Control of Hemobilia by Embolization of a False Aneurysm and Arterioportalbiliary Fistula of the Hepatic Artery

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Hemobilia is a potentially lethal condition, frequently caused by iatrogenic trauma [1, 2]. Percutaneous transarterial methods are being used increasingly as the preferred form of therapy [1–4]. We report a case of hemobilia due to a false aneurysm and arterioportalbiliary fistula in the hepatic artery that was successfully treated by transcatheter embolization via a T-tube track, an approach not previously described.

Case Report

A 40-year-old woman had cholangitis and obstructive jaundice. Sonography showed intrahepatic and extrahepatic biliary dilatation and a 10-mm calculus in the lower main bile duct, confirmed by ERCP. After successful endoscopic sphincterotomy, the Dormia basket became entrapped around the stone during attempted endoscopic extraction because of a hitherto undiagnosed stricture in the distal bile duct. A right-sided percutaneous external biliary drain was placed to prevent cholangitis. An unsuccessful attempt to free the endoscopically placed basket with a second Dormia basket passed via the external drain track was made 4 days later. At laparotomy the next day, the calculus and entwined basket were removed by choledochotomy, and a cholecystectomy was performed. Intraoperative removal of the external biliary drain, however, was followed by major hemorrhage from the intrahepatic bile ducts. Hemorrhage was controlled by temporary digital compression of the porta hepatitis. The common bile duct was then closed over a T tube.

On the seventh postoperative day, another major episode of hemobilia occurred through the T tube. A selective hepatic angiogram showed a 2-cm false aneurysm and arterioportal shunt from one of the two major branches of the right hepatic artery, which arose from the superior mesenteric artery (Fig. 1A). The portal vein was patent with normal flow. Superselective catheterization was not possible because of the adverse anatomy and proximal atheroma, therefore, embolization of the proximal right branch of the hepatic artery was done with Gianturco coils (Cook Co., Bloomington, IN). The postembolization angiogram showed no filling of the false aneurysm or the arterioportal fistula. Six days later the patient had yet another major hemorrhage from the T tube and was referred for reembolization. Collateral flow via the second branch of the right hepatic artery to the false aneurysm and arterioportal shunt was blocked with Gianturco coils as distally as possible, just proximal to the gastroduodenal artery. No further bleeding occurred.

An angiogram obtained 7 days later showed extensive fine collaterals reconstituting the false aneurysm and arterioportal shunt (Fig. 1B). Consequently, a 5-French 0.038-in. (0.96 mm) lumen cobra catheter was passed over a guidewire via the T-tube tract into the involved right bile ducts. A small intraluminal filling defect at the site of the bleeding false aneurysm seen on cholangiography was gently probed with the catheter tip. This caused a sudden dilution of the contrast material in the biliary tree, with blood refluxing up the T-tube track alongside the cobra catheter. This was easily controlled by inflating an occlusion balloon catheter at the site of the aneurysm.

After a few minutes the cobra catheter was again passed into the area of the fistula with entry of its tip into the portal vein (confirmed

Received December 4, 1990; accepted January 7, 1991.

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Fig. 1.—A, Angiogram shows tip of sidewinder catheter in right hepatic artery, atheroma (short solid arrow), and site of false aneurysm and fistula (long arrow) with filling of portal vein (curved arrow). Gastroduodenal artery (open arrow) arises from other right segmental branch.

B, After staged embolization of both segmental branches of right hepatic artery, angiogram obtained after injection of contrast medium into origin of right hepatic artery (curved arrow) shows persistent filling of false aneurysm (wide arrow) by collaterals, including gastroduodenal artery (small arrow).

C, Angiogram obtained after cobra catheter was passed via T-tube track and tip (straight arrow) entered portal vein shows filling defect in bile ducts due to hematoma (curved arrow).

D, Angiogram obtained after injection of contrast medium at same position as in C fills portal vein (arrow).

E, After final embolization, angiogram shows occlusion of false aneurysm and fistula by 8-mm Gianturco coil (curved arrow) placed via T-tube track. Note external biliary drain passed via T-tube track (straight arrow).

by contrast injection, Figs. 1C and 1D). An 8-mm coil was then deposited in the fistula, with the distal end in the portal vein branch and the proximal end in the bile duct. A hepatic angiogram obtained 3 days later showed no aneurysm or fistula (Fig. 1E). A month later the stenosis of the distal common bile duct was dilated to 6 mm with a Gruntzig balloon catheter on two occasions. The patient has been well in the following 14 months.

Discussion

Although vascular injury after percutaneous transhepatic biliary drainage (PTBD) has been reported in up to 32% of cases, only one in six injuries caused significant bleeding [2]. Probable causes for early hemorrhage are direct trauma and infection and for late hemorrhage are pressure erosion, catheter exchanges, progressive liver disease, coagulopathy, or tumor involvement [1, 2, 5, 6]. Although cure may be spontaneous [2], hepatic artery embolization is the method of choice for treating this serious complication of PTBD [1, 2]. Ideally, embolization of the artery should be done close to the injury, but this may be impossible despite the use of a variety of guidewires and catheters. Apart from Gianturco coils, embolic agents include gelatin sponge [2-4], tissue adhesives [4], or detachable balloons [1] and, more recently, platinum microcoils passed through Tracker catheters [7] (Target Therapeutics, San Jose, CA). Nonsel ective particle embolization can be dangerous and has been associated with at least two deaths [2], and was not considered further because of the arterioportal fistula.

One of the first reports of the use of the nonarterial route in performing embolization of a false aneurysm in the hepatic
artery was by Rosen et al. [5], who used the existing transhepatic drainage catheter tract. A similar approach used a balloon catheter for tamponade [6]. This route was not available in our patient because the drain had been withdrawn.

This report demonstrates the feasibility of using a T-tube track as an alternative biliary route for the embolization of a false aneurysm and arterioporal fistula in the hepatic artery when the conventional angiographic approach fails. In view of the potential difficulty of localization and the risk of provoking hemorrhage, occlusion balloon catheters, immediate surgical backup, and availability of cross-matched blood are advised. Endoscopic retrograde cholangiographic guidance may also be feasible by using a technique similar to that described for embolization of external biliary fistulas [8]. Intraoperative cholangiographically guided embolization is another alternative, depending on availability of adequate fluoroscopy. The importance of considering repeated angiography to confirm sustained occlusion of arterial lesions despite initially satisfactory angiographic findings is also emphasized.

REFERENCES

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