Determinants of reverse remodeling following minimally invasive mitral valve repair in asymptomatic patients

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Objective

The reverse remodeling following minimally invasive mitral valve repair has already been reported. However, factors that may have impact on reverse remodeling in this group are not described. The aim of the study is to determine those factors.

Methods

Asymptomatic patients undergoing minimally invasive mitral valve repair due to severe, primary mitral regurgitation who had full echocardiographic assessment (ejection fraction, ventricular end systolic and end diastolic diameters and volumes, left atrial diameter, areas and volumes, right ventricular and right atrial diameters) at baseline and six months following the surgery were selected for the analysis. Decrease or increase in left ventricular end diastolic volume (LV-EDV), left ventricular end systolic volume (LV-ESV) and left atrial volume (LAvolume) of 10% or more was considered significant. Multivariate analysis was used to determine factors that may affect reverse remodeling at six month follow-up.

Results

Number of patients: 92	
Age [years]	48.0 (36.0- 59.0)
Male gender	62 (67.4%)
Arterial hypertension	34 (36.9%)
Hyperlipidaemia	22 (23.9%)
Obesity	10 (10.9%)
Diabetes	2 (2.2%)
Asthma/COPD	0
Kidney failure	0
History of stroke/TIA	5 (5.4%)
Paroxysmal AF	11 (11.9%)
Persistent/Permanent AF	9 (9.8%)
Euroscore II [%]	0.5 (0.5- 0.65)

Table 1 Baseline patient characteristics. Data are presented as number (percentage) or median (interquartile range). AF- atrial fibrillation, COPD- chronic obstructive pulmonary disease, TIA- transient ischemic attack

Results

Ejection fraction [%]	68.0 (61.5- 73.0)
Left ventricular end systolic diameter [mm]	35.0 (30.0- 38.5)
Left ventricular end diastolic diameter [mm]	58.0 (53.5- 64.0)
Left ventricular end systolic volume [ml]	56.5 (39.0- 73.0)
Left ventricular end diastolic volume [ml]	167.0 (131.0- 207.0)
Mitral valve annulus [mm]	42.0 (39.0- 46.0)
Left atrial volume [ml]	88.0 (72.5- 123.0)

Table 2 Baseline echocardiographic parameters. Data are presented as median (interquartile range)

Artificial annuloplasty ring	92 (100%)
P2 resection	16 (17.4%)
Artificial chordae	64 (69.6%)
P1/P2 cleft closure	3 (3.3%)
P2/P3 cleft closure	4 (4.3%)
A3 resection	2 (2.2%)
Chordae reimplantation	1 (1.1%)
Concomitant left atrial ablation	9 (9.8%)
Concomitant left atrial appendage closure	12 (13.0%)

Table 3 Surgical procedures. Data are presented as number (percentage)

End diastolic volume decrease	81 (88.1%)
End systolic volume decrease	54 (58.7%)
Any ventricular volume decrease	82 (89.1%)
Atrial volume decrease	82 (89.1%)
Atrial or any ventricular volume decrease	89 (96.7%)
Any ventricular volume increase	22 (23.9%)
Atrial volume increase	9 (9.8%)

Table 4. Number of patients who had change of ventricular or atrial diameter at 6-month follow-up. Data are presented as number (percentage)

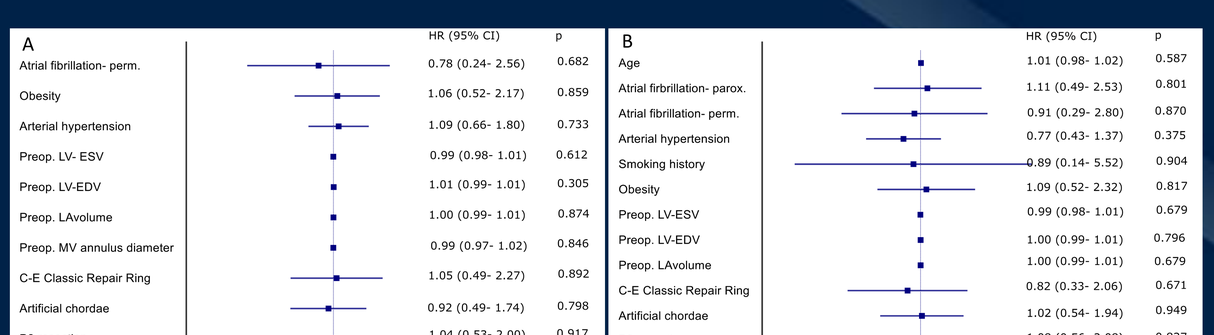


Figure 1 Forest plot of hazard ratios for successful reverse ventricular remodeling (A) and successful atrial remodeling (B). Horizontal bars indicate 95% confidence intervals. Atrial firbillation- parox.- paroxysmal atrial firbillation; Atrial fibrillation- perm.- permanent atrial fribrillation; LAvolume- left atrial volume; LV-EDV- left ventricular end diastolic volume; LV-ESV- left ventricular end systolic volume; MV- mitral valve; P2- P2 segment of posterior leaflet

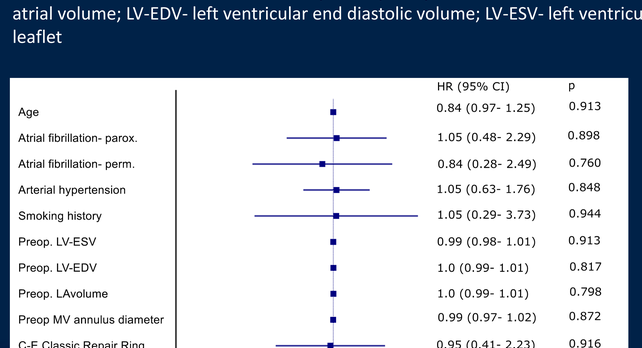


Figure 2 Forest plot of hazard ratios for cummulative endpoint of successful reverse ventricular or atrial remodeling. Horizontal bars indicate 95% confidence intervals. Atrial firbillation- parox.- paroxysmal atrial firbillation; Atrial fibrillation- perm.- permanent atrial fribrillation; LAvolume- left atrial volume; LV-EDV- left ventricular end diastolic volume; LV-ESV- left ventricular end systolic volume; MV- mitral valve; P2- P2 segment of posterior leaflet

In a multivariate analysis, no factors significantly determined further increase in ventricle volumes. However, in patients with larger atrium, the risk of further increase in its volume was significantly lower (HR 0.94; 95%CI 0.90- 0.99; p= 0.023)

Conclusions

Most asymptomatic patients benefit from minimally invasive mitral valve repair, as their ventricular or atrial volume significantly decreases. In a multivariate analysis, none of evaluated parameters affects the reverse remodeling potential.

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