

Insuficiència Mitral Aguda: On Encaixa el Mitraclip?

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Clinical Case

- 78 yo woman.
- CVRF: HTN, DL, DM (Insulin).
- CKD. GF 44 ml/min
- Acute Inferior Myocardial Infarction Killip III
- Primary PCI: RCA 100% → DES x 2 . LAD and LCx OK
- Persistent CHF despite Furosemide iv.

Clinical Case

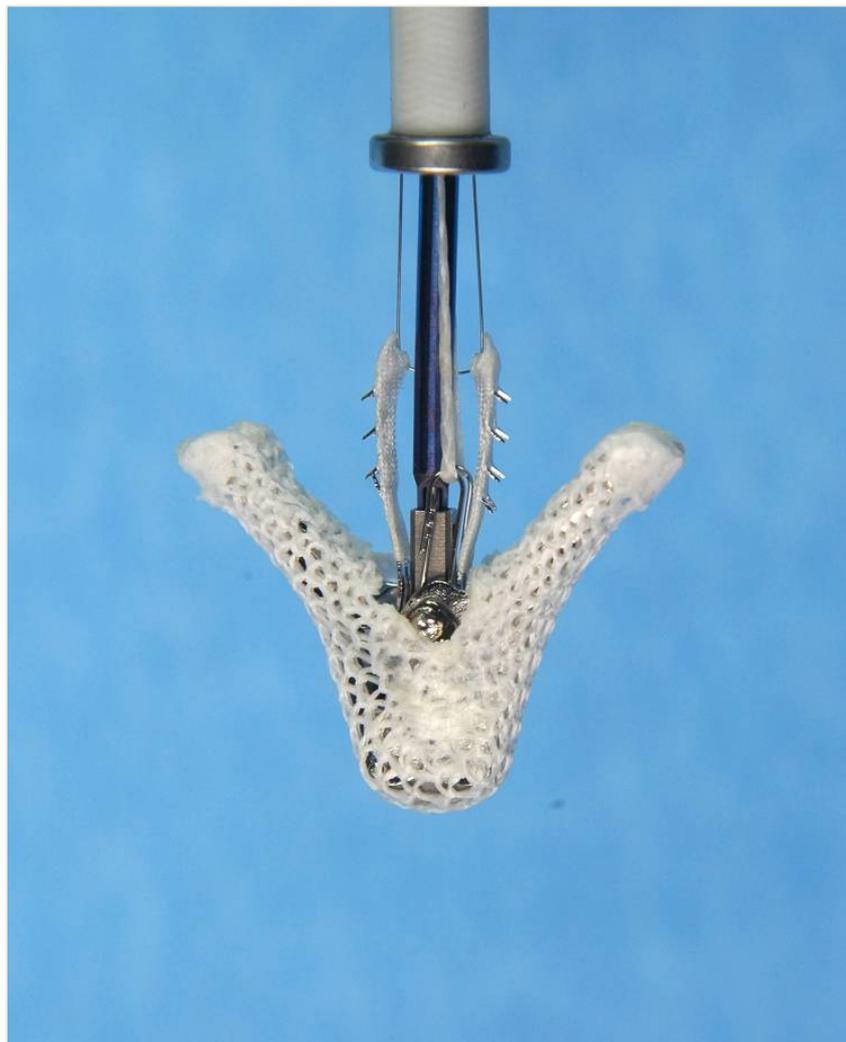
- Progressive worsening in 3 hours → Cardiogenic Shock
 - TTE: LVEF 40% (Inferior Akinesia) / Severe MR (FMR?)
 - NTG, DBT and Furosemide iv.
 - IABP
 - BiPAP → Mechanical Ventilation
- CV Surgery Assessment → Turned down for surgery (instability?)

Clinical Case

- Hemodynamic stabilization with DBT/NA and IABP.
- No clear symptomatic improvement.
- Progressive multi-organic failure:
 - Continuous HDF.
- Turned down for cardiac surgery again.
- TEE: Severe FMR (suitable anatomy for Mitraclip).



Percutaneous mitral repair with Mitraclip

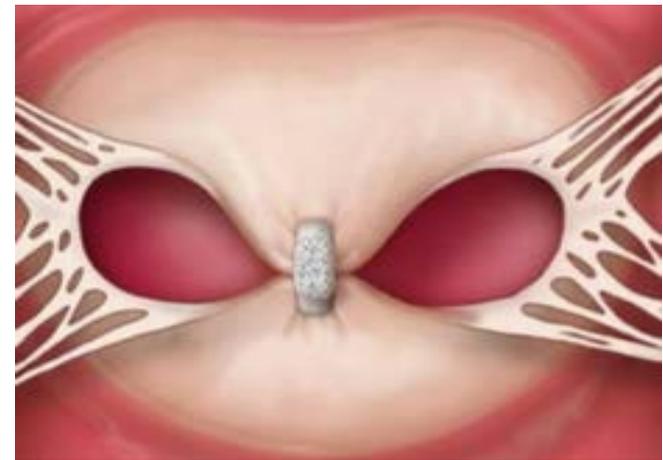
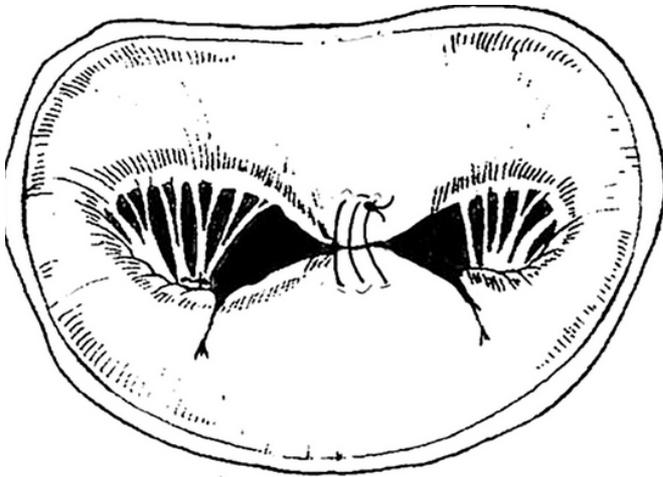


Percutaneous mitral repair with Mitraclip

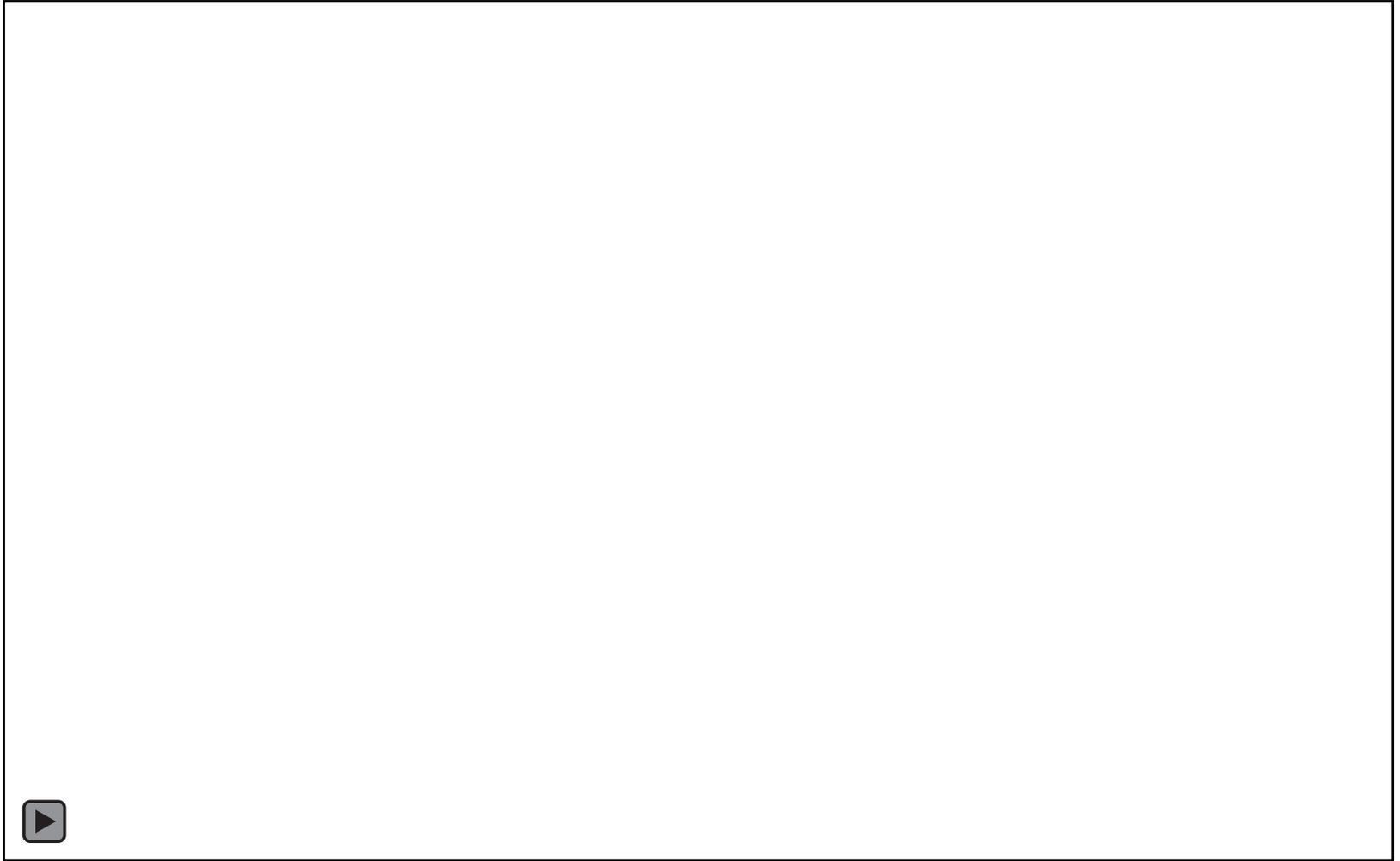
- Venous Access (24 French).
- Transeptal Puncture (TEE guided).
- Guidance with Fluoroscopy and **TEE 2D-3D**.
- General anesthesia.
- Heparin ev (ACT>250).
- No contrast (renal protection).
- Repositionable and retrievable (no rush).

Alfieri versus Mitraclip

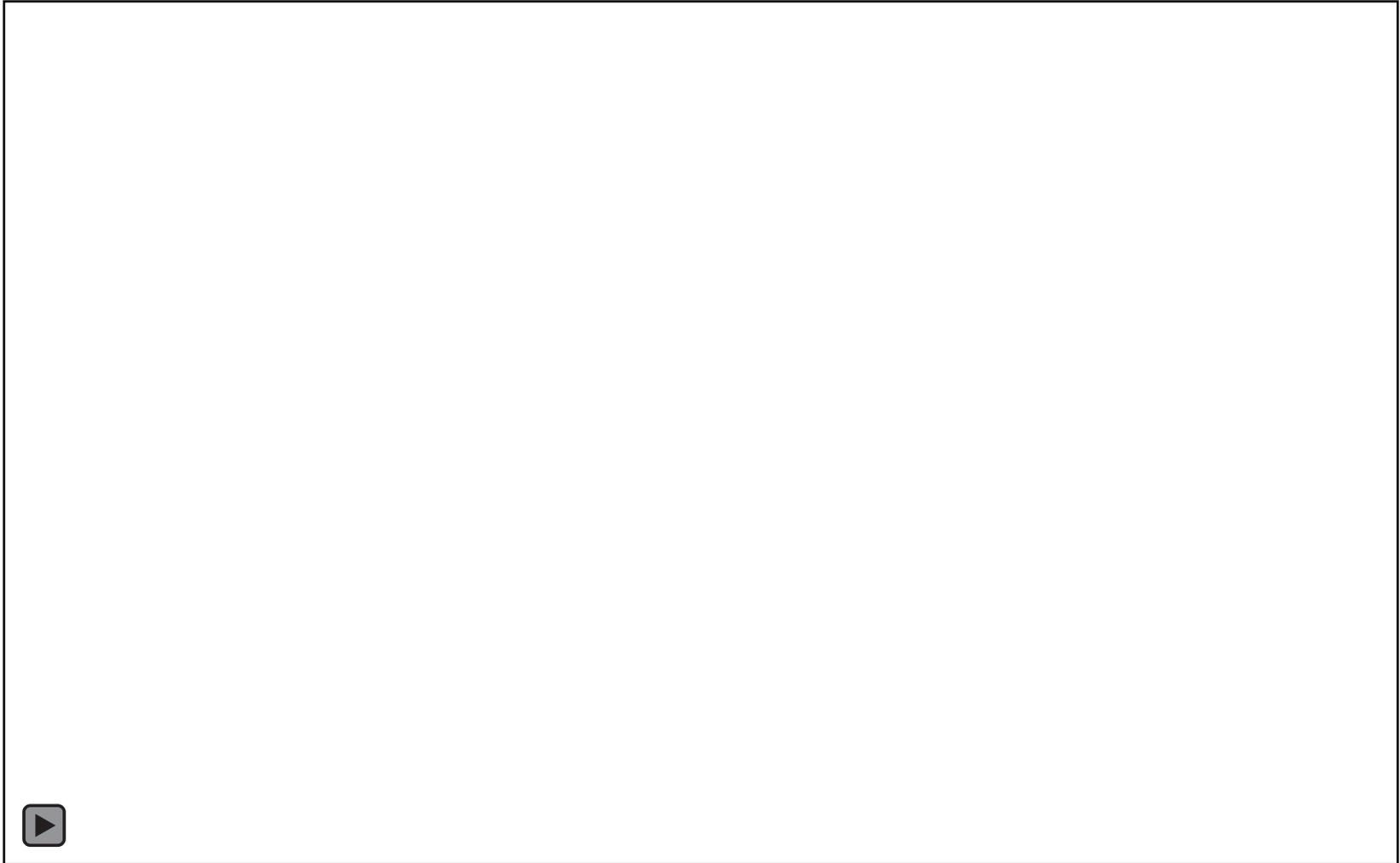
- Beating heart technique.
- Continuous evaluation of the mitral regurgitation.
- Possibility to reposition / implantation of additional clips.
- Indirect annuloplasty¹



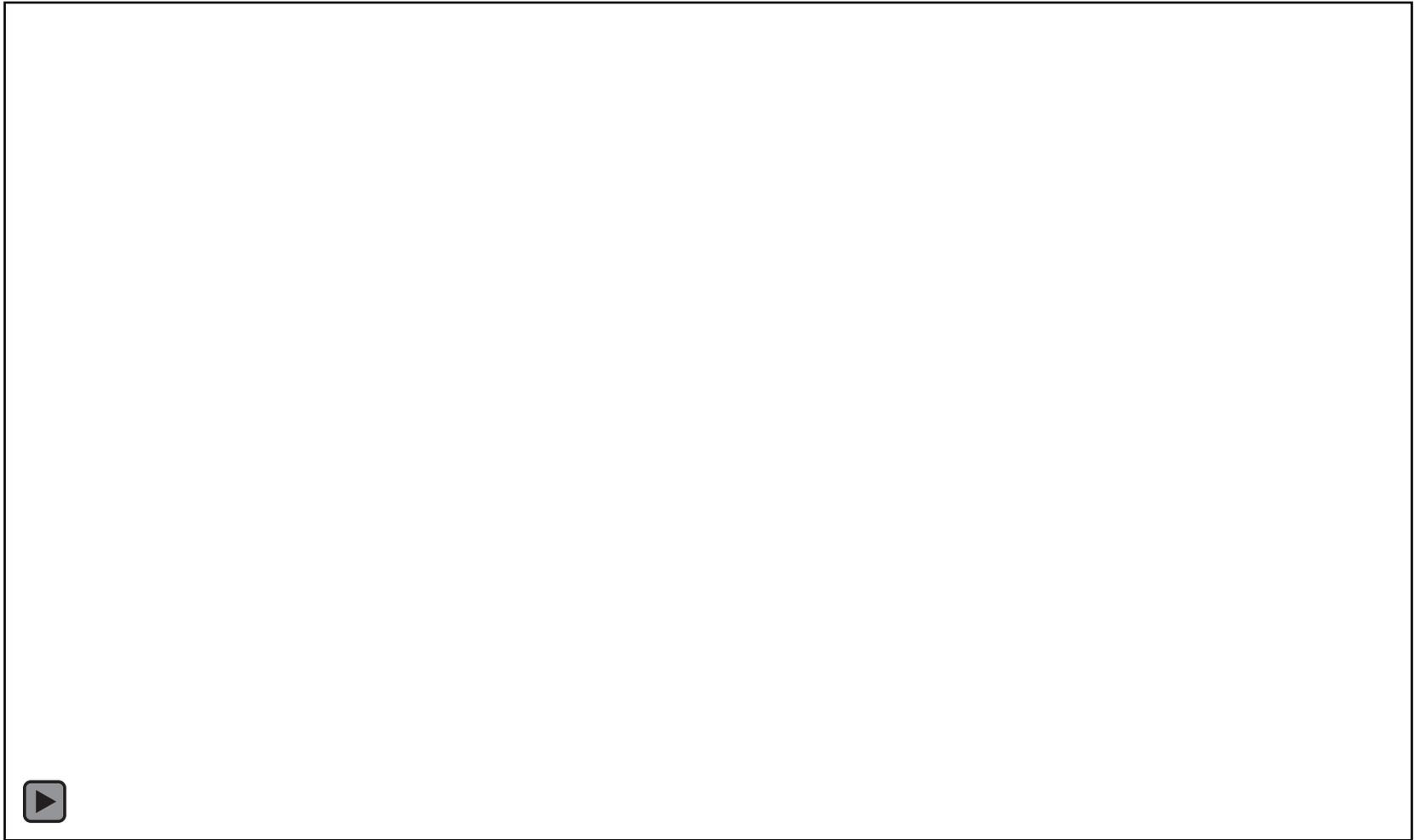
Acute Mitral Regurgitation after AMI



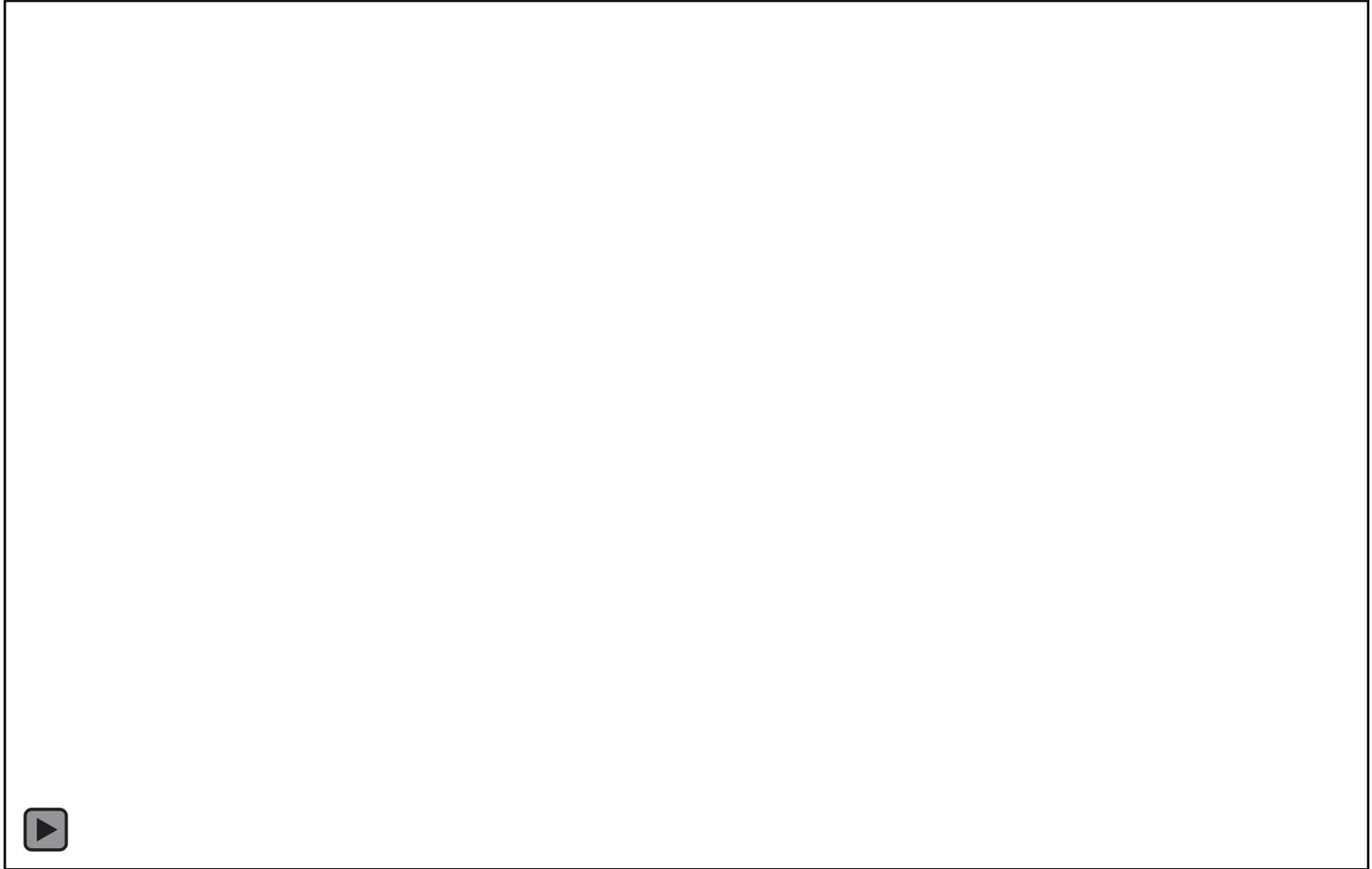
Acute Mitral Regurgitation after AMI



Acute Mitral Regurgitation after AMI



Acute Mitral Regurgitation after AMI



Clinical Case

- Progressive improvement after Mitraclip.
- Weaning from IABP → DBT → Mechanical Ventilation.
- Restored diuresis 4 days after the intervention.
- Discharged 12 days after the intervention.
- Clinical Follow-up at 6 months: NYHA 2/4 / mild-moderate MR

Acute MR after MI

- Acute severe MR is poorly tolerated during STEMI/NSTEMI
- Mortality rate in different series around 40%.
- >50% of patients are in cardiogenic shock.
- Medical treatment is the most followed strategy.
- In “real world” series, cardiac surgery is infrequently performed.

Acute MR after MI

- Between 2012 and 2017 → 3020 STEMI patients were screened.
- 43 patients (1.5%) presented acute severe MR.
- In 48% the MR was diagnosed prematurely (<12h).
- 54% of patients were on Killip IV.
- In-hospital mortality was 37.2%

Acute MR after MI

Type of MR	
- FMR	67.4%
- FMR + DMR	32.6%
Time to MR detection	
- <12h	48.8%
- 12-24h	9.3%
- >24h	41.9%
LVEF	33.4 ± 9.7%
sPAP	36.4 ± 18.1mmHg
Pericardial Effusion	30.2%

Acute MR after MI

MR Treatment	
- Medical therapy	72.1%
- Surgery	16.3%
- Mitraclip	7%
- Cardiac Transplantation	4.7%
Hemodynamic Support	
- No support	27.9%
- Inotropic drugs	32.6%
- IABP	2.3%
- Inotropic drugs + IABP	37.2%
- LVAD	0%

Acute MR after MI

- In-hospital mortality rate 37.2%
- In-hospital days of stay → 26 ± 30 days
- Predictors of mortality in multivariate analysis:
 - Killip IV
 - Aborted Cardiac Arrest
 - Elevated sPAP
 - RV Dysfunction
 - FMR + DMR

Need for Minimally Invasive Strategies

Mitraclip for acute MR after AMI

- Acute MR is poorly tolerated.
- Patients are frequently turned down for cardiac surgery.
- Cardiac anatomy is generally preserved:
 - Mild/moderate LV enlargement
 - Preserved leaflets
- Surgeons generally replace the mitral valve (no repair).
- Mitraclip is a very well-tolerated procedure even in critic patients.



Mitraclip for acute MR after AMI

	Patient #1	Patient #2	Patient #3	Patient #4	Patient #5
Age, yrs	76	51	76	72	66
Type of MI	STEMI	STEMI	NSTEMI	NSTEMI	STEMI
NYHA functional class IV/cardiogenic shock	Class IV	Cardiogenic shock	Class IV	Cardiogenic shock	Cardiogenic shock
Logistic EuroScore, %	29.1	38.3	68.1	15	22.6
Interval between MI and clip, days	9	33	49	12	8
Pre-procedural					
LVEF, %	65	43	23	48	16
MR grade	4+	4+	4+	4+	4+
Papillary muscle rupture	No	No	No	No	No
Systolic PAP, mm Hg	60	60	70	60	65
Procedural					
Device success	Yes	Yes	Yes	Yes	Yes
Number of clips	1	1	1	1	1
Device time, min*	140	150	138	60	90
LV support	No	IABP	Inotropes	IABP	IABP
Post-procedural					
MR grade	1-2+	2+	Trace	Trace	2+
MV area, cm ²	1.8	2.1	3.3	3	4
MV gradient, mm Hg	4.5	3.1	1.8	3.8	3.5
Follow-up					
MR grade	2+	2+	1+	1+	2+
LVEF, %	60	45	20	50	15
Systolic PAP, mm Hg	30	38	42	32	60
NYHA functional class	II	II	II	I	IV/death during admission

EREMMI PROTOCOL

EUROPEAN MULTICENTRIC REGISTRY



Acute MR after MI

- Between 2016 and 2018 → 44 patients underwent Mitraclip for acute severe MR after STEMI/NSTEMI
- Most of the patients underwent primary angioplasty LCx being the most common culprit artery (36.4%) and multivessel disease present in 54.5%.
- NYHA functional class IV with 54.3% on inotropes and 36.3% on mechanical circulatory support (2 ECMO and 14 IABP).
- Surgical risk was therefore extremely high, with a median EuroScore II of 15.1(6.2-23.2).

Echocardiographic Data

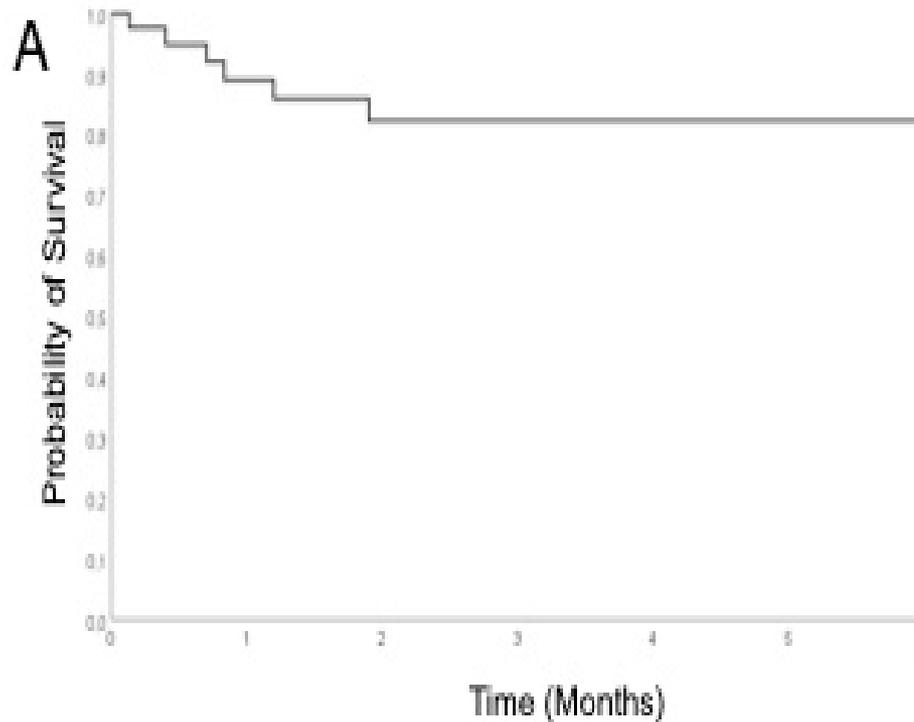
	Total n=44
Mitral regurgitation severity	
3	4(10.3)
4	35(89.7)
MR jet location	
A1-P1: lateral	3(7.5)
A2-P2: central	36(90.0)
A3-P3: medial	6(15.0)
LVEDD (mm)	55.5(48.2-59.5)
LVEDV (ml)	136 (102-163)
LVESV (ml)	76 (54-87.8)
LVEF (%)	35(26-44)
Tricuspid. Regurg.	1(1-2)
PASP (mmHg)	52.5(25-77.5)

Acute MR after MI

Procedural was considered urgent in 71%

Technical success was achieved in 88%

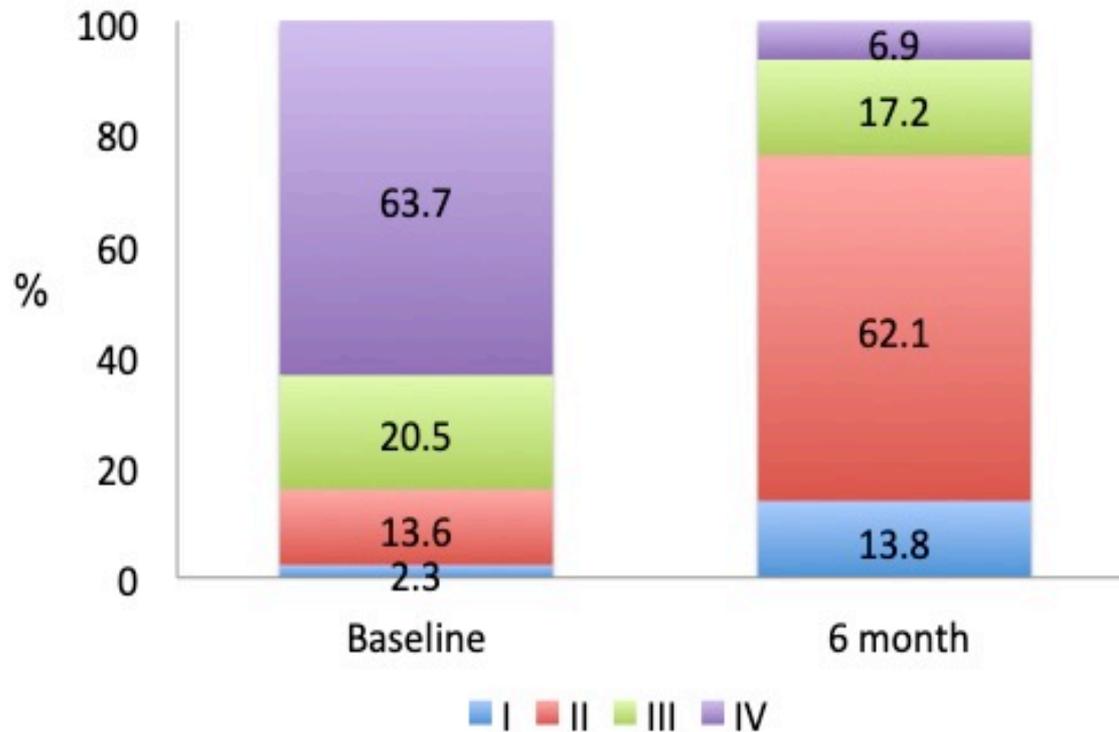
Mortality at 30 days was 9%



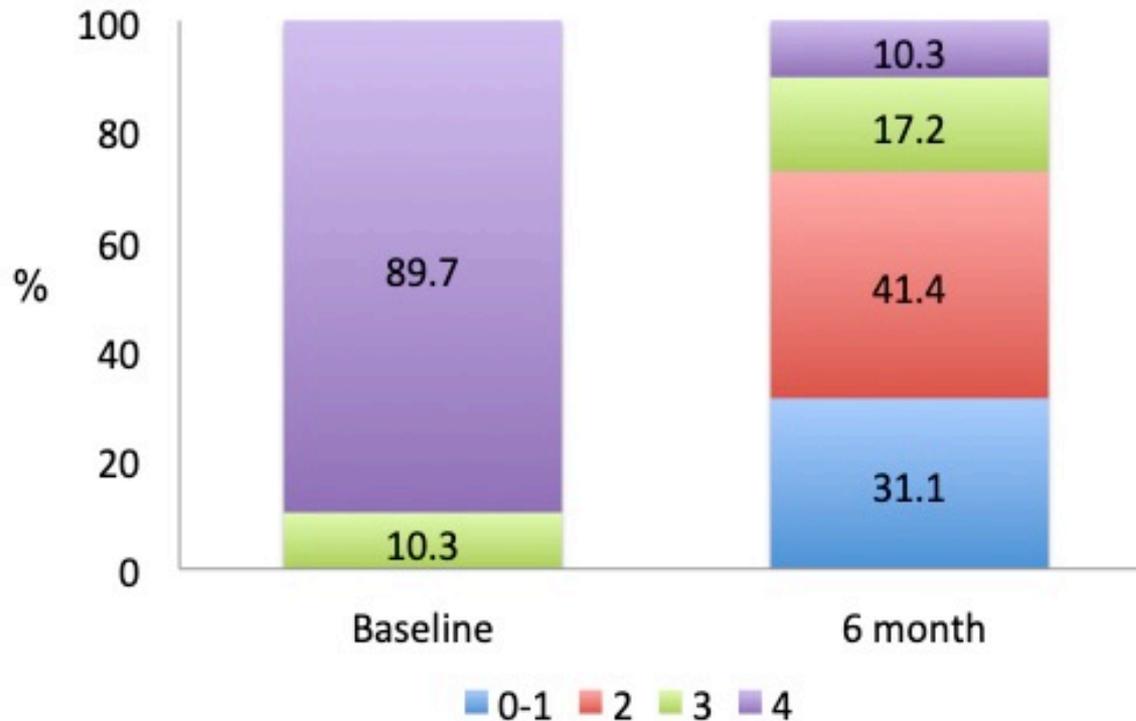
Acute MR after MI

- At 6 months follow-up, MAEs occurred in 36%
 - All-cause mortality was 18%
 - Readmissions for CHF were 11.4%
 - Cardiac Surgery in 6.8%

Clinical Status - NYHA



Echocardiographic Data



Mitraclip and Cardiogenic Shock

- 12 patients with cardiogenic shock undergoing Mitraclip.
- 8 patients with acute MI or acute MR.
- Among 4 patients with longstanding MR → 75% mortality at 30d
- Among 4 patients with acute MI → 25% mortality at 30d
- Among 4 patients with acute MR → 25% mortality at 30d

Predictors of Mitraclip Response in FMR

**Clinical
Status**

**Severity and
Acuteness MR**

**Is the MR of the patient playing a major role
in the symptoms?**

LVEF

**Anatomical
restrictions**

MitraClip G4 – 4 Sizes



Clinical Case

(Acute DMR over chronic FMR)

76 y.o male

Ischemic MCD. CRT

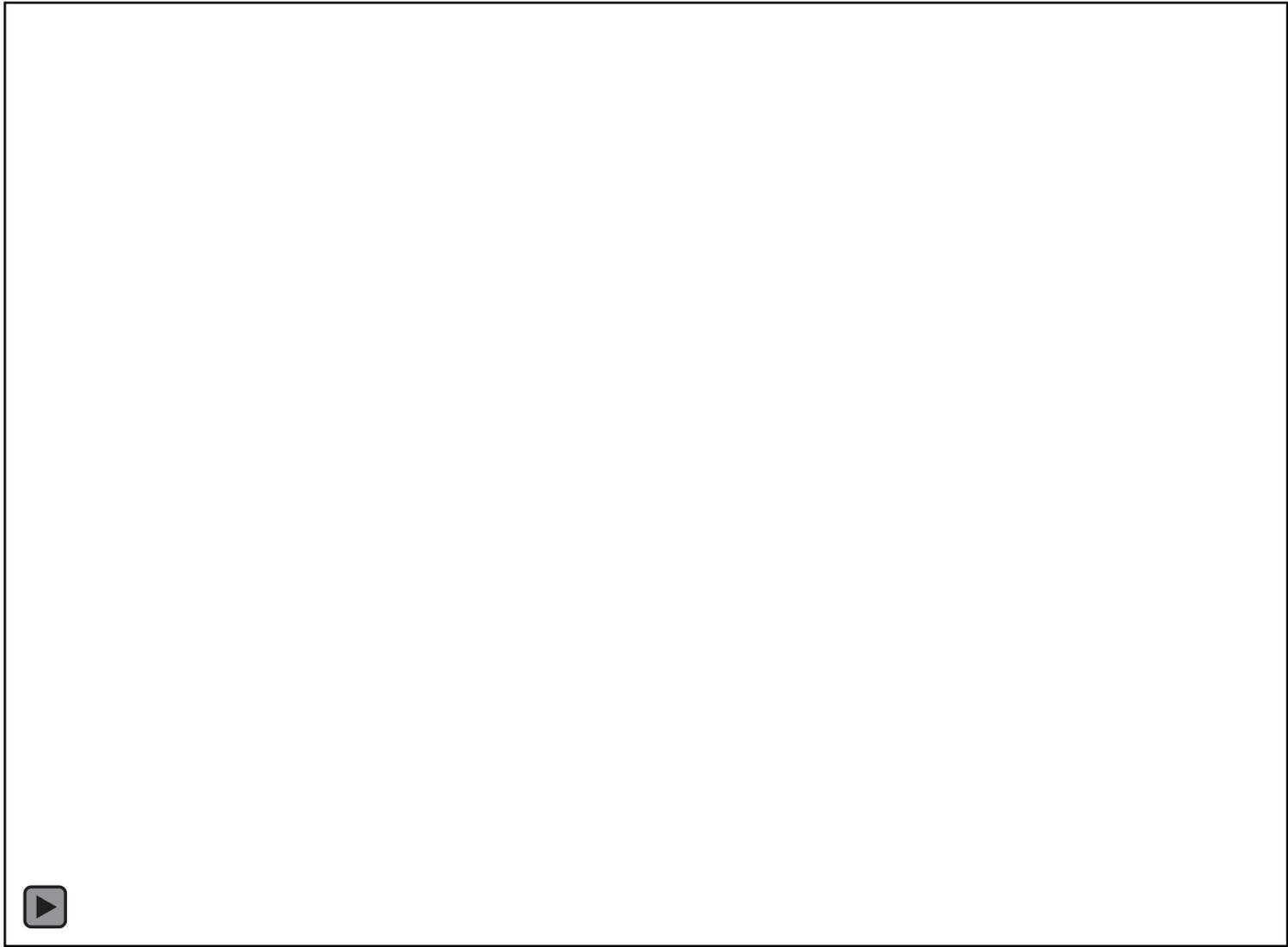
NYHA Class IV – IAoBP – Inotropic support (DBT/NA)

Severe MR (FMR + DMR)

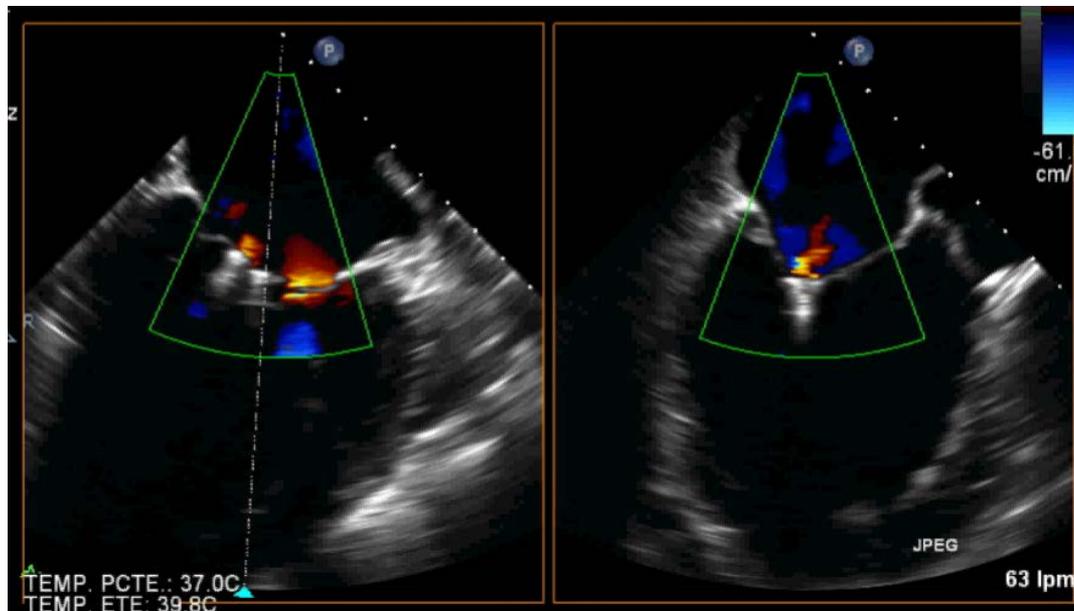
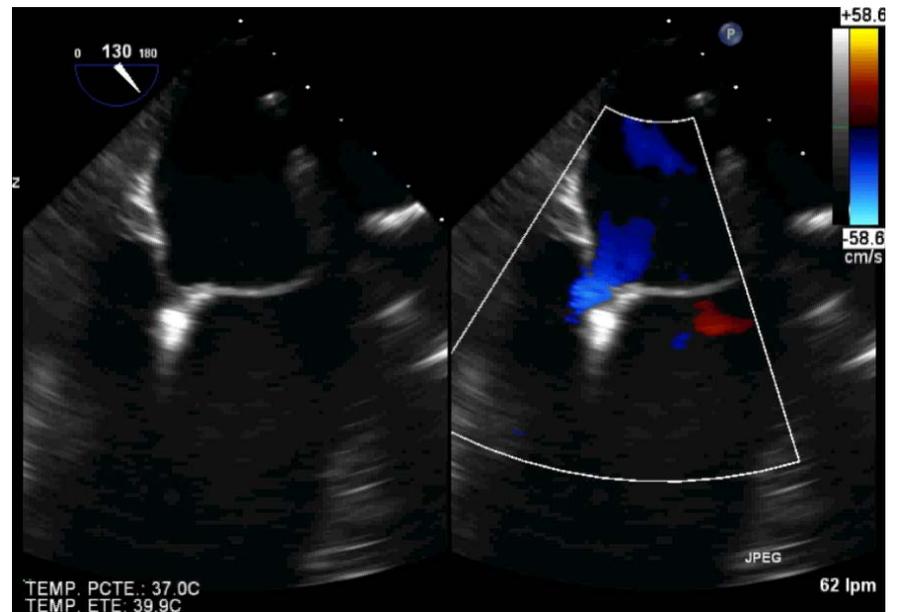
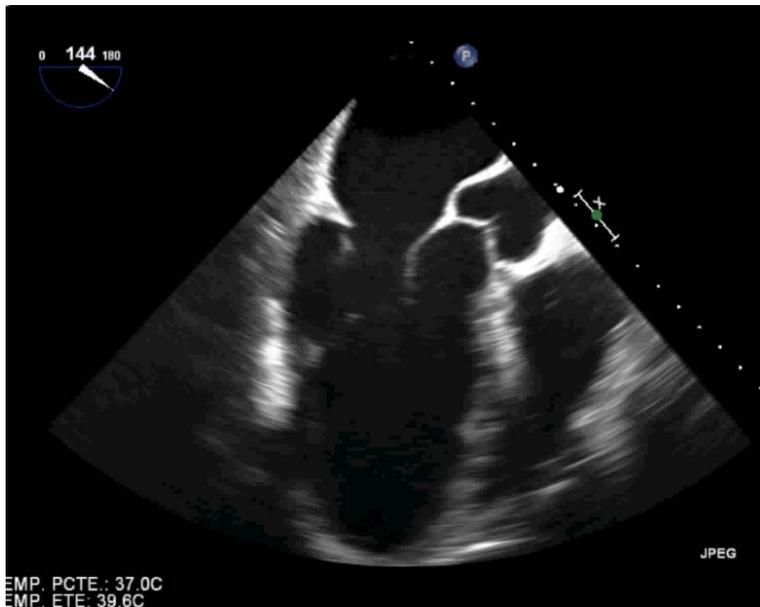
LVEF 20-25%

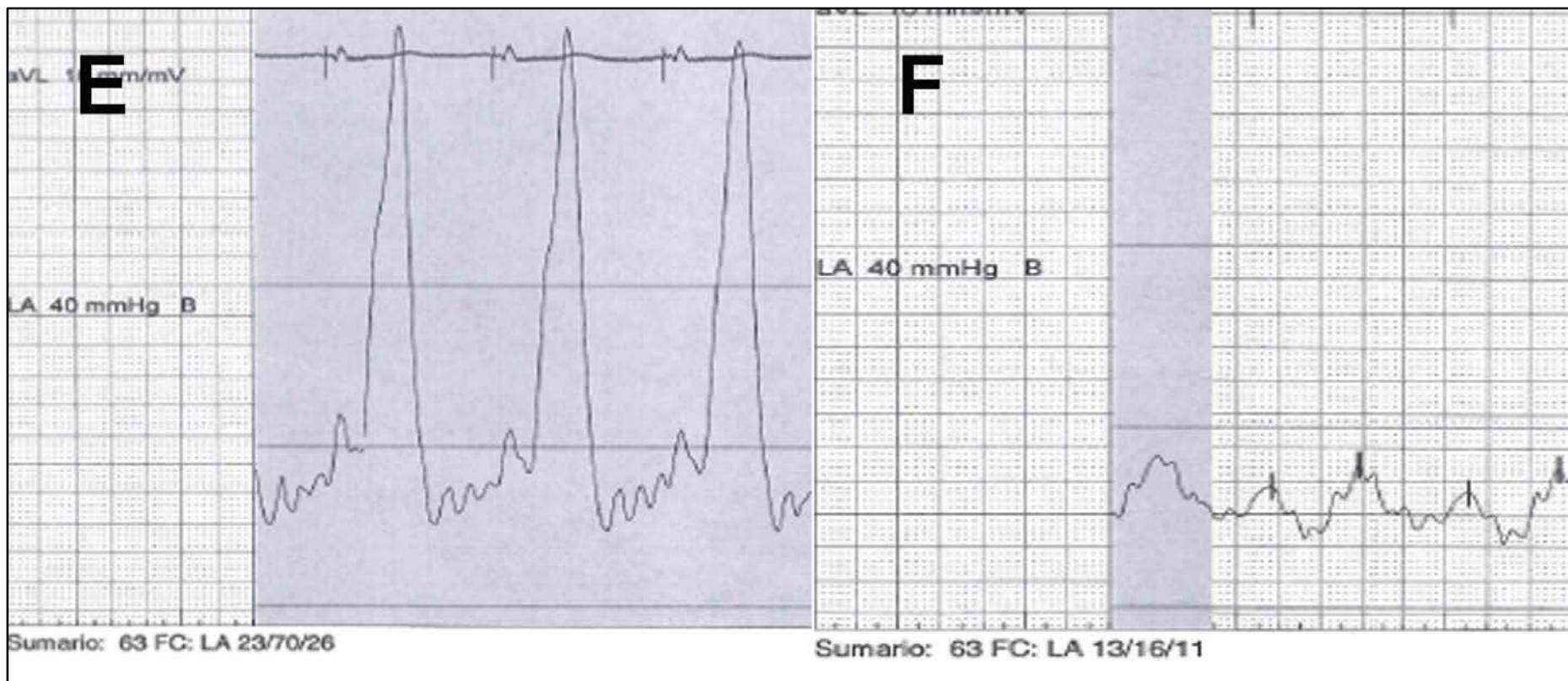
PAP 65 mmHg. Normal RV

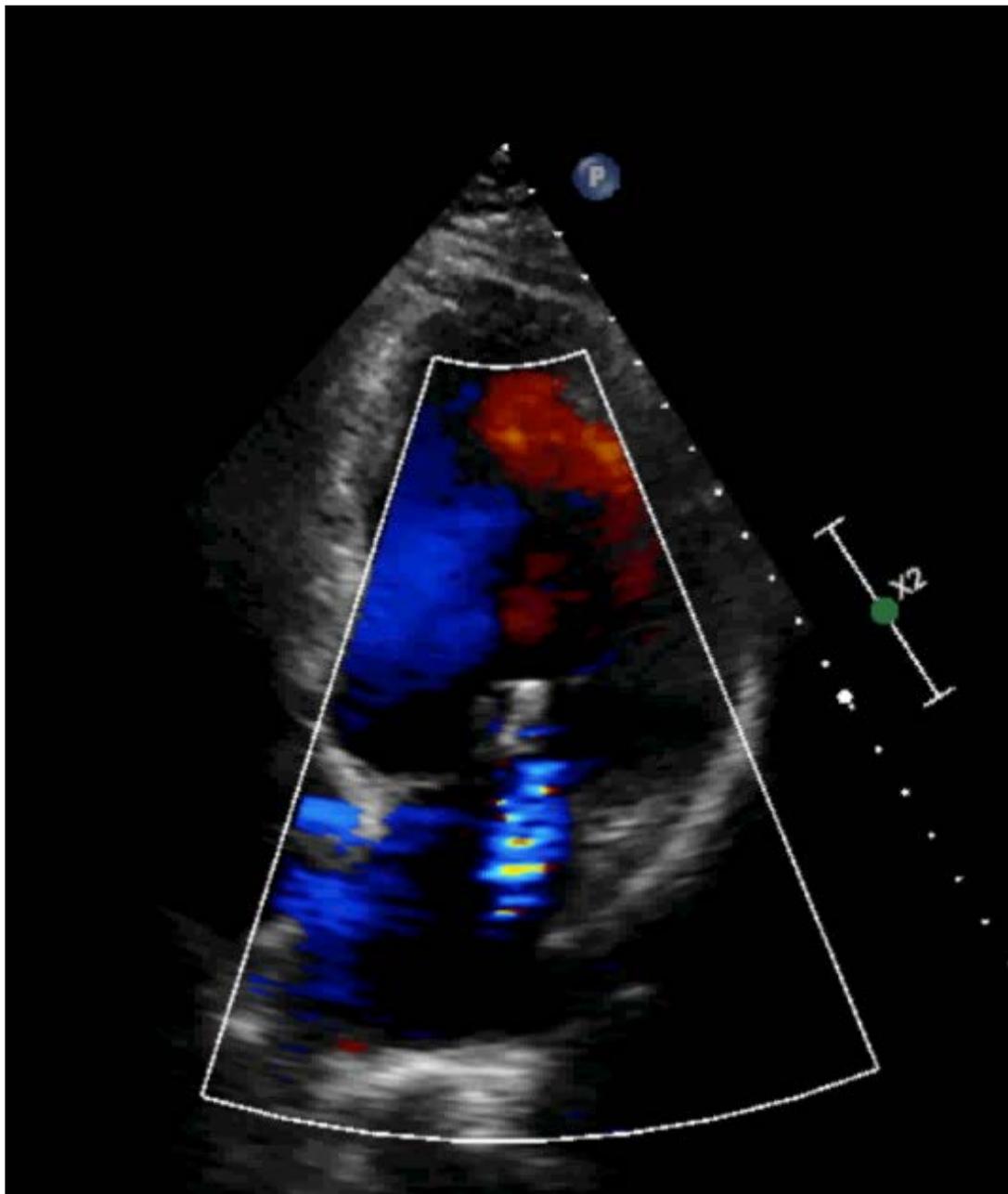












Conclusions

- Mitraclip is a safe intervention even in unstable patients.
- In hemodynamic unstable patients with acute and severe MR, Mitraclip might be a valid alternative to cardiac surgery.
- Mitraclip should be considered as a therapeutic option in acute MR after AMI.
- We should treat patients **NOT TOO LATE!!!**

Moltes gràcies!!!