Structure and function improvement of the left atrium following mitral valve transcatheter edge-to-edge repair: assessment by cardiac magnetic resonance imaging

Takahide Arai, Yodo Gatate, Keisuke Matsuo, Mitsunobu Nagai, Hiroki Hoya, Yoshie Nakajima, Shiro Iwanaga and Shintaro Nakano
Department of Cardiology, Saitama Medical University, International Medical Center, Saitama, Japan

1.Introduction

Despite the significant implications of left atrial (LA) imaging as a marker of cardiac dysfunction and cardiovascular outcomes, there remains a scarcity of data concerning the structural and functional changes in the LA following transcatheter edge-to-edge repair (TEER) of the mitral valve in patients with secondary mitral regurgitation (SMR).

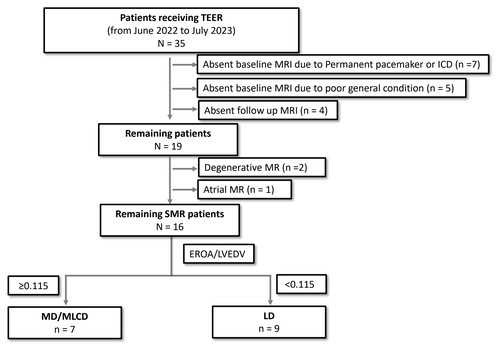
This study aimed to investigate structural and functional alterations in the LA using cardiac magnetic resonance imaging (CMR) in SMR patients after TEER, stratified by proportionality.

2. Methods

Among 35 patients who underwent TEER between June 2022 and July 2023, 16 SMR patients who underwent pre-procedural and 6-month post-procedural CMR were included. The ratio of pre-procedural effective regurgitant orifice area (EROA) to left ventricular end-diastolic volume (LVEDV) was retrospectively assessed. SMR proportionality was stratified into two groups based on EROA/LVEDV ratio: MR-dominant /MR-LV-co-dominant (MD/MLCD) and LV-dominant (LD). CMR was used to analyze

LA volume (LAV) and LA reservoir strain post-TEER.

3. Study flow chart



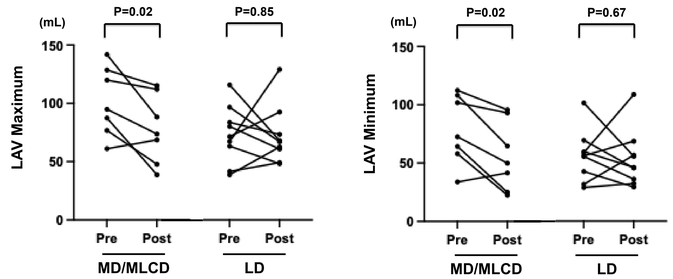
Conflict of interest statement
The authors report no conflicts of interest.

3. Baseline, procedural and post-procedural characteristics stratified by proportionality

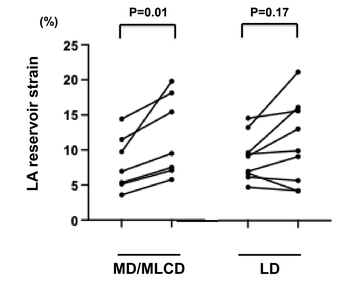
	MD/MLCD	LD	
Patients, n	n=7	n=9	p value
Characteristics			
Age, years	77.0 ± 5.8	75.8 ± 7.2	0.83
Male, n	4 (57.1)	58 (32.0)	0.06
Body mass index, kg/m^2	22.5 ± 2.2	23.4 ± 5.2	0.75
Prior MI, n	3 (42.9)	5 (55.6)	0.67
Prior CABG, n	1 (14.3)	0 (0)	0.43
Prior PCI, n	2 (28.6)	4 (44.4)	0.45
Dyslipidemia, n	4 (57.1)	6 (66.7)	0.54
Diabetes mellitus, n	2 (28.6)	3 (33.3)	0.63
Hypertension, n	5 (71.4)	6 (66.7)	0.63
CKD, n	7 (100.0)	6 (66.7)	0.15
Atrial fibrillation, n	3 (42.9)	3 (33.3)	0.54
STS score, %	12.8 ± 6.3	10.6 ± 6.9	0.47
Medications	32 (76.2)	150 (82.9)	0.31
ACEi/ARB/ARNI, n	7 (100)	9 (100)	-
βblocker, n	7 (100)	8 (88.9)	0.56
MRA, n	7 (100)	9 (100)	-
SGLT2i, n	5 (71.4)	7 (77.8)	0.60
Echocardiographic data			
MR grade, n			0.15
III	2 (28.6)	6 (66.7)	
IV	5 (71.4)	3 (33.3)	
LVEF, %	33.5 ± 15.4	39.1 ± 12.1	0.35
LAD, mm	46.4 ± 6.1	45.0 ± 3.8	0.25
LVDd, mm	58.5 ± 3.3	55.8 ± 5.5	0.35
LVDs, mm	46.8 ± 8.5	44.0 ± 6.1	0.40
LVEDV, mL	121.4 ± 19.4	136.4 ± 35.1	0.75
LVESV, mL	74.1 ± 26.7	82.6 ± 30.6	0.75
EROA (PISA), cm^2	0.23 ± 0.09	0.10 ± 0.02	<0.01
Procedural variables			
Clip number			0.17
Implantation of one clip, n	5 (71.4)	9 (100)	
Implantation of two clip, n	2 (28.6)	0 (0)	
Cardiac tamponade, n	0 (0)	0 (0)	-
Postprocedural variables			
Echocardiographic data			
MR grade, n			0.19
I	4 (57.1)	8 (88.9)	
II	3 (42.9)	1 (11.1)	
LVEF, %	43.5 ± 8.5	45.0 ± 10.4	0.77
LAD, mm	46.1 ± 2.9	42.5 ± 4.3	0.11
LVDd, mm	57.2 ± 5.5	50.8 ± 5.7	0.07
LVDs, mm	42.1 ± 4.5	36.6 ± 5.6	0.11
Hospitalization for heart failure, n	0 (0)	0 (0)	-
Cardiac death at 30 days, n	0 (0)	0 (0)	-

4. Results:

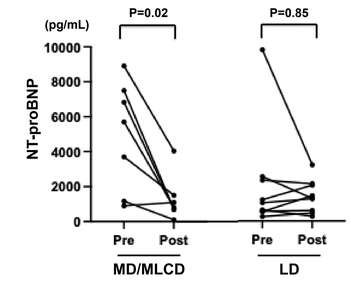
・Change in maximum and minimum LA volume post-TEER by proportionality



・Change in LA reservoir strain post-TEER by proportionality



・Change in NT-proBNP level post-TEER by proportionality



Conclusion. This study identified reverse remodeling and functional improvement in the LA following successful TEER in MD/MLCD patients, as evaluated using CMR imaging.