Watchful Waiting vs. Early Surgery in Asymptomatic Severe Degenerative Mitral Regurgitation

Watchful Waiting is the Standard of Care

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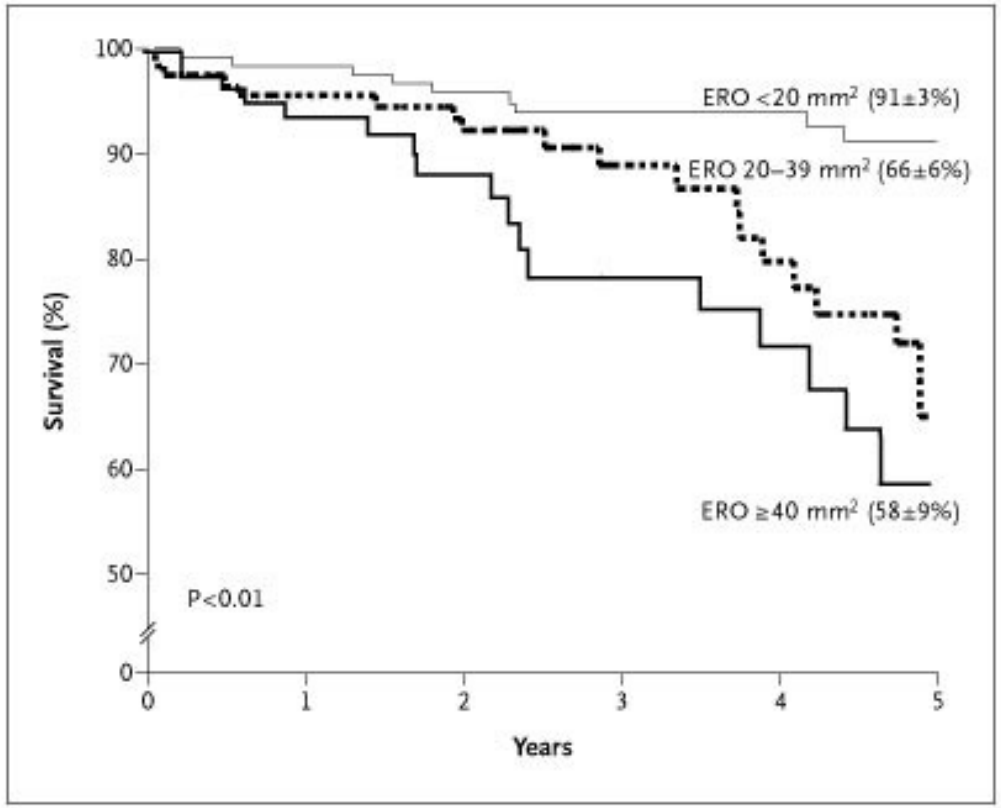
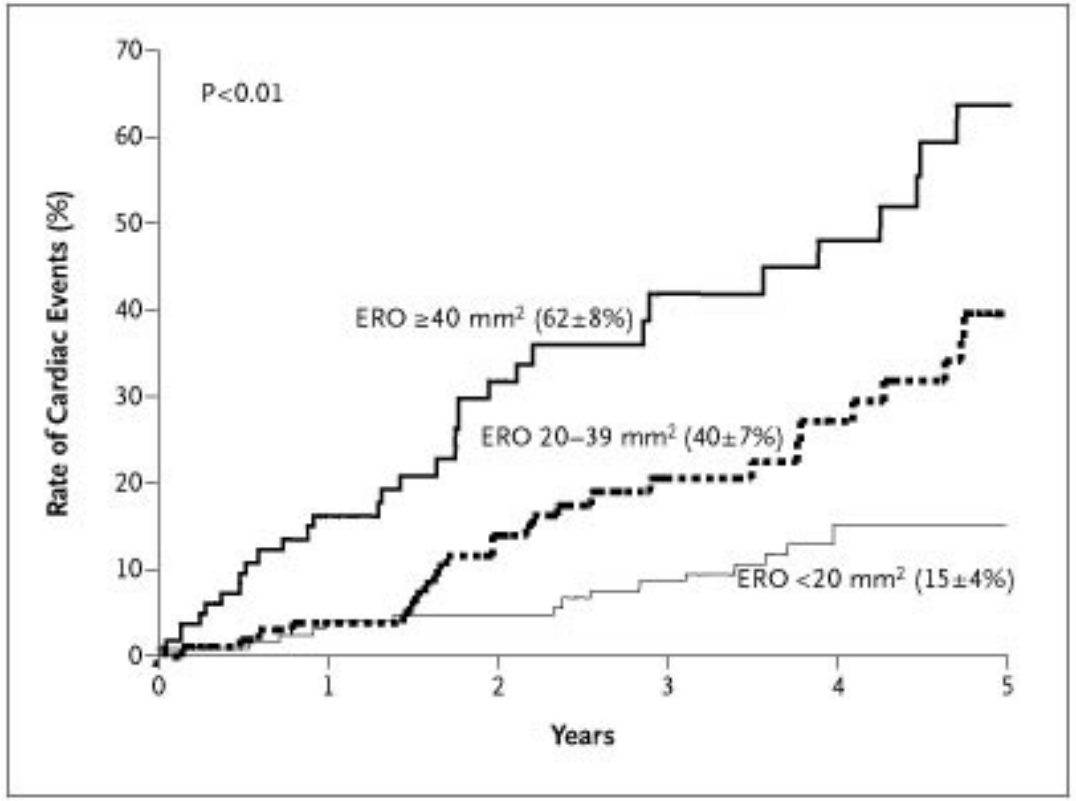
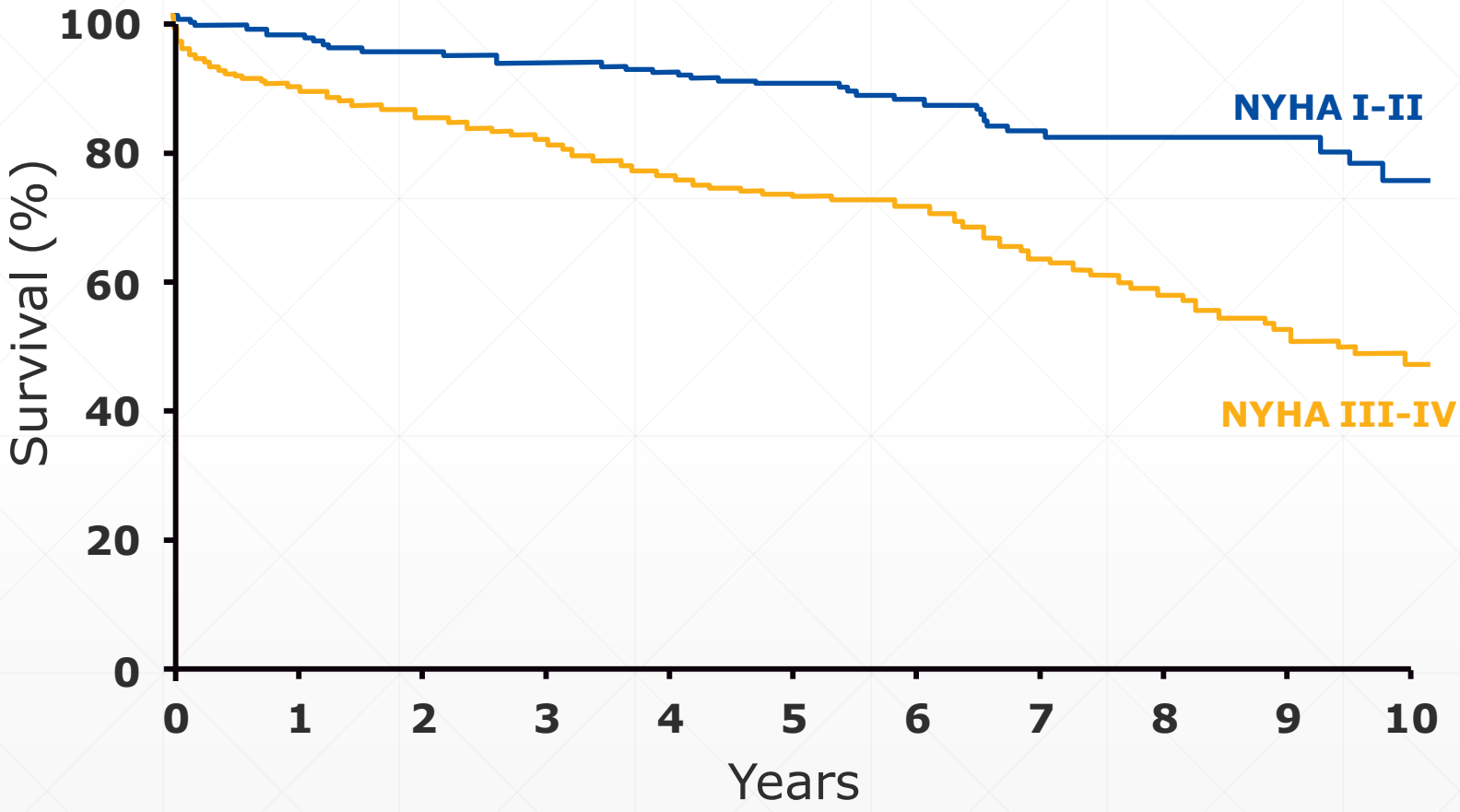
MR Severity in Symptomatic Patients- Prognosis





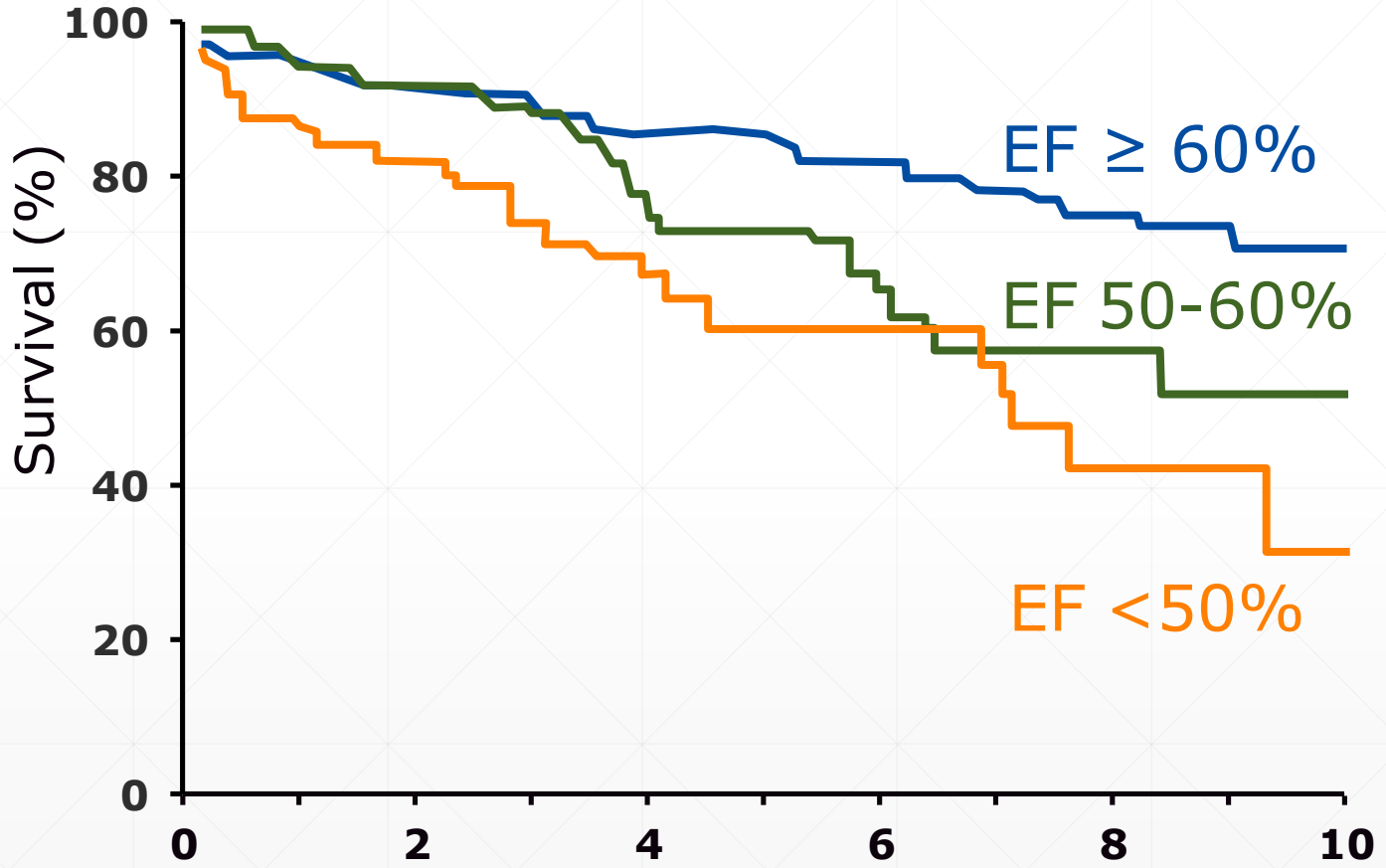
Enriquez-Sarano M.et al. N Engl J Med 2005; 352:875-883

Indications for intervention in severe primary mitral regurgitation



Tribouilloy C et al. Circulation 1999;99:400

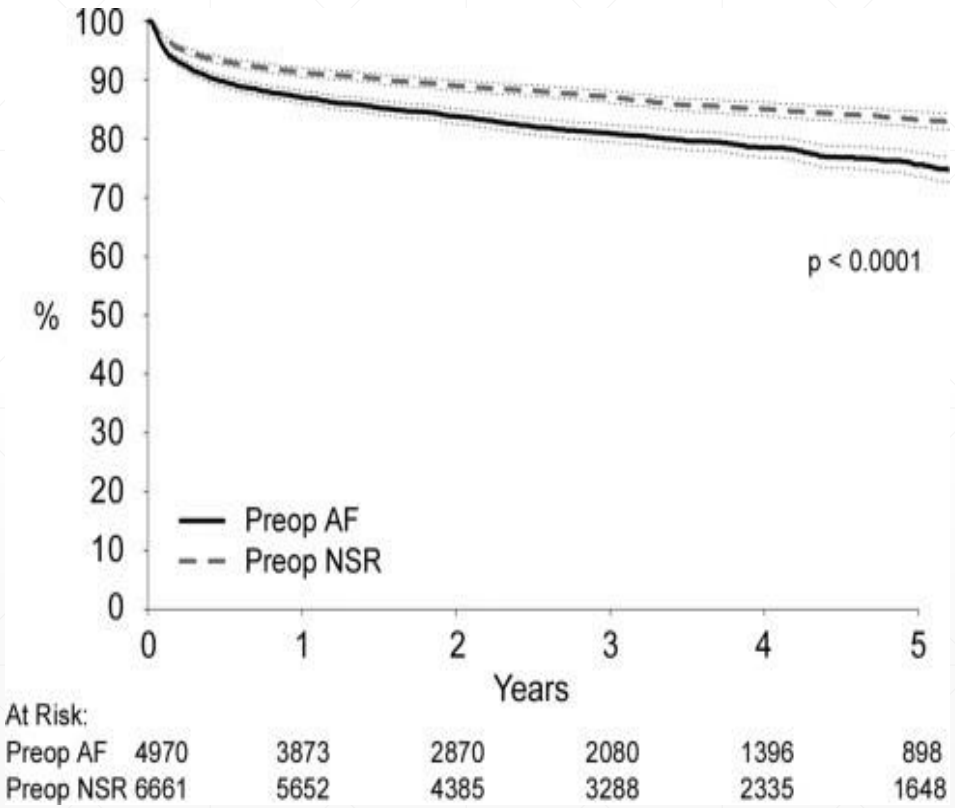
Indications for intervention in severe primary mitral regurgitation



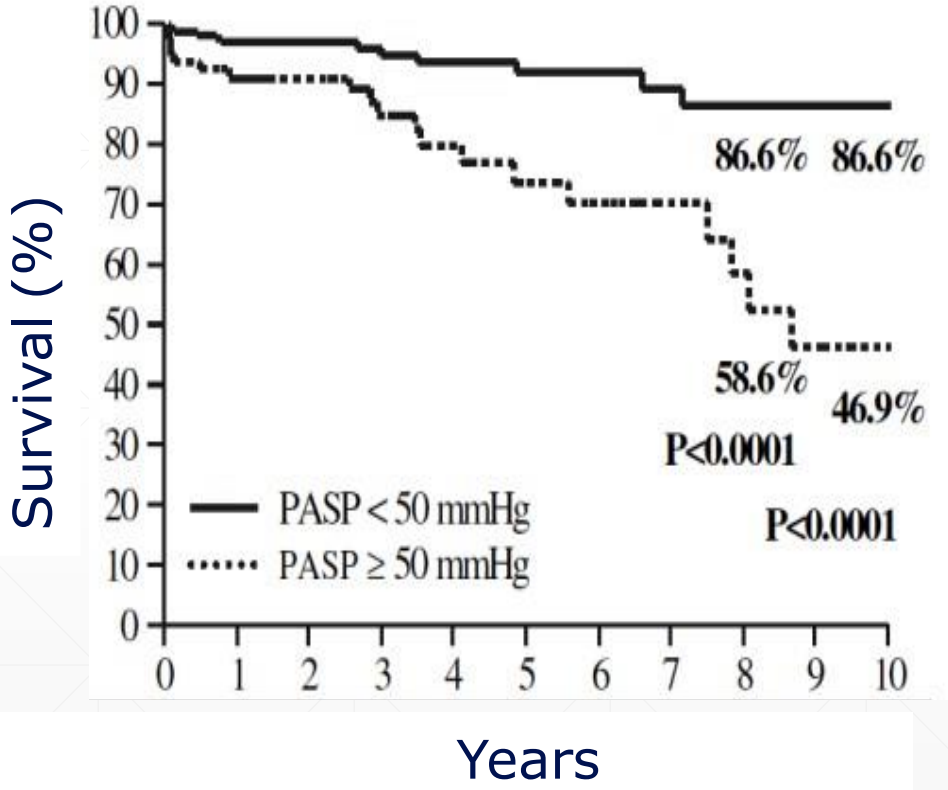
Enriquez-Sarano et al. Circulation 1994;90:830-837.

Indications for intervention in severe primary mitral regurgitation

Atrial Fibrillation & Pulmonary Hypertension Postoperative Survival



Badhwar et al. Ann Thor Surg 2012;94:1870-1877



Le Tourneau et al. Heart 2010;96:1311-1317

Indications for intervention in severe primary mitral regurgitation

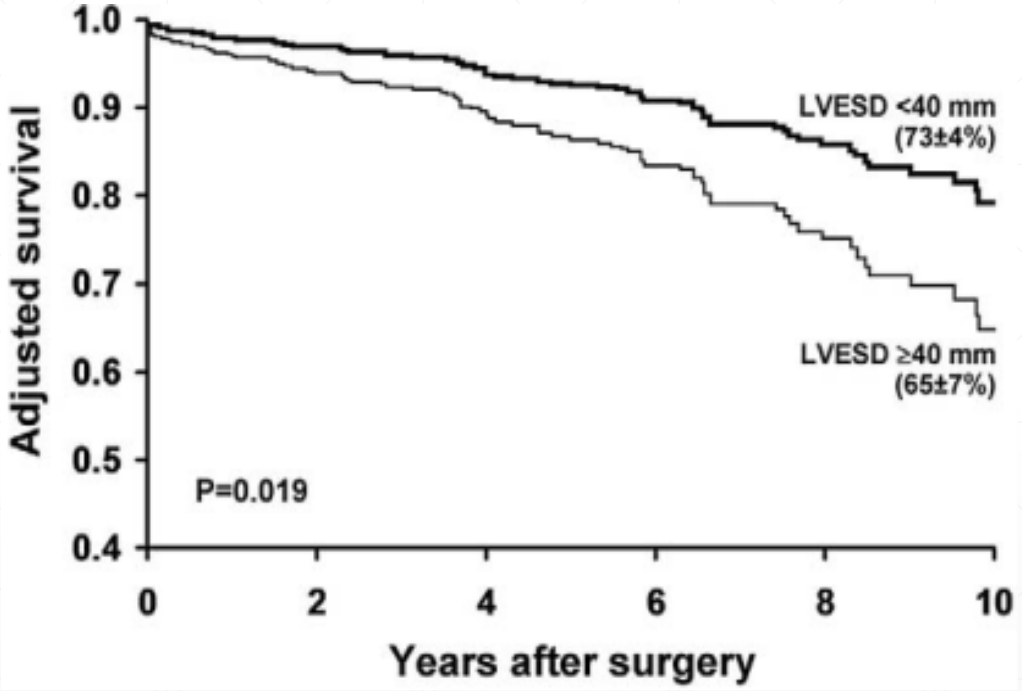
Recommendations	Class	Level
Mitral valve repair should be the preferred technique when the results are expected to be durable.	I	C
Surgery is indicated in symptomatic patients with LVEF >30%.	I	B
Surgery is indicated in asymptomatic patients with LV dysfunction (LVESD ≥45 mm* and/or LVEF ≤60%).	I	B
Surgery should be considered in asymptomatic patients with preserved LV function (LVESD <45 mm and LVEF >60%) and atrial fibrillation secondary to mitral regurgitation or pulmonary hyper- tension (systolic pulmonary pressure at rest >50 mmHg**).	IIa	B

** Cut-offs refer to average-size adults and may require adaptation in patients with unusually small or large stature*

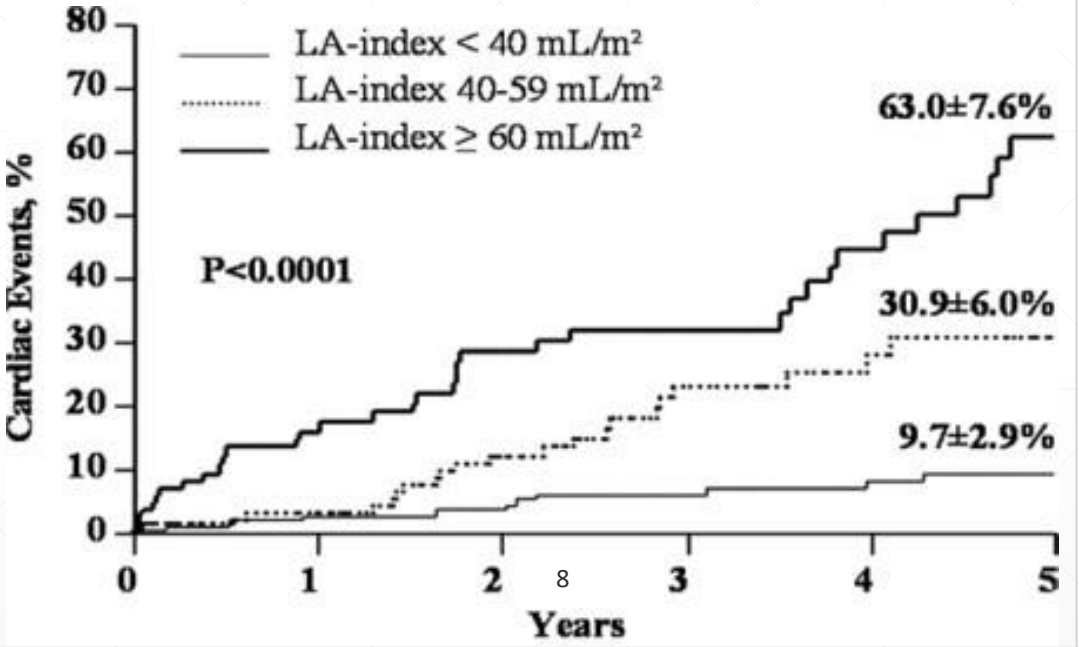
***** If an elevated SPAP is the only indication for surgery, the value should be confirmed by invasive measurement***

Indications for intervention in severe primary mitral regurgitation

Left Ventricular and Left Atrial Size in patients with flail leaflets



Tribouilloy C et al. J Am Coll Cardiol 2009



Le Tourneau T. et al. J Am Coll Cardiol 2010

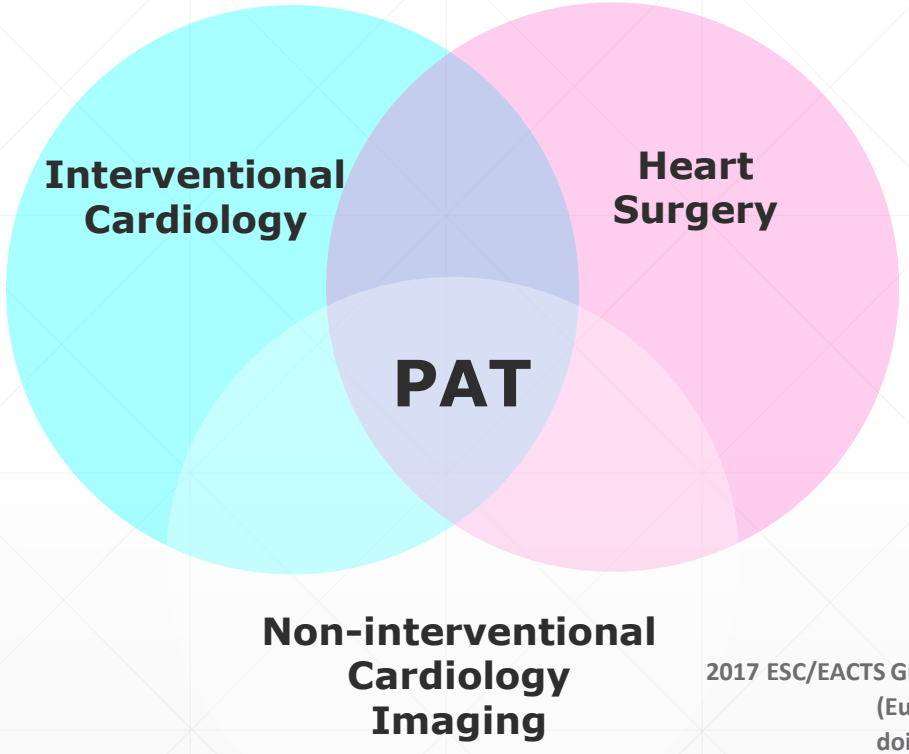
Indications for intervention in severe primary mitral regurgitation

Recommendations	Class	Level
Surgery should be considered in asymptomatic patients with preserved LVEF (>60%) and LVESD 40–44 mm* when a durable repair is likely, surgical risk is low, the repair is performed in heart valve centres, and at least one of the following findings is present: - flail leaflet or, - presence of significant LA dilatation (volume index ≥60 mL/m² BSA) in sinus rhythm.	IIa	C
Mitral valve repair should be considered in symptomatic patients with severe LV dysfunction (LVEF <30% and/or LVESD >55 mm) refractory to medical therapy when likelihood of successful repair is high and comorbidity low.	IIa	C

** Cut-offs refer to average-size adults and may require adaptation in patients with unusually small or large stature*

www.escardio.org/guidelines
2017 ESC/EACTS Guidelines for th Management of Valvular Heart Disease
(European Heart Journal 2017 -
doi:10.1093/eurheartj/ehx391)

Concept of Heart Valve Centres

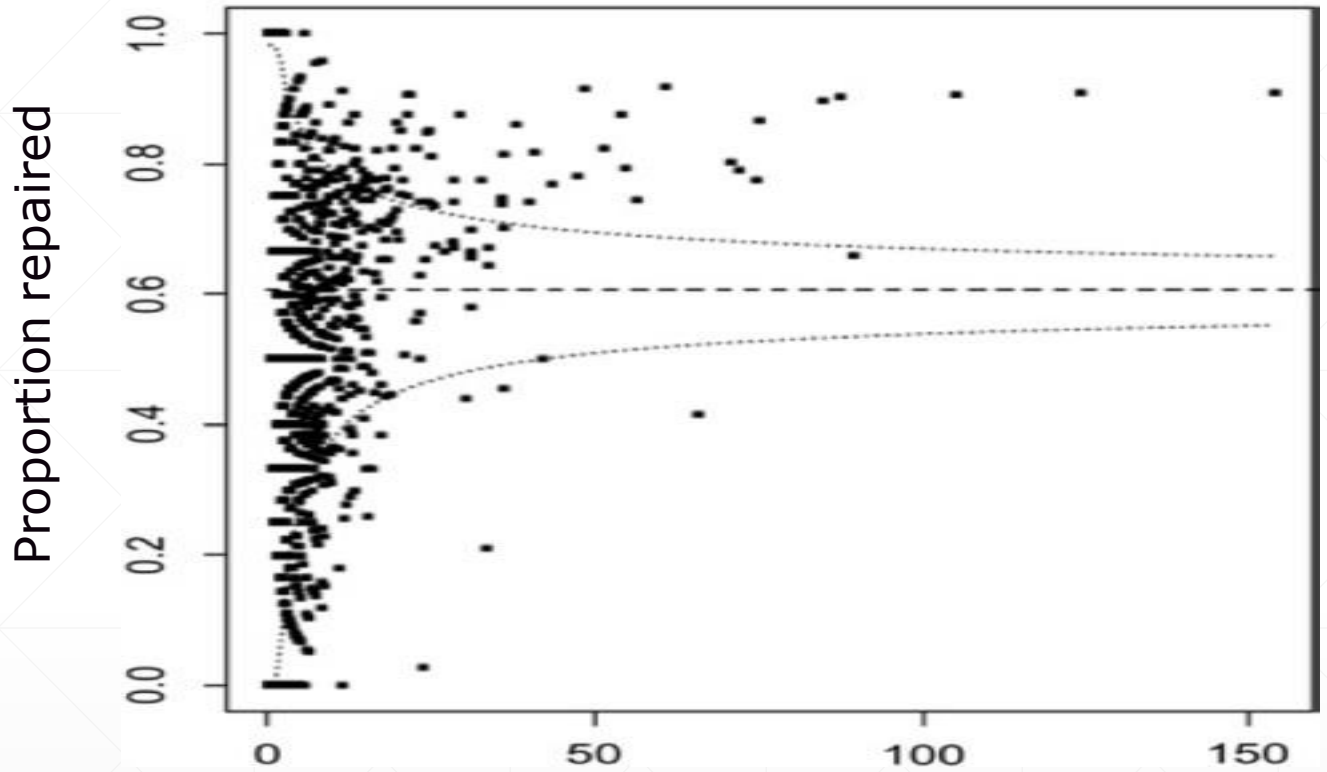


- Multidisciplinary Teams
- Volume
- Quality Assessment (robust audit)
- Excellence in
  - Imaging
  - Intervention
  - Surgery

2017 ESC/EACTS Guidelines for the Management of Valvular Heart Disease (European Heart Journal 2017 - doi:10.1093/eurheartj/ehx391)

Modified from Chambers J et al. Eur Heart J 2017;38:2177-2183.

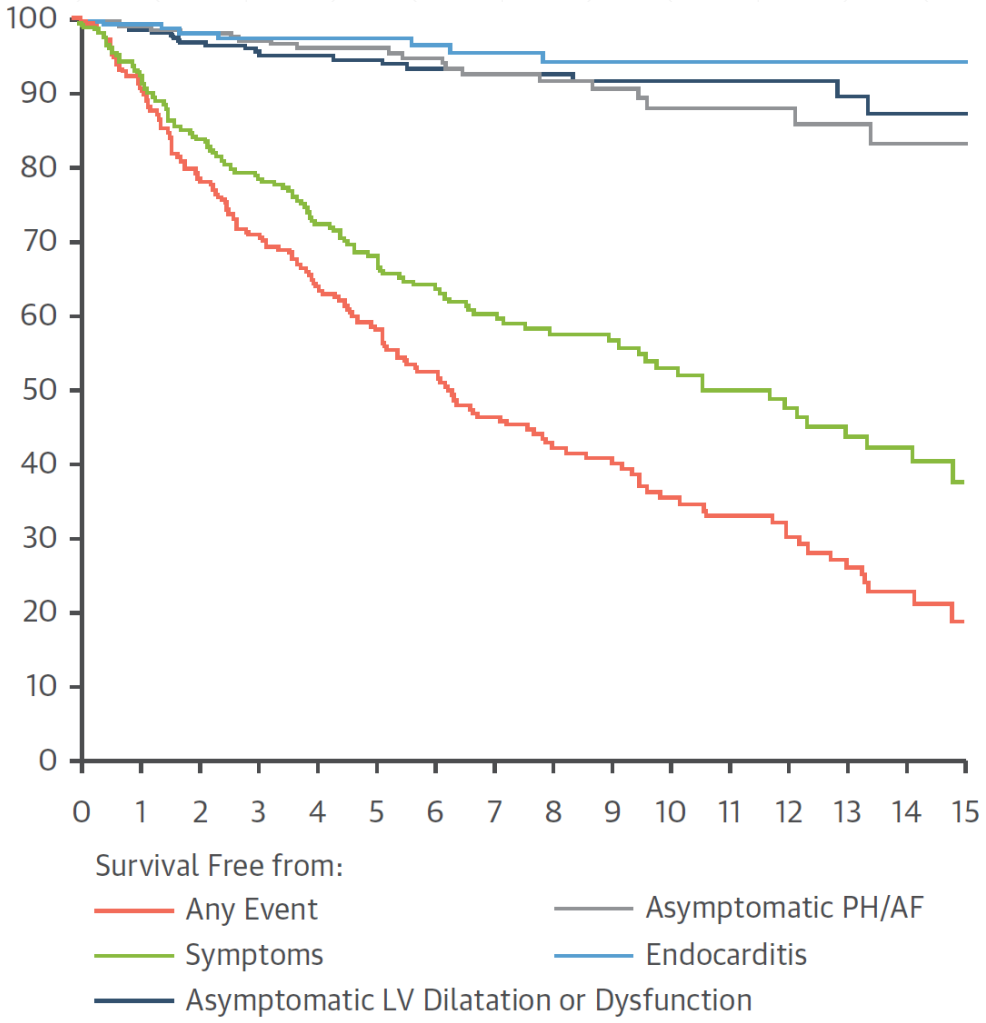
Experience and Outcome of Mitral Surgery in Mitral Regurgitation

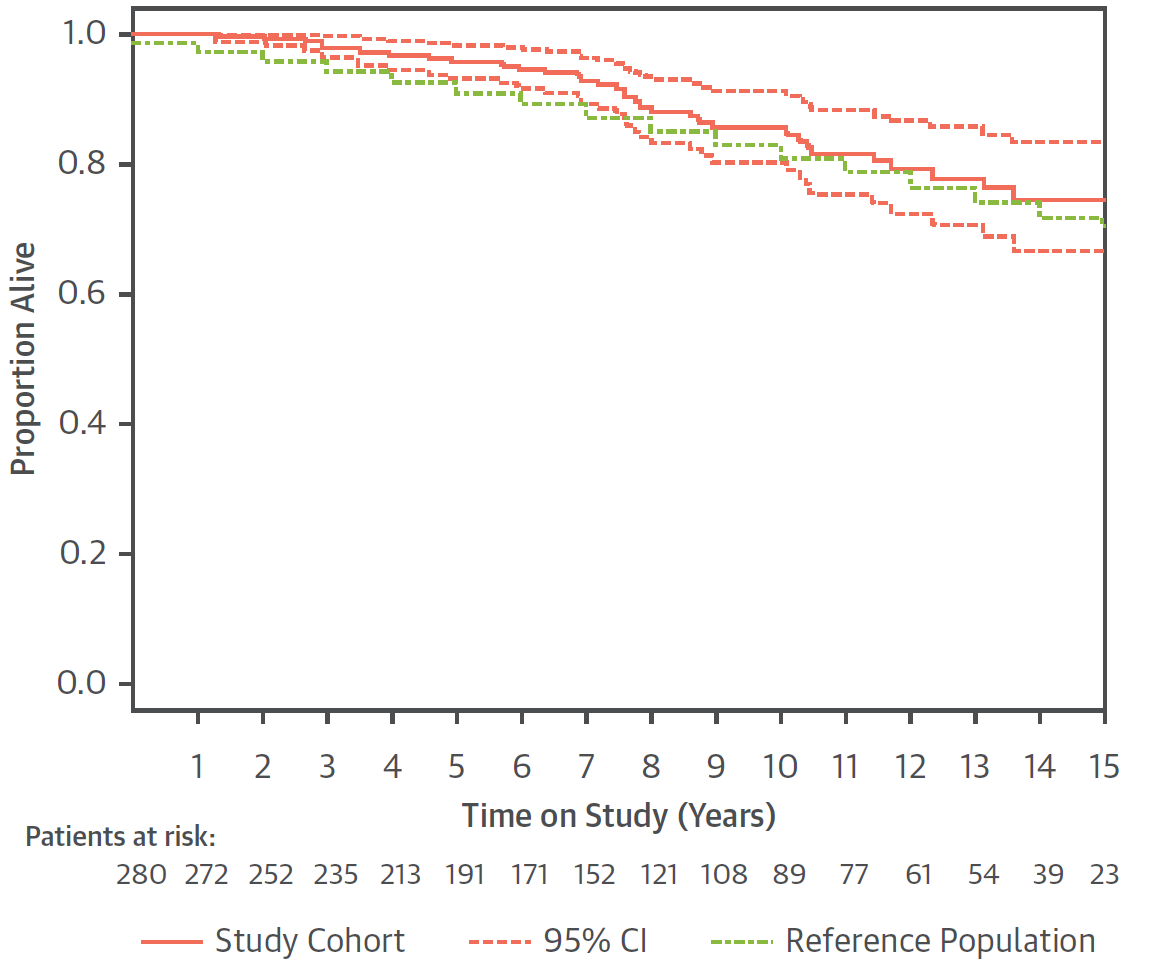


Bolling S et al.
Ann Thorac Surg 2010;90:1904-11

Annual Mitral Volume	1	5	10	15	20	30	40	50	60	70	80	90	100
Predicted Probability of Repair, %	49.9	54.6	60.4	65.4	69.6	75.4	78.9	80.8	81.8	82.3	82.4	82.5	82.6

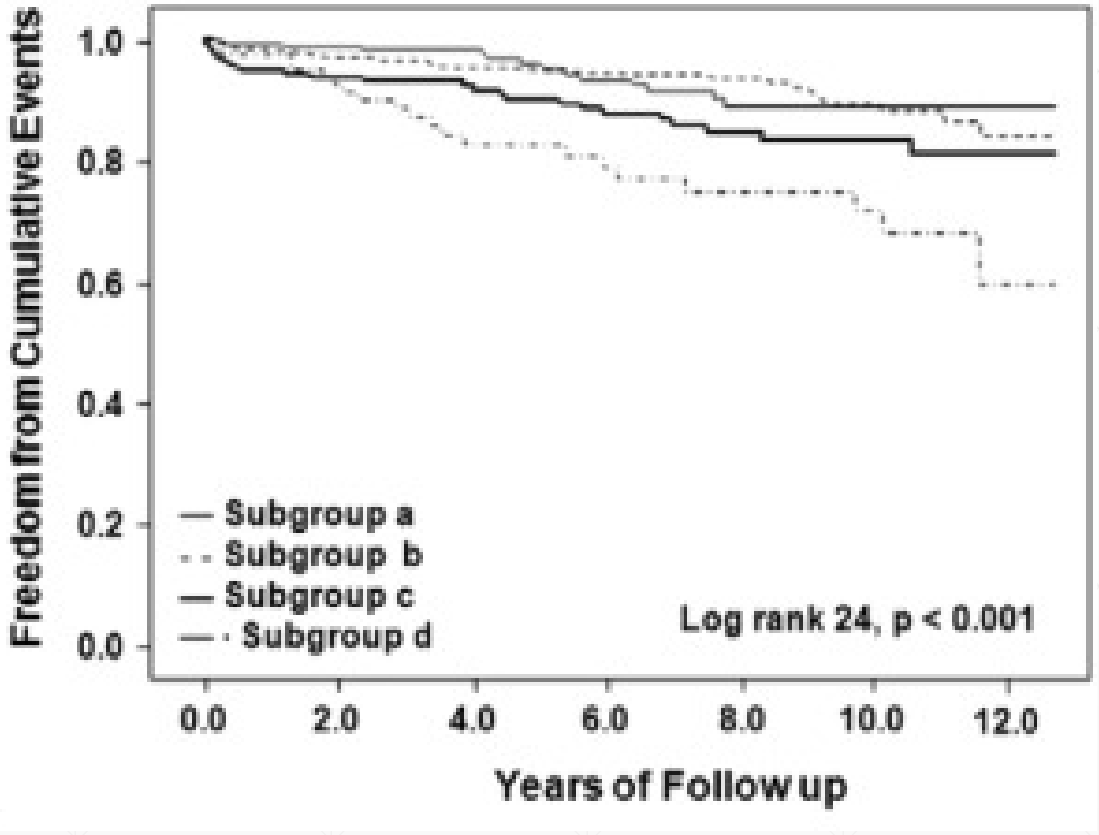
Prognosis of Watchful Waiting

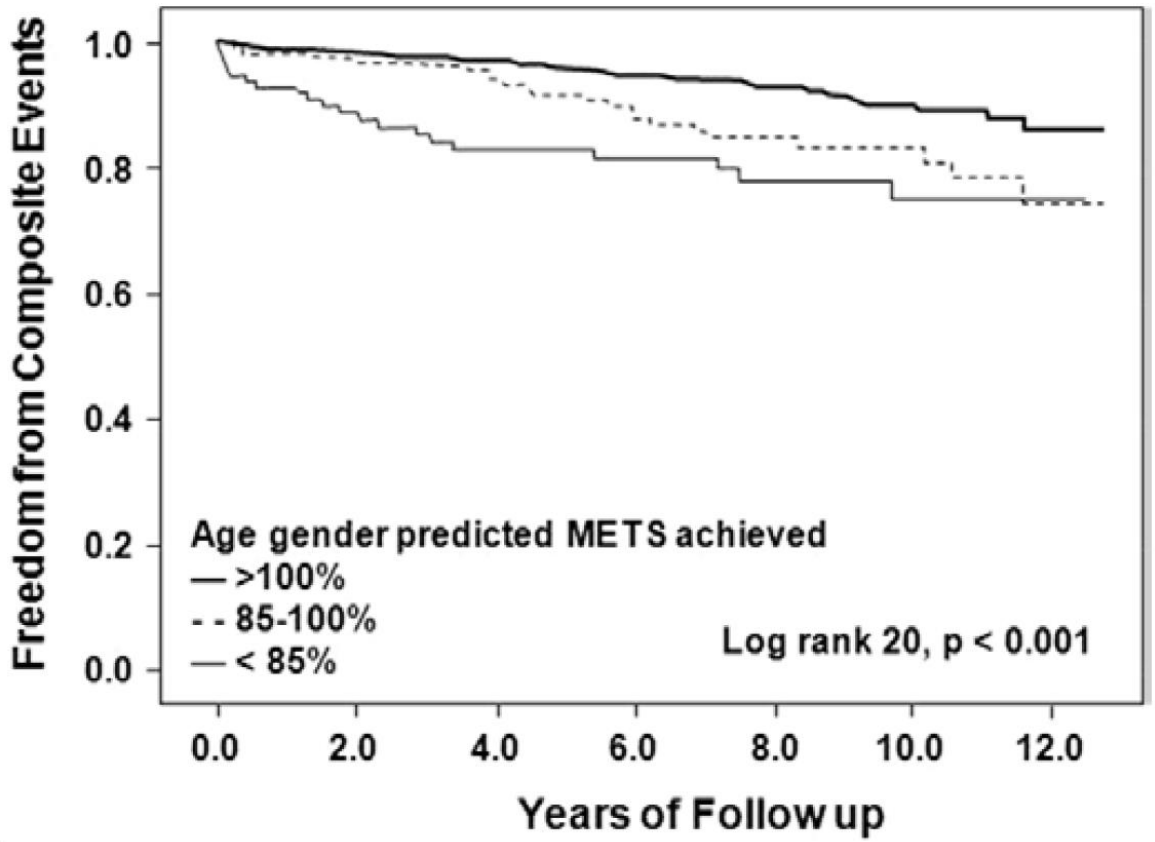




Silberzsac P. et al. J Am Coll Cardiol Img 2018;11:1213–21)

Watchful Waiting in Primary MR





subgroup a, no surgery and achieved METs ≥85%;
subgroup b, surgery and achieved METs ≥85%;
subgroup c, surgery and achieved METs <85%;
subgroup d, no surgery and achieved METs <85%

Naji P. et al. Circulation. 2014;129:1310-1319

Early Surgery vs Conventional Treatment

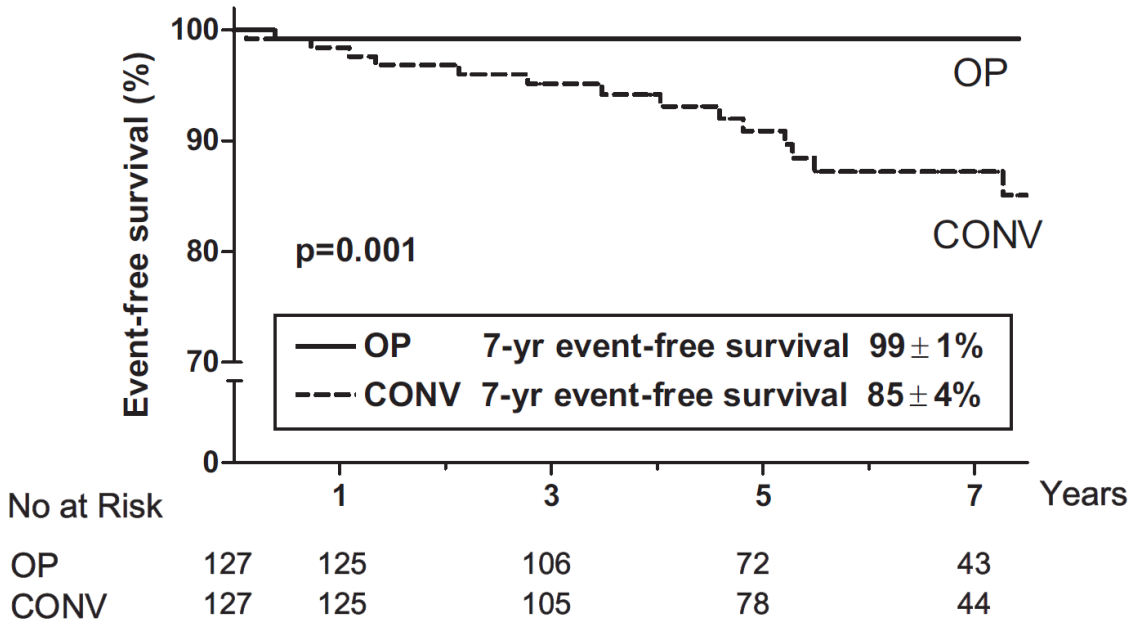


Table 4. Comparison of Echocardiographic Results Between the Early Surgery Group and Those Who Had Late Surgery

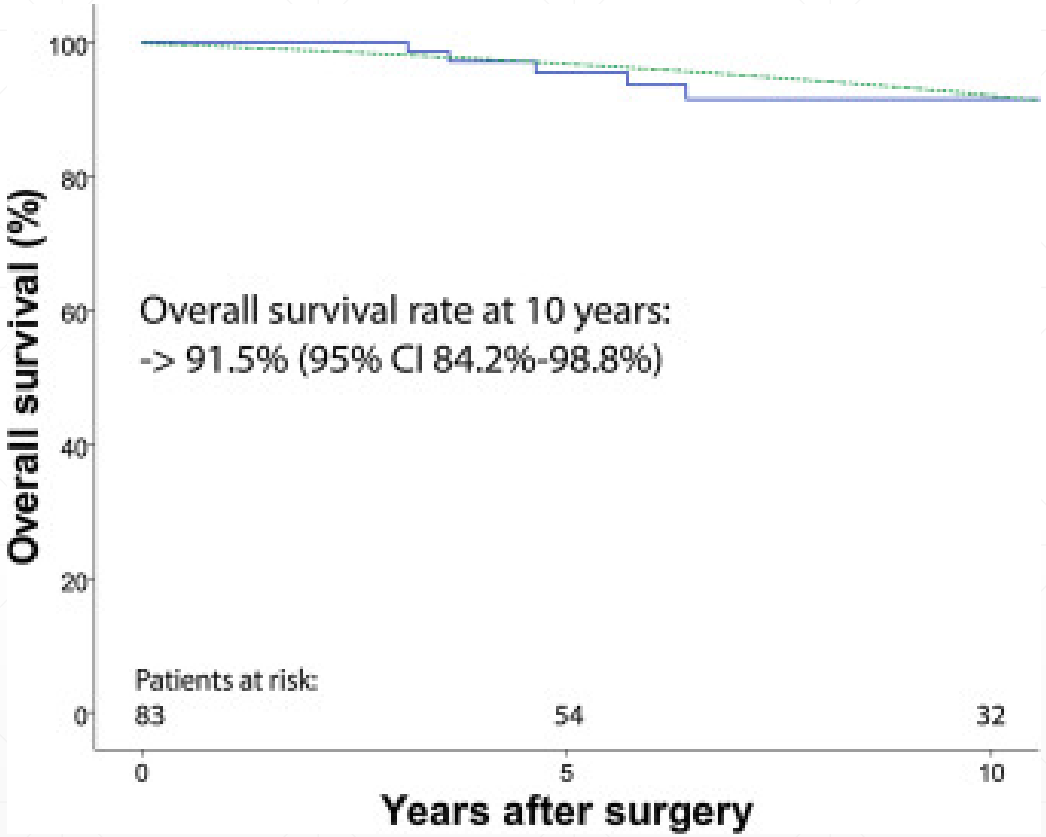
	Early Surgery Group (n=161)			Late Surgery Group (n=53)		
	Preop	Postop	Follow-Up	Baseline	Postop	Follow-Up
LVESD, mm	36±5	34±6†	31±5*	37±4	37±6	33±5
LVEDD, mm	59±6	49±7*	49±5	60±5	51±6	50±6
LVESV, mL	45±16	38±17†	36±74*	47±14	48±19	42±12
LVEDV, mL	130±40	85±28†	90±28*	136±37	105±33	102±25
EF	0.66±0.05	0.56±0.09	0.60±0.06	0.65±0.05	0.55±0.08	0.59±0.05

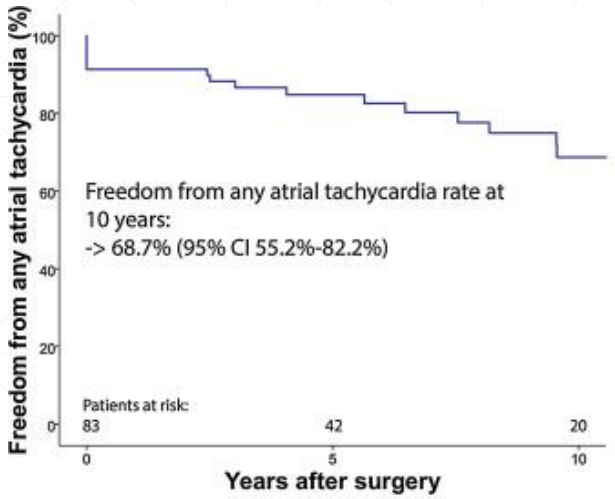
Preop indicates before surgery; Postop, after surgery; LVESD, LV end-systolic dimension; LVEDD, LV end-diastolic dimension; LVESV, LV end-systolic volume; and LVEDV, LV end-diastolic volume.

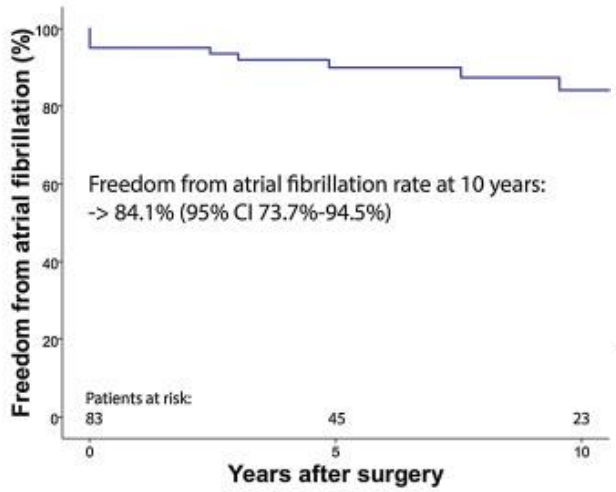
*$P<0.05$, †$P<0.01$ vs late surgery group.

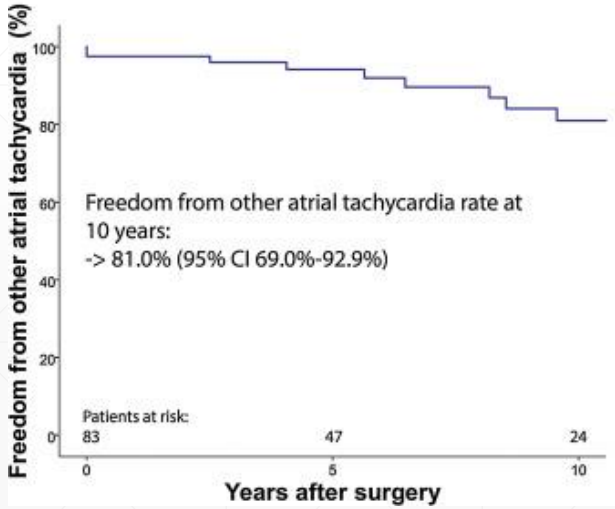
Kang D-H et al. Circulation. 2009;119:797-804

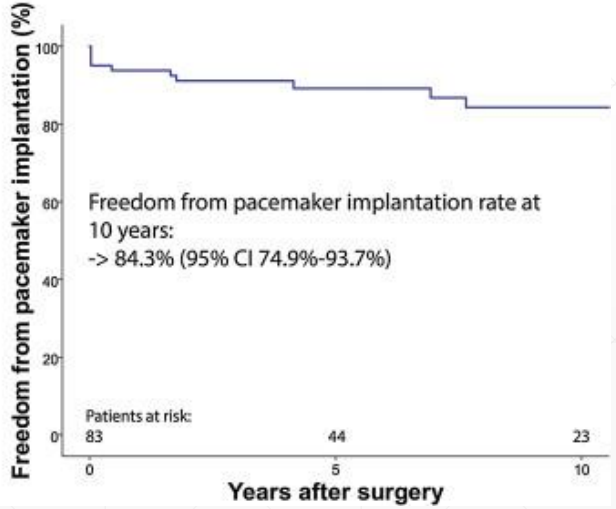
Early Surgery Outcomes in Asymptomatic Patients





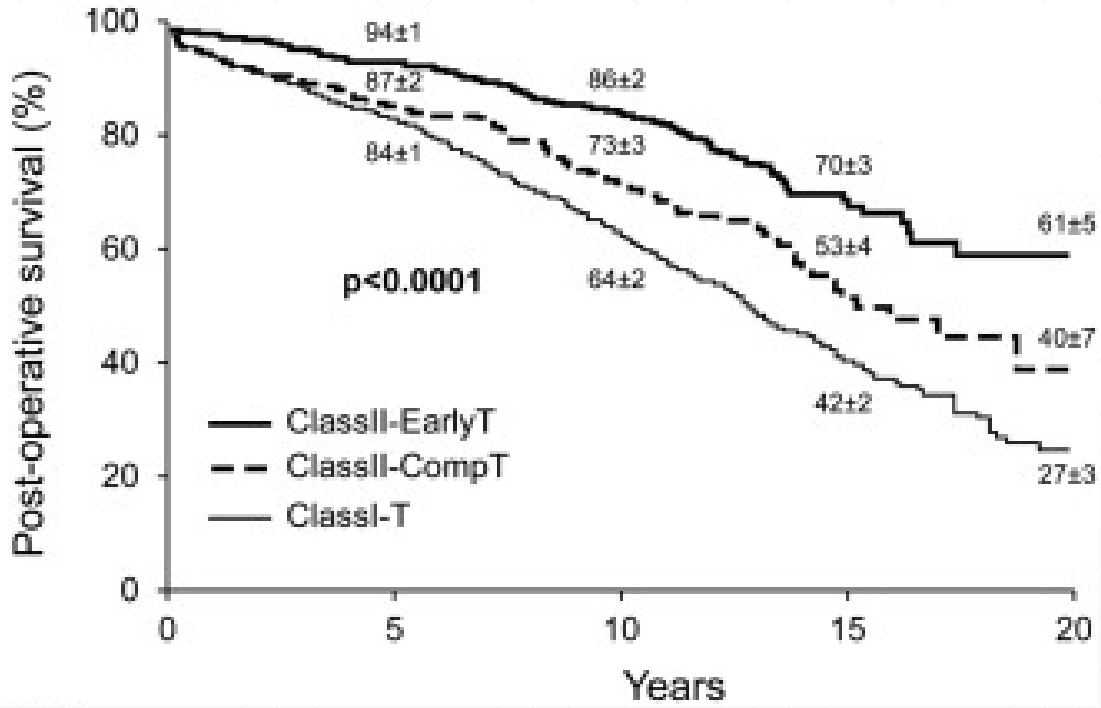


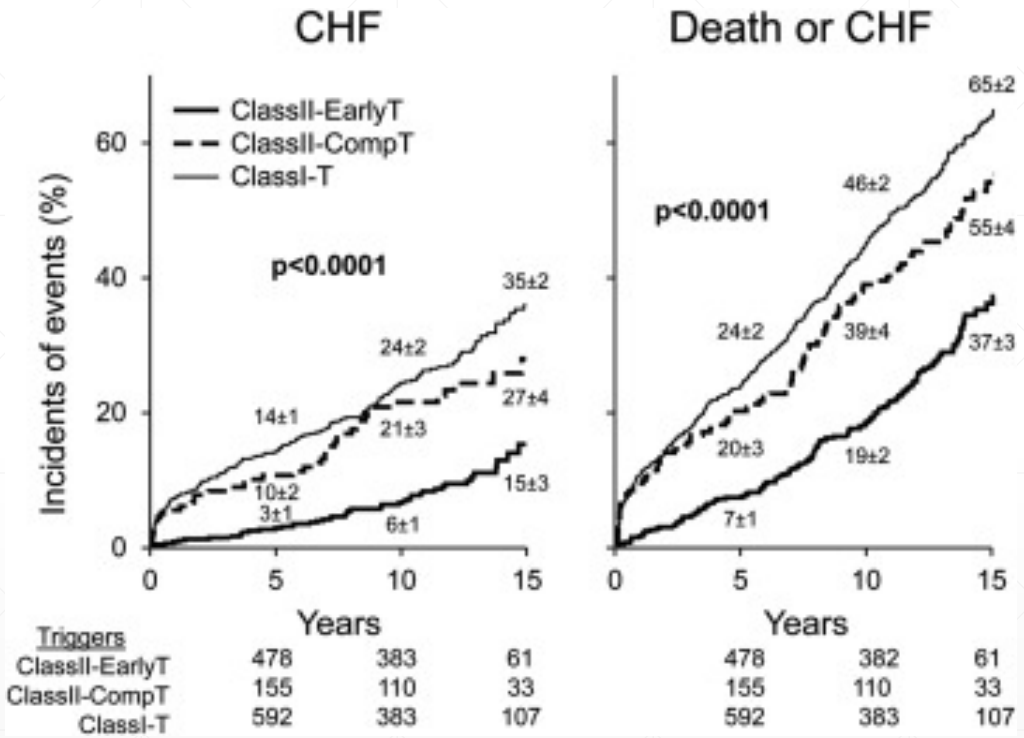




Tomšic A et al J Cardiol 72(2018) 473–479

“Penalty” for Guidelines-Derived MR Surgery

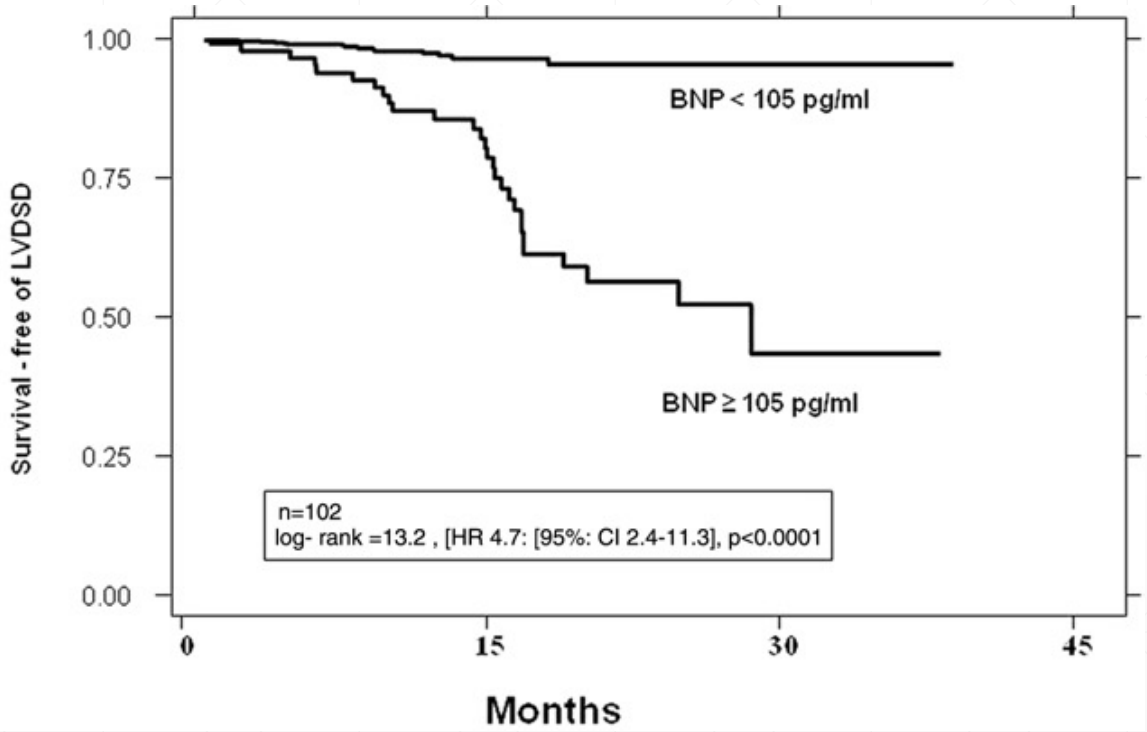


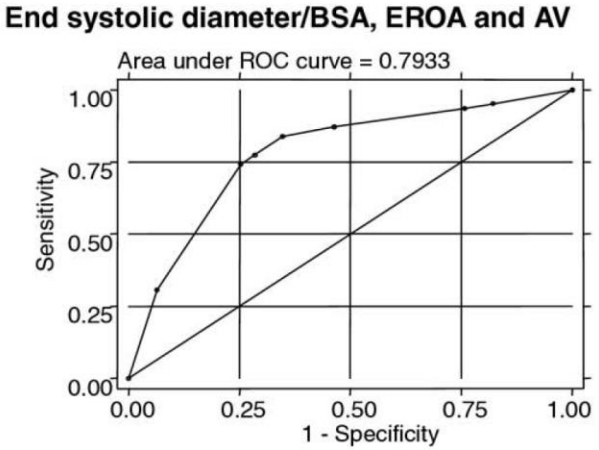


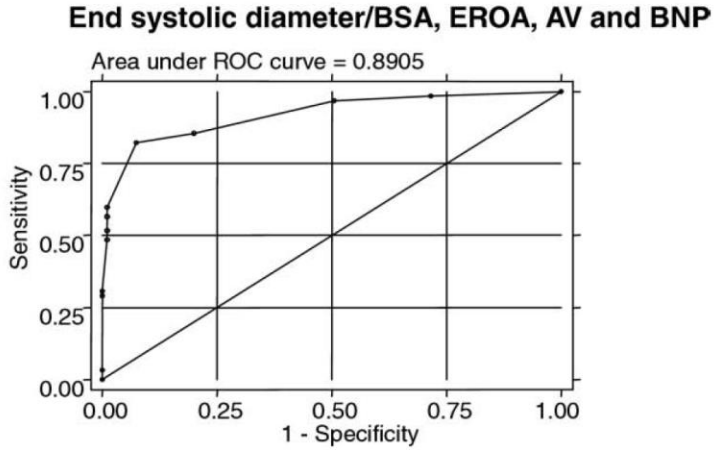
Enriquez-Sarano M, et al. J Thorac Cardiovasc Surg 2015;150:50-8

Can We Assess Risk with Further Refinement?

BNP Adds Discriminative Power

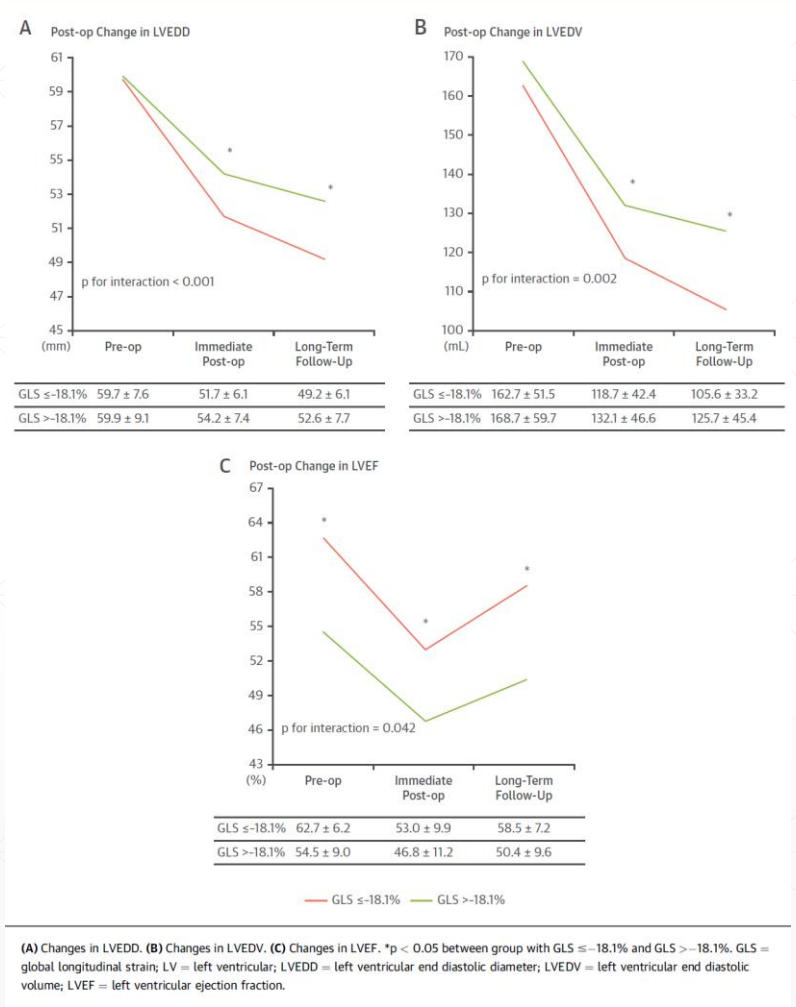






Pizzaro R at al. J Am Coll Cardiol 2009;54:1099–106

Global Longitudinal Strain



(A) Changes in LVEDD. **(B)** Changes in LVEDV. **(C)** Changes in LVEF. *p < 0.05 between group with GLS ≤−18.1% and GLS >−18.1%. GLS = global longitudinal strain; LV = left ventricular; LVEDD = left ventricular end diastolic diameter; LVEDV = left ventricular end diastolic volume; LVEF = left ventricular ejection fraction.

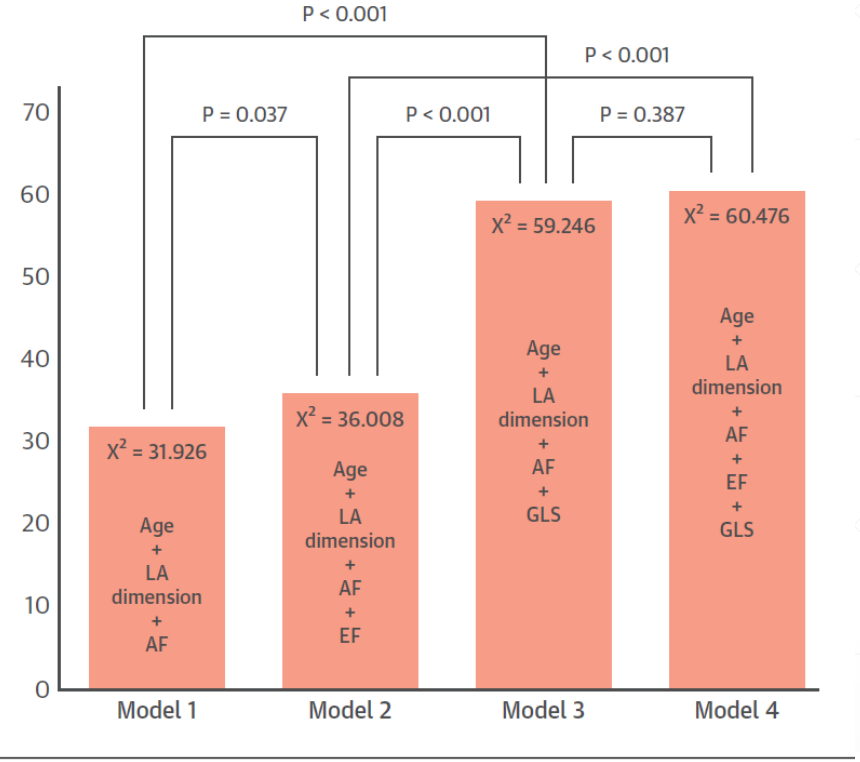


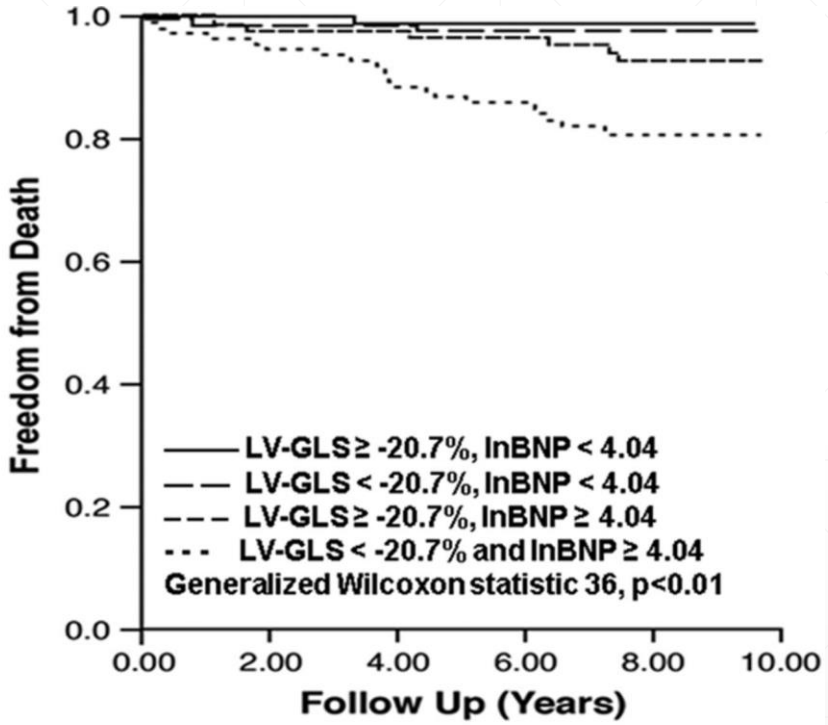
Table 3. Estimated Areas Under the Receiver Operating Characteristic (ROC) Curves in 2 Nested Logistic Regression Models for Developing Postoperative Left Ventricular Dysfunction[a]

Models	Area Under ROC Curve (95% Confidence Interval)	Cross-Validated Area Under ROC Curve (95% Confidence Interval)
Echo and demographics	0.687 (0.585-0.788)	0.604 (0.496-0.712)
Strain, echo, and demographics	0.955 (0.922-0.988)	0.945 (0.878-0.972)

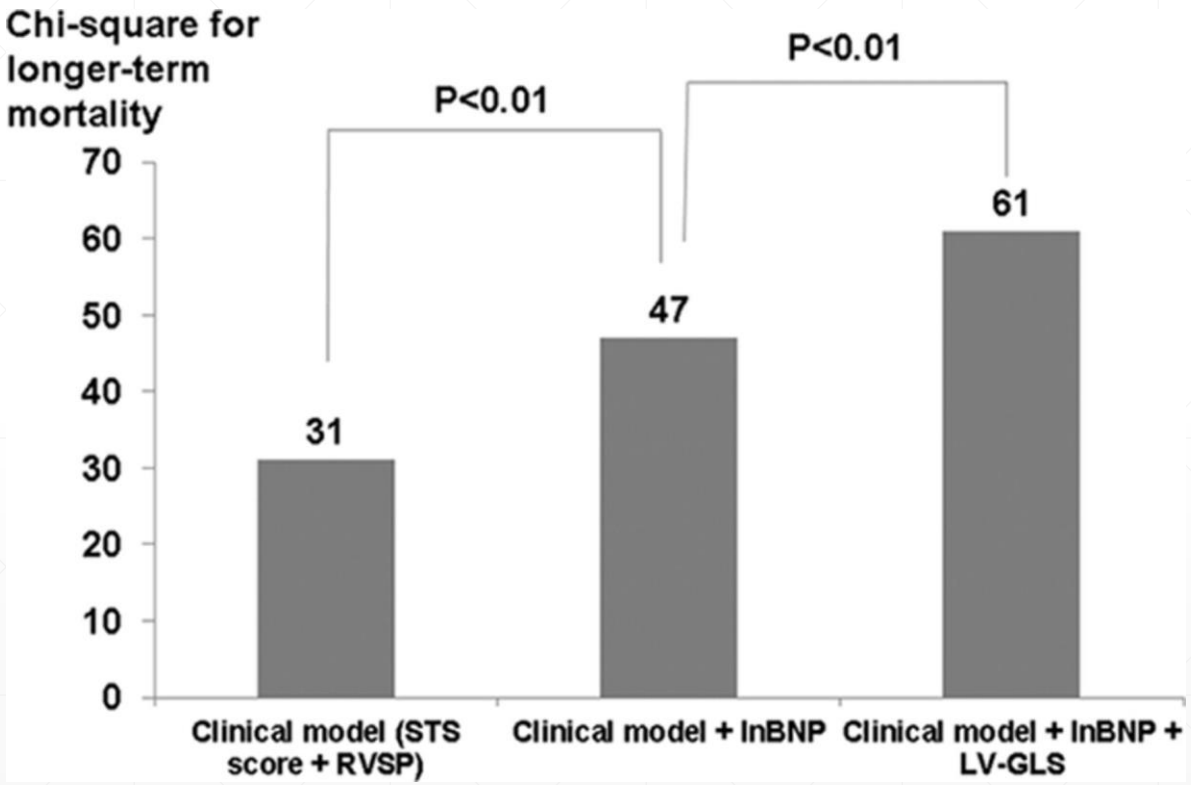
[a]The first model involved only baseline demographics and echo parameters, whereas the second model supplemented the first one with strain measurements. Each model was internally validated using leave-1-out cross-validation and the area under the ROC was recalculated.

Kislitsina ON et al. Ann Thorac Surg 2020;109:669-77
Kim HM et al. J Am Coll Cardiol Img 2018;11:1235–44)

GLS+BNP



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 A. et al. Circ Cardiovasc Imaging. 2016;9:e004451

The International Journal of Cardiovascular Imaging (2019) 35:1597–1604
https://doi.org/10.1007/s10554-019-01598-6

ORIGINAL PAPER

Prognostic value of left atrial strain in asymptomatic mitral regurgitation

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Received: 23 January 2019 / Accepted: 3 April 2019

ORIGINAL RESEARCH

Prognostic Impact of Extra-Mitral Valve Cardiac Involvement in Patients with Primary Mitral Regurgitation

MD,[a] Valentina Mantegazza, MD,[b] Yasmine L. Hiemstra, MD,[a] Valentina Volpato, MD,[b]
Pepi, MD,[b] Meindert Palmen, MD, PhD,[c] Victoria Delgado, MD, PhD,[a]
Tamborini, MD,[b] Jeroen J. Bax, MD, PhD[a]

European Heart Journal - Cardiovascular Imaging (2022) 00, 1–10
https://doi.org/10.1093/ehjci/jeac058

ESC European Society of Cardiology

Prognostic value of left atrial reservoir function in patients with severe primary mitral regurgitation undergoing mitral valve repair

Jan Stassen[1,2], Aniek L. van Wijngaarden[1], Steele C. Butcher[1,3],
Meindert Palmen[4], Lieven Herbots[2], Jeroen J. Bax[1,5], Victoria Delgado[1], and
Nina Ajmone Marsan[1*]

Valvular

ak mitral inflow velocit
erative mitral regurgitation

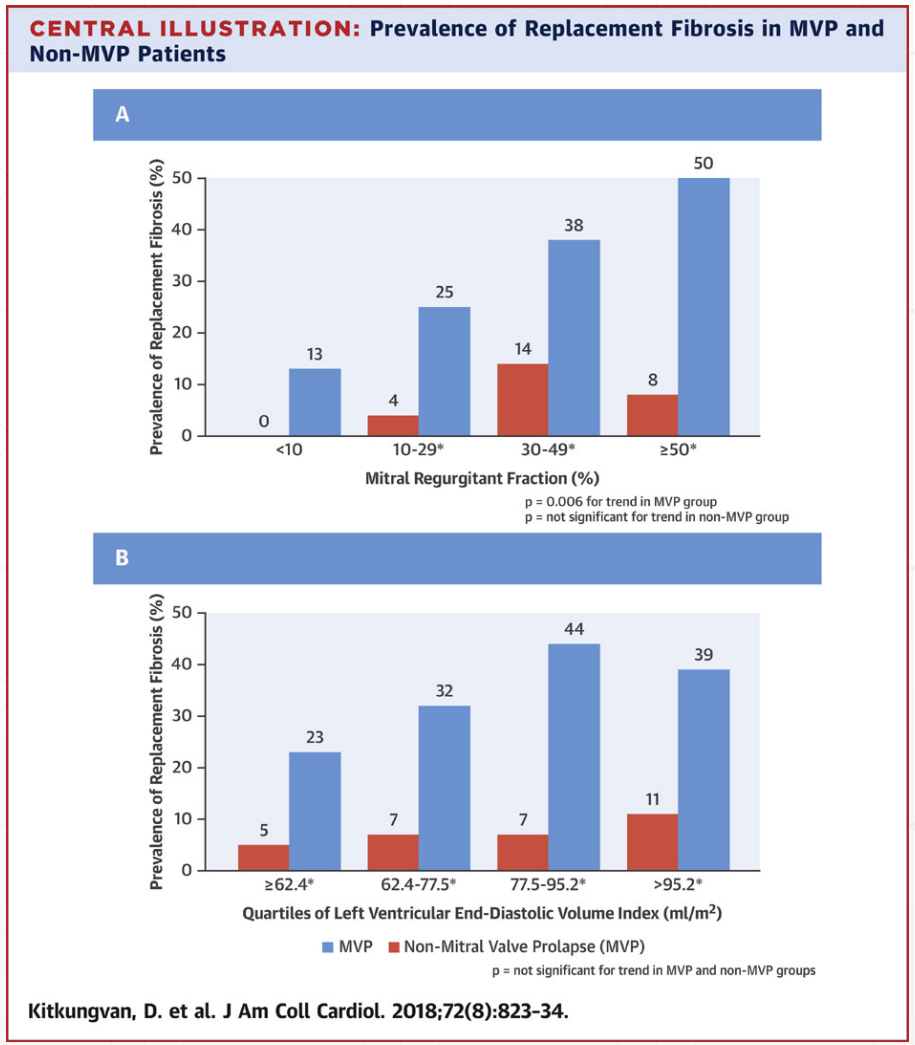
2) 27:1247–1260
10741-021-10100-1

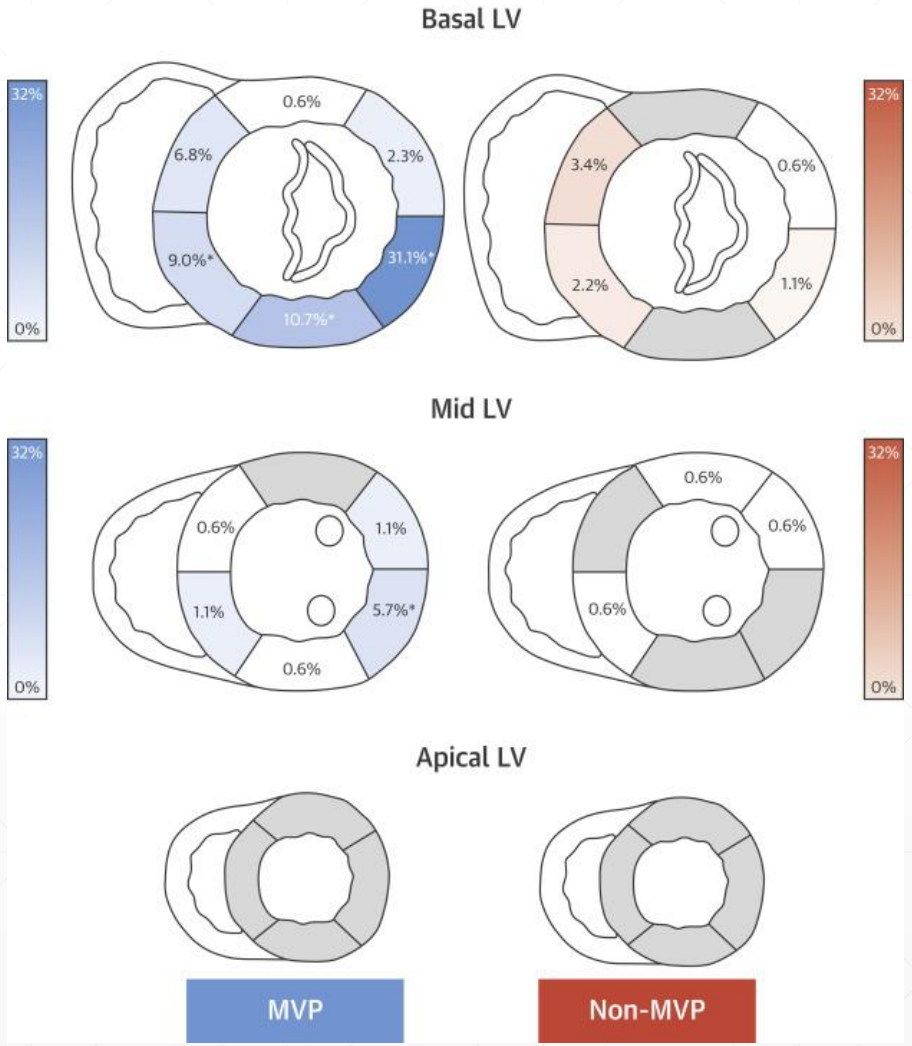
1 Hideaki Kanzaki,[1] Kunihiro Nishimura,[2]
Takahama,[1] Makoto Amaki,[1]
Yasuda,[1]

tracking echocardiography in primary mitral re
we reconsider the time for intervention?

Concetta Pastore[1,2] · Giulia Elena Mandoli[1] · Aleksander D
Santoro[4] · Marcelo Haertel Miglioranza[5] · Marta Focardi[1] · Li
Mondillo[1] · Matteo Cameli[1]

Is Fibrosis the Key to Decision?





Kitkungvan D. et al. J Am Coll Cardiol 2018;72:823–34

Fibrosis Extent Predicts Post-op Reverse Remodeling

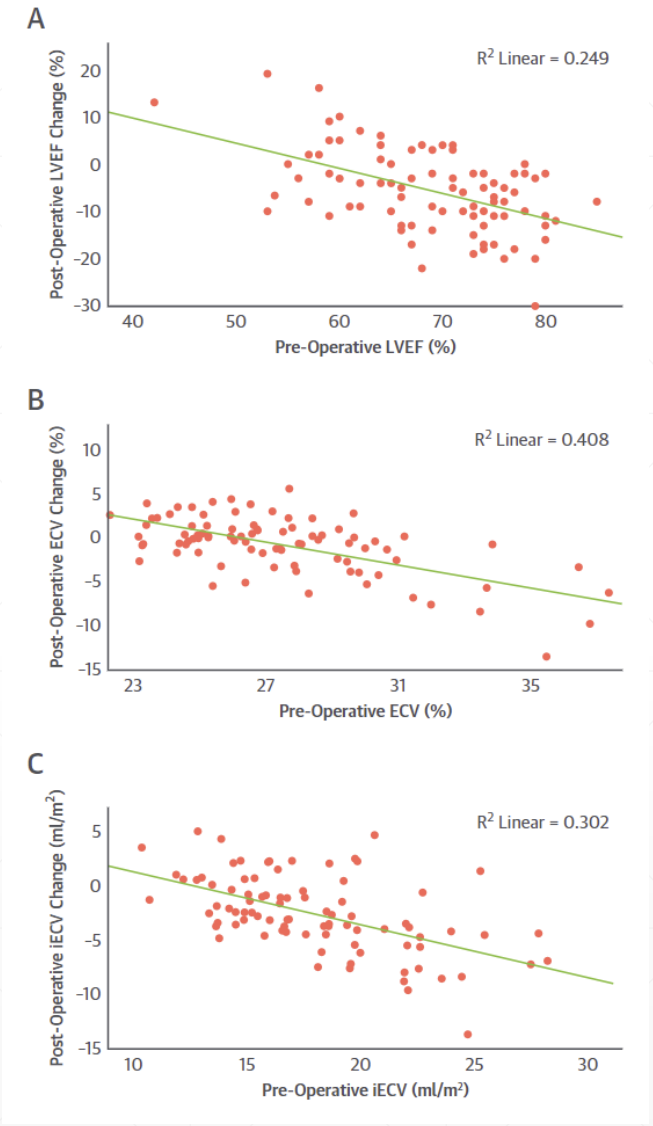


TABLE 3 Preoperative Predictors of Postoperative Remodeling

	Correlation		Univariable Predictors			Multivariable Predictors[a]		
	Rho	*P* Value	β	95% CI	*P* Value	β	95% CI	*P* Value
Preoperative predictors of change in iECV (multivariable model R^2 = 0.51)								
ECV%	−0.29	**0.007**	−0.36	−0.57 to −0.14	**<0.001**	−0.46	−0.63 to −0.29	**<0.001**
LVMi[b]	−0.45	**<0.001**	−0.11	−0.16 to −0.06	**<0.001**	−0.07	−0.12 to −0.02	**0.009**
LVEF	−0.14	0.188	−0.07	−0.16 to 0.02	0.147	−0.11	−0.18 to −0.03	**0.007**
MR volume[b]	−0.50	**<0.001**	−0.07	−0.09 to −0.04	**<0.001**	−0.05	−0.07 to −0.03	**<0.001**
Age	−0.09	0.407	−0.00	−0.06 to 0.06	0.962			NS
Gender	0.18	0.099	1.37	−0.27 to 3.00	0.100			NS
iECV	−0.55	**<0.001**	−0.49	−0.65 to −0.33	**<0.001**			NS
iICV[b]	−0.36	**0.001**	−0.12	−0.19 to −0.04	**0.002**			NS
LGE	−0.20	0.057	−0.58	−1.30 to 0.15	0.119			NS
LVESVi	−0.14	0.188	−0.06	−0.12 to 0.00	0.054			NS
MR fraction[b]	−0.39	**<0.001**	−0.11	−0.15 to −0.06	**<0.001**			NS
NT-proBNP[c]	−0.27	**0.011**	−1.42	−2.68 to −0.16	**0.027**			NS
Predictors of postoperative LVESVi (multivariable model R^2 = 0.42)								
LVESVi[b]	0.55	**<0.001**	0.56	0.41 to 0.71	**<0.001**	0.63	0.47 to 0.79	**<0.001**
MR fraction[b]	−0.07	0.510	0.01	−0.15 to 0.16	0.940	−0.17	−0.29 to −0.04	**0.011**
Age	−0.02	0.883	0.05	−0.13 to 0.23	0.576			NS
Gender	−0.11	0.316	−2.65	−7.65 to 2.35	0.295			NS
ECV%	−0.07	0.531	0.61	−0.08 to 1.30	0.084			NS
iECV	0.28	**0.006**	1.04	0.49 to 1.58	**<0.001**			NS
iICV[b]	0.20	0.060	0.24	0.01 to 0.47	**0.038**			NS
LGE	−0.05	0.652	−0.88	−3.12 to 1.37	0.440			NS
LVMi[b]	0.28	**0.008**	0.23	0.07 to 0.39	**0.006**			NS
LVEF[b]	−0.38	**<0.001**	−0.60	−0.86 to −0.35	**<0.001**			NS
MR volume[b]	0.18	0.087	0.02	−0.05 to 0.10	0.567			NS
NT-proBNP[c]	0.11	0.317	3.17	−0.81 to 7.15	0.117			NS
Predictors of postoperative LVEF (multivariable model R^2 = 0.29)								
iECV	−0.27	**0.010**	−0.61	−1.05 to −0.18	**0.006**	−0.53	−0.96 to −0.11	**0.015**
LVEF[b]	0.43	**<0.001**	0.47	0.28 to 0.66	**<0.001**	0.57	0.34 to 0.80	**<0.001**
NT-proBNP[c]	−0.13	0.226	−2.04	−5.08 to 1.01	0.118	3.15	−0.08 to 6.37	0.056
Age	0.02	0.832	−0.01	−0.14 to 0.13	0.943			NS
Gender	0.13	0.215	2.49	−1.32 to 6.31	0.198			NS
ECV%	−0.02	0.858	−0.24	−0.78 to 0.29	0.372			NS
iICV[b]	−0.20	0.062	−0.19	−0.36 to 0.01	**0.040**			NS
LGE	−0.02	0.862	0.67	−1.05 to 2.39	0.442			NS
LVMi[b]	−0.27	**0.009**	−0.16	−0.28 to −0.03	**0.014**			NS
LVESVi[b]	−0.56	**<0.001**	−0.38	−0.50 to −0.26	**<0.001**			NS
MR volume[b]	−0.21	**0.046**	−0.04	−0.10 to 0.02	0.114			NS
MR fraction[b]	−0.17	0.115	−0.09	−0.21 to 0.02	0.116			NS

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Conclusions

- No randomized controlled trial suggesting better criteria than class I and IIa recommendations
- Surgical skills most important for end result
- Symptoms, ESV/EF, PAP, AF and possibly LA size with flail leaflets should be the main decision determinants
- GLS and BNP may be added to further refine decision
- Possibly, amount of fibrosis should become the main intervention tilt-point, after more studies
- As of now, no evidence form indiscriminate intervention in asymptomatic severe primary MR

Thank you