A New Technique for Complete Portal Vein and Superior Mesenteric Vein Thrombosis in a Liver Transplant Recipient

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Abstract

We describe a deceased-donor liver transplant recipient with grade 3 complete portal vein and superior mesenteric vein thromboses, which was successfully managed with an extensive thrombectomy through the venotomy site of superior mesenteric vein. In this case report, we suggest our method as an option for grade 3 portal vein thromboses, and discuss other options available for recipients with portal vein thromboses.

Key words: Liver transplant, Portal vein thrombosis, Thrombectomy

Introduction

Portal vein thrombosis is a common complication for patients with end-stage liver disease; having an incidence of 0.6% to 26% in those with well-compensated disease.1-3 Complete obstruction of the portal vein was once considered a contraindication for orthotopic liver transplant.4 Today, many centers do not consider preoperative portal vein thrombosis as a contraindication for liver transplant, especially when there is a partial portal vein thrombosis.5 Various approaches, ranging from thrombectomy of the obstructed vein to porto-caval transposition, have been described to allow these patients to receive a liver graft.6 Eversion thrombectomy is the most commonly used technique for a partial portal vein thrombosis and a segmental thrombosis localized to the portal vein itself. If the thrombosis is more extensive, invading the main superior mesenteric vein, a venous graft is anastomosed to the distal superior mesenteric vein and brought up through the mesocolon. The long-term outcomes of both methods now our comparable to those of patients without a portal vein thrombosis.7

Choosing the optimal approach in an individual case depends on the preoperative diagnosis and the surgeon’s preference. We seek to report the alternative method of reconstructing the portal flow in a liver transplant recipient who has extensive portal vein and superior mesenteric vein thromboses.

Materials and Methods

A 52-year-old man underwent a deceased-donor liver transplant for hepatitis B virus cirrhosis. Before transplant, he had variceal bleeding, hepatic encephalopathy, and uncontrolled ascites. His Child-Turcotte-Pugh score was 10, and his Model for End-Stage Liver Disease score was 20. A triphasic computed tomography scan taken before surgery showed extensive thromboses involving the splenic vein, the superior mesenteric vein, and the right and main portal vein (Figure 1). The portal vein thrombosis of this patient was Yerdel’s grade 3.8

Surgical procedure

During the operation, we observed a chronic portal vein thrombosis with well-developed, large collateral variceal branches. The transected portal vein showed no venous flow; it had a chronic fibrotic cord occlusion. We tried eversion thrombectomy first, through the transected portal vein. The surgeon could separate the thrombus from the media of the vein,
while compressing the portal vein with the surgeon’s middle finger. This maneuver went as far as entering the splenic and superior mesenteric veins. However, during this operation, we could not achieve adequate portal flow after the eversion thrombectomy, because the thrombus extended too far into the distal superior mesenteric vein.

After mobilizing completely the hepatic flexure and lateral half of the transverse colon, the gastrocolic trunk could be clearly seen at the base of the transverse mesocolon, so that the entrance to the superior mesenteric vein could be easily dissected. This maneuver exposes a large expanse of the superior mesenteric vein. We isolated the proximal and distal superior mesenteric veins circumferentially, and opened the superior mesenteric vein. An additional thrombectomy was done through the venotomy into the superior mesenteric vein (Figure 2). After the thrombectomy, enough blood could flow and the venotomy site was sutured. The portal vein reconstruction, in this case, was accomplished by a portoportal anastomosis.

Results

The procedure was without intraoperative complications. The operative time was 699 minutes, the cold ischemic time was 474 minutes, and the warm ischemic time was 23 minutes. Blood loss was estimated to be 6000 mL, we used 3 units of transfused packed red blood cells, 12 units of leukocyte depleted platelet concentrate, 10 units of fresh frozen plasma, 6 units of the cryoprecipitate, and 2900 mL of cell-saver blood.

On postoperative day 1, a Doppler ultrasound showed the portal velocity to be 24.2 cm/sec, with no anastomotic site stenosis. He discharged from the hospital to home on day 36. One week after discharge, he was readmitted for abdominal discomfort and cytomegalovirus antigenemia. We checked his computed tomography scans, and there was a large amount of complicated fluid collected in the retro-omental area. We inserted a percutaneous
drainage catheter and removed the catheter after 7 days’ drainage. The fluid that was drained was clear, and there was no infection. The cytomegalovirus antigenemia was well-controlled by intravenous ganciclovir. At the time of this writing (5 months after the transplant), the patient is doing well. The last Doppler ultrasound showed the portal velocity was 50.9 cm/sec, and his computed tomography scan showed a patent portal vein from the superior mesenteric vein (Figure 3).

Discussion

Previously, a portal vein thrombosis was regarded as a contraindication for a liver transplant. However, improvements in the surgical technique have made liver transplant feasible in select patients with portal vein thrombosis. For grades 1 to 2 portal vein thrombosis, the evasion thrombectomy and restoring of the portal flow by a portoportal anastomosis has been used widely. For a grade 3 portal vein thrombosis, restoring portal perfusion may require anastomosing the donor portal vein to the superior mesenteric vein distally (with or without an interposed vein graft), left gastric vein, choledochal vein plexus, or mesenteric varices. The outcomes of these procedures have improved with time.

There are many ways to restore portal perfusion with grade 3 portal vein thrombosis. In cases when the portal vein thrombosis involves the retropancreatic portal vein, low dissection and thrombectomy are not advisable owing to the risk of massive bleeding and/or pancreatitis. Therefore, in cases that show a diffuse portal vein thrombosis with a distally open superior mesenteric vein, a jump graft is the best approach.

We use an alternate means of treating a grade 3 portal vein thrombosis, without using graft vein. This staged thrombectomy is applied easily, and anatomic reconstruction is accomplished easily. However, exposing the superior mesenteric vein could be dangerous in the setting of liver cirrhosis, with many collateral vessels. In addition, a long and tortuous anomalous hepatic artery arising from the superior mesenteric artery may pass behind the pancreas, or actually lie in the pancreas itself. To avoid these hazards and to visually expose this dangerous area, the surgeon should be familiar with the anatomy of this area. And postoperative fluid collection around the pancreas could occur because this exposure process must have extensive dissection. In our case, postoperative fluid was collected and needed percutaneous drainage.

In this case, a mesentericoportal anastomosis by interposing a donor iliac vein graft between the infrapancreatic superior mesenteric vein and graft portal vein was an option. Until recently, the results of using a jump graft was comparable with an evasion thrombectomy. However, Kim and associates reported the patency of portal vein flow was somewhat better during an evasion thrombectomy, than using a jump graft, and the need for a vascular graft is essential for vascular reconstructions.

Pre-existing portal vein thromboses in liver transplant recipient is not rare. Except for Yerdel’s grade 4 portal vein thrombosis, most portal vein thrombosis can be managed with various methods. When the vascular graft is not available, or the anastomosis to the mesenteric vessels is technically difficult, our method can be used.

In conclusion, this is a good approach for portal revascularization for liver transplant in patients with complete portal vein thrombosis. Patients with complete portal vein thrombosis undergoing a liver transplant must often have a surgical technique that overcomes the difficulties of the operation. Various alternatives are helpful in performing this operation. A staged thrombectomy could be risky and may not work in some case; however, this staged thrombectomy can be an option for complete portal vein thrombosis.

References