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Case Report

Intrahepatic portal-venous shunts during PVE

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ABSTRACT

Portal venous embolization (PVE) is a well-validated technique to promote contralateral liver lobe hypertrophy prior to hepatic resection. We present a case of a patient with Type IV cholangiocarcinoma undergoing PVE prior to hepatic surgical resection. However, intrahepatic portal-venous shunts were incidentally found during the procedure and were subsequently embolized using embolic coils and N-butyl cyanoacrylate. While most patients with congenital portal-venous shunts remain asymptomatic, an unrecognized shunt during PVE could have resulted in a devastating complication secondary to nontarget embolization through the fistula.

To our knowledge, this is the first reported case of a portal-venous shunt being discovered during a PVE.

Introduction

Portal venous embolization (PVE) is an image-guided technique used to induce parenchymal hypertrophy on one side of the liver prior to hepatic resection on the other side, in order to create an adequate future liver remnant (FLR). This technique redirects blood flow from the targeted portal veins toward the segments of FLR [1]. The size of FLR is typically determined by multiphase contrast enhanced computed tomography (CT), and is subsequently standardized to patient size through a ratio of FLR to total functional liver volume—also known as standardized FLR [1]. This percentage is utilized to determine if a PVE is indicated in a given patient [2]. PVE performed in patients with hepatobiliary malignancies has been shown to be safe and effective in inducing hypertrophy of FLR prior to hepatic resection [3]. Embolic coils, dehydrated alcohol, and spherical microparticles have been widely utilized for PVE. N-butyl-cryanoacrylate is a newer liquid embolic agent that can also be used for PVE and while available data are still limited, it has been shown to be superior to spherical microparticles and coils leading to a greater percentage of left lobe hypertrophy [4]. Absolute contraindications to the procedure include tumor thrombus and clinically significant portal hypertension [1]. Complications of PVE include pneumothorax, cholangitis, FLR injury, hemoperitoneum, and rarely biliary-pleural fistula in the setting of cholangiocarcinoma and obstructive jaundice [1,5,6].

Case report

The patient is a 66-year-old female who presented with abdominal discomfort, bloating, and weight loss of 3 months

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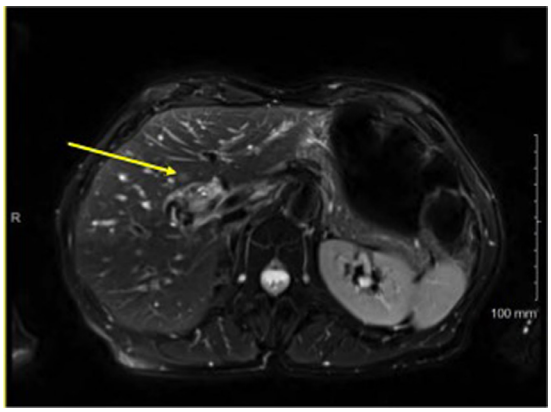

Fig. 1 – MR abdomen was obtained due to clinical elevation in liver function tests and biliary duct dilatation. T2-weighted and T1-weighted postcontrast MRI images showing T2 hyperintense perihilar lesion with delayed contrast enhancement on T1 weighted image (shown by yellow arrows). MR, magnetic resonance; MRI, magnetic resonance imaging. (Color version of figure is available online.)

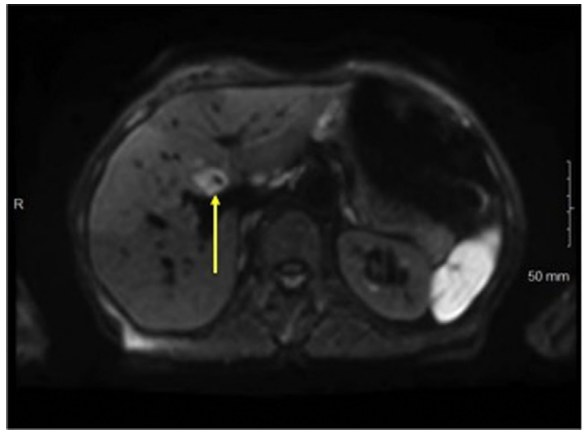

Fig. 2 – MR abdomen was obtained due to clinical elevation in liver function tests and biliary duct dilatation. T2-weighted and T1-weighted postcontrast MRI images showing T2 hyperintense perihilar lesion with delayed contrast enhancement on T1-weighted image (shown by yellow arrows). MR, magnetic resonance; MRI, magnetic resonance imaging. (Color version of figure is available online.)

duration at an outpatient clinic. She had elevated liver function tests and CT scan of abdomen that demonstrated intraductal dilation at an outside institution. The patient was then referred to our medical center for endoscopic ultrasound (EUS), and her initial workup included magnetic resonance imaging (MRI) of abdomen and magnetic resonance cholangiopancreatography (MRCP) followed by EUS and endoscopic retrograde cholangiopancreatography (ERCP).

The magnetic resonance cholangiopancreatography demonstrated a Bismuth-Corlette Type IV cholangiocarcinoma (Figs. 1-2). A roughly 3.5 cm ill-defined tumor was centered on the proximal hepatic duct extending into the hepatic hilum. There is evidence of periductal tumor extension along the right and left hepatic ducts to involve the first and second order ducts. The anterior division of the right portal vein was diminutive due to tumor involvement. The EUS displayed a 1.5-2 cm isoechoic poorly demarcated mass with significant intrahepatic biliary dilatation upstream. The mass was subsequently biopsied using a 25G needle with preliminary cytology revealing adenocarcinoma. A random liver biopsy was also performed and was unremarkable with no significant fibrosis or liver fatty infiltration.

The EUS was followed by an ERCP with placement of 2 intrahepatic stents for hyperbilirubinemia. Prior to performing ERCP, her AST and/or ALT ratio blood urea nitrogen and/or creatinine ratio, and hemoglobin were 0.74, 24, and 12.7 g/dL respectively. The ERCP demonstrated a high-grade, malignant-appearing, and hilar stricture extending to the origins of right and left hepatic ducts with upstream dilatation. Two 10 Fr plastic stents were deployed bilaterally across the hilum (Fig. 3). Her diagnostic laparoscopy and cytology from peritoneal washings was negative.

The patient was diagnosed with Stage IIIB intrahepatic cholangiocarcinoma given the invasion of one of the portal vein branches and no enlarged nodes seen on MRI. The goal

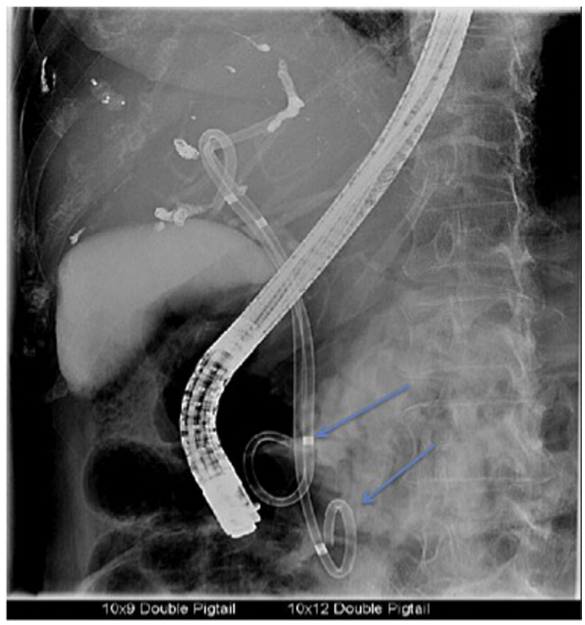

Fig. 3 – ERCP guided bilateral biliary stent placement (as depicted by blue arrows). ERCP, endoscopic retrograde cholangiopancreatography. (Color version of figure is available online.)

of her treatment was curative intent after PVE prior to resection followed by neoadjuvant chemotherapy with gemcitabine and cisplatin.

Patient was planned for PVE via ipsilateral approach. A 22-gauge Chiba needle was used for percutaneous puncture of right hepatic lobe. After subsequent catheterization of a peripheral right portal vein using a 5 Fr reverse curve catheter