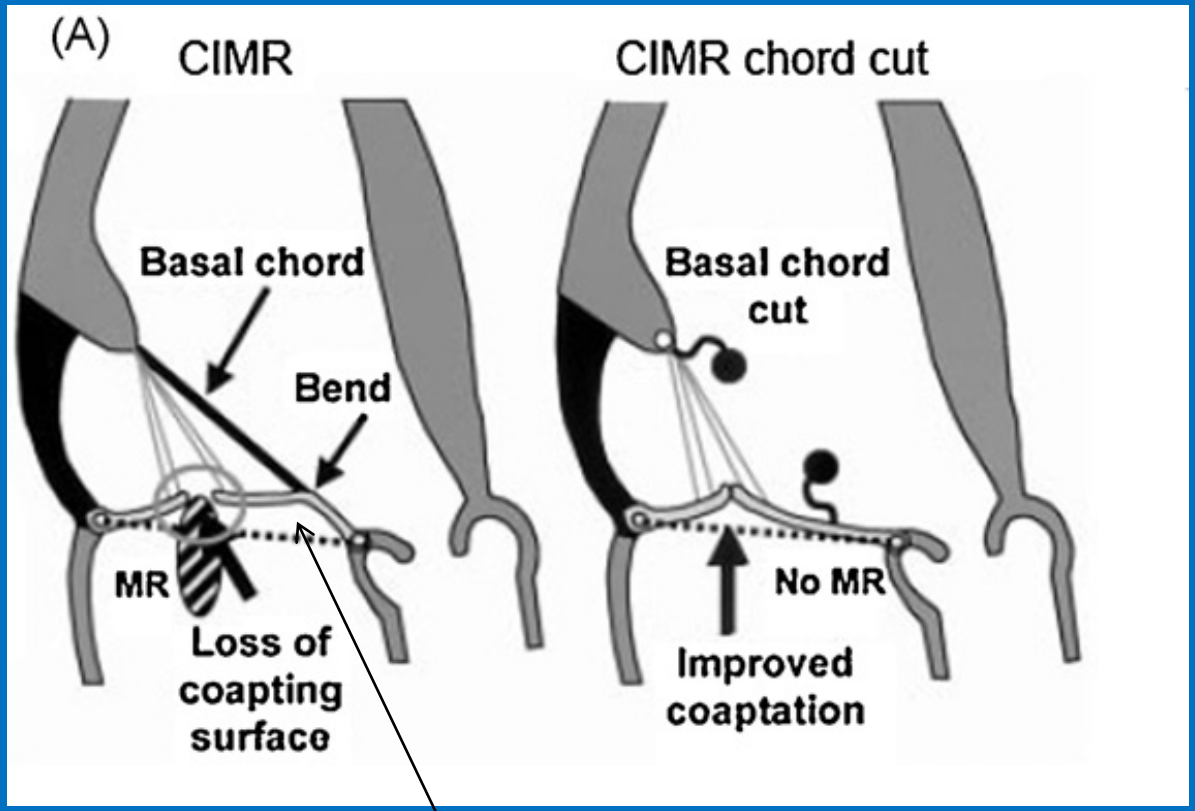
Undersized annuloplasty in IMR

- Feasible with low hospital mortality



- Improved symptoms and QOL

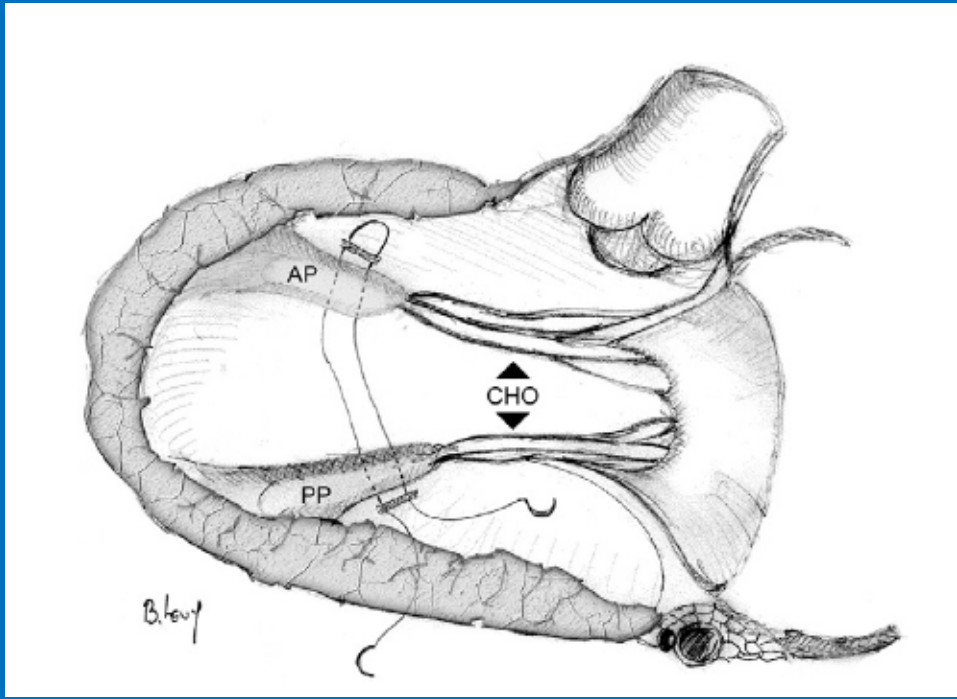
Second-order chordal cutting

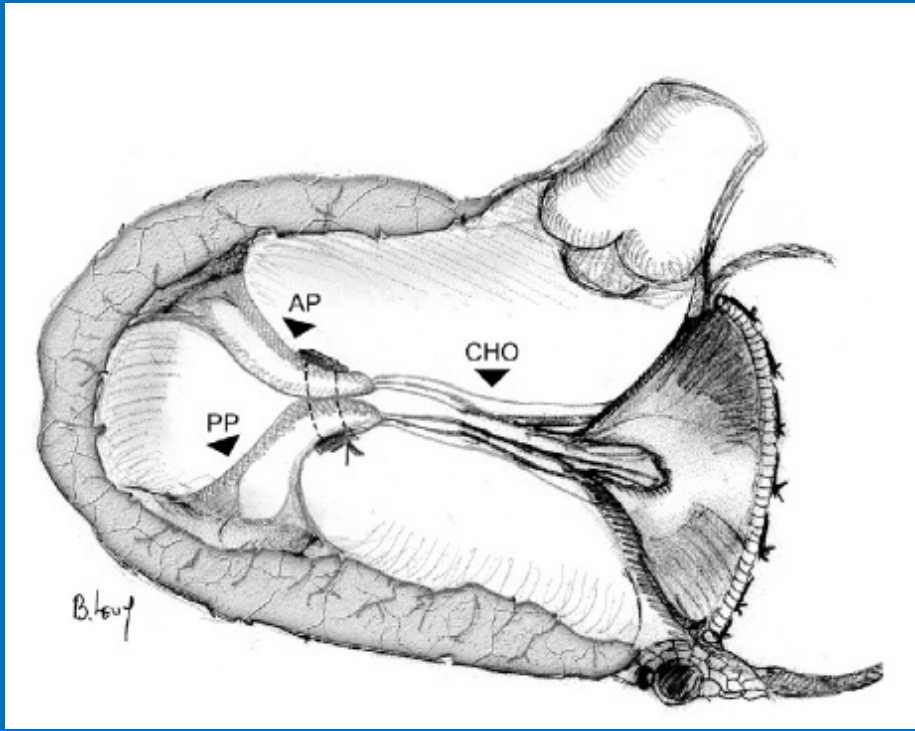


hockey stick configuration

Borger : JTCS -2007

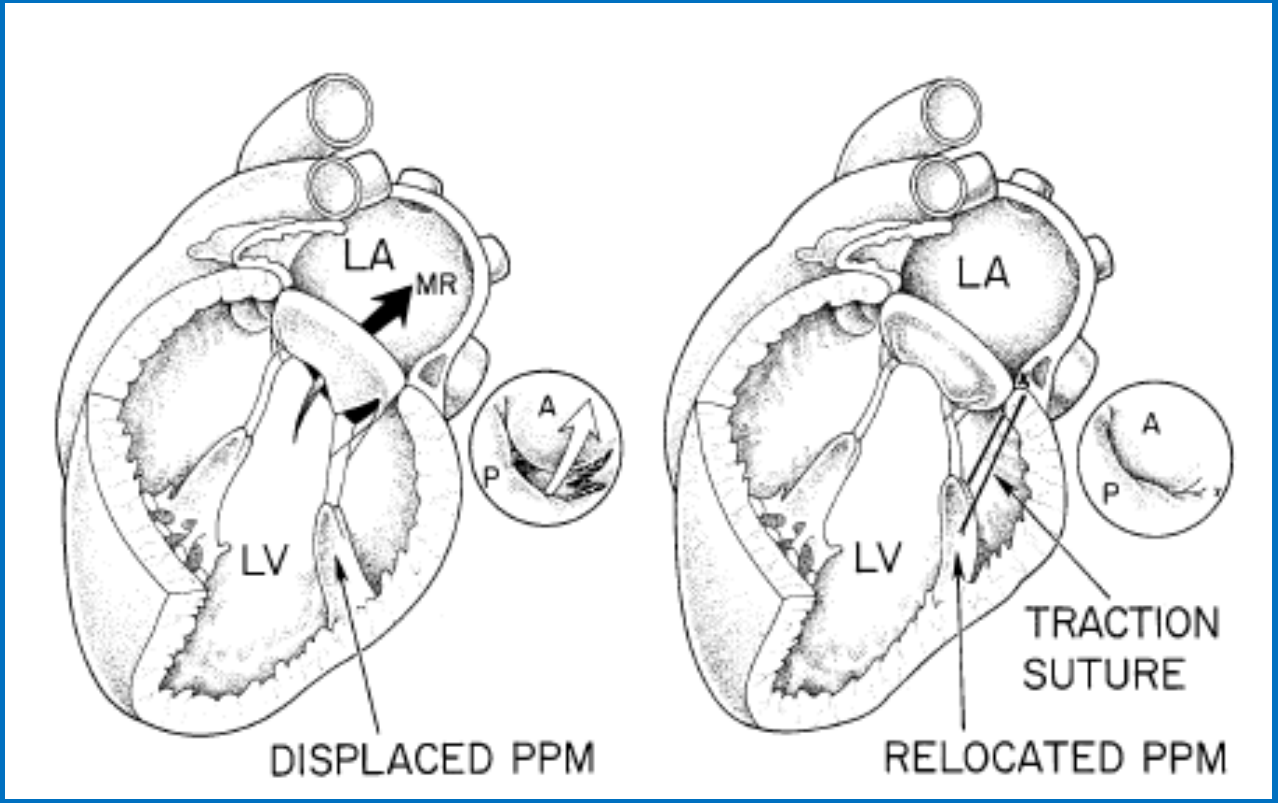
PM approximation





Rama Ann Thorac Surg 2007

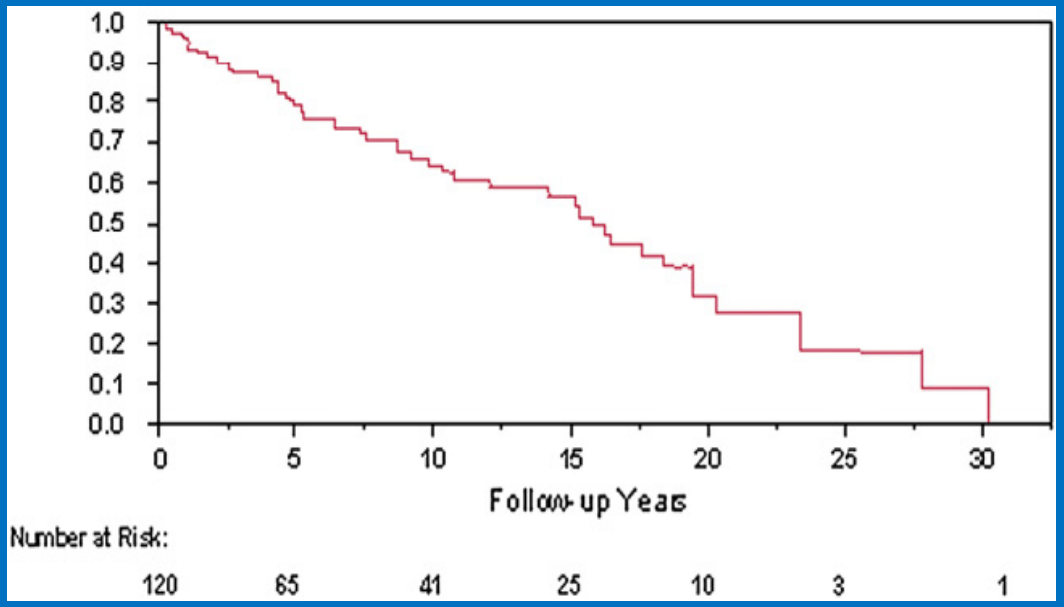
Relocation of the posterior PM



Kron Ann Thorac Surg 2002

Mitral Valve Repair in Functional Ischemic Regurgitation

The 10-, 20-, and 30-year survivals of 44%, 4%, and 0%, respectively Whereas the freedom from MV reoperation was only 63% at 10 years.



Cohn et al, J Thorac Cardiovasc Surg 2010

" Mitral regurgitation may occur in 28% of individuals 6 months following mitral repair "

McGee et al J.Thorac Cardiovasc Surg 2004

?

Severity of regurgitation

?

?

LV volume

left ventricular function

?

?

LV remodeling

?

?

Age

?

symptoms

Recurrence of Ischemic Mitral Regurgutation

Not performed Undersized annuloplasty

Bax and Braun : Unlikely LV reverse remodeling
if preoperative LVEDD exceeds 65 mm
and/or LVESD exceeds 51mm

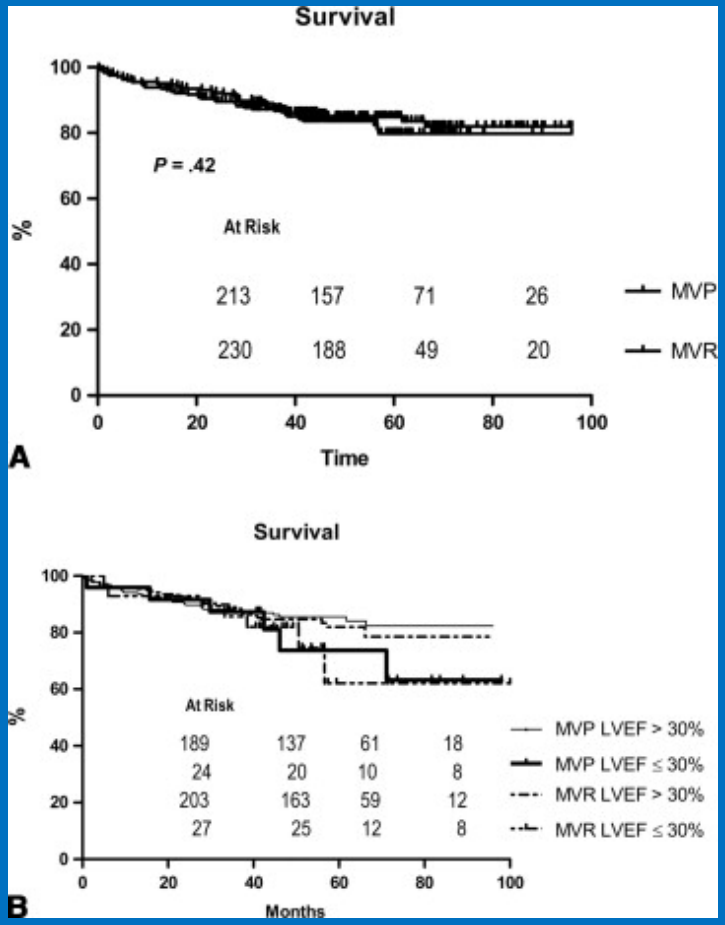
- R. Dion : if the short axis is > 64 mm
something should be done on
the ventricle

- A. Calafiore : if the deep of the tenting
area is > 10 mm the valve
should be replaced

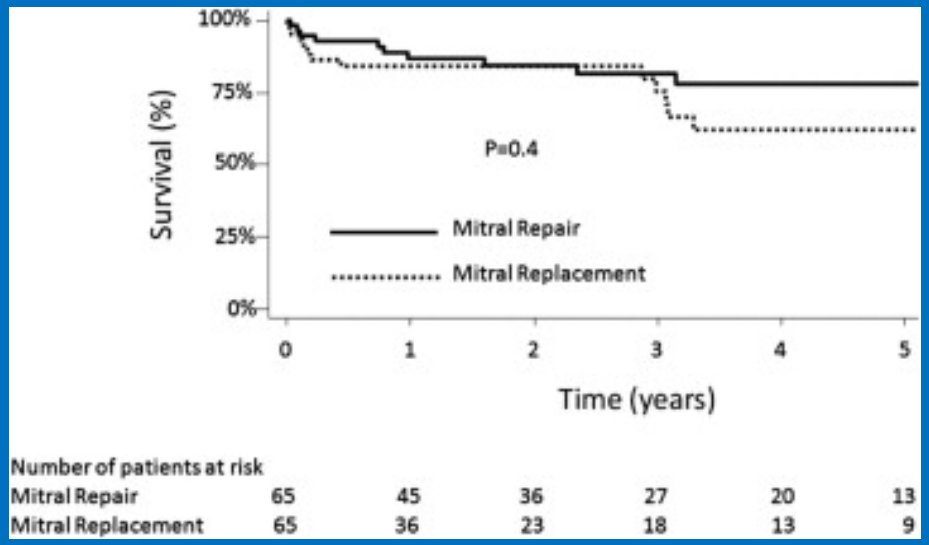
The presence of preoperative predictor of increased risk of mitral regurgitation recurrence and preoperative severity of regurgitation may indicate the correct surgical options

Severity	Treatment
Mild (grade 1+)	CABG
Moderate (grade2+)	CABG vs CABG + down-sized mitral valve ring annuloplasty
Moderate-to-severe (grade 3) Severe (grade 4+)	CABG+down-sized mitral valve ring annuloplasty ± adjunct procedure vs CABG+mitral valve replacement

MVrepair vs MVreplacement



Lorusso et al :J. Thorac Cardiovasc Surgery 2013



Chan V. et al: Ann Thorac Surg 2011

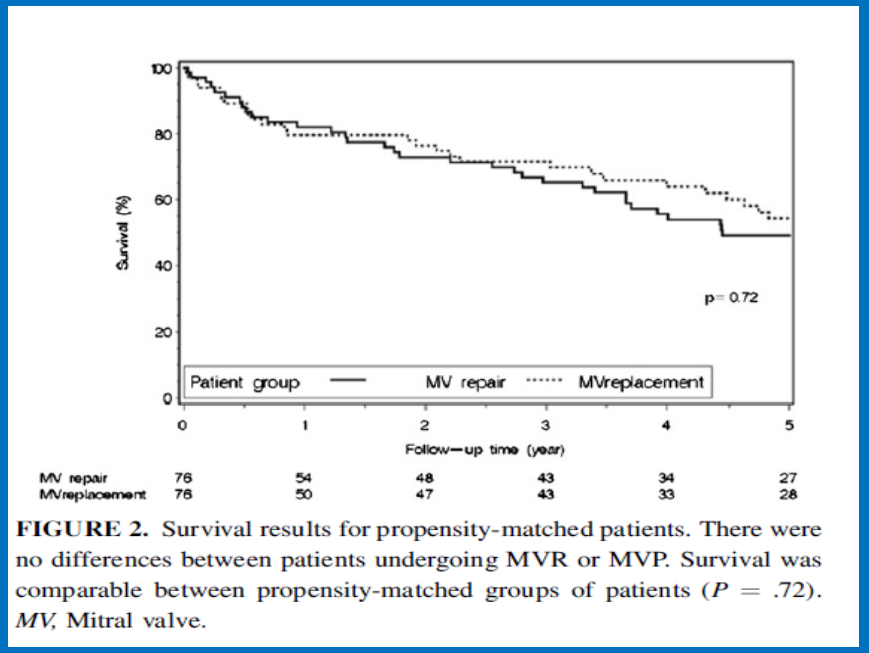
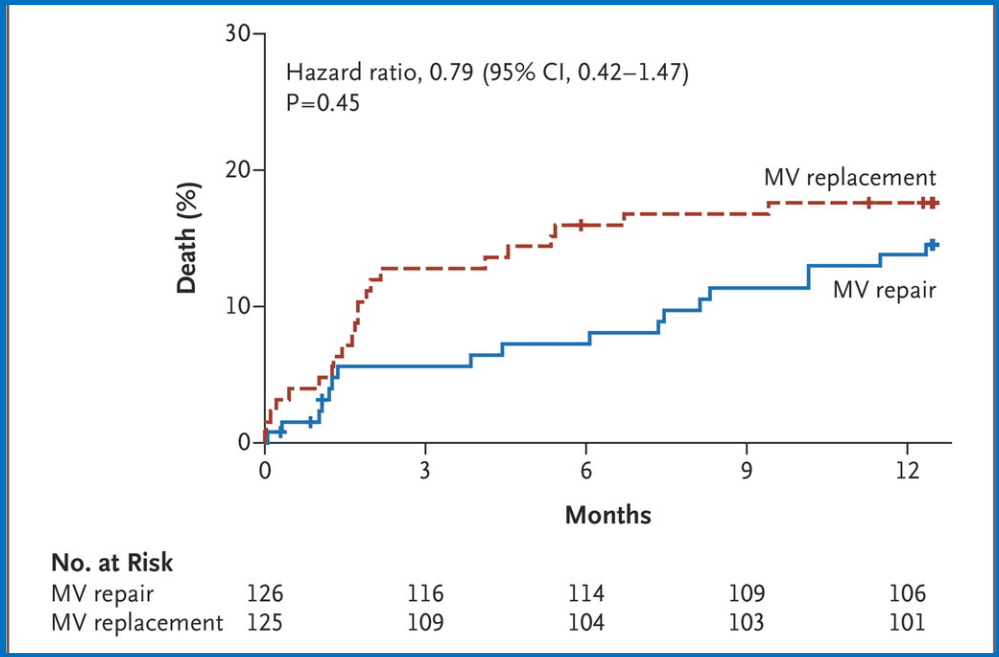


FIGURE 2. Survival results for propensity-matched patients. There were no differences between patients undergoing MVR or MVP. Survival was comparable between propensity-matched groups of patients ($P = .72$). *MV,* Mitral valve.

Maltais et al :J. Thorac Cardiovasc Surgery 2011

MVrepair vs MVreplacement

randomized

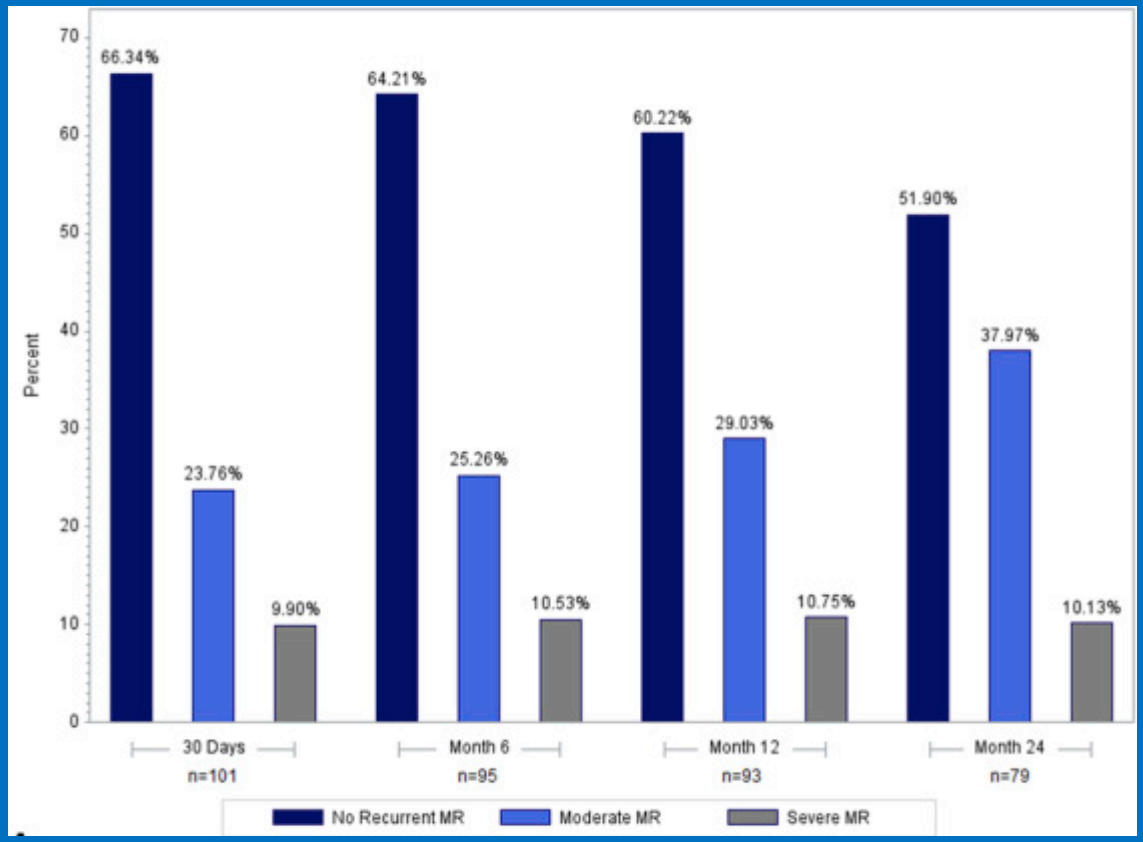


Acker M. et al: N Engl J Med 2014

Both surgical approaches reduced left ventricular end-systolic volume index (LVESVI) at 12 months.

1-year mortality was similar in both groups

Regurgitation recurrence



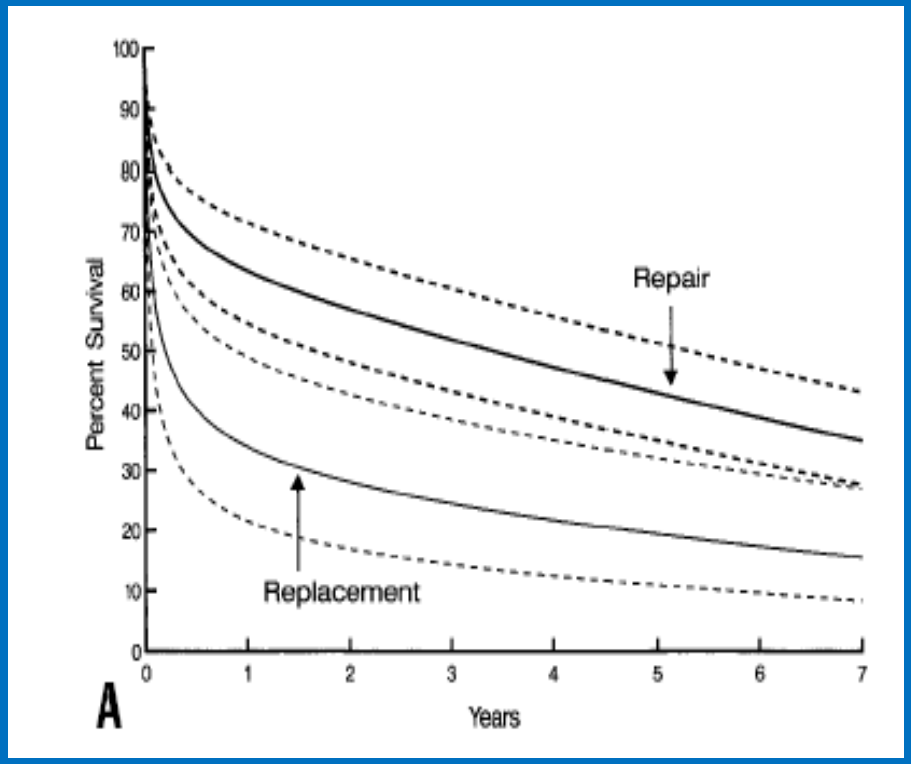
Kron et al ; JTCS 2015

Is repair preferable to replacement for ischemic mitral regurgitation?

A. Marc Gillinov, MD[a]
Per Nils Wierup, MD[a*]
Eugene H. Blackstone, MD[a,b]
Ehab S. Bishay, MD[a]
Delos M. Cosgrove, MD[a]
Jennifer White, MS[b]
Bruce W. Lytle, MD[a]
Patrick M. McCarthy, MD[b]

SI

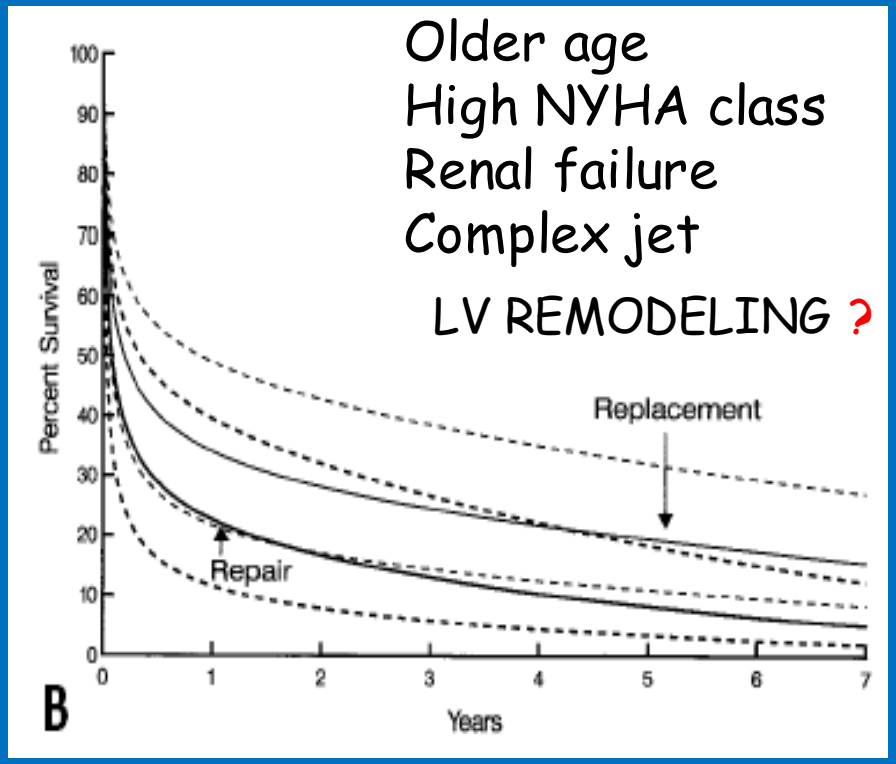
NO



BETTER RISK pts

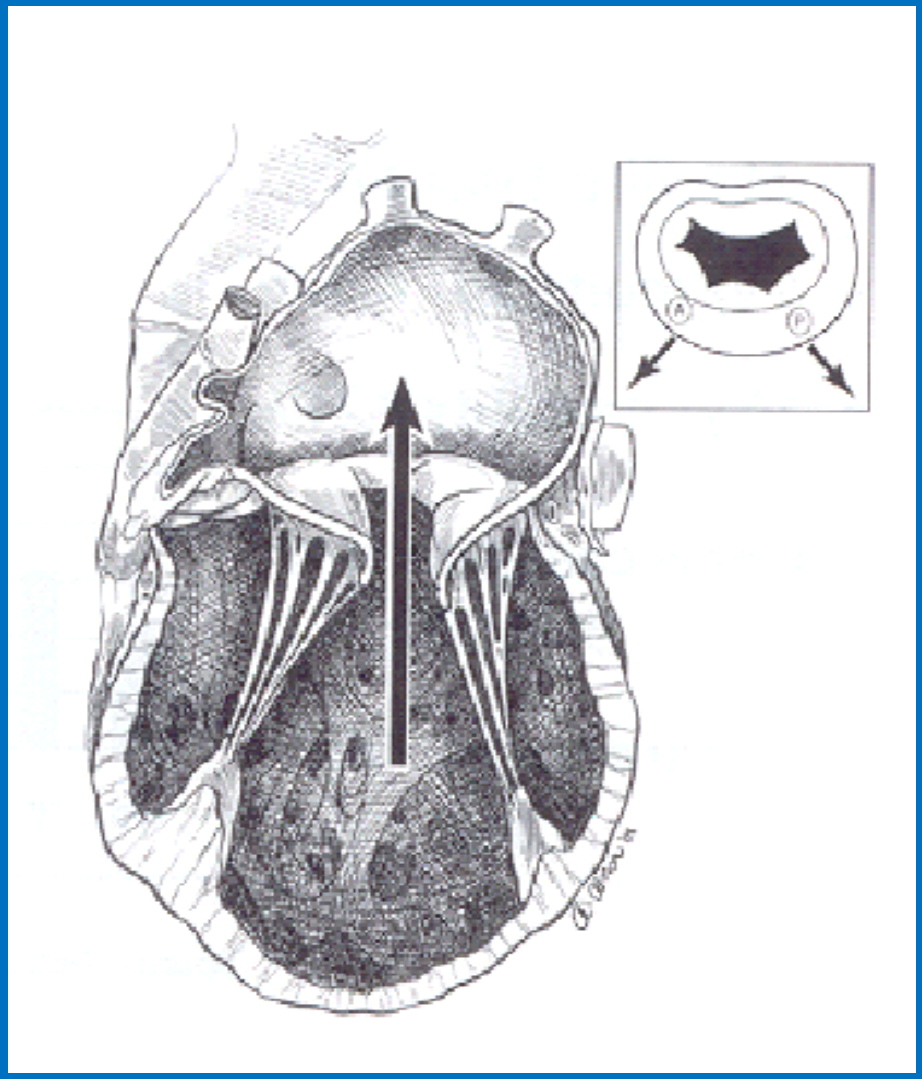
Older age
High NYHA class
Renal failure
Complex jet

LV REMODELING ?



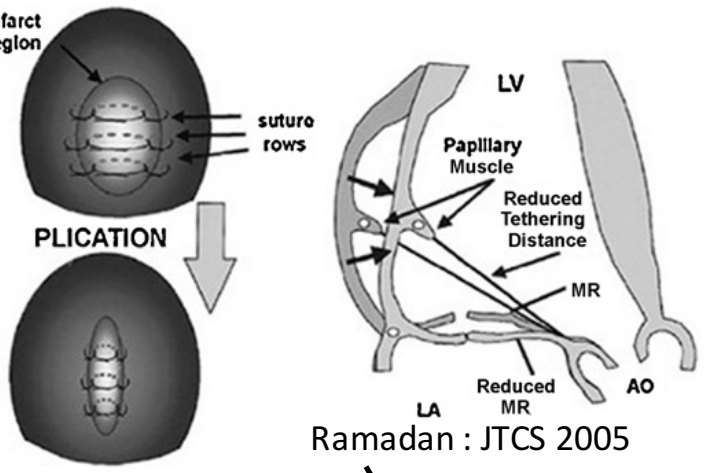
POOR RISK pts

Functional IMR with annular dilatation, LV remodeling, papillary muscle displacement



Infarct Plication

(C)



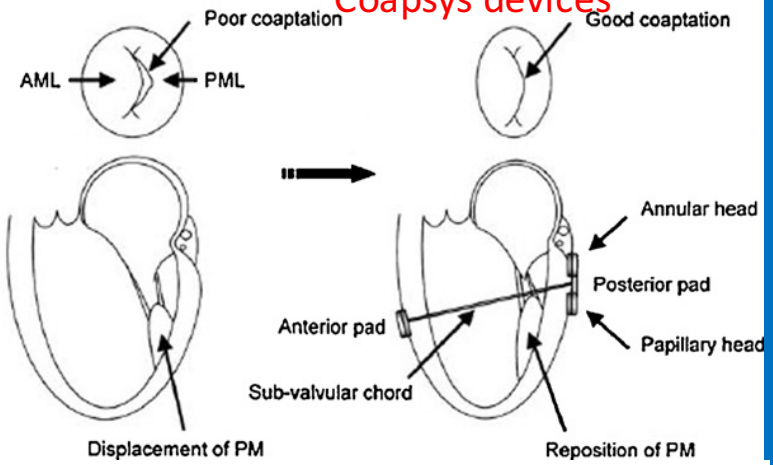
Ramadan : JTCS 2005

echniques for CIMR.

		MVA (n=)	CABG (n=)	Preoperative MR grade[b]	Follow-up	Mortality at follow-up	MR grade at follow-up[b]
	Anterior leaflet augmentation (pericardial patch)		n.a.	290			
	Percutaneous transvenous mitral annuloplasty (PTMA)	5[j]	n.a.	554			
	Percutaneous transvenous Alfieri edge-to-edge repair	1	n.a.	4			
Subvalvular techniques							
	Second-order chordal cutting	43	43	40			
	Relocation of the PMPM (string)	18	18	18			
	Relocation of the PMPM (transventricular string)	12	12	12			
	PM sling	10	10	10			
	PM approximation	8	8	8	2+/3+	7–14 months	38%
Ventricular techniques							
	PM repositioning by infarct plication	3	0	3	3+	7 months[h]	0%
	Ventricular restoration and PM imbrication	46	0	46	≥2+	Early postop	15%
	Ventricular restoration	108	108	108	2.9 ± 1.2[e]	Early postop	17%
	External ventricular restraint device (epicardial balloon)	10[k]	0	0	7.8 ± 3.1[e,l]	Intra-operative	0%
	Coapsys device	11	0	11	2.9 ± 0.5[e]	1 year	0%

(D)

Coapsys devices

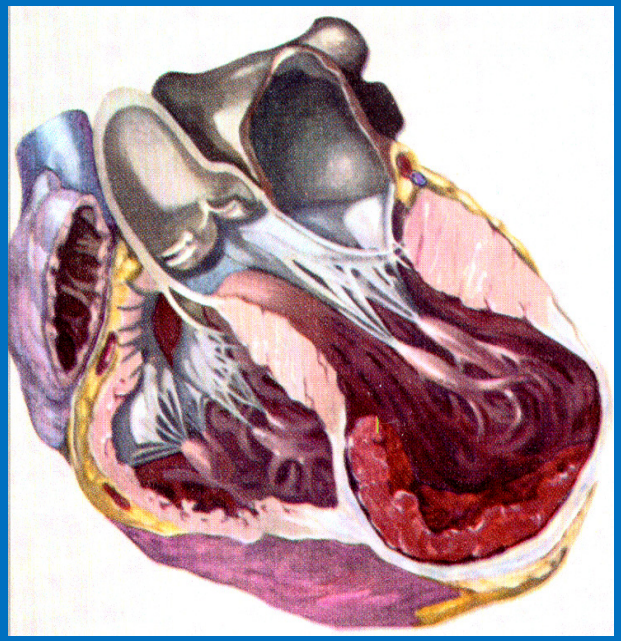


Grossi : JTCS 2006

Mishra : Ann Thorac Surg 2006

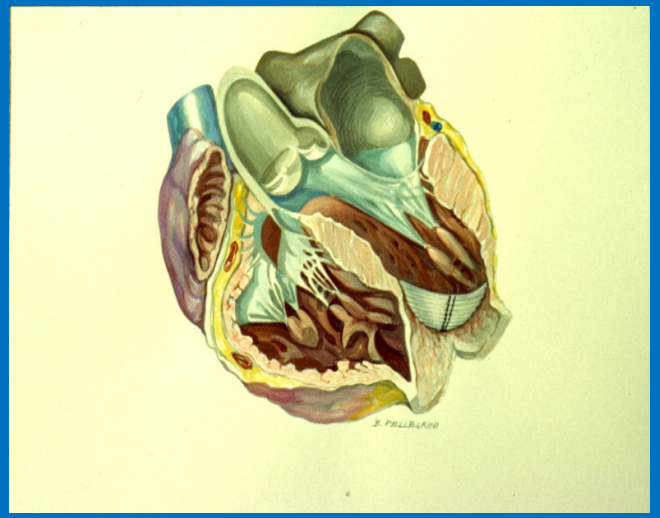
BEST SOLUTION

The disease process



PROBABLY

LEFT VENTICULAR RESTORATION



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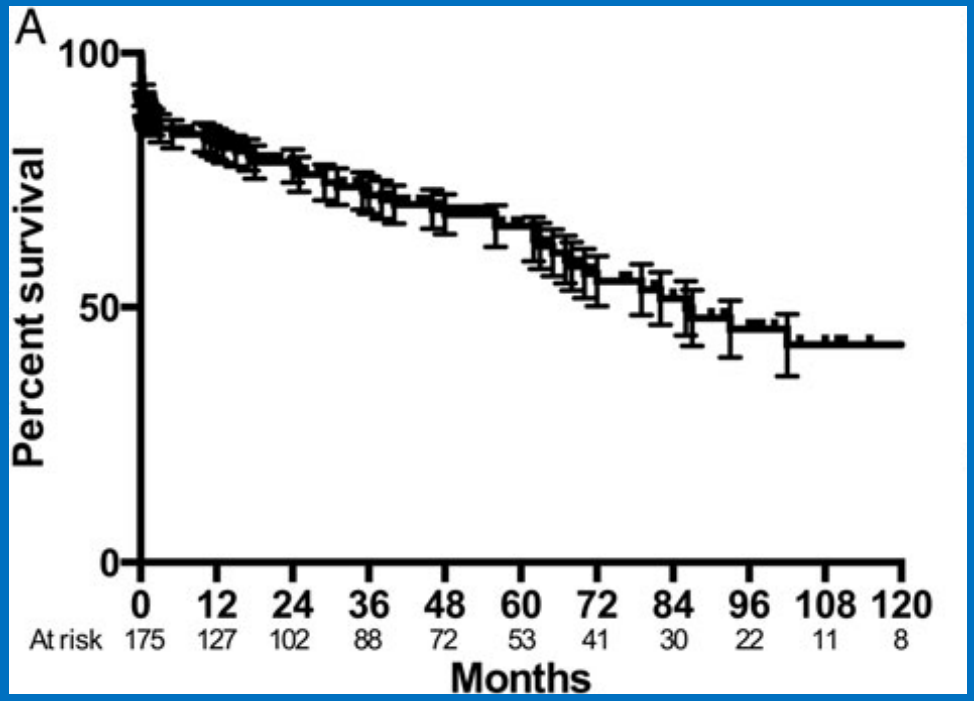
Surgical ventricular restoration plus mitral valve repair

626 patients underwent SVR

175 (28%) had an additional MV repair

Operative death occurred in 14.3%



The actuarial survival at 3, 5 and 8 years was 72 ± 4, 65 ± 4 and 45 ± 6%, respectively

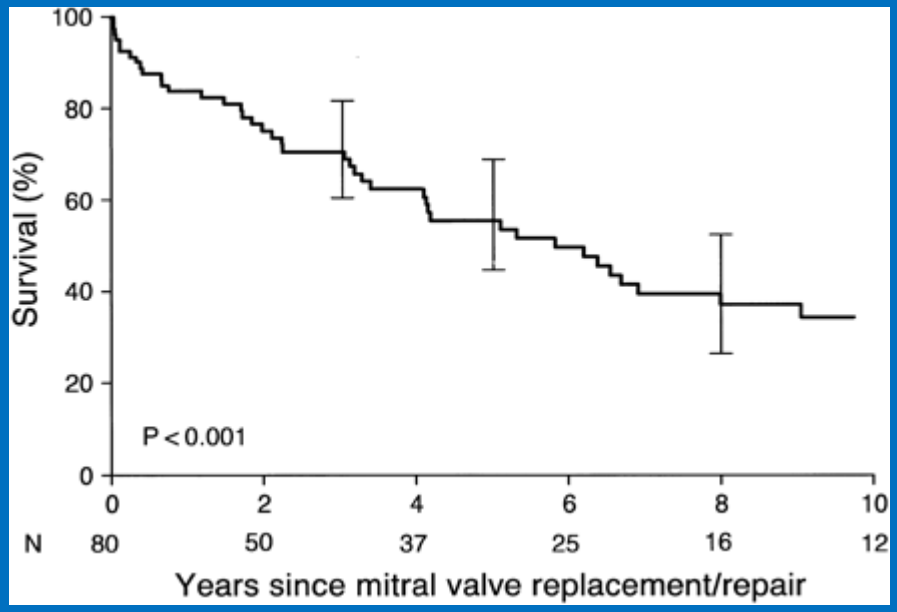
Serenella Castelvecchio et al; E J of Cardio-Thoracic Surgery (2016)

"Ischemic mitral regurgitation remains one of the most complex and unresolved aspect in the management of ischemic heart disease"

Mitral valve surgery after previous coronary artery bypass grafting

- Operative risk !
- Fe
- Age
- NYHA Class
- Urgent

?



In-hospital mortality 8.8%

Izhar U. et al Circulation 1999

Conclusion

- Ischemic Mitral regurgitation is a post IMA desease
- Must be differenciated from a MI determined by a transient ischemia
- Assessment of mitral valve before PTCA !
- Ischemia must be treated
- Mitral regurgitation must be treated

Conclusion

- Moderate IM Undersized annuloplasty probably is enough
- Annular surgery effective if EDD < 65 mm
- Replace the valve is not a “crime”!
- In Very large LV if the post-op LVEDD is expected to be more then 65 mm (in spite of SVR), replacement must be an option.

Ischemic Mitral Regurgitation