

Asymmetric leaflet tethering is associated with worse outcomes after edge-to-edge mitral valve repair for secondary mitral regurgitation

L. Stolz¹, M. Orban¹, D. Braun¹, P. Doldi¹, M. Orban¹, T. Stocker¹, M. Mehr¹, J. Steffen¹, K. Loew¹, C. Hagl², S. Massberg¹, M. Naebauer¹, J. Hausleiter¹

¹Clinic of the University of Munich Großhadern, Medizinische Klinik und Poliklinik I, Munich, Germany; ²Clinic of the University of Munich Großhadern, Herzchirurgische Klinik und Poliklinik, Munich, Germany

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Background: The impact of mitral valve (MV) tethering patterns on outcomes of patients undergoing transcatheter edge-to-edge mitral valve repair (TEER) for severe secondary mitral regurgitation (SMR) is unknown.

Purpose: The purpose of this study was to evaluate the impact of asymmetric postero-anterior and medio-lateral MV leaflet tethering on procedural and survival outcomes after TEER for SMR.

Methods: Symmetry of postero-anterior tethering was defined as the ratio of the posterior to anterior MV leaflet angle (PLA/ALA) in the central MV segment 2. The ratio of the tenting area between MV segments 3 and 1 (S3/S1 ratio) was defined as medio-lateral tethering symmetry. We used receiver operating characteristics and a proportional Cox model to identify cut-off values of asymmetric postero-anterior and medio-lateral tethering for prediction of two-year survival after TEER.

Results: 178 patients receiving TEER for SMR were included. Asymmetric

postero-anterior tethering was observed in 67 patients (37.6%, PLA/ALA ratio cut-off >1.54). Medio-lateral tethering was asymmetric in 49 patients (27.5%, S3/S1 ratio cut-off >1.49). MR was reduced to MR ≤2+ in 91.6% of patients, while postprocedural MR remained higher in the presence of asymmetric postero-anterior tethering (p=0.01). After adjustment for potential clinical and echocardiographic confounders, multivariable Cox regression analysis confirmed asymmetric postero-anterior tethering (HR=2.77, CI=1.43–5.38, p<0.01) and asymmetric medio-lateral tethering (HR=2.90, CI=1.54–5.45, p<0.01) as independent predictors for two-year survival.

Conclusions: Asymmetric postero-anterior and medio-lateral MV leaflet tethering patterns independently increase two-year all-cause mortality in patients undergoing TEER for SMR. Detailed echocardiographic patient selection might improve outcomes after TEER.

