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Effects of mitral valve repair on left ventricular remodeling and ventricular arrhythmia in mitral valve prolapse patients: five-year follow-up

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Introduction: There is limited data on the efficacy of surgical repair in reducing ventricular arrhythmia (VA) in mitral valve prolapse (MVP) patients. Improvement in malignant ventricular arrhythmias has been reported only in isolated cases after mitral valve surgery. Our aim was to evaluate the possible effects of mitral valve repair on left ventricular (LV) reverse remodeling and incidence of VA in MVP patients in mid-term follow-up.

Methods: 30 consecutive patients (mean age 53.1 ± 9.4 , 47% male) undergoing mitral valve repair for severe mitral regurgitation (MR) due to mitral valve prolapse were enrolled in our observational, prospective, single-center study. Resected abnormal segments of the mitral leaflets were examined by experienced pathologists for signs of myxomatous degeneration. Transthoracic echocardiography extended with speckle-tracking echocardiography and 24-hour Holter monitoring were performed pre- and postoperatively annually. Atrial fibrillation, PVCs and nonsustained ventricular tachycardia (VT) runs were reviewed.

Results: During 144 person-years of follow-up no deaths, and 3 cases (10%) of recurrent moderate or severe (≥ 2) MR occurred. The total number of PVCs and non-sustained ventricular tachycardia runs dropped significantly in 1st ($p=.04$, Wilcoxon matched pairs test) and 2nd ($p=.03$), years of postoperative follow-up. Postoperative incidence of PVC and VT correlates strongly with postoperative end-diastolic LV diameter (EDD $r_s=.70$; $p=.005$), moderate negatively with LV ejection fraction (EF $r_s=-.55$; $p=.01$), but not postoperative MR ($p>.05$). EDD (58.8 ± 7.6 mm vs. 49.9 ± 5.6 mm; $p=.00001$) and EDV (156.6 ± 32.1 ml vs. 104.1 ± 22.8 ml; $p=.00001$) decreased in 1st year after repair with non-significant changes in EF ($63.8 \pm 12.8\%$ vs. $59.6 \pm 14.5\%$; $p=.20$), global systolic longitudinal strain $-13.8 \pm 2.5\%$ vs. $-14.6 \pm 2.7\%$; $p=.20$) and SR (-0.93 ± 0.12 s⁻¹ vs. -0.98 ± 0.13 s⁻¹; $p=.09$) values.

In univariate analysis, postoperative end-diastolic LV diameter ($p=.001$), low EF ($p=.003$), myxomatous degeneration ($p=.008$) were identified as risk factors of persistent PVCs/VT after surgery.

Conclusions: Mitral valve repair in MVP with severe mitral regurgitation is associated with reduction in ventricular arrhythmia, which strongly correlates with postoperative LV dimensions and function. Further investigation in larger cohorts to evaluate the association between degenerative mitral valve disease and ventricular arrhythmia is needed.