Great Innovations in Cardiology
Turin 15 - 16/10/2009

Università degli Studi di Torino
DIVISIONE DI CARDIOCHIRURGIA
Director: Prof. Mauro Rinaldi

Asymptomatic mitral regurgitation: repair now or later?

C. Comoglio MD

Mitral Regurgitation

AHA/ACC/ESC guidelines

Patients with chronic severe MR:

Surgery is recommended in pts with LVEF<60% and LVESD >45mm

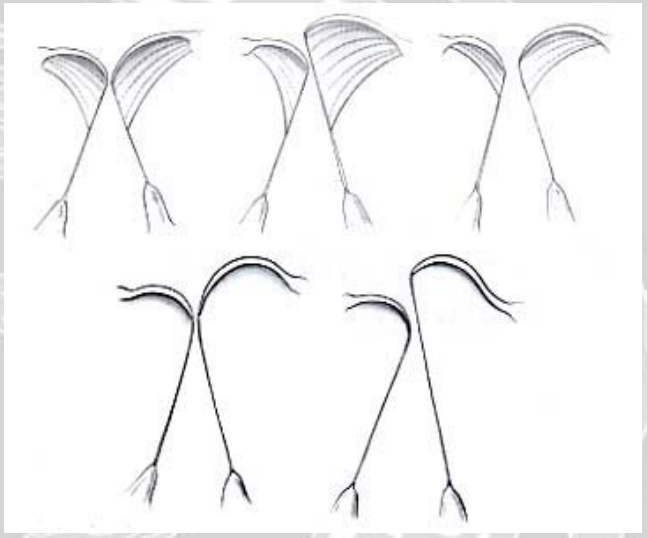
- **Surgery is usually not recommended in asymptomatic pts with preserved LV function**
- **Surgery may be considered, provided that there is a 90% likelihood of successful valve repair**
- Surgery may be considered when:
  - FA ensues
  - presence of pulmonary hypertension

Mitral Regurgitation

Ethiopathogenesis

Major causes of surgical MR in western countries

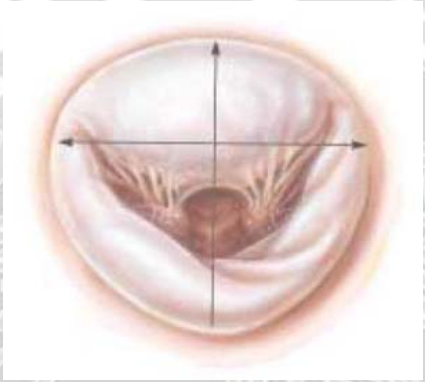
DEGENERATIVE	**60-70%**
ISCHAEMIC O DCM	**20%**
RHEUMATIC	**2-12%**
ENDOCARDITIS	**2-10%**
CONGENITAL AND MISCELLANEOUS	**<5%**



- **Degenerative mitral regurgitation** is the second most frequently encountered valvular disease in Western countries

  and is **often discovered fortuitously** in still asymptomatic patients.

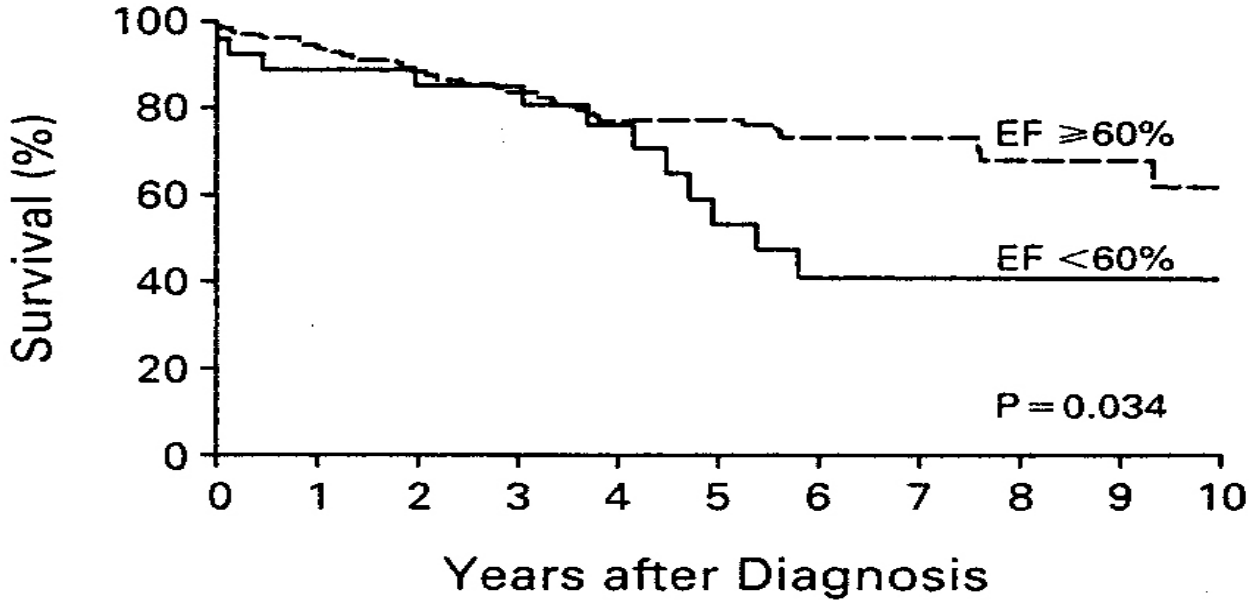
Mitral Regurgitation



Patients may remain asymptomatic associated with long-standing disease and gradually deteriorating LV function because of mitigating effect of regurgitant mitral flow on LV sistolic function, EF and cardiac output.

Mitral Regurgitation and EF

Long-term survival with medical treatment, according to the ejection fraction (EF)



No. at Risk											
EF ⩾60%	185	109	94	83	69	61	45	30	19	11	6
EF <60%	44	24	21	20	15	9	6	4	1	1	1

Ling et al. N Engl J Med 1996;335:1417-1423

Mitral Regurgitation

Is a progressive, self-sustained disorder that:
LEADS TO LV DYSFUNCTION AND CONGESTIVE HEART FAILURE.

Surgery is the only treatment proven to improve symptoms and prevent heart failure!

Should be performed before the development of the functional impairment.

ENRIQUEZ-SARANO.CIRCULATION 1999-99:400-5

Mitral Regurgitation
flail leaflet

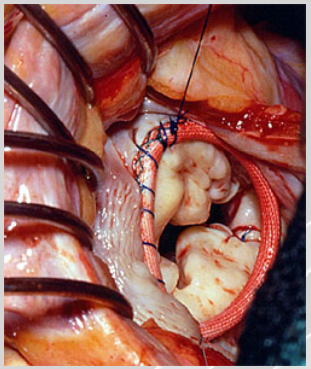
Within 10 yrs of diagnosis death occurs or cardiac surgery is needed in at least 90 % (for severe MR)

Yearly mortality rate with medical treatment : 6 %

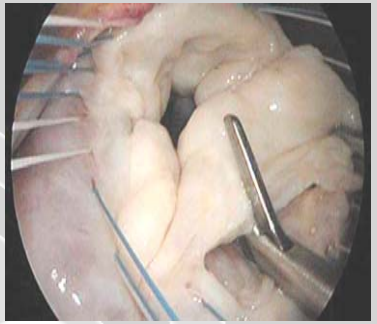
Yearly cardiac event rates with medical treatment : 10-12 %

- **heart failure 8- 9 %**
- **AF 5 %**

F.GRIGIONI J Am Coll Cardiol Img, 2008
ENRIQUEZ-SARANO, CARY W AKINS, ALEC VAHANIAN Aprile 18,2009



Mitral Regurgitation
MV REPAIR



Mitral valve repair, whenever feasible, is the **GOLD STANDARD** for the management of MR.

ACC/AHA guidelines.

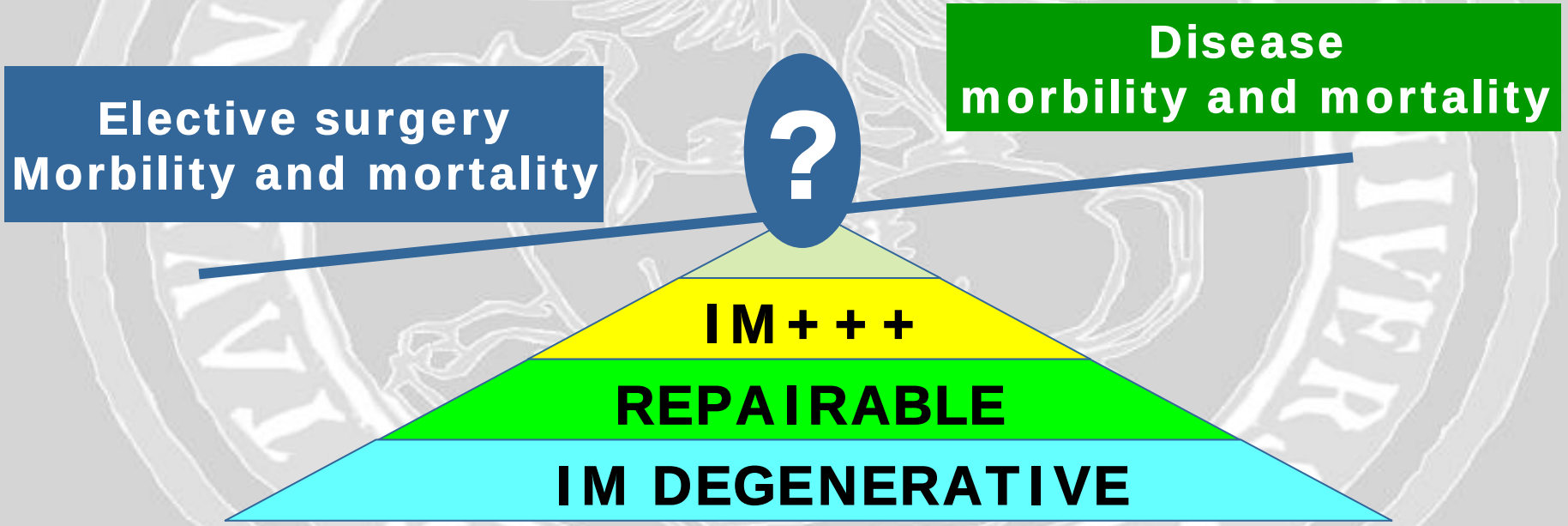
POSTOPERATIVE SYSTOLIC AND DIASTOLIC LV FUNCTION ARE PRESERVED AFTER MITRAL VALVE RECONSTRUCTION.

HESS J.Am.Coll.Cardiol. 1995

Mitral Regurgitation

Timing in asymptomatic patients remains

CONTROVERSIAL!!!!!

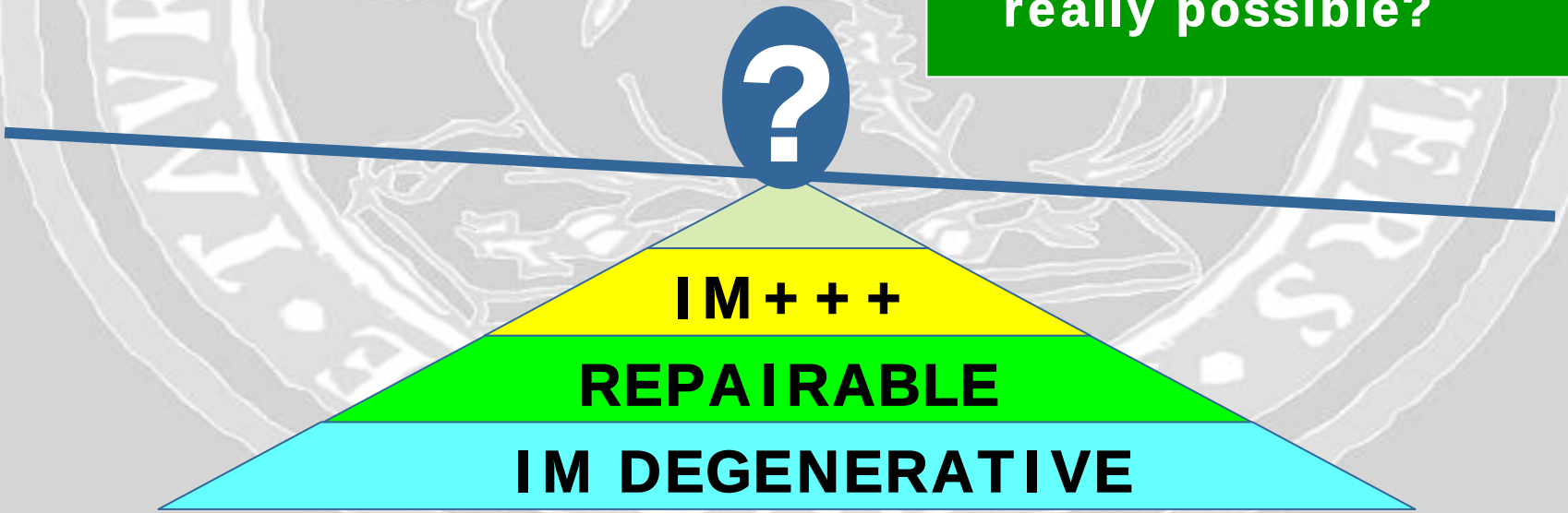


THERE ARE NO RANDOMIZED TRIALS TO SUPPORT ANY PARTICULAR COURSE OF ACTION

Mitral Regurgitation
MV REPAIR

It is impossible to make an asymptomatic pt feel better after heart surgery

Watchful waiting is really possible?



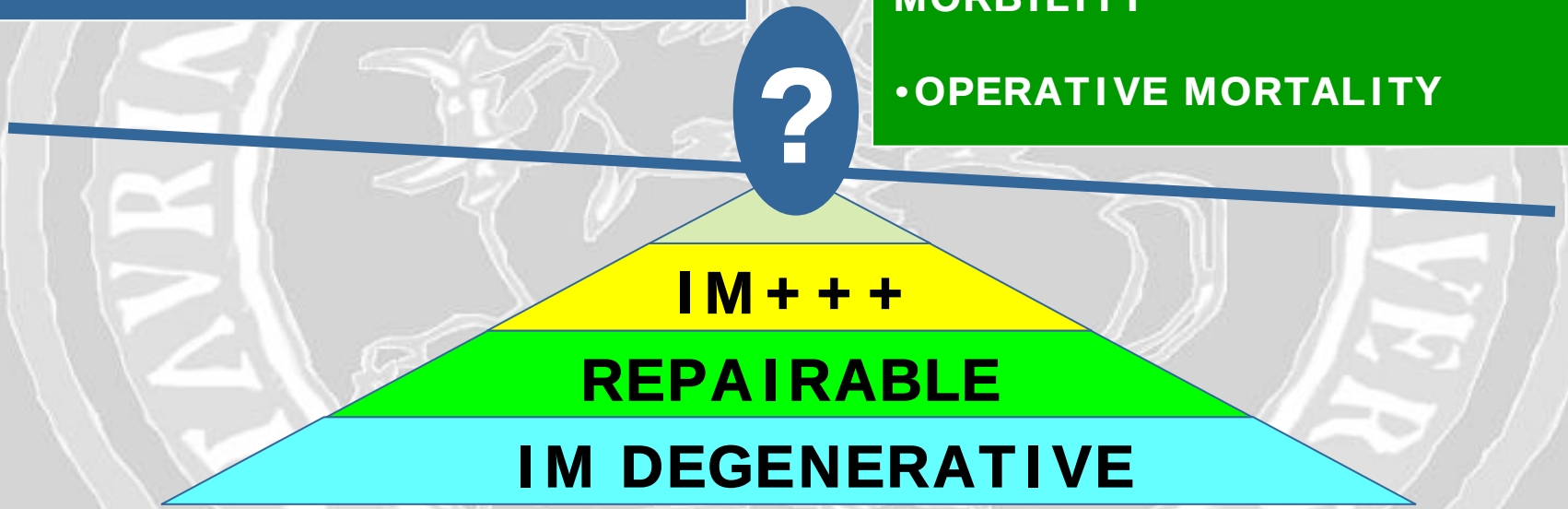
Mitral Regurgitation
MV REPAIR

GOOD RESULTS OF VALVE REPAIR

LV DYSFUNCTION PREVENTION

- **RISK OF VALVE REPLACEMENT**
- **PROSTHETIC VALVE-RELATED LONG TERM MORTALITY AND MORBILITY**

- **OPERATIVE MORTALITY**

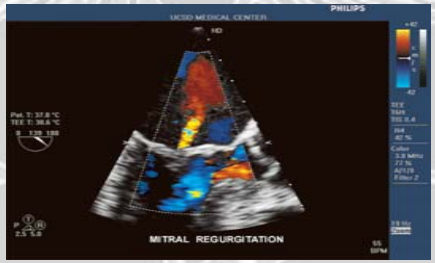


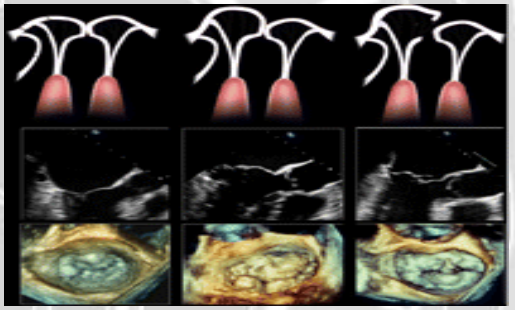
Valve repairs is done only in about 50% of pts in USA and Europe. In centres with surgeons proficient in valve repair, more than 80%-90% repair rates are achieved.

Mitral Regurgitation
MV REPAIR

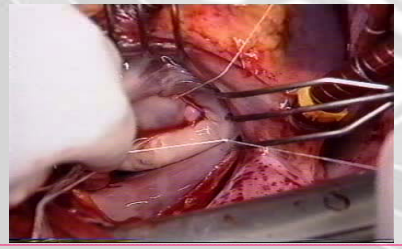
In the last 4-5 years substantial progress has been achieved to improve its:

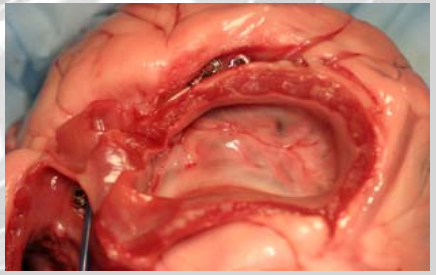
- **Diagnosis**



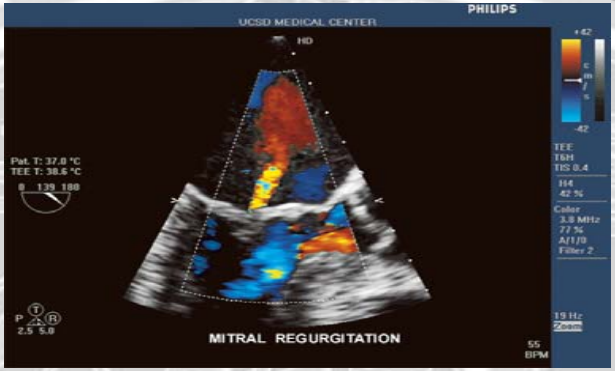


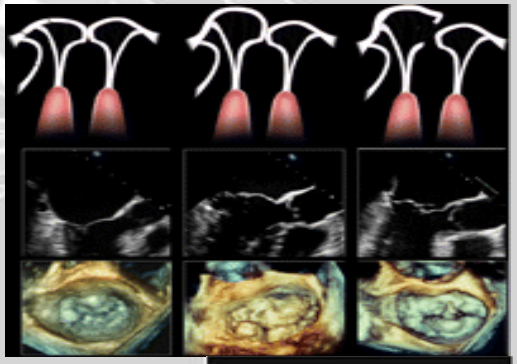
- **Surgical treatment**
  - Mitral valve approach
  - Mitral valve repair





Mitral Regurgitation
Doppler echocardiography





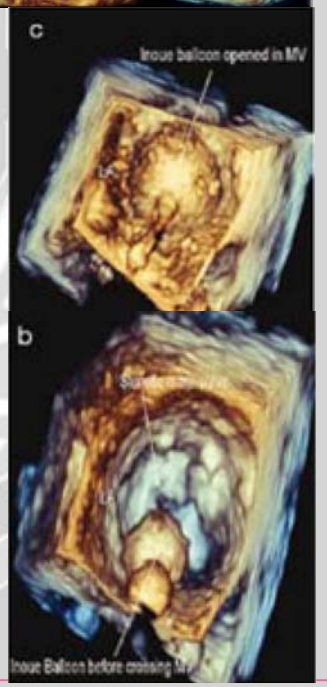
TT, 3D ECO and TEE provides:

- Precise pre-operative evaluation

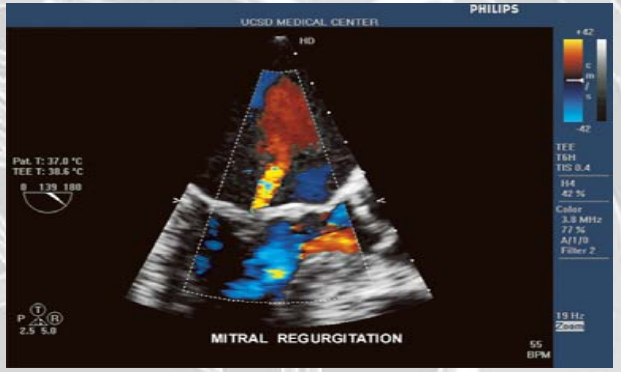
- to exactly plan the surgical strategy
- to evaluate preop risk

- Real time intraoperative evaluation

- Post-operative results evaluation



Mitral Regurgitation
Doppler echocardiography



TT 3D ECO and TEE provides:

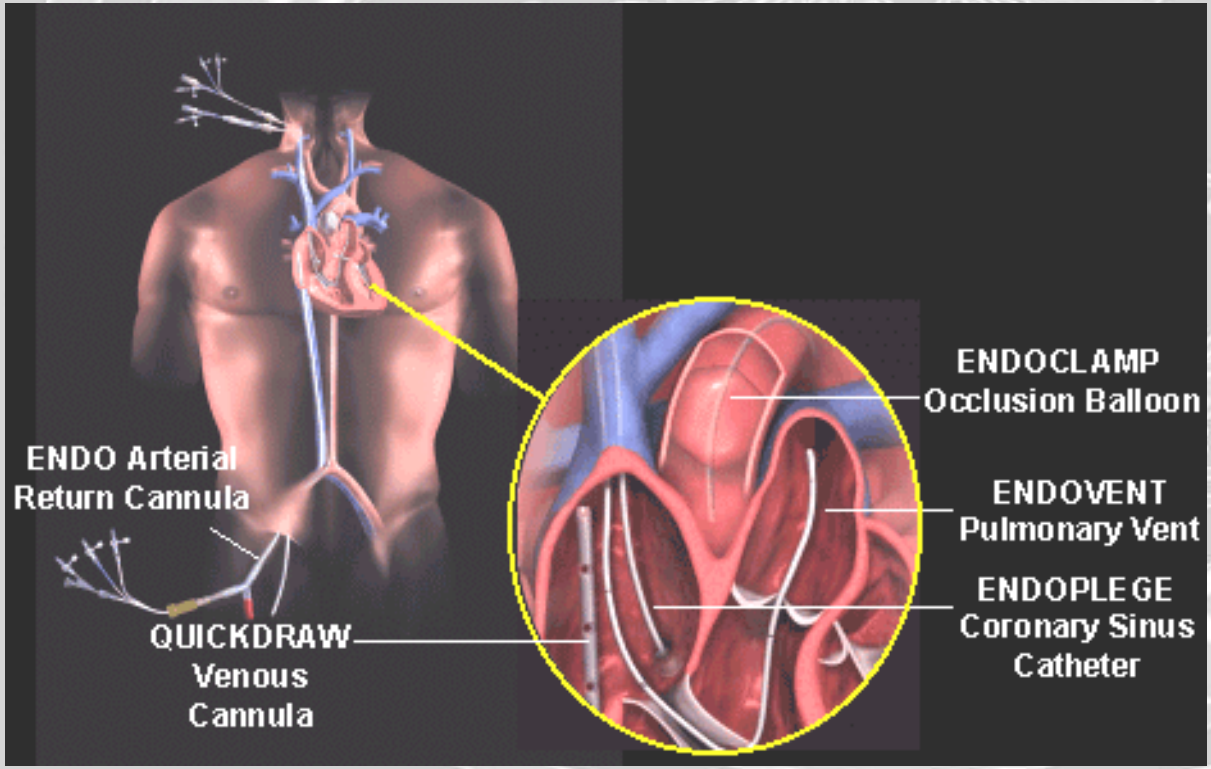
functional anatomical information that is CRUCIAL for assessment of REPARABILITY by defining:

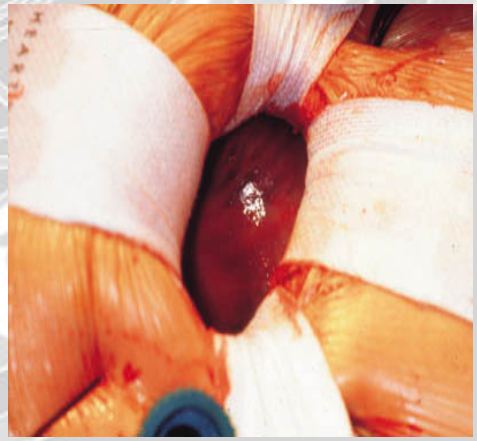
- **cause,**
- **mechanism,**
- **presence of calcification,**
- **localization of lesions.**

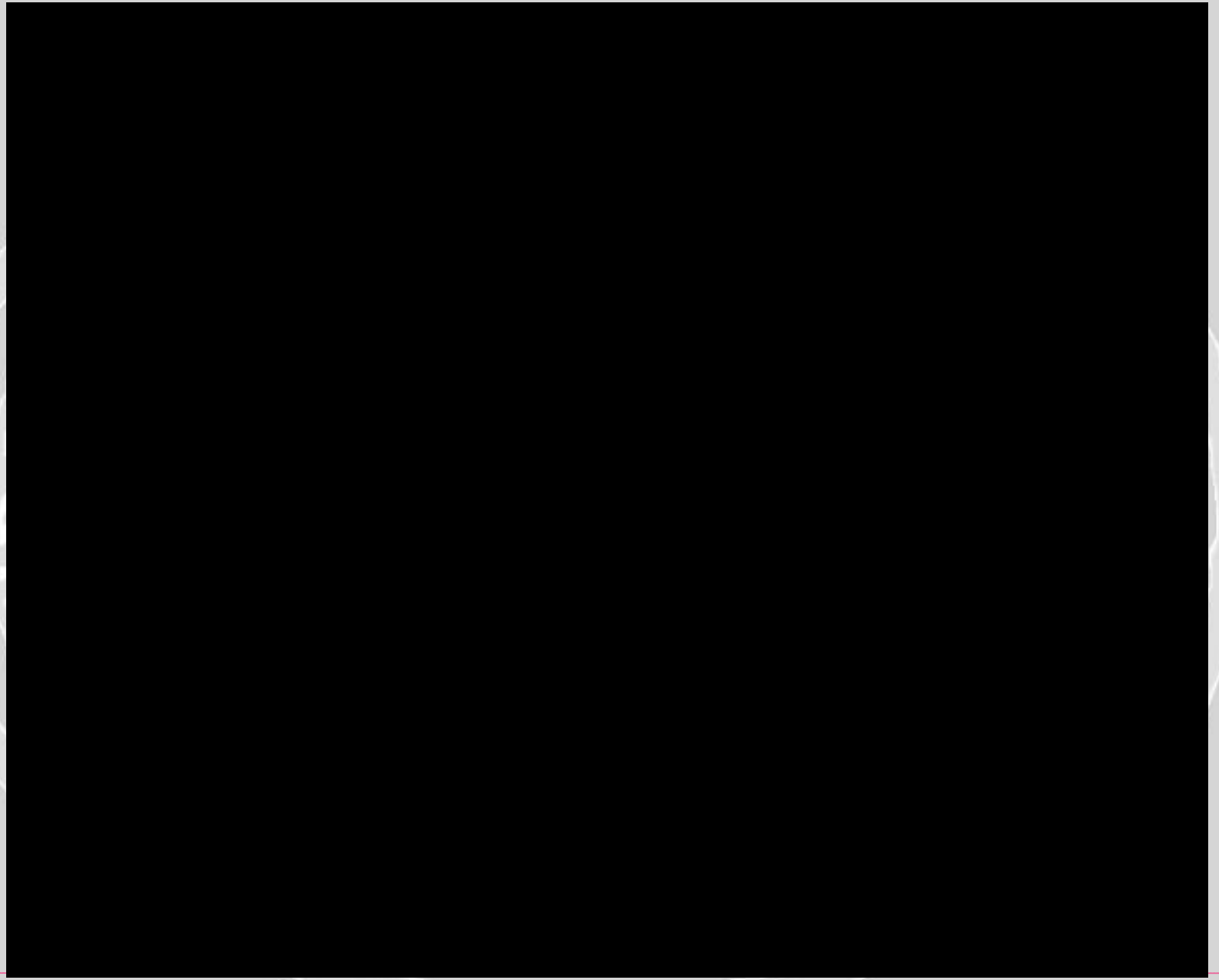
Mitral Regurgitation
MV REPAIR

MINIMALLY INVASIVE CARDIAC SURGERY

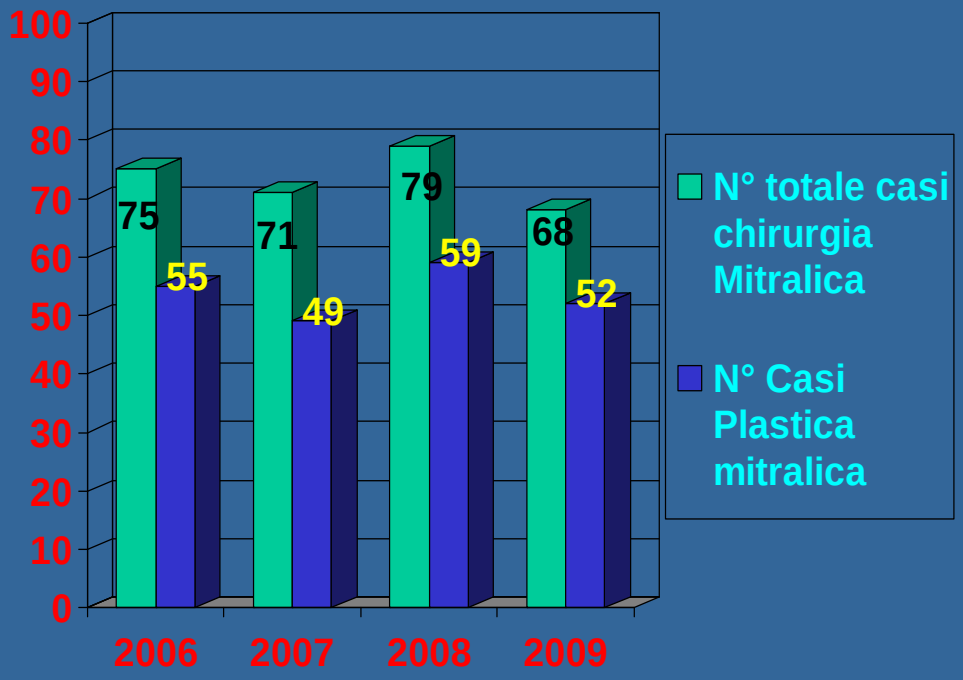
The new surgical approach

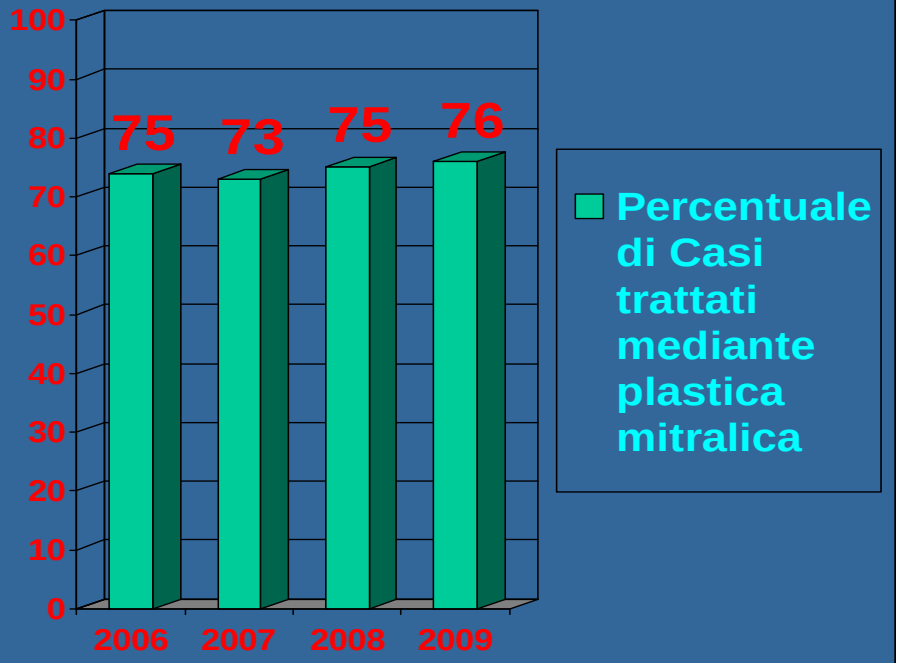






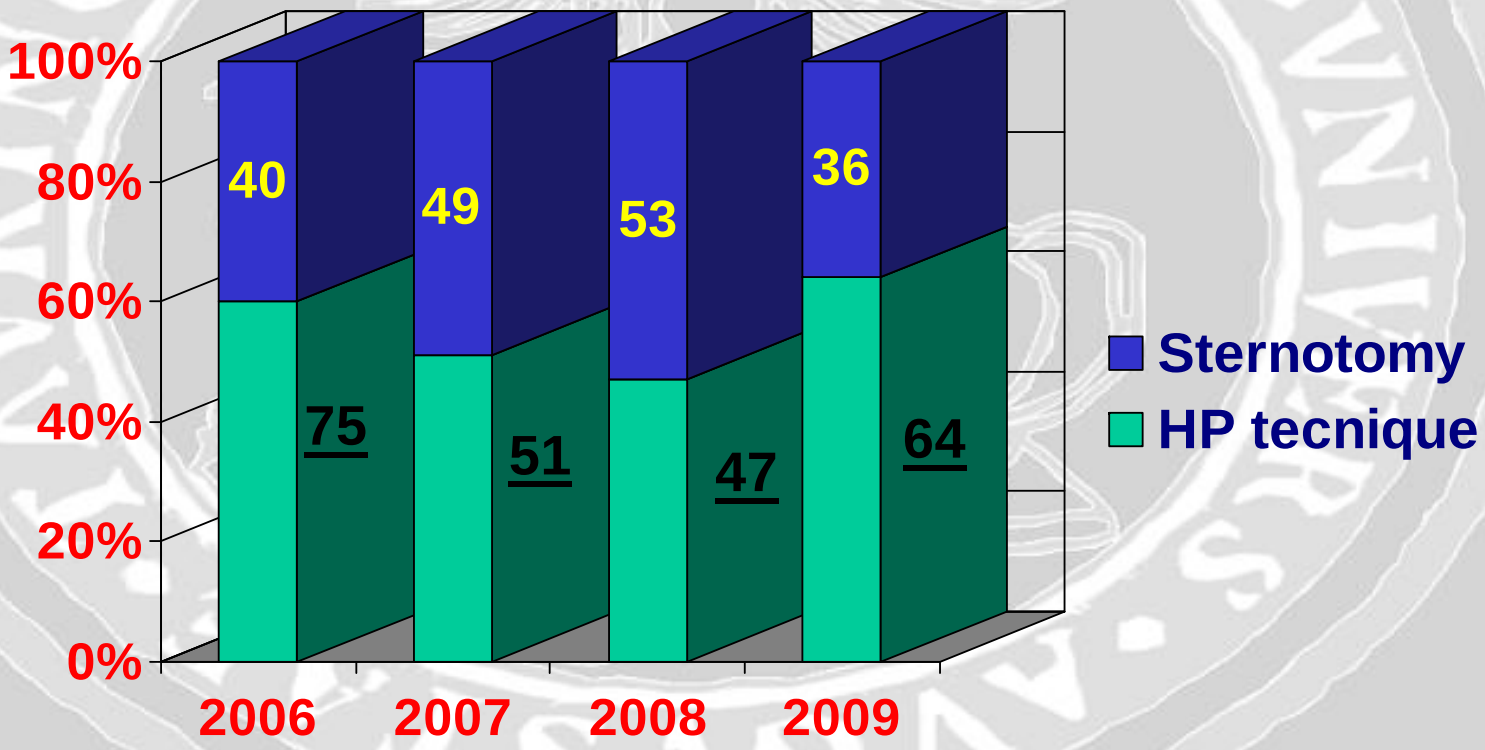
Mitral Regurgitation
MV REPAIR



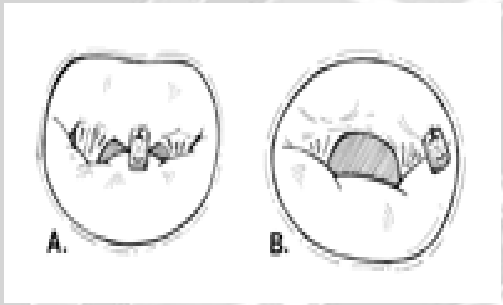


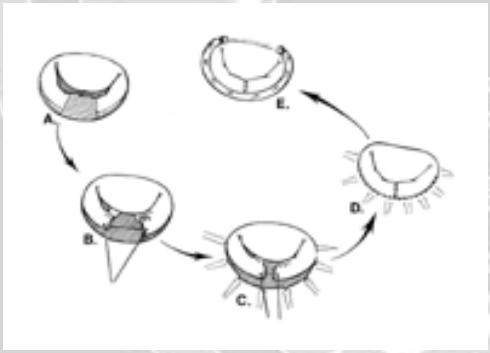
Mitral Regurgitation
MV REPAIR

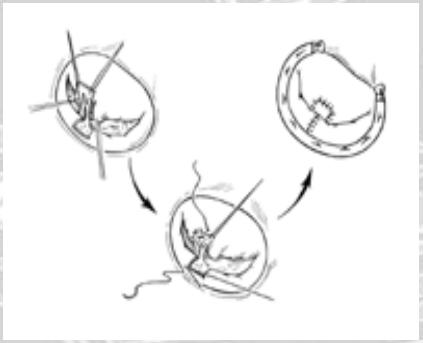
Mitral valve approach

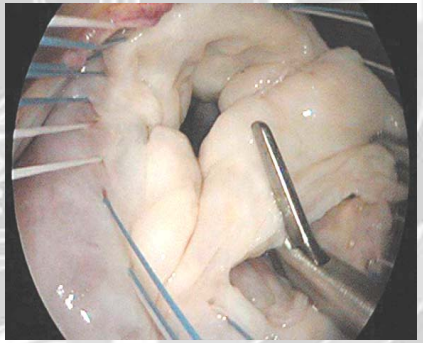


Mitral valve repair
Surgical Technique









Valve repair includes an arrey of valvular, subvalvular and annular procedures aimed at restoration of leaflets coaptation and elimination of MR.

Mitral Regurgitation
Indications for operation

MR severe **degenerative**

- **Posterior leaflet prolapse / flail leaflet** **70-80%**
- Anterior leaflet prolapse 8%
- both leaflets prolapse 12-20%
- paracommissural prolapse <10%
- annular calcification

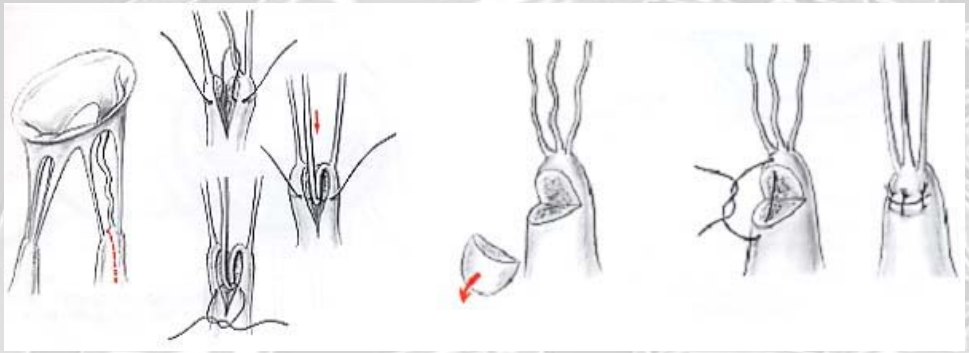
Mitral repair

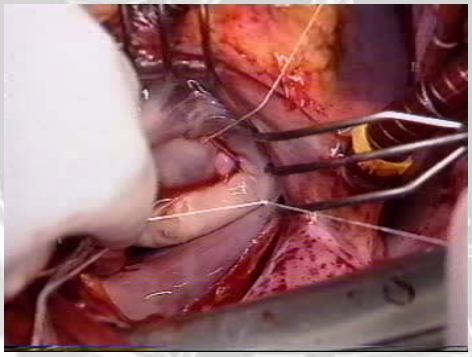
Reoperation free at 10 yrs

LPM **90/100%**

LPM + LAM **85%**

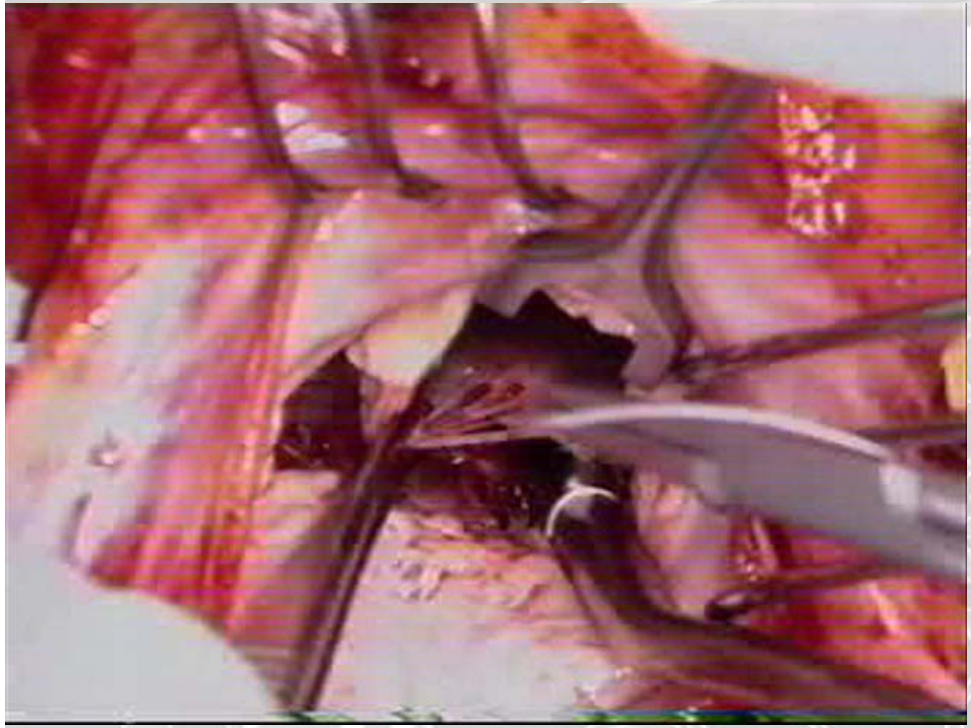
Mitral valve repair
Surgical Technique
subvalvular procedures

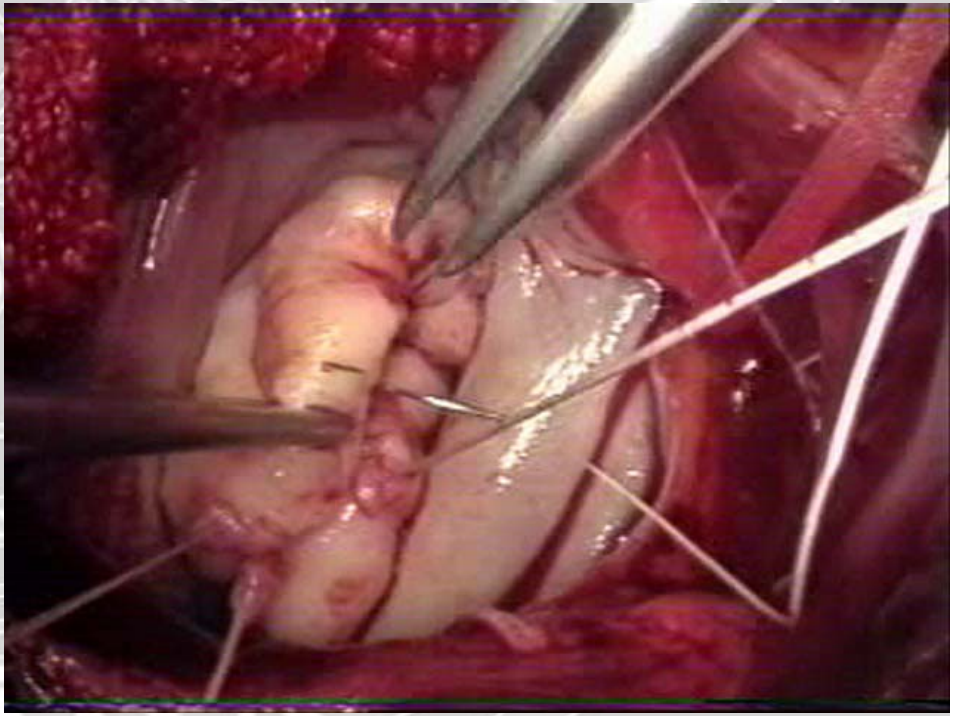




ARTIFICIAL CHORDAE

Does not substitute more traditional techniques, but it allows to increase the number of valve repairs





Mitral Regurgitation

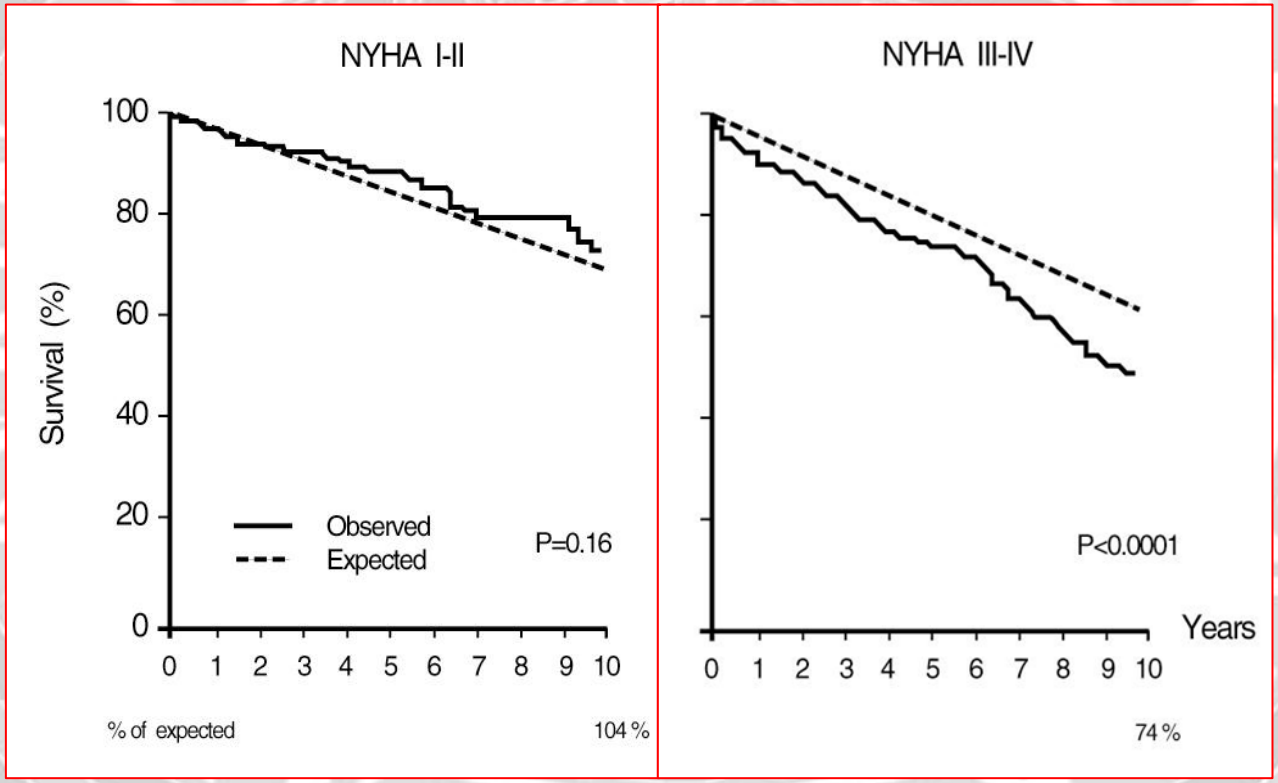
Asymptomatic mitral regurgitation: repair now or later?

It must be demonstrated:

- **Improves the overal survival**
- **Improves quality of life in comparison to the disease process natural course.**

Mitral Regurgitation

Comparison of observed with expected survival after surgery



patients in NYHA I / II (left) and in class III / IV (right)

Tribouilloy C.M. Circulation 1999; 99:400-405

Mitral Regurgitation
Operative mortality

- isolated mitral valve repair can be below **1 %**

patients younger than 75 years

Thomson H.Cardiology in Review; 2001; 9; 3, 137-143

NYHA I / II	**NYHA III / IV**
0 %	**2.5 %**

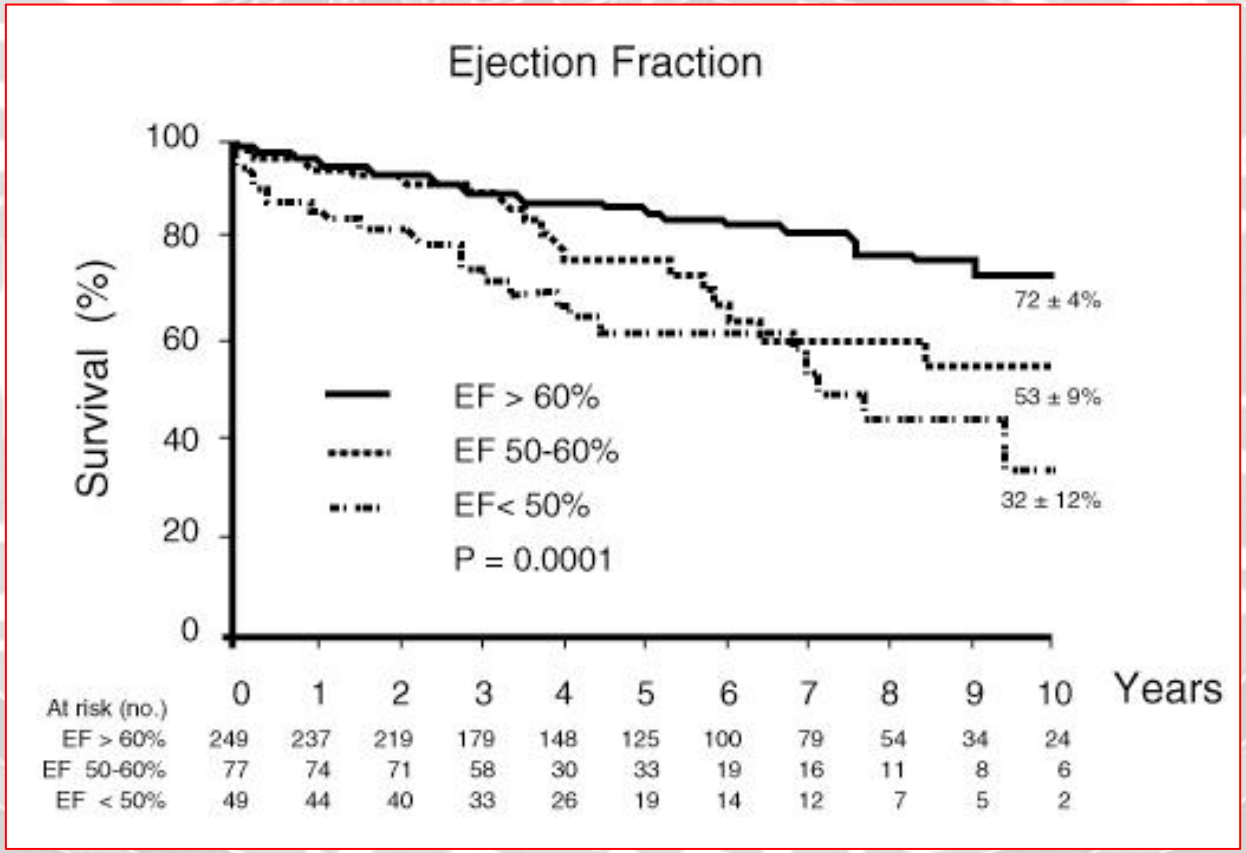
David T. *J Thorac Cardiovasc Surg 1998;118:1279-83*
Cohn L. *J Am Coll Cardio 1990:16:1575-8*
Perier P. *Ann Thorac Surg 1997;64:445-450*

5 years freedom from reoperation 95-100 %

David et coll. J.thorac.Cardiovasc.Surg 2003

Mitral Regurgitation

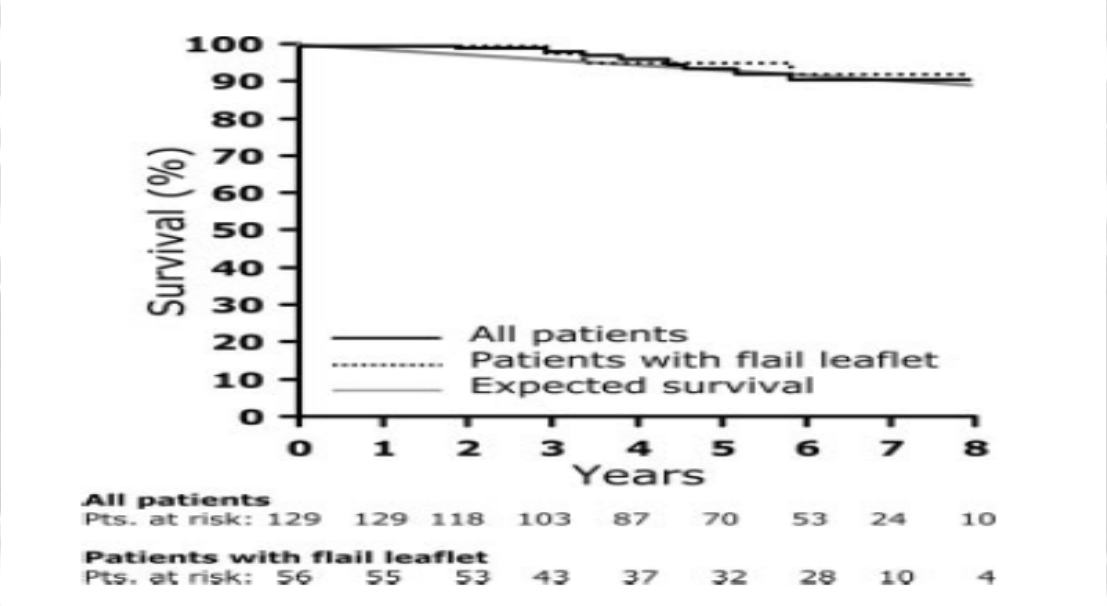
Ejection Fraction preop. and survival postop.



Enriquez-Sarano M., Circulation 1994;90:830-837

Outcome of Watchful Waiting in Asymptomatic Severe Mitral Regurgitation

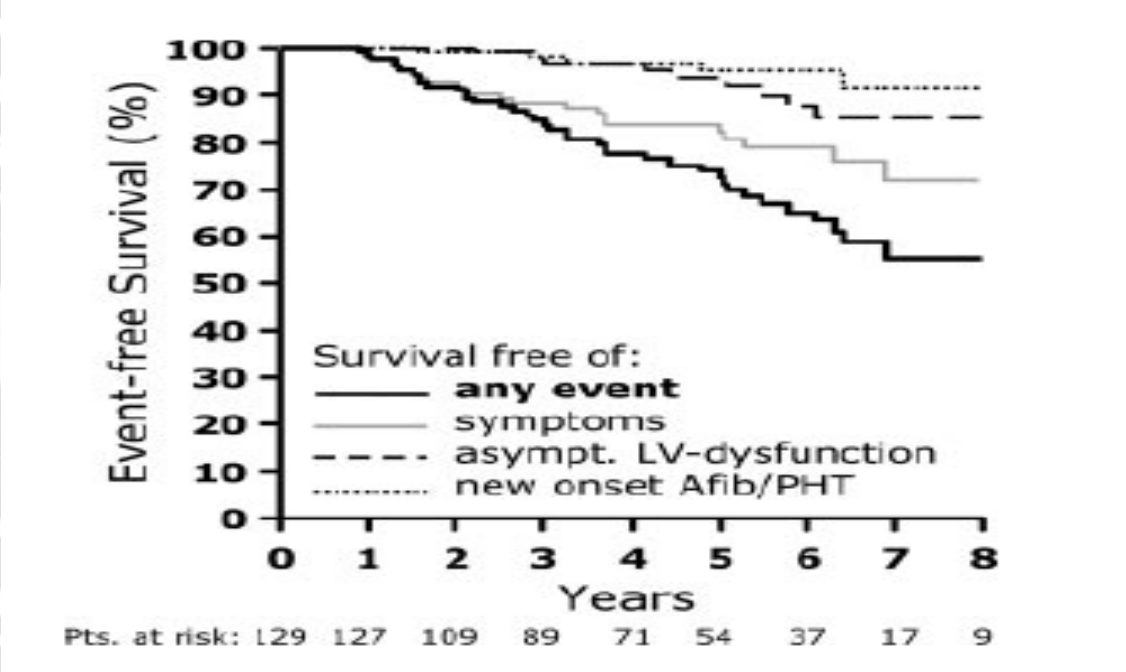
Raphael Rosenhek, MD; Florian Rader, MD; Ursula Klaar, MD; Harald Gabriel, MD; Marcel Krejc, PhD; Daniel Kalbeck, PhD; Michael Schemper, PhD; Gerald Maurer, MD; Helmut Baumgartner, MD



Asymptomatic pts with severe degenerativeMR
can be safely followed up until either symptoms occur or currently recommended cutoff values for LV size, LV function, or pulmonary hypertension are reached.
This management strategy is associated with good perioperative and postoperative outcome but **requires careful follow-up**.

Outcome of Watchful Waiting in Asymptomatic Severe Mitral Regurgitation

Raphael Rosenhek, MD (*Circulation*. 2006;113:2238-2244.)



Postoperative outcome was good with regard to survival, symptomatic status, and postoperative LV function.

Outcome of Watchful Waiting in Asymptomatic Severe Mitral Regurgitation

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Survival **free of any indication** for surgery was

92±2% at 2 years,
78±4% at 4 years
65±5% at 6 years,
55±6% at 8 years.

patients enrolled had generally **smaller ventricular dimensions** (likely reflecting less severe consequences of MR)

The favorable outcome might also be related to the significantly **younger mean age** of the patients (55 ± 15 years).

ORIGINAL RESEARCH

Outcomes in Mitral Regurgitation Due to Flail Leaflets

A Multicenter European Study

Francesco Grigioni, MD, PHD,* Christophe Tribouilloy, MD, PHD, FACC,†
Jean Francois Avierinos, MD,‡ Andrea Barbieri, MD,§ Marinella Ferlito, MD,*
Faouzi Trojette, MD,† Laurence Tafanelli, MD,‡ Angelo Branzi, MD,*
Catherine Szymanski, MD,† Gilbert Habib, MD,‡ Maria G. Modena, MD,§
Maurice Enriquez-Sarano, MD, FACC,‖ on behalf of the MIDA Investigators

Bologna and Modena, Italy; Amiens and Marseille, France; and Rochester, Minnesota

JACC: CARDIOVASCULAR IMAGING, VOL. 1, NO. 2, 2008
MARCH 2008:133–41

A Multicenter European Study

this is the first multicenter study on the long term outcome of MR diagnosed by echocardiography under nonsurgical management and during post-surgical follow-up.

The **MIDA** (Mitral Regurgitation International Database) is a registry created for multicenter study of MR with echocardiographically diagnosed flail leaflet as a model of pure, organic

394 patients :age 64 ± 11 years;

67% men;

64% in NYHA I,II;

left ventricular ejection fraction 67 ± 10%

JACC: CARDIOVASCULAR IMAGING, VOL. 1, NO. 2, 2008
MARCH 2008:133–41

ORIGINAL RESEARCH

Outcomes in Mitral Regurgitation Due to Flail Leaflets

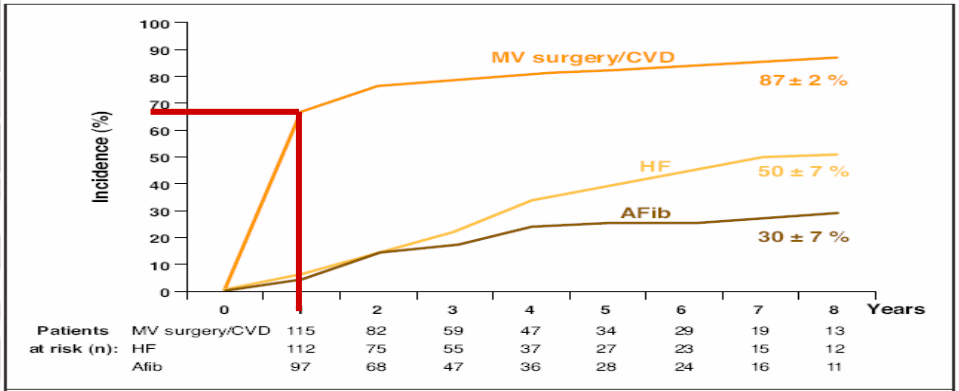


Figure 1. Long-Term Outcome of Mitral Regurgitation Due to Flail Leaflet Under Medical Treatment

Kaplan-Meier curves showing the estimated 8-year cumulative incidence of atrial fibrillation (AFib), heart failure (HF), or mitral valve (MV) surgery/cardiovascular death (CVD) during nonsurgical management of patients (n = 394) with mitral regurgitation due to flail leaflet. The results indicate that patients experienced high rates of adverse events under nonsurgical management, and surgery seemed almost unavoidable at 8 years.

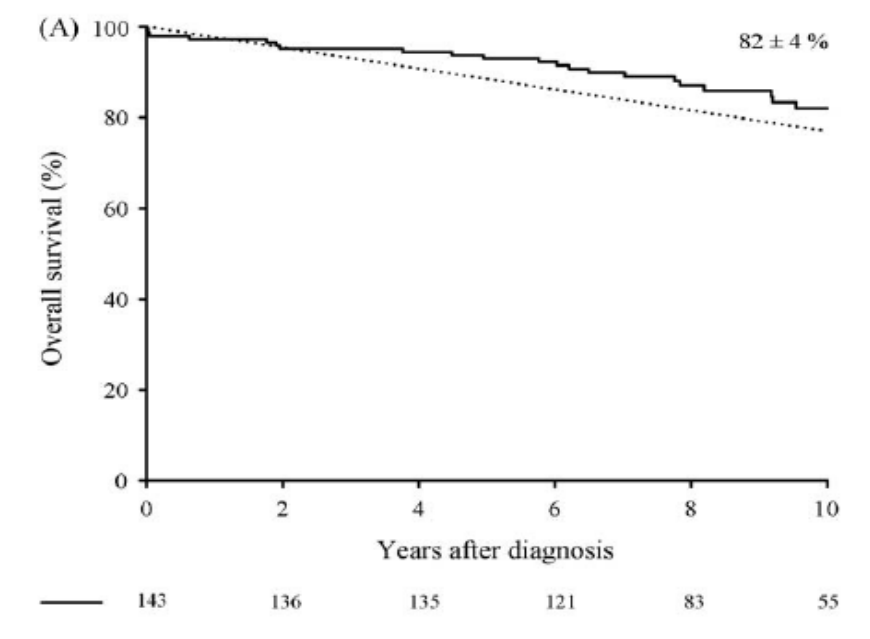
The results of this multicenter study do provide suggestive evidence **in favor of early consideration of surgery when MV repair is feasible**.

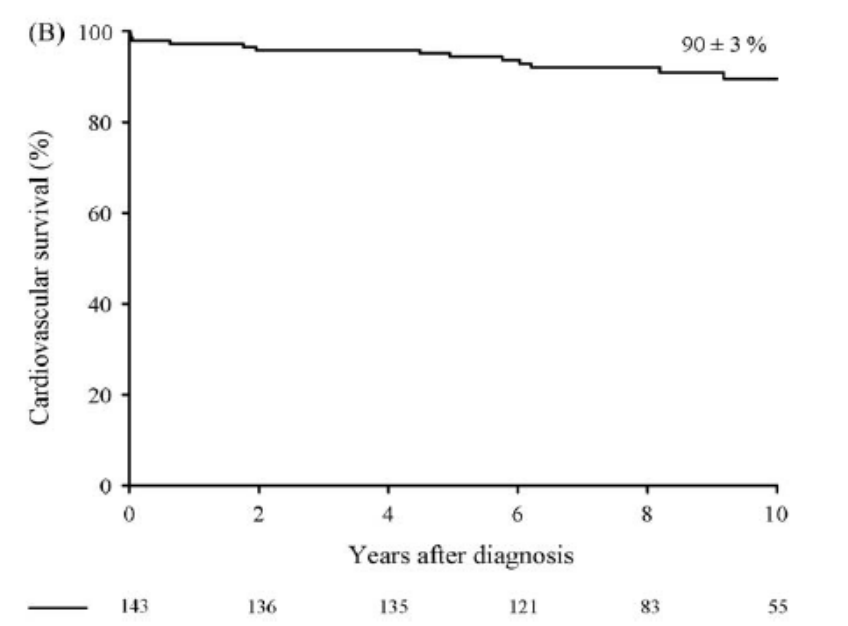
1) high incidence of adverse events under medical treatment;
2) generalized necessity of surgery in the medium term;
3) low surgical risk;
4) more favorable long-term outcome when the intervention is performed in an early phase of the disease.

Long-term clinical outcome of mitral valve repair in asymptomatic severe mitral regurgitation☆,☆☆

Fabien Chenot [1], Patrick Montant [1], David Vancraeynest, Agnès Pasquet, Bernhard Gerber, Philippe Henri Noirhomme, Gébrine El Khoury, Jean-Louis Vanoverschelde *

European Journal of Cardio-thoracic Surgery 36 (2009) 539–545





Long-term clinical outcome of mitral valve repair in asymptomatic severe mitral regurgitation☆,☆☆

Fabien Chenot [1], Patrick Montant [1], David Vancraeynest, Agnès Pasquet, Bernhard Gerber, Philippe Henri Noirhomme, Gébrine El Khoury, Jean-Louis Vanoverschelde *

4.2. Conclusions

Our data demonstrate that mitral valve repair in asymptomatic patients with severe degenerative MR is usually associated with an excellent prognosis, except in the presence of preoperative MR-related complications. This suggests that mitral valve repair should be performed early in the presence of severe MR, before the development of any MR-related complications.

Mitral Regurgitation conclusion

The optimal timing of surgical intervention in patients with asymptomatic severe mitral regurgitation remains **controversial**,because **the potential benefits of early surgery need to be balanced against the operative risks.**

Mitral Regurgitation conclusion

- On average, asymptomatic patients who had **early surgical correction** incurred **lower mortality and morbidity than pts who were followed more conservatively**

- They also tended to have **better overall, survival than that expected in the age- and gender-matched population.**

Mitral Rigurgitation conclusion

Early surgery was associated also with **better,cardiovascular and event.free survival**

The potential advantages of early surgical treatment **seem largely to depend on the ability to achieve MV repair.**

Mitral Regurgitation conclusion

- Among pts **who were not operated on early**, those who were **regularly followed** had a higher likelihood for being referred in a timely manner to surgery and hence had **better long-term outcome than those who were not.**

Mitral Regurgitation conclusion

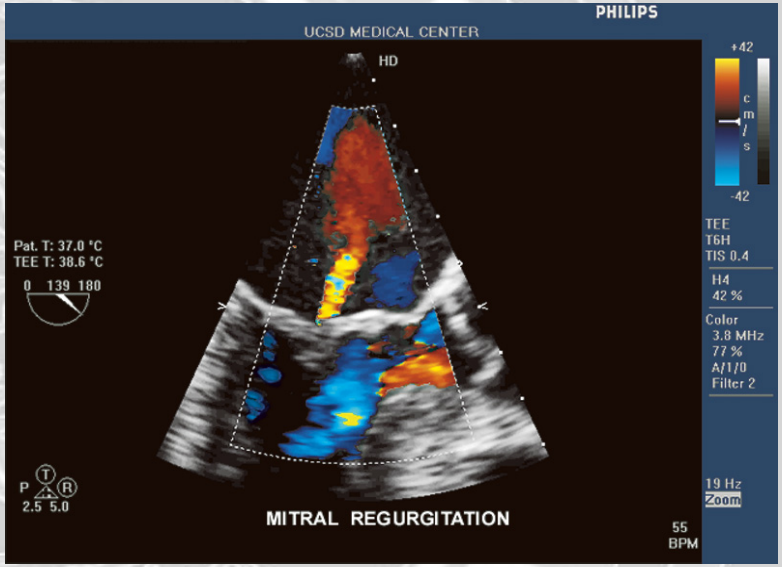
- Asymptomatic pts presenting with **AF, pulmonary hypertension or both** had an extremely **poor prognosis when treated conservatively**


GRAZIE !

MITRAL VALVE IS LIKE A WOMAN.....

...THE MORE YOU STUDY IT THE LESS YOU WILL UNDERSTAND IT!!

Mitral Regurgitation
Doppler echocardiography



SEVERE MR

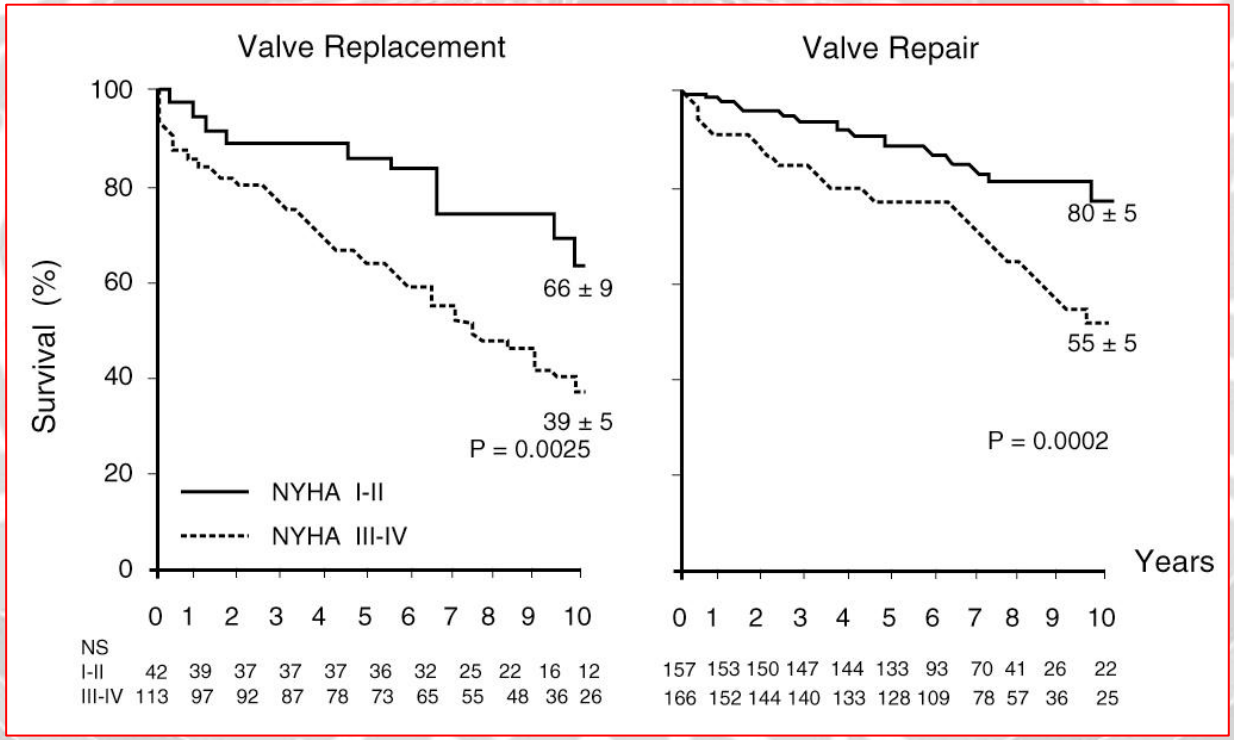
Regurgitant volume(RV) >60mL

Effective regurgitant orifice area(ERO) >40mm2

E.SARANO M ET ALL. N.Engl J Med. Mar3,352(9):928-9.

Mitral Regurgitation

Overall survival compared for patients in NYHA class I / II and those in class III / IV who had valve replacement (left) or valve repair (right)



Tribouilloy C.M. Circulation 1999; 99:400-405