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Percutaneous transhepatic embolization of an intrahepatic pseudoaneurysm following liver biopsy in a liver transplant patient

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Abstract. A 41-year-old liver transplant patient had severe hemobilia from an intrahepatic pseudoaneurysm secondary to a liver biopsy. Selective intra-arterial embolization was not technically possible due to marked redundancy and tortuosity of the allograft hepatic artery. The pseudoaneurysm was localized by ultrasound and embolized using a direct percutaneous transhepatic approach. This is a novel way of approaching hemobilia in liver transplant patients after liver biopsy and may avoid the risks of arterial embolization.

Key words: Hepatic aneurysm – Percutaneous embolization, hepatic aneurysm – Liver biopsy, hepatic aneurysm

Introduction

Hemobilia is a rare but well-described complication of percutaneous liver biopsy and/or transhepatic catheterization [2]. The presentation is usually that of intermittent upper gastrointestinal tract bleeding following liver biopsy without an apparent source in the stomach or the duodenum. Treatment of this complication in liver transplant recipients can be difficult and not without risk to the graft [4, 5]. In the past, we have approached this problem by localizing the lesion through selective angiography and embolizing the feeder artery of the pseudoaneurysm with stainless steel coils or detachable balloons. This mode of treatment has the inherent risk of hepatic ischemia, resulting in biliary stricture formation and/or necrosis of a segment of the liver. It may be technically impossible to selectively embolize only the end feeder artery. In such cases a larger segment of the liver may be at risk with intra-arterial embolization. An operative approach may involve major resections, which could be very difficult in liver transplant patients.

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We would like to describe a technique of dealing with an intrahepatic pseudoaneurysm using direct percutaneous embolization. This method of treating hemobilia can potentially avoid the risks of intra-arterial embolization. The pseudoaneurysm is localized by Doppler ultrasound, approached directly using a 22-gauge needle, and embolized with stainless steel micro coils and thrombin.

Case report

A 41-year-old female with hepatitis C underwent a successful liver transplantation. Her postoperative course was remarkable only because a biliary reconstruction was required due to anastomotic stricture. Hepatitis recurred 2 months after transplantation and she was placed on alpha-interferon therapy. A Tru-Cut needle biopsy of her liver was obtained for follow-up of the hepatitis. Gastrointestinal tract bleeding occurred 2 days after the biopsy. Upper and lower endoscopies were negative. A diagnosis of hemobilia was suspected but not confirmed until the patient had recurrent bleeding 6 weeks later. In addition, the patient's symptoms included right upper quadrant pain, jaundice, elevated liver enzyme levels (bilirubin up to 3.4 mg/dl from 1.0 mg/dl, alkaline phosphatase 905 SI from 574 SI, 1327 SI from 1032 SI), and a gamma glutamine transpeptidase (GGT) fever spike to 39°C.

Angiography showed a pseudoaneurysm of a branch of the right hepatic artery (Fig. 1). The proximal allograft arterial tree was redundant and too tortuous to permit selective arterial embolization. A Doppler sonogram was obtained and was able to localize the pseudoaneurysm. Under ultrasound guidance, a 22-gauge needle was inserted percutaneously into the pseudoaneurysm from an anterolateral approach. Its position was confirmed by water-soluble contrast injection into the pseudoaneurysm. Three stainless steel 5-mm micro coils soaked in thrombin were inserted into the pseudoaneurysm. The patient had recurrent gastrointestinal tract bleeding the following day and Doppler ultrasound showed persistent flow in the pseudoaneurysm.

The procedure was repeated with another four coils and a direct injection of 1500 units of thrombin. Complete occlusion of the pseudoaneurysm was verified with angiography following the procedure (Fig. 2) and with Doppler ultrasound the following day. Bleeding did not recur and the patient's symptoms were relieved. The patient was prophylactically treated with antibiotics for the procedure.

Liver function improved with the bilirubin decreasing to 0.7 mg/dl, GGT to 736 SI, and alkaline phosphatase to 416 SI. A mild elevation of all liver enzymes remained as a result of the hepatitis but

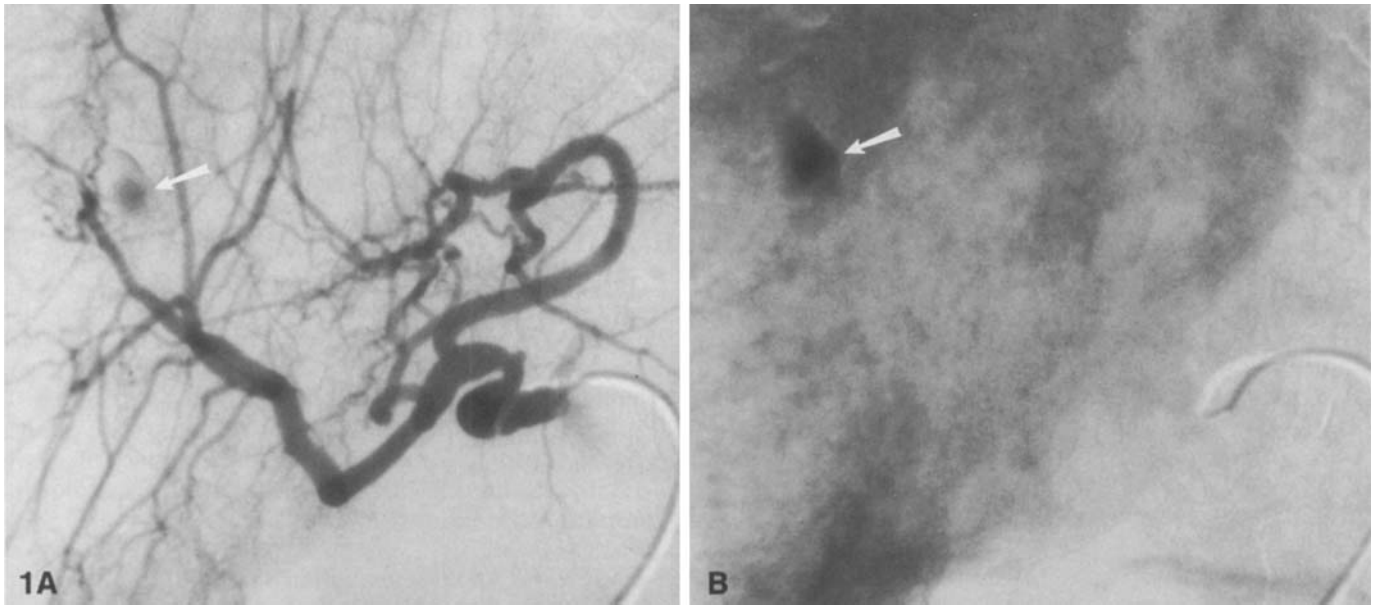

Fig. 1. A pseudoaneurysm *(arrow)* of a branch of the right hepatic artery is demonstrated on early arterial (**A**) and hepatogram (**B**) phases of a selective common hepatic arteriogram. Note the marked redundancy with tortuosity of the proximal allograft hepatic artery

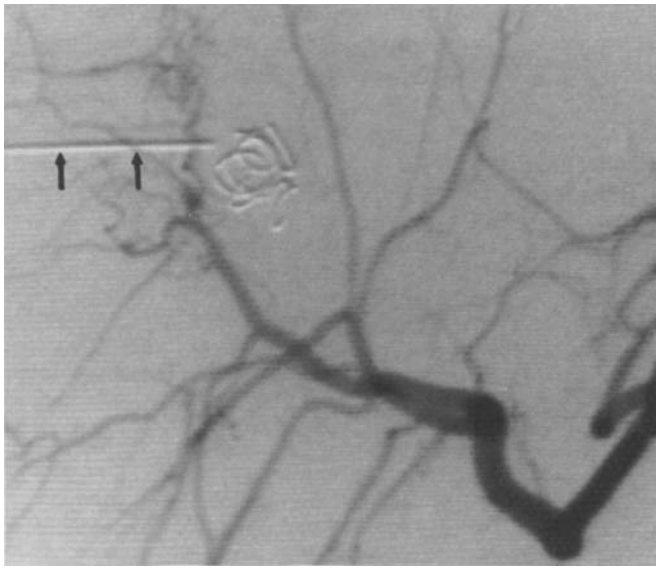

Fig. 2. Complete occlusion of previous pseudoaneurysm with preservation of distal arterial flow is demonstrated on the hepatic arteriogram following direct transhepatic embolization via a 22-gauge needle *(arrows)*

improved on follow-up. Bleeding ceased and hematocrit was stable. Six months after the procedure the patient is stable with improved liver function and no signs of bleeding.

Discussion

Hemobilia is a rare complication of liver biopsy in liver transplant patients. Nevertheless, it is an ominous complication that can potentially lead to loss of the graft.

We have previously summarized our experience with transarterial embolization for hemobilia in two liver transplant patients [5]. Transarterial embolization may cause liver necrosis even though there is some compensation by intrahepatic collateral circulation. The biliary tree is supplied only by arterial flow and is, therefore, the most susceptible to arterial occlusion. One of our previously reported patients developed an intrahepatic bile duct stricture after 9 months [5]. The stricture was presumed to have been due to arterial occlusion from the embolization. The extent of the damage cannot be accurately controlled and success in resolving the hemobilia may lead to abscess or biloma formation [4, 5].

A similar direct percutaneous approach has been taken and reported previously by other authors [1, 3]. In both cases the pseudoaneurysms resulted from trauma and the authors used large needles (18-gauge) or catheters for the procedure. These reports did not involve liver transplant patients. Liver transplant patients are at a higher risk for the development of hepatic pseudoaneurysms because they usually require multiple needle biopsies of their livers. The transplanted liver does not have a collateral arterial blood supply from the ligaments and is, therefore, more susceptible to the consequences of arterial injury and occlusion [4]. Selective arterial catherization may cause arterial dissection and thrombosis, and the water-soluble contrast load associated with the procedure may injure the kidneys. The approach described in this report allows us to avoid the potential hazards of intra-arterial embolization.

We believe that the direct transhepatic approach to the pseudoaneurysm may proof to be an alternative method of treating hepatic pseudoaneurysms, especially when arterial embolization is not feasible or when the risk for arterial injury is great. The use of a 22-gauge Chiba needle provides a very safe and effective route for the insertion of micro coils and thrombin into the pseudoaneurysm and avoids the potential hazards of using larger caliber needles. The approach utilizes well-established techniques and requires precision and skill in ultrasound localization of

the lesion. Our experience suggests that follow-up ultrasound examinations should be performed to verify complete obliteration of the pseudoaneurysm.

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