The Journal of Thoracic and
Cardiovascular Surgery
Volume 112, Number 1

SEVERE LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION DESPITE SLIDING LEAFLET TECHNIQUE FOR REPAIR OF THE MITRAL VALVE

Bart Meyns, MD, Johan Vandommele, MD, Dirk Vlasselaers, MD, Patrick Peerenboom, MD, Wim Daenen, MD, PhD, and Willem Flameng, MD, PhD, *Leuven, Belgium*

Reconstructive surgery of the mitral valve has become the procedure of choice for mitral valve disease. In our center, the prevalence of reconstructive mitral valve surgery increased to 30% (42/139) in 1994. Systolic anterior motion of the mitral valve causing left ventricular outflow tract obstruction (LVOTO) after repair of the valve occurs in 1% to 6% of cases.[1-5] Risk factors for the occurrence of LVOTO include degenerative mitral insufficiency with excess leaflet tissue, nondilatated left ventricular cavity, narrow mitral valve–aorta angle, use of a rigid mitroplasty ring, and nonuse of the sliding leaflet technique.[1-5] We report a case in which LVOTO occurred in a high-risk patient despite our use of the sliding leaflet technique, with severe consequences.

A 59-year-old woman was referred to our surgical unit with a long-standing history of mitral insufficiency. Echocardiography had revealed prolapse of both anterior and posterior mitral leaflets, with myxomatous degenerative changes resulting in severe mitral regurgitation. Angiography confirmed these findings and also showed smooth coronary arteries and preserved left ventricular function. A narrow left ventricular outflow tract was noted, but no gradient was measured. On May 18, 1995, a reconstructive mitral valve operation was performed. The mitral valve was exposed through a superior septal approach, and retrograde bloodcardioplegia was used for myocardial protection. Because of prolapse of the posterior leaflet and rupture of one chorda, two quadrangular resections of the posterior leaflet were necessary. The defect was closed with the sliding leaflet technique. In addition, a prolonged chorda of the anterior leaflet was shortened by invagination of its excess length in the papillary muscle. The repair was concluded with a size 32 Carpentier annuloplasty ring (Baxter, Healthcare Corp., Deerfield, Ill.). Perioperative surgical and echocardiographic control showed no remaining insufficiency.

The patient was easily weaned from the extracorporeal circulation but while she was still in the operating room, low cardiac output developed (cardiac index 2.38 $L \cdot min^{-1} \cdot m^{-2}$) and was initially treated with positive inotropic support. Echocardiography revealed septal anterior motion with narrowing of the left ventricular outflow tract. Treatment consisted of reduction of inotropic support and fluid administration, with temporary improvement. After 36 hours, an intraaortic balloon pump was inserted to increase myocardial perfusion pressure. The patient's condition could not be stabilized with this maximal conservative treatment. Arterial pressures remained low (80/56 mm Hg), left atrial pressures remained high (16 mm Hg), and cardiac index remained low (2.43 $L \cdot min^{-1} \cdot m^{-2}$). Rising lactate levels indicated the beginning of organ failure. In addition, echocardiography showed decreased left ventricular function with severe hypocontractility of the apical area. Septal anterior motion was still present (Fig. 1). We were therefore urged to reoperate on the third postoperative day. A mechanical bileaflet valve was implanted in the mitral position. The patient could not be weaned from bypass, and the insertion of a left ventricular–assist device (Abiomed, Inc., Danvers, Mass.) was necessary. After 6 days of mechanical support, organ function was restored and myocardial contractility was normalized. The patient was successfully weaned from the assist device on the seventh day. Her further stay on intensive care was prolonged by severe generalized polyneuropathy. She remained in intensive care for a total of 29 days but is now completely recovered and discharged from the hospital. Her echocardiography shows a good left ventricular contractility and well-functioning mitral valve.

The sliding leaflet technique for repair of the mitral valve is advocated to avoid LVOTO. Recent reports have stressed the fact that LVOTO *never* occurs when using this technique.[5] Furthermore, Grossi and coworkers[4] have stated that septal anterior motion should be managed medically and that the associated LVOTO consequently resolves. We also had never noticed septal anterior motion before when the sliding leaflet technique was used, and this single experience does not call into question the superb results reported with this technique. The dramatic evolution of this case did, however, teach us the following: (1) The sliding leaflet technique does not per se exclude septal anterior motion and LVOTO in high-risk patients (patients with excess leaflet tissue in the presence of a small ventricular cavity). (2) Medical treatment may fail to resolve septal anterior motion, necessitating early surgical intervention.

From the Department of Cardiac Surgery, Gathuisberg University Hospital, Leuven, Belgium.

Received for publication Aug. 3, 1995; accepted for publication Oct. 3, 1995.

J Thorac Cardiovasc Surg 1996;112:187-8

0022-5223/96 $5.00 + 0 **12/54/69658**

REFERENCES

1. Lee KS, Stewart WJ, Lever HM, et al. Mechanism of outflow tract obstruction causing failed mitral valve repair. Circulation 1993;88(Suppl 2):II-24-9.
2. Mihaileanu S, Marino JP, Chauvaud S, et al. Left ventricular outflow obstruction after mitral valve repair (Carpentier's technique). Circulation 1988;78(Suppl 1):I78-84.

The Journal of Thoracic and
Cardiovascular Surgery
July 1996

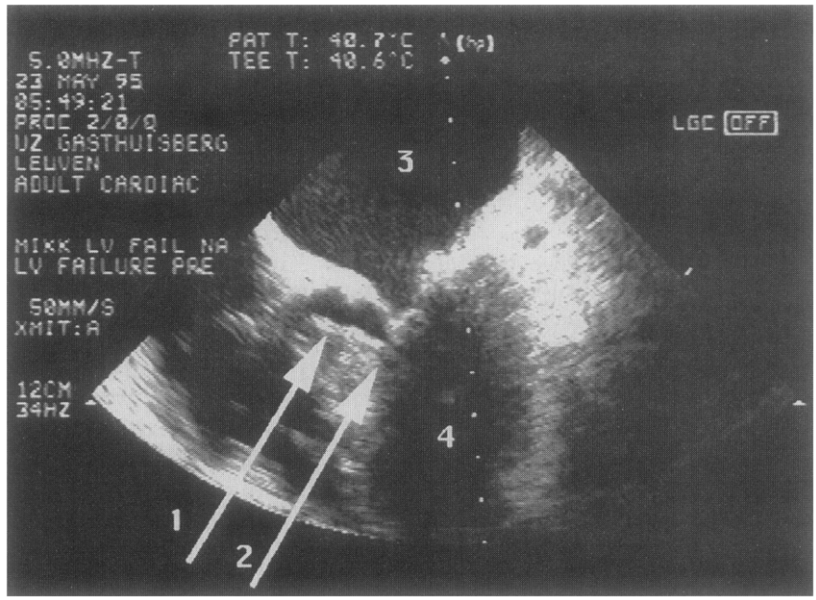

Fig. 1. Two-dimensional transesophageal echocardiography of the left ventricle outflow tract *(Arrow 1)* after mitral valve repair. Septal anterior motion is obvious, with the tip of the anterior leaflet touching the bulging septum during systole *(Arrow 2)*. *Arrow 3,* Left atrium; *Arrow 4,* left ventricle.

3. Schiavone WA, Cosgrove DM, Lever HM, et al. Long-term follow-up of patients with left ventricular outflow tract obstruction after Carpentier ring mitral valvulaplasty. Circulation 1988;78(Suppl 1):I-60-5.
4. Grossi EA, Galloway AC, Parish MA, 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.
5. Jebara VA, Mihaileanu S, Acar C, et al. Left ventricular outflow tract obstruction after mitral valve repair: results of the sliding leaflet technique. Circulation 1993;88(Suppl 2): 30-4.

THORACOSCOPIC RELEASE OF TRACHEOPEXY STITCH CAUSING PHRENIC NERVE PARALYSIS IN AN INFANT

Rodrigo Oyarzun, MD, Joseph V. Cotroneo, MD, Roberto M. DiDonato, MD, Mary Berry LeBoeuf, MSN, James S. Donahoo, MD, and John R. McCormick, MD, *Newark, N.J.*

Congenital vascular rings are often complicated by tracheomalacia. Even after release of the tracheal compression, the tracheomalacia may be severe enough to result in postoperative morbidity and mortality.[1] Therefore aortopexy or tracheopexy, or both, may be required to lessen respiratory insufficiency, especially in the immediate postoperative period.[2] We observed an unusual complication—a tracheopexy suture that caused phrenic nerve compression and resulting diaphragmatic paralysis. The phrenic nerve was successfully released by video-assisted thoracoscopic surgery (VATS).

An 8-month-old infant weighing 8.2 kg was admitted to Children's Hospital of New Jersey for correction of a

From The Department of Surgery, Division of Pediatric Cardiothoracic Surgery, Children's Hospital of New Jersey, and University of Medicine and Dentistry, New Jersey Medical School, Newark, N.J.

Received for publication Sept. 6, 1995; accepted for publication Oct. 3, 1995.

Address for reprints: J. Rodrigo Oyarzun, MD, University of Medicine and Dentistry of New Jersey–New Jersey Medical School, 185 South Orange Ave., MSB G 595, Newark, NJ 07103.

J Thorac Cardiovasc Surg 1996;112:188-90

0022-5223/96 $5.00 + 0 **12/54/69660**