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ORIGINAL ARTICLE

Conventional Surgery For Early and Late Symptomatic Mitral Valve Stenosis After MitraClip® Intervention: An Institutional Experience With Four Consecutive Patients

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Background Surgical mitral valve repair is the gold standard for treatment of mitral regurgitation. Recently, the transcatheter treatment of mitral regurgitation with the MitraClip® device (Abbot Vascular Structural Heart, Menlo Park, CA) has demonstrated promising results in treating patients not amenable for surgical correction of mitral valve regurgitation. Most patients reported in the literature requiring surgical bailout after MitraClip treatment presented with residual or recurrent mitral valve regurgitation. Mitral valve stenosis after MitraClip treatment has been rarely reported.

Methods From February 2010 to December 2014, four patients out of 165 patients who underwent MitraClip therapy developed symptomatic mitral valve stenosis (2.4%) and needed surgical correction. Data of the four patients were reviewed retrospectively. Follow-up data were obtained from each patient's general practitioner/cardiologist by phone calls and facsimile and were complete in all patients.

Results All four patients were treated with ≥ 2 MitraClip devices during their initial presentation. All four patients underwent MV replacement with a tissue valve. The postoperative course was uneventful and there was no 30-day mortality. At six-month follow-up, all patients were alive and in NYHA class I or III.

Conclusion Placement of multiple clip devices may lead to slightly elevated transmitral gradients. This may not necessarily interpret into symptomatic mitral stenosis. However, in some cases this is possible. Caution should be exercised at this phase of the learning curve of the percutaneous MC treatment, especially in use of multiple MC devices.

Keywords MitraClip® • Mitral valve stenosis • Mitral valve repair • Mitral valve replacement

Introduction

Mitral regurgitation (MR) is a frequent cardiac valve disorder in elderly patients ≥75 who generally present with several comorbidities [1]. Whilst primary/degenerative mitral regurgitation (DMR) is caused by degenerative and/or inflammatory processes of the mitral valve (MV) itself, secondary or functional mitral regurgitation (FMR) occurs due

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to dilatation of the mitral valve annulus or the left ventricle (LV) as a consequence of cardiomyopathy of various aetiologies. The survival benefit associated with surgery for MR due to ischaemic cardiomyopathy in this often elderly population is currently questionable [2]. Chikwe et al. recently reported that less than half of octogenarians with severe ischaemic MR treated surgically were alive at one year [2].

Percutaneous mitral valve repair technique with the MitraClip (MC) device has become an important option for high risk elderly patients with relevant FMR. The MC procedure has been reported to be safe, with success rates up to 90% in various studies on patients with FMR [3,4].

Though the need for surgical bailout after index MC treatment has been reported for patients presenting with residual or recurrent MR [5,6,7], mitral valve stenosis (MVS) after MC intervention has been rarely reported.

We present four patients who developed MVS at different intervals after treatment with ≥2 MC devices. All four patients at first had successful treatment with the MC device prior to development of MVS and the need for surgical bailout. All patients were treated successfully with mitral valve replacement surgery and were discharged alive from the hospital.

Patients and Methods

Of the first consecutive 165 patients treated with the MitraClip device from February 2010 through December 2014, four developed symptomatic MVS (absolute MVS in two patients and relative MVS in two patients) necessitating surgical correction. Surgical correction was performed at a mean of 188.5 ± 221 (range 7–480) days after interventional MVR. Detailed patient characteristics of all cases are presented in Table 1. All patients were initially treated with the MitraClip device due to the high risk of conventional surgery.

Table 1 Detailed Characteristics Of all Patients Treated Surgically After MitraClip Intervention.

Variable	Patient 1	Patient 2	Patient 3	Patient 4
Age (y)	84	74	75	77
Gender	m	f	m	f
BMI	23.9	26.3	28.7	29,4
Log EuroSCORE II (%)	16.32	6.45	36	9,79
LVEF	56.5	71.4	37	56
Aetiology of MR	ICM with annular and bi-atrial dilatation	Mixed FMR/DMR	ICM with annular and bi-atrial dilatation	Degenerative MR IV with PML prolapse and Cleft P2
Pre interventional MR-grade	3	3	3	4
Medical History	ICM, TR II-III°, Previous MI, Afib., Carcinoma of the prostate gland, CRF III°, Recurrent cardiac decompensation	ICM, TR II°, Previous MI, Afib DM	ICM, TR II°, recent MI, previous CABG, Afib. Renal CRF II°, recurrent cardiac Decompensation, previous stroke, pulmonary fibrosis	TR I°, Afib, COPD IV, previous MI CRF IV°,post mama carcinoma, DM
Number of clips placed	3	2	3	2
Mean MG prior MC/post MC/prior to surgery	6.0/10.0/15	1.6/6.4/10	1.6/6.7/10	1.4/4.0/18
MVA prior MC/post MC/prior to surgery	2.6/1.0/1.0	4.5/1.7/1.0	6.6/1.8/1.7	5.8/3.4/1.4
PAH	Yes	Yes	Yes	Yes
Time interval to surgery (d)	7	480	27	240
Indication for surgery*	MVS III°, TRII°, ASD Recurrent cardiac decompensation	MVS II-III°, TVR II°; Recurrent cardiac decompensation	MVS III°,MVR III°, TVR II° Recurrent cardiac decompensation	MVS III°/MVR II°, TVR II°, recurrent cardiac decompensation
Echo at discharge	MR 0, TR 0	MR 0, trivial TR	MR 0,TVR 0	MR 0, TR 0
Postoperative complications	Pneumonia, prolonged ventilation, (tracheotomy), recurrent intrapulmonary, bleeding		None	Dresslers syndrome, dialysis, postop. delirium, UTI (*p. aeruginosa)*,sacral decubitus
Survival postsurgery (days)	659	1240	1032	311

Abbreviations: ICM, ischaemic cardiomyopathy; PAH, pulmonary artery hypertension; CRF, chronic renal failure; Afib., atrial fibrillation; COPD, chronic obstructive pulmonary disease; DM, diabetes mellitus; LVEF, left ventricular ejection fraction, MVA, mitral valve annular area, MG, mitral gradient.
*Patient 3 had MVS III during intraop TEE documented on surgical report.

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