A 52-year-old man underwent surgical mitral repair for P2 flail. A conventional Carpentier technique was used (quadrangular resection+sliding plasty and annuloplasty with a 35-mm flexible band). Predischarge echocardiography showed no residual MR and no systolic anterior motion (SAM). One year after surgery, the patient came to our attention complaining dyspnoea on effort (New York Heart Association III). Rest echocardiography showed absence of recurrent MR, but evidence of SAM with mild left ventricular outflow tract (LVOT) obstruction. Exercise echocardiography revealed a significant SAM with severe LVOT obstruction (Figure 1; Movies I–III in the Data Supplement). An induced pressure gradient of 144 mm Hg and a dynamic flow acceleration with late systolic peak velocity were observed across the LVOT with concomitant moderate MR and mild pulmonary hypertension (systolic pulmonary pressure, 40 mm Hg; Figure 1). A pharmacological approach was attempted first (atenolol, 100 mg QID; diltiazem 180 mg QID) without clinical improvements and changes in SAM and LVOT obstruction. Therefore, an interventional strategy was considered. A MitraClip procedure was planned to correct the SAM. Adrenaline infusion was used to induce SAM. After ineffective attempts to place the clip in the central portion of the valve, a single clip was definitively placed just medial to the suture line of the resected portion of leaflet. Before the final detachment of the clip, mitral valve area and a transvalvular gradient were measured to evaluate the residual stenosis (mean transmitial gradient, 8 mm Hg). After MitraClip implantation, an evident displacement of the leaflets coaptation point toward the LV inflow was observed and LVOT obstruction disappeared (Figure 2; Movies IV–IX in the Data Supplement). No LVOT obstruction and MR were observed under adrenaline infusion. Six months after the MitraClip procedure, the patient is asymptomatic (New York Heart Association I) with active lifestyle. Follow-up rest echocardiography shows no residual MR, and exercise echocardiography shows no residual MR, moderate MR and mild pulmonary hypertension (systolic pulmonary pressure, 25 mm Hg), and a reduction of dynamic LVOT obstruction (peak gradients, 11 and 22 mm Hg, respectively; Figure 3; Movies VIII–X in the Data Supplement).

**Discussion**

SAM after mitral valve repair in the setting of degenerative disease is a well-known postoperative complication occurring in 9% to 11% of patients. Usually, postoperative SAM is evident immediately after cardiopulmonary bypass discontinuation, and it can be managed conservatively with medical therapy and volume optimization. In the presence of persistent SAM, surgical revision of mitral repair may be required immediately or within few days. The use of the edge-to-edge technique has been demonstrated effective to eliminate postoperative SAM. This is the first in men MitraClip procedure to treat late postoperative SAM after mitral valve repair. Although MitraClip has been used to treat LVOT obstruction because of hypertrophic cardiomyopathy, it has been never used to treat postmitral repair SAM. The decision to use MitraClip was based on the surgical experience, suggesting the efficacy of the edge to edge to relief postoperative SAM and LVOT obstruction in this context. The surgical reoperation was an option. A reoperation carries a surgical risk for mortality and morbidity anyway, and there was no guarantee to save the valve rather than replace it eventually. Using the MitraClip as first option, the procedural risk is low, the result obtained can be immediately evaluated and, in case of inefficacy, a surgical attempt of rerepairing the valve is still possible. Certainly, the development of a post-Mitraclip residual stenosis has to be considered during the decision-making process. From a technical point of view, the clip was not positioned in central portion of the valve. Previous resection may have precluded the grasping in the conventional position. The transmitial gradient was higher than the accepted cutoff both before clip release reflecting a moderate stenosis at rest. However, the degree of such a stenosis seems not have clinical implications (no symptoms, no exercise-induced pulmonary hypertension, an exercise gradient <18 mm Hg), this.
drawback is unlikely to have prognostic consequences. In conclusion, this case shows the feasibility and the efficacy of the MitraClip therapy to treat postmitral repair refractory SAM.

Disclosures

None.

References


Key Word: mitral valve

![Figure 1. Baseline echocardiographic examination: (A) 3-chamber view shows systolic anterior motion (SAM) and (B) 4-chamber view. Color-Doppler shows good results of mitral valve repair without residual mitral regurgitation. C, Continuous Doppler interrogation of left ventricular outflow tract (LVOT) shows flow acceleration with late systolic peak velocity. Exercise echocardiographic examination: (D) 3-chamber view demonstrates SAM and (E) 3-chamber view. Color-Doppler shows moderate mitral regurgitation. F, Continuous Doppler interrogation of LVOT shows flow acceleration with late systolic peak velocity and severe obstruction.](http://circinterventions.ahajournals.org/content/861/bimage/1)
Figure 2. Intraoperative echocardiographic monitoring. Preimplantation. 
C, Midesophageal long-axis view shows a displacement of the leaflets coaptation point toward the left ventricular (LV) inflow with resolution of LV outflow tract obstruction. D, Midesophageal long-axis view. Color-Doppler demonstrate the disappearance of the mitral regurgitation. 
E, Transmitral gradient. F, Three-dimensional surgical view of the mitral valve that shows the position of the clip just medial to the resected portion of leaflet.

Figure 3. Follow-up echocardiographic evaluation. Rest echocardiographic examination: (A) 3-chamber view shows systolic anterior motion (SAM) and (B) 4-chamber view. Color-Doppler shows absence of mitral regurgitation. C, Continuous Doppler interrogation of left ventricular outflow tract (LVOT) shows mild LVOT obstruction. Exercise echocardiographic examination: (D) 3-chamber view demonstrates SAM and (E) 4-chamber view. Color-Doppler shows absence of mitral regurgitation. F, Continuous Doppler interrogation of LVOT shows dynamic flow acceleration with late systolic peak velocity and mild obstruction.
First-in-Man MitraClip Implantation to Treat Late Postoperative Systolic Anterior Motion: Rare Cause of Tardive Mitral Repair Failure
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Circ Cardiovasc Interv. 2014;7:860-862
doi: 10.1161/CIRCINTERVENTIONS.114.001579

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