Εμφύτευση triClip σε ασθενή με 5γλώχινα βαλβίδα

Γιάννης Δημητρόγλου
Ειδικευόμενος
Α’ Πανεπιστημιακή Καρδιολογική Κλινικη

Clinical Case Presentation

- 77-year-old female patient

- **Clinical presentation**

Progressive dyspnoea on exertion and fatigue (NYHA III)

Clinical examination: mild bilateral leg edema, jugular venous distention and holosystolic murmur at the left lower sternal border

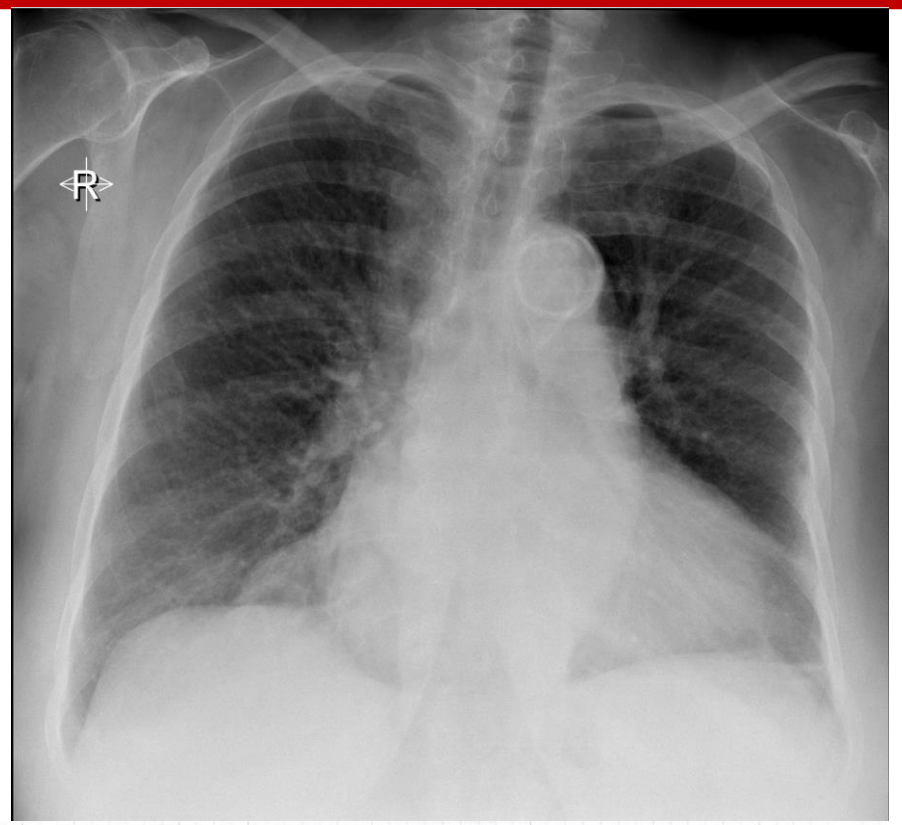
- **Past medical history**

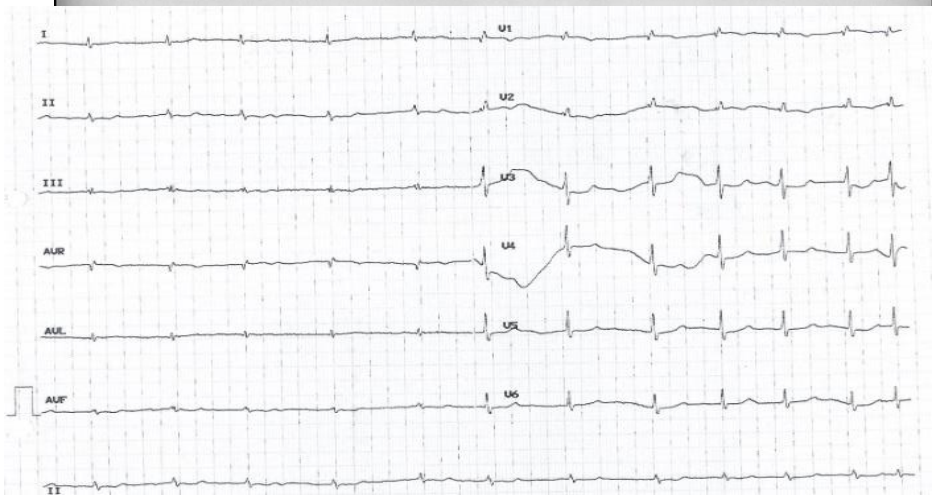
-Permanent atrial fibrillation

-Recurrent acute decompensated heart failure admissions

-**Severe tricuspid regurgitation**

Current medications: apixaban, bisoprolol, spironolactone, loop diuretic **(furosemide 500mg ¼ x1)**

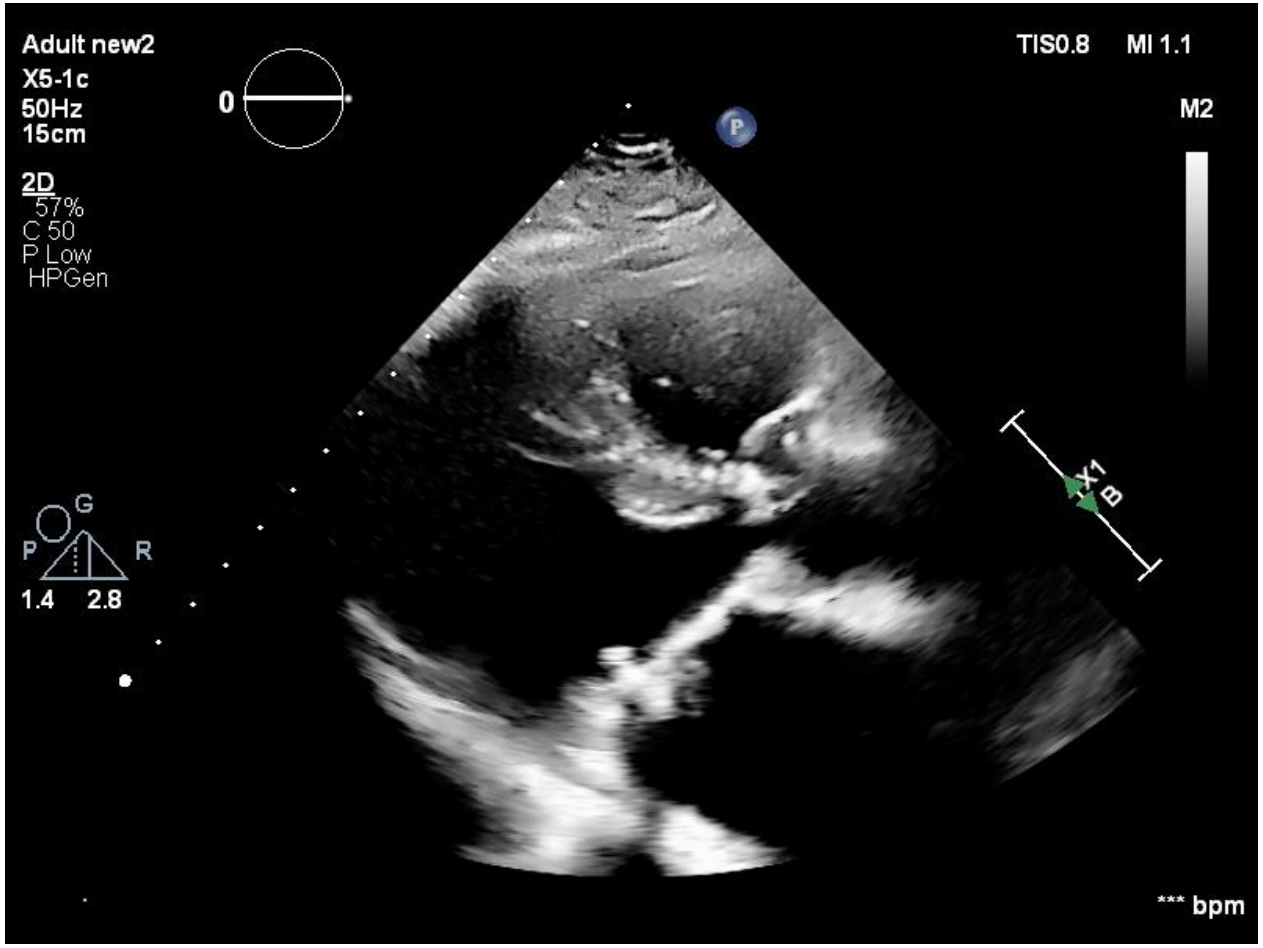




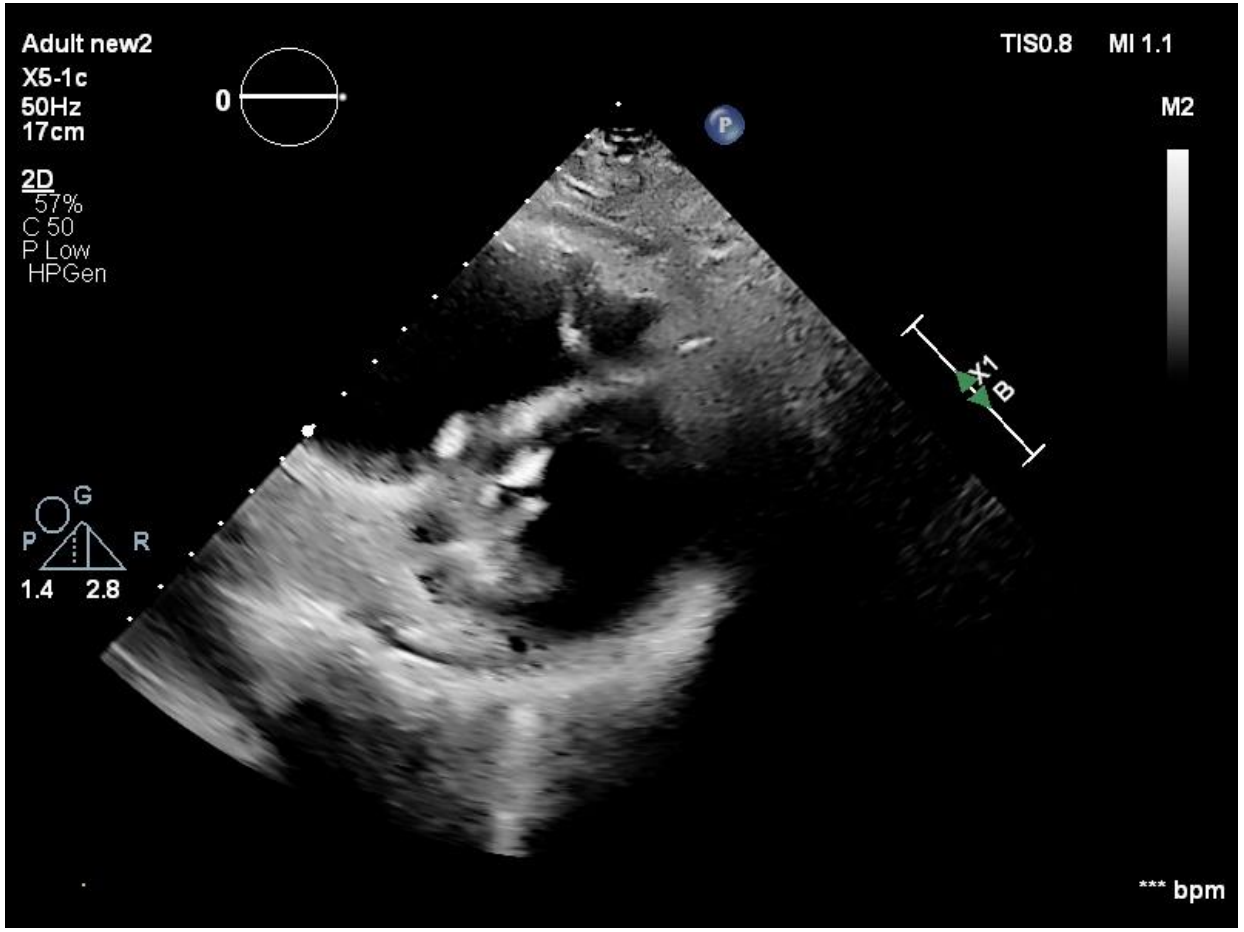
- **ECG : Afib**
- **Laboratory blood tests:**

GFR: 65 ml/ min 1.8m^2,Hb:14 g/dL,Albumin:4 g/dL,
SGOT:33 U/L, SGPT:19 U/L, Pro-BNP:2294 pg/ml

Transthoracic echocardiography after intensive diuretic treatment

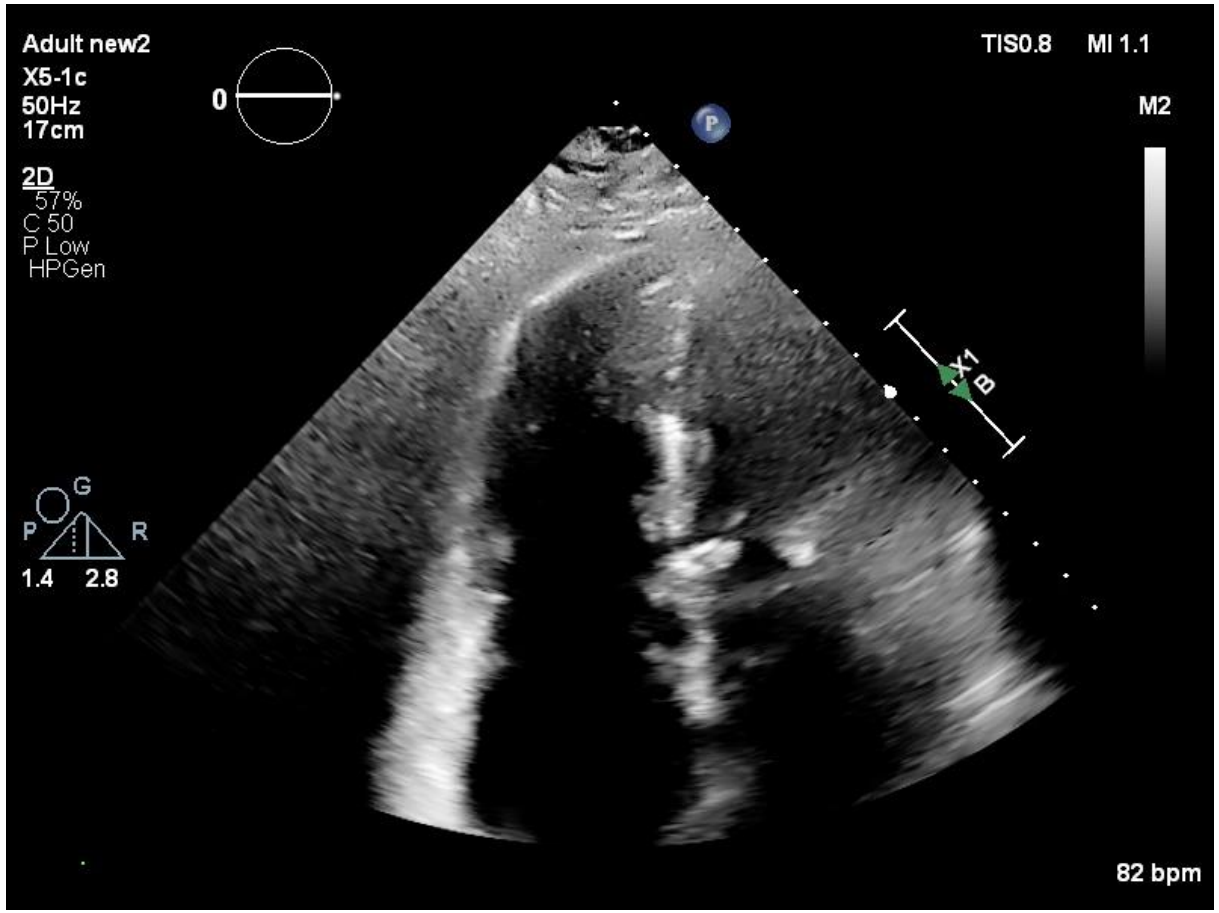


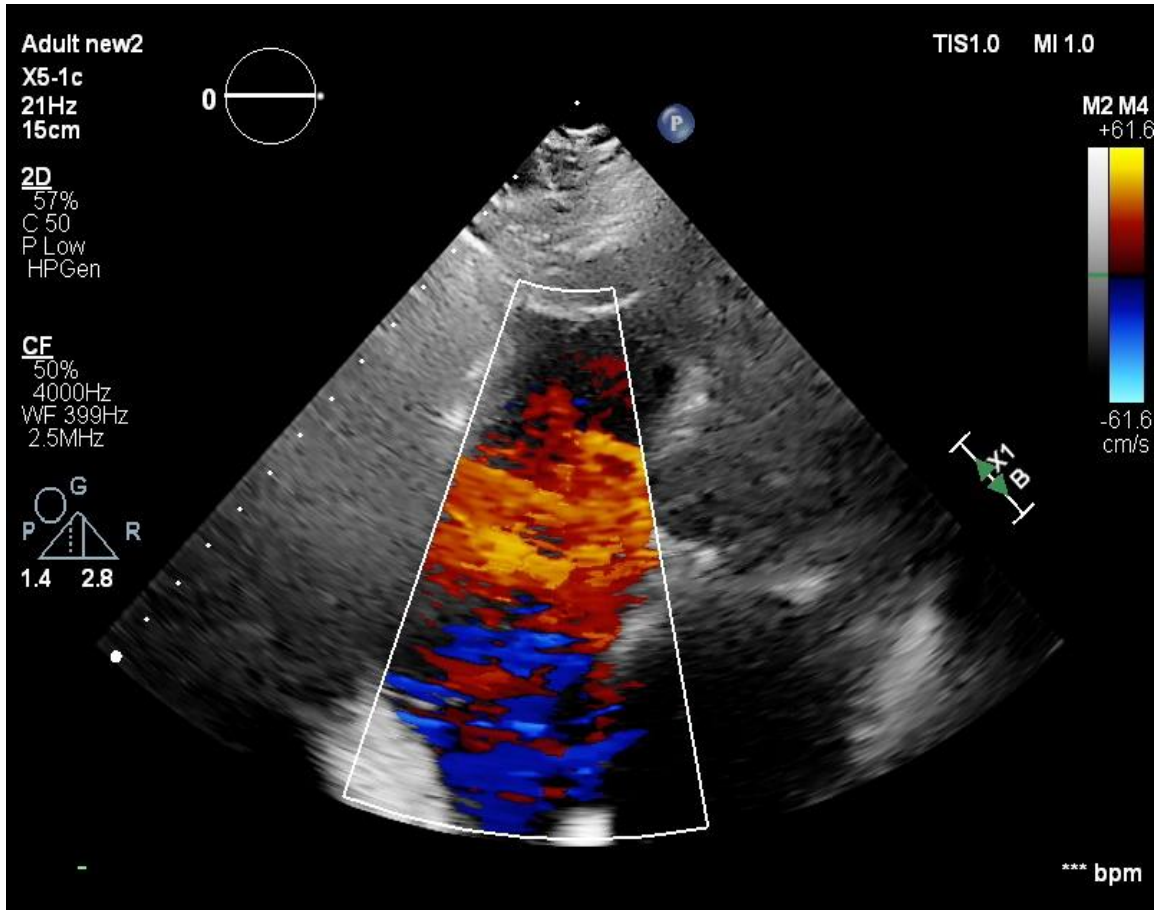
Dilated RV



D- shape configuration of LV

Transthoracic echocardiography after intensive diuretic treatment





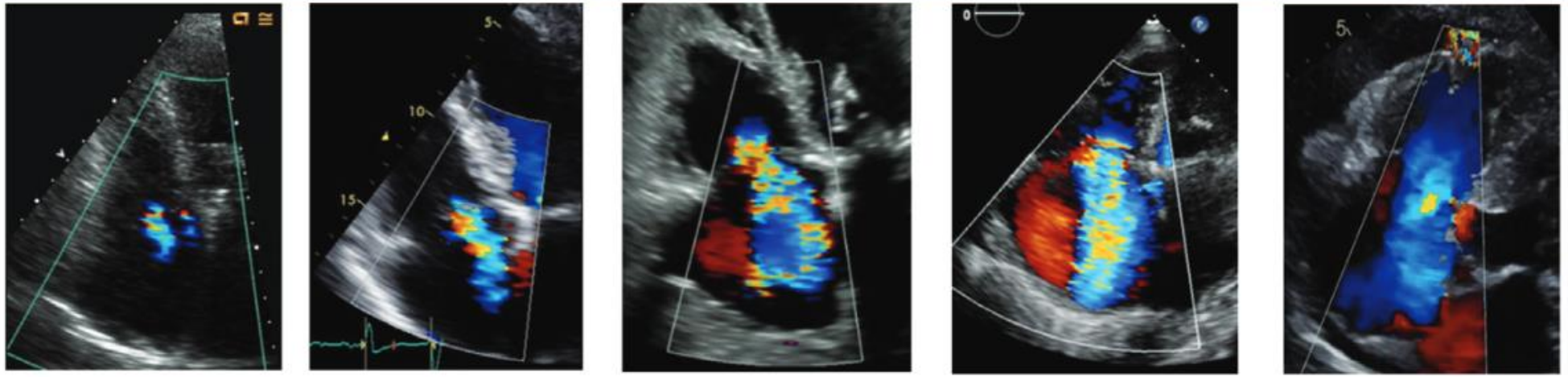
- S'RV 10 cm/sec, TAPSE 18mm

- Vena contracta width 17mm
- PISA radius 12 mm
- EROA 0.75cm^2
- Systolic hepatic vein flow reversal

Grading the severity of tricuspid regurgitation

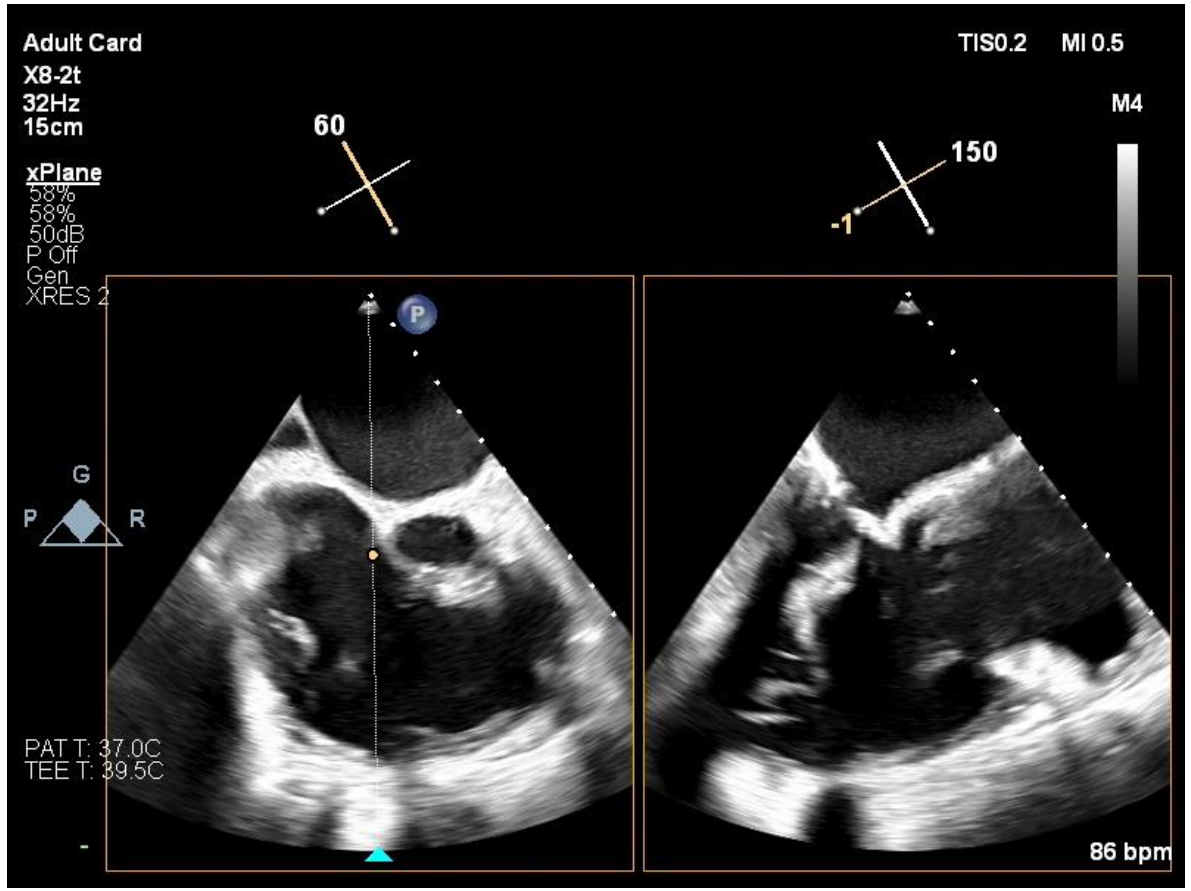
Parameters	MILD	MODERATE	SEVERE	MASSIVE	TORRENTIAL
Vena Contracta width (biplane average)	<3 mm	3-6.9 mm	7 mm - 13 mm	14-20 mm	≥21 mm
EROA by PISA	<20 mm^2	20-39 mm^2	40-59 mm^2	60-79 mm^2	≥80 mm^2
3D Vena Contracta Area or Quantitative Doppler EROA	-	-	75-94 mm^2	95-114 mm^2	≥115 mm^2

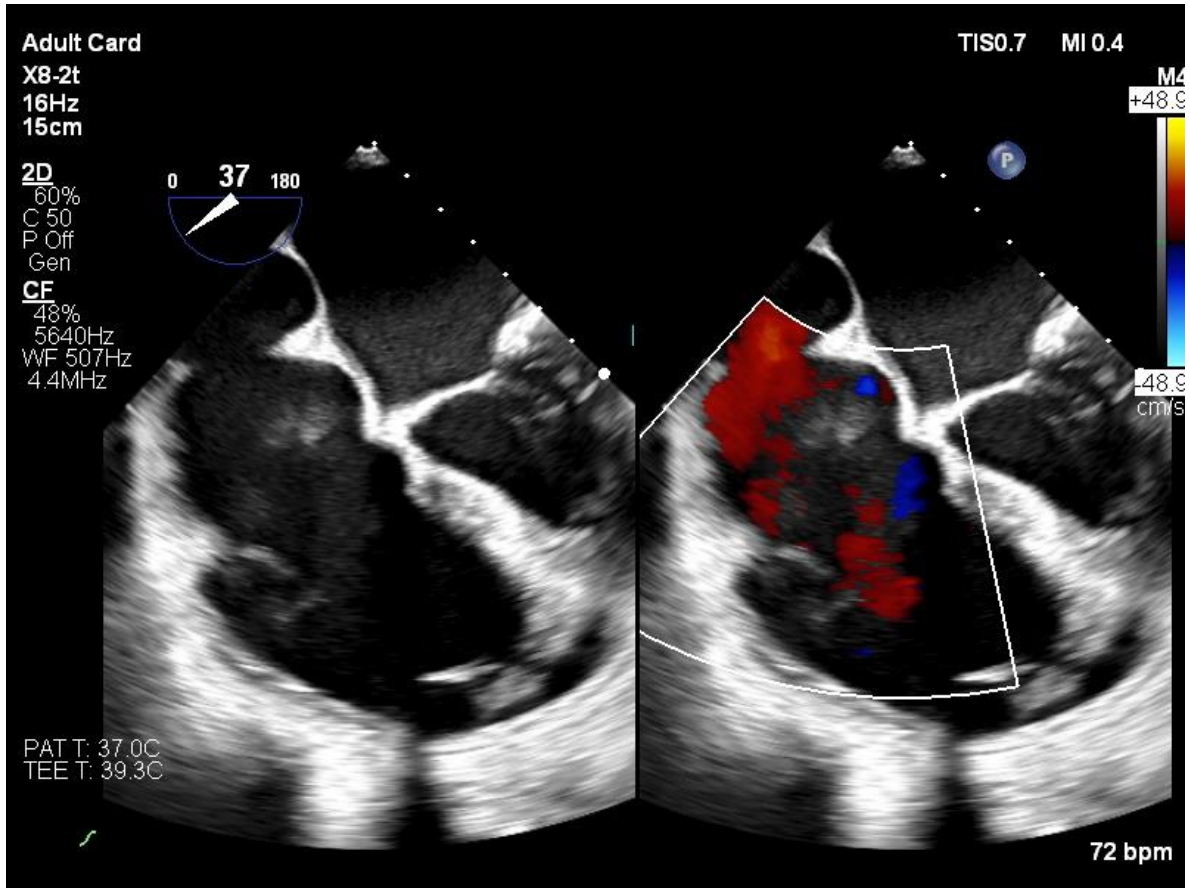
Example:



Hahn R., et al. Imaging Assessment ofTricuspid Regurgitation Severity JACC Cardiovasc Imaging 2019;12(3):469-490

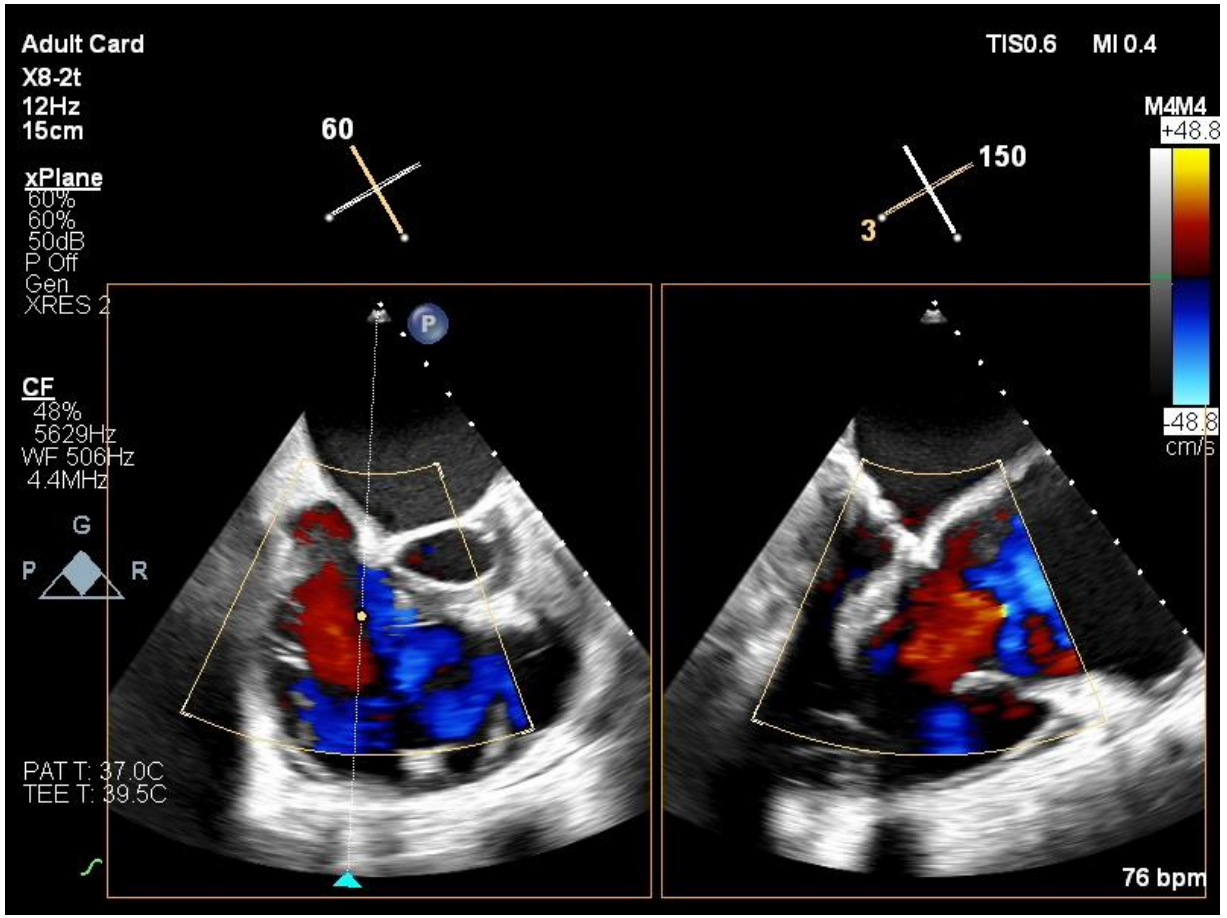
Transesophageal echocardiography after intensive diuretic treatment

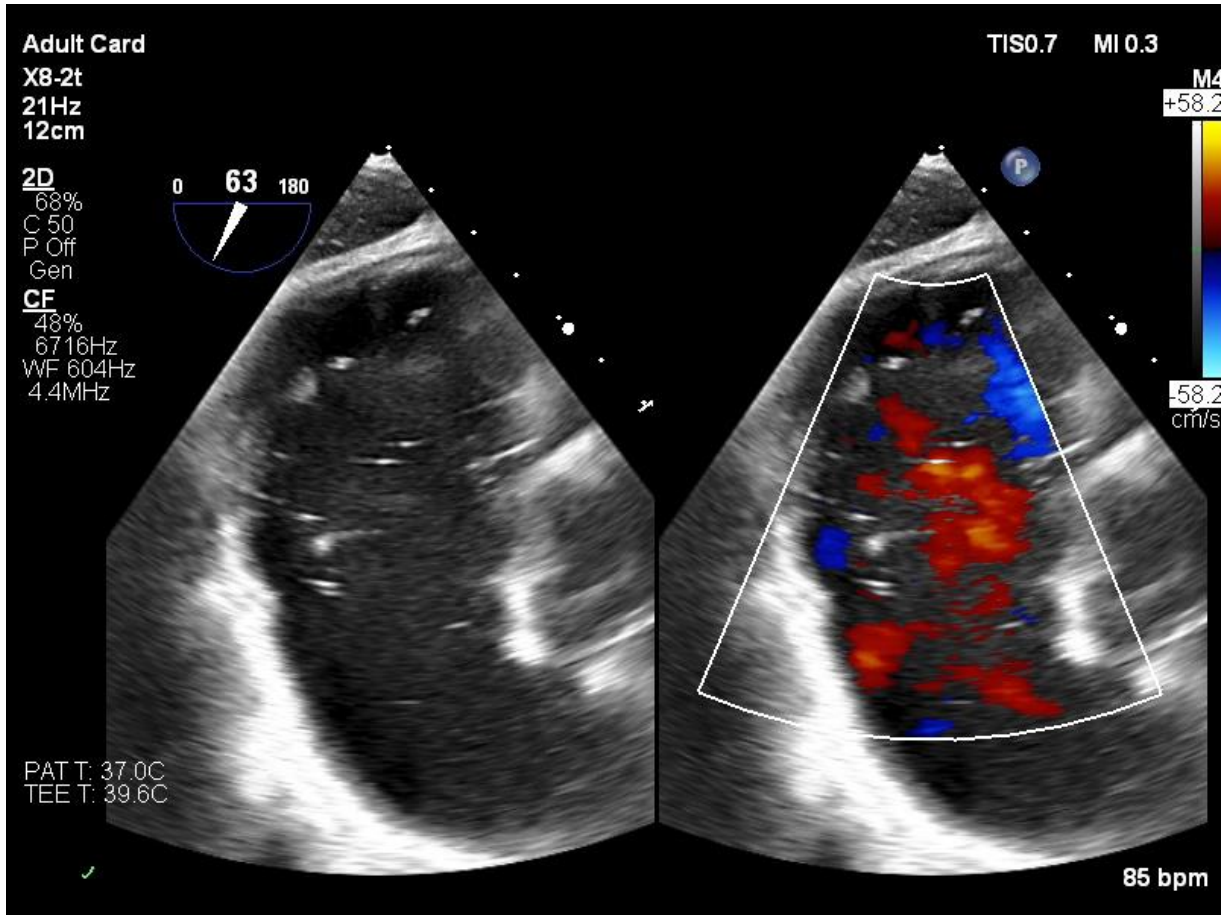




Coaptation Gap (0.7cm)

Transesophageal echocardiography after intensive diuretic treatment



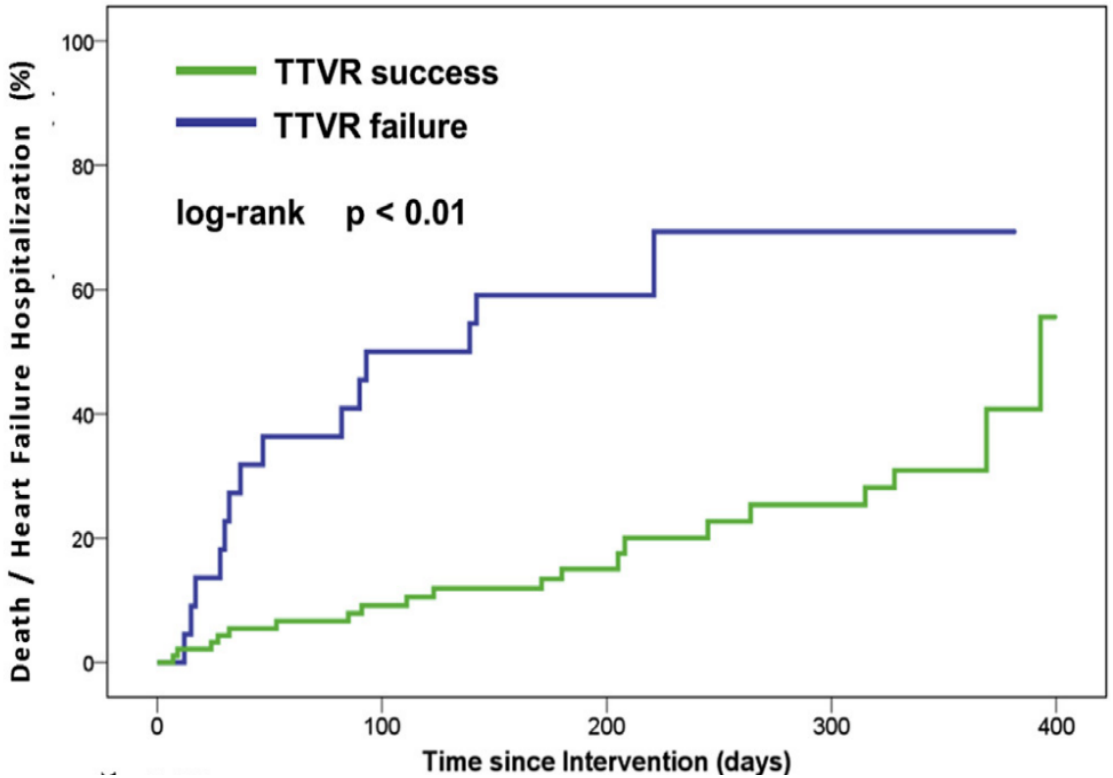


Central TR jet?

Transesophageal echocardiography after intensive diuretic treatment

TABLE 4 Predictors of Procedural Transcatheter TV Repair Success

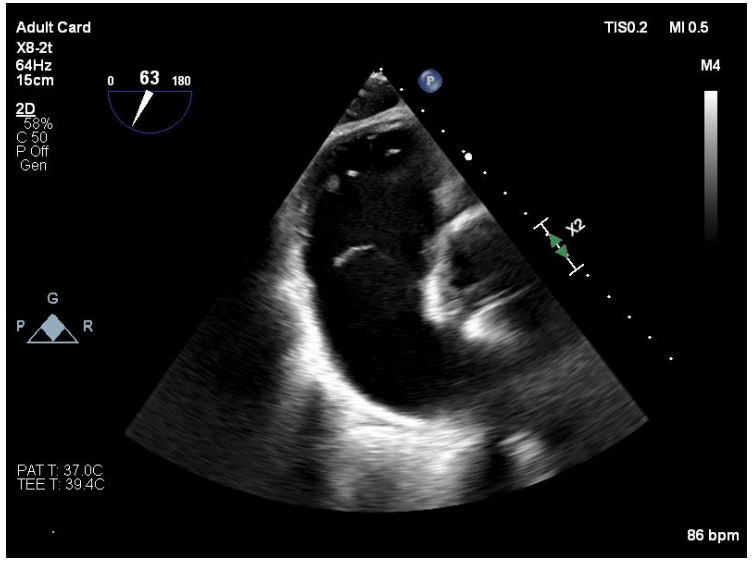
	Univariate		Multivariate	
	Odds Ratio	p Value	Odds Ratio	p Value
TR EROA (PISA)	0.21 (0.06-0.73)	0.01	–	–
TV tenting area	0.65 (0.45-0.94)	0.02	–	–
TR vena contracta	0.87 (0.77-0.99)	0.04	–	–
TV coaptation gap	0.74 (0.63-0.87)	<0.01	0.73 (0.62-0.88)	<0.01
TR jet non-central/ non-anteroseptal	0.22 (0.08-0.62)	<0.01	0.18 (0.06-0.56)	<0.01



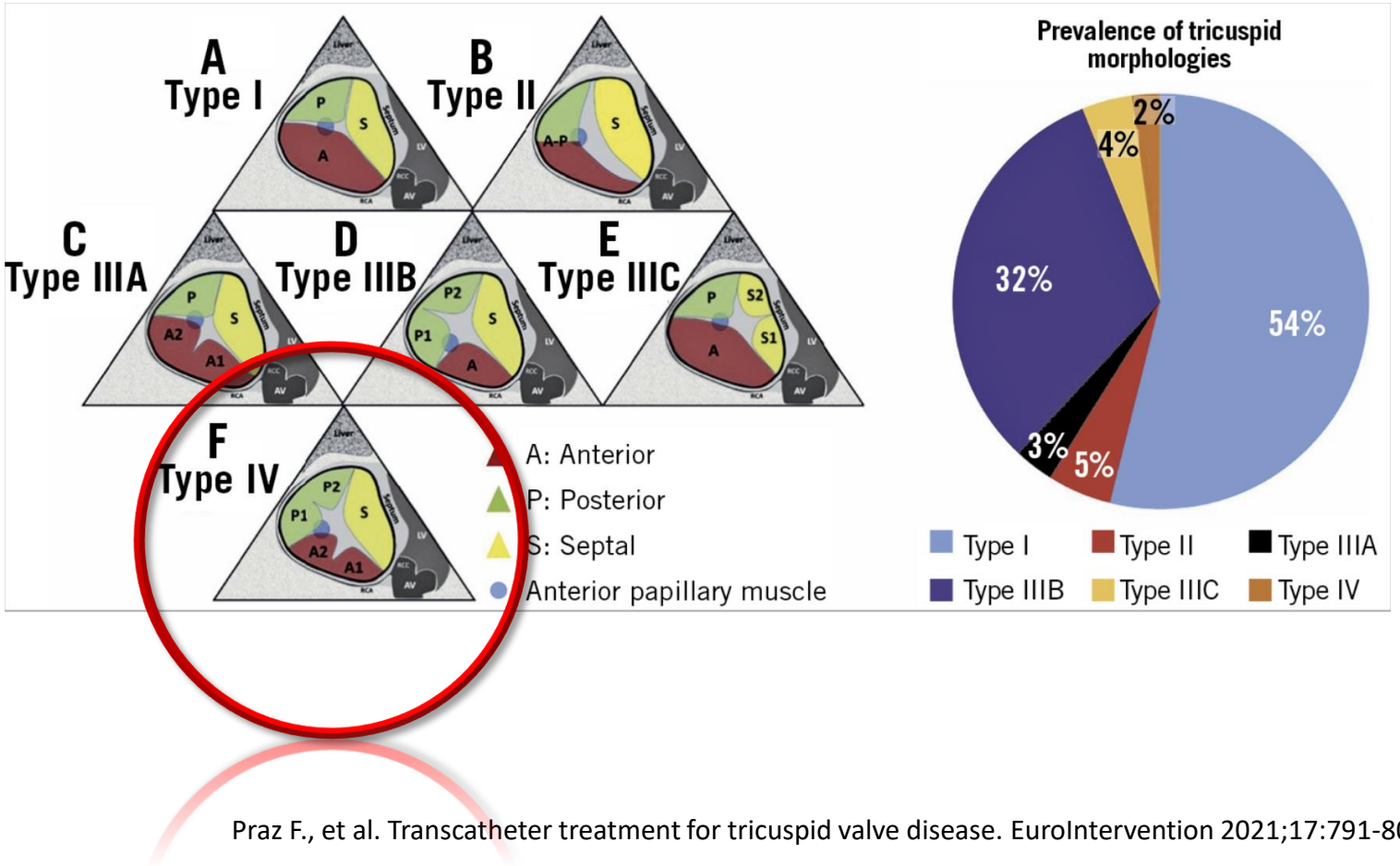
Besler C., et al. JACC Cardiovasc Interventions 2018

5-leaflet tricuspid valve

3D view of TV

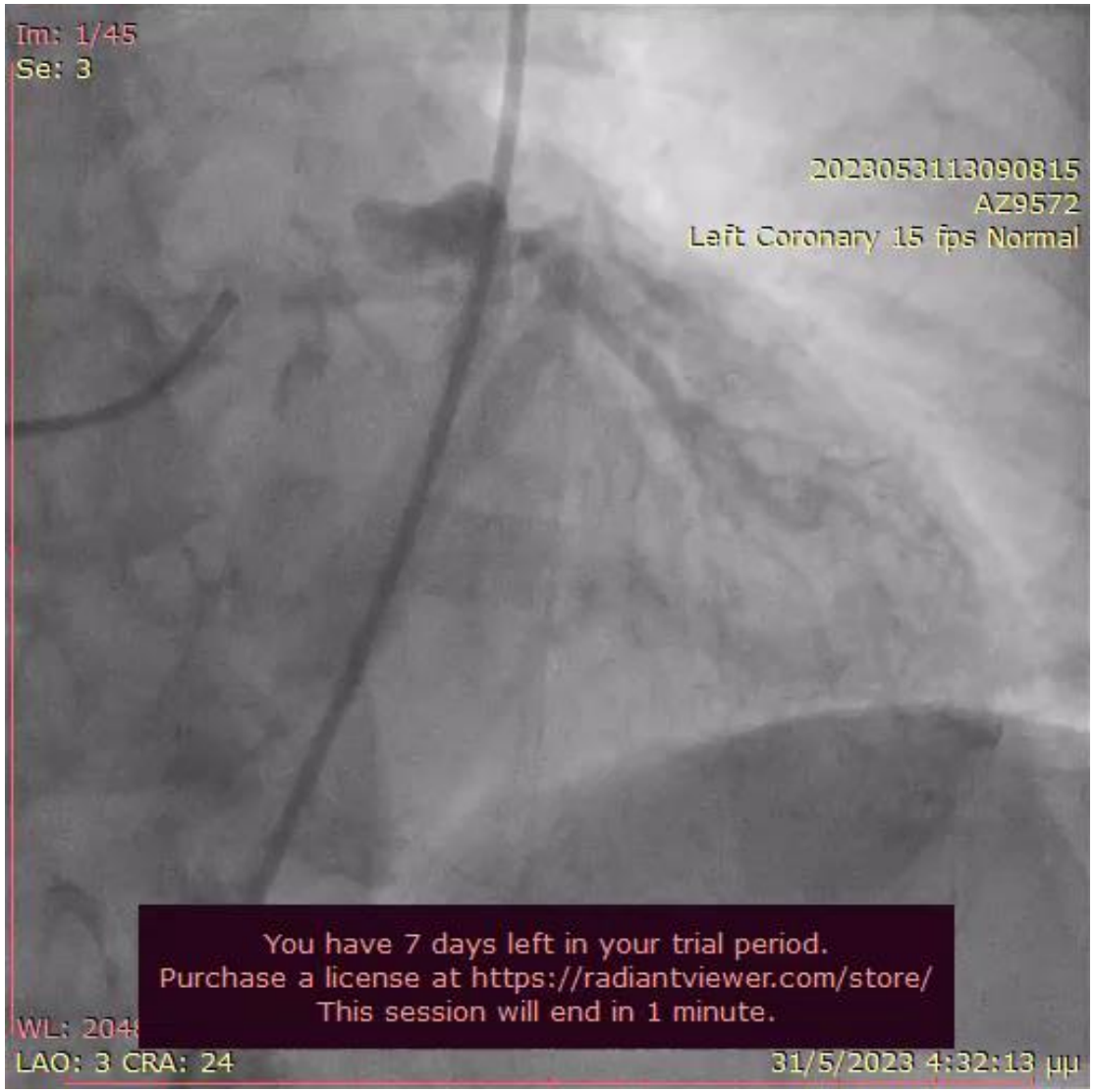


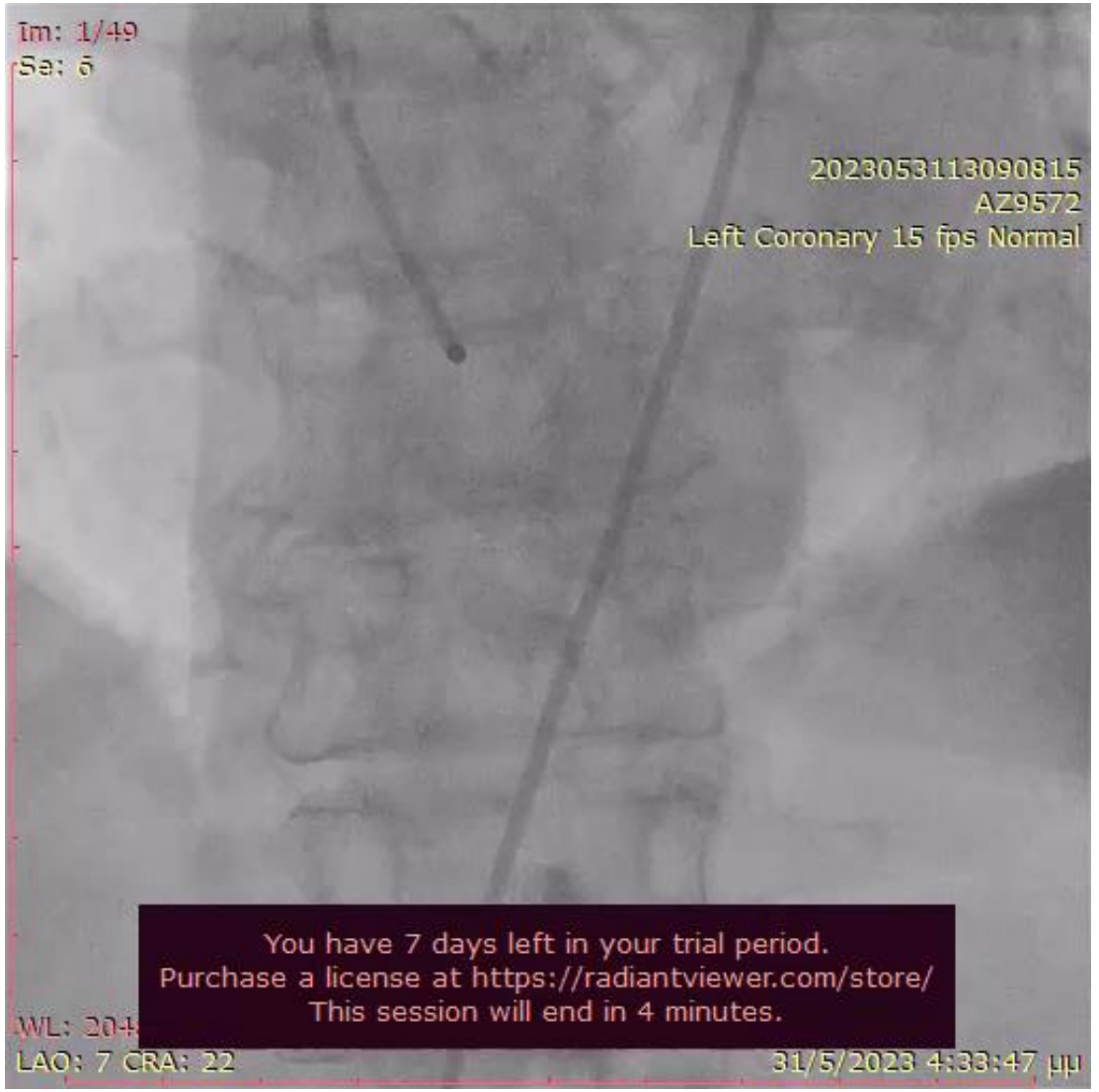
Transgastric view of TV



Praz F., et al. Transcatheter treatment for tricuspid valve disease. EuroIntervention 2021;17:791-808

Coronary catheterization catheterization



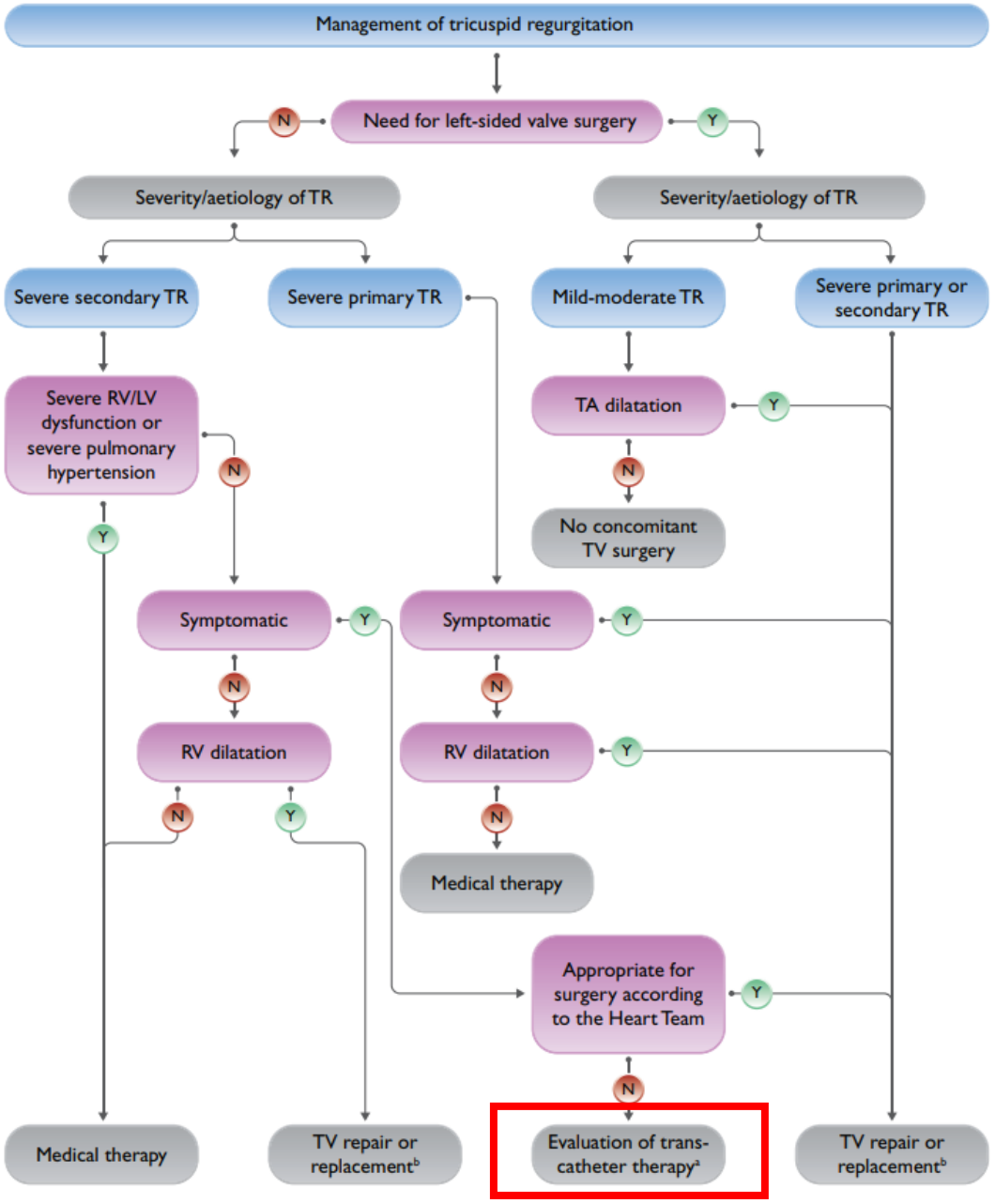


Right heart catheterization

- PCWP: 16mmHg
- PA: 40/18mmHg (Mean pressure 26mmHg)
- RV: 40/9mmHg
- RA: 11mmHg

Αποκλεισμός σημαντικής πνευμονικής υπέρτασης

Heart team assessment



Recommendations on primary tricuspid regurgitation		
Surgery is recommended in patients with severe primary tricuspid regurgitation undergoing left-sided valve surgery.	I	C
Surgery is recommended in symptomatic patients with isolated severe primary tricuspid regurgitation without severe RV dysfunction.	I	C
Surgery should be considered in patients with moderate primary tricuspid regurgitation undergoing left-sided valve surgery.	IIa	C
Surgery should be considered in asymptomatic or mildly symptomatic patients with isolated severe primary tricuspid regurgitation and RV dilatation who are appropriate for surgery.	IIa	C

Recommendations on secondary tricuspid regurgitation		
Surgery is recommended in patients with severe secondary tricuspid regurgitation undergoing left-sided valve surgery.[423–427]	I	B
Surgery should be considered in patients with mild or moderate secondary tricuspid regurgitation with a dilated annulus (≥40 mm or >21 mm/m^2 by 2D echocardiography) undergoing left-sided valve surgery.[423,425–427]	IIa	B
Surgery should be considered in patients with severe secondary tricuspid regurgitation (with or without previous left-sided surgery) who are symptomatic or have RV dilatation, in the absence of severe RV or LV dysfunction and severe pulmonary vascular disease/hypertension.[418,433 e]	IIa	B
Transcatheter treatment of symptomatic secondary severe tricuspid regurgitation may be considered in inoperable patients at a Heart Valve Centre with expertise in the treatment of tricuspid valve disease.[f]	IIb	C

Decision: Transcatheter TV repair

Heart team assessment

The NEW ENGLAND JOURNAL of MEDICINE

RESEARCH SUMMARY

Transcatheter Repair for Patients with Tricuspid Regurgitation

Sorajja P et al. DOI: 10.1056/NEJMoa2300525

CLINICAL PROBLEM

For patients with severe tricuspid regurgitation, transcatheter edge-to-edge repair (TEER) has emerged as a safe and potentially effective treatment option. This percutaneous, transvenous procedure deploys one or more clips to hold the tricuspid-valve leaflets together, thereby reducing regurgitation without the need for cardiac surgery. However, the clinical benefit of tricuspid TEER as compared with medical therapy alone is uncertain.

CLINICAL TRIAL

Design: An international, open-label, randomized, controlled trial evaluated the effectiveness and safety of TEER as compared with medical therapy alone in patients with severe, symptomatic tricuspid regurgitation who were at intermediate or greater surgical risk.

Intervention: 350 patients were assigned to either TEER or medical therapy (control). The primary end point was a hierarchical composite that included death from any cause or tricuspid-valve surgery; hospitalization for heart failure; and an improvement in quality of life as measured with the Kansas City Cardiomyopathy Questionnaire (KCCQ) (≥15-point improvement at 1 year).

RESULTS

Effectiveness: During 1 year of follow-up, the primary outcome favored the TEER group over the control group. The difference between the groups was largely attributable to a significantly greater mean improvement in the quality-of-life score in the TEER group.

Safety: 98% of patients who underwent TEER were free from major adverse events at 30 days, a finding that exceeded the performance goal of the trial (90%).

LIMITATIONS AND REMAINING QUESTIONS

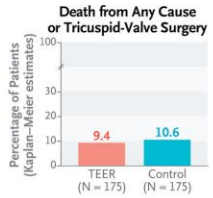
- The open-label nature of the trial could have introduced bias into the interpretation of clinical outcomes.
- The trial was conducted during the Covid-19 pandemic, which could have affected outcomes.
- The results may not apply to patients with hemodynamic or anatomical findings that do not meet the entry criteria used in the trial.

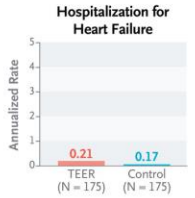
Links: Full Article | NEJM Quick Take | Editorial

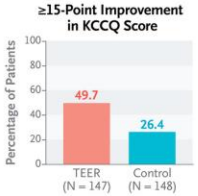
Primary End Point

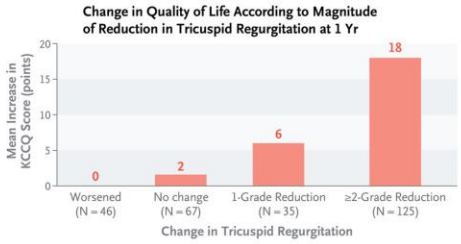
Win ratio, 1.48 (95% CI, 1.06–2.13); P = 0.02

	TEER Group (N = 175)	Control Group (N = 175)
Hierarchical composite — no. of wins	11,348	7643









CONCLUSIONS

In patients with symptomatic, severe tricuspid regurgitation, TEER was safe and was associated with a greater improvement in quality of life than medical therapy alone.

TRILUMINATE study

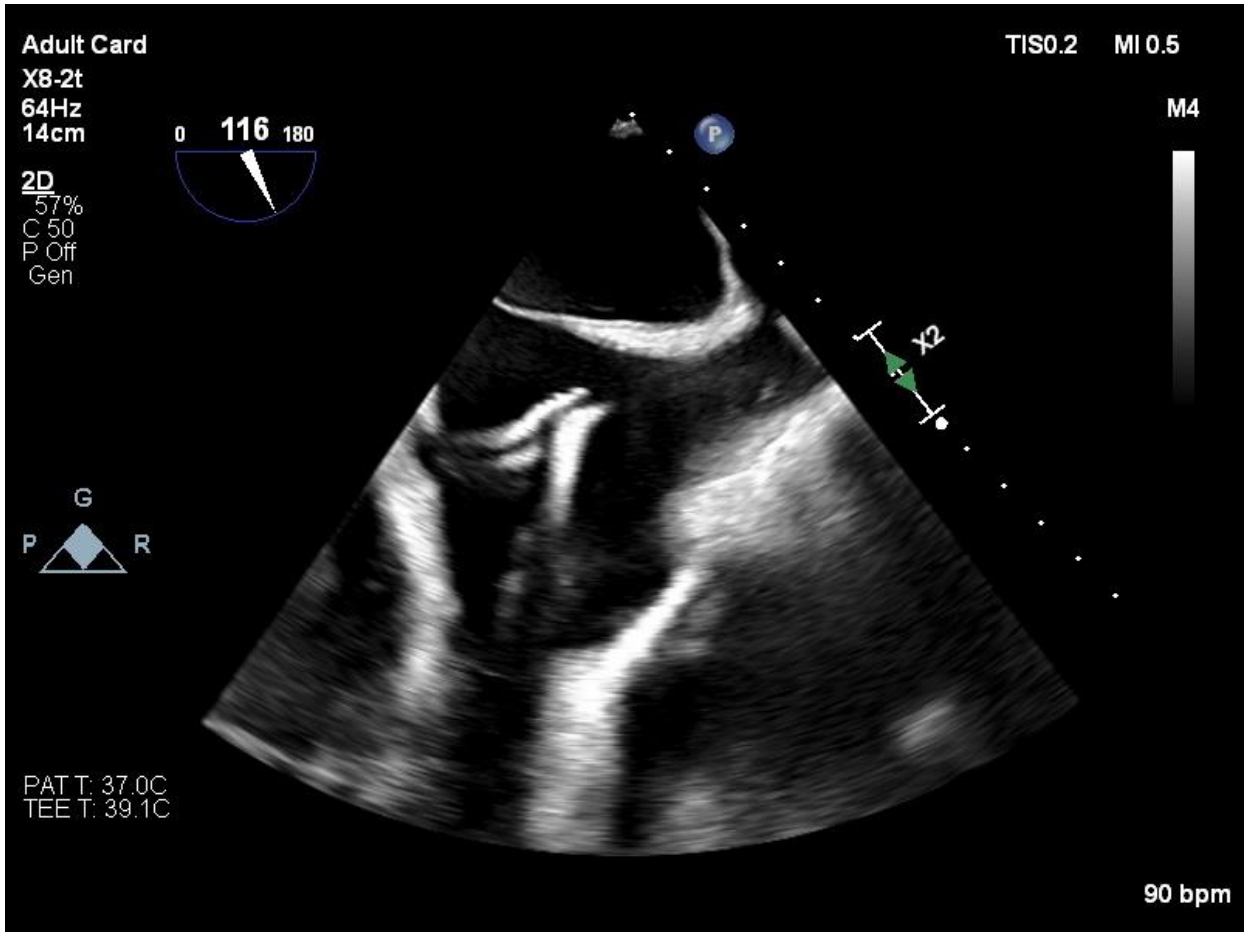
Methods

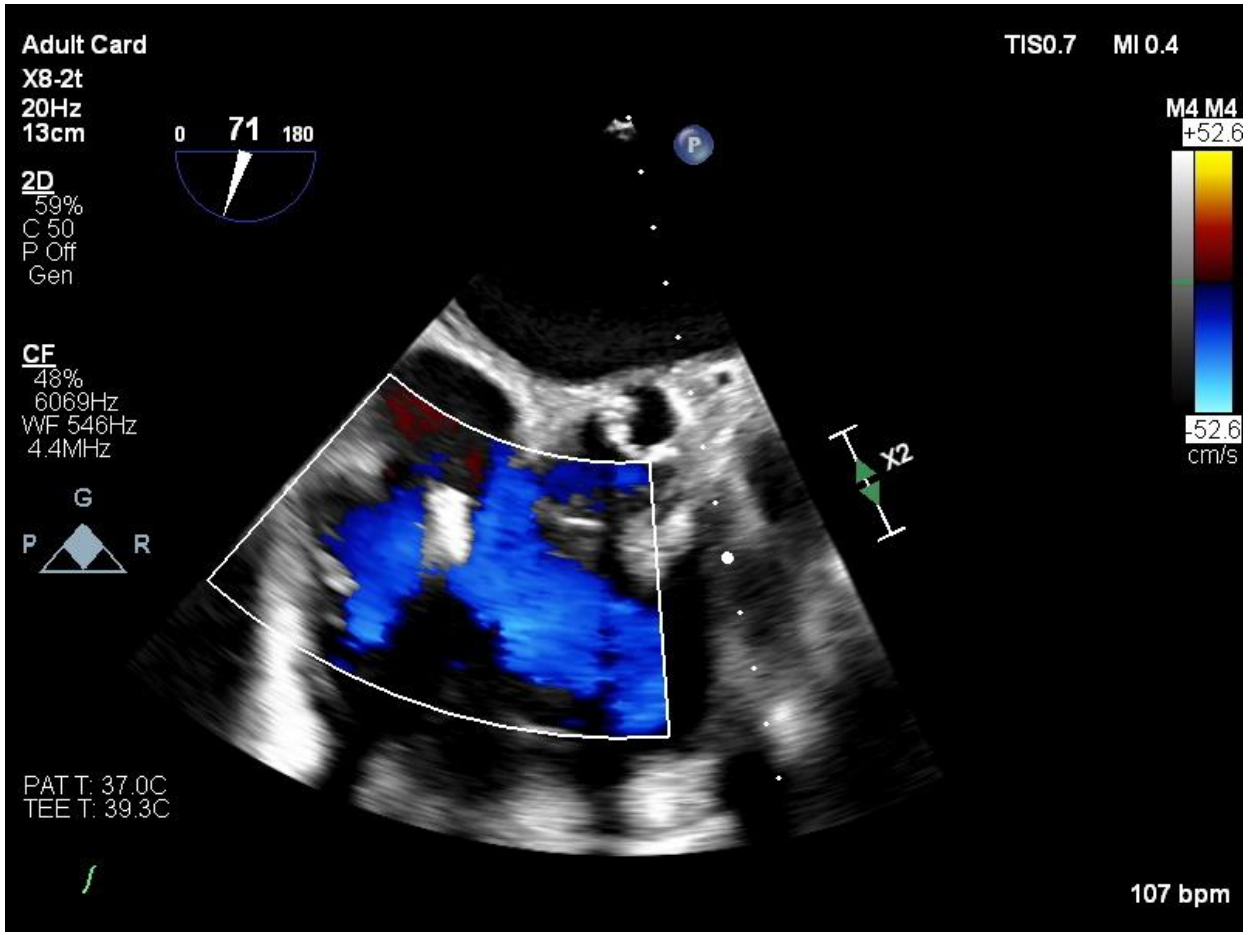
- Open label RCT
- 350 patients
- Multicenter
- TEER vs medical therapy
- Primary endpoint: hierarchical composite of death, HF hospitalization, QoL improvement (KCCQ questionnaire)

Results

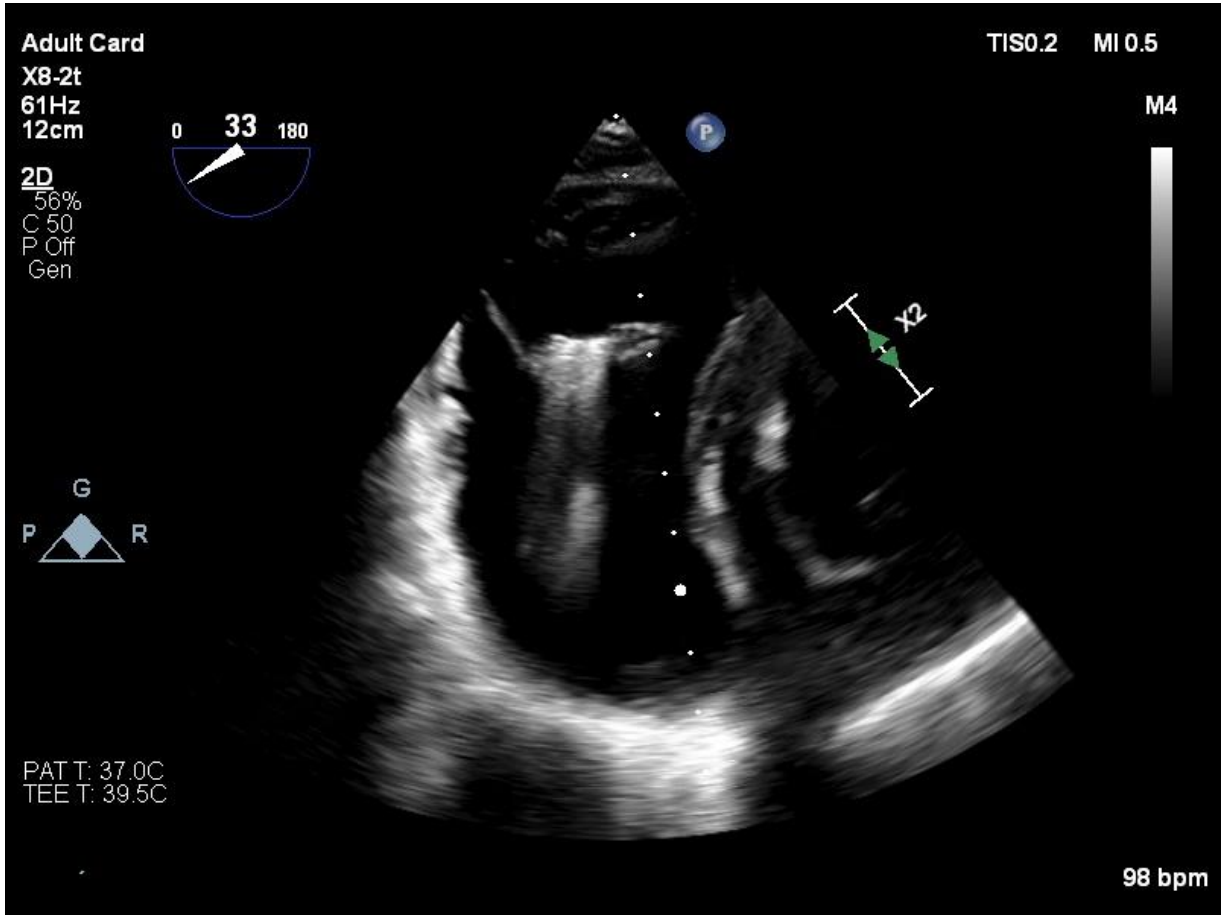
- ✓ Primary endpoint favored TEER
- ✓ Non significant difference in Death and HF hoslitalizations
- ✓ Significantly improved QoL
- ✓ Safety profile: Only 2% had major adverse event

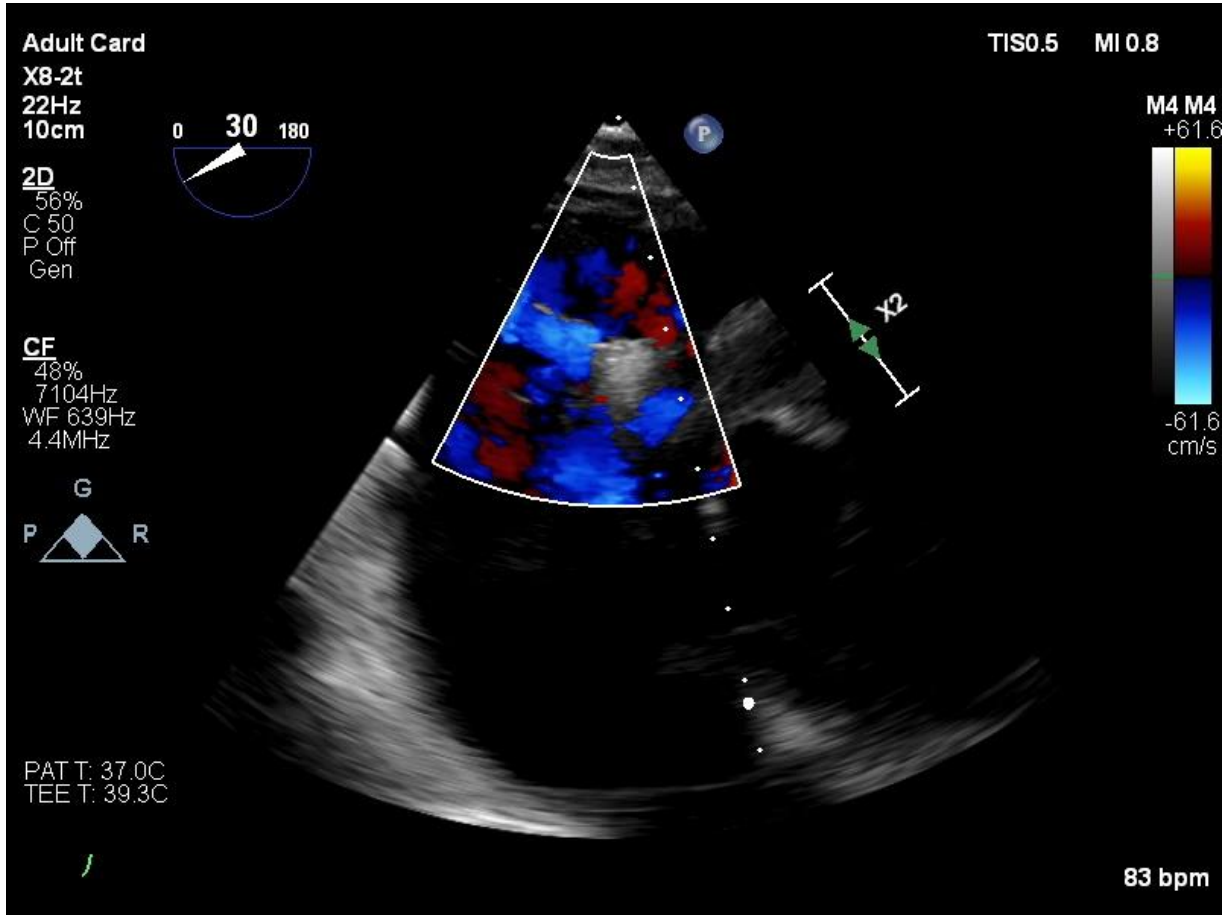
Intraprocedural transesophageal echocardiography



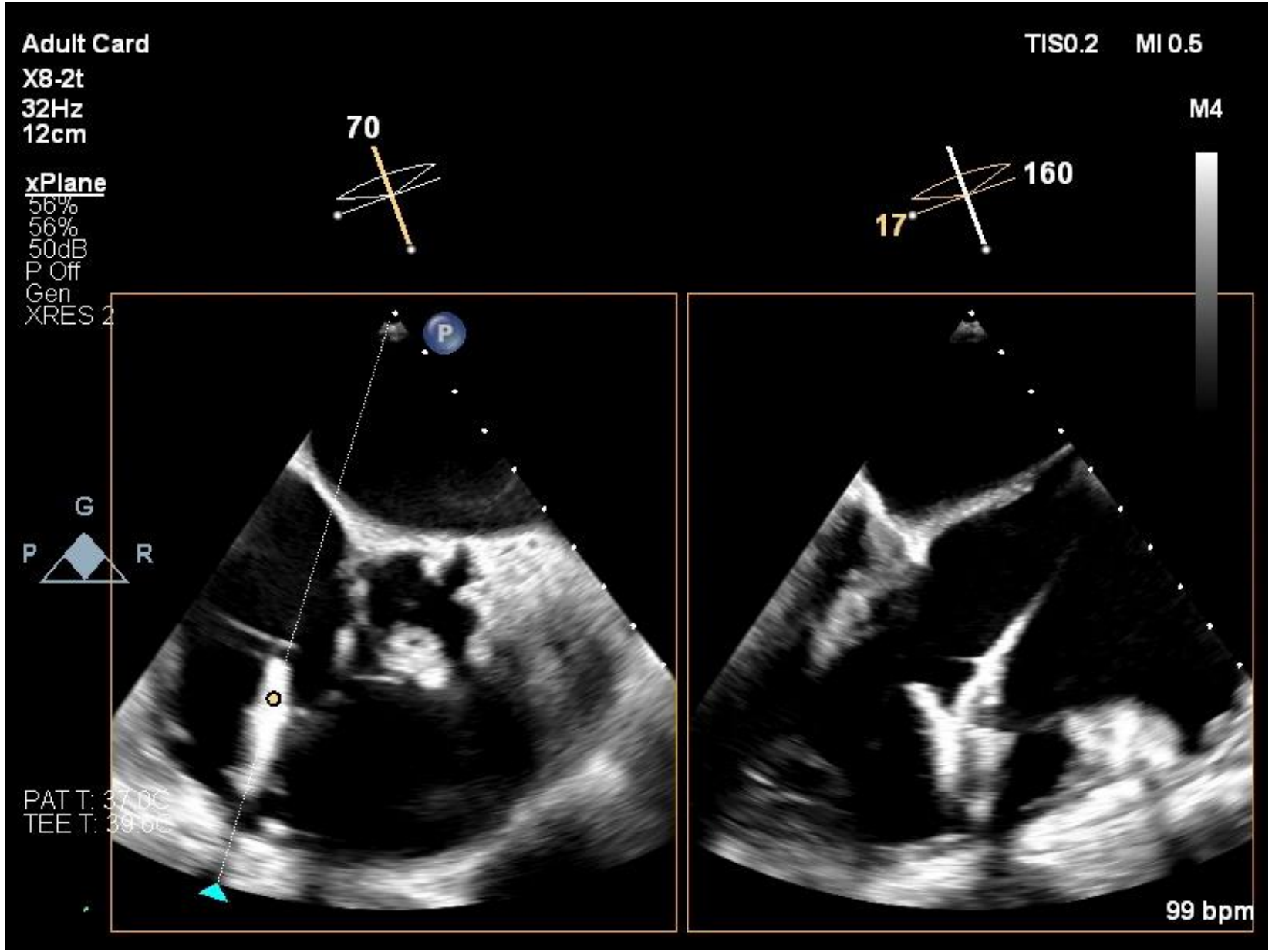


Intraprocedural transesophageal echocardiography

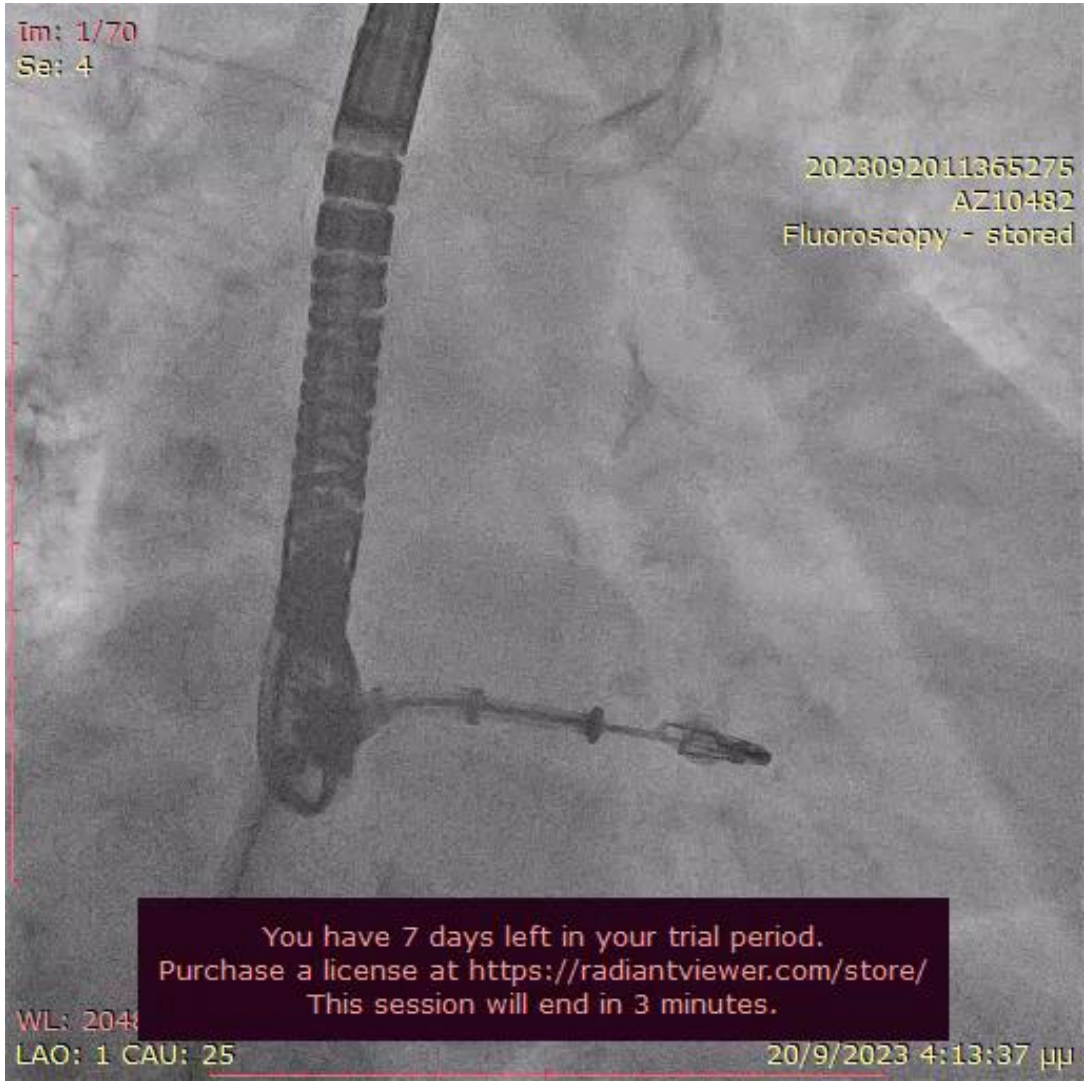




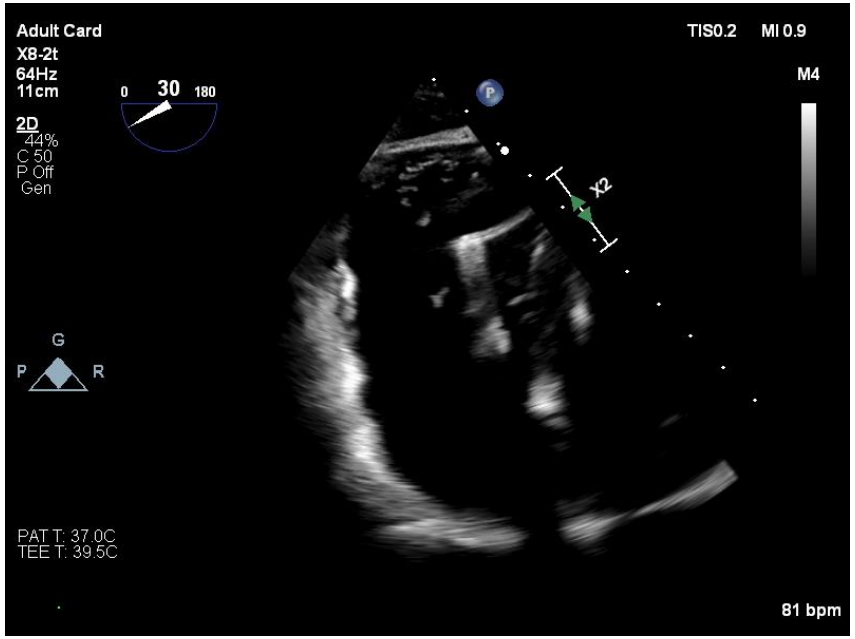
Intraprocedural transesophageal echocardiography

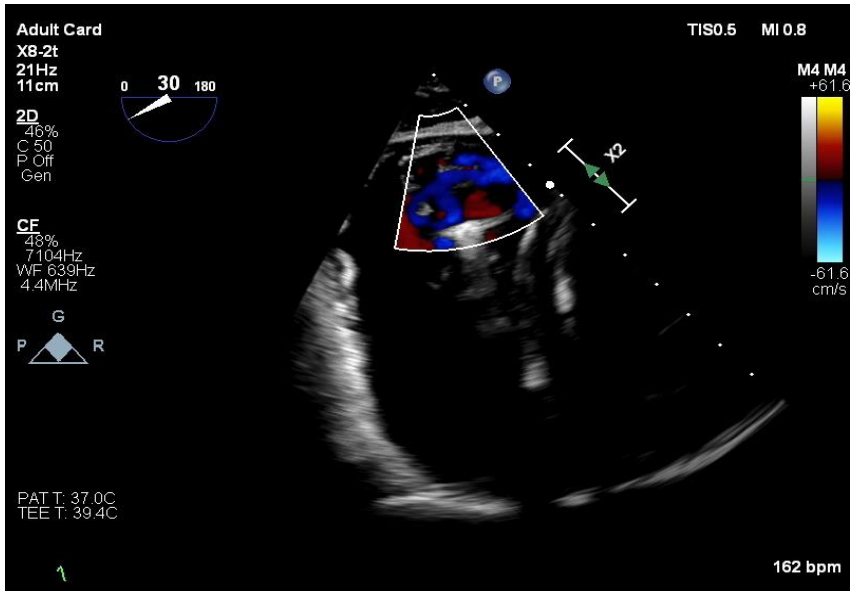


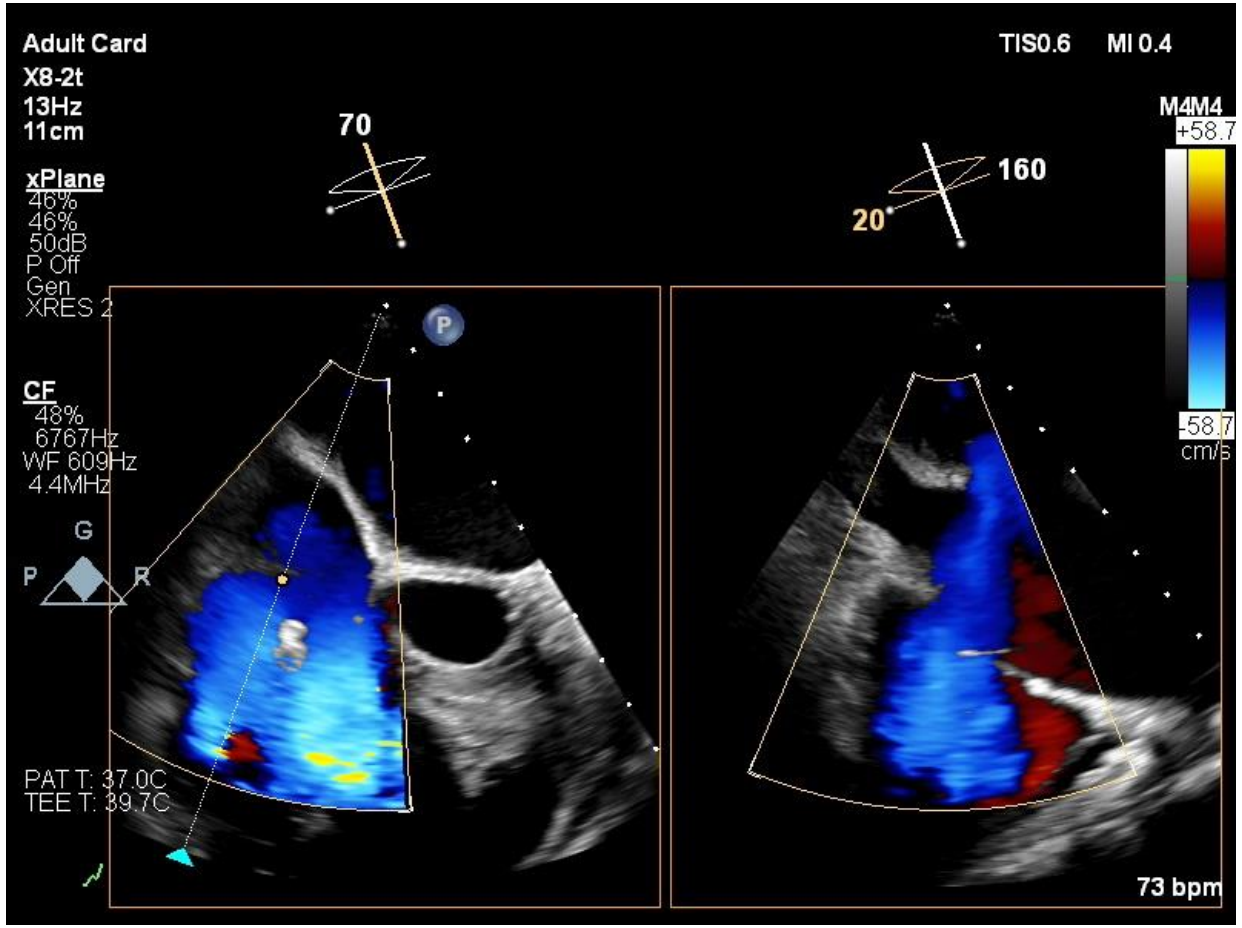
Intraprocedural cath lab images



Final result - Intraprocedural transesophageal echocardiography



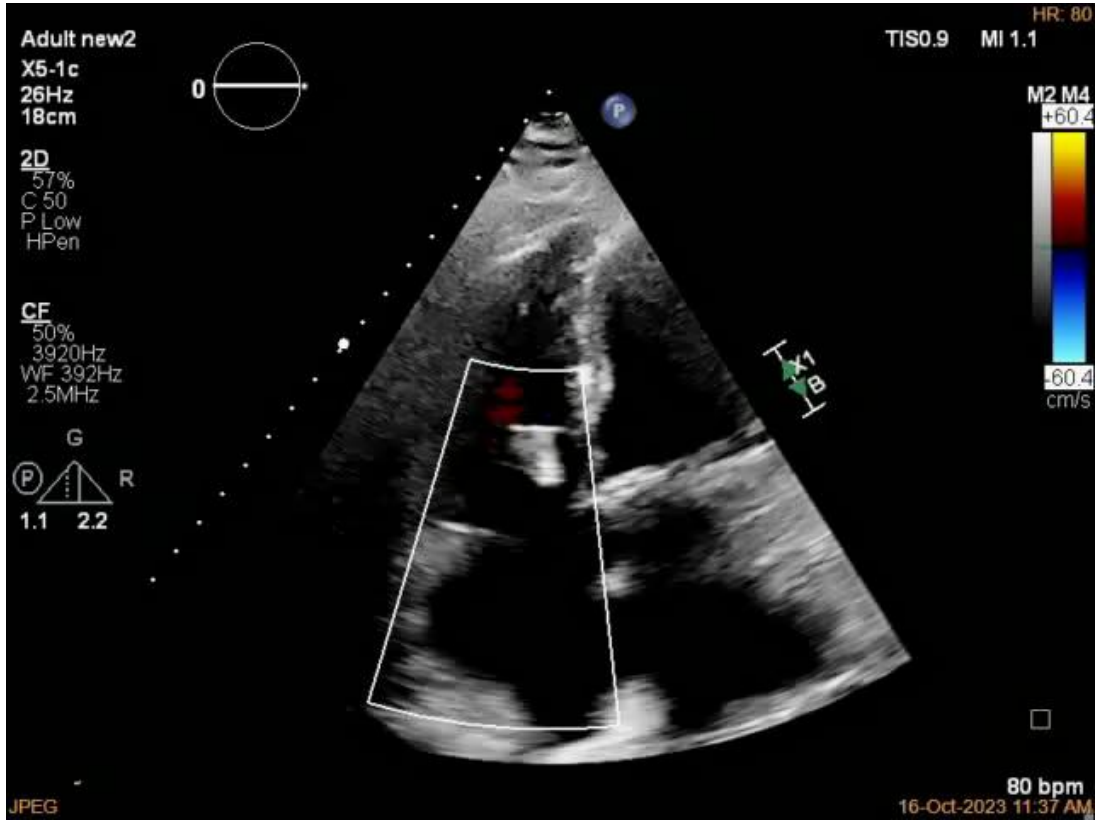




More TR reduction with 1 clip

Patient post-TEER follow up

- Free of symptoms, NYHA I (6 months after discharge)



- Reduction of the grade of tricuspid regurgitation from massive to –mild-moderate
- Reduced size of right ventricle
- PASP 35-40 mmHg

Take – home messages

- ❑ TV has a **complex anatomy** that is highly **variable**
- ❑ **TV evaluation** and **grading TR** should rely on **2D/3D echo**
- ❑ **Transcatheter** treatment has been given **a IIb recommendation** for **inoperable symptomatic** patients with **severe secondary** TR
- ❑ Patient selection is based on **anatomy**, **disease severity,** and **TR mechanism**
- ❑ **Approved devices** already offers a large spectrum of opportunities for treating patients with TR
- ❑ **More RCTs** are needed and experience in specialized centers