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LETTER TO THE EDITOR

Acute Hemobilia After Bilioplasty Due to Hepatic Artery Pseudoaneurysm: Treatment with an ePTFE-Covered Stent

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A 61-year-old male underwent biliodigestive anastomosis (BDA) 7 years after orthotopic liver transplantation (OLT) due to intra- and extrahepatic lithiasis. One month later he developed cholangitis and jaundice. Ultrasound examination revealed intrahepatic duct dilatation associated with the presence of stones. Percutaneous transhepatic cholangiography (PTC) and drainage were deemed necessary due to elevation of bilirubin levels and risk of sepsis. PTC revealed a stricture at the level of the previous BDA, with several filling defects in the common bile duct (CBD), which were attributed to the presence of stones. An 8-Fr internal/external drainage catheter (Flexima; Boston Scientific, Watertown, MA, USA) was initially used to decompress the biliary tree and gradually replaced with wider ones, up to 14 Fr, over the next 7 days.

Lithotripsy was then decided on, and a 0.035-in. stiff guidewire (Amplatz; Boston Scientific Corp., Natick, MA, USA) was advanced into the drainage catheter. Upon advancement of the wire into the catheter it accidentally came out of one of the side holes into the liver parenchyma, and when the catheter was removed a jet of massive high-pressure hemorrhage followed from the catheter tract. A new 14-Fr catheter was immediately inserted into the hepatic tract and angiography followed, but without the necessity for further intervention.

The patient remained stable for the next 48 h and reintervention was decided on. Dilatation of the BDA was performed with a 10 × 20-mm balloon and stones were advanced toward the bowel loop with a biliary extraction balloon. Two days later cholangiography was repeated and the external catheter was removed by a new high-pressure hemorrhage episode from the catheter tract. The patient became hemodynamically unstable, angiography was repeated, and a small, saccular aneurysm was demonstrated at the right hepatic artery main branch, close to the bilioplasty region (Fig. 1).

A 3.5 × 16-mm balloon-expandable coronary stent-graft (Graftmaster Jostent; Abbott Vascular, Ulestraten, Holland), covered eith expandable polytetrafluoroethylene (ePTFE), was advanced over a 0.014-in. stiff wire toward the aneurysm. Although the common hepatic artery had a stenosis, the stent was successfully advanced and deployed,

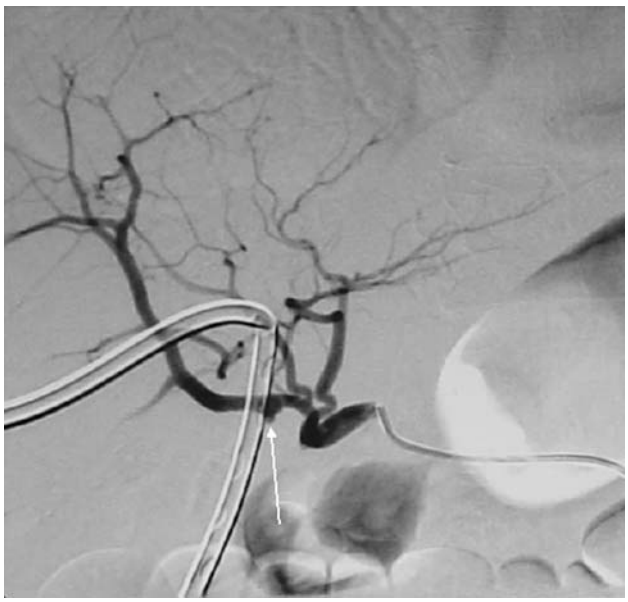

Fig. 1 A multilobular saccular aneurysm is demonstrated at the right hepatic artery main branch, next to the biliodigestive anastomosis region (arrow)

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without the necessity for balloon dilatation of the vessel. Control angiography revealed satisfactory outflow of the right hepatic artery, with total exclusion of the aneurysm (Fig. 2). In the same session the internal biliary catheter was exchanged for an external 8-Fr pigtail catheter. The patient became hemodynamically stable; cholangiography through the external catheter was performed 5 days later and revealed satisfactory outflow through the BDA.

Biliary complication after OLT occurs in 10%–26% of cases and is due to biliary strictures, biliary fistulae, or occlusion due to stones and/or sludge [1, 2].

Complications after BDA dilatation in the transplanted liver have been reported by some authors in the literature. Saad et al. studied 38 OLT patients who underwent 54 transhepatic balloon dilatations of anastomotic strictures and reported a complication rate of 3.8% [3]. In another study, by Righi et al., the authors reported 51 OLT patients who underwent balloon dilatation of anastomotic and nonanastomotic strictures and had a postdilatation complication rate of 8% [4].

Hepatic artery pseudoaneurysm is an increasing entity compared to historical data because of the elevated number of liver transplantations, the use of laparoscopic surgery, and the elevated number of percutaneous liver and gallbladder procedures [5]. The incidence of hepatic artery pseudoaneurysm reaches 2% of liver transplantation patients [6].

Endovascular treatment options include aneurysm embolization with coils, percutaneous injection of coagulation agents or glue, and use of covered stents [7]. In some extreme cases embolization of the common hepatic artery trunk may also be considered but with possible further impairment of liver function [8].

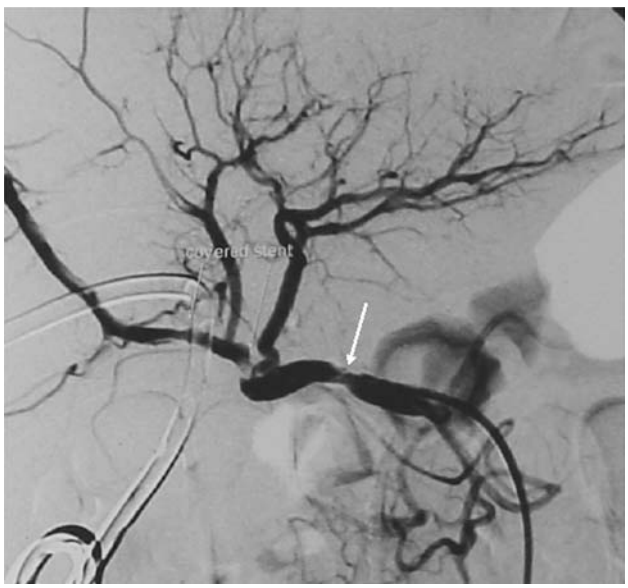

Fig. 2 After exact placement of the stent, angiography reveals satisfactory patency of the right hepatic artery and exclusion of the aneurysm (two gray arrows). A focal stenosis of the common hepatic artery trunk at the anastomosis site is noted (white arrow)

The use of coronary covered stents has lately been suggested as a treatment option in most such cases. The choice of a device used for coronary vessels is because hepatic vessels are similar in size to coronary vessels. The stent that we used is made from stainless steel and an ultrathin layer of ePTFE, which is placed between two stainless-steel layers. To our knowledge, use of this endoprothesis has been reported by some other authors in the literature for treatment of hepatic artery pseudoaneurysms. In three cases pseudoaneurysm occurred after liver transplantation [9–11]; in three, after biliodigestive surgery in nontransplanted patients [7, 12, 13]; in two it was an incidental finding [5, 14]; and in one case it occurred after thrombolysis in a transplanted patient [15]. In the case reported by Maleux et al. pseudoaneurysm formation occurred 73 days after OLT, but in that patient balloon dilatation of a biliary stricture was also performed 13 days after OLT. In that patient embolization with microcoils was initially performed, but due to failure, a coronary covered stent was successfully placed [10]. Sakai et al. reported a case of hepatic artery aneurysm that occurred immediately after OLT and was successfully treated with a 3.5 × 26-mm covered coronary stent [16]. Venturini et al. reported a case of postoperative iatrogenic pseudoaneurysm of the right hepatic artery that was excluded with a 19-mm balloon-expandable covered coronary stent [12]. The proper stent diameter is a very important issue in these cases, where complete sealing of the aneurysm/pseudoaneurysm is required. The eventual problem of hepatic artery stenosis should also be considered, since it is a very common complication in transplanted patients that may be encountered at the site of the arterial anastomosis, as in our case [3].

Percutaneous biliary interventions in OLT patients are challenging. Impaired liver function may seriously aggravate the patient's condition after a complication. In the case of arterial injury, covered stents are a suitable and elegant method for excluding the lacerated vessel portion, without sacrifice of any hepatic region, and it may be performed immediately by the same operator in the interventional suite.

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