

Portobiliary fistula: successful transcatheter treatment with embolisation coils

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ABSTRACT Although portobiliary fistula is a recognised complication of percutaneous transhepatic biliary drainage, it is extremely uncommon and can result in haemobilia. Herein, we present a case of complicated transhepatic biliary drainage catheter insertion in a patient with underlying hepatitis B liver cirrhosis, which resulted in a portobiliary fistula. The patient had a preoperative transhepatic biliary drainage procedure done prior to a Whipple's operation for a large, obstructive, gastrointestinal stromal tumour of the duodenum. To the best of our knowledge, this is the first case in the English medical literature reporting the successful treatment of portobiliary fistula by embolisation of its tract with embolisation coils, without compromising the portal vein or bile ducts.

Keywords: embolisation coil, haemobilia, portobiliary fistula, transhepatic biliary drainage

INTRODUCTION

Biliary drainage procedures are widely used in the management of biliary-related diseases, benign or otherwise. As percutaneous transhepatic biliary drainage (PTBD) is an invasive procedure, it is not risk-free. Although no significant difference in the success rate of cannulation in patients with dilated and non-dilated biliary systems has been reported, PTBD-related complications are found to be higher when performed on non-dilated biliary systems and small cirrhotic livers.^(1,2) Portobiliary fistula is a recognised, but uncommon, complication of PTBD and can result in significant haemobilia.^(3,4) We herein present a case of portobiliary fistula following PTBD catheter insertion in a patient with an underlying history of hepatitis B liver cirrhosis. The portobiliary fistula was successfully managed using embolisation coils to occlude the fistulous tract.

CASE REPORT

A 50-year-old man with underlying hepatitis B liver cirrhosis was investigated for anaemia. He was found to have a 5-cm fluorodeoxyglucose-avid duodenal mass arising from the second part of the duodenum, consistent with gastrointestinal stromal tumour (GIST). No distant metastasis was found. Transhepatic cholangiography was performed, together with preoperative insertion of a biliary drainage catheter before pancreaticoduodenectomy (i.e. Whipple's operation).

The patient's liver was found to be grossly cirrhotic. Successful access to the left hepatic lobe segment 3 duct was achieved using a 22G Chiba needle (Pajunk GmbH, Geisingen, Germany). A 0.018-inch Terumo guide wire (Terumo Corporation, Tokyo, Japan) was then advanced through the Chiba needle, and over this guide wire, a 6 French dilator was inserted. Through this dilator, a 0.035-inch Terumo guide wire (Terumo Corporation, Tokyo, Japan) was inserted and advanced

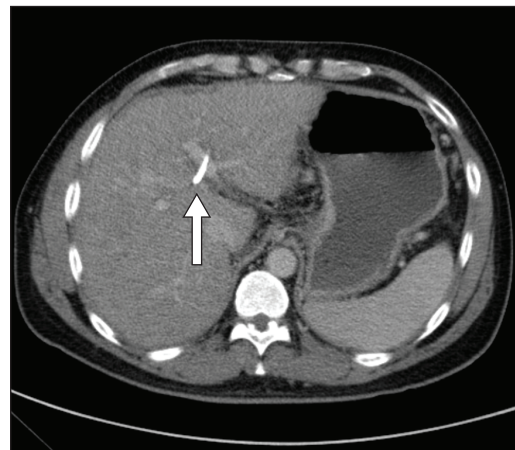


Fig. 1 CT of the abdomen shows the biliary catheter (arrow) traversing the left portal vein.

into the duodenum. There was good contrast drainage into the duodenum and satisfactory opacification of the duodenal loop. The dilator was then removed, and a 4 French cobra C2 catheter (Cordis, Miami Lakes, FL, USA) was advanced over the guide wire into the common bile duct (CBD) and then into the duodenum. The guide wire was then removed and a 0.035-inch stiff guide wire (Amplatz Super Stiff; Boston Scientific, Miami, FL, USA) was inserted. Over this guide wire, an 8 French biliary drainage catheter (Skater; Angiotech PBN Medicals, Denmark AS) was inserted with its catheter tip advanced into the duodenum and its catheter side holes positioned above and below the ampulla for internal/external biliary drainage.

Cholangiography performed immediately postinsertion showed opacification of an adjacent portal vein in the left hepatic lobe. The position of the catheter was subsequently adjusted and advanced further into the CBD and duodenum until there were no catheter side holes to opacify the intrahepatic portal/

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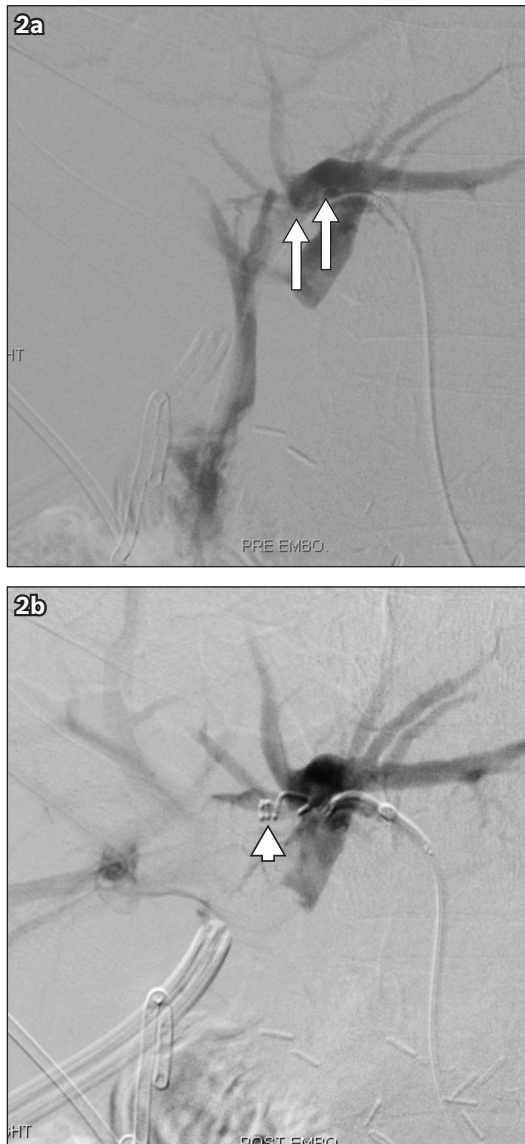


Fig. 2 Cholangiograms show (a) the portobiliary fistula tract (arrows), with the well-placed biliary catheter in the left duct traversing the left portal vein, and no evidence of haemobilia; and (b) coil embolisation (arrowhead) of the tract after removal of the biliary drainage catheter.

hepatic venous branches. The primary surgeon was informed of the planned subsequent removal of the biliary drainage catheter (under fluoroscopic imaging guidance in the angiogram suite) and possible tract embolisation during catheter removal. The catheter was secured with sutures, and haemostasis was obtained. The catheter was connected to a drainage bag and bile was allowed to drain externally.

After the duodenal GIST was deemed not amenable to local resection, the surgeon proceeded with Whipple's operation. On postoperative Day 5, computed tomography (CT) of the abdomen and pelvis was performed to look for intra-abdominal causes of the postoperative fever observed in the patient. A fluid collection was present in the surgical bed and lesser sac, which was then drained percutaneously. CT also showed the biliary catheter traversing the left portal vein (Fig. 1).

Although the left portal vein was traversed by the catheter, check cholangiography performed on postoperative Day 8

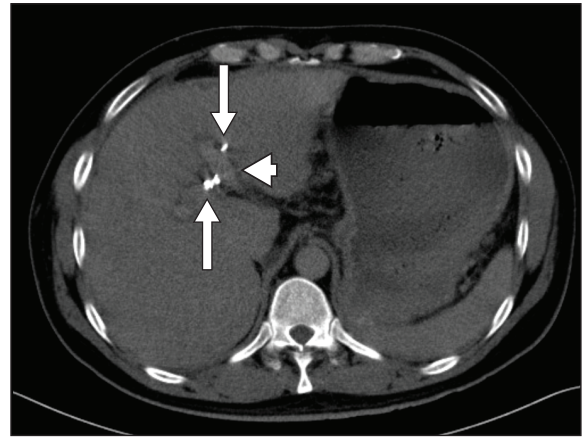


Fig. 3 Check CT after coil embolisation shows a well-positioned embolisation coil (arrows) occluding the portobiliary fistula tract, with no evidence of contrast leakage or compromise of the left portal vein calibre (arrowhead).

showed a patent and well-positioned biliary catheter in the left main duct with no evidence of haemobilia (Fig. 2a). Two weeks after Whipple's operation, the patient underwent uncomplicated embolisation of portal vein-biliary tract fistula following the removal of the biliary drainage catheter (Fig. 2b).

Initial check cholangiography performed intraoperatively confirmed the presence of a communicating fistula between the left biliary duct and the segmental branch of the left portal vein. The biliary tree was not dilated and no gross intraluminal filling defects were demonstrated. Contrast flow down the biliary tree through the hepaticojejunostomy anastomosis was very satisfactory, with no focal contrast leakage detected at the anastomosis.

The catheter was then removed over a 0.035-inch guide wire and exchanged for a 5 French vascular sheath (BRITe TIP; Cordis, Miami Lakes, FL, USA). Through the sheath, a 4 French hydrophilic catheter (Cobra C2 Glidecath; Terumo Corporation, Tokyo, Japan) was inserted and repeat check cholangiographies were performed in various oblique projections to confirm the position of the portal vein-biliary tract fistula. Embolisation of the fistula was then performed using a 4 cm length by 3 mm diameter fibred stainless steel embolisation coil (Gianturco; Cook Inc, Bloomington, IN, USA) deployed through the Glidecath with the catheter tip positioned just within the fistula. Post-embolisation contrast injection through the Glidecath showed satisfactory occlusion of the fistula with no opacification of the biliary tree.

Subsequently, the Cobra catheter and vascular sheath were withdrawn slowly and another 4 cm length by 3 mm diameter stainless steel Gianturco coil was deployed along the catheter tract within the liver parenchyma, adjacent to the portal vein wall, followed by Gelfoam slurry to embolise the percutaneous tract during catheter withdrawal. No immediate complications were encountered. The Cobra catheter and vascular sheath were removed completely at the end of the procedure and haemostasis was secured. Check CT done the following day showed no evidence of contrast leakage (Fig. 3).

The patient was discharged well and had no evidence of haemobilia at the one- and six-month follow-ups.

DISCUSSION

Morbidities of PTBD procedures can be as mild as skin discomfort or as life-threatening as arterial haemobilia with haemodynamic collapse of the patient.^(4,5) Minor complications such as biloma formation, mild venous haemobilia, transient bacteraemia, and transient hyperamylasaemia may occur early, while catheter dysfunction due to either a dilated tract with resultant bile leakage, or catheter occlusion, dislodgement or migration, more commonly occur later. Major complications include sepsis, acute cholangitis and vascular-related complications, such as significant venous and arterial haemobilia.^(1,4-7) The reported prevalence for major complications ranges from 2% in benign disease to 4%–25% in malignant disease.⁽⁶⁾ Overall, the incidence of procedure-related complications was reported to be 9%, but patients with non-dilated systems had significantly higher complication rates.⁽⁶⁾

Iatrogenic portobiliary fistula with resultant haemobilia, either minor or major, is a documented but uncommon occurrence; its management is based on the clinical assessment of the patient, as well as the experience of the interventional radiology team. Mild venous haemobilia is often treated either conservatively or by changing and increasing the size of the drainage catheter until the tract fully matures.⁽³⁾ The use of stent grafts has also been advocated for the treatment of significant venous haemobilia secondary to portobiliary fistula in a few case series.⁽⁸⁻¹⁰⁾ Chaitowitz et al⁽⁸⁾ reported the use of the stent-within-stent technique to obliterate a portobiliary fistula, which had resulted from stent erosion into the adjacent portal vein. In another series, Peynircioglu and Cwikiel⁽⁹⁾ reported the use of a stent graft in one patient who had venous haemobilia complicated by a small, asymptomatic hepatic infarction.

The presence of liver cirrhosis, coupled with a non-dilated biliary system made percutaneous transhepatic cholangiography technically challenging and difficult. To the best of our knowledge, the use of embolisation coils alone to embolise a portobiliary fistulous tract has never been reported. In one

report, technical difficulty was anticipated with embolisation of the fistula tract, due to the short distance between the bile duct and portal vein branch; placement of a stent graft was therefore considered a better alternative in that case.⁽⁹⁾ In another report,⁽³⁾ balloon tamponade of the bile duct and coil occlusion of the portal vein branch was used in three patients. Here, we present the successful use of embolisation coils in the obliteration of a portobiliary fistulous tract in a patient with a background of liver cirrhosis. Precision in the placement of the embolisation coils is of paramount importance, so as to not compromise the calibre or patency of the portal vein and the resultant hepatic blood supply, as well as the affected bile duct.

In conclusion, the present case demonstrates the feasibility of using embolisation coils in the management of a portobiliary fistula. The use of embolisation coils had resulted in a good outcome without compromising the calibre and patency of the portal vein and biliary tree.

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