Left Ventricular Rupture Following Mitral Valve Replacement
—A Report of Two Cases—

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ABSTRACT: Left ventricular rupture is a rare and usually fatal complication of mitral valve replacement, and we report herein, 2 successfully treated cases of type III left ventricular rupture. The laceration in the posterior ventricular wall was repaired by a wide buttressed mattress suture with teflon felt belts on either side, then covered with Oxycel and fibrin glue or a large patch and fibrin glue. Naturally, the operation must be performed carefully and gently, however, the most important etiologic factor of left ventricular rupture is the extremely friable myocardium due to aging and a long history of heart disease. Utilizing fibrin glue for successfully repairing the rupture proved very effective.

KEY WORDS: left ventricular rupture, mitral valve replacement, repair of a rupture, fibrin glue

INTRODUCTION

Left ventricular rupture is a rare and usually fatal complication of mitral valve replacement. From a total 36 patients undergoing mitral valve replacement, we experienced 2 (5.6 per cent) who developed type III left ventricular rupture, both of whom underwent successful repair. The common etiologic factors and improved methods of prevention and management of left ventricular rupture are also discussed herein.

Case 1

A 63 year old woman who had suffered a cerebral infarction and arrhythmia 2 years previously was hospitalized with chronic heart failure and pain in the left lower limb. The cardiothoracic ratio as seen on a chest X-ray was 58.1 per cent and the ECG showed atrial fibrillation and left ventricular hypertrophy. Cardiac catheterization revealed a mean pulmonary wedge pressure of 18 mmHg and a slight pressure gradient between the left ventricle and aorta. The cardiac index was 2.5 L/min., the area of mitral valve orifice 0.86 cm², and the area of aortic valve orifice 1.4 cm². Cardioangiographies showed grade I-II aortic regurgitation and stenosis with grade II–III mitral stenosis and obliteration of the right common iliac artery and right popliteal artery. Under cardiopulmonary bypass and cardioplegia, the patient underwent a mitral valve excision, leaving the basal chordae of the posterior leaflet,
and insertion of a 25M Omnicarbon mitral prosthesis fixed on the leaved mitral valve by a pledgeted mattress suture, without difficulty. After bypass was completed, the heart was gently and manually elevated to deaerate the left ventricle via the apex. Before chest closure, a sudden massive hemorrhage was observed behind the heart, and a 1.5 cm laceration and hematoma found in the postero-lateral wall of the heart (Type III). The bypass was reinstituted immediately, the aorta re-clamped, and the heart rearrested. The laceration was repaired by a wide buttressed mattress suture with dacron felt belts on either side, avoiding the coronary artery. Because of continuous oozing blood, Oxycels were then placed over the entire area of laceration and hematoma with fibrin glue. The pericardium and sternum were not closed and the sternotomy wound was covered with a piece of Goa-tex sheet sewn to the skin edges. Sternum closure was then performed uneventfully on the seventh post-operative day. Unfortunately, however, the patient died of a pulmonary infection caused by hemodilution for renal failure 3 months postoperatively.

Case 2
A 70 year old woman was repeatedly hospitalized for congestive heart failure over

Fig. 1. Case 1: Repair of the type III rupture requires a wide, deep buttressed suture repair transversely oriented to the ventricle long axis. Due to the oozing of blood, Oxycel was placed over the entire area of laceration and hematoma with fibrin glue.

Fig. 2. Case 2: Repair of the type III rupture using the same method as in case 1. Due to persistent bleeding, a large dacron patch was sutured to the healthy myocardial tissue at a distance from the laceration with a running suture. Fibrin glue was then inserted beneath the dacron patch.