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Case Report

Transsplenic portal vein reconstruction–transjugular intrahepatic portosystemic shunt in a patient with portal and splenic vein thrombosis

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ABSTRACT

Portal vein thrombosis (PVT) is a potential complication of cirrhosis and can worsen outcomes after liver transplant (LT). Portal vein reconstruction–transjugular intrahepatic portosystemic shunt (PVR-TIPS) can restore flow through the portal vein (PV) and facilitate LT by avoiding complex vascular conduits. We present a case of transsplenic PVR-TIPS in the setting of complete PVT and splenic vein (SV) thrombosis. The patient had a 3-year history of PVT complicated by abdominal pain, ascites, and paraesophageal varices. A SV tributary provided access to the main SV and was punctured percutaneously under ultrasound scan guidance. PV access, PV and SV venoplasty, and TIPS placement were successfully performed without complex techniques. The patient underwent LT with successful end-to-end anastomosis of the PVs. Our case suggests transsplenic PVR-TIPS to be a safe and effective alternative to conventional PVR-TIPS in patients with PVT and SV thrombosis.

Introduction

Portal vein thrombosis (PVT) is a potential complication of cirrhosis. Patients with PVT undergoing liver transplant (LT) are at greater risk of post-transplant mortality compared with those without PVT [1]. Portal vein reconstruction–transjugular intrahepatic portosystemic shunt (PVR-TIPS) can restore flow through the PV, alleviate portal hypertension (PH) by diverting blood from the PV directly to the inferior vena cava, and facilitate LT [2]. Here, we describe a case of percutaneous transsplenic PVR-TIPS in the setting of complete PVT and splenic vein thrombosis (SVT).

Case report

Our patient is a 48-year-old obese woman on the LT list with a history of nonalcoholic steatohepatitis, chronic hepatitis

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B virus infection, and cirrhosis complicated by ascites and PVT who presented with worsening postprandial epigastric pain. She was diagnosed with PVT shortly after starting tenofovir 3 years before presentation. Previous attempts at thrombolysis and TIPS placement failed. Abdominal computer tomography imaging revealed cavernous transformation of the PV, massive ascites, and paraesophageal varices (Fig. 1). Her model for end-stage liver disease score oscillated between 14 and 25 in the 2 months preceding transsplenic PVR-TIPS; Child-Pugh score was 14. Laboratory values on the day of the procedure were as follows: creatinine 1.08 mg/dL, albumin 2.7 g/dL, total bilirubin 5.0 mg/dL, international normalized ratio 2.10, and platelets 48,000/μL.

We used ultrasound scan (USS) guidance to identify and puncture the right internal jugular vein (IJV) with a micropuncture needle. A 10-Fr vascular sheath was then placed. We catheterized the right hepatic vein (HV) using a 5-Fr MPA catheter (AngioDynamics, Latham, NY) and obtained a venogram, which demonstrated a normal pattern. Portosystemic gradient was 17 mm Hg. Afterward, an intraparenchymal tributary of the SV was identified via USS and accessed percutaneously using a 21-G needle. Splenic venogram revealed numerous collateral veins and occlusion of the SV (Fig. 2). A 0.018-in guidewire was then advanced into the PV followed by introduction of an Accustick System (Boston Scientific, Natick, MA). Repeat splenic venogram showed significant flow in the inferior mesenteric vein with lack of flow in the PV. In light of these findings, a KMP catheter (Cook Medical, Bloomington, IN) was advanced via a 0.035-in stiff glide wire, and the PV was recanalized. Portal venogram demonstrated patent intrahepatic portal branches and filling defects in the proximal right and left PVs and main PV.

To begin TIPS placement, a 10-mm snare was placed in the PV via the SV. Attempts to access the PV snare from the transjugular approach were unsuccessful. Thus, a snare was placed in the right HV. Both snares were then accessed in bull's eye fashion using a 21-G needle under fluoroscopic guidance. A 7 cm × 10 mm Viatorr stent (Gore, Newark, DE) was deployed in the liver parenchymal tract, connecting the right PV and right HV, without extending deep into the portal system. Splenic and portal venograms showed good flow through the newly created TIPS and recanalization of the SV and main PV. Portosystemic gradient was 6 mm Hg. Finally, the tract thought the spleen was embolized using two 6-mm type IV Amplatzer plugs (St. Jude Medical, Plymouth, MN) and Gelfoam slurry (Upjohn Co, Kalamazoo, MI). TIPS patency was demonstrated using USS at the end of the procedure, on the third day, and at 1-month follow-up.

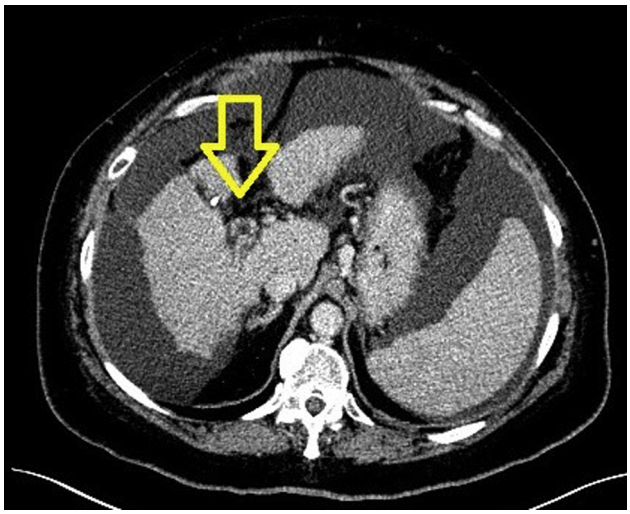

Fig. 1 – Abdominal computer tomography of a 48-year-old obese woman with end-stage liver disease. Note presence of massive ascites and cavernous transformation of the PV (arrow).

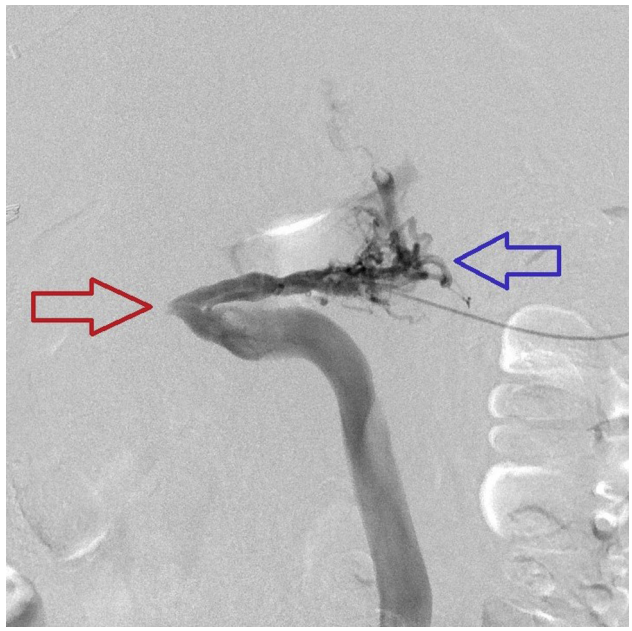

Fig. 2 – A splenic venogram demonstrating tortuous collateral veins (blue arrow) and complete occlusion of the SV (red arrow) at the junction with the inferior mesenteric vein.

At 4 months postoperatively, she presented to the emergency department with altered mental status, fever, and abdominal pain. USS showed occlusion of the TIPS. TIPS revision was subsequently performed by advancing a 4-Fr MPA catheter through the IJV and into the TIPS. SV and PV venograms demonstrated hepatofugal flow into an enlarged inferior mesenteric vein; no flow was evident in the superior mesenteric vein (SMV) or TIPS (Fig. 3). The Penumbra aspiration system (Penumbra Inc, Alameda, CA) was advanced through the IJV and into the TIPS for suction thrombectomy (Fig. 4). Approximate blood loss was 275 mL, and the patient received 2 units of blood. Follow-up portal venogram showed hepatopetal flow through the TIPS and residual mural filling defects in the TIPS and PV. Venoplasty of the PV and TIPS was performed with a 10 mm × 4 cm Conquest balloon (Bard PV, Tempe, AZ; Fig. 5). SV venoplasty was then performed with a Conquest balloon from the mid-SV to the TIPS. The SMV was next catheterized and venoplasty performed as previously mentioned. Flow was restored throughout the portal system (Fig. 6).

Approximately 1 month after TIPS revision, the patient underwent LT. Intraoperatively, a hard thrombus was discovered