NYHA class IV in patients with degenerative mitral regurgitation undergoing transcatheter edge-to-edge repair: Results of the worldwide, multicenter PRIME-MR registry

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Background: Patients with degenerative mitral regurgitation (DMR) presenting with resting dyspnoea (New York Heart Association [NYHA] class IV), particularly in cases of acute onset or rapid deterioration, constitute a high-risk cohort with significant implications for preprocedural planning. This study aims to assess whether preprocedural NYHA class IV is associated with adverse events and outcomes in DMR patients undergoing Transcatheter mitral edge-to-edge repair (TEER), by analyzing data from the PRIME-MR registry.

Methods: PRIME-MR, a retrospective, investigator-initiated, multicenter registry, comprises patients who underwent TEER for relevant DMR in 24 high-volumes centres between 2008 and 2022. The primary objective was to evaluate the outcomes of patients with resting dyspnoea (defined as NYHA class IV at baseline) and compare these to patients presenting with NYHA class II or III.

Results: In this analysis, 1,941 consecutive patients (median age: 81 years [IQR 76; 85]; 46.8% female; mean STS Mortality Score [mitral repair]: 5.0% ± 3.9) with available follow-up data were included (median follow-up time 2.56 years [95%-confidence interval 2.39; 2.47]). Of these patients, 323 (16.6%) presented with NYHA class IV at baseline. There were no differences at baseline in terms of median left ventricular ejection fraction (NYHA IV: 58% [IQR 50; 64] vs. NYHA II/III: 60% [IQR 50; 65]; p=0.30) or right ventricular function, measured by TAPSE (NYHA IV: 19mm [IQR 15; 22] vs. NYHA II/III: 19mm [IQR 16; 23]; p=0.088). DMR severity was comparable between the groups (effective regurgitation orifice area [EROA]: NYHA IV 0.5cm² [IQR 0.4; 0.7] vs. NYHA II/III: 0.4cm² [IQR 0.3; 0.6]; p=0.052). The main pathology differed between both groups, with higher proportions of flails in patients with NYHA IV (57.3% [n=142] vs. NYHA II/III: 48.4% [n=674]; p=0.013). NYHA class IV patients had higher median levels of baseline NT-proBNP (NYHA IV: 3182ng/L [1411; 7966] vs. NYHA II/III: 1875ng/L [IQR 803; 3968]; p<0.001). Functional success rates according to M-VARC criteria (residual mitral regurgitation [rMR] ≤2+, EROA ≤0.15cm², transmirtal pressure gradient ≤5 mmHg) were comparable (NYHA IV: 71.4% [n=200] vs. NYHA II/III: 73.5% [n=1060]; p=0.52). Postprocedural efficacy was high in both groups (rMR ≤2+ at discharge in NYHA IV: 87.4% [n=243] vs. NYHA II/III: 90.4% [n=1,344]; p=0.59; Figure 1). However, Kaplan-Meier analysis for all-cause mortality or rehospitalization after two years revealed worse outcomes of patients with NYHA IV (log-rank p=0.002; Figure 2).

Conclusion: This analysis of the PRIME-MR registry revealed that, despite similar baseline characteristics and high procedural efficacy in both groups, the presence of NYHA class IV at baseline was associated with inferior clinical outcomes in DMR patients undergoing TEER. As such, it represents an important indicator of increased risk of mortality and rehospitalization and may require closer patient follow-up.
MR at baseline and discharge

Figure 1. Mitral regurgitation at baseline and discharge

Figure 2. Kaplan-Meier Analysis according to baseline NYHA class

Kaplan Meier analysis