Simultaneous Orthotopic Liver Transplantation With Abdominal Aortic Aneurysm Repair: A Case Report

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Abstract

The simultaneous occurrence of an abdominal aortic aneurysm and liver cirrhosis needing surgical treatment is extremely rare. There is still controversy regarding the timing of abdominal aortic aneurysm repair and liver transplantation and regarding optimal treatment of the aneurysm. Here, we describe a 70-year-old white male patient who presented with end-stage liver disease secondary to chronic hepatitis C with a solitary hepatocellular carcinoma measuring 5.5 cm in diameter in the right liver lobe. A pretransplant work-up resulted in discovery of a 6.7-cm abdominal aortic aneurysm. The decision was made to perform orthotopic liver transplantation with simultaneous aneurysm repair. The patient was initially explored through a median laparotomy. The liver transplant was performed first with the graft prepared on the back table using a standard procedure. The liver graft was transplanted using a “piggy-back” technique with end-to-side caval and end-to-end portal vein anastomosis. The arterial anastomosis was performed with an end-to-end anastomosis between the donor’s proper hepatic artery and the recipient’s common hepatic artery. The bile duct anastomosis was performed with an end-to-end anastomosis. A midline incision was extended to the pubis. After proximal and distal vascular control of the infrarenal aorta, resection of the abdominal aortic aneurysm was performed followed by reconstruction with an InterVascular 22-mm prosthesis using 3.0 Prolene in a running fashion. Eight days after surgery, the patient was discharged and remained well during the 2-year follow-up. Although rare, in a patient with end-stage liver disease and abdominal aortic aneurysm, a simultaneous liver transplantation and aneurysm repair procedure represents the safest treatment solution.

Key words: Aorta, Hepatic transplant, Surgical treatment

Introduction

The simultaneous occurrence of an abdominal aortic aneurysm and liver cirrhosis needing surgical treatment is extremely rare. There is still controversy regarding the timing of abdominal aortic aneurysm repair and liver transplantation1-3 and regarding optimal treatment of abdominal aortic aneurysm.4 However, it has been observed that these aneurysms expand more rapidly in transplant recipients than in nontransplant individuals.5 It has also been noted that the incidence of these aneurysms in liver transplant recipients is 1.7% and that performing abdominal aortic aneurysm repair after transplantation is associated with higher potential perioperative complications.6 Furthermore, transplant patients show higher rates of abdominal aortic aneurysm rupture with a considerable risk for surgery-related ischemic injury.5-7 In this report, we describe our treatment of a patient with end-stage liver disease secondary to chronic hepatitis C with a solitary hepatocellular carcinoma and abdominal aortic aneurysm.

Case Report

A 70-year-old male patient presented with end-stage liver disease secondary to chronic hepatitis C virus (genotype 1A) infection with a solitary hepatocellular carcinoma measuring 5.5 cm in diameter in the right liver lobe. Preoperative multislice computed tomography showed a 55 × 50 mm solitary node in the
right liver lobe but without any signs of extrahepatic spread. Also shown was an infrarenal abdominal aortic aneurysm measuring 67 mm in maximum diameter. The decision was made to perform the orthotopic liver transplantation and aneurysm repair simultaneously.

We procured the liver from a deceased donor using standard procedures. The recipient was explored through a median laparotomy with a right subcostal extension. The liver transplant was performed first with the liver graft prepared on the back table in a standard fashion. The liver graft was transplanted using a “piggy-back” technique with end-to-side caval and end-to-end portal vein anastomosis. The arterial anastomosis was performed with an end-to-end anastomosis between the donor’s proper hepatic artery and the recipient’s common hepatic artery. The bile duct anastomosis was performed with an end-to-end anastomosis. A midline incision was then extended to the pubis, and the infrarenal aorta was clamped proximally and distally from the aneurysm. Resection of the abdominal aortic aneurysm was performed followed by reconstruction with an InterVascular 22-mm prosthesis using 3.0 Prolene (Ethicon, West Somerville, NJ, USA) in a running fashion. The cold ischemia time was 8 hours, the warm ischemia time was 27 minutes, and the total operating time was 6 hours. The patient was then admitted to the intensive care unit and was extubated 6 hours after the surgical procedure.

The patient’s early postoperative course was unremarkable with no need for blood transfusion. Routine Doppler ultrasonography examination showed normal hepatic arterial and venous waveforms. Immunosuppressive treatment consisted of cyclosporine and mycophenolate mofetil with corticosteroids tapered over a period of 3 months. The patient was discharged 8 days after the surgery. Hepatitis C virus reinfection was found and treated with antiviral therapy 8 months after the surgery. The patient remained well during the 2-year follow-up.

Discussion

Recent literature reports on simultaneous abdominal aortic aneurysm repair and orthotopic liver transplantation are limited, and only a few papers have reported simultaneous repair of an abdominal aortic aneurysm with kidney transplant. Ballotta and associates reported the incidence of asymptomatic abdominal aortic aneurysm to be only 1.7% among liver transplant recipients. The controversial issue is the timing of the abdominal aortic aneurysm repair among patients awaiting liver or kidney transplant, as well as the optimal treatment of abdominal aortic aneurysm. According to the available literature, this is the first case report of a simultaneous open repair of an abdominal aortic aneurysm using a prosthesis in a liver transplant recipient.

Open repair of an abdominal aortic aneurysm represents a high-risk operation in patients with liver cirrhosis because any abdominal surgical procedure can lead to liver decompensation and multiple postoperative complications. On the other hand, the risk of rupture of the abdominal aortic aneurysm after liver transplantation is increased due to several reasons. An increased activity of collagenase and other proteases has been recorded postoperatively after liver transplantation. Additionally, increased systemic blood pressure due to an increase in the preload after removal of the cirrhotic liver and secondary to the influence of immunosuppressive therapy further increases the risk of rupture. Moreover, after the liver transplantation and recovery of liver function, the cholesterol level is elevated. The faster increase of the aneurysm’s diameter in transplant patients can be related to the direct effects of immunosuppressive therapy as the assumed mechanisms are based on immunologic changes. Ballotta and associates reported a mean expansion rate of 0.73 cm/year among transplant recipients, compared with 0.2 to 0.5 cm/year in the general population.

Recently, endovascular treatment of abdominal aortic aneurysms has gained popularity due to lower mortality and morbidity with this treatment, as well as a faster return to daily activities. The main disadvantages of an endovascular approach are suitability determined by anatomic criteria, a reintervention rate of about 15% per year due to endoleak, stent migration, procedure costs, and stent infection. Testa and associates have thus far described the only simultaneous liver and kidney transplant with repair of abdominal aortic aneurysm using arterial allograft as the most optimal approach.

Conclusions

In the present case, we describe a successful simultaneous orthotopic liver transplantation and open
repair of abdominal aortic aneurysm using prosthesis with an uneventful 2-year follow-up. Although rare, in a patient with end-stage liver disease and abdominal aortic aneurysm, simultaneous liver transplantation and aneurysm repair represents a safe and technically feasible surgical procedure.

References