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Left Ventricular Perforation during Catheter Ablation in a Patient with Idiopathic Thrombocytopenic Purpura

Hiroaki Sakamoto, MD, PhD, Toru Tsukada, MD, Chiho Tokunaga, MD, PhD, Muneaki Matsubara, MD, PhD, Shizu Aikawa, MD, PhD, Yoshiharu Enomoto, MD, PhD, Fujio Sato, MD, PhD, Yuji Hiramatsu, MD, PhD

Department of Cardiovascular Surgery, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan

ABSTRACT

Preoperative gamma-globulin therapy was recently performed to prevent bleeding complications in a patient with concomitant idiopathic thrombocytopenic purpura undergoing cardiac surgery. Here we report the case of a 75-year-old male patient with idiopathic thrombocytopenic purpura, chronic aortic dissection, and funnel chest in whom a left ventricular perforation sustained during catheter ablation was repaired during emergent surgery. Despite preoperative gamma-globulin therapy not being performed, bleeding complications were prevented because platelets were preserved by avoidance of cardiopulmonary bypass use. Although the funnel chest made it difficult to secure the operative field, the deep pericardial sutures were effective in repairing the perforation without cardiopulmonary bypass.

INTRODUCTION

Idiopathic thrombocytopenic purpura (ITP) is a refractory bleeding disorder. Perioperative bleeding complications are a serious problem in cardiac surgery for patients with ITP. High-dose gamma-globulin therapy has been shown to be effective and is widely performed preoperatively to increase the platelet count and prevent bleeding complications [Imbach 1981; Mathew 1997; Marumoto 2005]. Catheter ablation for arrhythmia has rapidly evolved in recent years. However, critical complications such as ventricular perforation have been reported [Tokuda 2011]. We report the case of a patient who presented with left ventricular perforation sustained during catheter ablation and complicated by ITP, aortic dissection, and funnel chest deformity.

CASE REPORT

A 75-year-old man was transferred to our institution because of left ventricular perforation with hemorrhagic cardiac tamponade. The left ventricular perforation had occurred during catheter ablation for ventricular tachycardia at his local hospital. The patient had a funnel chest and a history of dilated cardiomyopathy, implantable cardioverter-defibrillator implantation, ITP, and type B chronic aortic dissection. The ITP had been treated with 5 mg/day of prednisolone. On admission, 10 μg/kg/min of dopamine and dobutamine were given intravenously. Continuous bleeding via the pericardial drainage tube was found. His blood pressure was 70/40 mmHg, and room-air oxygen saturation was 70%. He was still conscious. A blood test revealed a decreased hemoglobin level of 8.3 g/dL and a decreased platelet count of 37,000/μL. A computed tomographic image of the chest taken at his local hospital before he was transferred to our hospital showed pericardial hemorrhagic effusion, type B chronic aortic dissection, and severe funnel chest deformity (Figure 1).

The patient underwent emergent surgery. The chest was opened via a median sternotomy. The pericardial hemorrhage was found, but the bleeding point was not present in the anterior wall of the heart. Because the funnel chest made it difficult to expose the lateral and posterior walls, two deep pericardial sutures were placed to lift the heart out of the chest. The bleeding point was found in the apicolateral wall of the left ventricle and sutured using 2-0 polypropylene sutures secured with Teflon felt strips. It was then reinforced with a TachoSil Tissu Sealing sheet (CLS Behring, Tokyo, Japan). Eventually, the bleeding point could be repaired without cardiopulmonary bypass (CPB). However, the oozing of

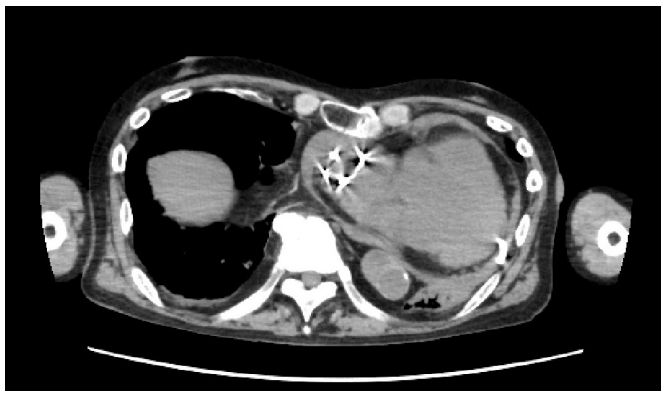

Figure 1. Computed tomography of the chest showed pericardial hemorrhage, type B chronic aortic dissection, and an extremely leftward-displaced heart because of funnel chest deformity. The abnormal shadows in the heart represent the pericardial drainage tube and implantable cardioverter-defibrillator lead.

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Correspondence: Hiroaki Sakamoto, MD, PhD, Department of Cardiovascular Surgery, Faculty of Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba 305-8575, Japan; +81-29-853-3210/3097 (e-mail: sakamotob@md.tsukuba.ac.jp).

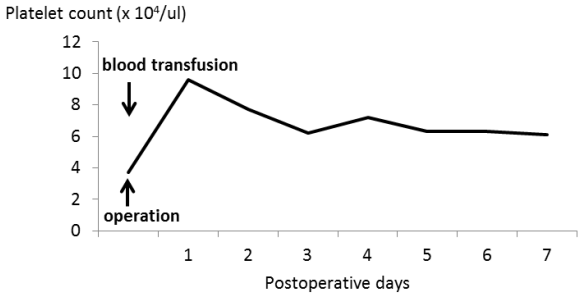

Figure 2. Change in the platelet count.

blood continued because the patient's preoperative platelet count was low. Finally, hemostasis was achieved with 10 units of packed red blood cells, 10 units of fresh frozen plasma, and 30 units of platelet transfusion. The platelet count was increased to 96,000/μL immediately after the operation. After that, it gradually decreased to 61,000/μL at the time of discharge (Figure 2).

The patient was extubated on postoperative day (POD) 3, the chest drainage tube was removed on POD 5, and he was transferred to his local hospital for rehabilitation on POD 7. He had no perioperative bleeding complications.

DISCUSSION

Since 1981, when its positive effect on ITP in childhood was first reported by Imbach et al [Imbach 1981], high-dose gamma-globulin therapy has been widely performed before cardiac surgery in patients with ITP [Mathew 1997; Marumoto 2005]. The effect of this therapy is to increase the platelet count before surgery and thereby prevent perioperative bleeding complications. Our patient had to undergo emergent surgery without such preoperative therapy because he was in cardiogenic shock. In this case, the left ventricular perforation could be repaired without CPB, so thrombocytopenia induced by CPB could be avoided. Therefore, hemostasis was achieved, and perioperative bleeding complications could be prevented.

Although the patient had a high possibility of undergoing CPB because of his type B chronic aortic dissection and funnel chest deformity, fortunately he did not need it. Regarding the type B aortic dissection, if the circulatory insufficiency of this patient had become worse, we would have had no choice but to use CPB to maintain his circulation because intraaortic balloon pumping is contraindicated for patients with aortic dissection. In addition, the funnel chest deformity made it difficult to secure the operative field, and the heart had to be lifted out of the chest to confirm the bleeding point. In this case, the deep pericardial sutures made it possible to lift the heart without CPB. Another option was to use a suction traction device, such as the Starfish or Octopus (Medtronic, Minnesota, USA), which could be useful to secure the operative field. However, if we had not been able to secure the operative field even with the placement of the deep pericardial sutures or the suction traction device, we would have had to perform CPB. Another option to be considered for avoiding CPB use is anterolateral thoracotomy with partial sternotomy (ALPS), which might be applied as an alternative to median sternotomy. ALPS has been reported as an approach for extensive thoracic aortic aneurysm [Uchida 2012], but it might also provide a good operative field for patients with an extremely leftward-displaced heart, such as in funnel chest deformity, because ALPS is accompanied by left thoracotomy.

In recent years, catheter ablation has become widely used, but it carries the risk of serious complications such as ventricular perforation. Tokuda et al have reported that the incidence of ventricular perforation during catheter ablation of ventricular arrhythmias was about 1% [Tokuda 2011]. Although the incidence of this serious complication is low, catheter ablation should be performed with the support system of the heart team, including surgeons. The heart team is extremely important, particularly if the patient has many accompanying complications, as in the case reported here.

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