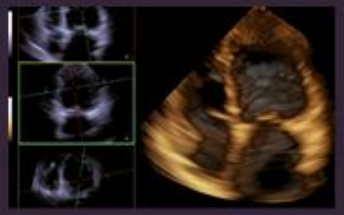
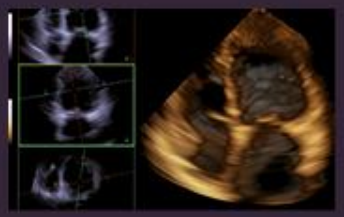


EuroValve
March 10-11, 2016

Patient management after MitraClip

Victoria Delgado, MD, PhD
Leiden University Medical Center
The Netherlands

www.eurovalvecongress.com



EuroValve
March 10-11, 2016

Faculty disclosure

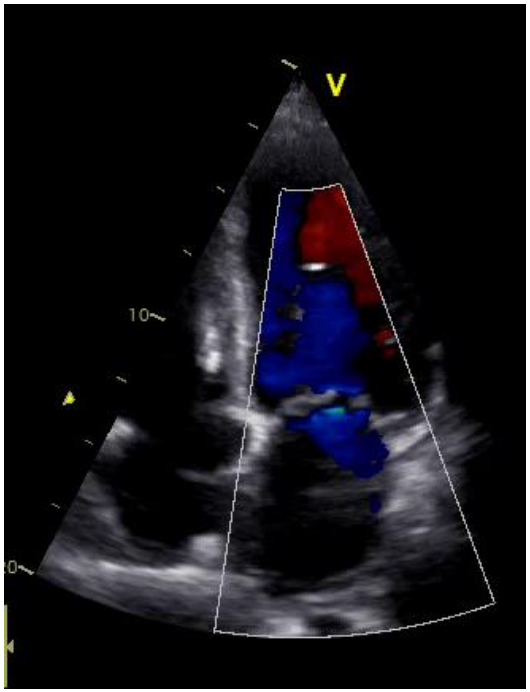
I disclose the following financial relationships:

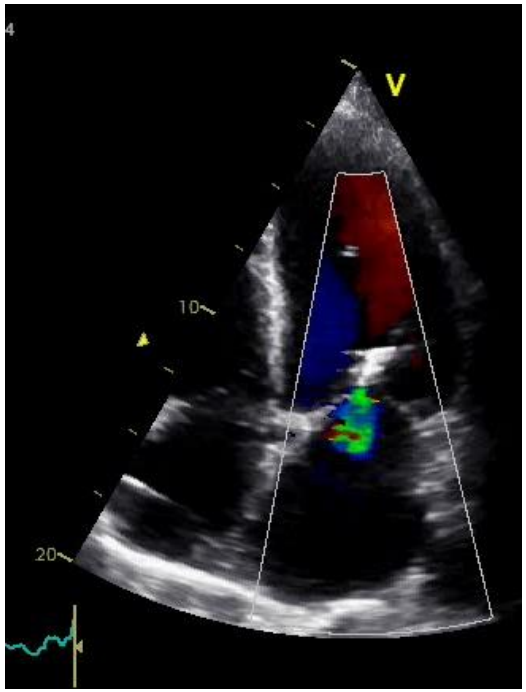
Paid speaker for Abbott Vascular

Follow-up: what to check?

- MR grade
- LV and LA reverse remodeling
- Pulmonary pressures and RV function
- ASD?
- Medication:
  - Anticoagulant / antiaggregant therapy

MR grade: how to grade?

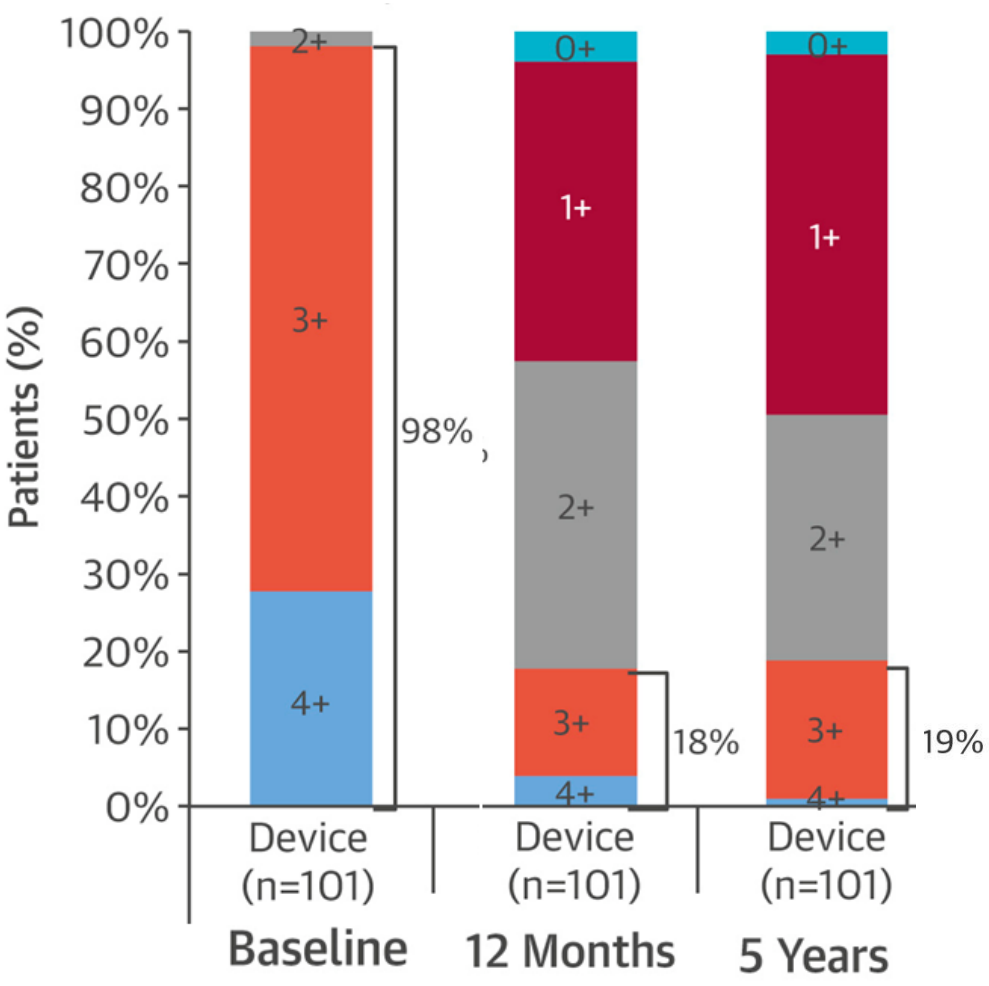




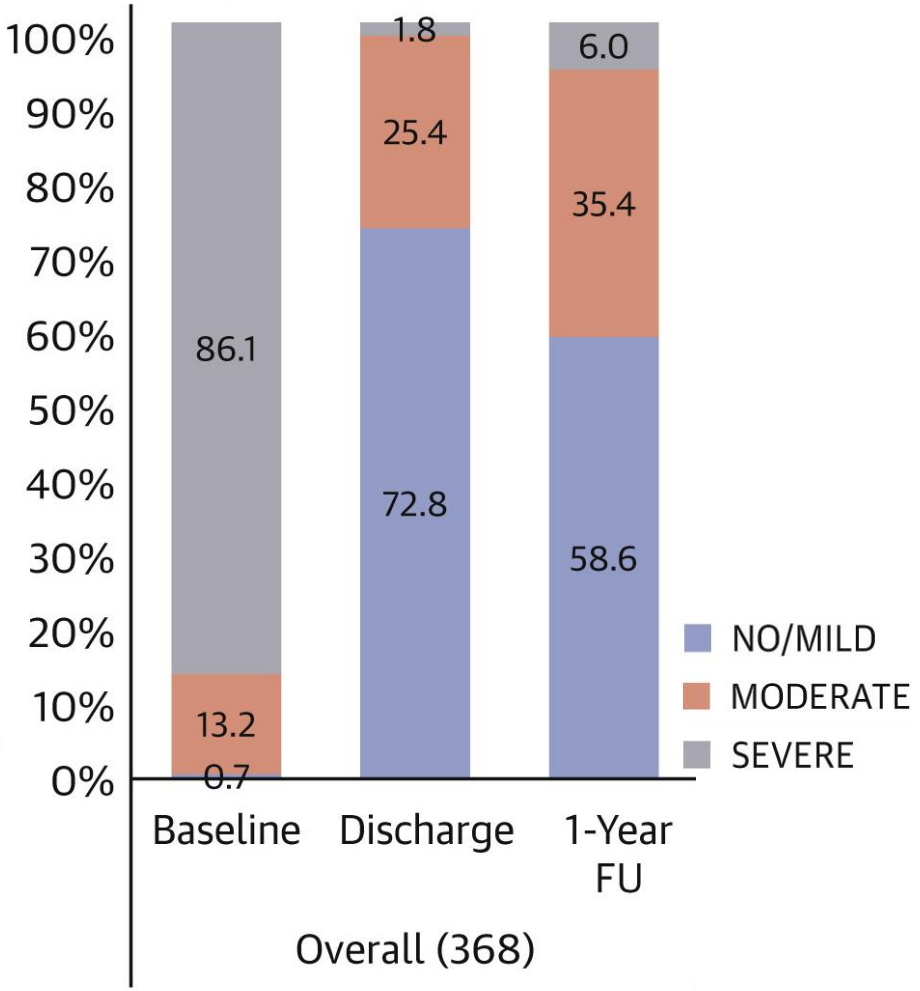
MVARC definitions:

- Measured at ≥30 days
- Optimal:
  - Reduction to no more than trace
- Acceptable:
  - Reduction at least 1 grade
  - Reduction to ≤2+

Stone et al. Eur Heart J 2015



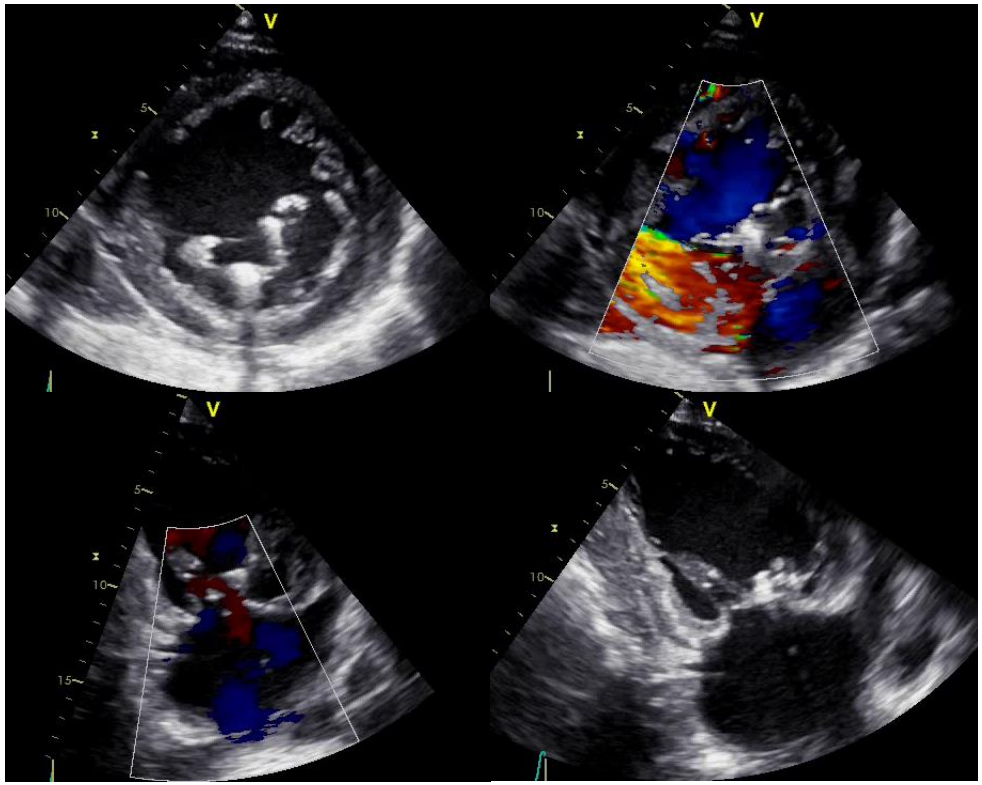
EVEREST II Feldman JACC 2015



2011–2012 Pilot European Sentinel Registry; Nickening JACC 2014

	Mild	Moderate	Severe
Qualitative			
LV size	Normal	Normal or dilated	Usually dilated
Valve structure and motion	Usually normal	Usually abnormal	Usually abnormal
Color flow jet area	Small	Intermediate	Large central or eccentric adhering, variable size wall impinging jet swirling in LA
Flow convergence	No or small	Intermediate	Large
Jet density and contour CW Doppler	Faint/Parabolic	Dense/Parabolic	Dense/triangular
Semi-quantitative			
Pulmonary venous flow	Systolic dominance	Systolic blunting	Systolic flow reversal
Quantitative			
Vena contracta width (mm)	<3	3-5.9	≥6
EROA (mm2)	<20	20-39	≥40
Regurg. Vol (mL)	<30	30-59	≥60
Regurg. Fraction (%)	<30	30-50	>50

ASE recommendations JASE 2009



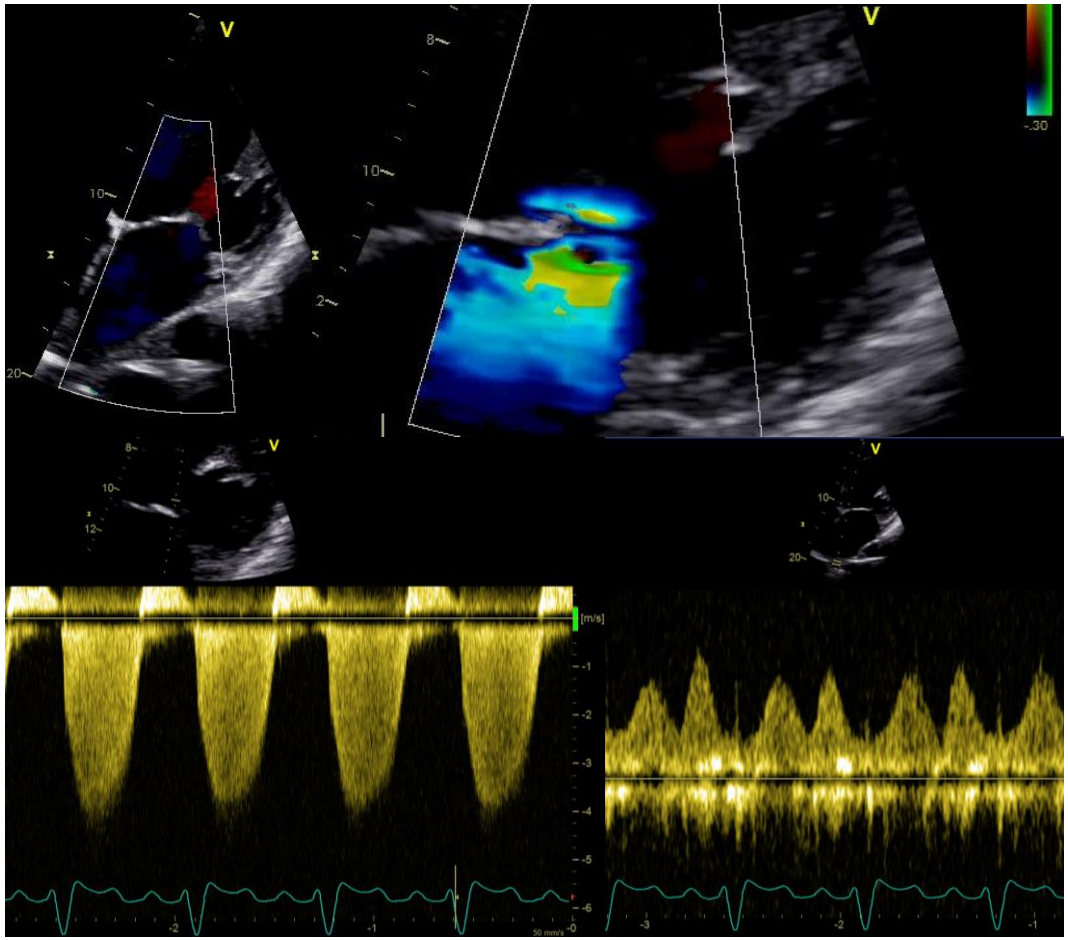
Valve structure and motion

Baseline underlying mechanism:

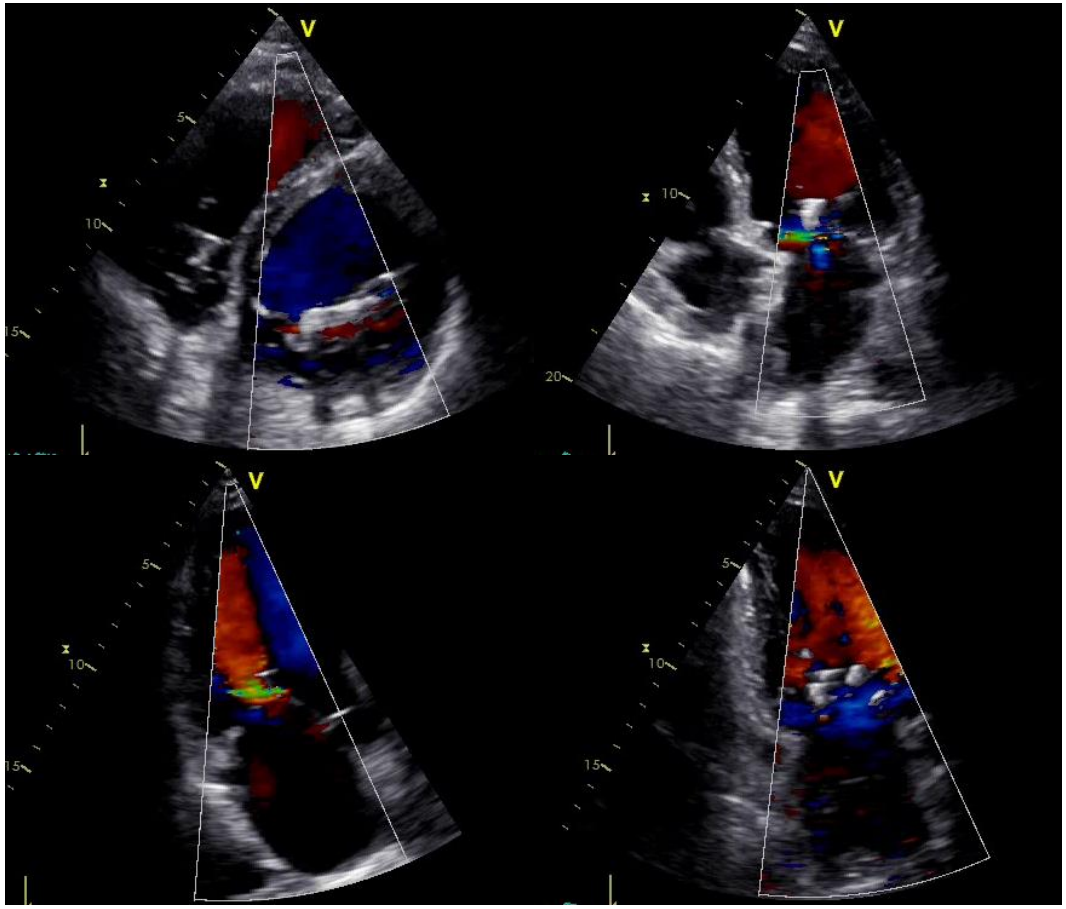
- Organic (perforation, calcification)
- Functional (tethering)

Partial detachment

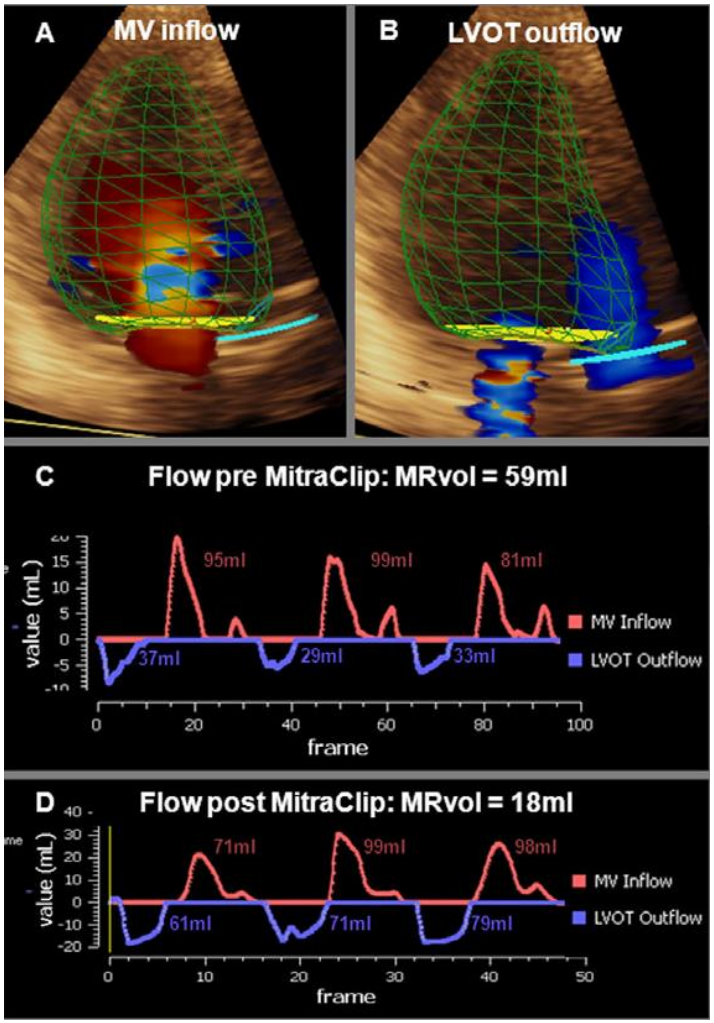
Chorda rupture



Qualitative
Color flow jet area: intermediate
Flow convergence: intermediate
Jet density and contour CW Doppler: dense and parabolic
Semi-quantitative
Pulmonary venous flow: Blunted S

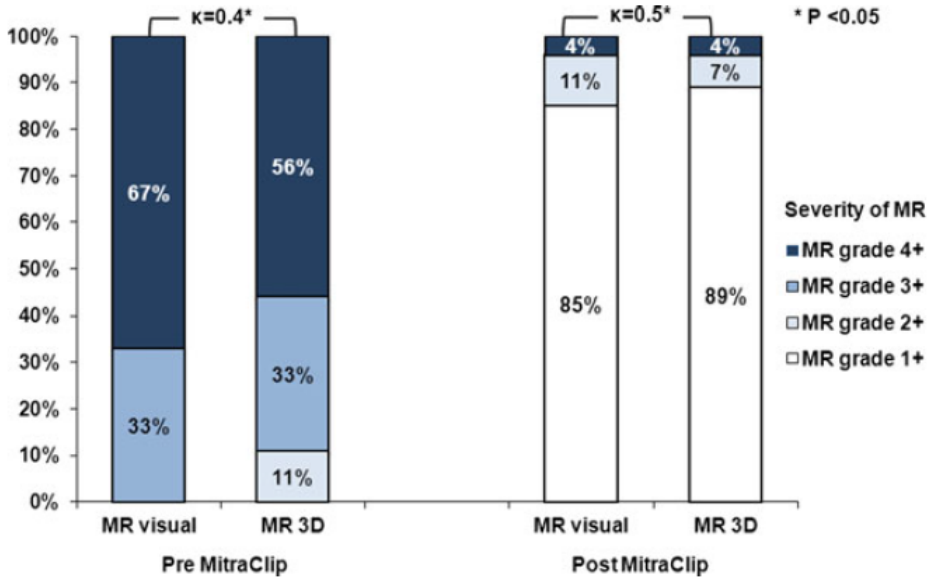


Quantitative
Vena contracta width (mm) ???
EROA (mm2) ???
Regurg. Vol (mL) ???
Regurg. Fraction (%) ???



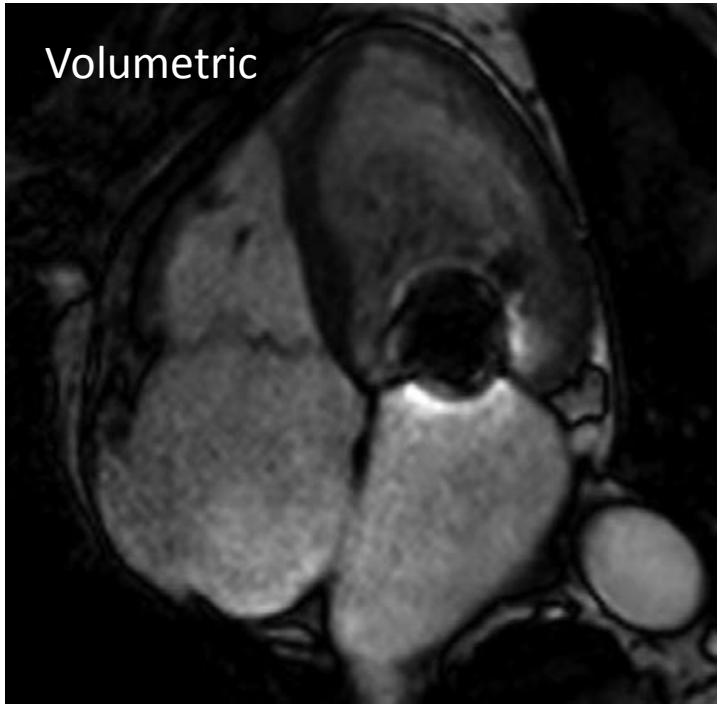
N =27 patients

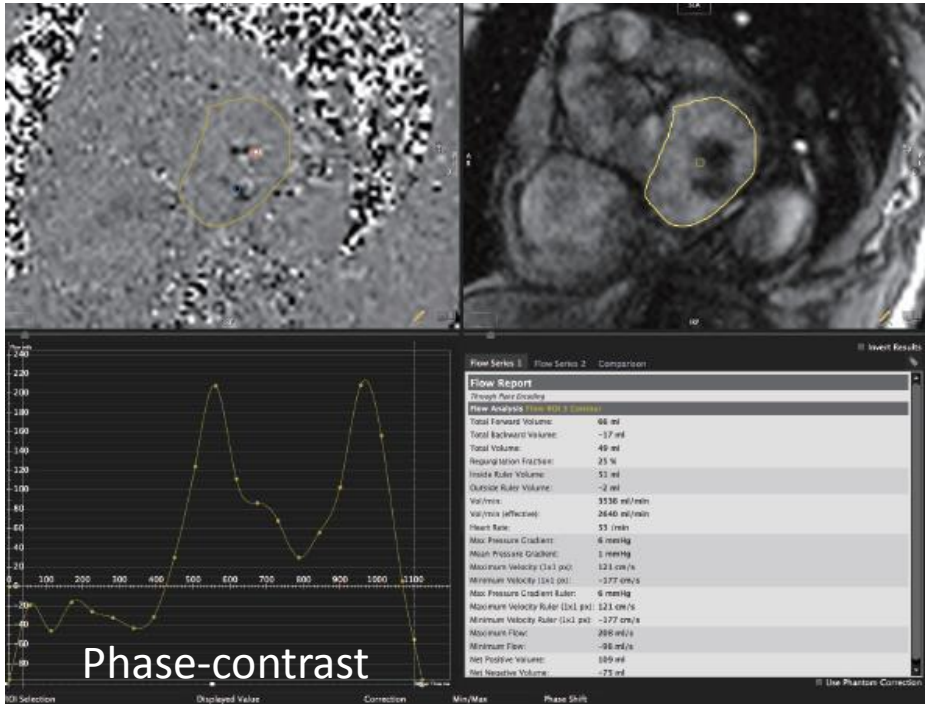
Agreement between visual assessment and 3D real-time volume color flow Doppler



Gruner et al. Echocardiogr 2015

MRI quantification

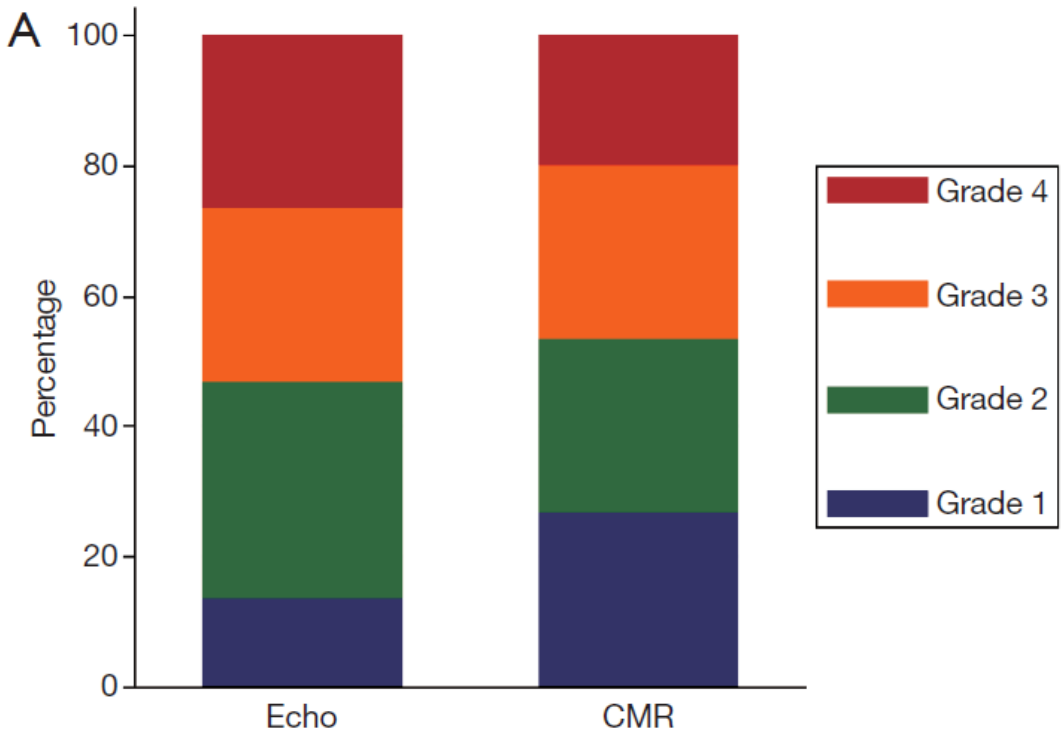




RF: [(total LV SV – total aortic forward flow)/total LV SV) × 100]

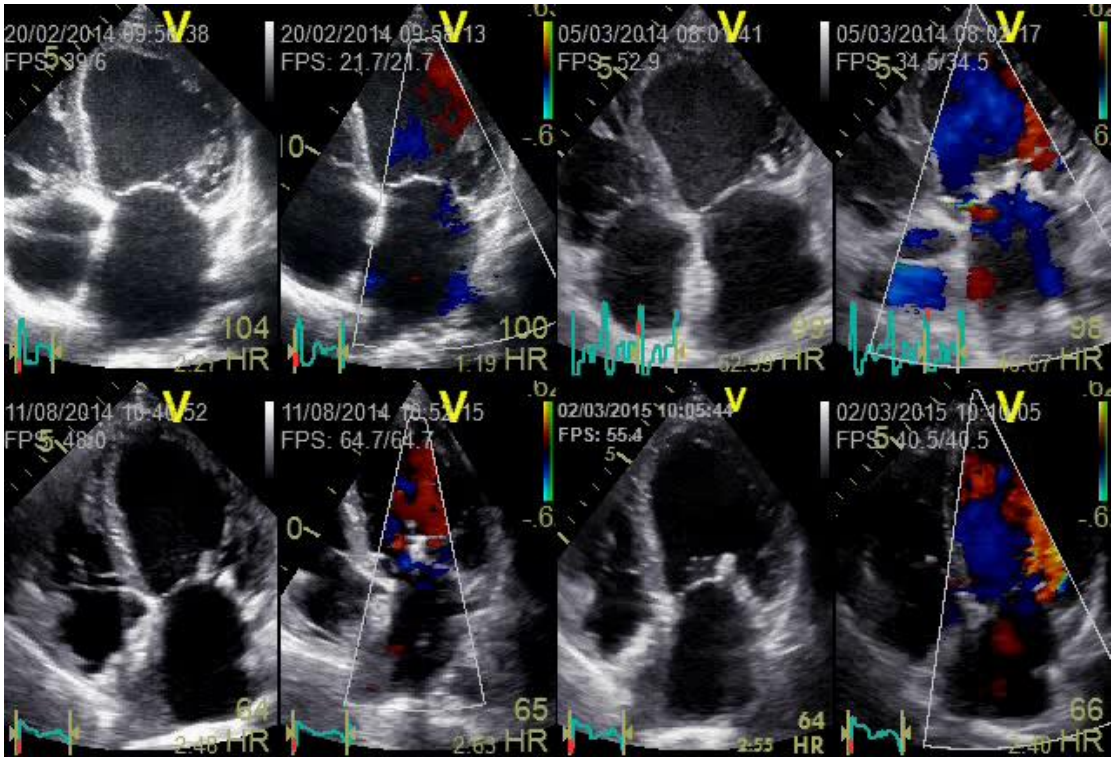
Lurz et al. Eur Heart J Cardiovasc Imag 2015
Hamilton-Craig et al. Ann Cardiothorac Surg 2015

Table 1 Baseline characteristics (n=16)	
Characteristics	n [%]
Mean age, years [range]	79 [58-92]
Female	5 [28]
NYHA class	
2	2 [11]
3	14 [78]
4	2 [11]
STS score (mean, range)	
Morbidity/mortality	29.3% [9-54]
Mortality	5.0% [1-11.2]
Baseline MR severity	
3+	2 [11]
4+	16 [89]
MitraClip	
1 clip	11 [61]
2 clips	7 [39]
Etiology	
Functional MR	12 [75]
Degenerative MR	6 [25]
6MWT mean (meters)	
Pre-procedure	340
Post-procedure	366
Ejection fraction (%, standard deviation)	
Echo	54±16
MRI	44±11



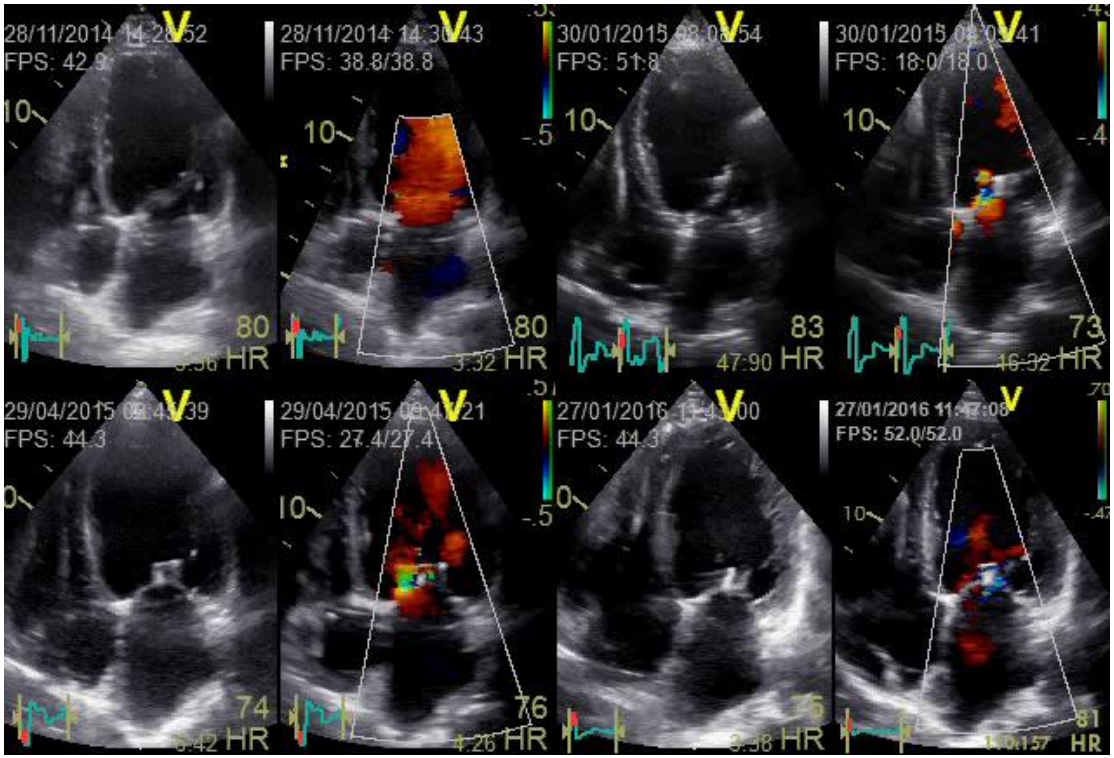
Hamilton-Craig et al. Ann Cardiothorac Surg 2015

LV and LA reverse remodeling



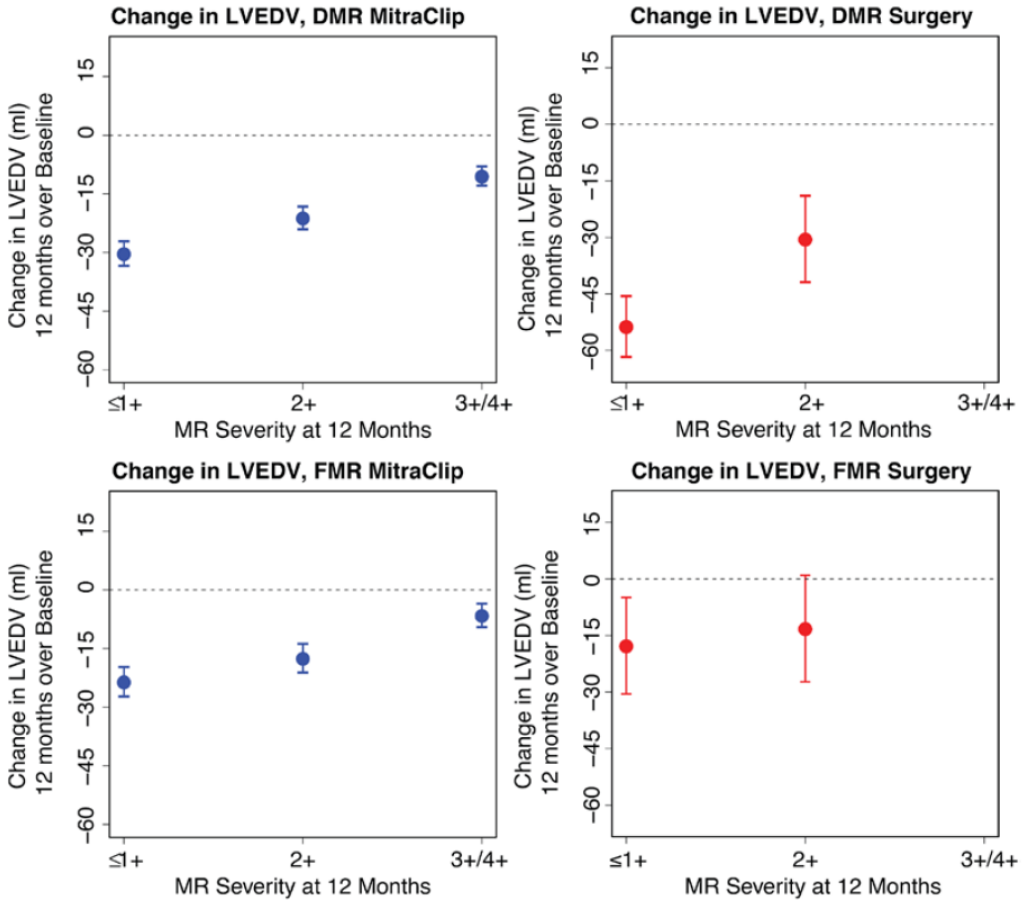
59 year old man
Ischemic cardiomyopathy
LBBB
Renal failure
NYHA IV, inotropes
CRT-D
4 mitraclips

	LVESV	LVEDV	LVEF	LA
Baseline	183 ml	241 ml	21%	150 ml
1-year	105 ml	164 ml	36%	133 ml



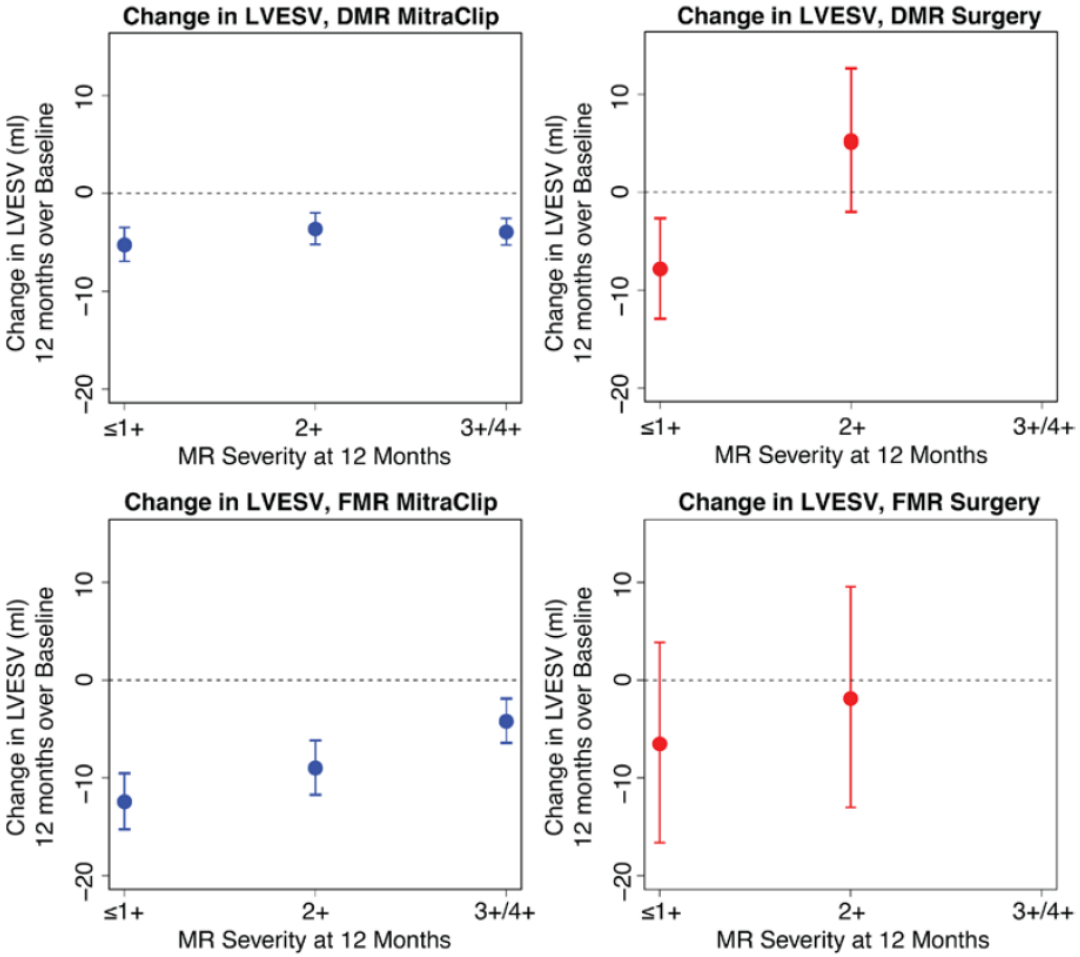
76 year old man
Ischemic cardiomyopathy
ICD
Renal failure
AVR (mechanic)
2 mitraclips

	LVESV	LVEDV	LVEF	LA
Baseline	194 ml	244 ml	20%	118 ml
1-year	218 ml	265 ml	18%	123 ml



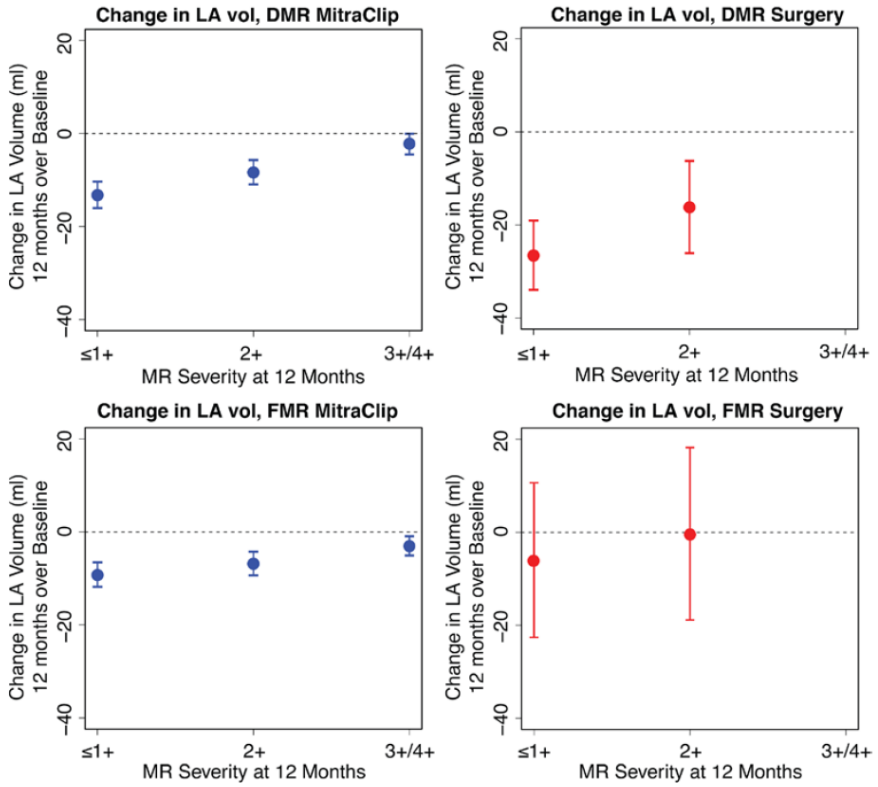
N = 801
EVEREST II
EVEREST II High-risk
REALISM

Grayburn et al. Circulation 2013



N = 801
EVEREST II
EVEREST II High-risk
REALISM

Grayburn et al. Circulation 2013



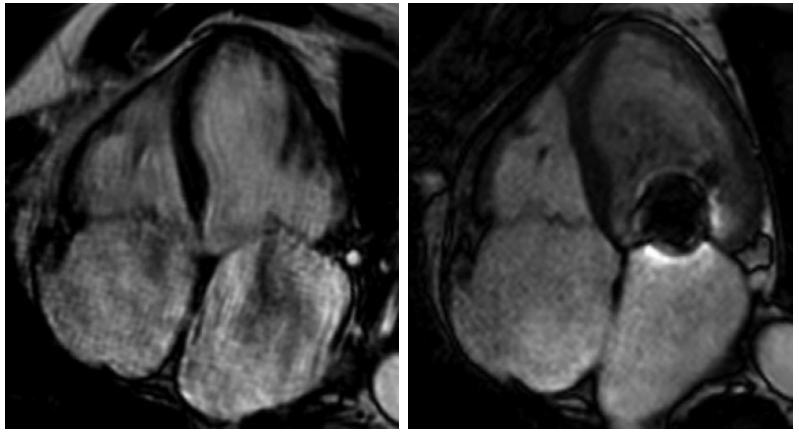
N = 801
EVEREST II
EVEREST II High-risk
REALISM

Grayburn et al. Circulation 2013

- Reduction of LVEDV and LA volume, but not LVESV in degenerative MR, is consistent with correction of volume overload from primary MR.
- Reduction of all 3 measurements in functional MR demonstrates reverse remodeling when MR severity is reduced to either 1+ or 2+ by MitraClip

N = 20 (15 FMR, 5 DMR)
Baseline and 7 days of follow-up

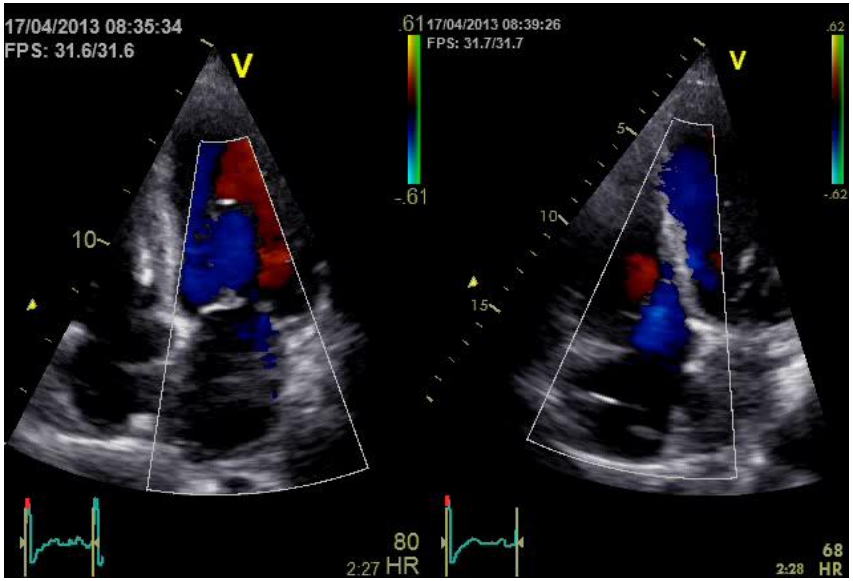
☞too early to assess LV or LA reverse remodeling

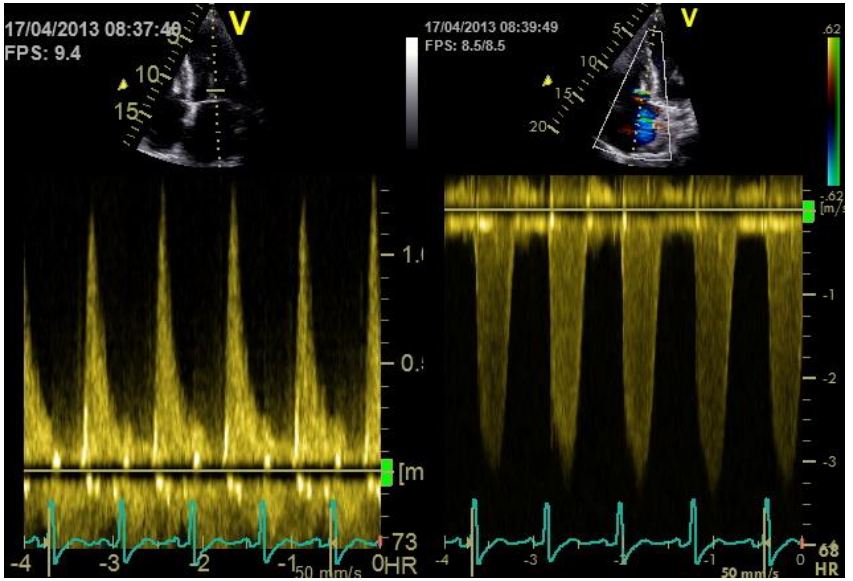


	Pre	Post	*P*-value
LV end-diastolic volume, mL/m^2	115 ± 36	105 ± 41	0.002
LV end-systolic volume, mL/m^2	70 ± 37	70 ± 45	1.0
LV stroke volume, mL/m^2	45 ± 14	35 ± 7	<0.001
LV ejection fraction, %	42 ± 15	41 ± 16	0.8
Effective LV stroke volume, mL/m^2	26 ± 6	26 ± 6	0.9
Mitral regurgitation fraction, %	36 ± 10	19 ± 12	<0.001

Lurz et al. Eur Heart J Cardiovasc Imag 2015

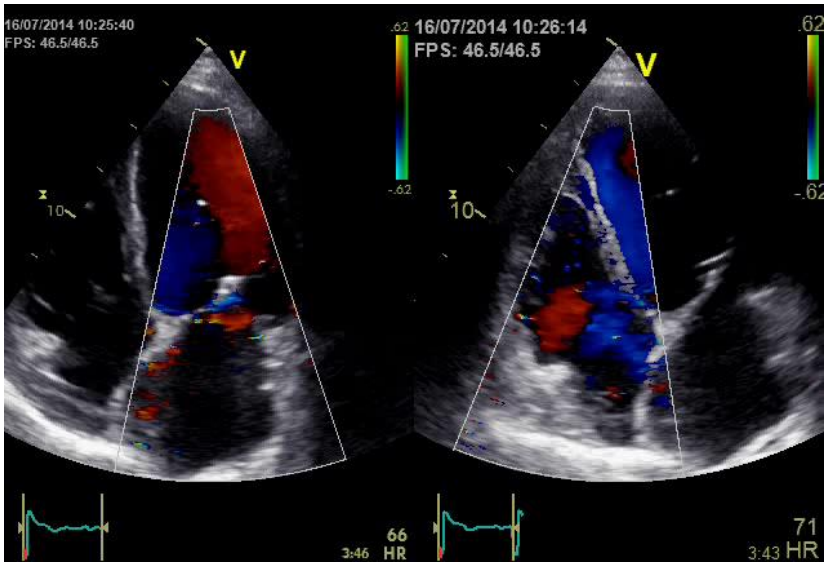
RV and pulmonary pressures ASD?



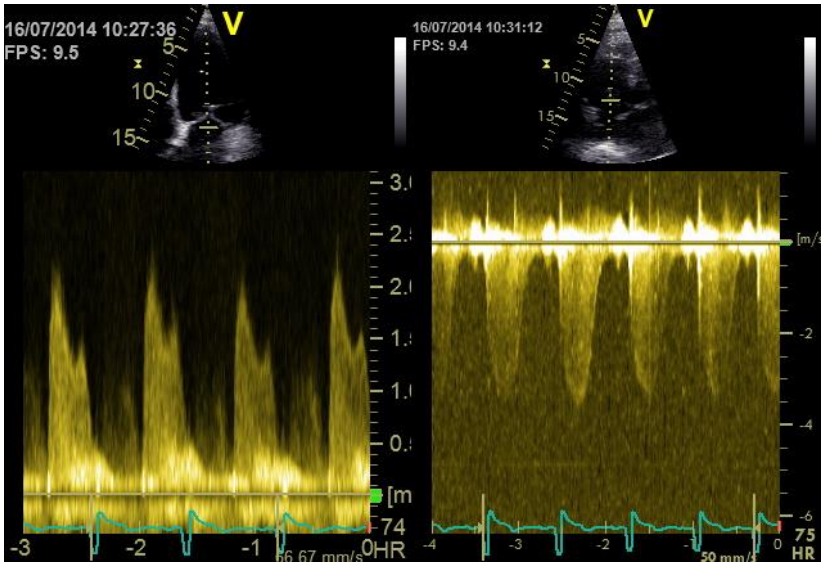


85 year old patient
Ischemic cardiomyopathy, severe LV systolic dysfunction, restrictive filling pattern
Severe FMR (mean grad. 2 mmHg), mild TR, estimated pulmonary pressures 44 mmHg

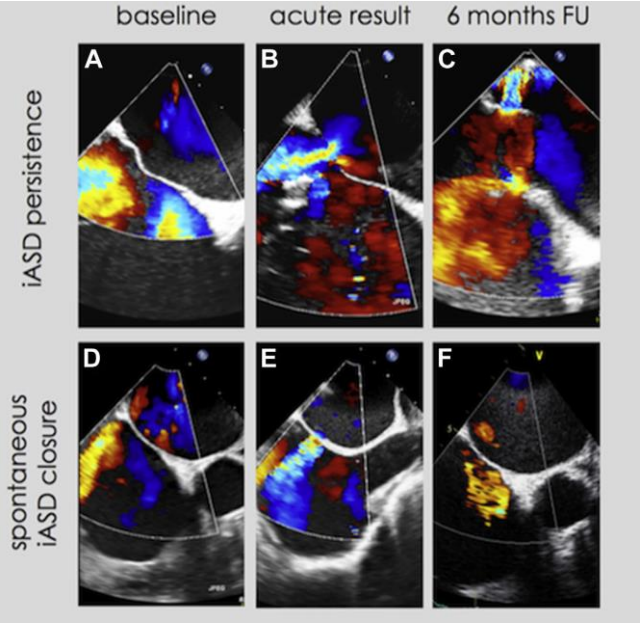
RV and pulmonary pressures
ASD?

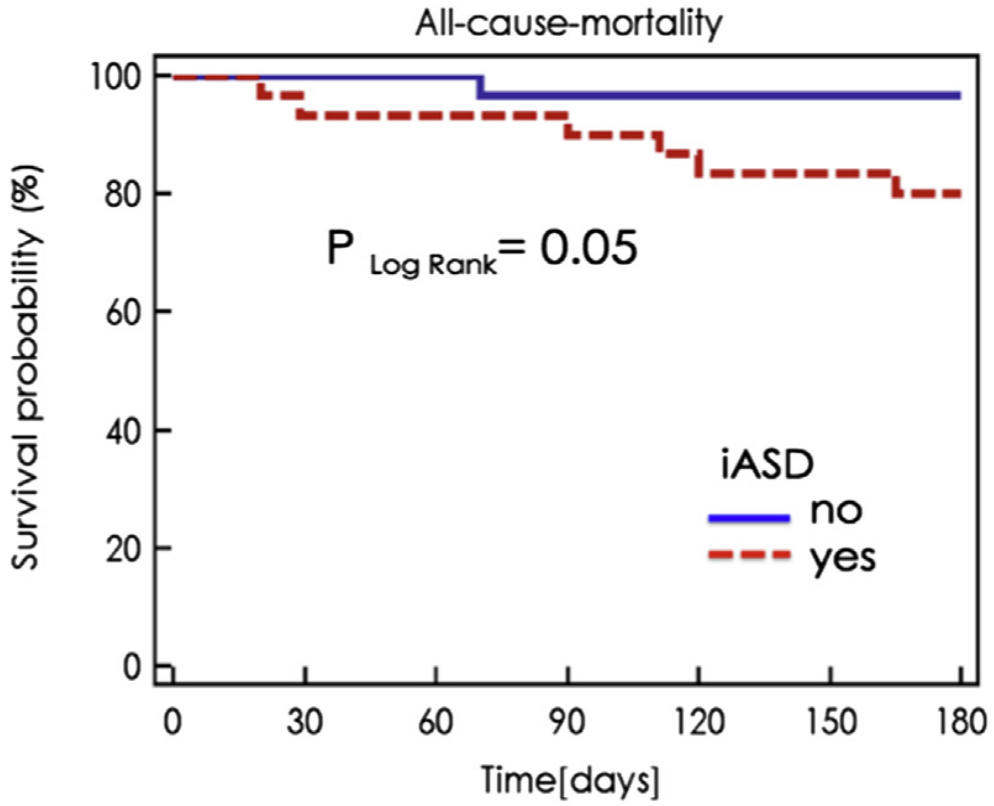


2 mitraclips
Residual MR grad 2+



MV mean grad 11 mmHg
TV peak grad. 51 mmHg





N = 66 patients

Residual ASD at 6-month follow-up 50%

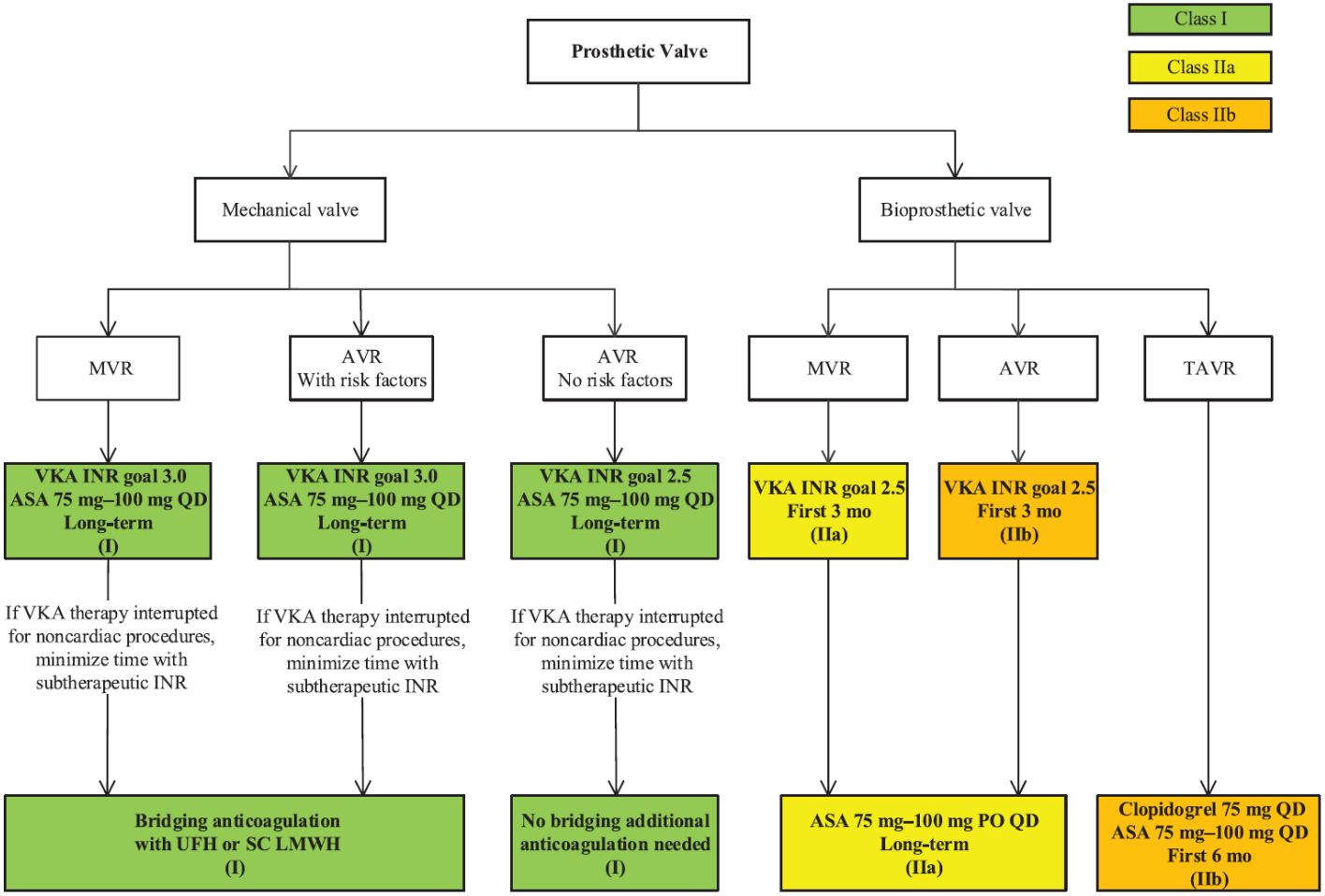
6% with shunt right-left

Schuler et al. JACC Cardiovasc Intervent. 2015

Anticoagulant/antiplatelet

Oral anticoagulation is recommended lifelong for all patients with a mechanical prosthesis.	I	B
Oral anticoagulation is recommended lifelong for patients with bioprostheses who have other indications for anticoagulation.[d]	I	C
The addition of low-dose aspirin should be considered in patients with a mechanical prosthesis and concomitant atherosclerotic disease.	IIa	C
The addition of low-dose aspirin should be considered in patients with a mechanical prosthesis after thromboembolism despite adequate INR.	IIa	C
Oral anticoagulation should be considered for the first three months after implantation of a mitral- or tricuspid bioprosthesis.	IIa	C
Oral anticoagulation should be considered for the first three months after mitral valve repair.	IIa	C

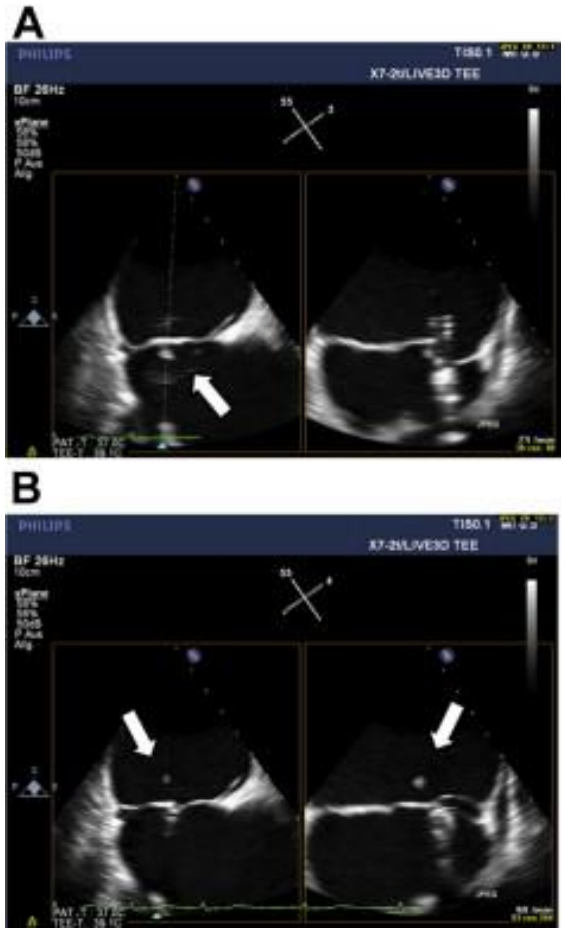
ESC Guidelines 2012



AHA/ACC Guidelines 2014

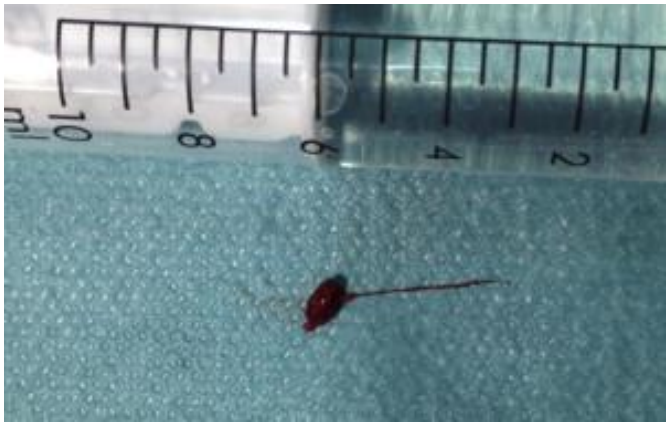
	Before the procedure	During the procedure	After the procedure
Anti-platelets	Patients who are already being treated with aspirin or clopidogrel should be continued on aspirin without interruption before the procedure	Patients already being treated with anti-platelets should be continued on their regimen without interruption. Patients not being treated with anti-platelets should be started on aspirin 325 mg and clopidogrel 75 mg immediately after the procedure	Aspirin at a dose of 325 mg daily for 6 months to 1 year is recommended along with clopidogrel at a dose of 75 mg daily for 1 month unless there are other indications for longer use
Anticoagulation	Anticoagulation should be interrupted at least 5 days before the procedure Patients with high risk for thrombosis should be bridged regardless of their risk of bleeding Patients with low risk for thrombosis shouldn't be bridged regardless of their risk of bleeding The management of patients with moderate risk for thrombosis should be individualized depending on their bleeding risk and informed decision	Heparin should be bolused right after successful transseptal puncture. Goal ACT should be kept around 250 Bivalirudin is not recommended	Patients in whom anticoagulation was interrupted before the procedure should be started back on their anticoagulation regimen. If needed, heparin infusion can be started 6 h after the access sheath is removed Although anticoagulation is not currently recommended after the procedure if no other indication for anticoagulation exists, more studies are needed to address this issues

Alsidawi et al J Thromb Thrombolysis 2014



Thrombus formation:

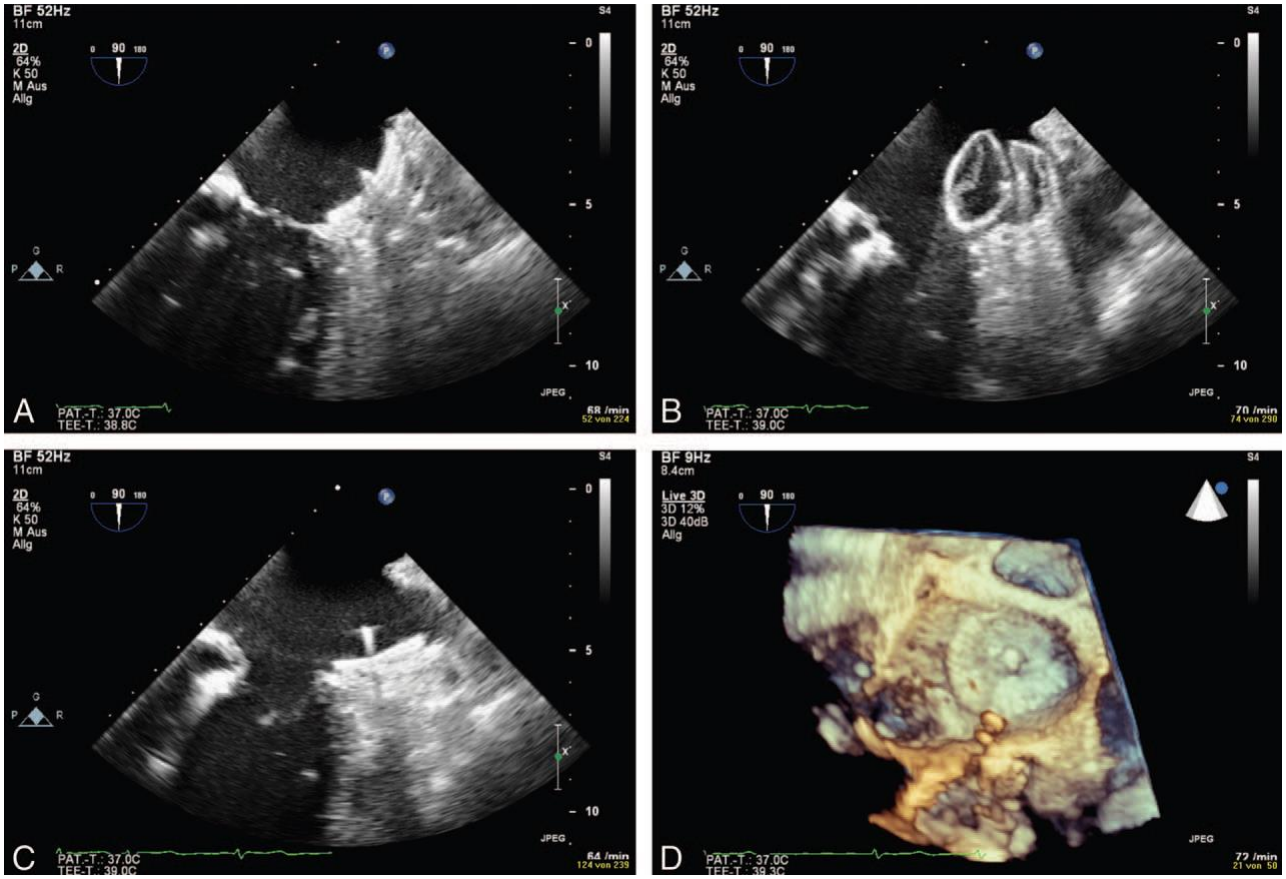
- On the device
- In the LAA (low flow after resolution of MR and persistent AF and poor atrial function)
- In the LV (heart failure patients



Huntgenburth et al. JACC Intervent 2014

90 year old patient
CAD
Severe AS
Severe FMR
AF

Staged procedure:
-PCI
-TAVI
-Mitraclip
-LAA closure



Puls et al. Catheter and Cardiovasc Intervent 2013

Conclusions

- Standard definitions of MR grade after mitraclip
- Identification of patients who may not benefit in terms of LV functional recovery and reverse remodeling
- Standardization of anticogaulation/antiaggregant therapy