Primary Mitral Valve Disease: Natural History & Triggers for Intervention

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Disclosures: GE stock,

56yo woman with MVP and dyspnea

<u>TTE and TEE:</u>

- Barlow's MVP
- EROA = 39mm2
  - RF=52%
- normal LV
  - EF=65%, ESD=34mm
- LAE: 60 ml/M^2

What are next steps?

1. Full pulmonary function testing for dyspnea
2. Proceed to mitral valve repair
3. Check BNP for heart failure
4. Get a stress echo for pulmonary hypertension

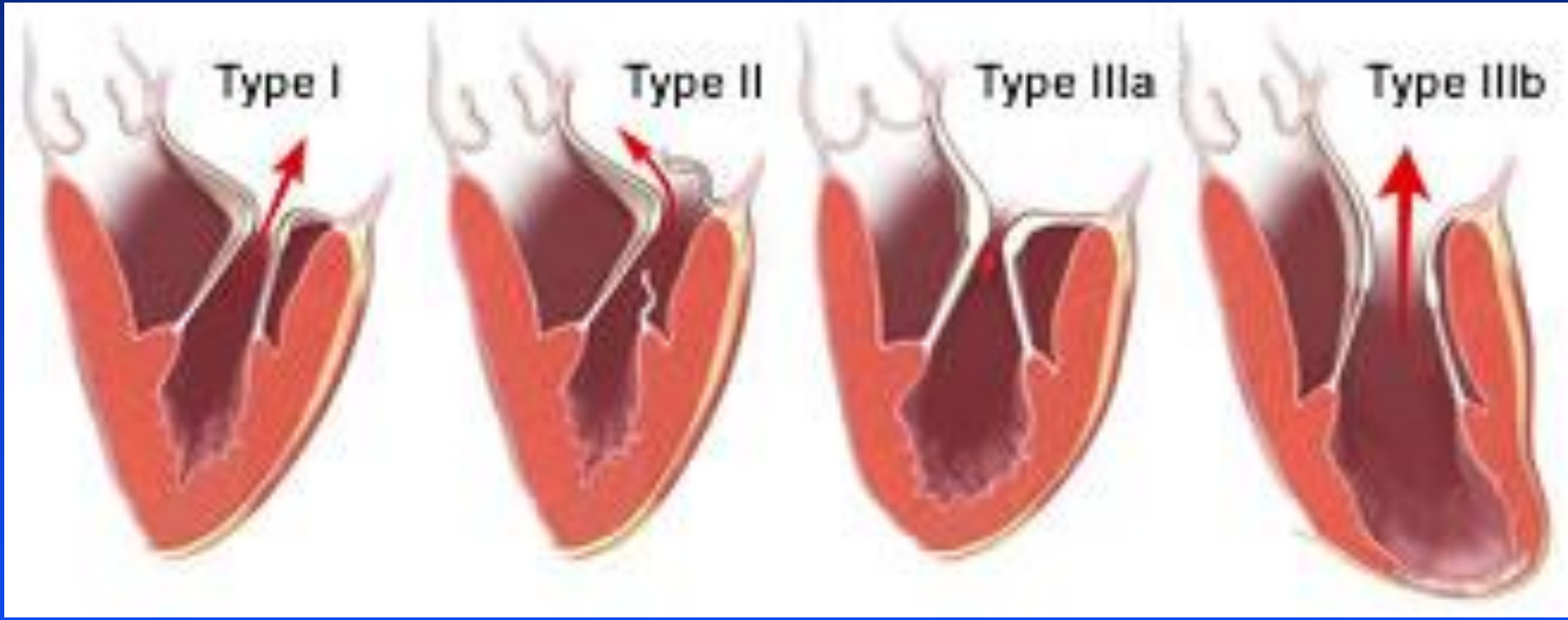
Primary Mitral Valve Disease: Outline

- Definitions/diagnosis
- Staging
- Natural history
- Management

Mitral Regurgitation: common

- Etiology changing in developed countries.
  - Decrease in rheumatic heart disease
  - Increase in lifespan
- Acquired MR
  - **Primary**: intrinsic lesions of the valve apparatus
    - organic/degenerative/infectious
  - **Secondary**: normal leaflets
    - Functional/ischemia

Carpentier Classification of Dysfunction



I: annular dilation

-Nml leaflet motion

II. Increased leaflet motion

-chordal rupture/elongation

-leaflet prolapse

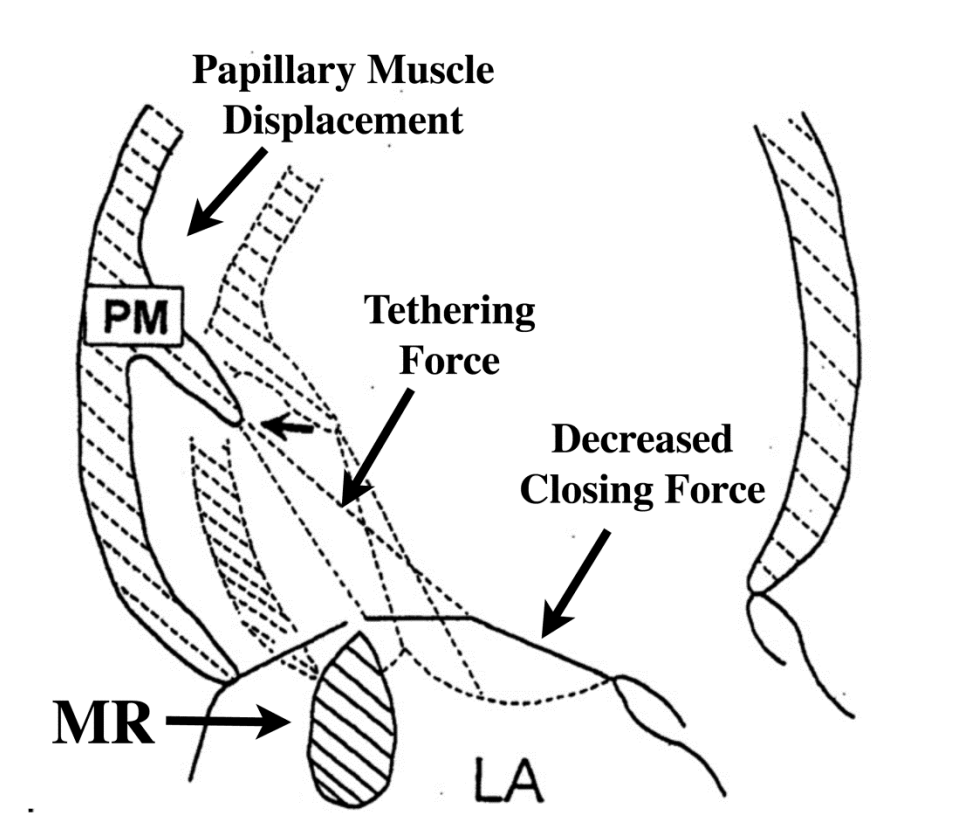
III. Restricted Leaflet Motion

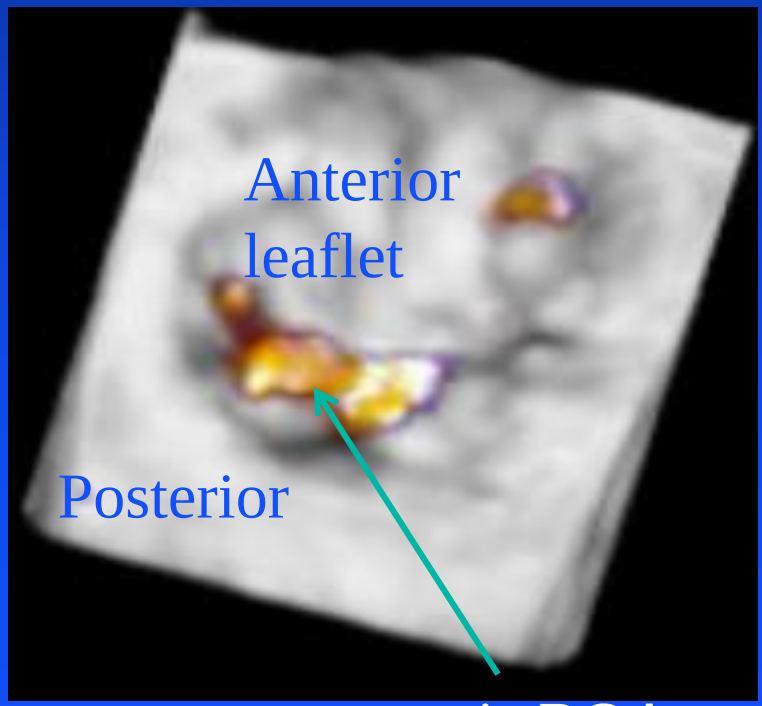
-a. diastole & systole

-b. during diastole

PM displacement, leaflet tethering

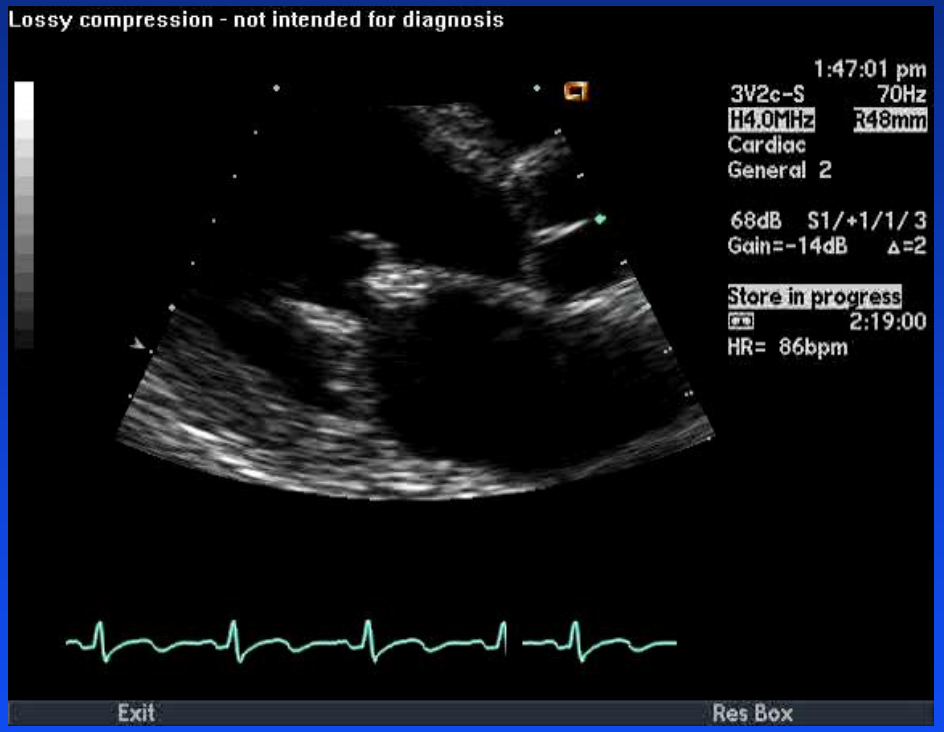
Secondary MR: Ventricular problem

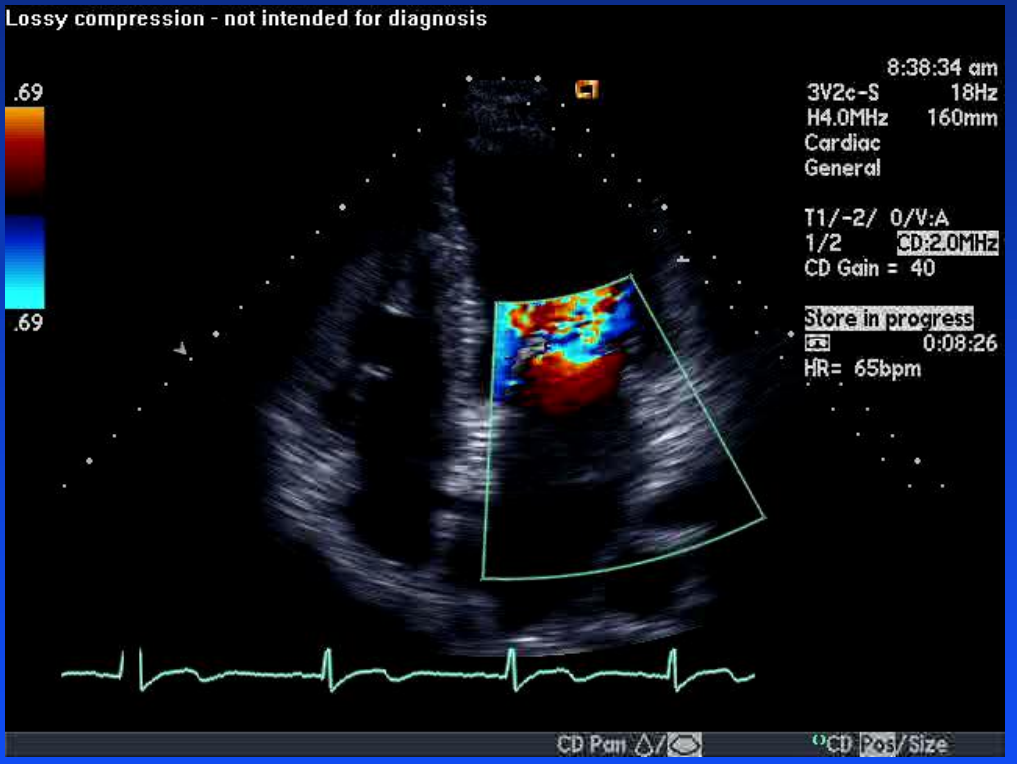




eccentric ROA

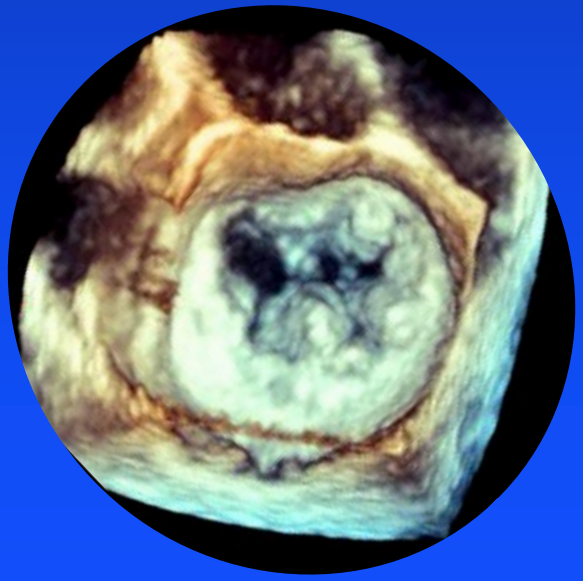
Primary, Degenerative MR: Endocarditis, rheumatic, prolapse



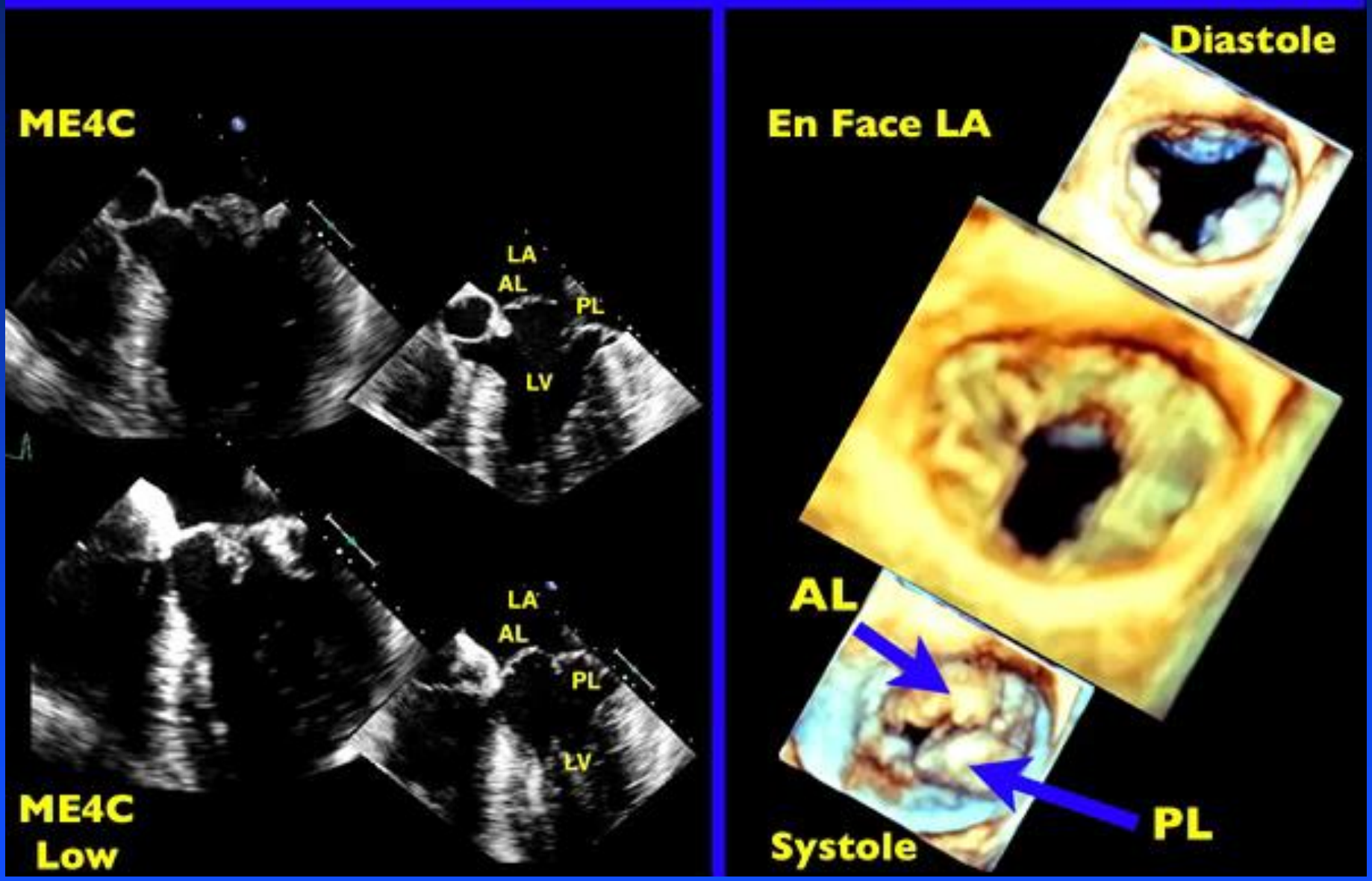


MV Prolapse: Barlows vs Fibroelastic Deficiency

- Barlows: younger, chronic murmur
  - excess leaflet tissue
    - Thickened, large, billowing leaflets
  - PMVL attaches on LA
  - Annulus large
  - Thickened and elongated chordae
- FED: older (>60 yrs), newer murmur
  - Single chordal rupture
  - Prolapse of scallop (P2)
  - anterior leaflet normal size, thickness

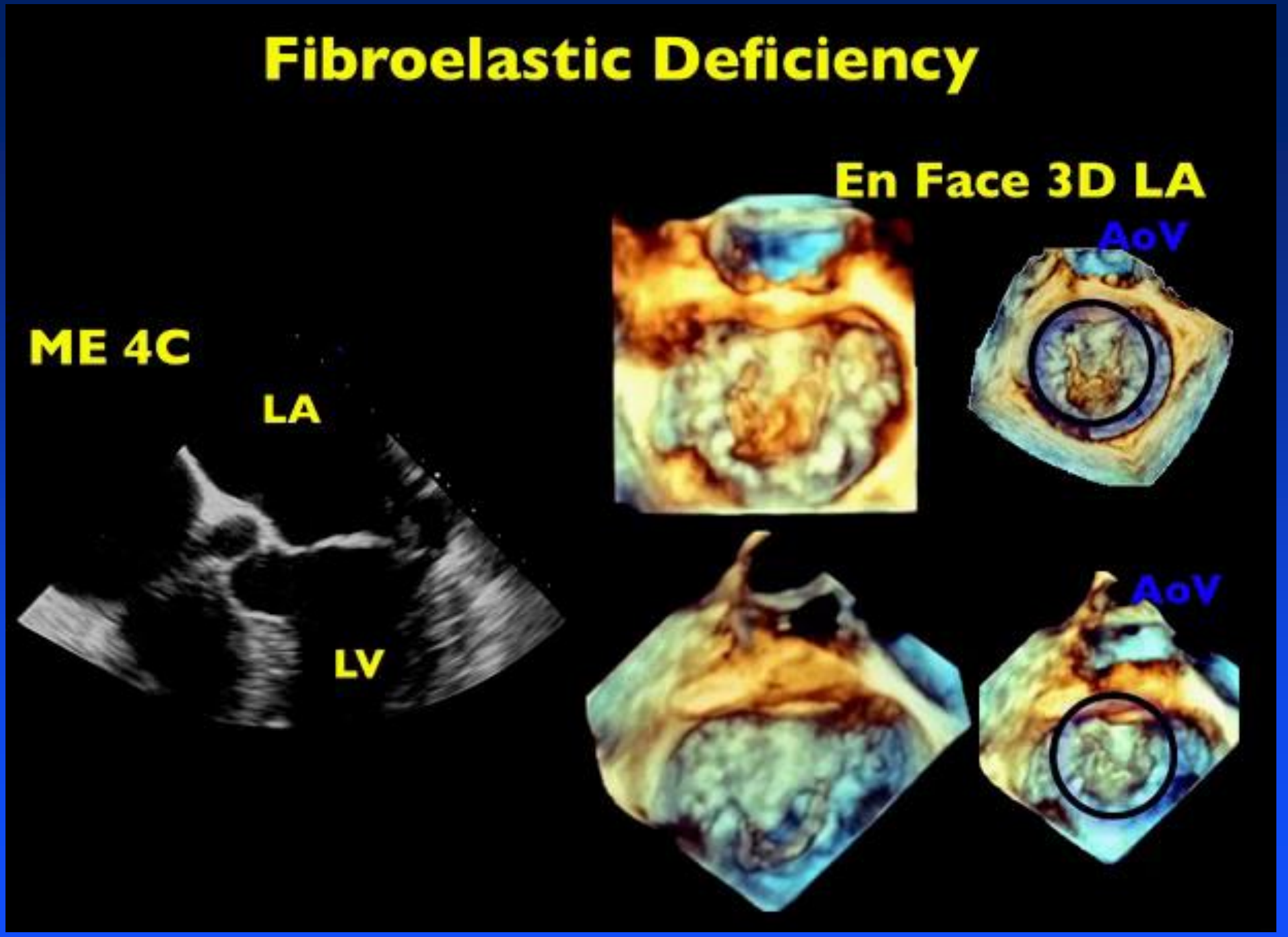


Bileaflet Myxomatous Disease
Barlow's Disease



Maslow A. JCVA 2015

Fibroelastic Deficiency



Maslow A. JCVA 2015

Primary Mitral Regurgitation

- Definitions/diagnosis
- Staging
- Natural history
- Management

Stage of Progression of VHD

Stage	Definition	Description
A	At risk	Risk factors for developing VHD
B	Progressive	Mild to moderate and asymptomatic
C	Severe-a	Asymptomatic and severe VHD
		C1: LV/RV compensated
		C2: LV/RV decompensated
D	Severe-s	Symptomatic from VHD

Nishimura. ACC/AHA guidelines 2014

Table 15. Stages of *Primary* MR

Grade	Definition	Valve Anatomy	Valve Hemodynamics*	Hemodynamic Consequences	Symptoms
A	At risk of MR	• Mild mitral valve prolapse with normal coaptation • Mild valve thickening and leaflet restriction	• No MR jet or small central jet area <20% LA on Doppler • Small vena contracta <0.3 cm	• None	• None
B	Progressive MR	• Severe mitral valve prolapse with normal coaptation • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE	• Central jet MR 20%–40% LA or late systolic eccentric jet MR • Vena contracta <0.7 cm • Regurgitant volume <60 mL • Regurgitant fraction <50% • ERO <0.40 cm^2 • Angiographic grade 1–2+	• Mild LA enlargement • No LV enlargement • Normal pulmonary pressure	• None
C	Asymptomatic severe MR	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet MR >40% LA or holosystolic eccentric jet MR • Vena contracta ≥0.7 cm • Regurgitant volume ≥60 mL • Regurgitant fraction ≥50% • ERO ≥0.40 cm^2 • Angiographic grade 3–4+	• Moderate or severe LA enlargement • LV enlargement • Pulmonary hypertension may be present at rest or with exercise • **C1:** LVEF >60% and LVESD <40 mm • **C2:** LVEF ≤60% and LVESD ≥40 mm	• None
D	Symptomatic severe MR	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet MR >40% LA or holosystolic eccentric jet MR • Vena contracta ≥0.7 cm • Regurgitant volume ≥60 mL • Regurgitant fraction ≥50% • ERO ≥0.40 cm^2 • Angiographic grade 3–4+	• Moderate or severe LA enlargement • LV enlargement • Pulmonary hypertension present	• Decreased exercise tolerance • Exertional dyspnea

*Several valve hemodynamic criteria are provided for assessment of MR severity, but not all criteria for each category will be present in each patient. Categorization of MR severity as mild, moderate, or severe depends on data quality and integration of these parameters in conjunction with other clinical evidence.

ERO indicates effective regurgitant orifice; IE, infective endocarditis; LA, left atrium/atrial; LV, left ventricular; LVEF, left ventricular ejection fraction; LVESD; left ventricular end-systolic dimension; and MR, mitral regurgitation.

Primary Mitral Regurgitation: The scope of the problem

- Definitions/diagnosis
- Staging
- Natural history
- Management

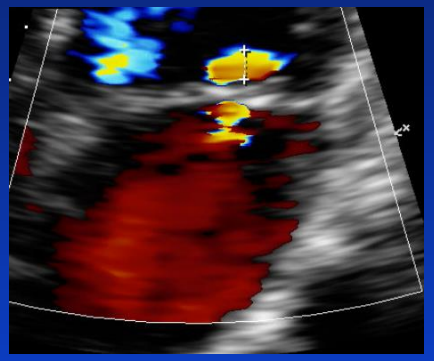
Natural History of Primary MR

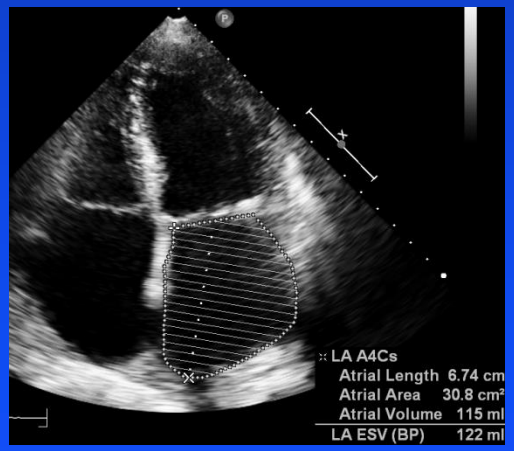
- Asymptomatic, chronic severe MR
  - All-cause death: 22%/ 5 years
  - Cardiac death: 14%
  - MACE: 33%

Enriquez-Sarano M. Lancet 2009.; 373:1382

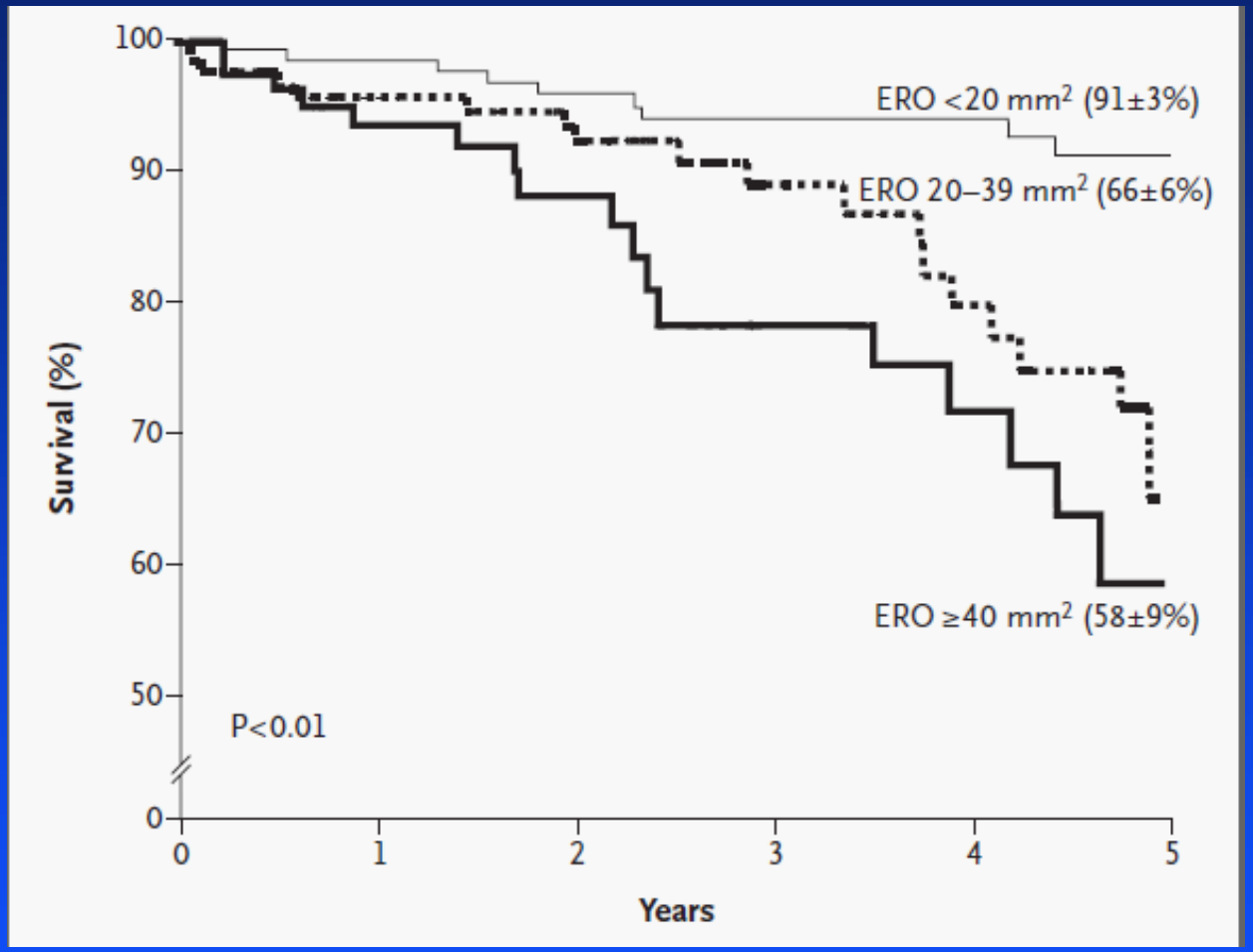
Predictors of Outcome in Primary MR

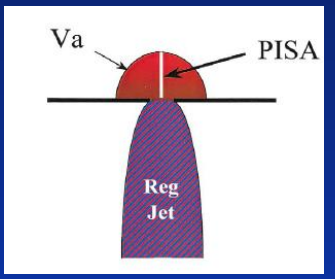
- Age and Symptoms
- Quantitative MR severity:
  - EROA
- Chamber size/function:
  - LA, ESV, EF
- Pulmonary hypertension
- Atrial fibrillation
- New:
  - exercise, BNP, strain





Flail MV: Survival by EROA

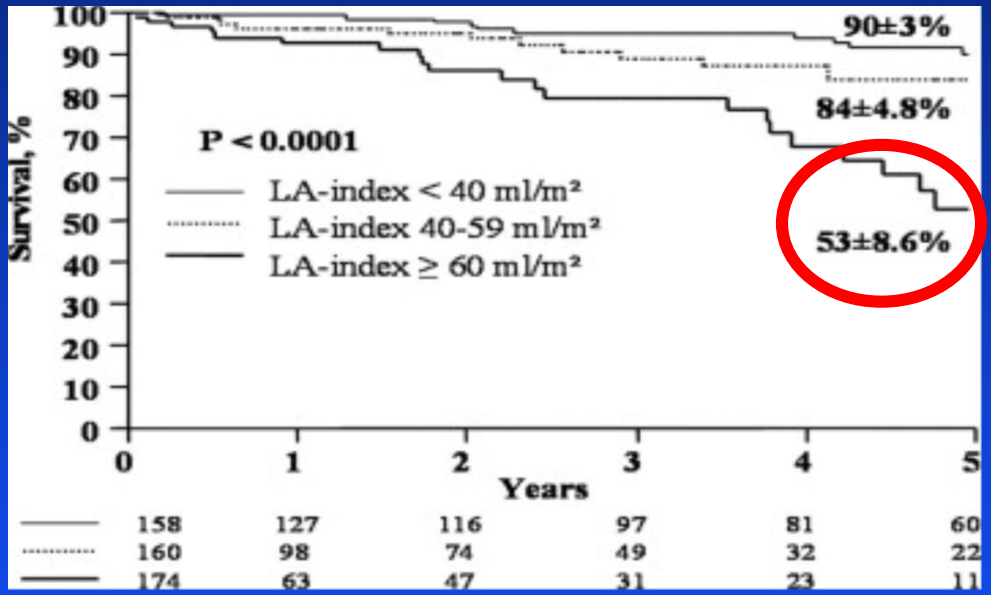




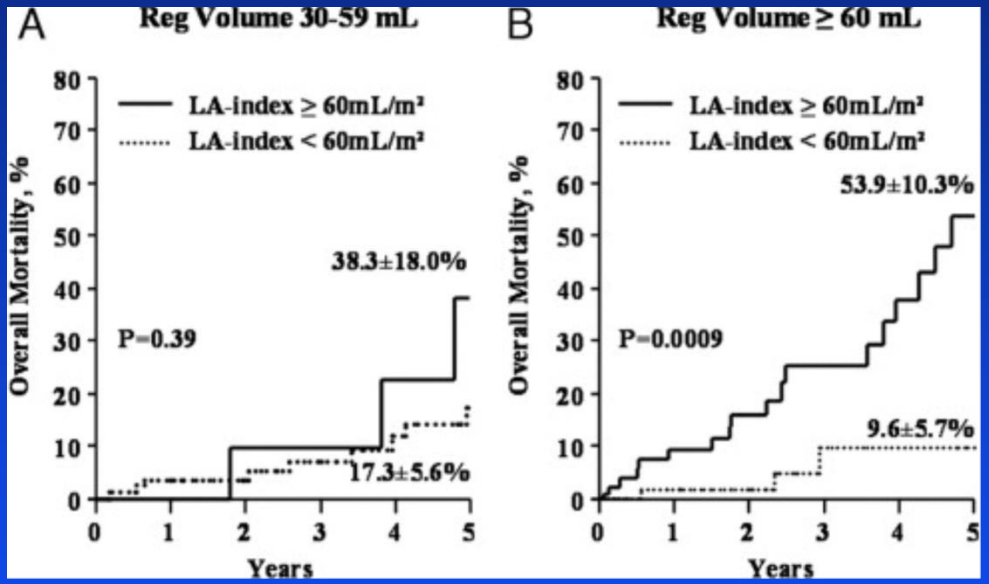
465 prospective patients with asymptomatic, organic MR.

Enriquez-Sarano NEJM 2005

Impact of Left Atrial Volume on Clinical Outcome in Organic MR



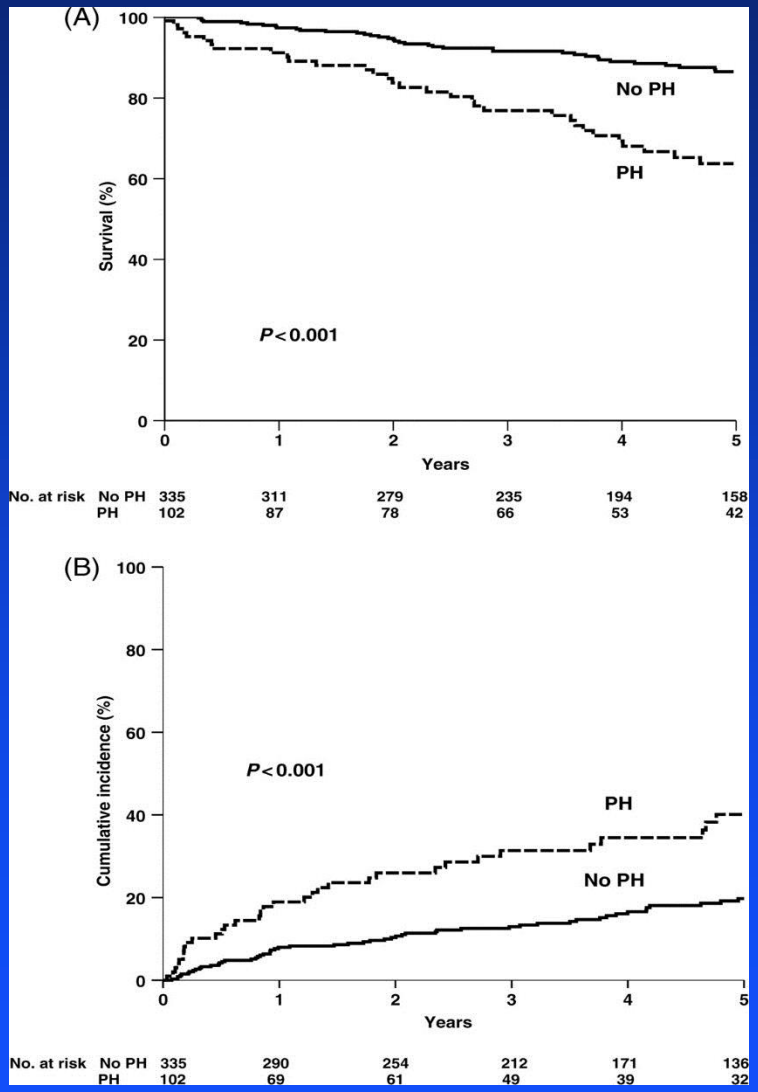
Survival After Diagnosis According to LAV



Mortality according to LAV stratified by Moderate or Severe RV

J Am Coll Cardiol. 2010;56(7):570-578.

Impact of pulmonary hypertension on survival in MR due to flail leaflets.



- Death OR=2
- CV death OR =2.2
- CHF OR=1.7

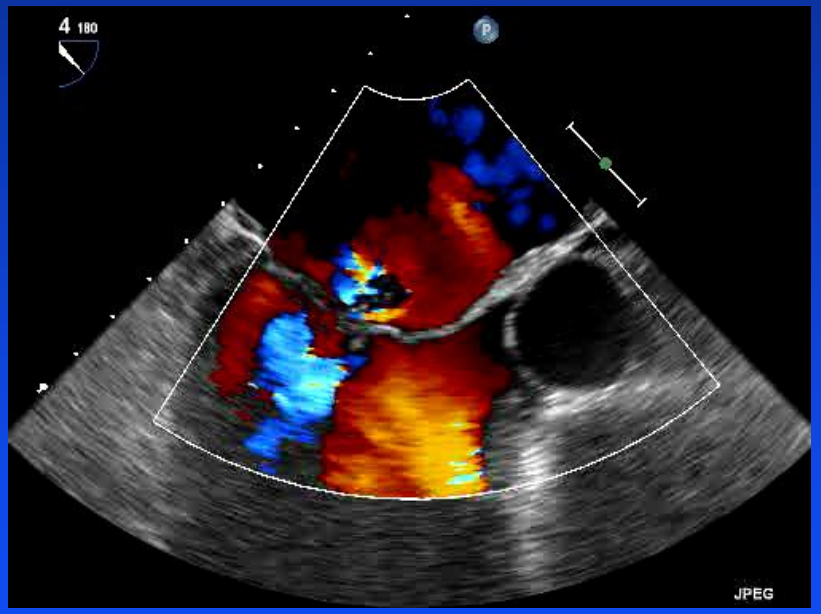
- Adjusted for age, gender, NYHA, EF, AF, MVR

- Registry ‘87-04, 437pts

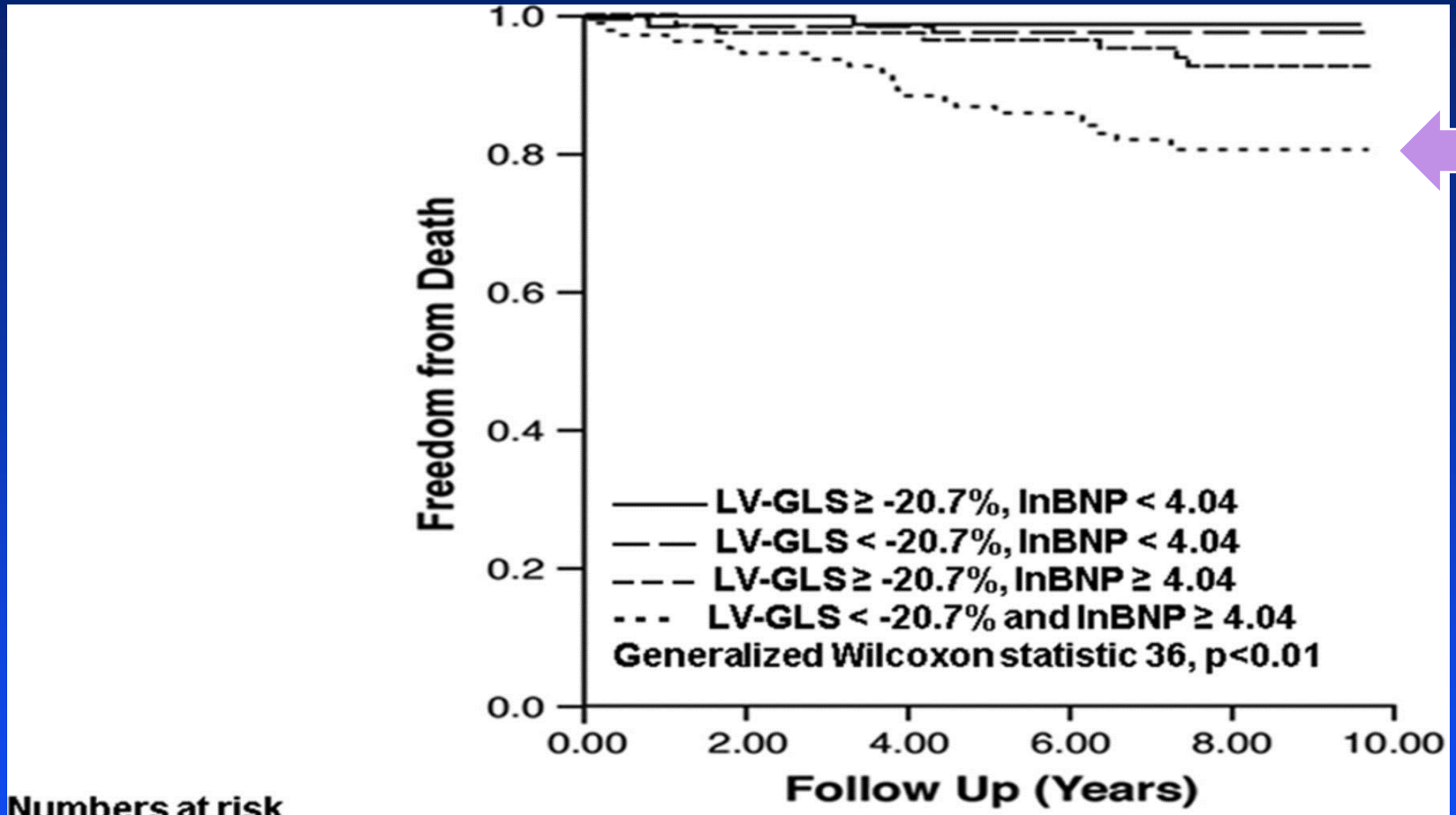
Barbieri et al. Eur Heart J 2011;32:751-759

Newer prognostic markers

- BNP
  - >105 MACE
  - < 50 NPV
- LV strain/SR
- Exercise PHTN



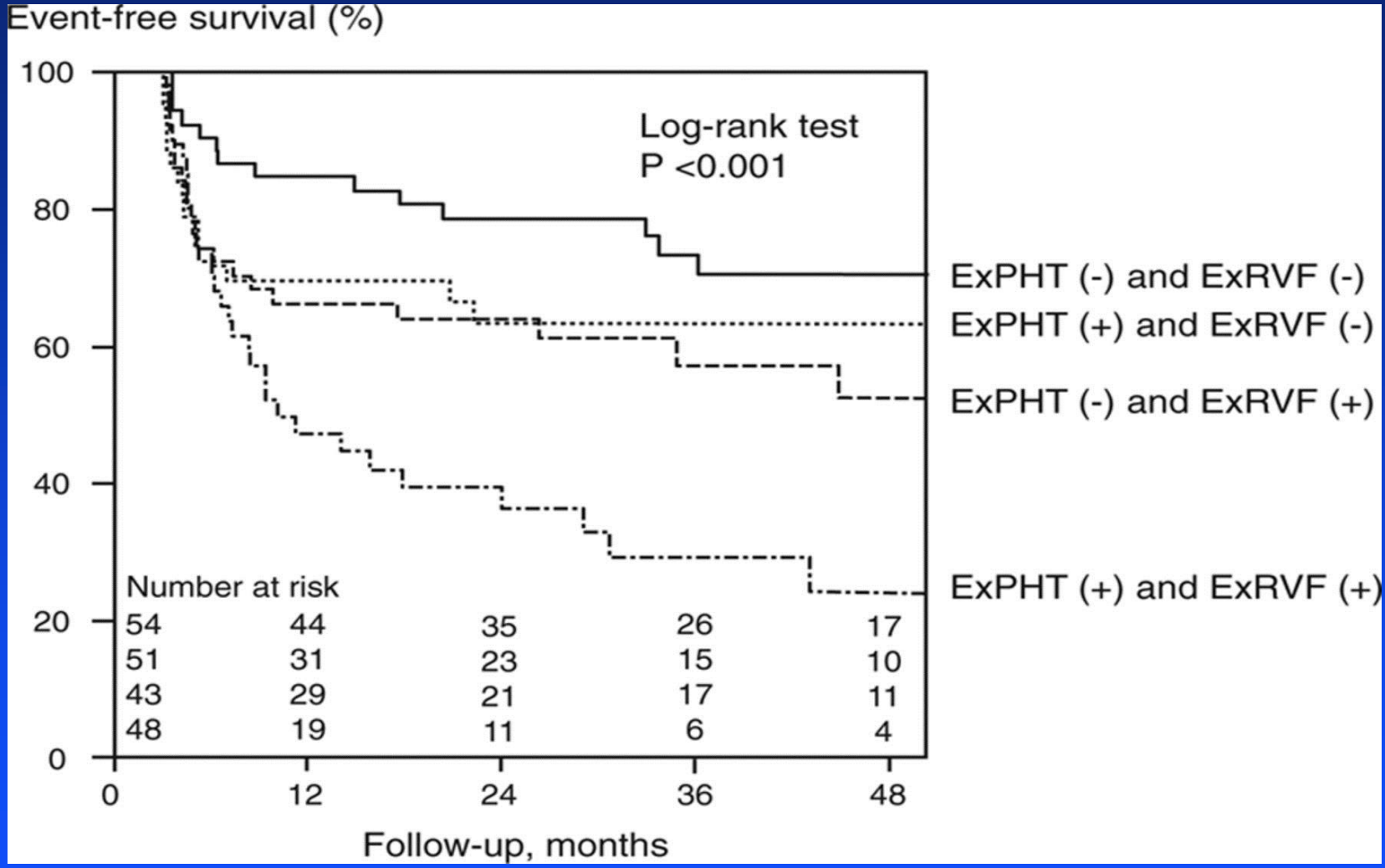
Primary MR: Survival based on LV-GLS and lnBNP



Numbers at risk						
LV-GLS ≥ -20.7%, lnBNP < 4.04	128	128	127	111	72	0
LV-GLS < -20.7%, lnBNP < 4.04	106	105	105	95	56	0
LV-GLS ≥ -20.7%, lnBNP ≥ 4.04	98	96	96	86	58	0
LV-GLS < -20.7%, lnBNP ≥ 4.04	116	110	103	93	54	0

Alashi et al. Circ Cardiovasc Imaging. 2016;9(7)

Event-free survival according to exercise induced pulmonary hypertension and right ventricular function



Kusunose et al. Circ Cardiovasc Imaging. 2013;6:167-176

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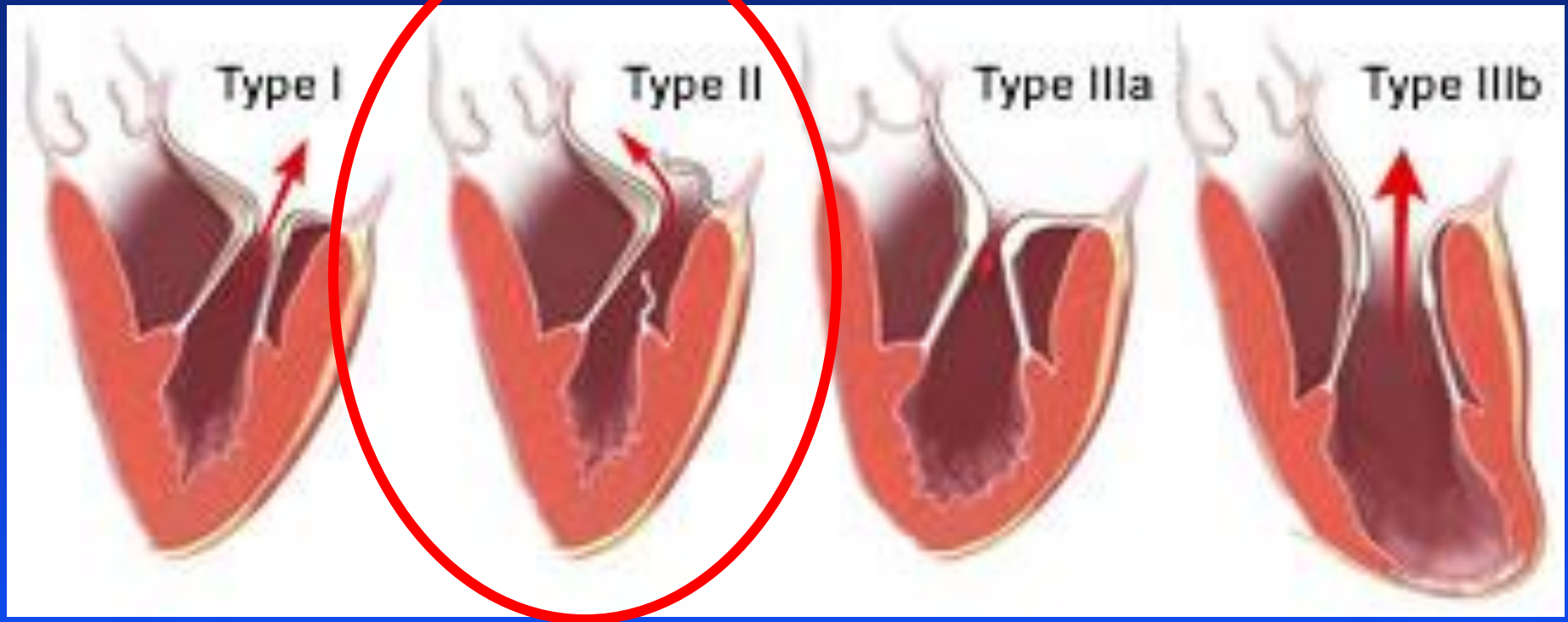

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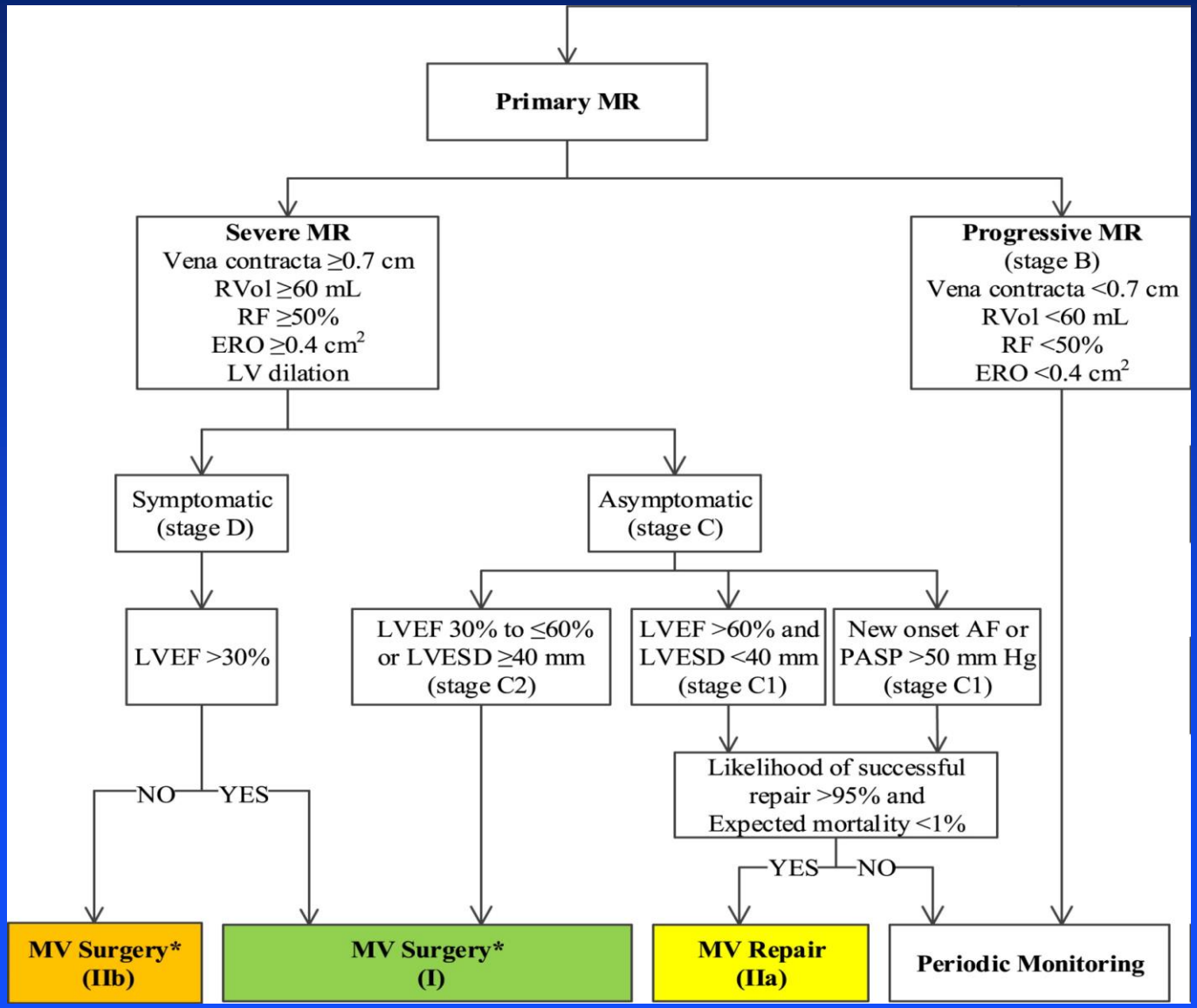
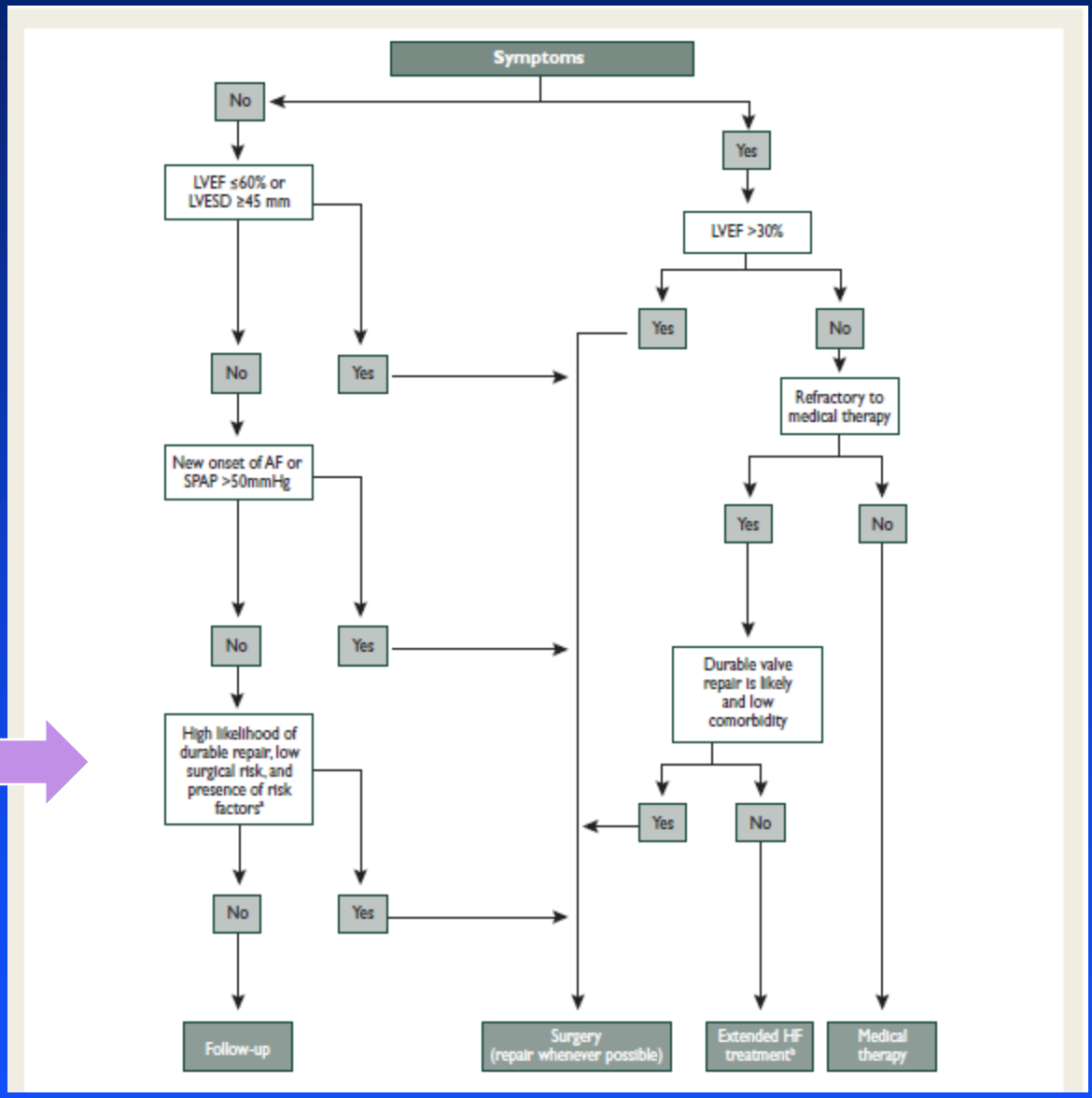
PM displacement, leaflet tethering

Indications for Surgery for Primary MR



Nishimura. ACC/AHA guidelines 2014

Indications for Surgery for Primary MR

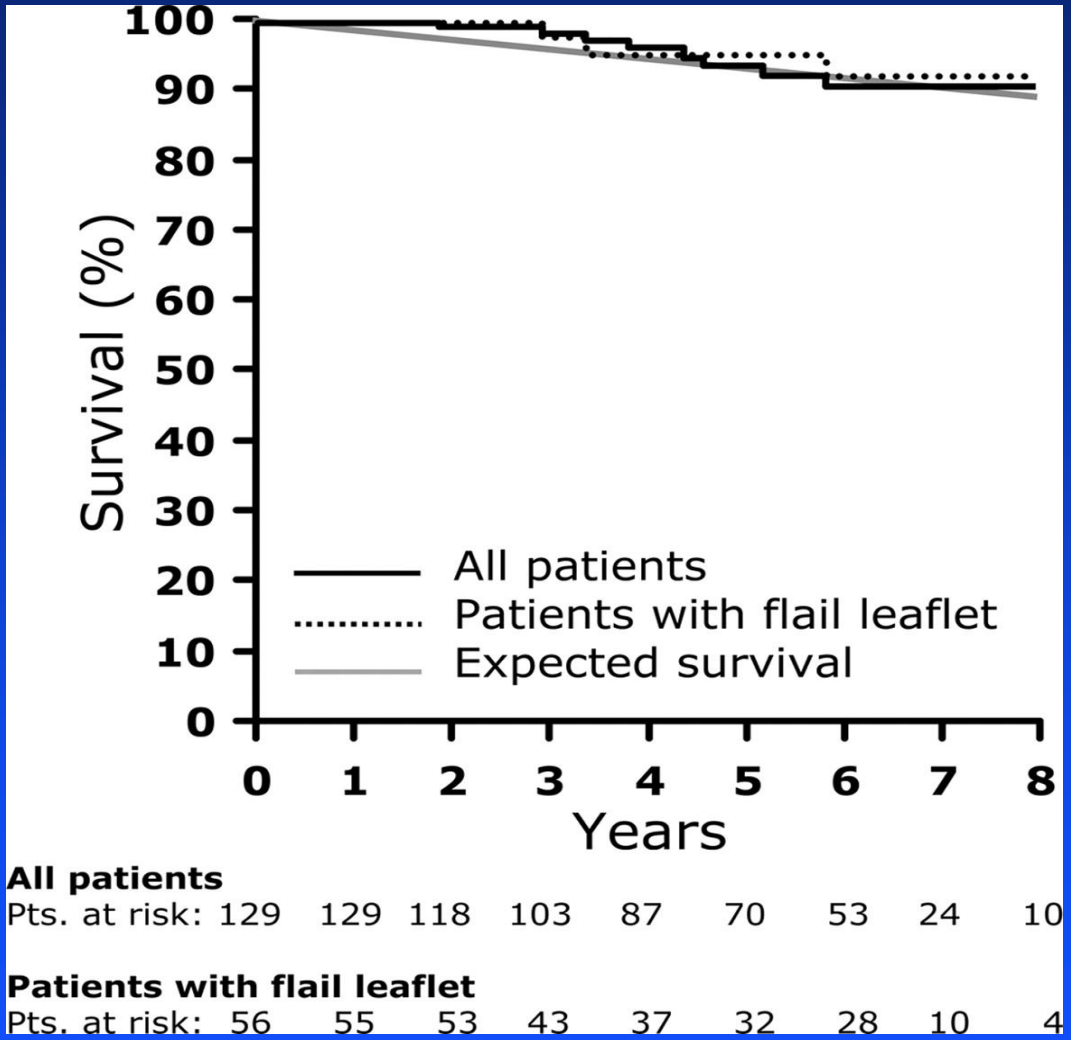


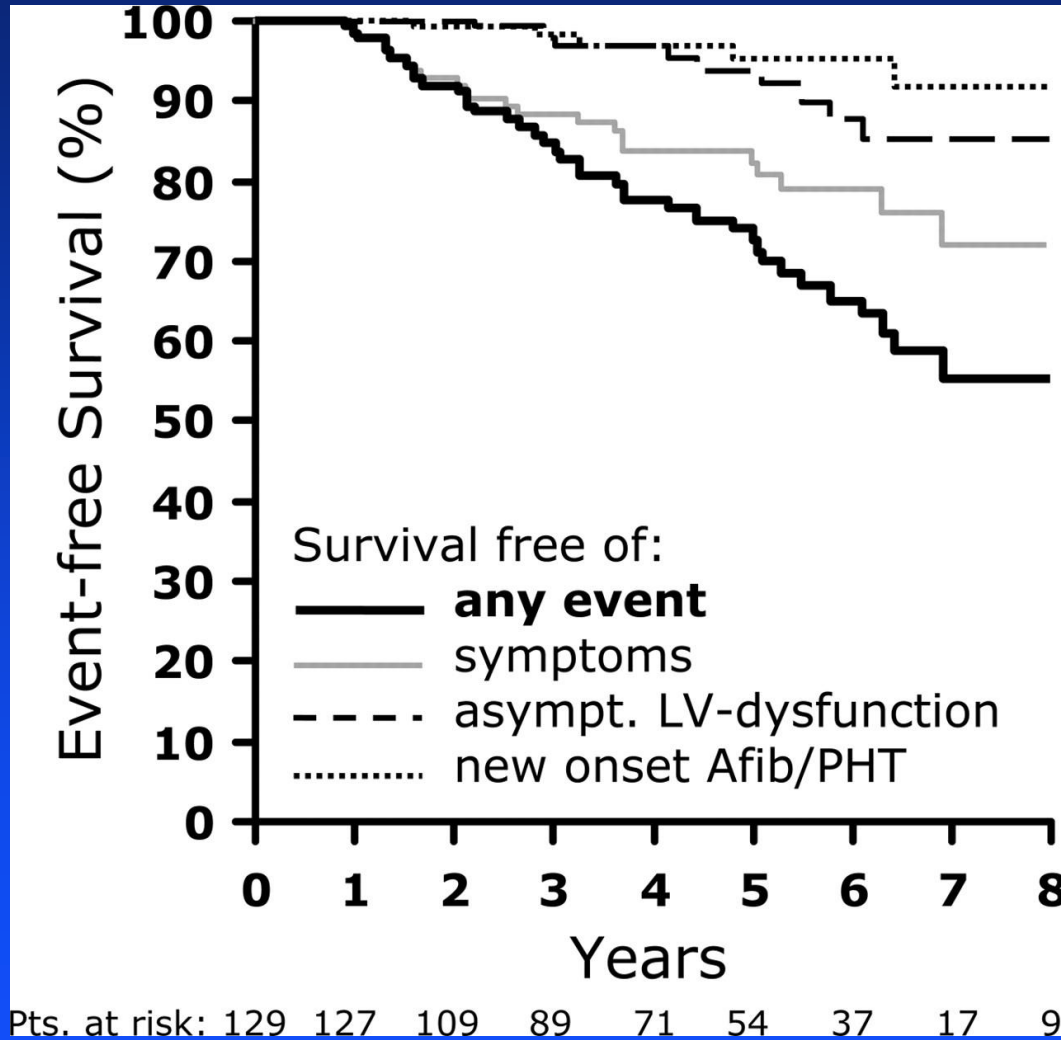
Vahanian ESC guidelines 2012

Asymptomatic severe MR: Watchful waiting vs early surgery

- ACC/AHA Class IIA
  - If likelihood of successful and durable repair without residual MR >95% and Mortality <1%
    - Ie isolated posterior leaflet MVP
- ESC IIA
  - Also, flail and LVESD≥40mm
- ESC IIB
  - Also, LAV ≥ 60ml/M^2
  - or exercise induced PHTN (60mmHg)

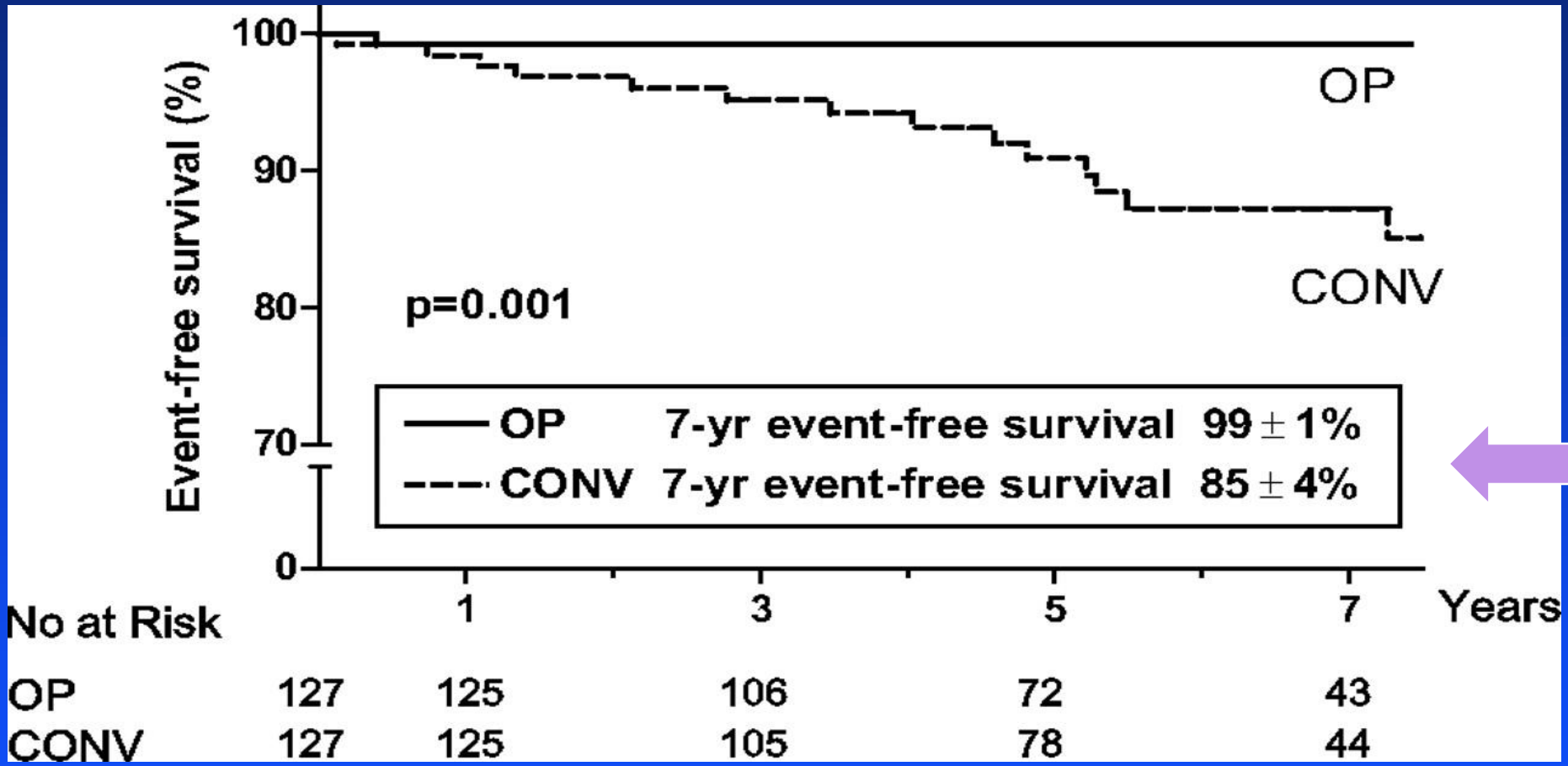
Survival with asymptomatic severe degenerative MR managed with watchful waiting strategy





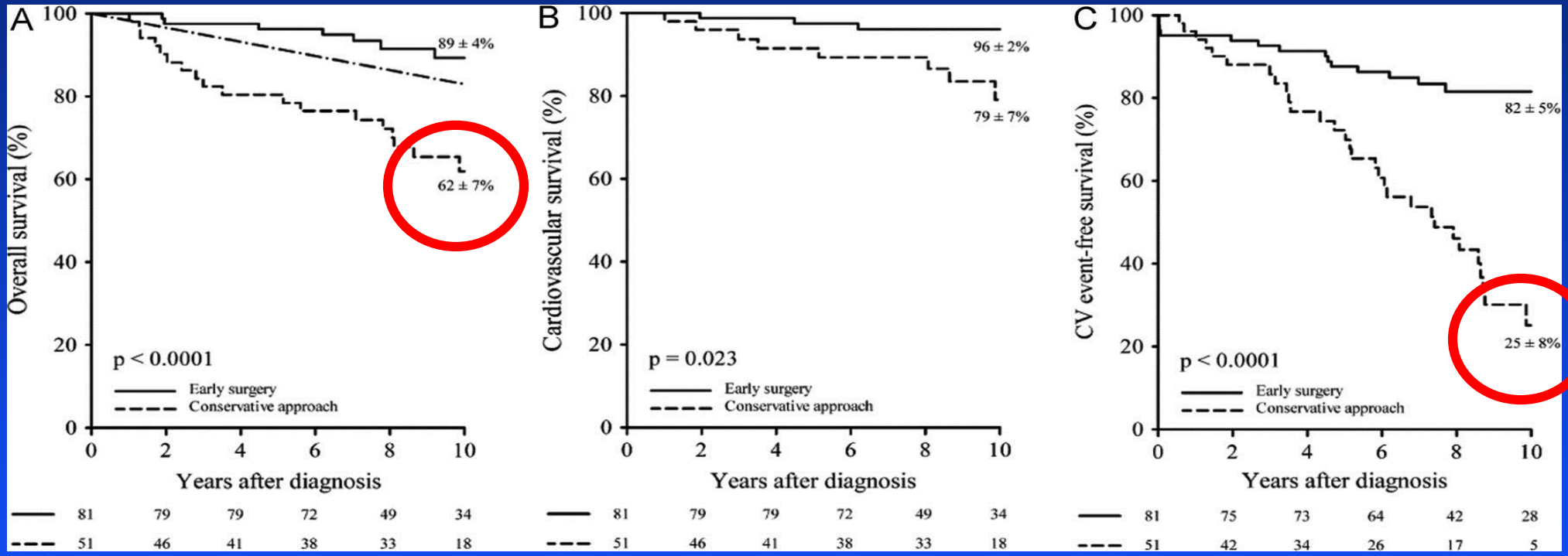
Rosenhek Circulation. 2006;113:2238-2244

Event-free survival better in operated than conventional treatment (CONV) groups in propensity-matched pairs.



447 consecutive, asymptomatic severe MVP
Kang et al. Circulation. 2009;119:797-804

Ten-year survival of patients with early repair compared with similar patients followed conservatively



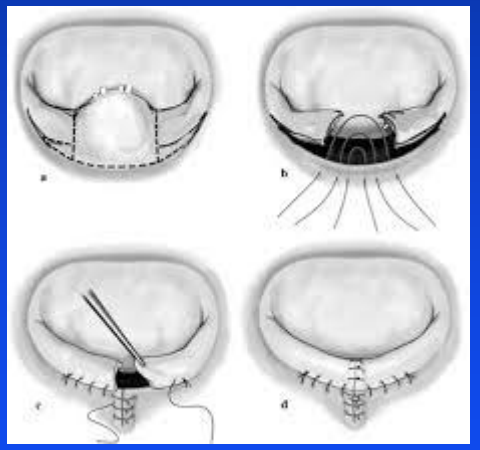
Propensity matched score-adjusted HR= 5.2 , 4.8, 4.4

Montant P. JTCS. 2009;138: 1339.**: 192 w/o ESC indications for MVR (symptoms, LVE/dysf, AF, PHTN**

De Bonis, and Bolling Eur Heart J 2013;34:13-19

Early surgery (2mos) after symptoms

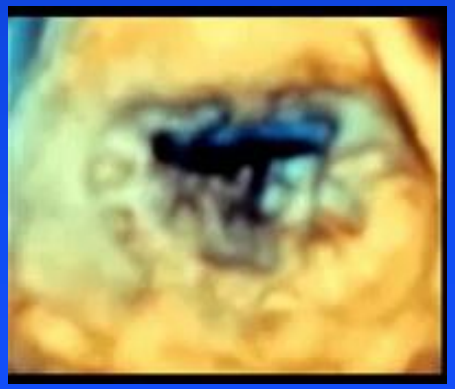
- Duke database: 481 patients/20 yrs
  - 168 early (2mos of symptoms)
  - 94 late surgery
  - 219 medically management
- MVA: Early surgery & repair
- **Death HR= 0.54**



Samad. Heart 2011;97(3):221.

56yo woman with MVP and dyspnea

- Barlow's MVP
  - EROA = 39mm2
  - RF= 52%
  - normal LVEF, ESD
  - LAE: 60 ml/M^2
- stress echo with PHTN
  - Successful MV repair



Primary Mitral Valve Disease

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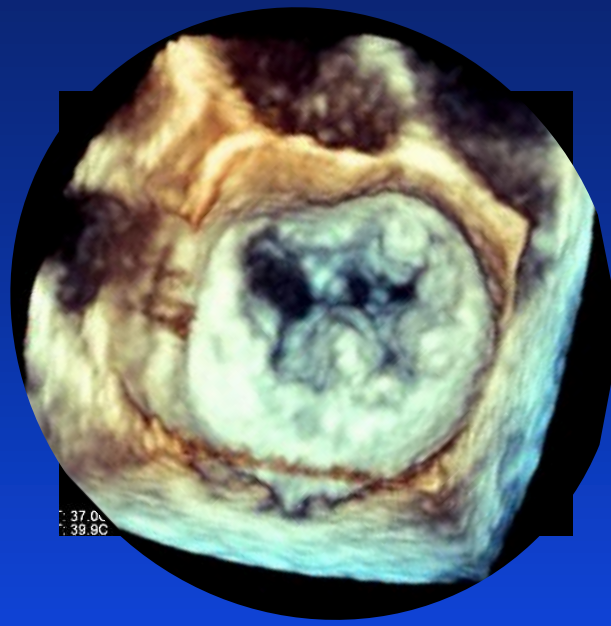
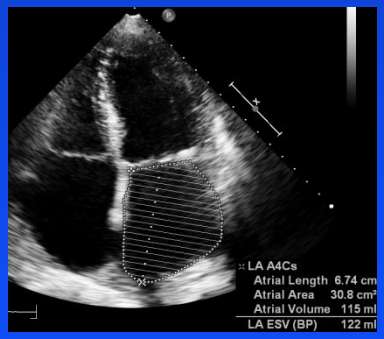
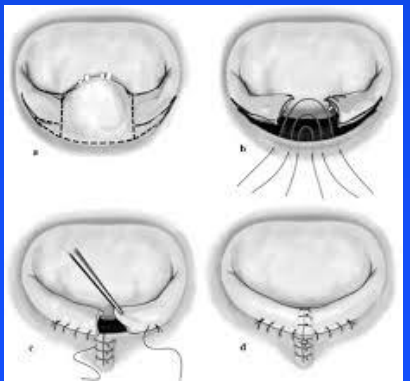


C	Asymptomatic severe MR	• Severe mitral valve prolapse with loss of coaptation or flail leaflet



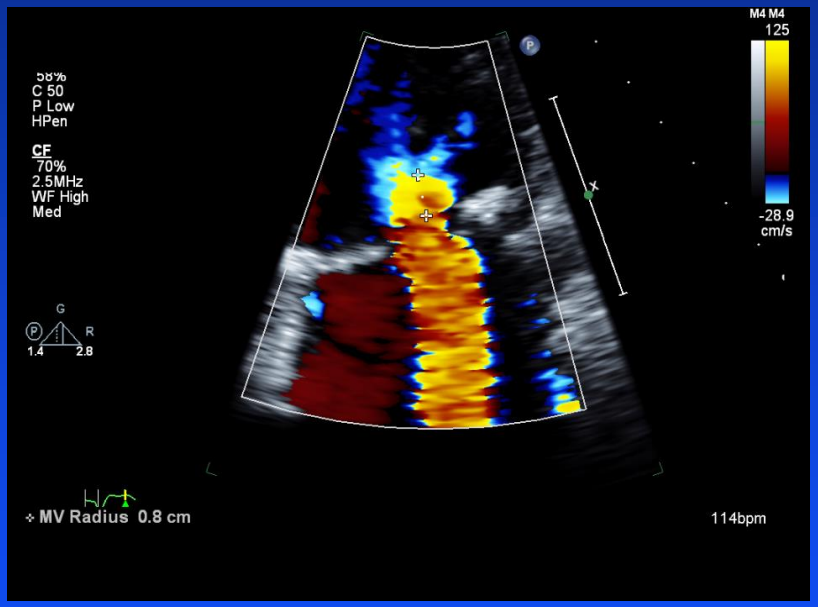


Thank you for your attention!

Practice Gaps in care of MR

Uncertainty:

- Timing for surgery
  - 50% PCP
- Quantitative MR
  - Limited or no reporting
- Surgical volumes
  - 30% cardiologists/PCP

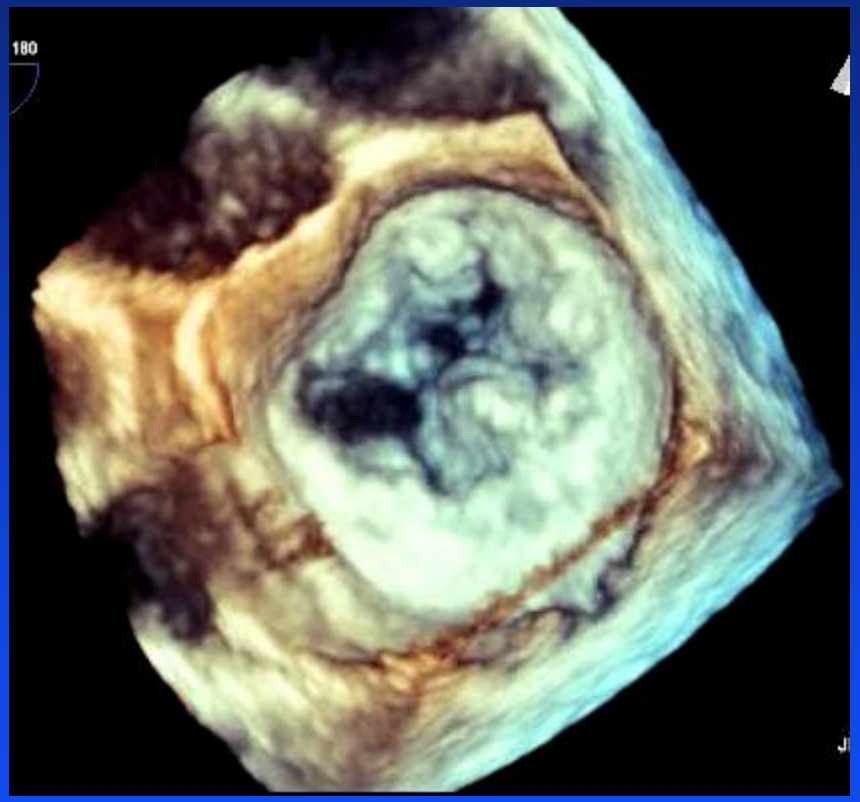


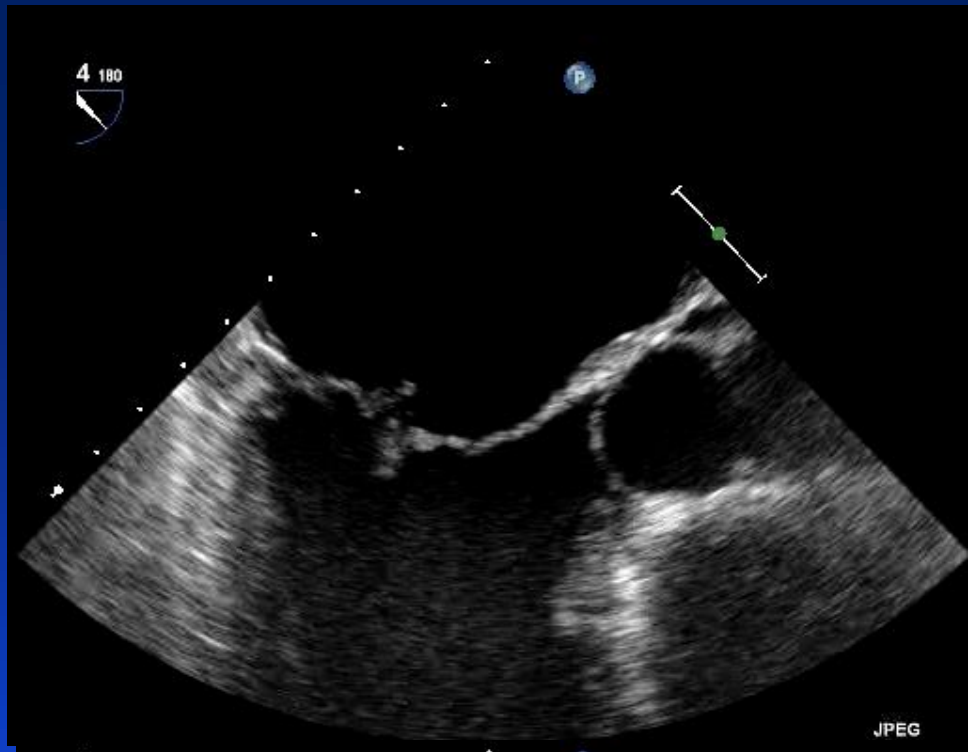
Wang AHJ. 2016;172:70

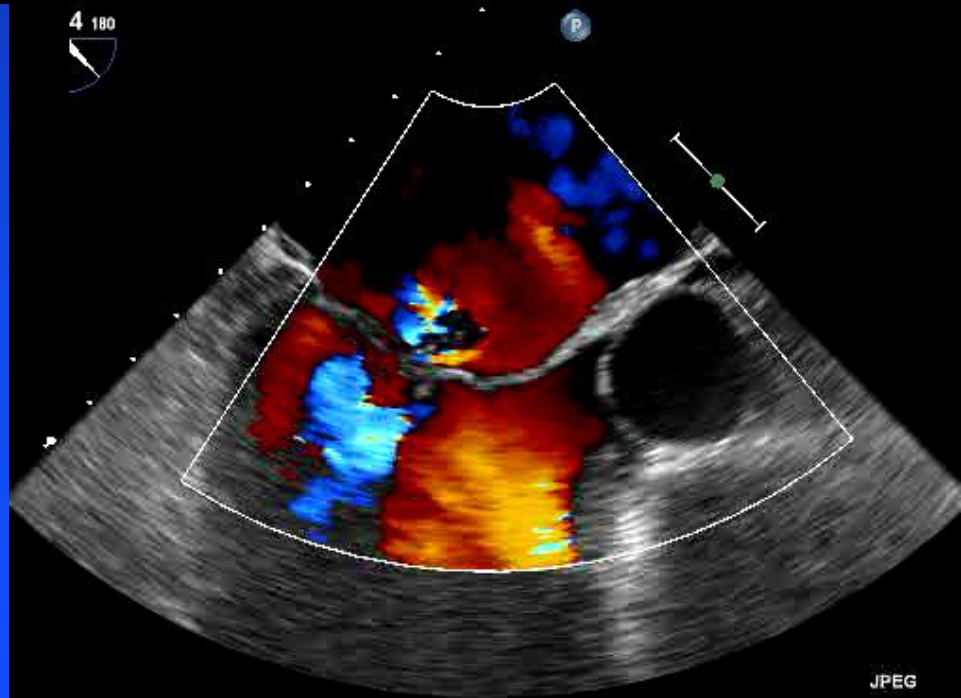
Diagnostic Testing and followup

- TTE:
  - assess LVF and LVESD, PASP
- Stage A: every 3-5 years
- Stage B: every 1-2 years
- Stage C: every 6-12 months
- TEE:
  - 2D and 3D to assess anatomy and surgical repair
- Cardiac catheterization
  - Confirm hemodynamics, assess coronaries

FED: P2 flail with torn chordae







Acute Mitral Regurgitation: Flail MVP