Early and Long-term Echocardiographic Assessment Following Minimally Invasive Mitral Valve Repair

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Background

Reverse remodeling of cardiac chambers after valve surgery remains one of key factors determining long-term clinical outcome. The study was conducted to evaluate the significance and long-term stability of reverse remodeling following minimally invasive mitral valve repair.

Methods

145 consecutive patients who underwent mitral valve repair due to severe, primary mitral regurgitation were assessed in clinical and echocardiographic long-term follow-up. The analysed echocardiographic parameters included: EF- ejection fraction; EDV- end-diastolic volume; ESV- end systolic volume; EDD end diastolic diameter; ESD- end systolic diameter; LA Area- left atrial area, LA volume- left atrial volume; RA area- right atrial area. The echocardiography was performed before the surgery, in the 1st, 6th, 12th and 24th month following the surgery. Furthermore, investigation towards MACCE (mortality, reoperation, infarction, cerebrovascular incident) was performed.

Results

Male gender	**102 (70.3%)**
Age	49.5 (38.0- 59.0)
History of myocardial infarction	4 (2.8%)
History of coronary intervention	6 (4.1%)
History of documented endocarditis	2 (1.4%)
Diabetes	3 (2.1%)
Hyperlipidemia	33 (22.8%)
Arterial hypertension	58 (40%)
Obesity	20 (13.8%)
Smoking	8 (5.5%)
Paroxysmal atrial firbillation	18 (12.4%)
Persistent/Permanent atrial fibrillation	13 (8.9%)

Table 1. Baseline characteristics. Data are presented as numer (percentage) or median (interquartile range)

Commisurotomy	**2 (1.4%)**
A3 resection	2 (1.4%)
P2 resection	32 (22.1%)
A2/A3 cleft closure	2 (1.4%)
P1/P2 cleft closure	4 (2.8%)
P2/P3 cleft closure	9 (6.2%)
Artificial chordae	91 (62.7%)
Chordae reimplantation	2 (1.4%)
Radiofrequency ablation	16 (11.0%)
Left atrial appendage closure	20 (13.8%)
Patent foramen ovale closure	15 (10.3%)
Artificial ring implantation	145 (100%)
Successful correction	144 (99.3%)
Median crossclamp time [min.]	73.0 (66.0- 86.0)
Median extracorporeal circulation time [min.]	108.5 (96.0- 120.0)

Table 2. Procedures. Data are presented as numer (percentage) or median (interquartile range)

In a long-term follow-up (24 months) one patient required reoperation due to valve insufficiency associated with systolic anterior motion (SAM) and died (0.7% overall mortality). Two other patients underwent successful reoperation due to valve insufficiency. None of them suffered from a stroke or myocardial infarction. Overall MACCE frequency was 2.1% (84.8% follow-up).

Parameter	EF [%]	EDV [ml]	ESV [ml]	EDD [mm]	ESD [mm]	LA area [cm2]	LA volume [ml]	RA area [cm2]
Baseline	68 (62-73)	165 (128-199)	51 (37- 69)	58 (52- 63)	35 (30- 38)	26 (22- 30)	96 (76-122)	15 (13- 18)
1 month	57 (53-63)	109 (91-135)	46 (35- 60)	50 (45- 55)	33 (30- 38)	19 (17- 22)	60 (49- 77)	15 (13- 17)
6 months	60 (56- 65)	104 (90-124)	42 (32- 54)	50 (46- 53)	32 (28- 35)	18 (15- 21)	54 (45- 68)	14 (12- 16)
12 months	60 (55-66)	100 (81-124)	40 (34- 54)	49 (45- 52)	30 (28- 35)	18 (15-21)	54 (42- 67)	14 (12- 18)
24 months	61 (56- 65)	109 (88-127)	42 (32- 55)	49 (46- 50)	30 (27- 34)	18 (15- 25)	49 (38- 59)	13 (12- 16)
Significance p	**<0.000001**	**<0.000001**	**0.000781**	**<0.000001**	**0.000044**	**<0.000001**	**<0.000001**	0.063158

Table 3. Echocardiographic parameters in consecutive time intervals . 24 moth follow-up completion: 84.8%. Data are presented as median (interquartile range).

Conclusions

Minimally invasive mitral valve repair is safe and efficient method of treatment for severe, primary mitral regurgitation. Reverse remodelling of left ventricle and left atrium is visible in the first moth following surgery and remains stable in consecutive time intervals.

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