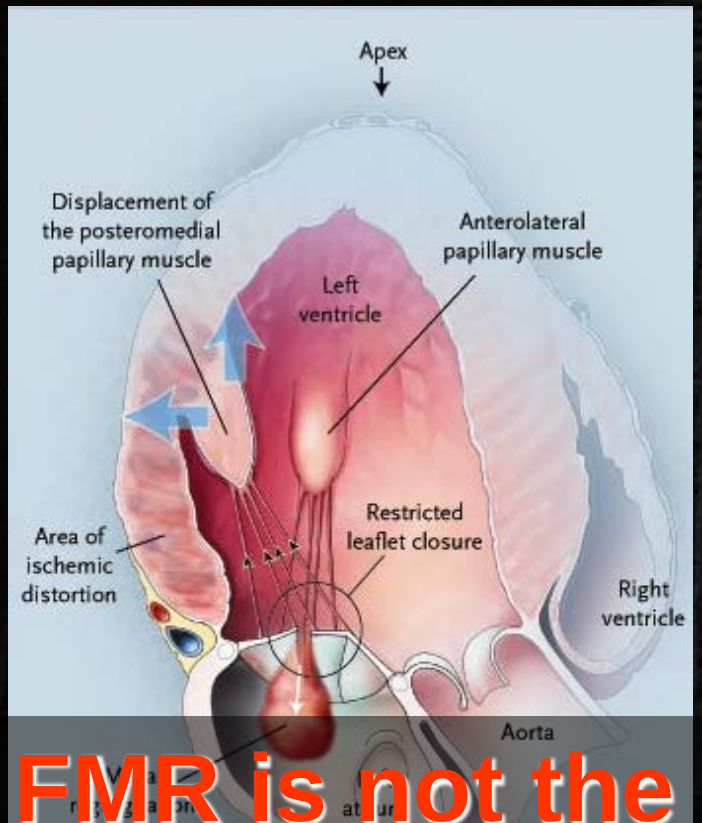
Functional Mitral Regurgitation; therapeutic continuum overview

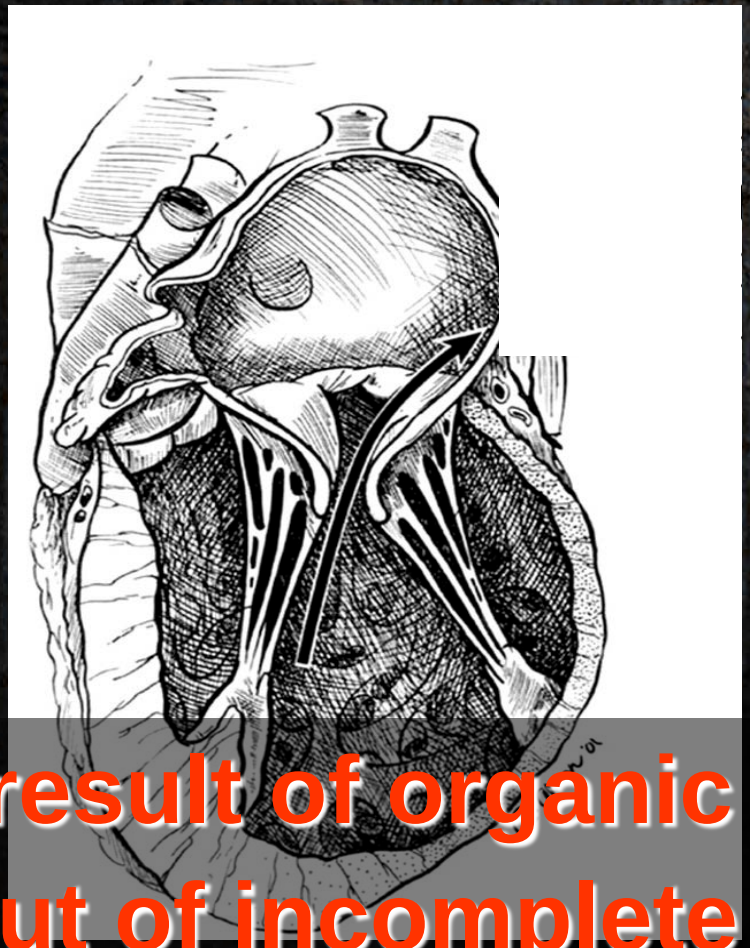
Michele Senni

Cardiologia 1 – Scompenso e Trapianti di Cuore

A.O. PAPA GIOVANNI XXIII

Functional Mitral Regurgitation





FMR is not the result of organic mitral lesions but of incomplete closure of normal leaflets

Levine R N Engl J Med 2004;351:1681

Prevalence of moderate to severe FMR in chronic HF

A Japanese cohort of 1.701 patients chronic HF, moderate to severe MR was present in 6% of those.

Fumijo K et al. Heart and Vessels 2013

Large centre US cohorts have shown that 29% of 370 chronic HF patients had moderate/severe MR.

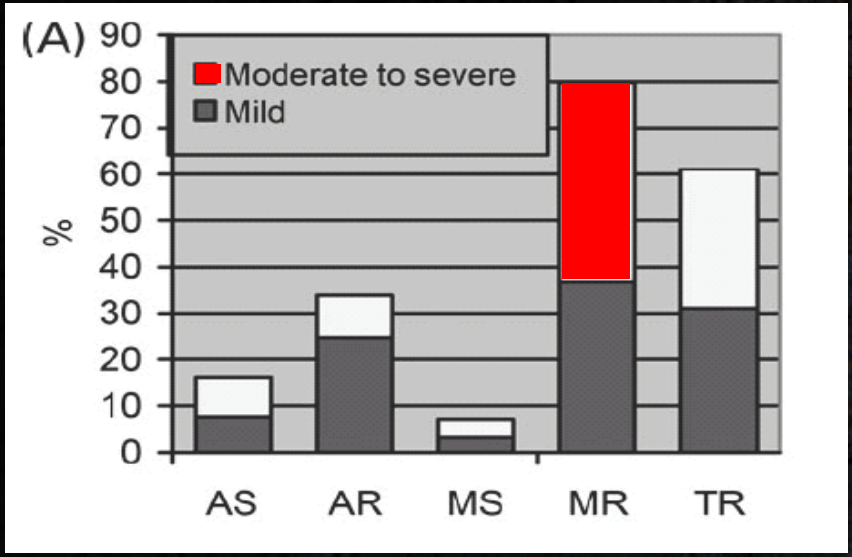
Varadarajan P et al. J Am Echocardiogr 2006

An Italian mutli-center registry reported that 42% of 243 chronic HF patients of ≥ 70 years had moderate to severe MR.

Cioffi G et al. J Card Fail 2004

Prevalence of moderate to severe FMR in acute HF

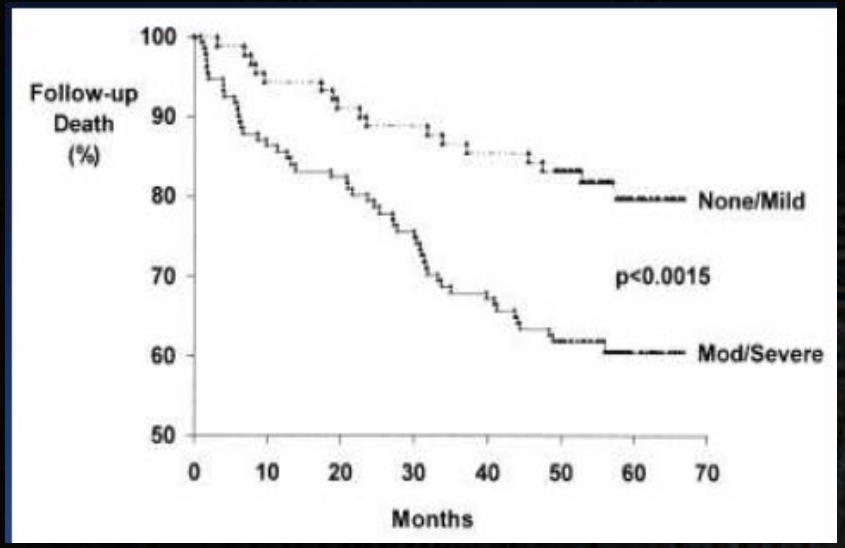
EuroHeart Failure Survey II



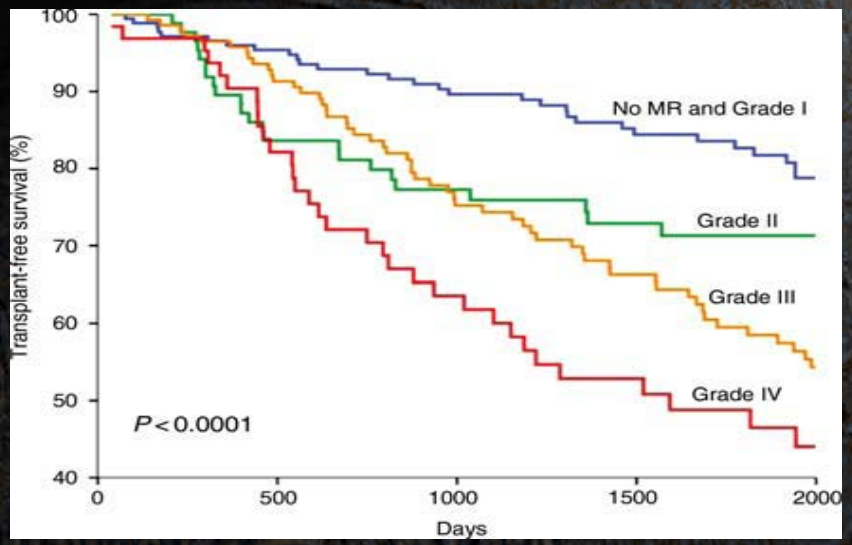
Nieminem MS Eur Heart J 2006

One cohort of inpatients had moderate to severe MR in 74% of heart failure patients.

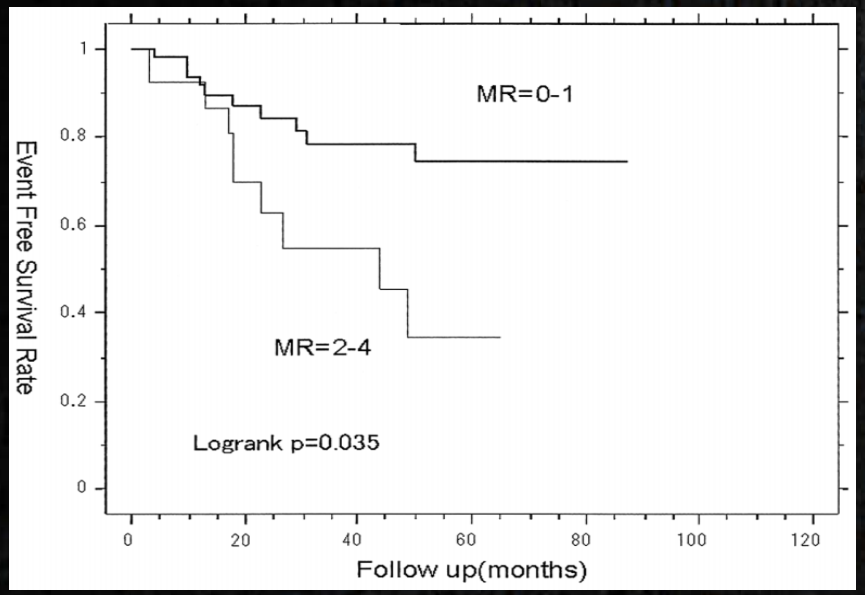
Robbins JD et al. Am Heart J 2003



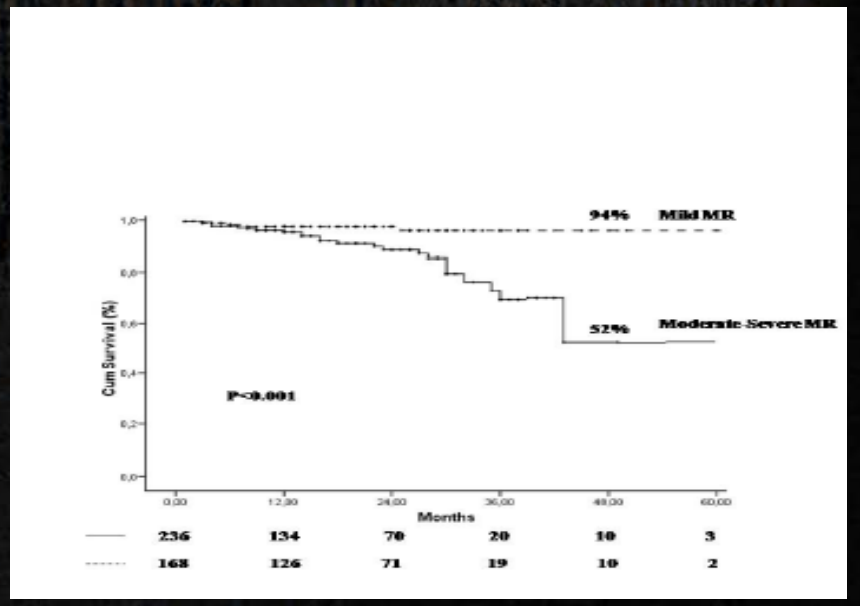
Robbins, Am J Cardiol 2003



Bursi, European J Heart failure 2010

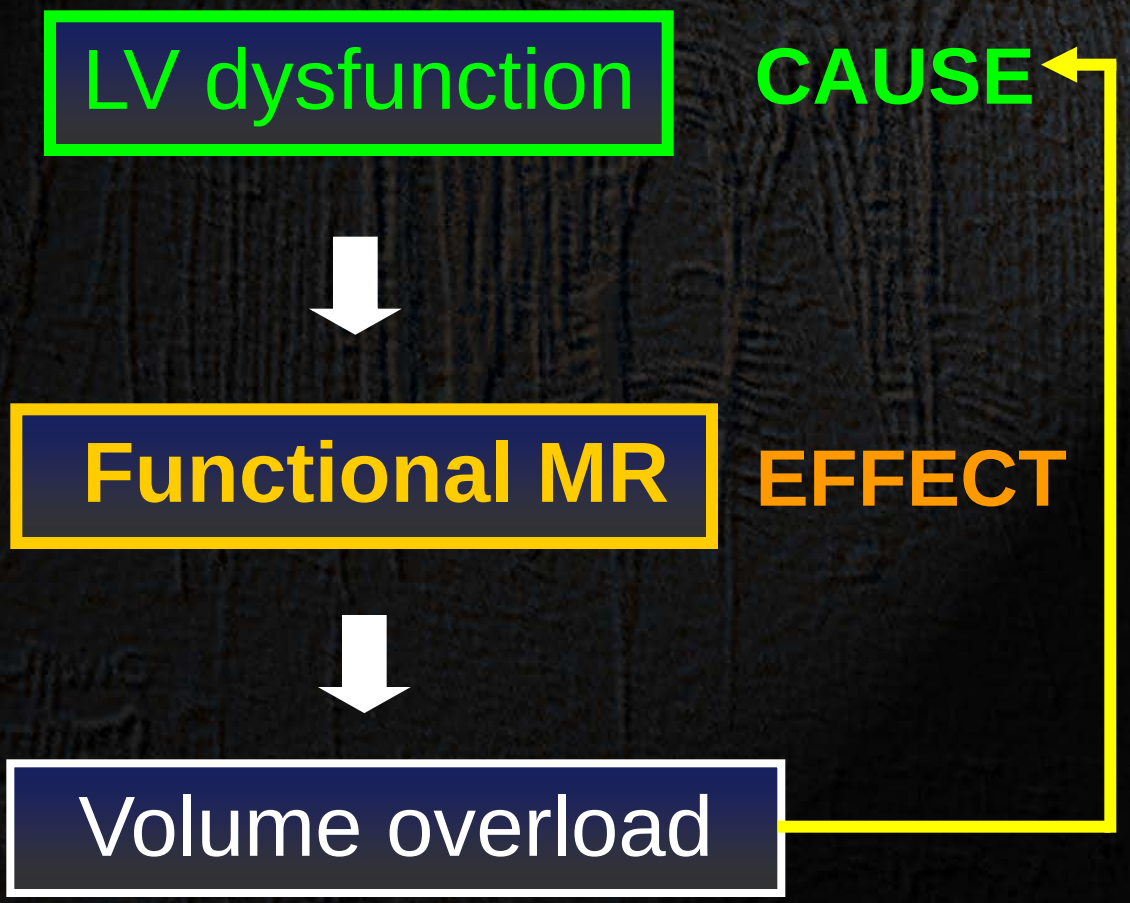


Eisuke Amiya, Circ J 2006

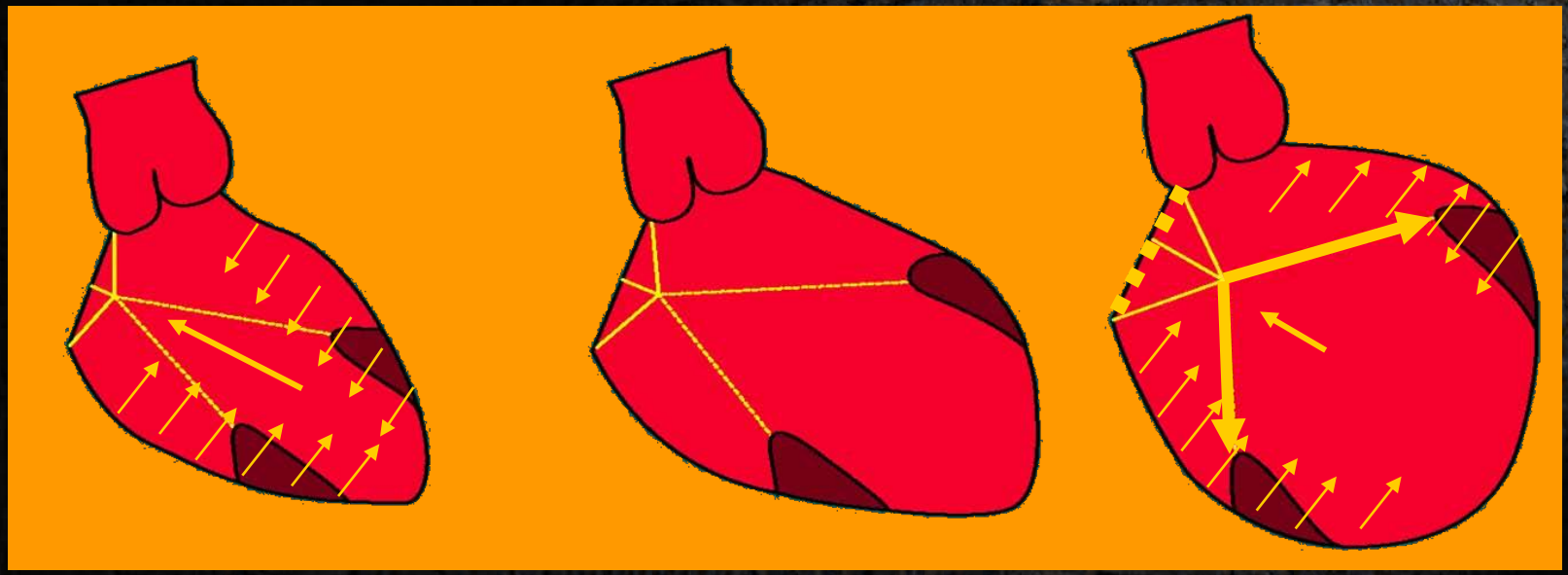


Agricola, Eur J Heart Fail. 2009

CHF and MR


LV dysfunction
CAUSE
Functional MR
EFFECT
Volume overload
Negative contribution

Functional Mitral Regurgitation
Mechanism



- Annular dilatation/distorsion and ↓ contraction
- Apical and posterior displacement of PM (Tenting)
- Decreased closing forces
- Dyssynchrony

Options for Management Advanced HF and FMR

Optimized Medical RX ± Revascularization

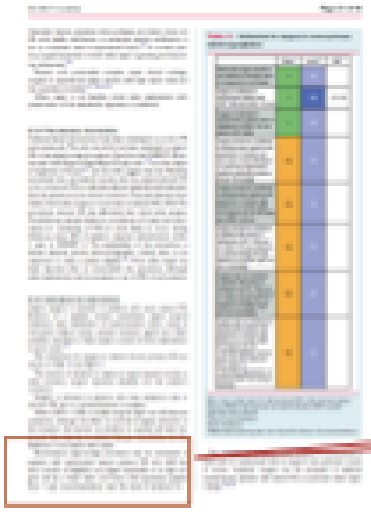
BIV Pacing

Not improved

MV
- percutaneos repair (Mitral Clip)

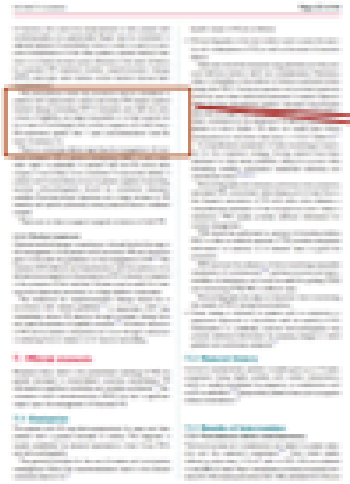
Improved

MitraClip therapy in ESC/EACTS 2012 Guidelines



Indication for primary MR

"Percutaneous edge-to-edge procedure may be considered in patients with symptomatic severe primary MR who fulfill the echo criteria of eligibility, are judged inoperable or at high surgical risk by a 'heart team', and have a life expectancy greater than 1 year (recommendation class IIb, level of evidence C)." *page 21*

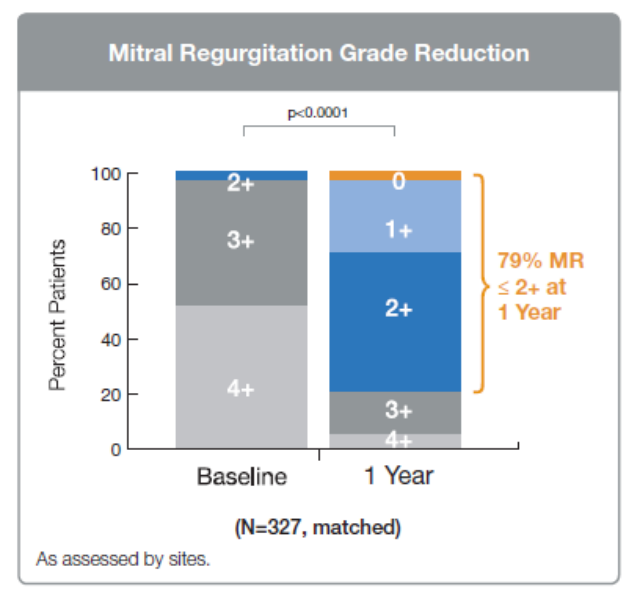


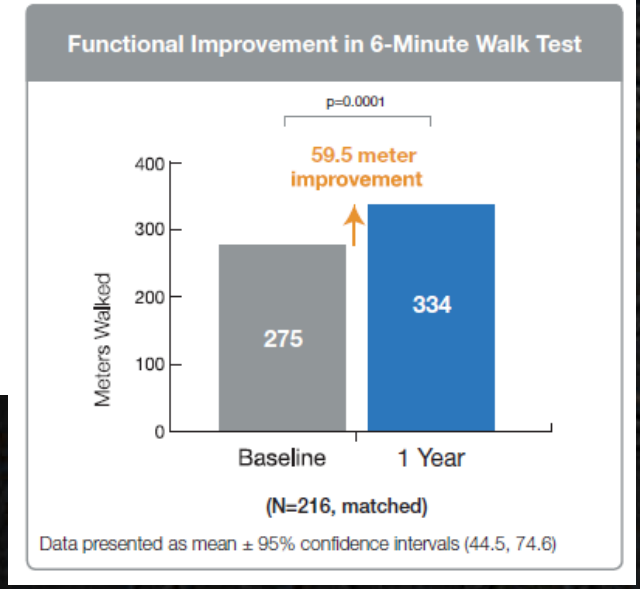
Indication for secondary MR

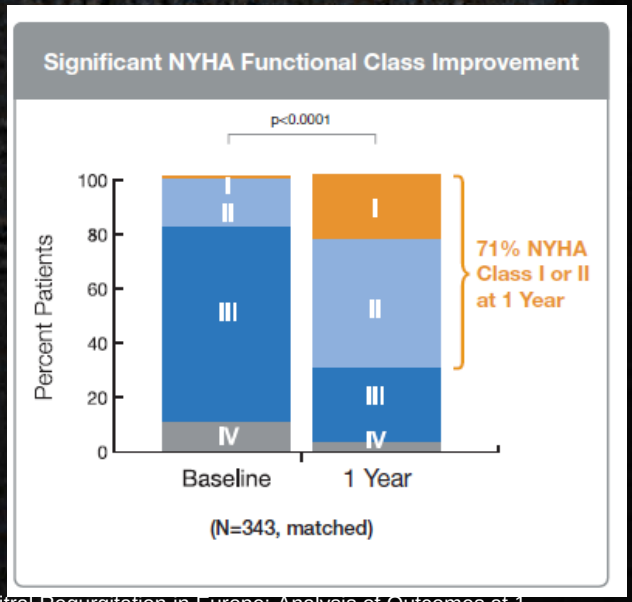
"The percutaneous mitral clip procedure may be considered in patients with symptomatic severe secondary MR despite optimal medical therapy (including CRT if indicated), who fulfill the echo criteria of eligibility, are judged inoperable or at high surgical risk by a team of cardiologists and cardiac surgeons, and who have a life expectancy greater than 1 year (recommendation class IIb, level of evidence C)." *page 25*

Source: http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/valvular-heart-disease.aspx

ACCESS EU - Real-World Clinical Experience





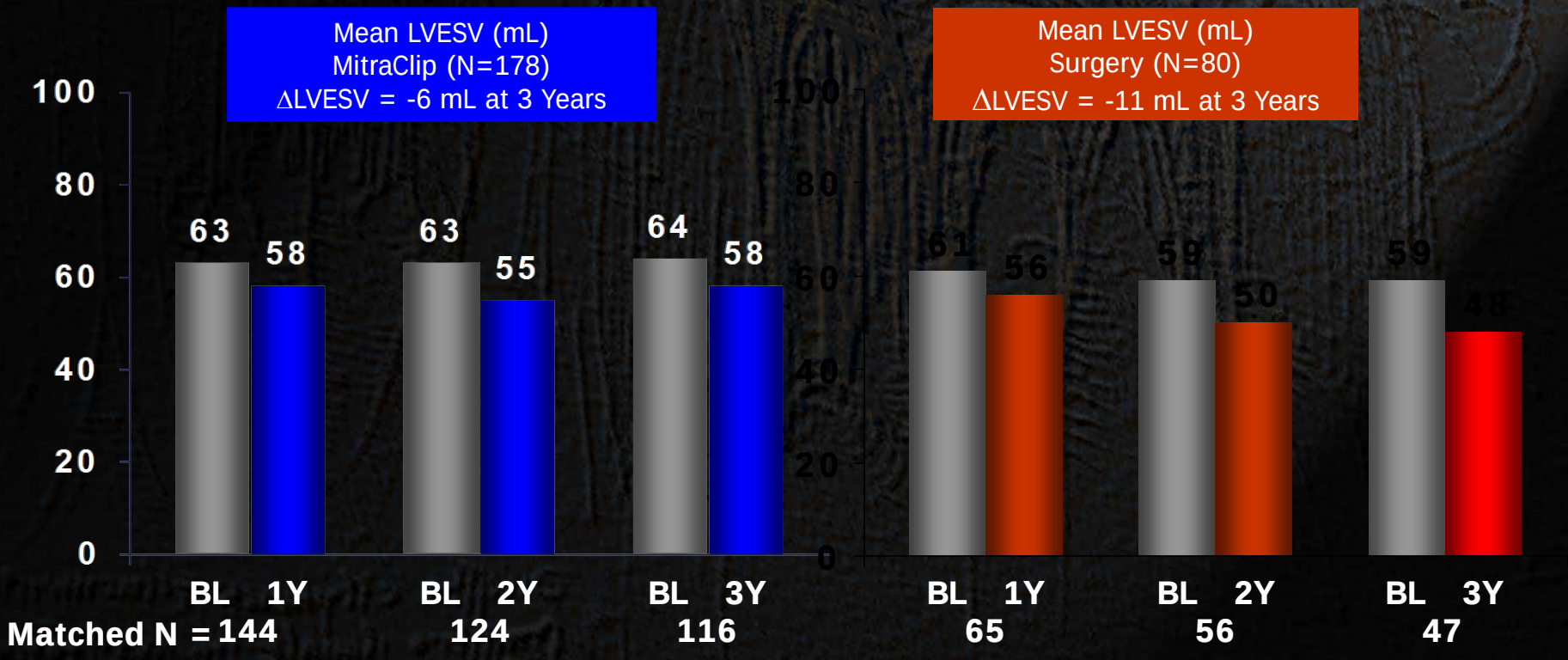


Source: Schillinger, W. ACCESS-EUROPE Phase I: A Post Market Study of the MitraClip System for the Treatment of Significant Mitral Regurgitation in Europe: Analysis of Outcomes at 1 Year. ESC 2012; August 25-29, 2012; Munich, Germany.

Maisano F. et. al. Percutaneous Mitral Valve Interventions in the Real World: Early and One Year Results From the ACCESS-EU, a Prospective, Multicenter, Non-Randomized Post-Approval Study of the MitraClip® Therapy in Europe.. J Am Coll Cardiol. 2013 Jun

MitraClip data on reverse LV remodeling
EVEREST II RCT – 3 years *(Feldman et al TCT 2012)*

Significant Reduction on Left Ventricular end Systolic Volume

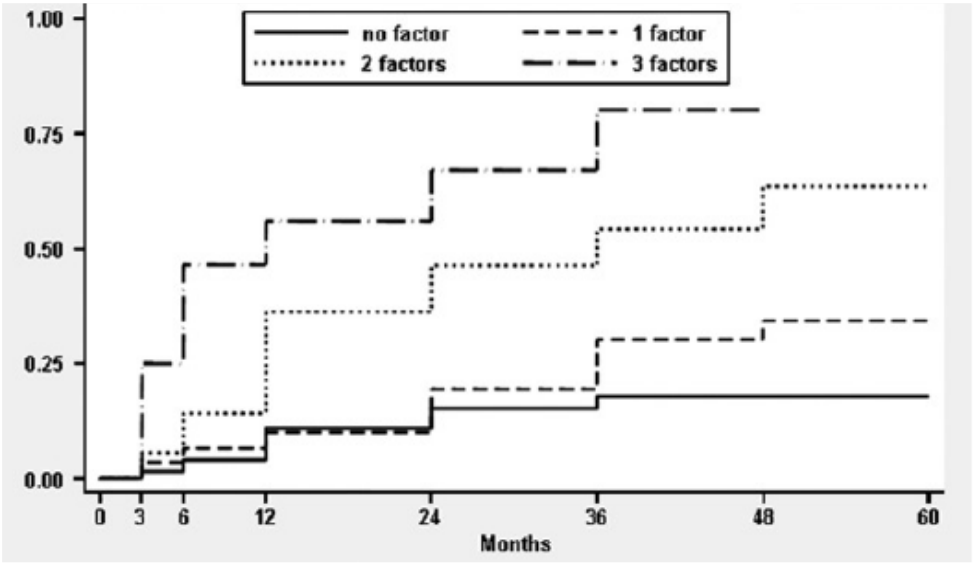


p < 0.05 for all changes from Baseline within groups

CRT Responders: who respond better?

Factors that predict CRT responsiveness:

- ✓ **Female**
- ✓ **Non-ischemic etiology**
- ✓ **LVEDV <180 mL**
- ✓ **30%< LVEF < 35%**
- ✓ **Not too compromised patients**

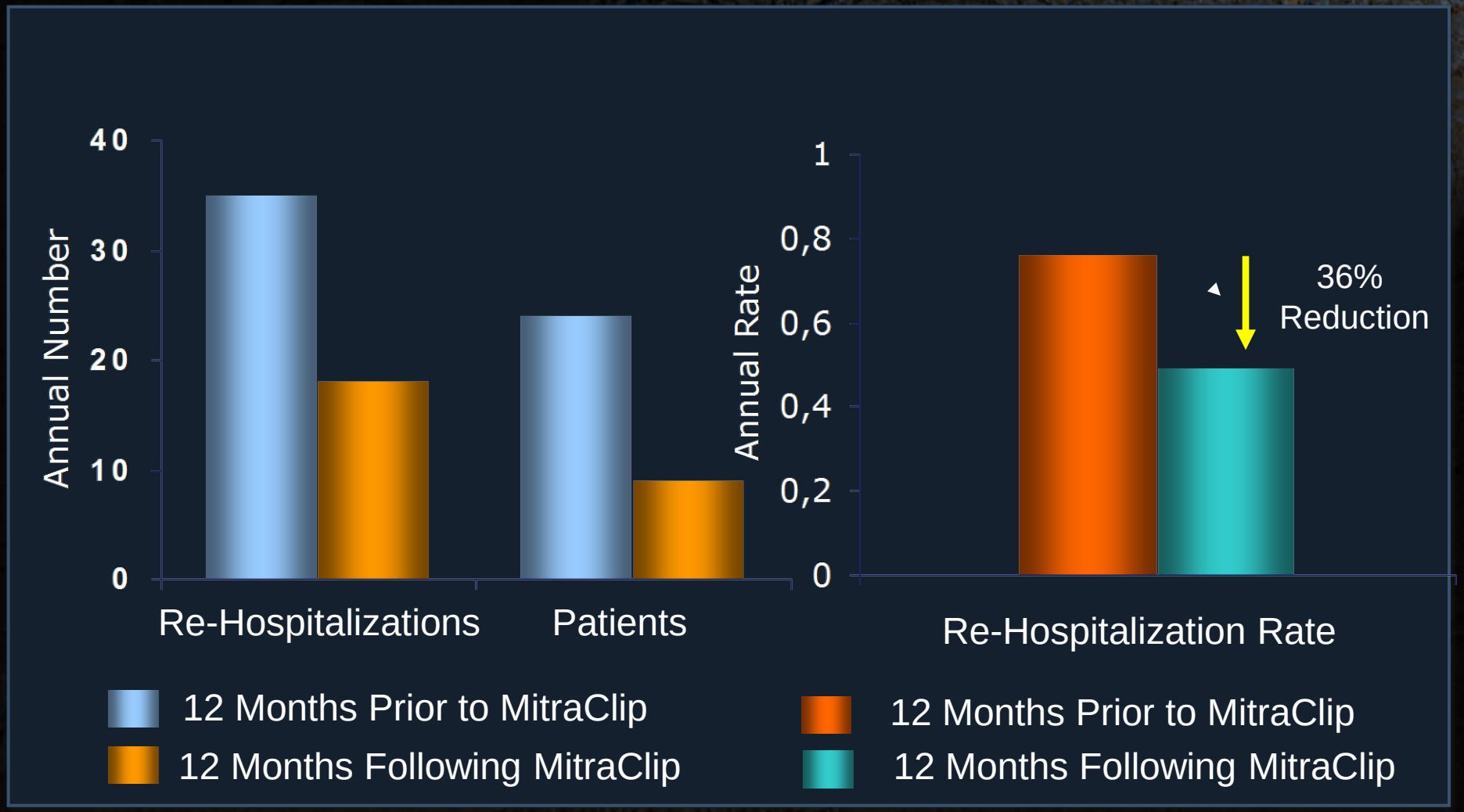


Cumulative incidence of HF remission according to the number of favorable factors. Test for trend $P < .001$; Cox model $P < .001$. One factor vs no factor: HR = 1.46 (95% CI 0.81-1.62, $P = .202$); 2 factors vs no factor: HR = 3.79 (95% CI 2.15-6.69, $P < .001$); 3 factors vs no factor: HR = 7.79 (95% CI 4.17-14.55, $P < .001$).

Gasparini M et al, Am Heart J 2008

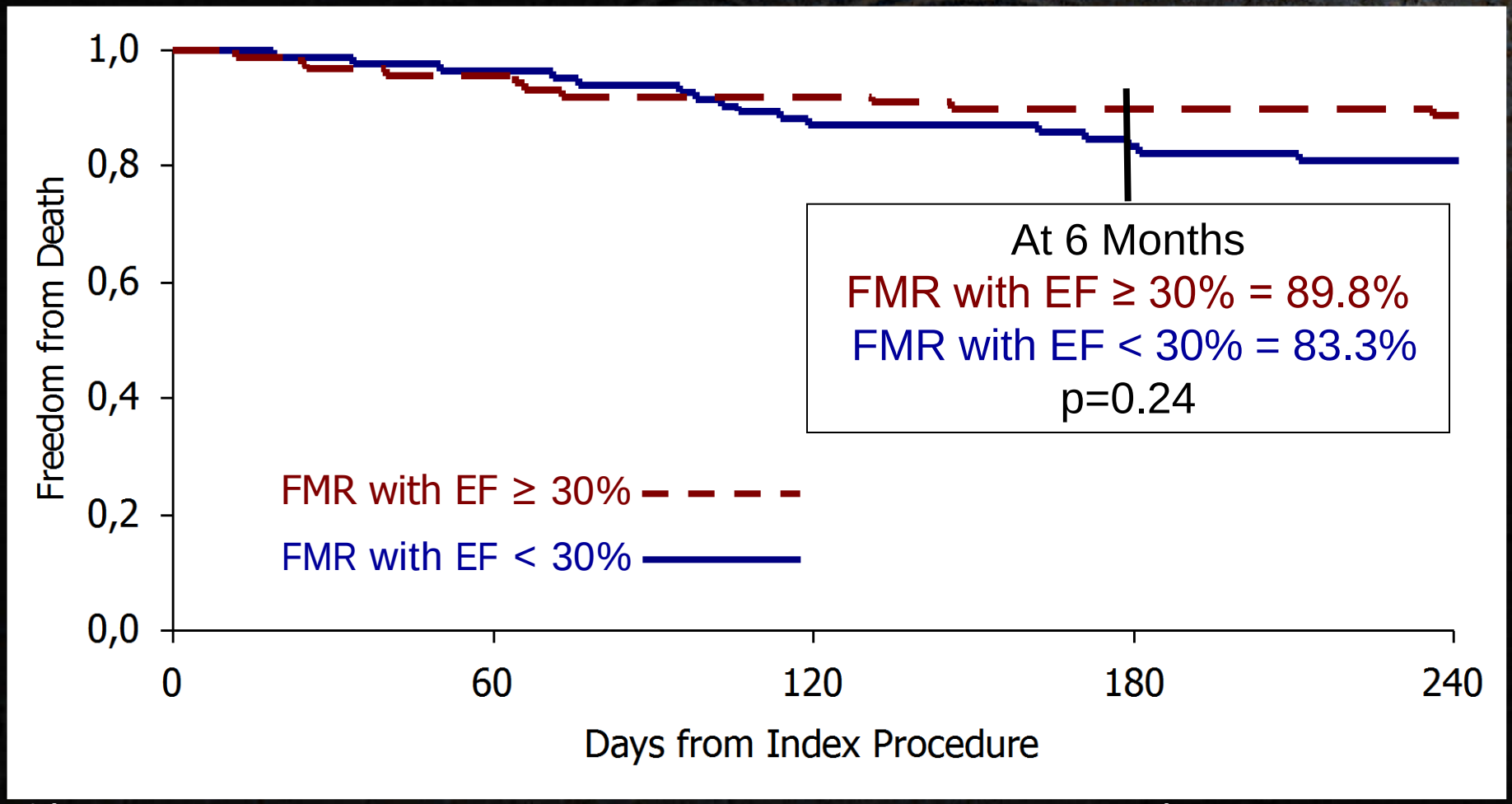
HRR: FMR Cohort: Re-hospitalization for CHF

Significant reduction in rate of re-hospitalization for CHF



Kaplan-Meier Freedom from Death

Functional MR Stratified by EF



At Risk:	0 Days	6 months
EF ≥ 30% N	88	79
EF < 30% N	84	70

	RESHAPE MitraClip vs. medical therapy	COAPT MitraClip vs. medical therapy
Patients (n)	800	420
FMR grade	" 3+	" 3+
NYHA	III, IV	II, III, IV
LVEF	" 15% - ! 40%	"20% - ! 60%
Primary endpoint	Death or HF Rehospitalization at 1 year	HF Rehospitalization at 1 year
Primary safety endpoint		Death, stroke LVAD, cardiac transplant
Follow up	2 years	5 years

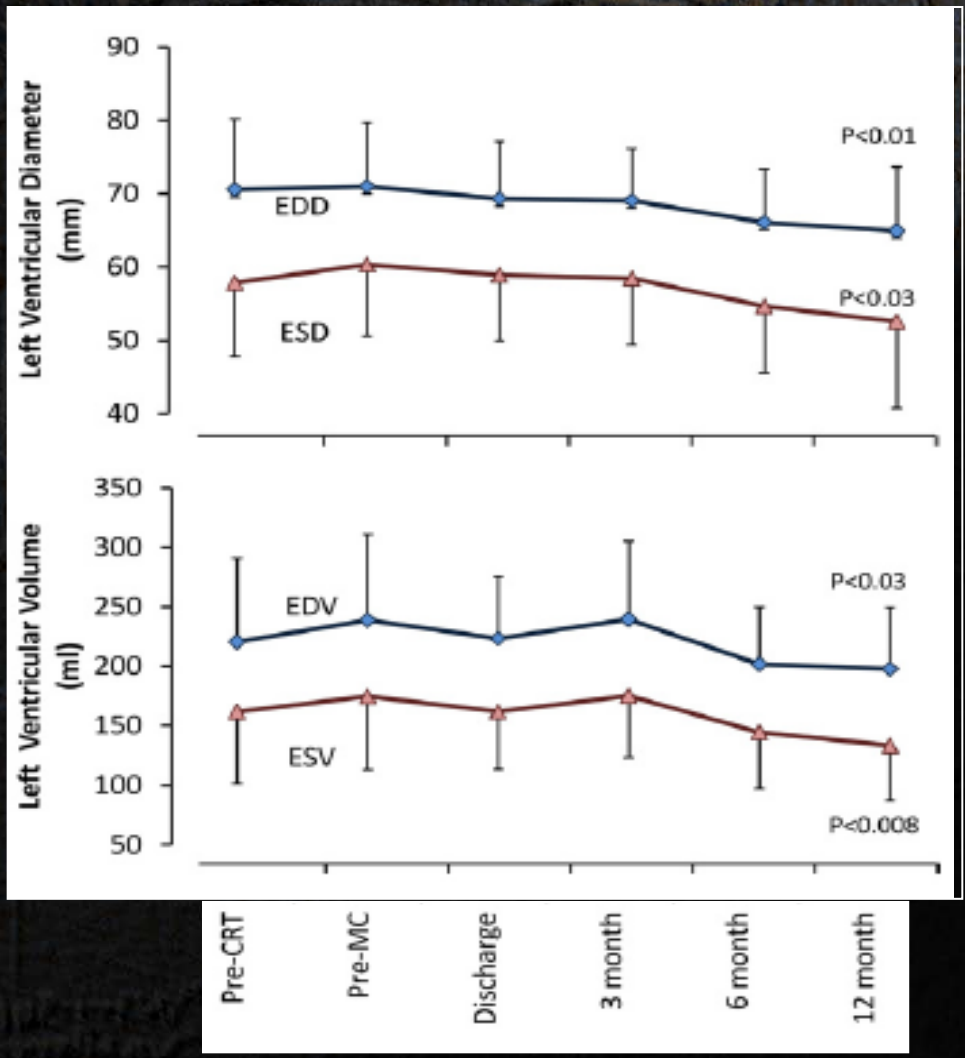
PERMIT CARE Registry

(Auricchio A et at . JACC 2011)

- ✓ FMR persists in about 20% to 25% of CRT patients
- ✓ 10% to 15% of FMR worsen after CRT

Ypenburg C et al. JACC 2009

- **MitraClip** in CRT NonResponders with severe FMR, n = 51
- Ischemic cardiomyopathy 73%
- About 60% to 70% retained FMR of grade ≥2+ at 6 month



MitraClip Responders: who respond better?

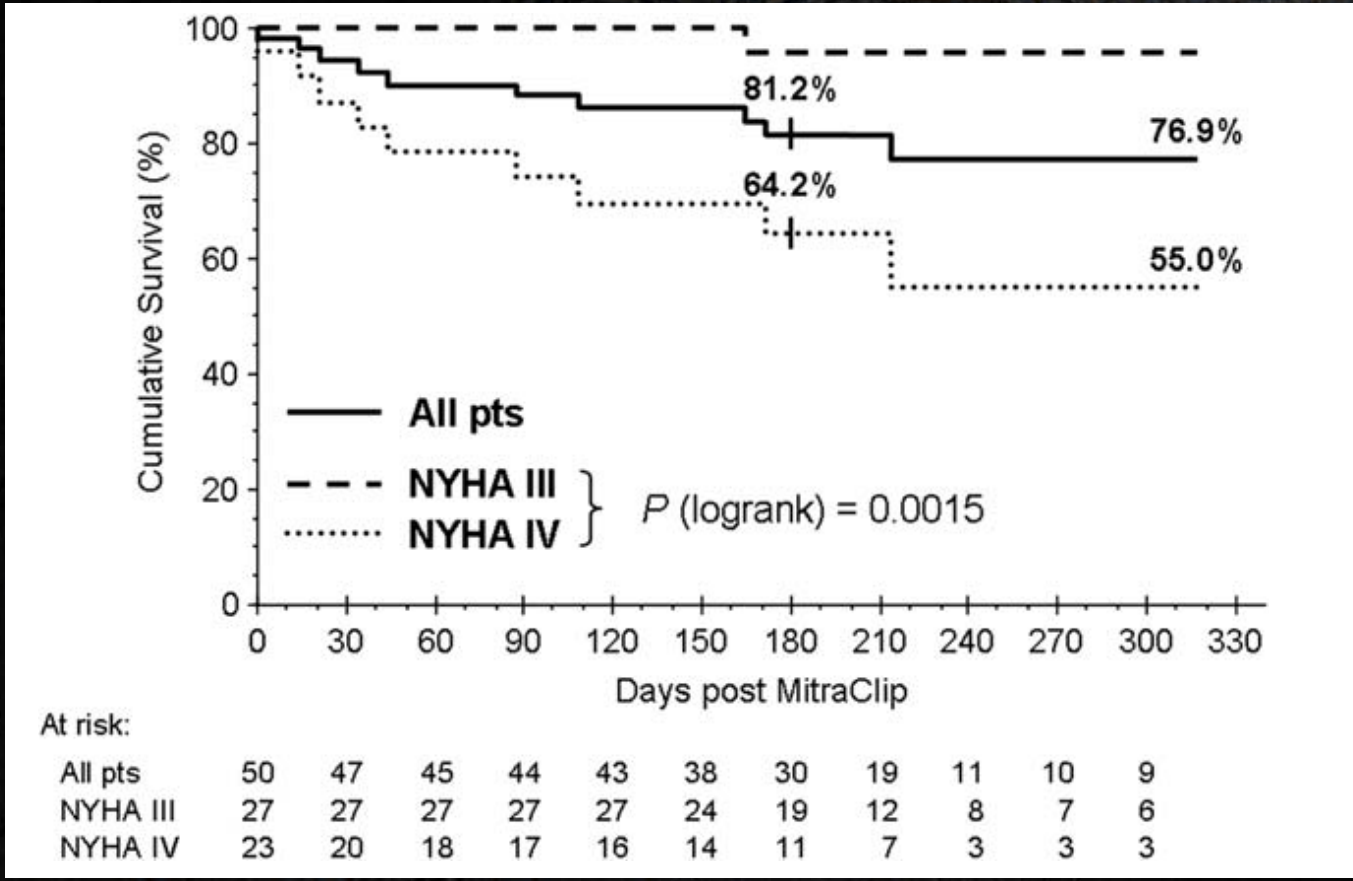
Prognostic implications of functional mitral regurgitation according to the severity of the underlying chronic heart failure: a long-term outcome study

Among the 316 patients in NYHA I–II, 97 subjects died or underwent heart transplantation. In this subgroup, FMR was an independent predictor of events even after adjusting for age, sex, aetiology, atrial fibrillation, chronic renal failure, chronic obstructive pulmonary disease, ACE inhibitors/ARBs, beta-blockers, ICD, cardiac resynchronization therapy, and LV ejection fraction ($P < 0.0001$).

Among the 153 patients in NYHA Class III–IV, 93 patients died or underwent heart transplantation. FMR was no longer a significant predictor of events at univariate analysis and after adjusting for age, sex, aetiology, atrial fibrillation, chronic renal failure, chronic obstructive pulmonary disease, ACE inhibitors/ARBs, beta-blockers, ICD, cardiac resynchronization therapy, and LV ejection fraction. The only independent predictor of worse outcome in this subgroup was age ($P = 0.016$).

Bursi et al. Eur J Heart Fai 2010

MitraClip in patients with end-stage systolic HF



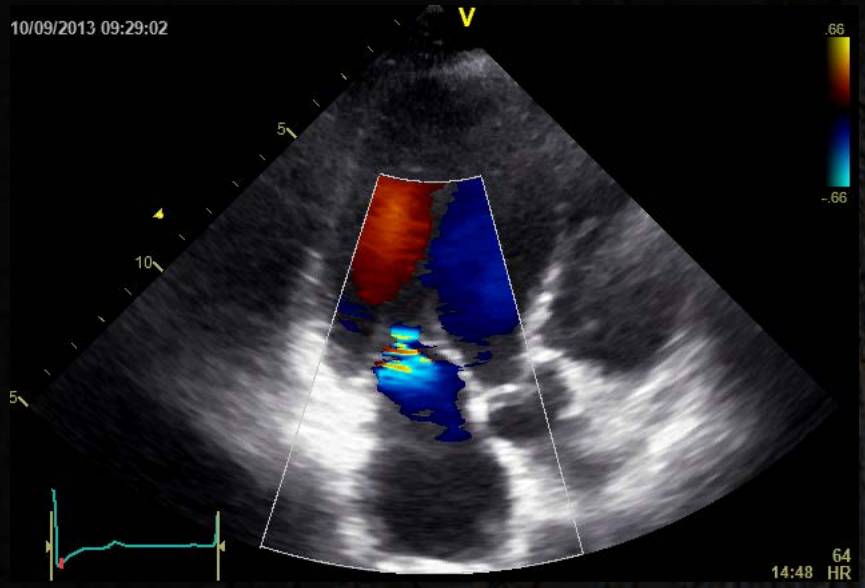
Franzen O et al. Eur J Heart Fail 2011

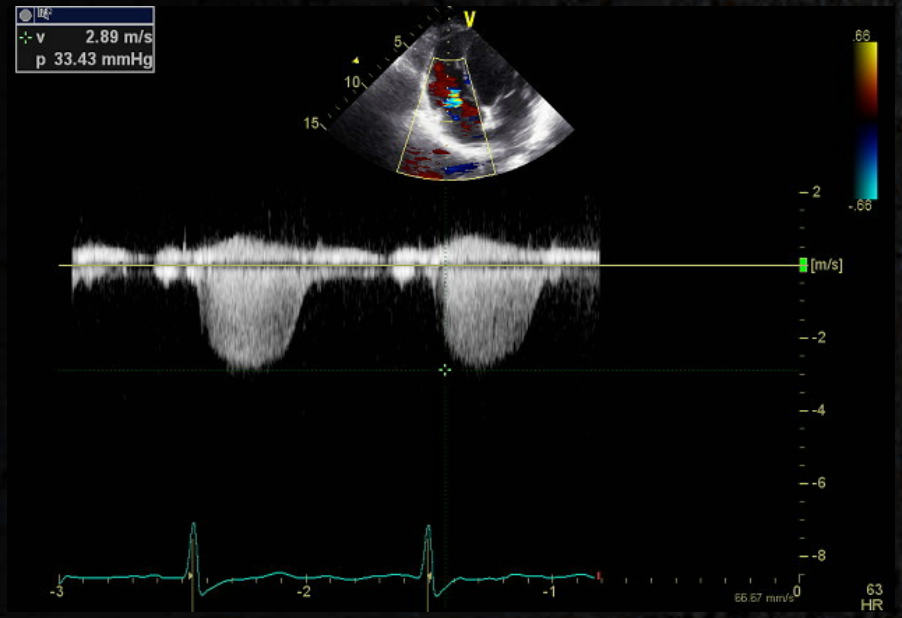
Functional MR: a dynamic condition

Functional MR is a dynamic condition and its severity may vary depending upon changes in loading conditions: hypertension, medical therapy or exercise.

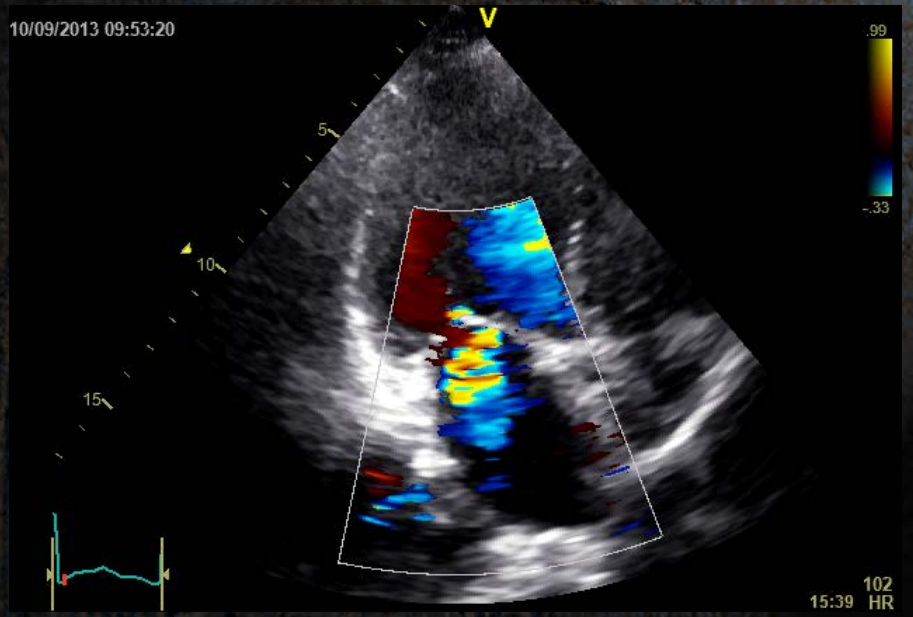
The dynamic component can be assessed and quantified by exercise echocardiography.

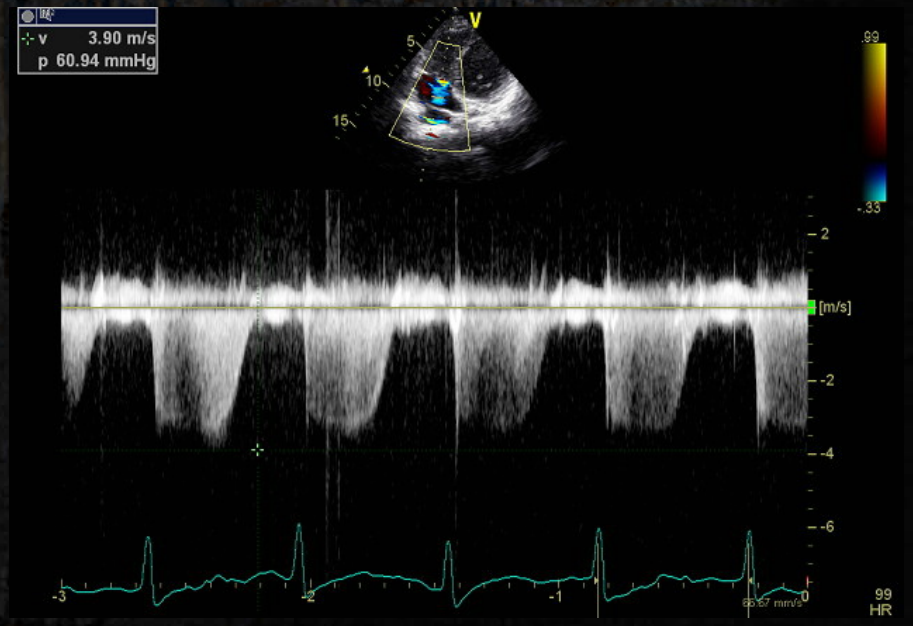
Baseline





BIKE





Team work

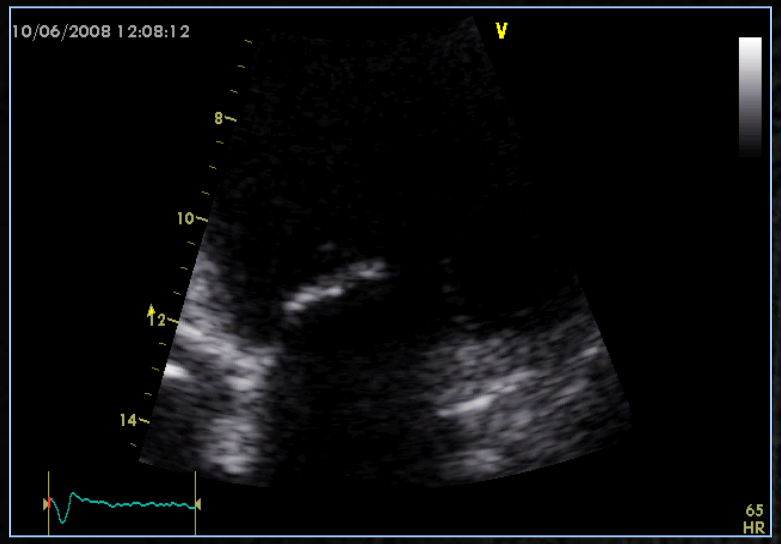
Clin/Inv Cardiologists
Echographer
Surgeon
Anestesiologist

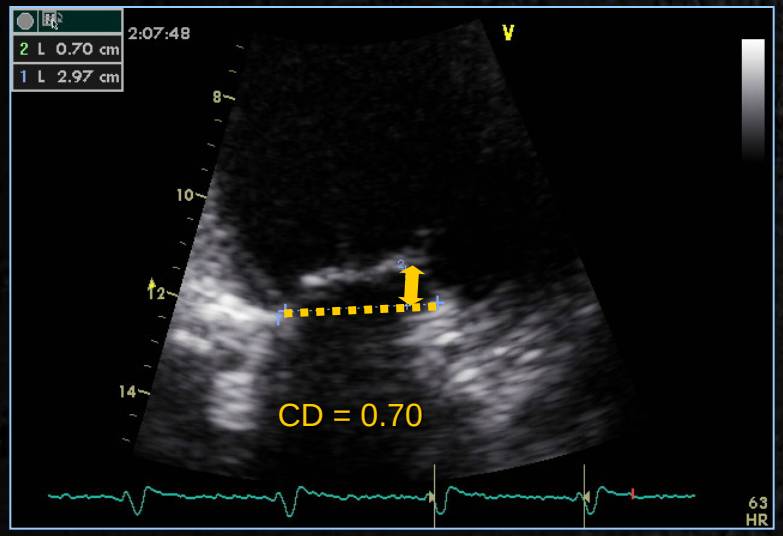
1. **Assess feasibility of repair/MitraClip**
2. **Global assessment of the heart**

   (Myocardial reserve, LV dilatation, RV function

   ➡ Timing is crucial)
3. **Life expectancy ➔ risk score**

Coaptation Depth





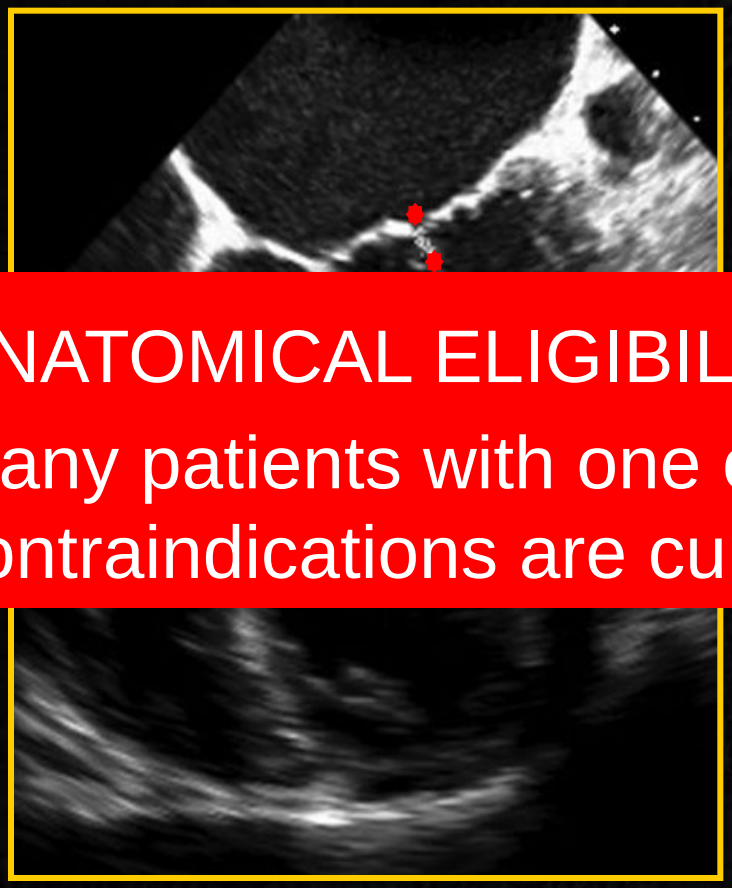
≤ → MV Repair

10 mm

> → MV Replacement

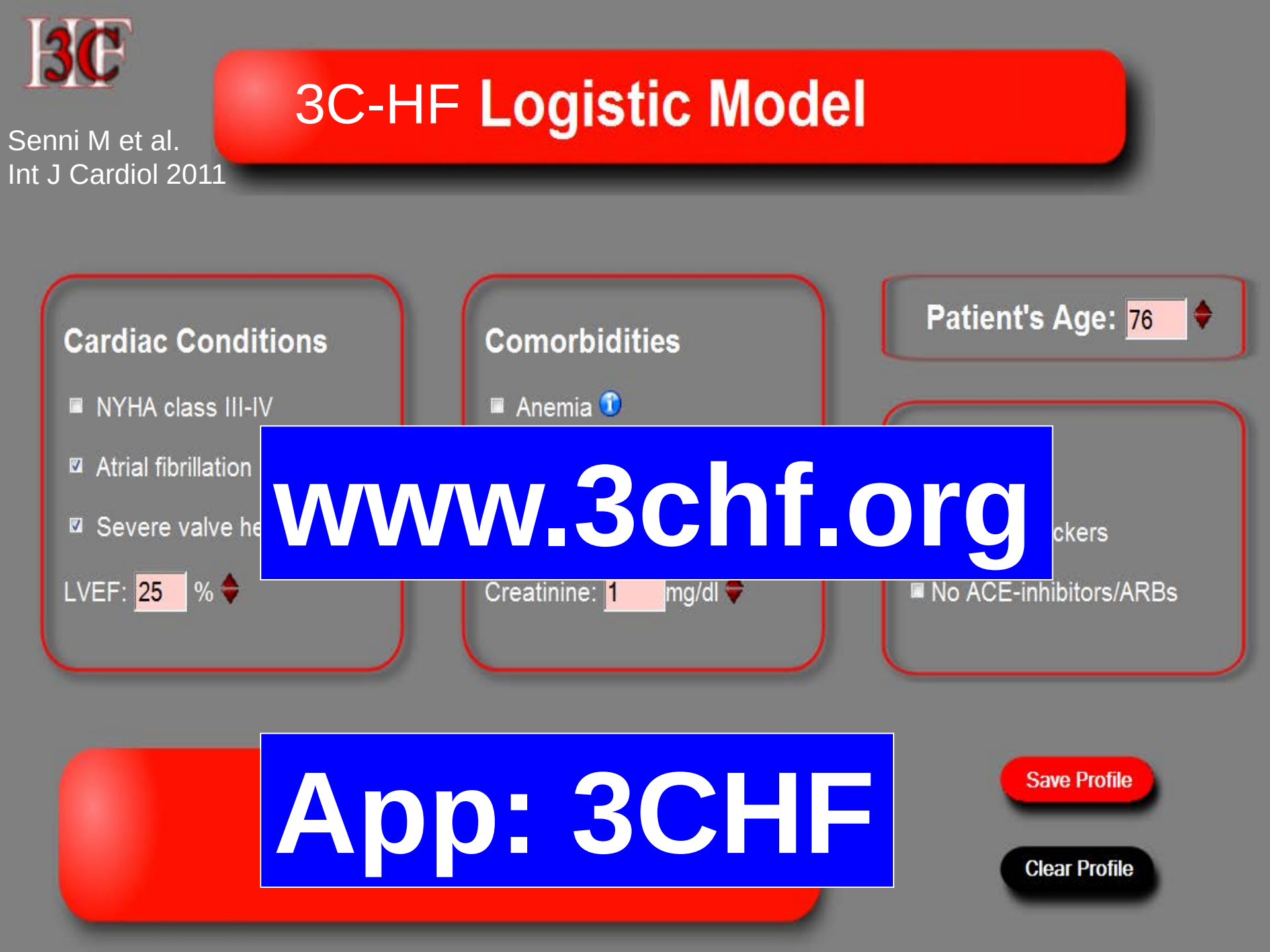
Calafiore AM et al. Ann Thor Surg 2001

Coaptation length

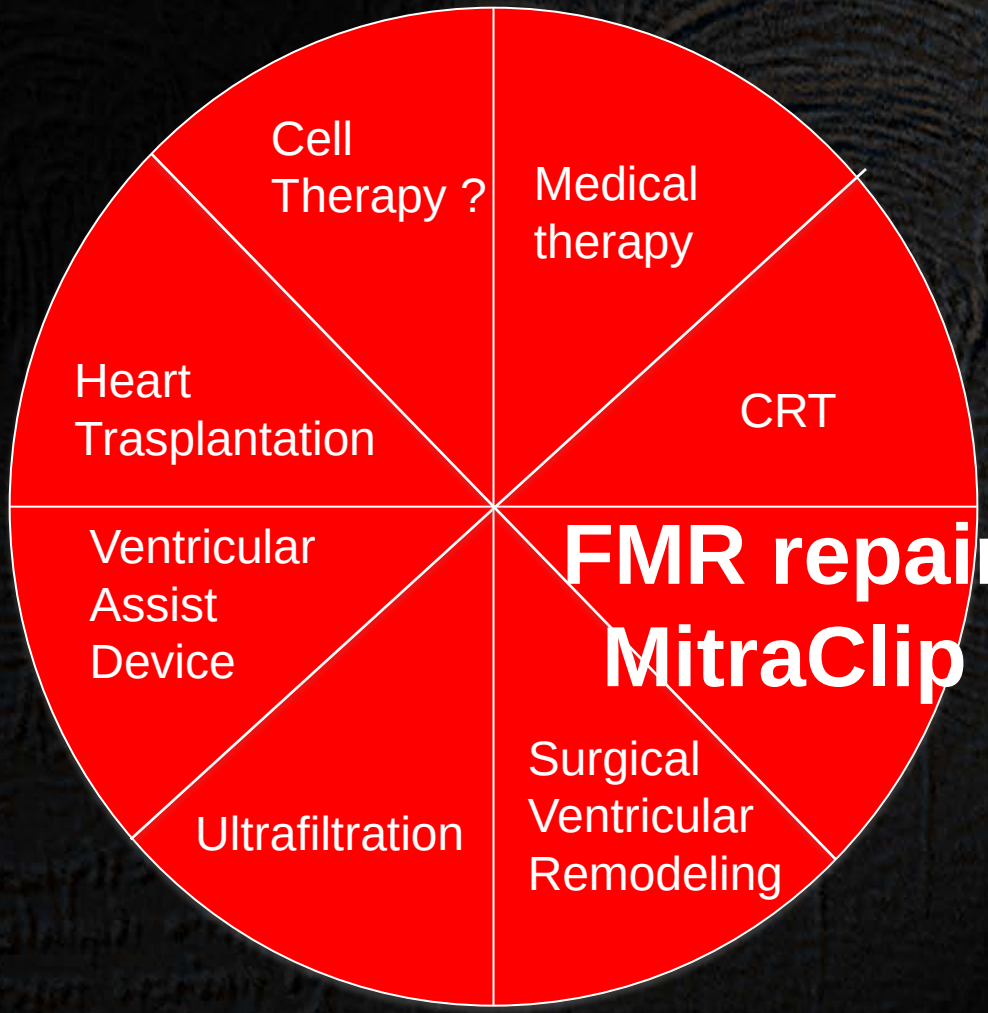


ANATOMICAL ELIGIBILITY IS OFTEN NOT AN ISSUE.

Many patients with one or more anatomical EVEREST contraindications are currently treated


3C-HF Logistic Model
Senni M et al.
Int J Cardiol 2011
Cardiac Conditions
NYHA class III-IV
Atrial fibrillation
Severe valve he
LVEF: 25 %
Comorbidities
Anemia
Creatinine: 1 mg/dl
Patient's Age: 76
ckers
No ACE-inhibitors/ARBs
www.3chf.org
App: 3CHF
Save Profile
Clear Profile

Modern management of advanced HF



Functional Mitral Regurgitation in CHF

“La selvaggina e’ varia: abbi sempre nella tua faretra frecce diverse”

Detto irlandese

“Il buon arciere si riconosce non dalle frecce ma dalla buona mira”

Detto provenzale