Functional disease: Yes, Good for intervention! Focus on mitral

Professor Darren Walters

University of Queensland

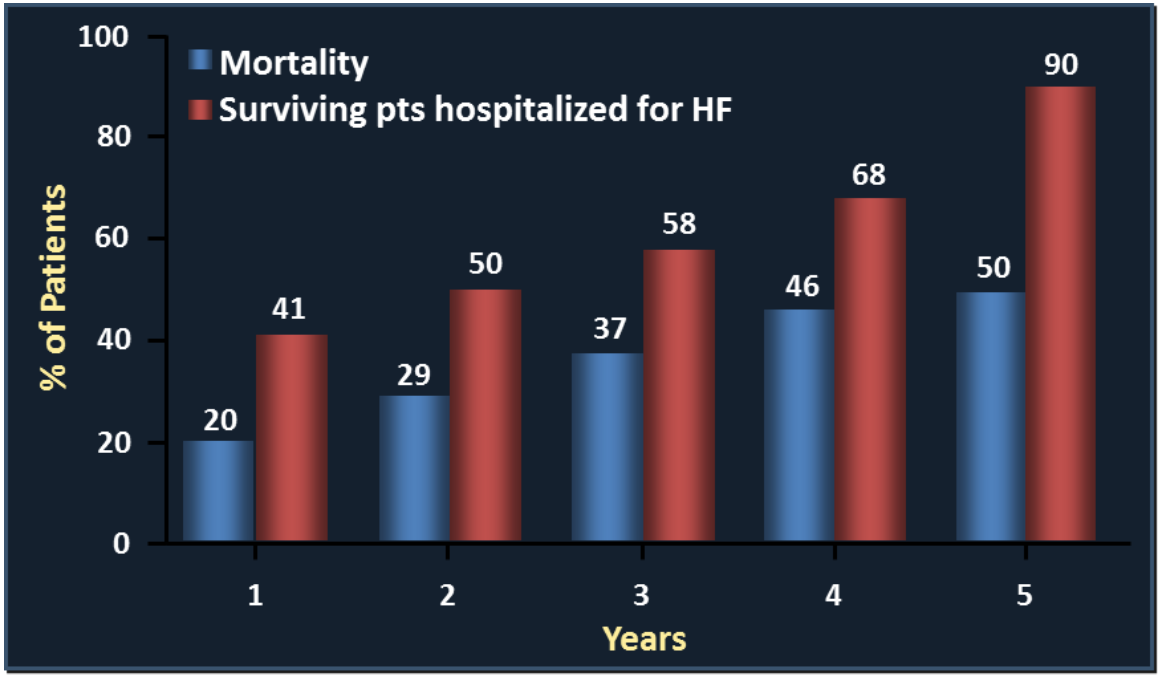
Heart Lung Institute

The Prince Charles Hospital

Prognosis of patients with 3+/4+ MR with heart failure

1,095 pts* with 3+/4+ MR and HF between 2000 and 2008 (74% FMR, 21% DMR). Rx before 10/2011:

Un-operated pts had lower LVEF (mean 27% vs. 42%, $p<0.0001$ and higher STS score (median 5.8 vs. 4.0, $p<0.001$) compared with operated pts.



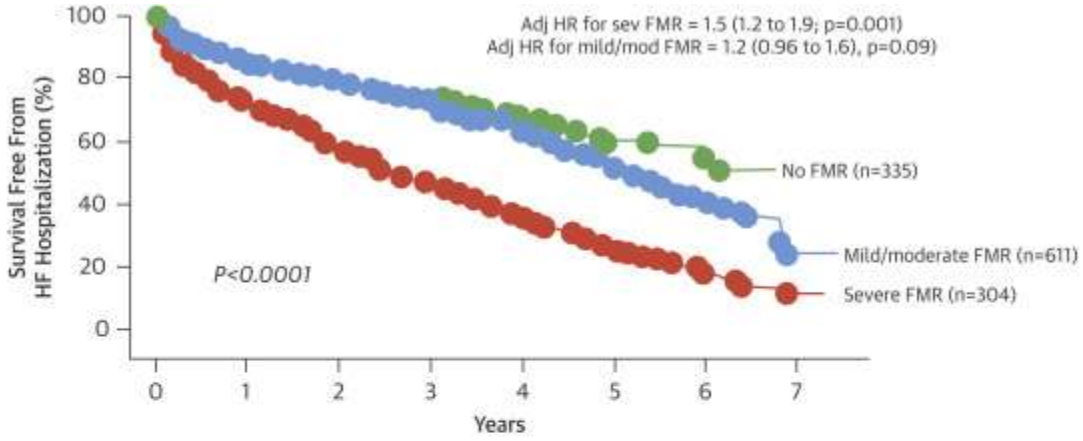
Prognosis worse than the worst cancer

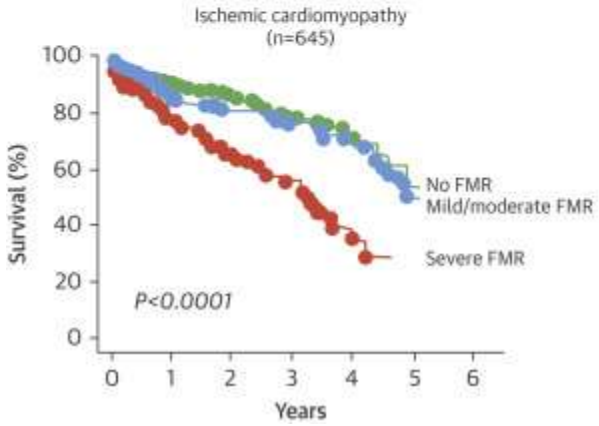
171 of 474 (36%) un-operated pts with FMR and good echos would have been eligible for MitraClip based on published criteria

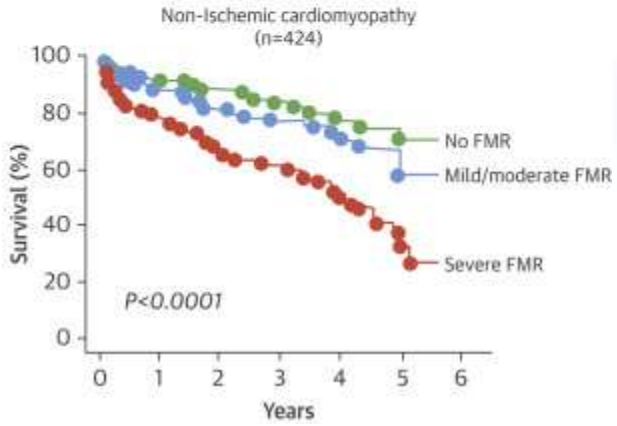
* Excluded MVA ≤2 cm^2, AR ≥2+, aortic peak velocity ≥2.5 m/s, HCM, endocarditis, concomitant AV, Ao or pericardial surgeries, LVAD or OHT.

Goel SS et al. *JACC* 2014;63,:185–90

Prognosis of patients with functional MR with heart failure



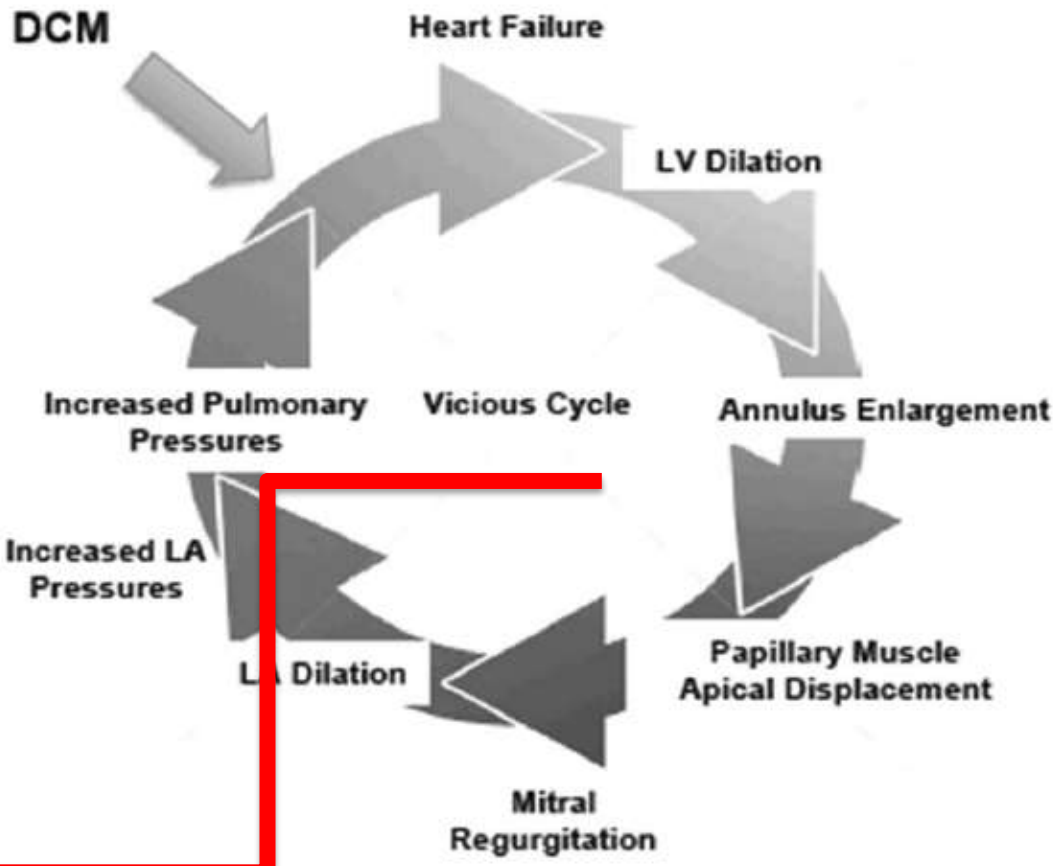




Rossi et al. Heart 2011

Asgar et al. JACC 2015

The Mitral Regurgitation Cycle

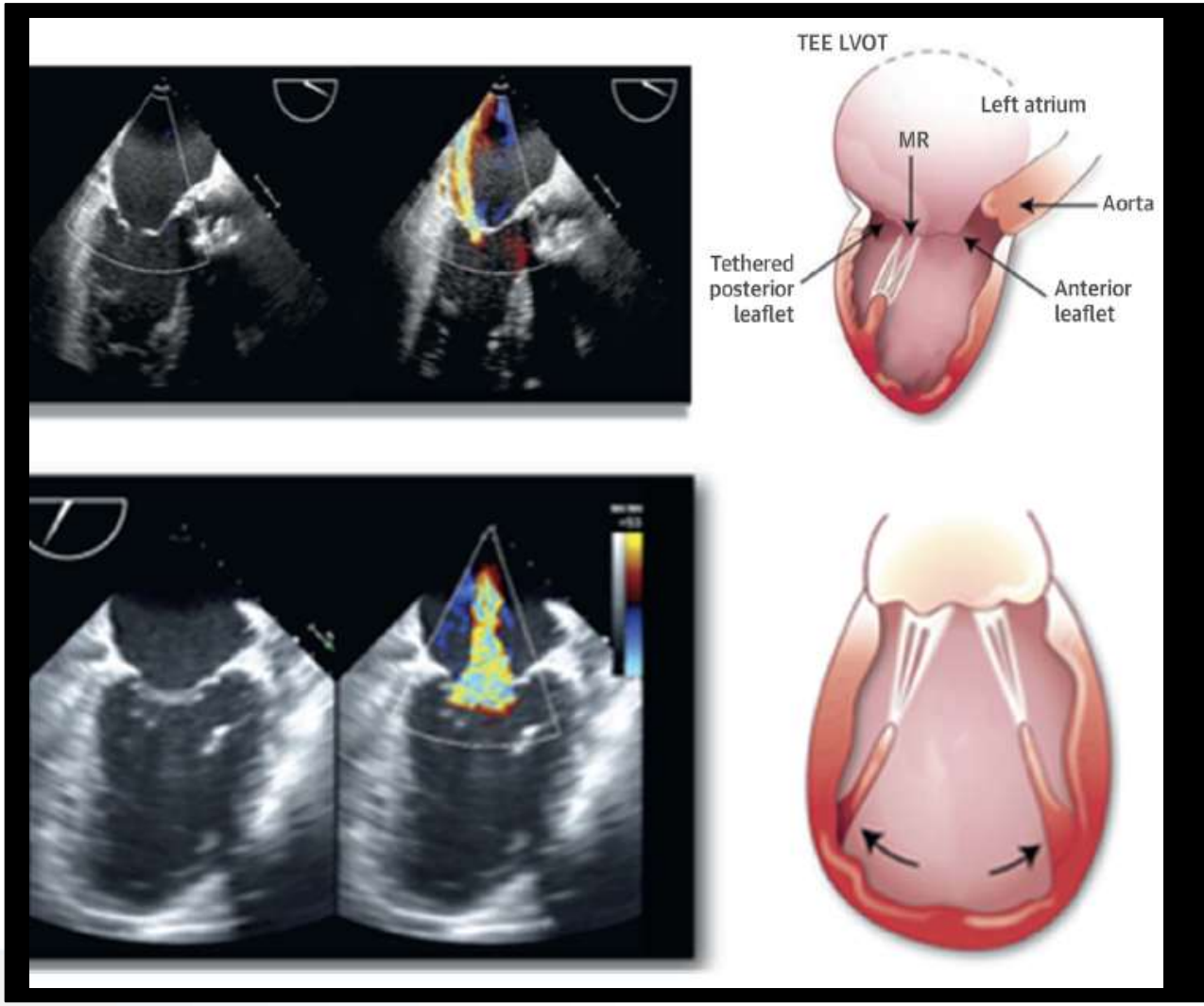


(Schmitto et al. Cardiol in Rev 2010)

Secondary (Functional) MR: The disease is the muscle not the leaflet

Ischemic cardiomyopathy

Idiopathic dilated cardiomyopathy



Asgar, Mack, Stone. 2015;65:1231–48

The Vicious Cycle of Secondary MR

Global or regional LV dysfunction

↓

LV dilatation

Improved prognosis?

Mitral leaflet tethering and MR

↓

Case study

71 yo female

4 wheelie walker arthritis

Symptoms-

- NYHA 3 despite resynchronisation therapy in 2012 improving EF28-49%.
- Currently EF 45%.

Functional Mitral regurgitation:

- Restricted posterior MV leaflet, Posterior MAC, 3/4 posteriorly directed MR
- Left ventricular function – 45%

Atrial Fibrillation

Background Medical History

Obstructive sleep apnoea CPAP

Antiplatelets- Nil

Anticoagulation- Warfarin

Other relevant medications

- **-Monopril 20, Spiractin 25**
- **-Lasix 40, Digoxin 125,**
- **-Warfarin, Bicor 7.5**

Allergies

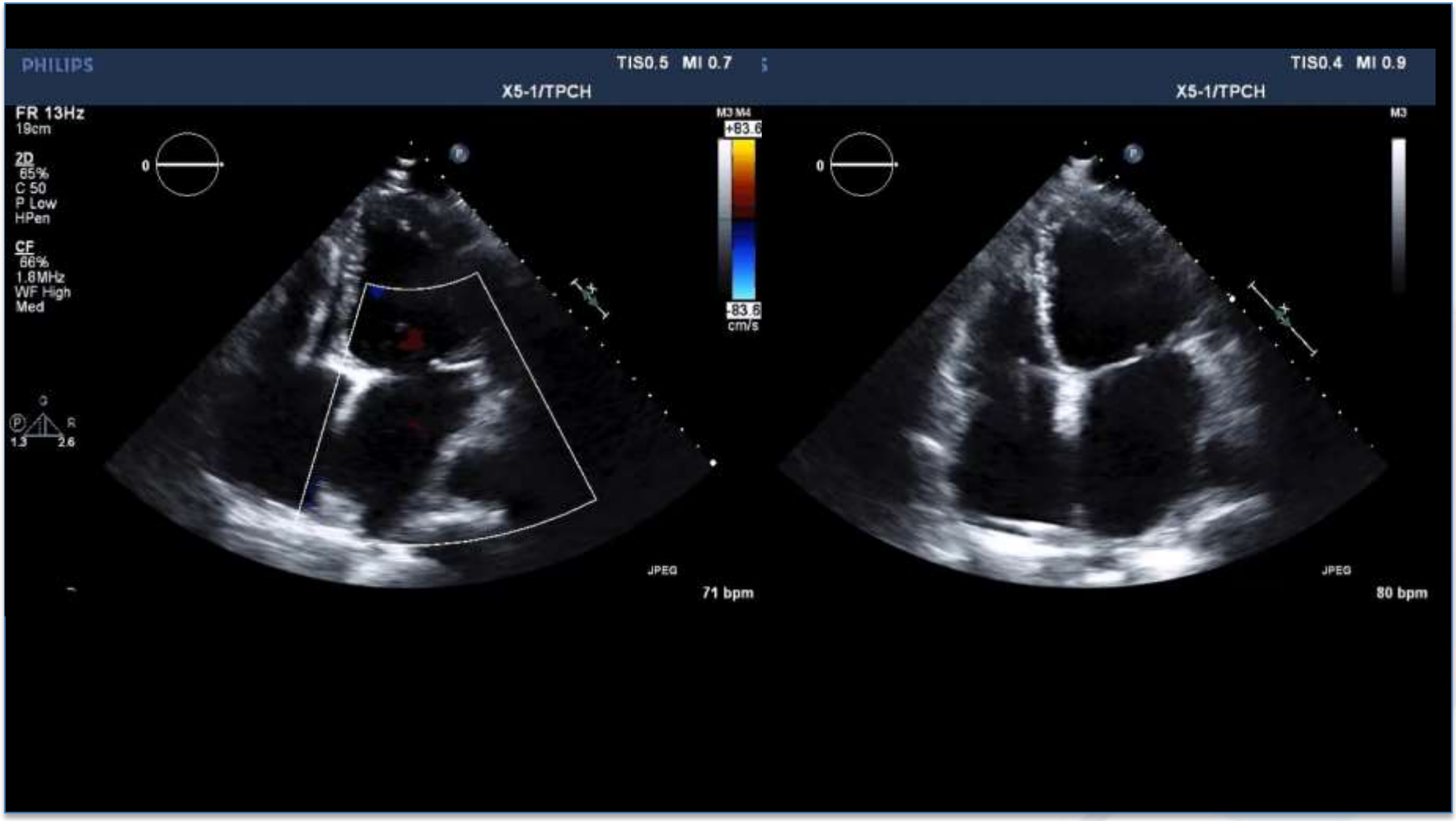
- **-Monobactam - dizziness**

Hb	**128**	g/L
Plt	**213**	$x10^9$/L
Urea	**8.6**	mmol/L
Creat	**108**	umol/L
eGFR	**45**	mL/min/ $1.73m^2$

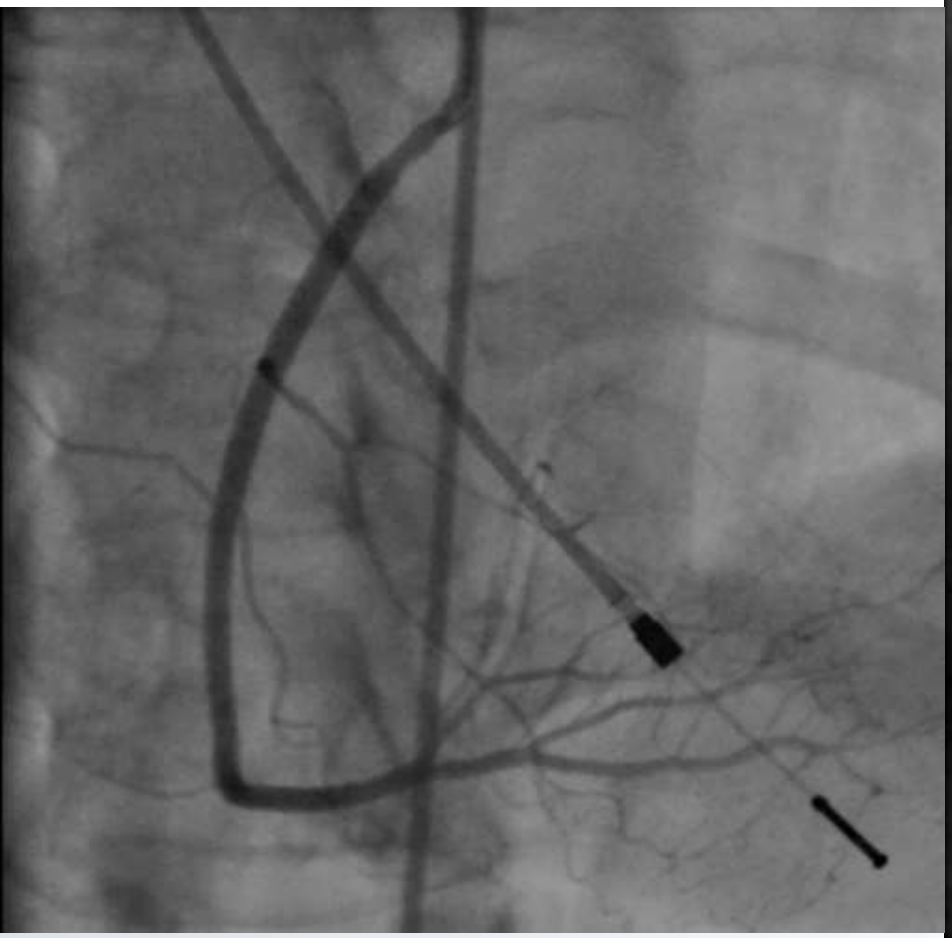
Echocardiographic Evaluation

LV Size	Mild-Mod dilatation	Aortic Valve	N
Ejection Fraction	45%	RV Size and Function	Size-Normal Function-Mild-mod impairment
MR severity	¾	Degree of TR	1-2/4
MR characteristics	Restricted posterior leaflet with posteriorly directed MR	RVSP	41mmHg
Mitral Valve Area	>4.0 cm2	Pulmonary hypertension?	yes

Functional Mitral Regurgitation

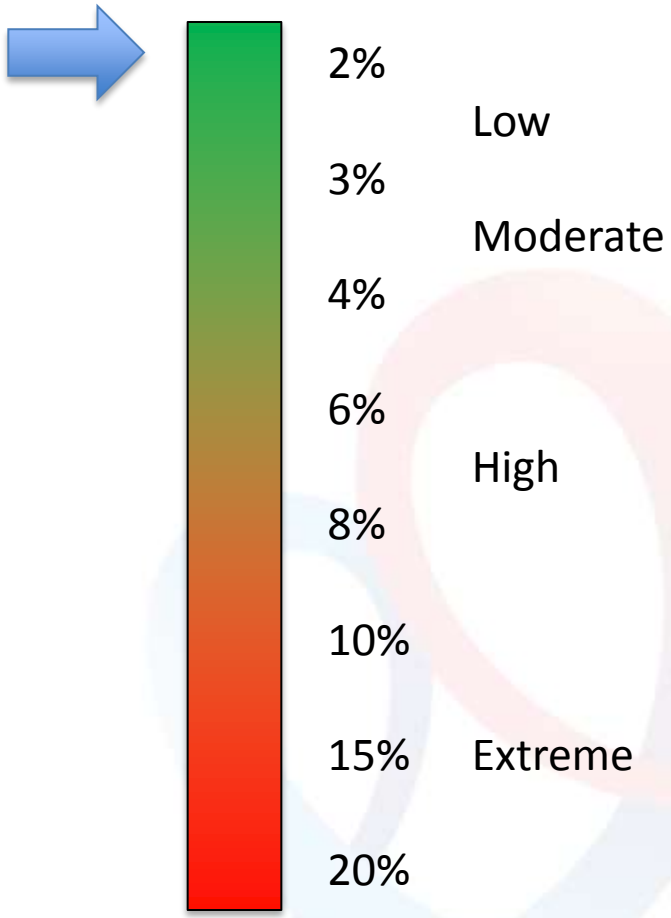


Coronary Artery Evaluation



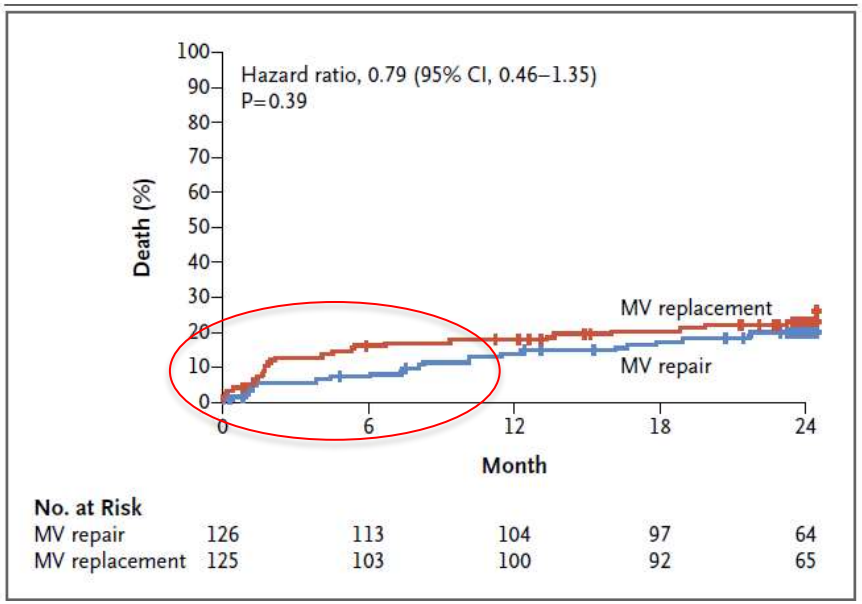
Surgical Risk Scores

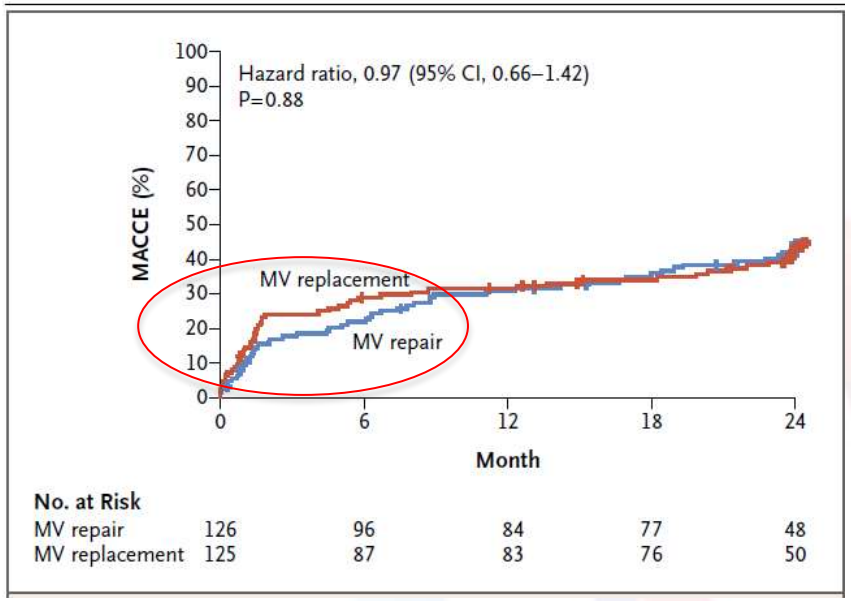
- STS mortality 1.77%
- STS morbidity and mortality 15.04%
- Euroscore I
- Euroscore logistic 4.02%
- Euroscore II 2.1%



Declined for surgical MVR by three surgeons

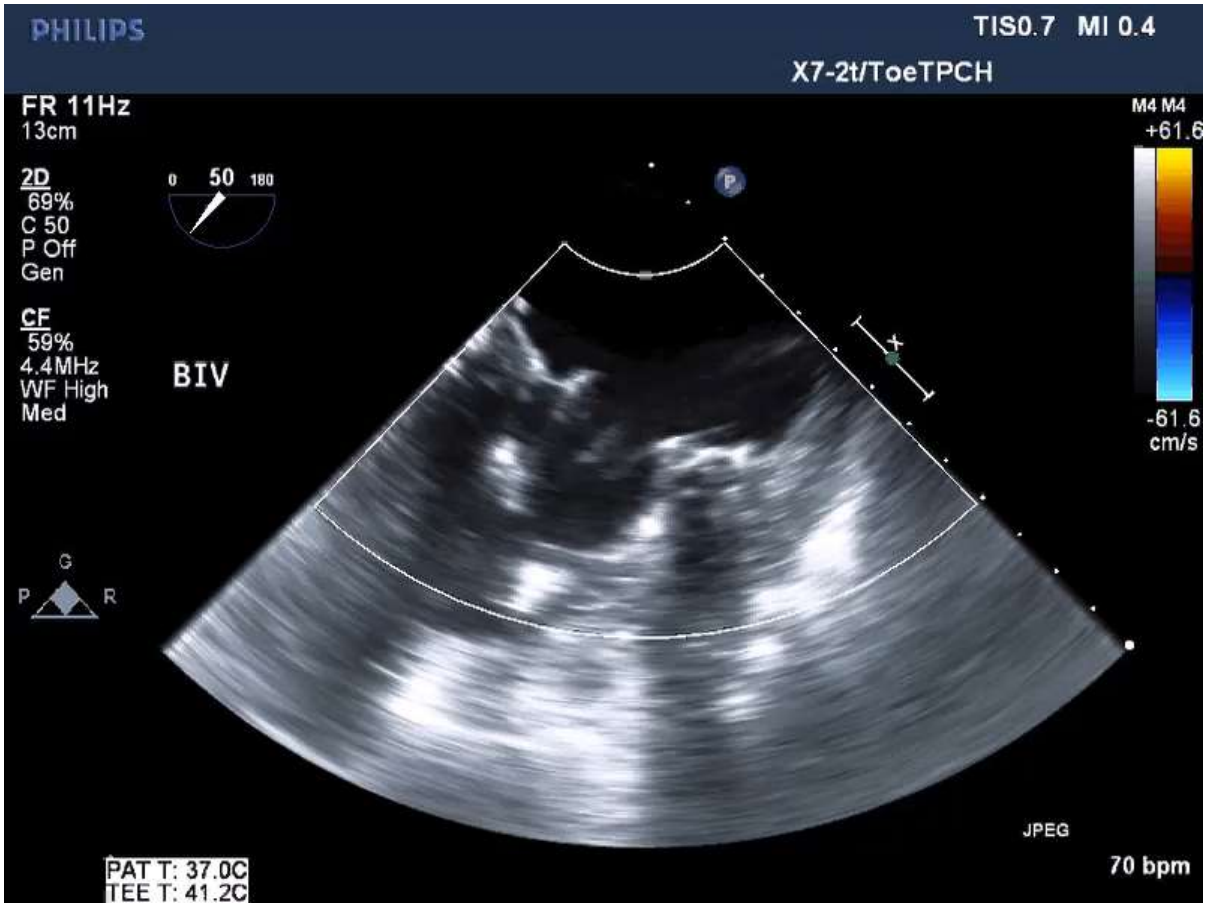
High mortality in Patients Undergoing MV Surgery for FMR



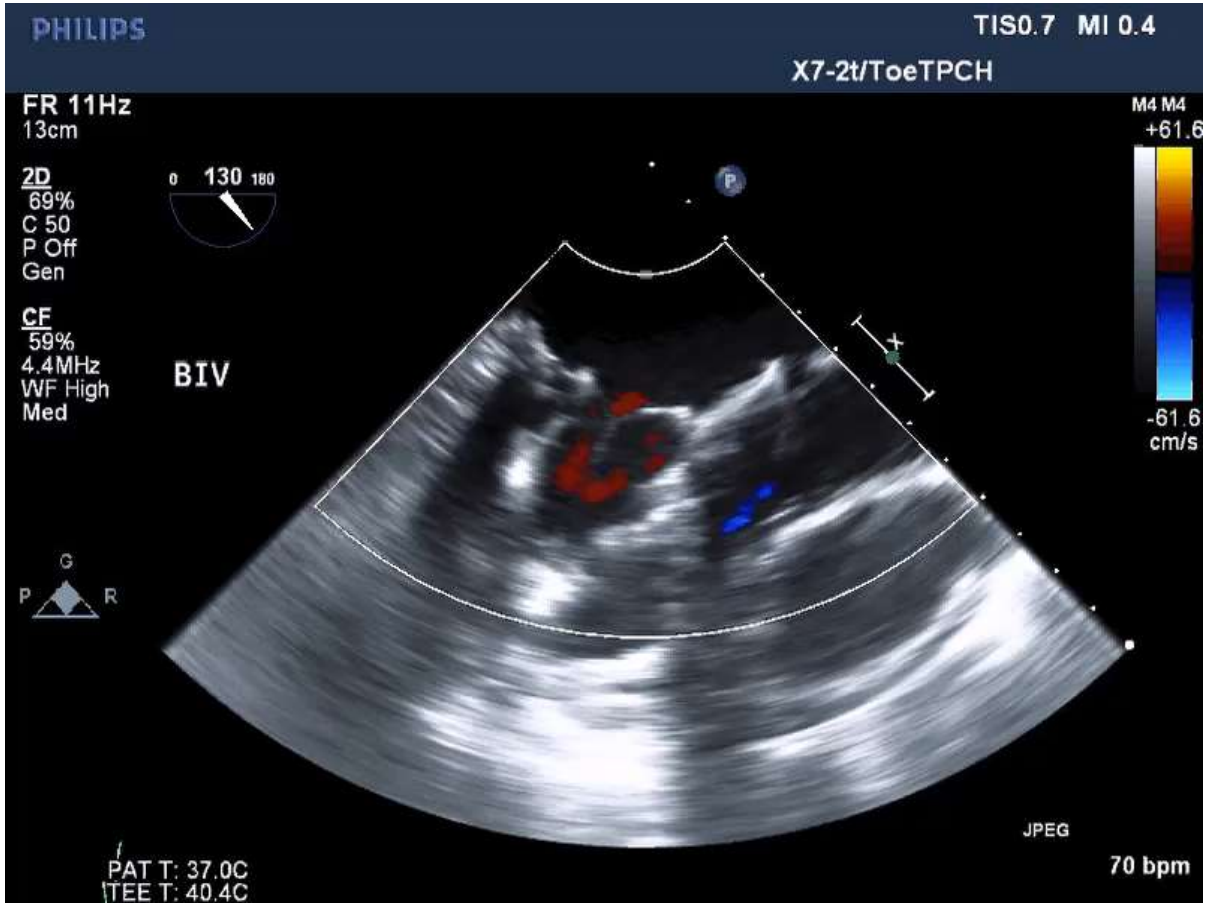


Goldstein et al. NEJM 2016

Tendyne Mitral T H Valve Replacement

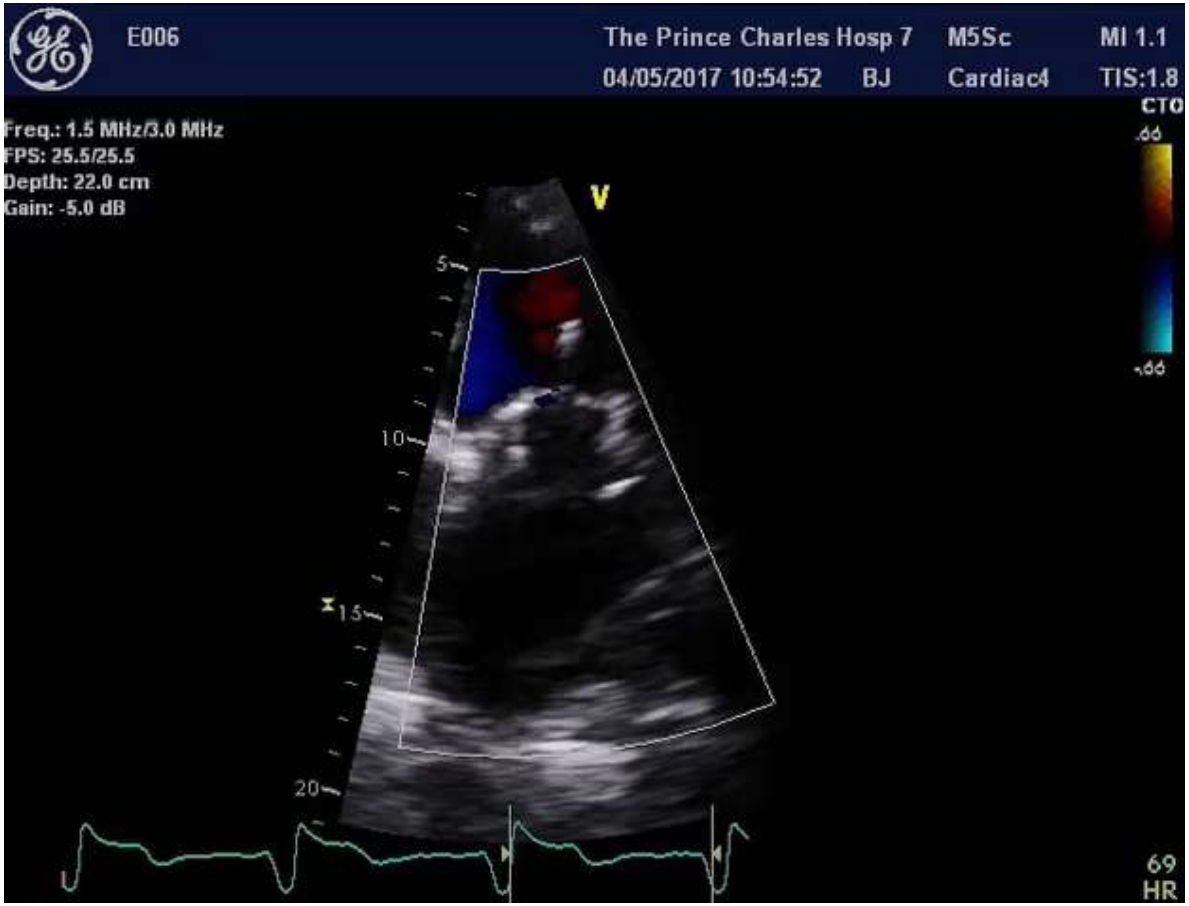


Tendyne Mitral T H Valve Replacement



Tendyne Mitral T H Valve Replacement

Tendyne Mitral T H Valve Replacement 1 year follow up




FIRST ON 9
ONLY TURN OFF FRIDAY'S
Prof D Walters
9NEWS .com.au

Case 2

NYHA Class II-III including PND over the last 6 months

Severe MR

Two open heart surgeries one week apart for CABG + AVR+ Aortic root surgery

- 16 March 2007:LIMA-LAD
- 21 march 2007: Aortic replacement and hemi-arch utilising the bio-root incorporating a 28 Valsalva graft and

  25 mm Perimount bioprosthesis

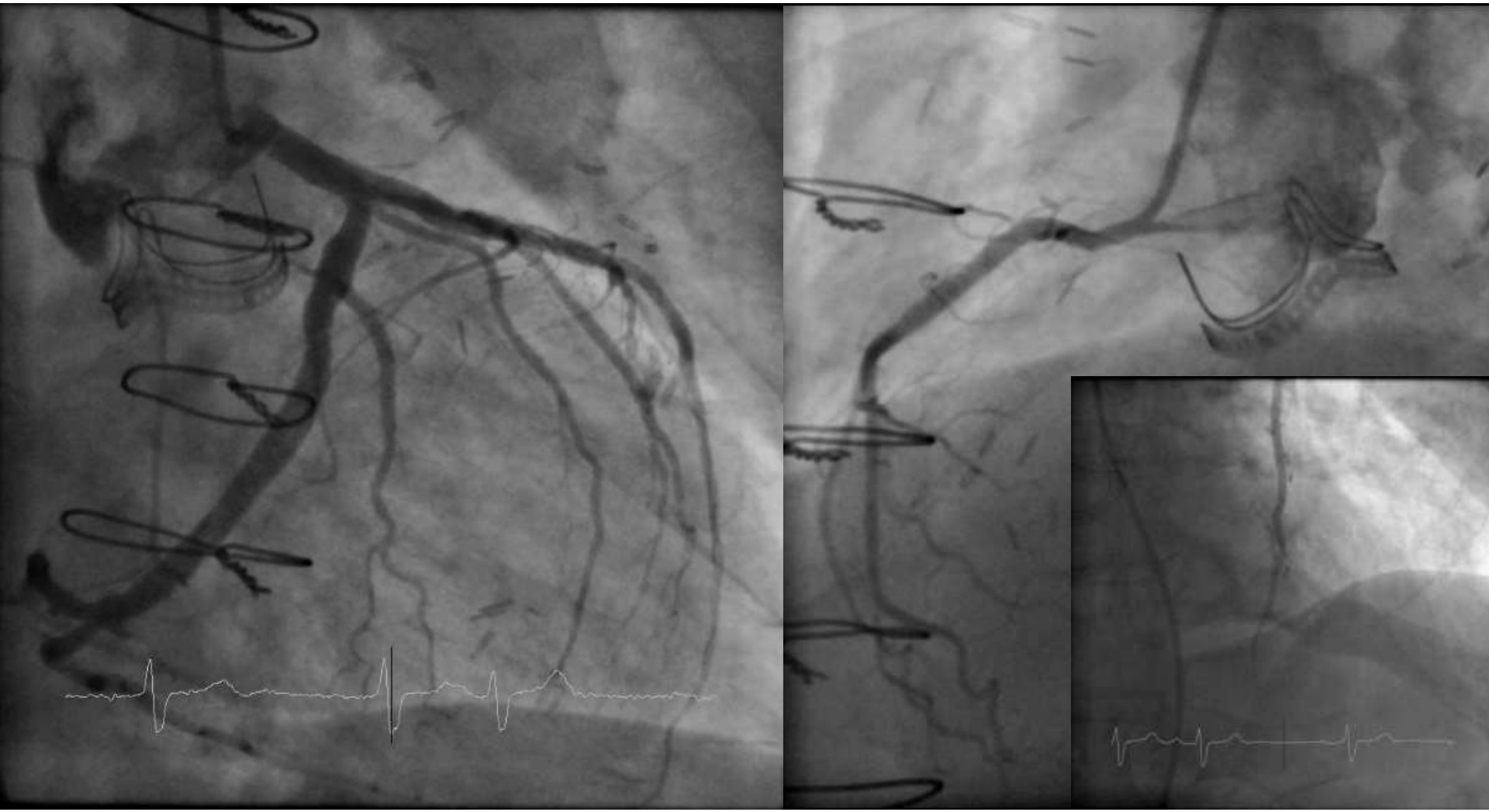
Prostate cancer: surgical castration and radiotherapy

Ankylosing Spondylitis for 30 years:

Aortopathy and AR, iritis, and previous back pain. No Known ILD

Socially active-avid square dancer. Non smoker. MMSE 30/30

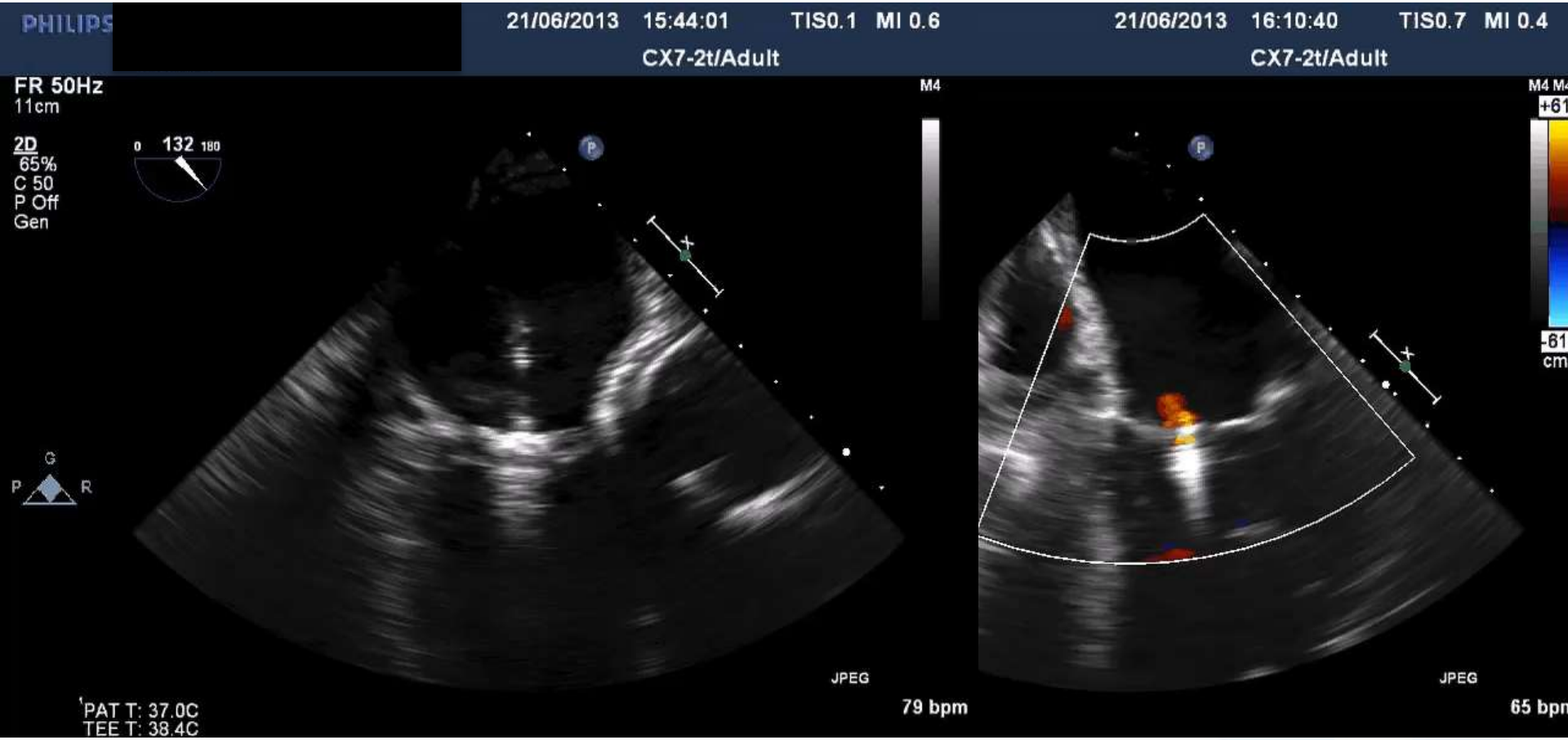
Coronary Angiography



Baseline Functional Mitral regurgitation

Mildly impaired EF 45%

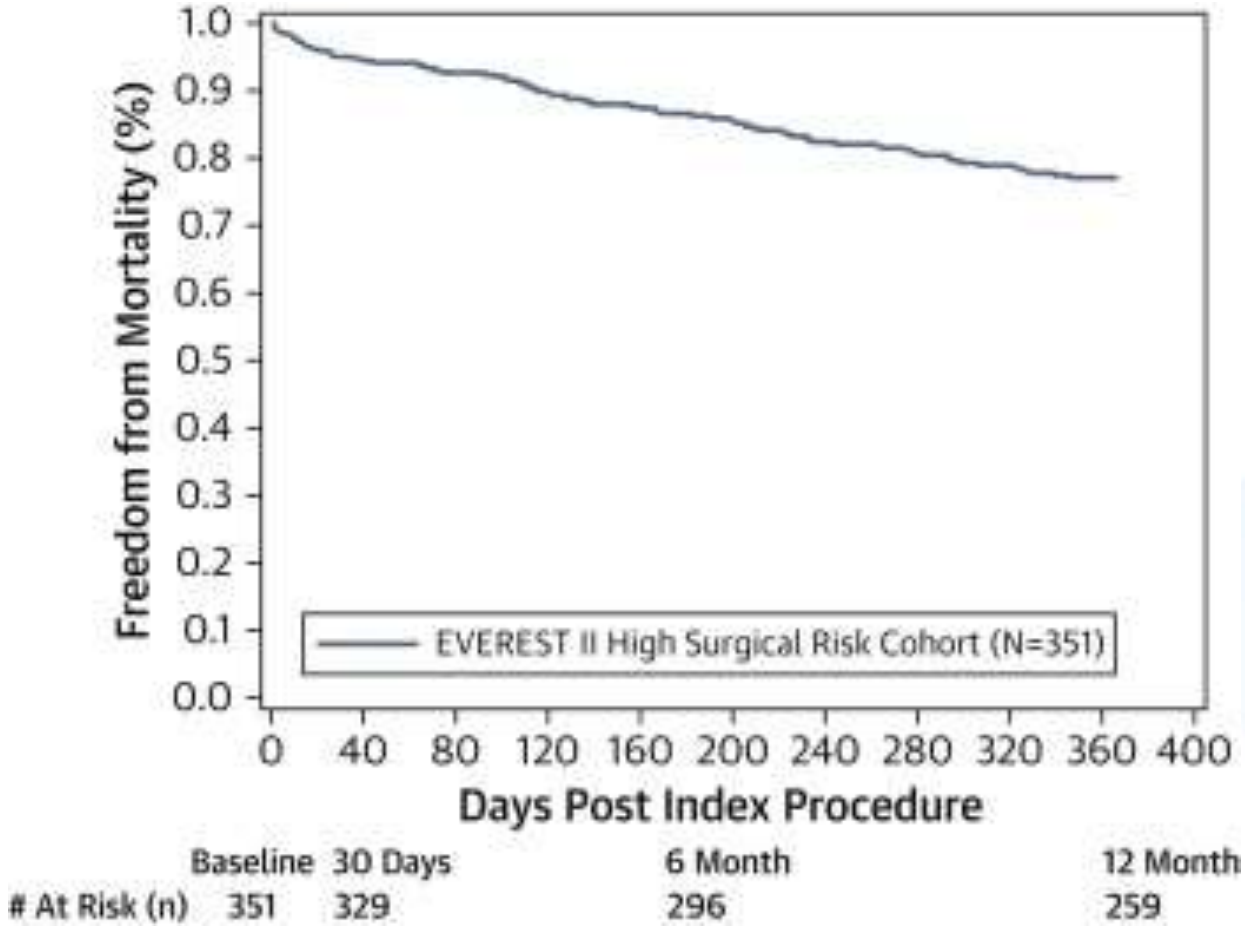
Proceeded to Mitra clip



4 years post

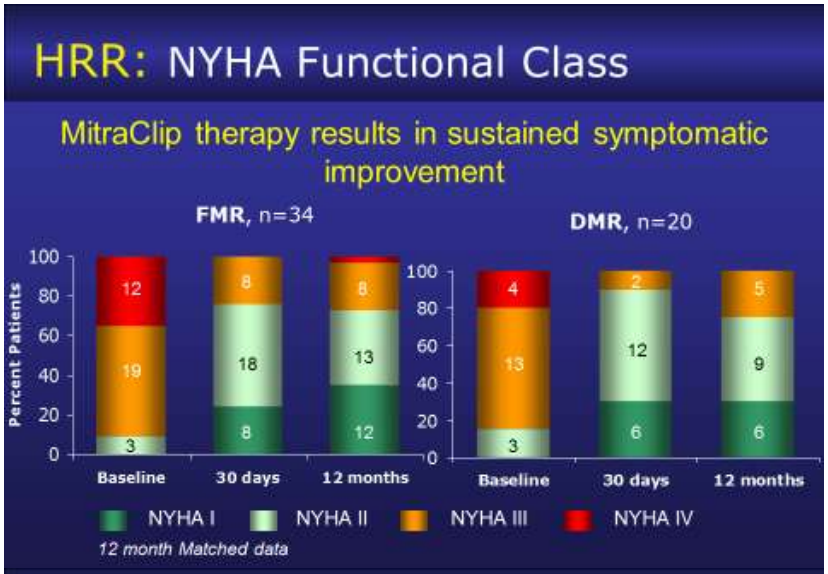

The Prince Charles Hosp 3
M5Sc
MI 1.1
25/07/2017 11:15:23
MH
Cardiac4
TIS:1.8
Freq.: 1.5 MHz/3.0 MHz
FPS: 27.5/27.5
Depth: 20.0 cm
Gain: -1.0 dB
64
-64
V
10
X
20
46
HR

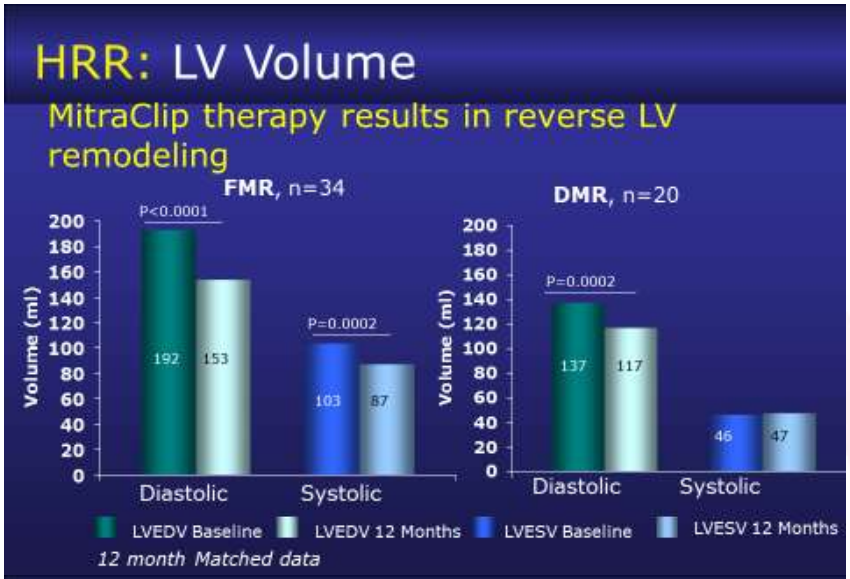
High-Risk Patients
Results of the EVEREST II Study

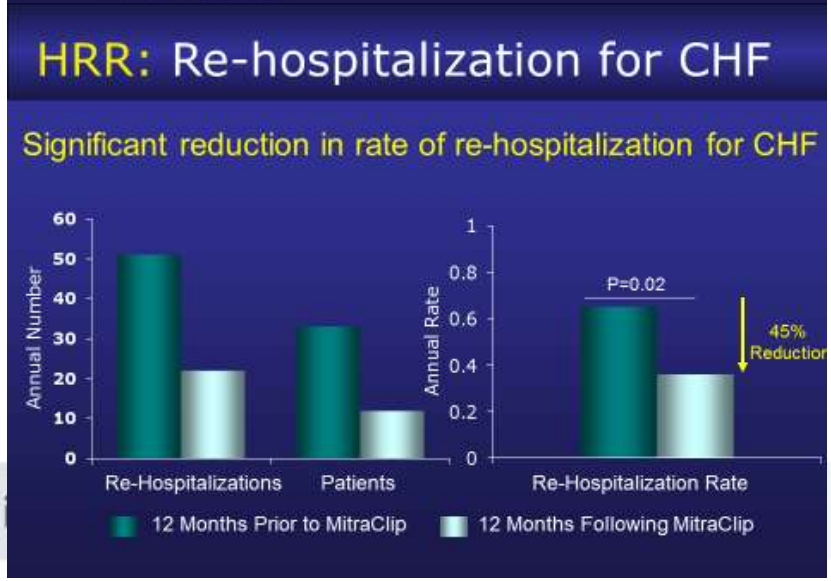


Donald D. Glower et al, Journal of the American College of Cardiology, Volume 64, Issue 2, 2014, 172–181

Everest High Risk registry

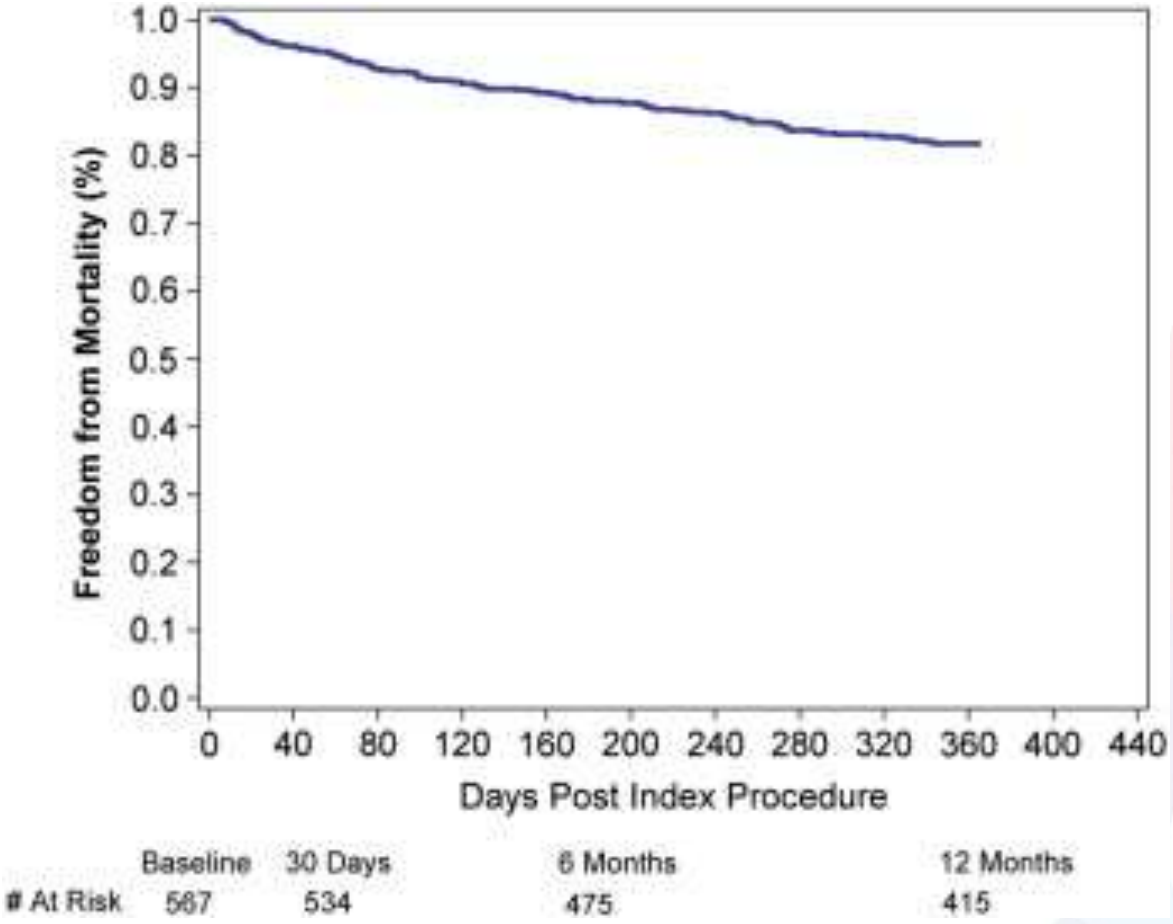






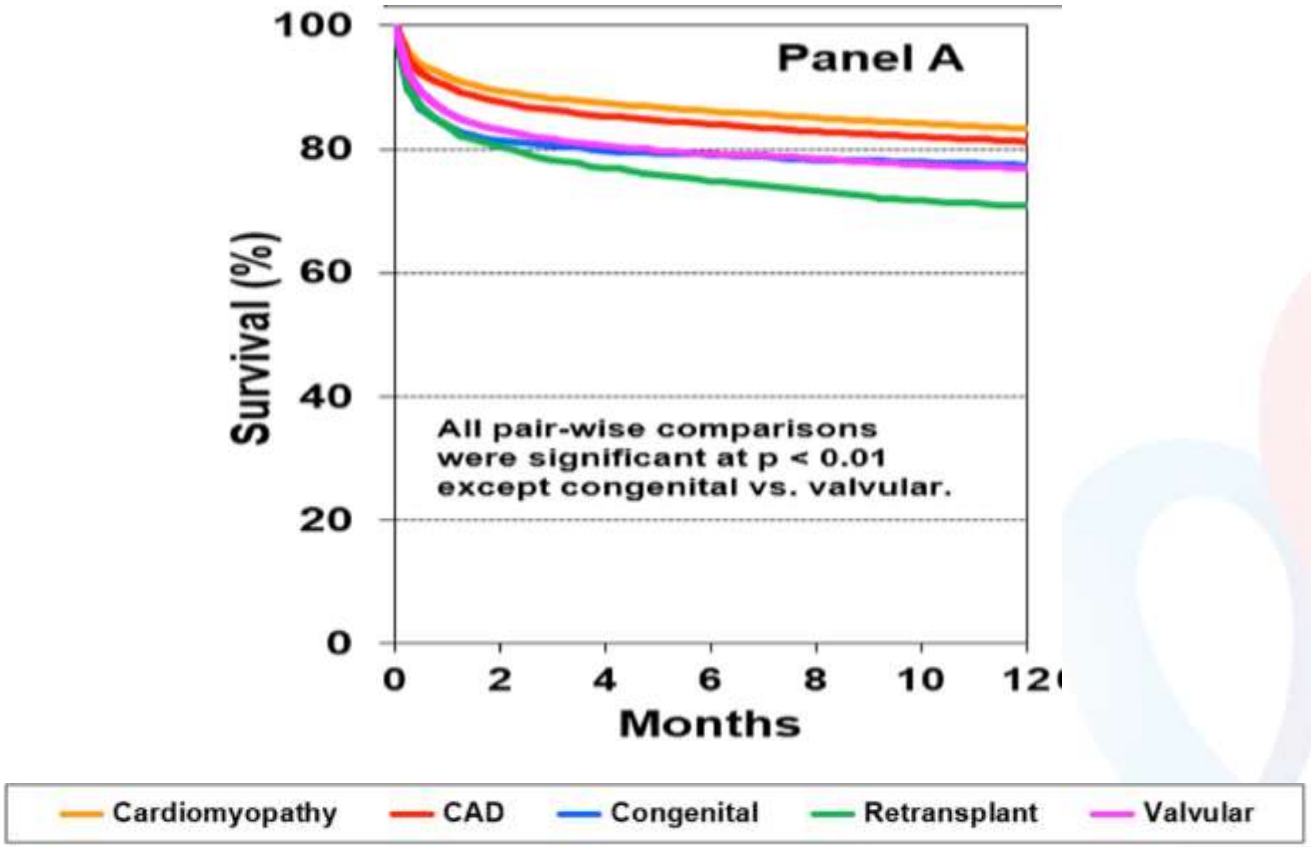
1-Year Results From the ACCESS-EU

A Prospective, Multicenter, Nonrandomized Post-Approval Study of the MitraClip Therapy in Europe



Francesco Maisano, Journal of the American College of Cardiology, Volume 62, Issue 12, 2013, 1052–1061

Heart transplant Survival



Lars H. Lund et al The Journal of Heart and Lung Transplantation, Volume 34, Issue 10, 2015, 1244–1254

Functional Mitral Regurgitation: timing is important

European Journal of Heart Failure (2014) 16, 1223–1229
doi:10.1002/ejhf.169

Clinical outcome of critically ill, not fully recompensated, patients undergoing MitraClip therapy

Volker Rudolph[1]*, Michael Huntgeburth[1], Ralph Stephan von Bardeleben[2], Peter Boekstegers[3], Edith Lubos[4], Wolfgang Schillinger[5], Taoufik Ouarrak[6], Holger Eggebrecht[7], Christian Butter[8], Björn Plicht[9], Andreas May[10], Olaf Franzen[11†], Joachim Schofer[12], Jochen Senges[6], and Stephan Baldus[1]

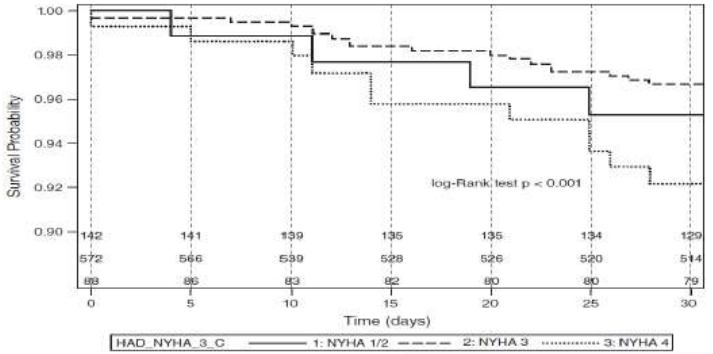


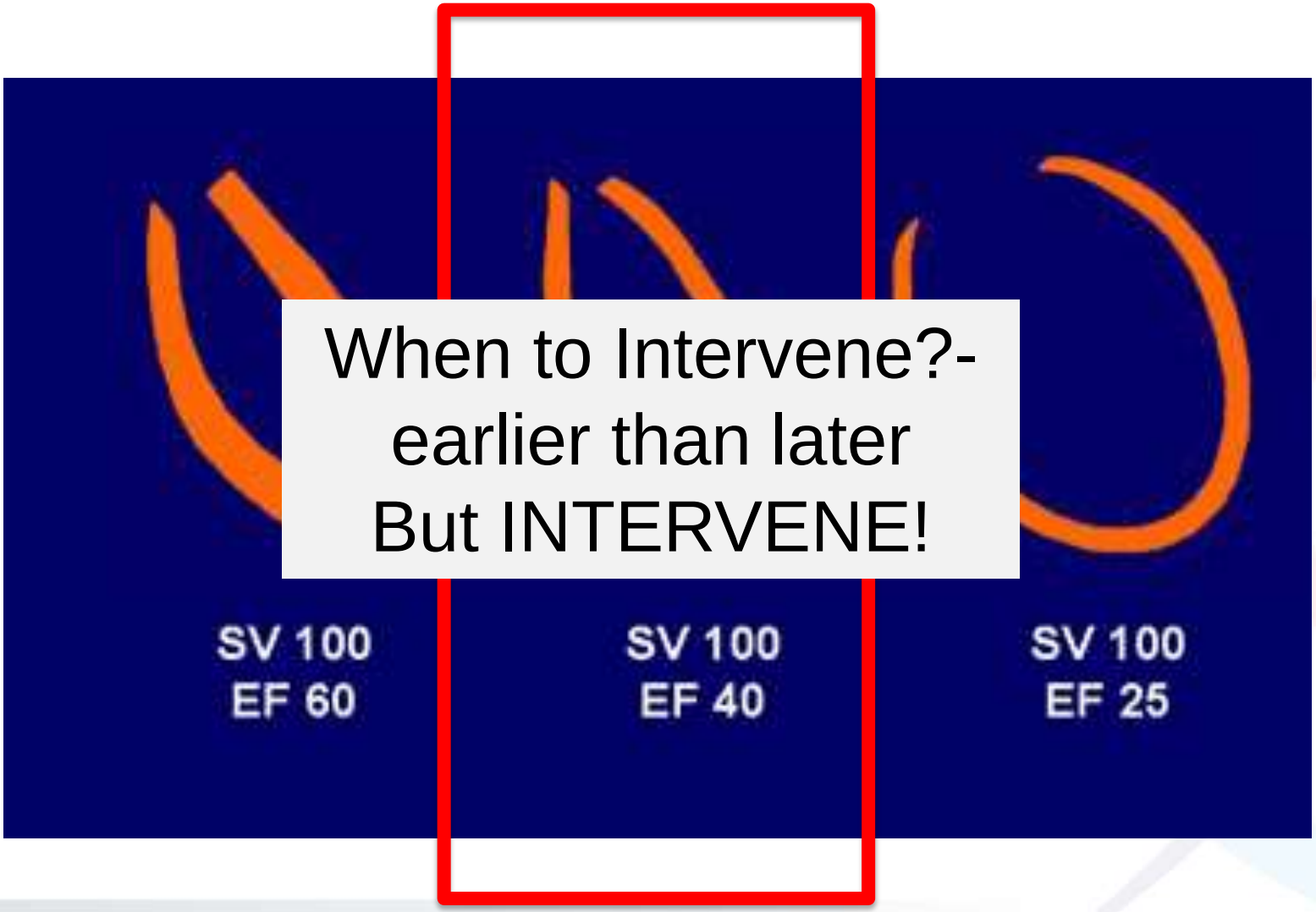
Table 3 Thirty-day outcome

	NYHA IV ($n = 143$)	NYHA III ($n = 572$)	NYHA I/II ($n = 88$)	*P*-value
Mortality	8.0% (11/137)	3.2% (17/526)	4.8% (4/83)	<0.05
Rehospitalization	10.4% (10/96)	11.3% (44/391)	13.8% (8/58)	0.81
Severe bleeding	15.3% (15/98)	9.8% (38/387)	7.0% (4/57)	0.19
Non-fatal stroke	1.1% (1/89)	0.3% (1/378)	0.0% (0/55)	0.44
Non-fatal TIA	6.6% (6/91)	1.3% (5/380)	0.0% (0/55)	<0.01
Non-fatal myocardial infarction	1.1% (1/90)	0.0% (0/377)	0.0% (0/55)	0.09
Mitral valve reintervention	2.2% (2/91)	0.8% (3/378)	1.9% (1/54)	0.46
Mobility				
Not impaired	37.4% (34/91)	45.9% (170/370)	69.1% (38/55)	<0.001
Moderately impaired	59.3% (54/91)	52.2% (193/370)	30.9% (17/55)	<0.01
Bed-ridden	3.3% (3/91)	1.9% (7/370)	0.0% (0/55)	0.37
EQol D5-score	0.8 (0.5–1.0)	0.9 (0.7–1.0)	0.9 (0.8–1.0)	<0.05

Values are displayed as percentages (absolute frequencies/total number of patients) or median (interquartile range).
TIA, transient ischaemic attack.

MitraClip therapy is feasible and safe even in critically ill, decompensated patients and leads to symptomatic improvement in over 2/3 patients;
however, it is associated with ~2 x elevated 30-day mortality.

Functional Mitral Regurgitation



Clinical Outcomes Assessment of the MitraClip Percutaneous Therapy for High Surgical Risk

COAPT TRIAL

>610 patients enrolled at >85 US sites

Significant FMR ≥3+ core lab; EF<50%; CHF hospitalization or BNP>300

High risk for mitral valve surgery- Local Heart Team

Specific valve anatomic criteria

Randomize 1:1

MitraClip

Control group Standard of care

Safety: Composite death, stroke, worsening renal function, LVAD implant, heart transplant at 12 months

Effectiveness: Recurrent heart failure hospitalizations

Protocol conditionally approved by FDA July 26, 2012

Conclusion

- functional valvular disease remains a key target for intervention
- natural history even with GDMT is poor
- correction of severe regurgitation can break a vicious cycle of decline and decompensation
- outcomes for intervention are favourable
- results of randomised triasl much anticipated