Systolic anterior motion after mitral valve repair: An exceptional cause of late failure

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With the increasing practice of mitral valve repair (MVR) worldwide, more and more surgeons will face cases of valve repair failure. Systolic anterior motion (SAM) is now an infrequent complication of MVR that may lead to early valve repair failure necessitating revision or valve replacement. However, previous studies have shown that most patients with SAM could be successfully managed with medical treatment.¹ To the best of our knowledge, SAM as a cause of late valve repair failure necessitating reoperation has not been previously described.

We report here a case of SAM with left ventricular outflow tract obstruction and mitral regurgitation that did not regress under medical treatment and required a redo valve repair 8 years after the first operation.

Clinical Summary

A 48-year-old woman had been previously operated on for degenerative mitral regurgitation (Barlow disease) caused by posterior leaflet prolapse. She underwent a sliding plasty of the posterior leaflet along with a rigid annuloplasty ring (Carpentier-Edwards 32; Edwards Lifesciences, Irvine, Calif), after which transthoracic echocardiography (TTE) showed SAM with discrete mitral valve regurgitation. Medical treatment was instituted (propranolol 120 mg/day). Eight years later, the patient became symptomatic (New York Heart Association class II) and transient atrial fibrillation developed. TTE and transesophageal echocardiography (TEE) (Figure 1) showed SAM with left ventricular outflow tract obstruction (rest peak gradient at 46 mm Hg) and moderate mitral regurgitation. There was no septal bulging and no hyperkinesia (ejection fraction = 73%). Because of this clinical deterioration despite medical therapy, we decided to reoperate. At reoperation, SAM was related to excess valvular tissue. A sliding resection of the posterior leaflet associated with an ovoid resection of the anterior leaflet was performed (Figure 2). The ring was replaced with a 34 Carpentier-Edwards Physio ring (Edwards Lifesciences). Postoperative TEE revealed no SAM and no residual mitral regurgitation (Figure 1). Two years later, the patient is asymptomatic and free from recurrence of SAM and from mitral regurgitation on repeated TTE.

Discussion

Since the first MVR with a prosthetic ring in 1968, more than 10,000 mitral valve repairs have been performed in our department. Redo surgery for symptomatic chronic SAM (as in our case report) has been performed in only 3 patients, in all of whom a second valve repair with a similar procedure has been successfully done. The decision to reoperate on our patients was delicate, because previous studies have stressed the “benign” long-term evolution of SAM.¹ Despite medical treatment, our 3 patients remained symptomatic with repeatedly documented persistence of left ventricular outflow tract obstruction and progression of mitral regurgitation. After repair, their clinical status improved dramatically.

Suppression of SAM is still possible through a second valve repair even late after the first operation. In our experience, the main factor responsible for SAM (which must be corrected) is the presence of an excess valvular tissue relative to the size of the mitral orifice area (whatever the type of ring used at the first operation). Several echocardiographic studies have

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Figure 1. *Left*, Preoperative TEE study showing SAM of the mitral valve (position and length of the leaflets are better visualized with the interrupted lines). *Right*, Postoperative TEE study of the same patient revealing that SAM has disappeared after repair. AL, Anterior leaflet; PL, posterior leaflet; LA, left atrium.

Figure 2. Schematic representation of the sliding plasty associated with an ovoid resection of the anterior valve (interrupted lines).

also documented the role of excess tissue in the genesis of SAM after valve repair.² The surgical correction (or prevention) of SAM relies on several principles that have been previously proposed.³ First, the height of the posterior leaflet is easily reduced to no more than 1.5 cm by using the sliding plasty with triangular resection of the mural leaflet. Second, the choice of the ring annuloplasty is critical. One should make sure that the vertical diameter of the ring is the same as the height of the anterior leaflet. Third, in some instances of important excess tissue, reduction of the height of the anterior leaflet becomes a good solution. Application of these

simple principles has led to sustained disappearance of SAM in our patients as documented by iterative TTEs.

Other authors have also recently proposed that the height of the anterior leaflet be reduced either to correct or to prevent postrepair SAM in Barlow disease.^{4,5} In our experience, suboptimal reduction of the height of the posterior leaflet is a frequent cause of postrepair SAM. Reduction is still easily feasible without reperforming the sliding plasty. A large surface of leaflet coaptation is certainly critical to achieve good long-term results in valve repair. Because we believe that too much reduction of the height of the anterior mitral valve may compromise the long-term durability of the repair, we therefore recommend that it should not be performed systematically in Barlow disease. This procedure may be useful in cases of excess valvular tissue involving the anterior leaflet when the other predisposing factors to SAM have been adequately addressed.

References

1. Grossi EA, Galloway AC, Parish MA, Asai T, Gindea AJ, Harty S, et al. Experience with twenty-eight cases of systolic anterior motion after mitral valve reconstruction by the Carpentier technique. *J Thorac Cardiovasc Surg.* 1992; 103:466-70.
2. Mihaileanu S, Marino JP, Chauvaud S, Perier P, Forman J, Vissoat J, et al. Left ventricular outflow obstruction after mitral valve repair (Carpentier's technique): proposed mechanisms of disease. *Circulation.* 1988;78(3 Pt 2):178-84.
3. Carpentier A. The SAM issue. *Le Club Mitrale Newsletter.* 1989;1:72-5.
4. Raney AA, Shah PM, Joyo CI. The "Pomeroy procedure": a new method to correct post-mitral valve repair systolic anterior motion. *J Heart Valve Dis.* 2001;10:307-11.
5. Quigley RL, Garcia FC, Badawi RA. Prevention of systolic anterior motion after mitral valve repair with an anterior leaflet valvuloplasty. *J Heart Valve Dis.* 2004;13:927-30.