Early Mortality after TIPS in a Liver Transplant Recipient

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Very few studies have evaluated transjugular intrahepatic portosystemic shunt (TIPS) insertion in liver transplant recipients. In general, it appears to be a viable long-term treatment option in some patients and may serve as a bridge to retransplantation in others. The overall risk of early mortality appears to be similar to patients without transplants; mortality is more common in patients with advanced liver and kidney disease.

CASE REPORT

A 63-year-old woman with a past history of Crohn's disease and orthotopic liver transplantation 7 years earlier for hepatitis C cirrhosis was referred for TIPS to treat refractory ascites. She had been well until recently when she developed large-volume ascites and renal dysfunction (Fig. 1). Due to multiple abdominal adhesions from previous surgeries, large-volume paracentesis was nearly impossible. Notable laboratory values included total bilirubin 2.8, creatinine 1.6, and a MELD (model of end-stage liver disease) score of 24. An ultrasound examination of the liver demonstrated patency of the hepatic artery, portal veins, and hepatic veins (Fig. 2). A lengthy consultation was performed given the underlying condition and relatively high risk of the procedure. Despite being at increased risk for early mortality after TIPS, the patient and her family believed it to be the only reasonable option.

TIPS was performed uneventfully using a 8-mm covered stent graft (Viatorr; Gore, Flagstaff, AZ) (Fig. 3). On postoperative day 1 in the intensive care unit, she became hypotensive with mental status changes. A presumptive diagnosis of septic shock was made, and she was intubated and placed on broad-spectrum antibiotics. All cultures were negative. Liver failure ensued with hypoglycemia, elevation of liver function tests, coagulopathy, and disseminated

intravascular coagulopathy. She was initiated on pressors but expired 3 days after TIPS insertion. An autopsy revealed macronodular and micronodular cirrhosis, patency of the shunt, no source of infection to verify clinical diagnosis of sepsis, and no clear explanation of the acute vascular collapse that precipitated death.

DISCUSSION

Complications related to TIPS placement can be divided into procedural and postprocedural complications. Procedural complications include access site injuries such as carotid puncture and right atrial perforation, portal vein localization injuries such as capsular laceration, vessel laceration, or bile duct injury, and stent-graft complications such as misplacement and migration. The most common postprocedural complications are shunt occlusion and encephalopathy. Covered stents have decreased the incidence of shunt occlusion by precluding bile leakage into the shunt. Encephalopathy is managed medically or by reducing flow in the shunt by a variety of methods.

When considering TIPS for the treatment of ascites, it is important to weigh risks and benefits carefully. Unlike variceal bleeding, ascites is typically not life threatening, and patients with ascites may have more advanced liver disease compared with patients with variceal bleeding. But because refractory ascites is not used in calculating a MELD score and no longer used to prioritize patients awaiting transplantation, liver transplantation may not be an immediate therapeutic option. The patient in this case had already undergone liver transplantation and developed refractory ascites 7 years later. She was not considered a retransplantation candidate.

In a meta-analysis of TIPS in patients with ascites, Russo et al concluded that TIPS results in a

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Figure 1 Ultrasound-guided paracentesis in liver transplant recipient with refractory ascites. (A) Ultrasound of right lower quadrant reveals extensive ascites. (B) Fluoroscopic image shows pigtail catheter draining ascites.

complete response in 45% of patients and a partial or complete response in 63% of patients. TIPS also appeared to improve creatinine clearance and urinary sodium excretion in those studies reporting these variables. Pooled 6-month mortality in this analysis was 36%. Risk factors for mortality included renal insufficiency (serum creatinine > 1.5 mg/dL), elevated bilirubin (total bilirubin > 3 mg/dL), advanced age (> 60 years), and poor response to TIPS. A third of patients developed new or worsening encephalopathy, although nearly all of those cases were managed successfully with medical therapy.

There are few studies evaluating TIPS in liver transplant patients. Patel et al evaluated 30 patients in three reported series. TIPS were inserted for conventional indications in most patients with refractory ascites ($n = 20$ patients) being most common. They found the 6-month mortality was 30% for all patients. The 6-month mortality for patients treated for ascites was 40%. Overall, the results of TIPS in the transplant population appears to be similar for patients without liver transplants. In our own experience, we have found

Figure 2 Doppler ultrasound examination prior to transjugular portosystemic shunt insertion. (A) Conventional Doppler ultrasound shows patent hepatic artery. (B) Color Doppler ultrasound shows patent hepatic vein.

that TIPS may serve as an effective bridge to retransplantation.

MELD scores have been correlated with survival after TIPS in numerous studies. Harrod-Kim reported a 6-month survival of 86% for patients with MELD scores ≤ 15 , 77% for scores 15 to 25, and 47% for scores > 25. Ferral found that 30-day mortality was 0% in patients with scores ≤ 10 versus 42% in patients with scores ≥ 25 . Moreover, the 3-month and 6-month mortality rates in Ferral's series were 66% and 74%, respectively, for patients with scores > 25 versus 0% in those with scores < 10.

The etiology of early mortality after TIPS is not entirely clear. In most patients, a hyperdynamic state occurs after TIPS insertion with increasing pulmonary artery and right atrial pressure. The cardiac index and pulmonary vascular resistance also rise. This can lead to acute decompensation if there is limited cardiac reserve. The patient in this report suffered from fulminant liver failure that ultimately led to her demise. Although the hepatic artery was noted to be patent, it is possible there was an insufficient increase in hepatic arterial flow to

Figure 3 Transjugular portosystemic shunt insertion. (A) Hepatic venogram showing patent hepatic vein. (B) Portal venogram showing patency of portal vein. (C) Calibrated portal venogram showing track length. (D) Portal venogram after covered stent insertion.

compensate for diverted portal vein flow. The patient's rapid demise and unstable condition precluded placement of a reducing shunt or occluding the shunt completely, which may have helped avert liver failure.

SUGGESTED READINGS

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