Transcatheter Embolization of Hepatic Arteriovenous Fistulas for Control of Hemobilia

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Abstract. Two cases of traumatic hemobilia are presented in which hemorrhage was controlled by transcatheter vascular occlusion with stainless steel coils. Embolic therapy was safely performed without liver necrosis, despite the presence of portal hypertension in 1 patient. The technique is a useful alternative to surgery, which did not control hemorrhage in 1 case.

Key words: Angiography, embolization technique - Liver, arteriovenous fistula

Hepatic arteriovenous fistula is a known complication of needle liver biopsy, transhepatic cholangiography, percutaneous biliary drainage, and blunt abdominal trauma [1-7]. Hemorrhage may occur with such lesions, manifested by hemobilia, intrahepatic or subcapsular hematoma, or hemoperitoneum [5, 7, 8].

The angiographic findings in such cases are well described and include hepatic artery pseudoaneurysm, intrahepatic contrast medium extravasation, and arteriovenous fistula [7-10]. Embolization of intrahepatic arteries with Gelfoam sponge has been used to control hemobilia [11-14], and in 1 instance arterial balloon occlusion was performed [15]. Hemorrhage from blunt abdominal trauma has also been managed with Gelfoam particle embolization [16, 17].

We report here 2 cases of liver hemorrhage associated with hepatic arterioportal venous fistulas in which Gelfoam sponge embolic vascular occlusion was incomplete, and in which subsequent occlusion with hemorrhage control was obtained using stainless steel coils. Embolization did not result in clinically significant hepatic necrosis, despite the presence of portal hypertension in 1 patient.

Case Reports

Case 1
A 54-year-old man was evaluated for liver disease because of elevated serum bilirubin and alkaline phosphatase, 3.5 mg/dl and 400 U, respectively. He had a history of chronic cholecystitis, chronic alcoholism, and esophageal varices documented by upper gastrointestinal series. A liver biopsy showed nutritional cirrhosis. Two days after the biopsy he became febrile and hypotensive, and Escherichia coli was cultured from his blood. An exploratory laparotomy revealed cholechocholithiasis and a stricture of the distal common bile duct. The common duct was explored, the stones removed, and a T-tube placed proximal to the stricture for external drainage. The next day he developed hemobilia, with blood draining through the T-tube. Arteriography demonstrated an intrahepatic aneurysm at the site of biopsy and an arterioportal venous fistula (Fig. 1). Portal blood flow was stagnant and hepatofugal. Embolization of a branch of the right hepatic artery was attempted with Gelfoam sponge particles, but the artery could not be occluded because the fistula was too large. A stainless steel coil was inserted for complete occlusion. Following embolization, hemobilia ceased and there were no episodes of hypotension or blood loss. The patient’s condition stabilized without further complications, and subsequently he underwent a choledochojejunostomy for biliary diversion. Five months following embolization he has had no rebleeding and no clinical or laboratory evidence of liver necrosis.

Case 2
A 32-year-old man was admitted with multiple injuries from an automobile accident. He was unconscious with a right pneumothorax and dislocation of the right hip. Computed tomography of the brain showed a left frontal contusion. He was treated with thoracostomy tube drainage and a femoral Steinman pin. Six days following admission he became febrile and jaundiced, with a bilirubin of 3.7 mg/dl. Intermittent bleeding from the nasogastric tube was noted and the hematocrit fell to 27%. Upper gastrointestinal endoscopy revealed an ulcer of the gastroesophageal junction. An exploratory laparotomy performed for continued gastrointestinal hemorrhage and jaundice disclosed hemobilia. A gastrostomy, choledochojejunostomy and liver biopsy were performed. The liver biopsy revealed areas of necrosis and bile stasis. Postoperatively gastrointestinal hemorrhage persisted and he was referred for angiography. Aortography demonstrated an intrahepatic aneurysm and an arterioportal venous fistula (Fig. 2). Right and left hepatic arteriograms showed fistula communications from both arteries. Embolization of the right and left hepatic arteries was performed with stainless steel coils after Gelfoam sponge particles failed to cause...
occlusion. The patient was subsequently stabilized without further hemorrhage. He experienced a transient rise in serum lactic dehydrogenase over 24 hours from 1,006 to 1,208 µM/ml. Over the next 20 days the liver enzymes and bilirubin values returned to normal. After a complicated hospital course relating to his multiple injuries, he was discharged ambulatory and alert. Four months following embolization he has had no further hemorrhage.

Discussion

Arterial embolization is an accepted technique for control of hemorrhage in various areas of the body. In the liver the most frequently used embolic material has been Gelfoam sponge [11–14, 16, 17]. In our pa-