Case Report

Successful Aortic Valve Replacement for Infective Endocarditis in a Patient with Severe Liver Cirrhosis

Masaya Takahashi, MD, Tao-Sheng Li, MD, Yoshitaka Ikeda, MD, Hiroshi Ito, MD, Akihito Mikamo, MD, and Kimikazu Hamano, MD

Patients with liver cirrhosis are prone to the development of severe complications associated with high mortality rates after major surgery, especially cardiac surgery using cardiopulmonary bypass (CPB). We report the case of a 65-year-old man with acute infective endocarditis and aortic valve perforation, complicated by non-cardiac liver cirrhosis (Child-Pugh class B). After careful preoperative anti-inflammatory and systemic support treatment, we successfully treated infective endocarditis-induced aortic valve perforation by performing aortic valve replacement (AVR). (Ann Thorac Cardiovasc Surg 2006; 12: 287–9)

Key words: infective endocarditis, cirrhosis, open heart surgery

Introduction

According to many recent studies, elective cardiac surgery using cardiopulmonary bypass (CPB) is contraindicated for patients with moderate to severe cirrhosis (Child-Pugh class B or C cirrhosis).[1)] However, surgery is often the only effective treatment, even for patients whose disease is complicated by severe cirrhosis. We report a case of aortic valve perforation caused by acute infective endocarditis in a patient with chronic non-cardiac cirrhosis (Child-Pugh class B), which was treated successfully by aortic valve replacement (AVR) with CPB after anti-inflammatory and systemic support.

Case

A 65-year-old man was admitted to our hospital with progressive dyspnea. On admission, the degree of dyspnea corresponded to NYHA class III. Arterial blood gas analysis showed a PaO_2 of 58.9 mmHg and a $PaCO_2$ of 22.1 mmHg in room air. Chest auscultation revealed decreased S2, a to-and-fro murmur at third left sternal border (3LSB), and moist rales in the bilateral lung fields. Laboratory data showed a remarkably increased C-reactive protein (CRP) value and moderate liver dysfunction (Table 1). The chest X-ray showed mild cardiomegaly with a cardiothoracic ratio of 54% and bilateral pulmonary oedema. Transthoracic echocardiography showed aortic regurgitation (grade III AR) caused by aortic valve perforation, without vegetation (Fig. 1A). Blood culture grew methicillin-resistant *Staphylococcus aureus*. All these findings supported a diagnosis of acute infective endocarditis, resulting in aortic valve perforation and regurgitation, accompanied by acute heart failure.

The patient had a history of viral hepatis type C and abdominal ultrasonography showed liver cirrhosis, mild ascites, and a solid high density mass (ø13 mm) with clear margins in S8 of the liver. These findings and the laboratory data suggested chronic moderate chronic liver cirrhosis (Child-Pugh class B) and hepatocellular carcinoma.

Intravenous gentamicin and vancomycin were immediately started to treat the acute infective endocarditis. On the 2nd day of his hospitalization, the patient was intubated and given catecholamine to control his heart failure. The systemic infection and heart failure both improved remarkably after 10 days of treatment (Table 1).

The acute infective endocarditis resulted in aortic valve

From Division of Cardiovascular Surgery, Department of Medical Bioregulation, Yamaguchi University School of Medicine, Ube, Japan

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Address reprint requests to Kimikazu Hamano, MD: Division of Cardiovascular Surgery, Department of Medical Bioregulation, Yamaguchi University School of Medicine, 1–1–1 Minami-Kogushi, Ube, Yamaguchi 755–8505, Japan.

Table 1. Laboratory data

	Admission	Preoperative	Discharge
Alb (g/dl)	1.8	2.3	2.4
AST (IU/l)	50	38	130
ALT (IU/l)	32	33	94
T.bil (mg/dl)	1.3	1.4	0.6
CRP (mg/ dl)	7.99	1.18	0.22
PT (second)	16.4	14.5	16.0
PT-% (%)	64.0	78.0	68.0
WBC (mm^3)	6,500	6,400	2,400
Plt ($10^4/mm^3$)	7.1	4.1	6.4

Alb, albumin; AST, asparate: 2-oxoglutarate aminotransferase; ALT, alanine: 2-oxoglutarate aminotransferase; T.bil, bilirubin; CRP, C-reactive protein; PT, prothrombin time; WBC, white blood cell count; plt, platelet count.

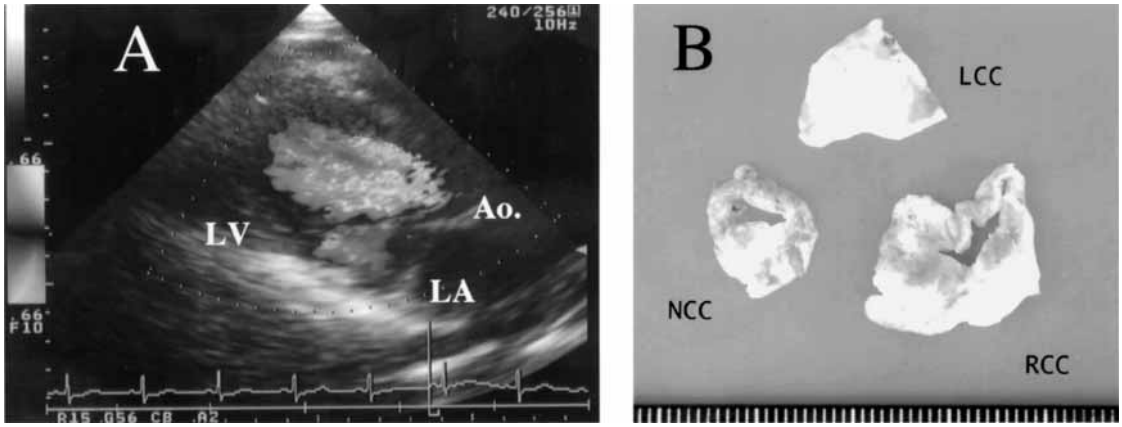

Fig. 1.
A: Transthoracic echocardiography showed massive aortic regurgitation.
B: Operative specimen.
All coronary cusps were destroyed by the infected endocarditis. NCC & RCC perforated.

LV, left ventricular; LA, left atrium; Ao., ascending aorta; NCC, non-coronary cusp; RCC, right coronary cusp; LCC, left coronary cusp.

perforation and grade III AR, so AVR was necessary. We performed AVR when the infection and heart failure were well controlled on the 10th day of hospitalization. Under CPB support, the heart was arrested and the ascending aorta was opened, revealing destruction and perforation of the non-coronary cusp (NCC) and the right coronary cusp (RCC) (Fig. 1B). The destroyed aortic valve was removed and replaced with a prosthetic valve (19 mm Carpentier-Edwards Prosthesis). There was no sign of infection of the annuls. The operation proceeded uneventfully with a CPB time of 109 min, and an aortic clamp time of 77 min. We gave the patient 60 U of platelet concentrate on the postoperative day, when the pump was removed. Fresh frozen plasma (FFP) was also given over 5 days postoperatively. Gentamicin and vancomycin were continued until postoperative day 28. The total operative blood loss was 285 ml and only 460 ml/day was drained on postoperative day 1. Drain tubes were removed on postoperative day 2. The patient recovered well after an uneventful postoperative course.

Discussion

Patients with liver cirrhosis who undergo cardiac surgery are prone to postoperative complications such as infections, excessive mediastinal bleeding, gastrointestinal

disorders, hepatic and renal failure, and fluid retention manifesting as ascites, pericardial effusion, or pleural effusion. The decreased platelet count and loss of platelet function also increases the postoperative bleeding time.[2] Furthermore, several factors relating to open cardiac surgery compromise liver function. First, CPB may not provide sufficient blood flow to the already compromised liver; second, the hemodilution and use of heparin during CPB decrease the levels of all coagulation proteins and prevent coagulation, although this does not inhibit consumption and surface activation of coagulation factors;[2] and third, the general anesthesia and anesthetic agents decrease liver blood flow and oxygen utilization. Thus, patients with liver cirrhosis are considered to be a high risk for open cardiac surgery under CPB.

According to recent studies, while patients with mild cirrhosis can tolerate open heart surgery, the incidence of postoperative complications is high.[3,4] Furthermore, patients with advanced cirrhosis have a significantly higher mortality rate (50–80%) after open heart surgery under CPB.[3,4] Although the definitive recommendations and indications for open heart surgery have not been established, based on these results, elective cardiac operation using CPB is generally considered to be contraindicated for patients with moderate to severe cirrhosis (Child-Pugh class B or C cirrhosis).[1] On the other hand, surgery may be the only effective treatment option, as in our patient, even though mortality from hepatic failure after open heart surgery is high in patients with moderate to severe cirrhosis. According to one report, the major predisposing factor leading to hepatic failure is perioperative bleeding necessitating excessive blood transfusion, which causes liver dysfunction.[2] Progressive liver dysfunction is one of the most severe postoperative complications in patients with cirrhosis, so it is important to maintain sufficient hepatic blood flow in the perioperative period to prevent further damage. Thus, control of perioperative bleeding is very important. To control perioperative blood loss, we gave our patient sufficient platelet concentrate (PC) (60 U/day) and FFP (4 U/day), from the day before surgery until postoperative day 5, for his liver cirrhosis and to decrease blood coagulation factors. The total operative blood loss was 285 ml and only 460 ml/day was drained postoperatively; much less than the postoperative drainage reported previously, which ranged from 500–1,200 ml/day.[4,5] Although controlling the infection and heart failure was obviously very important, minimizing perioperative bleeding was more important in our patient, who recovered uneventfully. The long-term administration of antibiotics is also necessary to prevent the recurrence of infective endocarditis.

In conclusion, we successfully performed AVR to treat aortic valve perforation and regurgitation induced by infective endocarditis, in a patient with chronic moderate cirrhosis. Thus, with careful preoperative preparation and good perioperative management, open heart surgery can be performed with a good outcome in patients with moderate or severe liver cirrhosis.

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