Delayed Closure of Postinfarction Ventricular Septal Rupture

Masahiro Miyajima, MD,1,2 Toshiya Kawashima, MD,1 Tatsuya Saito, MD,1 Hideo Yokoyama, MD,1 Katsumi Ohori, MD,1 Kenji Kuwaki, MD,2 Akihiko Sasaki, MD,2 and Tetsuya Higami, MD2

We present the case of a patient with postinfarction ventricular septal rupture (VSR) who underwent delayed repair using a modified infarction exclusion technique. The patient was taken to the operating room 21 days after the first incidence of acute myocardial infarction because the intra-aortic balloon pump maintained a stable circulatory condition without cardiogenic shock. In our procedure, a Dacron patch was sutured to the healthy endocardium to exclude the infarcted septum, and the VSR was subsequently closed with another Dacron patch. After three years of postoperation, the patient's condition remains normal with good ventricular kinesis and no residual shunt. We describe herein a novel procedure for repairing postinfarction VSR by using two Dacron patches. (Ann Thorac Cardiovasc Surg 2010; 16: 128–130)

Key words: infarction exclusion technique, postinfarction ventricular septal rupture, delayed closure

Introduction

Ventricular septal rupture (VSR) is a challenging complication that may follow acute myocardial infarction. Several operative modifications have been developed to remedy this complication. David-Komeda's operative technique has recently shown acceptable results. However, this procedure is technically demanding, and the incidence of residual shunt is not negligible. Many modifications have been reported. In our setting, we not only excluded the infarcted myocardium, but also closed the VSR.

Case Report

This is the case of a 66-year-old male who was admitted to another hospital because of shortness of breath 6 days after experiencing strong chest pain. He was diagnosed with acute myocardial infarction complicated by ventricular septal perforation. Thus he was referred to our institution. On admission, his blood pressure was 120/60 mmHg with a heart rate of 80 beats/min. An echocardiograph revealed an intraventricular septal aneurysm, an akinetic wall motion at the anteroseptal wall, and a left ventricular ejection fraction of 52%. An intra-aortic balloon pump (IABP) was inserted prophylactically. A coronary angiogram showed a total occlusion in the distal left anterior descending artery (LAD) and stenosis of the left circumflex artery. Intravenous inotropes and intra-aortic balloon counterpulsation were started. The IABP maintained a stable circulatory condition without cardiogenic shock. The patient was taken to the operating room 21 days after the first incidence of acute myocardial infarction. Because his condition was relatively stable, the operation to repair the VSR could be delayed. It was performed with cardiopulmonary bypass under moderate hypothermia. Cardiac arrest was accomplished by infusion of cold blood cardioplegia. The aneurysmal dilatation of the left ventricle (LV) was located on the anterior-apical portion. A left anterior ventriculotomy was made parallel to the LAD,
and the VSR was identified in the midportion of the ventricular septum. The infarcted septal wall appeared to be in the beginning stages of fibrosis. No infarcted tissue was excised. A 4.5 × 6.0 cm Dacron patch was tailored in an elliptical shape and sutured with several 3-0 polypropylene horizontal mattress sutures along the line of the inferior noninfarcted intraventricular wall. The free wall was similarly sutured (Fig. 1). Because we could distinguish the necrotic from the normal tissues, we sutured only the normal myocardium. We next closed the VSR with a second Dacron patch, using a 3-0 polypropylene running suture. The ventriculotomy was closed by using 2-0 Ethibond buttress sutures with a Teflon felt strip on either side of the incision (Fig. 2). The postoperative course was good, and the IABP was removed the next day.

**Discussion**

VSR is considered a critical complication after acute myocardial infarction. The repair of VSR, using the infarction exclusion technique, provides excellent results. The occurrence of residual shunt is reported in 18% of cases by Prêtre et al. and in 17%–43% of cases by Murday. The reason for this residual shunt is the technical difficulty and demands of continuous suture; especially, the baseline of the suture could be attributed to the residual shunts. The odd-shaped surface Travecular makes a complete closure of the perforation difficult. Although we feel that suturing the Xenomedica patch is easier and fits the defect in the endocardium better than a Dacron patch, past concerns over infection from a Xenomedica patch curtailed its clinical use until this issue was resolved. As far as we know, there has been no report that compared long-term results with different patch materials in VSR repair. Further investigation is needed to clearly delineate the advantages of both patches. To overcome these deficits of the infarct exclusion technique, many modifications are reported. Musumeci et al. revealed good results by using gelatin-resorcin-formal (GRF) glue as a sealant between the patch and the interventricular septum. Hirotani and Nakamichi used mattress sutures instead of running sutures on the posteroinferior margin of the patch, besides the one or two mattress sutures passing through the full thickness of the anterior papillary muscle. Fujiwara et al. made running sutures easier by beginning them with a larger-than-needed circular patch and later trimming it into a 3-dimensional patch to match the size of the exclusion area. In our case, we used multiple interrupted mattress sutures and closed the VSR with another Dacron patch. In general, suturing the VSR should be avoided because of the fragility of the tissues involved. In the case of a delayed operation where the necrotic tissue has already exhibited fibrosis, the suture line can easily be decided. Also, because the VSR is excluded from the high pressure of the LV, the risk of tearing is mitigated. According to analyses of the operative risk factors, early repairs after...
infarction, cardiogenic shock, and inferior VSR are usually indicated as predictors of mortality. Fortunately, in this rare case we were able to postpone the operation because the patient did not express cardiogenic shock resulting from a successful IABP. In the ward, the patient was continuously monitored with a Swan-Ganz catheter. After three years of postoperation, the patient’s condition remains normal with left ventriculography (LVG) showing good ventricular kinesis and no residual shunt.

References