Primary and redo valve replacement before and after liver transplantation

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Abstract

We report the case of a 39-year-old man who underwent life-saving aortic valve replacement with a bioprosthesis for acute endocarditis while on the liver transplant waiting list, followed by successful transplantation and late valve re-replacement with a mechanical prosthesis, 10.8 years after primary valve surgery.

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1. Introduction

Although advanced liver dysfunction significantly affects outcome after cardiac surgery [1], successful operations have been performed both before and after liver transplantation [2,3]. Simultaneous procedures have also been reported [4]. However, valve surgery in patients awaiting liver transplant has not been described.

2. Case report

A 39-year-old man awaiting liver transplantation was referred for severe aortic regurgitation and heart failure secondary to acute endocarditis caused by Staphylococcus aureus. Aetiology of liver disease was hydatidosis with subsequent unsuccessful resective surgery and secondary biliary cirrhosis (bilirubin = 3.8 mg/dl, mild ascites, INR = 2.2, albumin = 3.1 g/dl, no encephalopathy; creatinine = 1.8 mg/dl; Child-Pugh score = 10 [class C], model for end-stage liver disease [MELD] score = 26). The patient had been refused cardiac surgery at 2 other institutions, but the impossibility of resolving an active infection precluded transplantation. In this scenario, aortic valve replacement was planned on an urgent basis and the patient underwent implantation of a 21 mm stented porcine bioprosthesis (St. Jude Medical BioImplant; St. Jude Medical, Inc., St. Paul, MN). The postoperative course was complicated by a deep sternal wound infection requiring surgical debridement and temporary mediastinal irrigation with povidone-iodine solution. After a prolonged rehabilitation period the patient was readmitted to the liver transplant waiting list and eventually underwent a successful transplantation.

At 51 years of age, 130 months after the primary cardiac operation, progressive heart failure secondary to bioprosthetic valve malfunction (Fig. 1) dictated elective aortic valve re-replacement. In view of the good hepatic function and complete eradication of primary liver disease, a 21 mm supra-annular mechanical valve (CarboMedics Top Hat; CarboMedics, Inc., Austin, TX) was implanted. Immunosuppressive therapy (tacrolimus, 1 mg, twice daily) was not discontinued, whereas perioperative antibiotic prophylaxis consisted of intravenous ceftriaxone (1 g, once daily) and vancomycin (1.5 g daily, continuous infusion) until the removal of the central venous catheters. Low-dose dopamine was infused to promote diuresis during the perioperative period. The patient was discharged 5 days after reoperation, and the following 9 months follow-up course was uneventful.

3. Discussion

Liver dysfunction significantly affects mortality and morbidity in cardiac surgery [1]. Successful operations have been performed in patients awaiting liver transplantation [2], but, to the best of our knowledge, valve surgery has not been described. This attitude probably reflects the reluctance to implant prosthetic valves in patients who will need immunosuppressive therapy, and the concerns of cardiopulmonary bypass. Previous experience is confined to coronary
revascularisation with a trend towards off-pump techniques [2]. Interestingly, a recent randomised controlled trial documented significantly different aspartate-amino transferase, alanine-amino transferase, and bilirubin postoperative levels in conventional on-pump versus off-pump coronary operations [5]. Conversely, this study did not include patients with pre-existing liver disease and failed to identify significant differences of intracellular metabolic function measured with more sophisticated tests.

A simultaneous approach, including valve replacement procedures, has also been suggested [4]. This strategy eliminates the risks of a cardiac operation in a liver transplant candidate, but requires a thoracoabdominal surgical incision, and implies exposure to cardiopulmonary bypass at the time of transplantation and initiation of immunosuppressive therapy. Furthermore, infective endocarditis represents an obvious contraindication for a combined operation.

Although Child-Pugh scores $\geq 8$ and high MELD scores correlate with mortality after cardiac surgery [1], higher scores can be affected by comorbid conditions, such as heart failure or sepsis, possibly overestimating the severity of hepatic dysfunction. Conversely, the latter may also reflect elevated central venous pressure and reduced systemic return determined by cardiac decompensation. Interestingly, our patient showed no sign of encephalopathy. The eradication of infection and improved haemodynamics following surgery might thus interrupt a multifactorial vicious cycle, and explain a successful valve operation in a patient with cirrhosis classified as class C.

In spite of young age, the choice of a tissue valve in the present case was dictated not only by the patient’s very poor condition, but also by the possibility to avoid anticoagulation [6], which appears advantageous in the presence of advanced liver disease, both perioperatively and at time of transplantation.

Experience is greater with cardiac operations in transplant recipients. In this respect, the majority of patients have undergone previous kidney transplantation. In the case of prior liver transplantation, the risks are relatively low [3], and the most commonly encountered perioperative complication is renal failure, likely related to the renal side effects of cyclosporine, rather than liver dysfunction. Finally, we were unable to outline previous reports describing redo operations in a liver transplant recipient.

In conclusion, valve operations might not represent an absolute contraindication in patients awaiting liver transplantation, and may be considered when the severity of cardiac disease precludes transplantation. Bioprosthetic devices are the favoured option in this context, whereas progression of subsequent valve degeneration did not seem accelerated in our patient. Conversely, the clinical condition in the liver transplant recipient may not preclude the choice of a mechanical valve.

References