

Successful mitral valve replacement for infective endocarditis in a patient with liver cirrhosis and acute renal failure

Akut böbrek yetmezliği ve karaciğer sirozu olan enfektif endokarditli hastada başarılı mitral kapak replasmanı

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Patients with liver cirrhosis and acute renal failure are considered high risk for open cardiac surgery under cardiopulmonary bypass. A 58-year-old female patient with severe mitral regurgitation due to bacterial endocarditis associated with moderate liver cirrhosis was admitted to our clinic for the treatment of acute pulmonary edema. Preoperative hepatic function state was estimated as Child-Pugh class B. Intravenous gentamicin and vancomycin were initiated for the treatment of acute infective endocarditis. During antimicrobial therapy, the patient developed drug-induced acute renal failure. We immediately performed mitral valve replacement under cardiopulmonary bypass due to progressive heart failure. The postoperative course was problem-free and the patient was discharged. With careful preoperative preparation and good perioperative management, open heart surgery can be performed with a positive outcome in acute infective endocarditis patients with moderate liver cirrhosis and acute renal failure.

Key words: Acute renal failure; cirrhosis; endocarditis; mitral valve replacement.

Patients with liver cirrhosis are considered high risk for open cardiac surgery under cardiopulmonary bypass (CPB). Due to the systemic and hepatic effects of CPB, open heart surgery in patients with chronic liver disease is associated with high mortality and morbidity. The risk of further hepatic damage during CPB to an already compromised liver must be considered.^[1] In patients who require dialysis, the mortality rate is uniformly high in all studies and averages 60-70%. Despite advances in bypass techniques, intensive care, and delivery of hemodialysis, the mortality and morbidity associated with acute renal failure (ARF) have not markedly changed in the last decade.^[2]

Karaciğer sirozu ve akut böbrek yetmezliği olan hastaların, kardiyopulmoner baypas altında gerçekleştirilen açık kalp cerrahisi açısından yüksek risk taşıdığı kabul edilmektedir. Orta derecede karaciğer sirozu eşliğinde bakteriyel endokarditten dolayı ciddi mitral yetmezliği olan 58 yaşında kadın hasta akut pulmoner ödem tedavisi için kliniğimize başvurdu. Ameliyat öncesi karaciğer fonksiyon durumu Child-Pugh sınıf B olarak tespit edildi. Akut enfektif endokardit tedavisi için intravenöz gentamisin ve vankomisin başlandı. Antimikrobiyal tedavi sırasında hastada ilaca bağlı akut böbrek yetmezliği gelişti. Progresif kalp yetmezliğinden dolayı kardiyopulmoner baypas altında acil şekilde mitral kapak replasmanı gerçekleştirildi. Ameliyat sonrası süreci sorunsuz olan hasta taburcu edildi. Dikkatli ameliyat öncesi hazırlık ve iyi bir ameliyat sırası yönetim ile akut böbrek yetmezliği ve orta dereceli karaciğer sirozu olan akut enfektif endokarditli hastalarda açık kalp cerrahisi yüz güldürücü sonuçlarla yapılabilir.

Anahtar sözcükler: Akut böbrek yetmezliği; siroz; endokardit; mitral kapak replasmanı.

We report a case of mitral valve insufficiency caused by acute infective endocarditis in a patient with chronic noncardiac cirrhosis (Child-Pugh class B) and drug-induced ARF, which was treated successfully with mitral valve replacement (MVR) with CPB.

CASE REPORT

A 58-year-old woman was admitted to our clinic with progressive dyspnea, fever, and cough. On admission, the degree of dyspnea corresponded to NYHA (New York Heart Association) class III-IV. Chest auscultation revealed a systolic murmur at the apex and moist rales in the bilateral basal lung fields.

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Table 1. Changes in biochemical and hematological values

	Admission	Preoperative	Discharge	After three months
C-reactive protein (mg/dl)	53.7	9.6	27.1	2.4
Sedimentation (mm/h)	50	36	18	12
White blood cell (/mm ³)	25100	26000	9200	4200
Platelet (/mm ³)	292000	302000	193000	158000
Prothrombin time (second)/INR	17.4/1.41	13.9/1.09	18.1/1.3	12.9/0.9
Albumin (g/dl)	3.16	2.95	3.37	3.92
Alanine aminotransferase (u/l)	27	116	27.5	42.4
Aspartate aminotransferase (u/l)	20	121	1.87	25.4
Total bilirubin	1.6	1.13	0.81	1.36
Urea (mg/dl)	51	30	77	32
Creatinine (mg/dl)	0.82	2.73	3.72	0.7

INR: International normalized ratio.

Laboratory data showed remarkably increased C-reactive protein and moderate liver dysfunction (Table 1). A chest X-ray showed mild cardiomegaly and bilateral pulmonary edema. Transthoracic echocardiography showed mitral regurgitation (grade III MR) with vegetation (Figure 1). Transesophageal echocardiography was not performed because she had a history of esophageal variceal hemorrhage.

A blood culture grew vancomycin- and gentamicin-sensitive *Enterococcus faecalis*. All these findings supported a diagnosis of acute infective endocarditis resulting in mitral valve regurgitation accompanied by acute heart failure.

Abdominal ultrasonography revealed liver cirrhosis, moderate ascites, cholelithiasis, and splenomegaly. These findings and the laboratory data suggested moderate chronic liver cirrhosis (Child-Pugh class B).

The patient had a five-year history of primary biliary cirrhosis. We learned that she had been followed up

in the liver transplant program and had suffered five incidents of esophageal variceal hemorrhage during its course. We also learned that she had undergone a failed transjugular intrahepatic portosystemic shunt procedure the previous month.

Intravenous gentamicin and vancomycin were immediately initiated to treat the acute infective endocarditis. On the eighth day of antimicrobial treatment, the patient developed drug-induced ARF. Urea and creatinine levels increased to 78 mg/dl and 5.38 mg/dl, respectively. The gentamicin was halted, and the vancomycin dose was regulated according to the creatinine level.

The patient underwent two preoperative hemodialysis sessions. The urea and creatinine values decreased to 30.8 mg/dl and 2.73 mg/dl, respectively.

Since the heart failure was not controlled by drug therapy and a large vegetation was located on the anterior mitral leaflet, we decided to perform surgery. Under CPB support, the heart was arrested and the left



Figure 1. Large vegetation attached to the mitral anterior leaflet in transthoracic echocardiography.

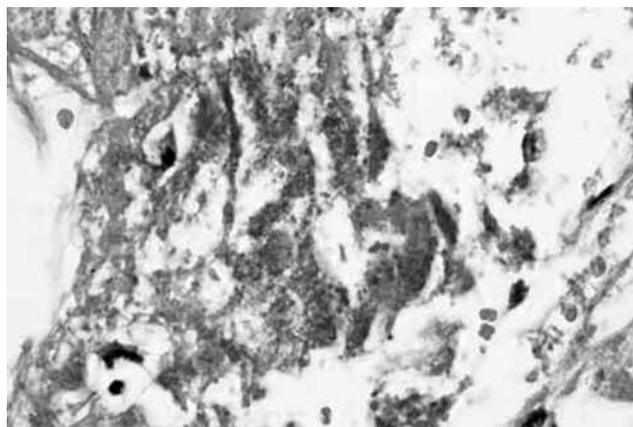


Figure 2. Bacterial organisms in coccoid form were seen in the fibrinous material on the endocardial surface (H-E x 1000).

atrium opened, revealing chordal rupture and perforation of the anterior mitral leaflet. The damaged mitral valve was removed and replaced with a prosthetic valve (27 mm Carpentier-Edwards bioprosthesis) (Edwards Lifesciences, Inc., Irvine, CA, USA). The operation proceeded uneventfully.

Fluid balance was achieved with hemofiltration during CPB. The mitral valve was excised and sampled for microbiological and histopathological analysis. There was polymorphonuclear leucocyte infiltration, and bacterial infiltration on histopathological examination of the mitral leaflets (Figure 2). However, no growth was observed in the culture of the valve.

The high prothrombin time, which was due to hepatic disease, was treated with fresh frozen plasma. No hemorrhage complications were recorded in the postoperative period. Renal function was screened, and hemodialysis was performed three times postoperatively. The vancomycin dosage was regulated according to creatinine level and continued for a total of six weeks. The albumin level was maintained as 2.5 mg/dl, and the hypoalbuminemia was treated. Paracentesis was required twice due to massive ascites. The patient recovered well after an uneventful postoperative course.

The patient's NYHA class was I-II in the 18th postoperative month. On echocardiography, pericardial effusion without tamponade and normofunction of the prosthetic mitral valve were observed. Pericardial effusion was followed by medical treatment. The patient's renal function improved, and hepatic function remained as Child-Pugh class B in the 18th postoperative month.

DISCUSSION

The mortality rate among patients with infective endocarditis remains high, especially if associated with complications or coexisting conditions such as renal failure accompanied by the combined use of medical and surgical therapy. Prolonged parenteral administration of a bactericidal antimicrobial agent or combination of agents is usually recommended. However, the optimal therapy for infective endocarditis associated with renal injury has not been adequately defined.^[3] In all patients, perioperative management should be conducted as follows: (i) the final dialysis should be performed the day before surgery; (ii) during CPB, hemodialysis should be performed using a dialyzer connected to the CPB circuit or hemofiltration; and (iii) after surgery, hemodialysis should be performed when necessary.^[4,5] We obtained fluid balance and decreased urine creatinine levels by

preoperative hemodialysis, operative hemofiltration, and postoperative hemodialysis when necessary.

Patients with liver cirrhosis are considered 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. These complications include infections, excessive mediastinal hemorrhage, gastrointestinal disorders, hepatic and renal failure, fluid retention manifesting as ascites, pericardial effusion, and pleural effusion. The decreased platelet count and loss of platelet function also increase the postoperative hemorrhage duration.^[2] Furthermore, patients with advanced cirrhosis have a significantly higher mortality rate (50-80%) after open heart surgery under CPB.^[3,4] According to many studies, elective cardiac surgery using CPB is generally considered to be contraindicated for patients with moderate to severe cirrhosis (Child-Pugh class B or C cirrhosis).^[1] Postoperative mortality of patients with Child-Pugh class A, B, and C cirrhosis was 6%, 67%, and 100%, respectively.^[1,6,7] Our patient had Child-Pugh class B cirrhosis. Considering the patient's history of esophageal variceal hemorrhage along with liver cirrhosis being a contraindication for anticoagulant therapy, we decided to use a bioprosthetic valve. In the postoperative period, highly increased prothrombin time, hypoalbuminemia, and acid development were observed and treated.

Infective endocarditis complicating liver cirrhosis is infrequently reported. The prognosis of patients with infective endocarditis and liver cirrhosis is poor. Endocarditis complicating the course of cirrhosis usually arises on a previously normal endocardium. Gram-positive cocci, mainly *Streptococcus spp.* (*S. viridans*, *enterococcus*, *bovis*) and *Staphylococcus aureus* are the most common causative organisms, but the possibility of endocarditis caused by enterobacteria should not be underestimated.^[8] Hsu et al.^[9] reported the clinical features of infective endocarditis in Taiwanese patients with liver cirrhosis. In this study, they showed that infection with *Staphylococcus species* was a dominant cause, and methicillin resistance was common.

Our patient had infective endocarditis, acute mitral insufficiency, drug-induced ARF (dependent on dialysis), and liver cirrhosis (Child-Pugh Class B). Despite the high mortality, surgery may be the only effective treatment option in such cases. We successfully performed MVR. Thus, with careful preoperative preparation and good perioperative management, open heart surgery can be performed with a positive outcome in patients with moderate liver cirrhosis and ARF.

Declaration of conflicting interests

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