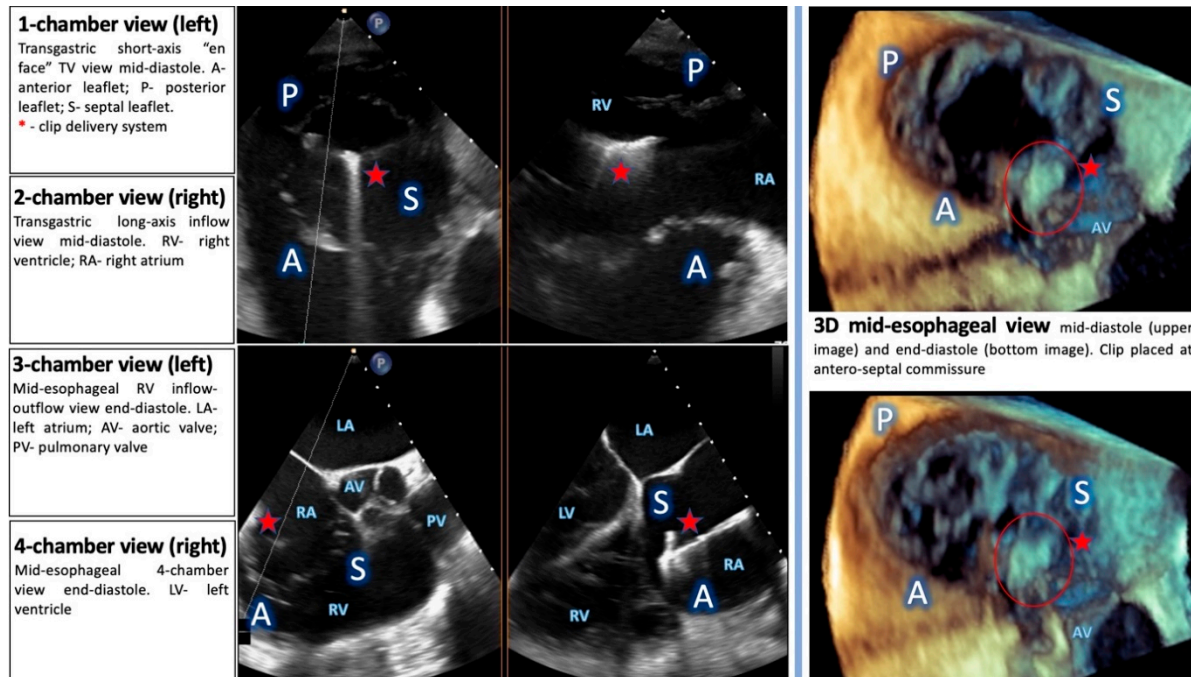


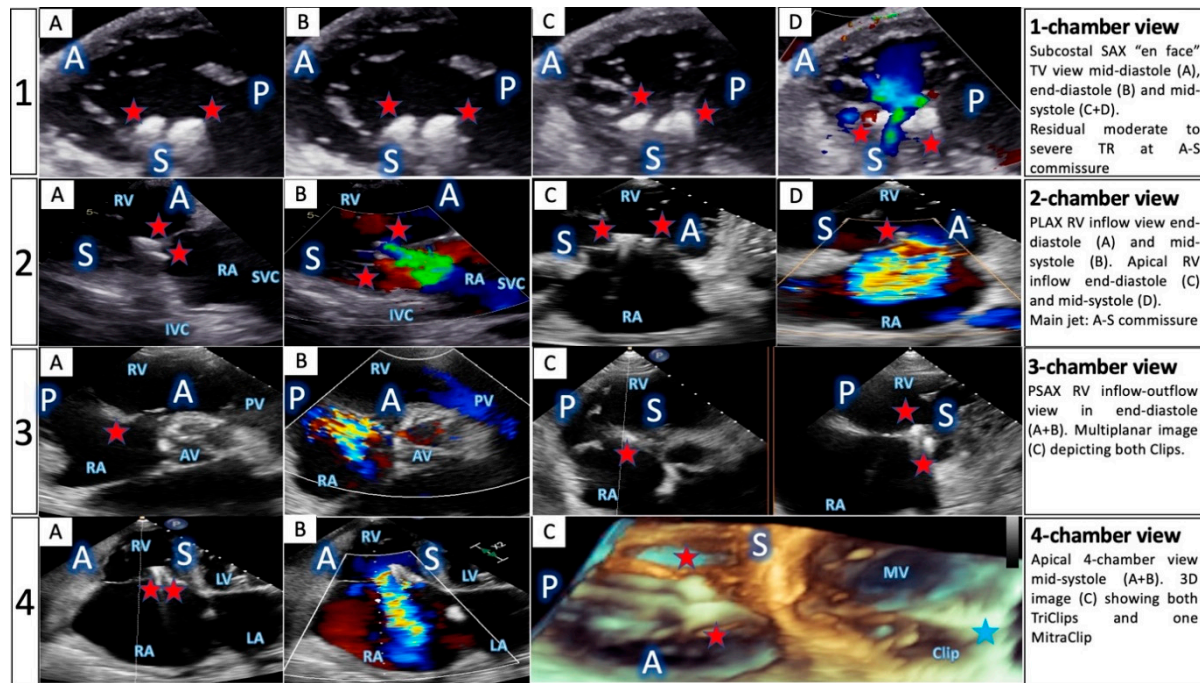
SUPPLEMENTARY MATERIAL

Supplementary Figure S1: TEE periprocedural protocol



Typical periprocedural TEE (transesophageal echocardiography) views during T-TEER, grouped according to the 4 right-sided chamber views. TV: tricuspid valve, RV: right ventricle, RA: right atrium, A: anterior leaflet, P: posterior leaflet, S: septal leaflet, AV: aortic valve, PV: pulmonary valve, LV: left ventricle, *clip delivery system

Supplementary Figure S2: TTE follow-up



Follow-up investigation after T-TEER, based on the concept of the 4 right-sided chamber views in a patient with reduction from torrential to severe TR. A: anterior leaflet, P: posterior leaflet, S: septal leaflet, RV: right ventricle, RA: right atrium, IVC: inferior vena cava, SVC: superior vena cava, AV: aortic valve, PV: pulmonary valve, LV: left ventricle, LA: left atrium, *2xTriClip™, *MitraClip™.

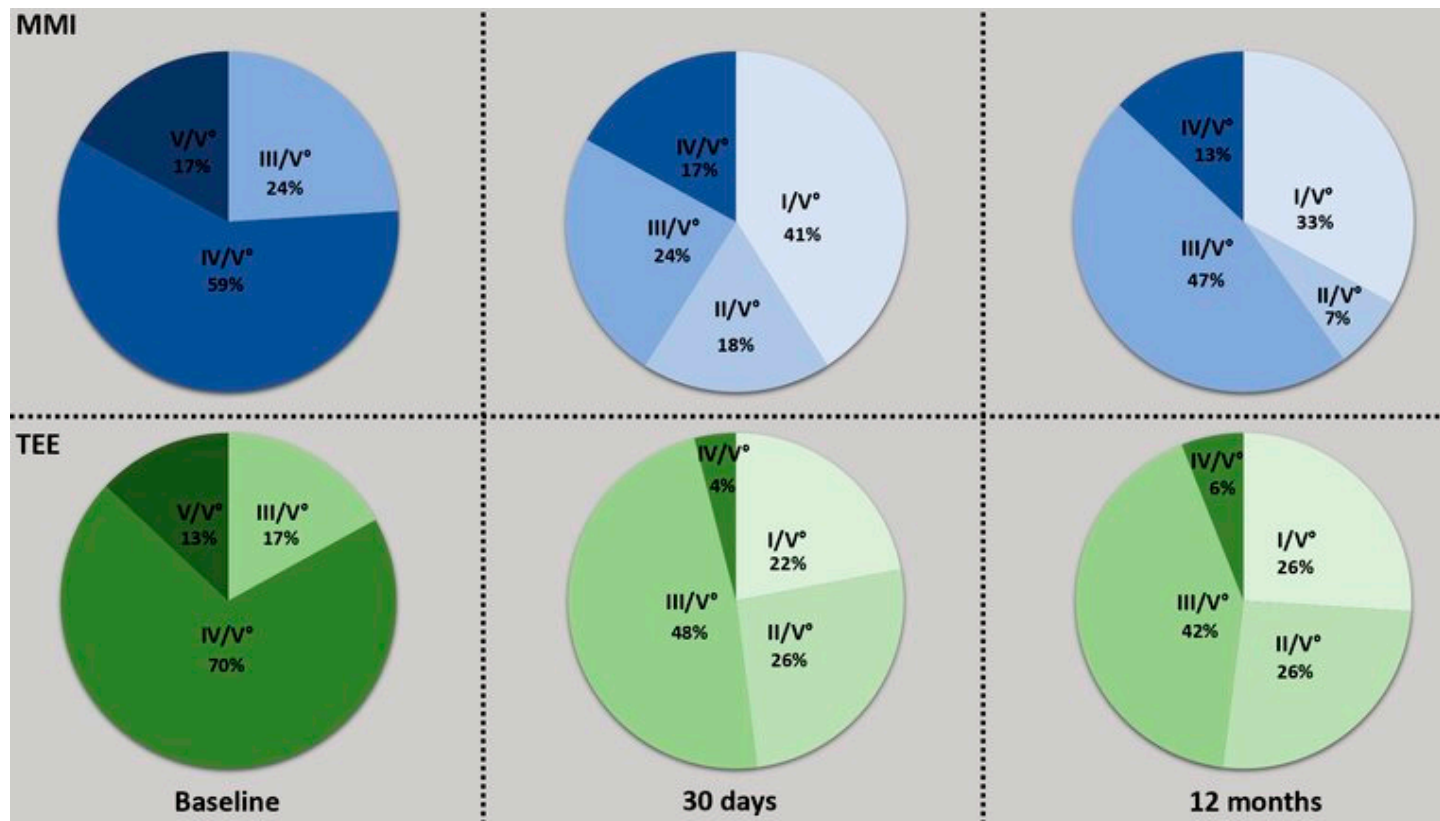
Supplementary Figure S3. Procedural steps of multimodality imaging guidance

Steps	Fluoroscopy Only	Chamber views (fluoroscopy + TTE)				TEE
		1-chamber	2-chamber	3-chamber	4-chamber	
1. Venous access*						
2. SGC advancement to RA						
3. Clip straddle and steering down						
4. Clip positioning and clocking						
5. Clip advancement to RV						
6. Grasping and leaflet insertion						
7. Verification of leaflet insertion						

→ mandatory → helpful → optional

TTE: transthoracic echocardiography; TEE: transesophageal echocardiography; 1- to 4-chamber annotations refer to the 4 right-sided chamber views explained in the imaging and procedural protocols; SGC: steerable guide catheter; RA: right atrium; RV: right ventricle; * ultrasound-guided puncture.

Supplementary Figure S4. TR reduction to baseline



Comparison of regurgitation reduction between the multimodality (MMI) and transesophageal echocardiography (TEE) groups, according to the 5-grade classification (I/V° to V/V°) for tricuspid regurgitation (TR).

Supplementary Table S1: TEE periprocedural protocol

TEE View		Focus	
		Morphology	Guiding
Bicaval view		TV position related to caval veins	Orientation SGC towards TV
Transgastric views	Short axis (RH 1 chamber view)	“en face” TV view	Selecting clip target
	Long axis (RH 2 chamber view)	RV inflow	Clip orientation / perpendicularity to TR jet
Mid-esophageal views	0° (RH 4 chamber view)	SL length, tethering, restriction	SL grasping
	40-90° (RH 3 chamber view)	SL visualization AL vs PL distinction Leaflet length, tethering, restriction	Grasping all leaflets Coaptation gap
	90-130°	SL visualization AL vs PL distinction Leaflet length, tethering, restriction	Grasping all leaflets Coaptation gap
3D-views		Leaflets and commissures CIED leads	Clip orientation

TEE: transesophageal echocardiography, RH: right heart, TV: tricuspid valve, RV: right ventricle, SGC: steering guide catheter, AL: anterior leaflet, PL: posterior leaflet, SL: septal leaflet

Supplementary Table S2. Baseline characteristics (extended)

Characteristic		MMI (n=17)	TEE (n=23)	p-value	Characteristic		MMI (n=17)	TEE (n=23)	p-value
Clinical					Comorbidities				
Age (years)		83.1±4.1	81±5.3	0.182	Atrial fibrillation		16 (94%)	23 (100%)	1.000
Female sex		10 (59%)	10 (44%)	0.595	Pulmonary hypertension		16 (94%)	22 (96%)	1.000
TTE acoustic window	Excellent	17 (100%)	0 (0%)	<0.001	Type 2 diabetes		6 (35%)	10 (43%)	0.773
	Good	0 (0%)	2 (9%)	0.506	Arterial hypertension		17 (100%)	23 (100%)	1.000
	Moderate	0 (0%)	13 (57%)	0.004	Hyperlipoproteinemia		6 (35%)	15 (65%)	0.405
	Poor	0 (0%)	8 (34%)	0.037	Tobacco		2 (12%)	2 (9%)	1.000
BMI (kg/m ²)		22.9±1.1	30.4±3.7	<0.001	COPD		3 (18%)	6 (26%)	0.719
EuroSCORE II (%)		10.1±8.2	8.6±5.6	0.496	CKD stage 3-5		14 (82%)	19 (83%)	1.000
Frailty (indices)		2.5±0.9	2.2±1.1	0.890	Prior stroke / TIA		3 (18%)	5 (22%)	1.000
STS Score MVR (%)		11.1±7.4	10.6±5.9	0.813	Coronary artery disease		8 (47%)	15 (65%)	0.339
STS Score MVR (%)		8.7±7.7	7.8±5.8	0.675	Coronary bypass graft		1 (6%)	2 (9%)	1.000
Major organ compromise		2.5±1.4	2.3±1.1	0.616	Prior myocardial infarction		1 (6%)	5 (22%)	0.380
NYHA class III-IV		15 (88%)	20 (87%)	1.000	Peripheral artery disease		4 (23%)	7 (30%)	1.000
RHF hospitalizations		2.8±0.7	2.5±0.7	0.188	Pacemaker / ICD / CRT		5 (29%)	4 (17%)	0.712
KCCQ Score		32.3±18.7	26.7±14.7	0.295	Prior MV repair	percutaneous	7 (41%)	3 (13%)	0.164
6-minute walk test		183.2±91.3	162.1±94.1	0.482		surgical	1 (10%)	1 (4%)	1.000

Data presented as n (%) or mean ± SD. BMI : body mass index ; EuroSCORE: European System for Cardiac Operative Risk Evaluation Score; STS: Society of Thoracic Surgeons predicted risk of mortality -> calculated based on either isolated mitral valve replacement (MVR) or mitral valve repair (MVR); NYHA: New York Heart Association; RHF: right heart failure; KCCQ: Kansas City Cardiomyopathy Questionnaire; COPD: chronic obstructive pulmonary disease; CKD: chronic kidney disease; TIA: transient ischemic attack; ICD: implantable cardioverter defibrillator; CRT: cardiac resynchronization therapy; MV : mitral valve

Supplementary Table S3. Echocardiographic parameters

Variable	TTE			TEE			TTE vs TEE (Δ)
	Baseline (n=17)	12 months (n=15)	p-value	Baseline (n=23)	12 months (n=19)	p-value	p-value
TR parameters							
PISA EROA (mm ²)	82.1±34.5	33.7±35.7	<0.001	77.5±36	23.8±20.1	<0.001	0.764
Mean vena contracta (mm)	16.2±4.8	7.8±5.5	<0.001	16.8±4.3	6.2±3.2	<0.001	0.542
TR volume (mL/beat)	70.4±22.7	31.8±34.4	<0.001	84.2±36.5	24.2±19.8	<0.001	0.112
PISA (mm)	9.1±1.7	5.9±4.3	0.006	9.5±2.3	5.3±2.8	<0.001	0.940
Jet area (4ch) (cm ²)	18.8±6.7	10.8±9.4	<0.001	17.3±7.5	7.8±4.7	<0.001	0.517
IVC diameter (mm)	24.1±7.7	15.7±7.5	<0.001	23.9±5.8	17.7±6.6	<0.001	0.639
Hepatic vein flow reversal (%)	13 (77%)	4 (27%)	0.120	19 (83%)	1 (5%)	0.001	0.212
Tenting height (mm)	8.5±1.8	--	--	8.5±1.9	--	--	0.492
Coaptation gap	7.7±2.7	--	--	8.1±2.4	--	--	0.325
Right heart remodeling							
RA indexed volume (mL/m ²)	99.3±61.9	58.4±39.9	<0.001	86.1±33.7	39.1±30.4	<0.001	0.882
Base RVEDD (4ch) (mm)	52.1±9.1	48.9±9.3	0.001	55.5±6.8	49.6±7.4	<0.001	0.464
TV annular diameter (mm)	44.1±7.7	41.1±8.7	<0.001	46.1±6.5	41.6±7.1	<0.001	0.101
Ventricular systolic function							

RV TAPSE (mm)	16.1±4.1	20.6±5.2	<0.001	15.7±3.8	19.3±3.4	<0.001	0.702
RV FAC (%)	33.5±7.2	41.8±10	0.023	29.5±8.7	33.3±15.3	0.029	0.469
Annular velocity TDI (cm/s)	9.2±3.2	13.7±4.3	0.023	8.7±1.9	17.3±11.4	0.002	0.729
LV ejection fraction (%)	51.5±12.4	52.6±8.9	0.095	53.9±12.9	54.1±9.9	0.054	0.628
<i>Hemodynamic parameters</i>							
TR peak velocity (cm/s)	311.9±46.9	282.3±33.7	0.008	331.2±40.1	287.6±54.2	<0.001	0.692
PAPs	58±11.7	48.3±7.3	0.015	62.8±10.6	48.4±14.8	<0.001	0.718
LV stroke volume (mL)	54.8±10.6	60.1±9.7	<0.001	54.2±8.8	56.7±10	0.300	0.410
Cardiac output (L/min)	3.9±0.9	4.4±0.7	0.002	3.8±0.9	3.9±0.7	0.501	0.108
RV stroke volume (mL)	60.5±10.9	65.4±10.4	0.001	59.1±10.8	62.2±11.2	0.013	0.261
Data presented as n (%) or mean ± SD. PISA EROA: proximal isovelocity surface area effective regurgitant orifice area; TR: tricuspid regurgitation; ch: chamber; IVC : inferior vena cava ; RA: right atrium; RVEDD: right ventricular end-diastolic diameter; TV: tricuspid valve; TAPSE: tricuspid annular plane systolic excursion; FAC: fractional area change; TDI: tissue doppler imaging; LV: left ventricle; PAPs: pulmonary systolic artery pressure							

VIDEO LEGENDS

Video S1. One-chamber TTE view

Video illustration of the 1-chamber right heart view in a patient with massive tricuspid regurgitation (Figure 1), containing the 2D subcostal short axis and the 3D “en face” tricuspid valve visualization derived from subcostal, apical or parasternal views.

Video S2. TTE screening for the 4 right-sided chamber views

Video compilation matching Figure 1 (Main text)

Video S3. Procedural steps of MMI guided T-TEER

Video sequence matching Figure 4 (Main text)