Thrombosis of St. Jude Medical Cardiac Valve in the Mitral Position

P. J. Commerford, M.B., Ch.B.;† E. A. Lloyd, B.M.;† and J. A. De Nobrega, M.B., Ch.B.;‡

Thrombosis of a St. Jude medical prosthesis in the mitral position resulted in severe pulmonary edema in a 47-year-old woman 23 days after implantation. The diagnostic importance of the finding of a diastolic murmur across the prosthesis and the value of fluoroscopy in the diagnosis of malfunction are emphasized.

The St. Jude medical cardiac valve prosthesis is presently undergoing clinical trial. In vitro trials demonstrated superior hemodynamic properties compared with other clinically available cardiac valve prostheses.1 There are, however, no clear guidelines for the use of anticoagulation in patients with these prostheses. The all pyrolytic carbon construction of these prostheses is reputed to render them antithrombogenic and possibly superior to other prostheses in this regard. Initial information from the clinical evaluation program reports one episode of thrombus formation on an estimated 1,919 mitral implants.8

We have recently seen a patient in whom extensive thrombus formation caused prosthetic restenosis 23 days after the surgery despite anticoagulation therapy with warfarin.

CASE REPORT

A 47-year-old woman underwent closed mitral valvotomy in 1970 for rheumatic mitral stenosis, resulting in good relief of symptoms. She remained well until 1976, when she was admitted with a diagnosis of anterior spinal artery embolism, from which she recovered well. She received maintenance therapy with warfarin.

The patient was admitted in November 1979 with New York Heart Association class 3 symptoms. Examination revealed mild chronic obstructive airways disease, atrial fibrillation, and features of mitral stenosis. Cardiac catheterization confirmed the diagnosis, and on Dec 13, 1979, an uncomplicated mitral valve replacement was performed using a size 29 St. Jude medical prosthesis. The left atrium was free of thrombus at surgery, and recovery was uneventful. Warfarin therapy was begun on the second postoperative day. Effective reduction of the prothrombin index to less than 50 percent was achieved by the sixth day. No other anticoagulation was used in the postoperative period.

She was discharged from the hospital on Dec 27. At

**Figure 1. Appearance of prosthetic leaflets at fluoroscopy (RAO projection). A (left), end-systole; B (right), end-diastole. Excursion of leaflets is greatly reduced.**

assessment before discharge she was well, in atrial fibrillation. On auscultation the closing sound and a soft opening sound of the prosthesis could be heard clearly, but a disturbing feature was a prominent grade 2/4 diastolic rumble audible in the mitral area. It was decided that since she was otherwise well she could be discharged and followed up closely as an outpatient, continuing to receive warfarin anticoagulation therapy.

She was readmitted on January 4, 23 days after her operation, complaining of severe shortness of breath that had developed after her discharge.

On examination she was severely distressed and dyspneic, hypotensive, and in pulmonary edema. On auscultation the closing sound of the prosthesis was dull, no opening sound was audible, and no murmurs were heard. Chest x-ray film showed cardiomegaly, a straight left heart border, and interstitial pulmonary edema. An ECG showed atrial fibrillation, with a mean ventricular rate of 120/min, axis 110°, clockwise rotation, and widespread T wave flattening. The prothrombin index was 26 percent.

On fluoroscopy it was evident that the anterior leaflet of the prosthesis was completely immobile, and the movement of the posterior leaflet was limited and did not reach its full excursion (Fig 1).

Catheterization disclosed a wedge pressure of 34 mm Hg, mean diastolic gradient across the prosthesis of 20 mm Hg, and a cardiac output of 2.01/min. The calculated prosthetic orifice area was 0.3 cm². The patient was immediately transferred for mitral valve replacement.

Operative Findings

At surgery there was extensive thrombus adherent to the atrial side of the prosthesis, immobilizing the anterior leaflet. The thrombus extended from the valve and occupied most of the left atrium. The prosthesis was excised and replaced with a porcine xenograft. The patient did not regain consciousness postoperatively. The neurologic opinion was that she had suffered a major cerebral embolus intraoperatively. She died ten days after the operation. At postmortem examinations, an obstructing thrombus was adherent to the xenograft.

**DISCUSSION**

In the preclinical animal trials there is one description of thrombus formation on the sewing ring of a St. Jude prosthesis in the tricuspid position.9 We are not aware of clinical reports of thrombus formation causing malfunction of the St. Jude prosthesis so soon after insertion.

CHEST, 80: 3, SEPTEMBER, 1981
We have not noted loud diastolic murmurs across this prosthesis in the mitral position in any of our other patients with the prosthesis, and, given the very favorable hemodynamic features of the valve reported elsewhere and in our own experience, a diastolic rumble would not be expected. Thrombus formation presumably occurred in the immediate postoperative period before adequate control of prothrombin index was obtained. We suggest that a significant diastolic murmur across a St. Jude prosthesis in the mitral position is an early sign of valve malfunction and an indication for fluoroscopic examination to ensure normal leaflet motion.

ACKNOWLEDGMENTS: The authors wish to thank the Medical Superintendent of Groote Schuur Hospital for permission to publish.

REFERENCES
2 Status report No. 7. Cardiac valve, clinical evaluation programme. St. Jude Medical Inc.

Quadricuspid Aortic Valve Associated with Fibromuscular Subaortic Stenosis and Aortic Regurgitation Treated by Conservative Surgery*

Alfonso Igleisas M.D.; Jose Oliver M.D.; J.E. Muñoz M.D.; and Luis Nuñez M.D.

A case of subaortic fibromuscular stenosis associated with a quadricuspid aortic valve with severe aortic insufficiency is reported. Correction of the anomaly was by resection of the subaortic stenosis and aortic valve valvuloplasty was performed with excellent clinical and hemodynamic results.

Quadricuspid aortic valve not associated to truncal anomalies is a very rare cardiac malformation. Most cases reported have been autopsy findings in patients without cardiac symptoms. Other cases reported, however, had severe aortic valve insufficiency of such a degree to need aortic valve replacement.

We report a case of quadricuspid aortic valve with severe regurgitation, associated with fibromuscular subaortic stenosis. Surgical correction was performed by resection of the subaortic stenosis and plastic repair of the quadricuspid aortic valve.

*From the Department of Cardiac Surgery, Ciudad Sanitaria La Paz, Autonomous University of Madrid, Madrid Spain.
Reprint requests: Dr. Igleisas, Ciudad Sanitaria La Paz, Madrid 34, Spain

CASE REPORT

A 42-year-old man was admitted to the hospital because of progressive dyspnea and substernal pain of two years' duration. On physical examination, he was in no distress. His blood pressure was 120/50 mm Hg, and his pulse was 87 beats per minute. On auscultation, there was a systolic ejection murmur, grade 3/4 and a diastolic murmur, grade 3/4 along the left sternal border. Chest X-ray film showed moderate cardiomegaly. The ECG showed left ventricular hypertrophy.

Heart catheterization showed a subaortic valvular gradient of 50 mm Hg. Aortic angiography showed moderate to severe aortic regurgitation. Left ventricular angiography revealed a 1-cm subaortic narrowing. With the diagnosis of aortic valve insufficiency and subvalvular fibromuscular stenosis, the patient was operated upon. When the aortic valve was exposed at operation, it showed a quadricuspid valve with three cusps of equal size and a small fourth cusp situated between the right and the noncoronary cusp (Fig 1). The attachment of the valve was normal. The cusps did not meet in the midline and had an obvious regurgitation in the central area. The four commissures were well developed and the cusps were mildly thickened although pliable. In the subaortic area, there was a 1-cm fibromuscular stenosis.

The subaortic stenosis was resected as well as part of

Figure 1. Quadricuspid aortic valve noticed during operation.

Figure 2. Quadricuspid aortic valve has been converted to tricuspid by suturing the edges of two cusps.