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Mitral Transcatheter Edge-to-Edge Repair: A Single Centre Experience

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Introduction: Mitral transcatheter edge-to-edge repair (M-TEER) has become an established alternative for patients with severe mitral regurgitation (MR) and high surgical risk, with clinical trials showing fewer heart failure hospitalizations and symptomatic improvement, and a survival benefit in selected patients with secondary MR.[1,2] A real-world data from Croatian centers remain limited.

Patients and Methods: We retrospectively analyzed data from patients that underwent the M-TEER procedure at our institution between January 2022 and early October 2026. Baseline clinical, laboratory, and echocardiographic parameters were compared with post-procedural and follow-up values using the Wilcoxon signed-rank and McNemar tests.

Results: A total of 50 patients underwent an attempted procedure, with successful device implantation in 42 (84%). The patient and procedure flow are reported in **Table 1**. The median age of the successfully implanted cohort was 74 years [interquartile range, IQR 67-80], and 64% were men. Further baseline characteristics of the cohort are presented in the **Table 2**. Most patients had secondary MR (83%), while primary MR accounted for 17%. A heart failure (HF) hospitalization in the preceding year occurred in 52% of patients. At discharge, residual MR was mild-to-moderate or less in 83% of patients, with a reduction of at least two grades in 68%, and a median transmitral gradient of 3.0 mmHg [IQR 2.6-3.6 mmHg]. During a median follow-up of 23 months (IQR 9–39), NYHA class improved significantly ($p<0.001$), **Figure 1**, with 96% of patients in NYHA class I–II, and accordingly two-thirds of patients

TABLE 1. Patient and procedure flow.

	n
Patients who underwent M-TEER	50
Total procedures	54
Successful procedures	45 (83%)
Unsuccessful procedures	9 (17%)
Cardiac tamponade	1
Procedure not initiated due to unfavorable anatomy	3
Inadequate leaflet grasping	2
Prohibitive transmitral gradient	1
Unfavorable device trajectory	2
Successful clip implantation	42 (84%)
Patients without a clip implanted	8 (16%)
Repeat procedure	4 (8%)
After cardiac tamponade at the first procedure	1
Re-clip	3

Abbreviations: M-TEER, mitral transcatheter edge-to-edge repair.

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TABLE 2. Baseline characteristics of patients with successful mitral transcatheter edge-to-edge repair (n = 42).

Characteristic	Value
Demographics	
Age, years	74.0 [67.3–79.8]
Male sex	27 (64%)
BMI, kg/m²	26.1 [23.7–29.9]
Clinical status	
NYHA class	
I	3 (7%)
II	23 (55%)
III	15 (36%)
IV	1 (2%)
≥1 HF hospitalization in previous 12 months	22 (52%)
MR etiology	
Secondary	35 (83%)
Atrial functional MR	8 (19%)
Primary	7 (17%)
Echocardiography	
LVEF, %	41 [35–55]
LVEF ≤ 40%	21 (50%)
LVEDs, mm	45 [40–53]
EROA, cm² [n=35]	0.45 [0.40–0.60]
LAVi, mL/m² [n=38]	72 [58–90]
sPAP, mmHg [n=37]	50 [40–65]
TR moderate-to-severe or worse [n=35]	20 (57%)
Laboratory values prior to the procedure	
NT-proBNP, pg/mL	3542 [1383–6979]
Creatinine, µmol/L	130 [100–173]
eGFR, mL/min/1.73 m²	43.5 [31.8–59.6]
eGFR < 60 mL/min/1.73 m²	31 (74%)
Hemoglobins, g/L [n=41]	128 [120–141]
Medical therapy before screening	
Beta-blocker	37 (88%)
ACEi	16 (38%)
ARB	2 (5%)
ARNI	12 (29%)
MRA	30 (71%)
SGLT2 inhibitor	26 (62%)
Loop diuretic	39 (93%)
Furosemide dose, mg/day	80 [40–125]
Optimal GDMT	19 (45%)

Continuous variables are presented as median (interquartile range); categorical and ordinal variables as n (%). Where data were incomplete, the number of patients with available data is shown in brackets.

Abbreviations: ACEi, angiotensin-converting enzyme inhibitors; ARB, angiotensin II receptor blockers; ARNI, angiotensin receptor/neprilysin inhibitor; BMI, body mass index; eGFR, estimated glomerular filtration rate; EROA, effective regurgitant orifice area; GDMT, guideline-directed medical therapy; HF, heart failure; LAVi, left atrial volume index; LVEDs, left ventricular end systolic pressure; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonists; MR, mitral regurgitation; M-TEER, mitral transcatheter edge-to-edge repair, n, number; NYHA, New York Heart Association; NT-proBNP, N-terminal pro b-type natriuretic peptide; SGLT2, sodium-glucose cotransporter-2; sPAP, systolic pulmonary artery pressure; TR, tricuspid regurgitation.

TABLE 3. Procedural results and follow-up (n = 42).

	Value
Procedure	
Waiting time, screening to implantation, days	98 [72–142]
Total number of clips implanted	58
Repeat procedure	4 (10%)
At discharge	
Residual MR	
None/trace	6 (14%)
Mild	12 (29%)
Mild-to-moderate	17 (40%)
Moderate-to-severe	7 (17%)
MR reduction ≥ 2 grades [n=41]	28 (68%)
Mean transmitral gradient, mmHg [n=21]	3.0 [2.6–3.7]
Follow-up	
Follow-up duration, months [n=36]	23 (9–39)
MR ≤ moderate at last echocardiogram [n=34]	23 (68%)
NYHA class I–II, paired [n=26]	15 (58%) → 25 (96%)
Optimal GDMT at discharge	31 (74%)
≥1 HF hospitalization after M-TEER [n=38]	10 (26%)
HF hospitalization rate, per patient-year	0.83 → 0.15 (p < 0.001)
Subjective improvement [n=37]	25 (68%)
All-cause death [n=38]	4 (11%)
Composite MACE [n=38]	15 (39%)

Continuous variables are presented as median (interquartile range); categorical and ordinal variables as n (%).

Abbreviations: GDMT, guideline-directed medical therapy; HF, heart failure; MACE, major adverse cardiovascular event; MR, mitral regurgitation; M-TEER, mitral transcatheter edge-to-edge repair; n, number; NYHA, New York Heart Association.

reported subjective improvement. Systolic pulmonary artery pressure decreased from 50 to 38 mmHg (p<0.001). The annualized HF hospitalization rate fell from 0.83 to 0.15 per patient-year (**Figure 2**). The proportion of patients on optimal guideline-directed medical therapy increased from 45% to 74% (p=0.002). Four patients (11%) died during follow-up, none attributed to heart failure, and the composite major adverse cardiovascular event (MACE) rate was 39%. Procedural results and the follow-up information are available in the **Table 3**.

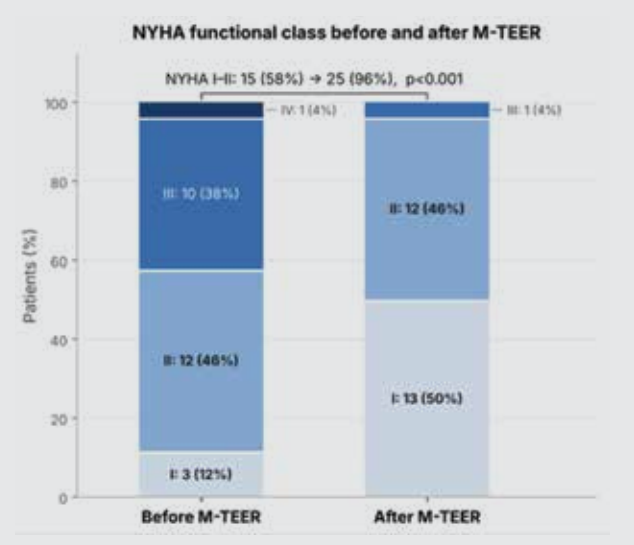

FIGURE 1. Distribution of New York Heart Failure Association functional class before mitral transcatheter edge-to-edge repair, and at last follow-up (medium follow-up 23 months, interquartile range 9-39) in 26 patients with paired data. The proportion of patients in New York Heart Failure Association class I-II increased from 58% to 96% (p<.001, Wilcoxon signed-rank test).

Abbreviations: M-TEER, mitral transcatheter edge-to-edge repair; n, number; NYHA, New York Heart Association.

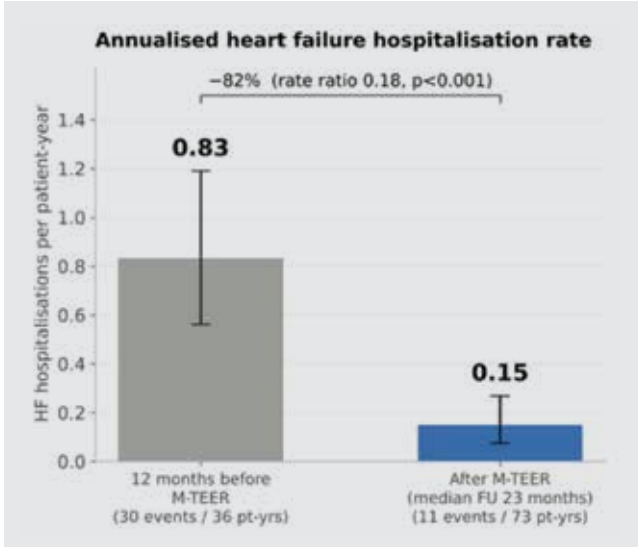

FIGURE 2. Annualized heart failure hospitalization rate in the 12 months before mitral transcatheter edge-to-edge repair, and during a median follow-up of 23 months (interquartile range 9-39). The rate fell from 0.83 to 0.15 per patient-year, an 82% reduction (rate ration 0.18; p<.001, exact Poisson test).

Abbreviations: FU, follow-up; HF, heart failure; M-TEER, mitral transcatheter edge-to-edge repair; pt-years, patient-years.

Conclusion: The M-TEER program was initiated at our institution in 2022, and since then we have achieved high procedural success in an elderly population with predominantly secondary MR. Our results show significant MR reduction, improved functional status, lower pulmonary pressures, and a marked reduction in HF hospitalizations.

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