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Endovascular Treatment of an Unusual Primary Arterioportal Fistula Complicated by Cavernous Transformation of the Portal Vein Caused by Portal Thrombosis

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We describe an elderly woman who presented with an unusual primary arterioportal fistula and cavernous transformation of the portal vein caused by portal thrombosis, which were subsequently managed with endovascular coil embolization and transjugular intrahepatic portosystemic shunt using 2 stents after balloon remodeling. This case shows a rarely seen condition in the elderly and a novel management strategy that should be considered in the management of this complex disease.

CASE REPORT

A 78 year-old woman complained of diarrhea for 50 years, abdominal distension for >1 year, and melena for 2 days. There was no history of trauma, iatrogenic causes, or tumor. The gastrointestinal bleeding in this patient did not appear to be life-threatening. The physical examination revealed shifting dullness with the spleen edge palpable 26 mm below the left costal margin. Routine blood and biochemical tests were normal; liver function was grade A, as defined by the Child–Pugh classification; and viral hepatitis marker tests showed negative hepatitis B surface antigen and no antibody against hepatitis C virus. Tumor and immune marker tests were also negative. The level of adenosine deaminase in the ascitic fluid was 56.20 U/L (normal = <24 U/L), with all remaining values within the normal range.

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An abdominal ultrasound revealed mural thrombosis in the trunk of the hepatic portal vein and left portal vein and dilation of the trunk of the portal vein and right portal vein. Duplex Doppler ultrasonography revealed retrograde filling of the portal system. Multislice computed tomography (MSCT) and computed tomography angiography (CTA) confirmed the ultrasound findings, showing enhancement of the portal vein in the early arterial phase, a high-flow APF within the parenchyma of the medial segment of the right hepatic lobe, cirrhosis, moderate splenomegaly, and CTPV (Fig. 1).

Before the procedure, selective hepatic angiography, performed with a 5-French catheter using a transfemoral approach, revealed dilated main and right hepatic arteries, a wide right hepatic artery directly entering the right portal vein, and reversal of flow in the portal and superior mesenteric veins (Fig. 2A). Blood flow was primarily toward the portal vein through a few collateral vessels in the delayed arterial phase. The vena ileocolica and its branch were markedly dilated, and no varicose abnormalities of the esophagus were seen.

For the embolization procedure, a 5-French Cobra catheter guided by a laminated hydrophilic guidewire (Cook, Bloomington, IN) was positioned at the site of the fistula under roadmap guidance. Four 4 cm × 3 mm and three 14 cm × 4 mm steel coils were anchored in the branch of the right

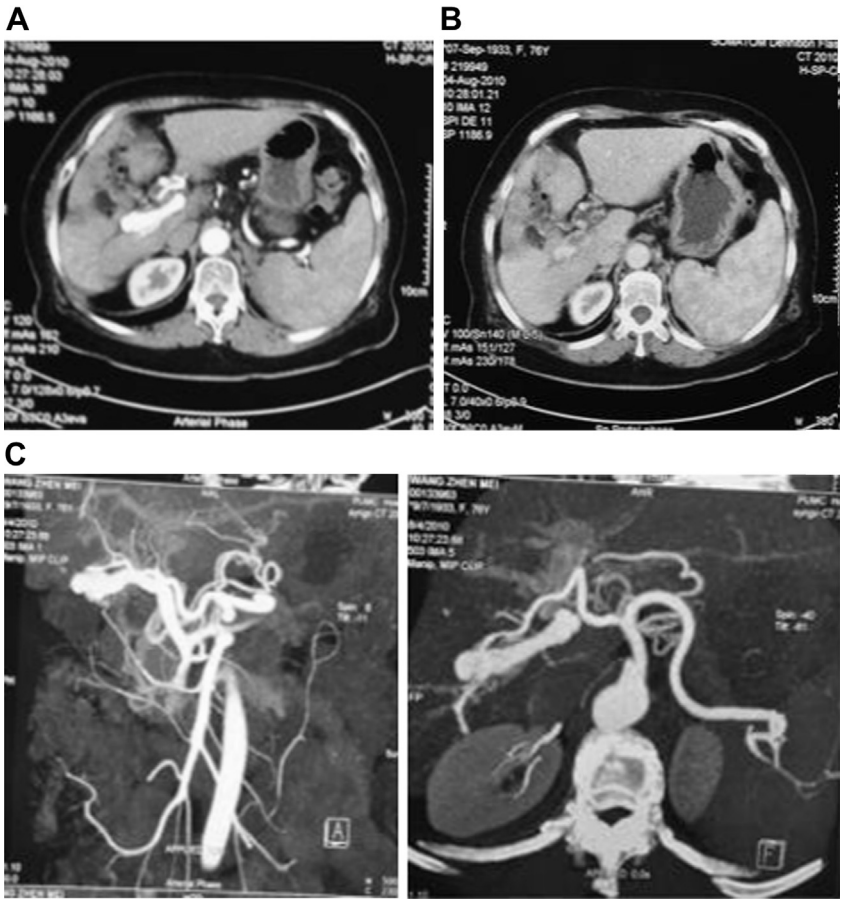

Fig. 1. (A) The right portal vein was rapidly enhanced in the early arterial phase and dilated. **(B)** Mural thrombosis in the trunk of the hepatic portal vein. Collaterals were well-developed surrounding the hilus of the portal vein. **(C)** Computed tomography angiography revealing a high-flow arterioportal fistula within the parenchyma of the medial segment of the right hepatic lobe.

hepatic artery, and the fistula was occluded. Hepatic arteriography was performed immediately postprocedure to confirm that the portal system and dilated vena ileocolica were no longer seen.

The pressure in the portal vein was measured directly using transjugular intrahepatic portal vein access. The distal pressure in the portal vein was 42 cm H_2O.

After consultation with the patient and her relatives, the TIPS procedure was elected to effectively decompress the portal system and prevent gastrointestinal bleeding. The details of this interventional radiology procedure have been described previously.[1–3] Briefly, the procedure involves the creation of a track between the right hepatic artery and the right portal vein (Fig. 2B). Two 8 cm × 9 mm metallic wall stents (Boston Scientific, Natick, MA) were deployed after the transhepatic track was dilated with a 6 mm × 60 mm diameter high-pressure angioplasty balloon (Cook) with a pressure of approximately 3 atmospheres for 5 sec. A direct portogram after TIPS revealed a patent shunt with the distal pressure of the portal vein dropping from 42 cm H_2O to 27 cm H_2O after the shunting. A liver biopsy specimen was obtained for histopathologic analysis via transjugular intrahepatic track access before placement of the stent.

The procedure was completed without complications. The patient was treated systemically with low–molecular weight heparin (5000 IU every 12 hrs) for 4 days and warfarin sodium (5 mg daily by mouth) for 6 months, beginning the second day after the procedure, to maintain the International Normalized Ratio between 2.0 and 3.0. The low–molecular weight heparin was discontinued when the prothrombin time–International Normalized Ratio reached 2.53. A few days after the procedure, the diarrhea and ascites resolved and treatment with