Two Cases of Major Hemorrhage Secondary to Transjugular Liver Biopsy

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ABSTRACT

Transjugular liver biopsy is an essential procedure in the armamentarium of the interventional radiologist for patients who otherwise are unable to undergo percutaneous liver biopsy. Multiple conditions exist that necessitate the transjugular approach for biopsy, including acquired coagulopathy, congenital blood disorders, or requirement for measurements of hepatic venous and/or wedged hepatic vein pressures. The safety and efficacy of transjugular liver biopsy is well established, with many studies citing extremely low rates of complication with high rates of technical success. Nonetheless, transjugular liver biopsy is not without complications. The most often reported complication is asymptomatic capsular perforation; however occasionally, major hemorrhagic complications and even death have been reported. We describe two major hemorrhagic complications that manifested several days after the procedure and required emergent intervention.

KEYWORDS: Liver, biopsy, complication, transjugular

Objectives: Upon completion of this article, the reader should understand the indications for transjugular liver biopsy, major complications of the procedure, and most typical cause of hemorrhage after the procedure.

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Transjugular liver biopsy has become an important diagnostic tool in a significant number of patients with contraindications to standard percutaneous liver biopsy, including the presence of coagulopathy, congenital blood disorders, ascites, renal failure, and obesity.¹⁻⁹ In addition to evaluating the liver parenchyma in patients with liver failure, transjugular liver biopsies also play a significant role in the management of allograft rejection in liver transplant recipients, and they may be performed repeatedly in this setting to manage antirejection medical regimens. Complications are uncommon, but may be serious or life threatening. We report

our experience and management of two patients with serious complications from transjugular liver biopsy.

CASE 1

A 52-year-old man with hepatitis C and human immunodeficiency virus infections and cirrhosis presented for transjugular liver biopsy for evaluation of cirrhosis progression as part of an investigational protocol for hepatitis C therapy. Transjugular liver biopsy was performed under fluoroscopic guidance using a Quick-Core transjugular access kit (Cook, Bloomington, IN), and no

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Figure 1 Axial computed tomography of the liver demonstrates high attenuation material (asterisk) in the gallbladder consistent with acute hemorrhage.

immediate hemorrhage or complication was observed. The patient was discharged following a 4-hour observation period. The patient returned to the emergency department 1 week following the biopsy with a complaint of increasingly severe abdominal pain. Physical examination showed right upper quadrant tenderness. Hematocrit was minimally decreased to 31.2% from a baseline preprocedure level of 32.2%. An abdominal computed tomography scan was remarkable for the presence of high-density material within the gallbladder lumen (Fig. 1) consistent with hemobilia. The patient was admitted to the hospital for observation, transfusion, and pain management.

Three days later, the patient suddenly became hypotensive, less responsive, and had significant melena, and he was transferred to the intensive care unit for supportive care. Hematocrit decreased to 21%. The patient underwent urgent hepatic arteriography that showed a pseudoaneurysm of a right hepatic arterial branch (Fig. 2A). Using a microcatheter, the branch vessel supplying the pseudoaneurysm was selected (Fig. 2B) and coil embolization was performed (Fig. 2C). Completion arteriogram showed the successful amputation of flow to the arterial branch supplying the pseudoaneurysm (Fig. 2D). The patient's hematocrit stabilized following transfusion. The patient's subsequent hospital course included the development of hepatic encephalopathy and marked lower extremity edema, which responded to medical management.

CASE 2

A 26-year-old man with a history of short bowel syndrome and developmental delay presented to the

emergency department with jaundice. A transjugular liver biopsy was requested due to a suspected coagulopathy with a activated partial thromboplastin (aPTT) time of 42.1 seconds. Four days following transjugular liver biopsy, the patient experienced an asymptomatic decline in hematocrit from his baseline of 42.2% to 38.4%. Upper gastrointestinal endoscopy demonstrated hemobilia from the ampulla. However, the patient's hematocrit stabilized, and no other intervention was performed.

One week following the biopsy, and 3 days following the initial episode of hemobilia, the patient experienced the abrupt onset of abdominal pain. Hematocrit was now 26.4%. Emergent CT imaging revealed a large, complex hepatic subcapsular hematoma, and emergent hepatic arteriography was performed. This study revealed a large arteriportal fistula originating from the branch of the right hepatic artery (Fig. 3A) as well as a smaller right arteriovenous fistula (not shown). Both fistulae were successfully coil embolized (Fig. 3B), and the patient stabilized for approximately 48 hours. Recurrent drop in hematocrit to 20.5% after transfusion prompted arteriographic reevaluation, which revealed multiple focal areas of hemorrhage along the liver capsule. Embolization was performed successfully using a gel-foam slurry. The patient stabilized over the next several weeks and was discharged home.

DISCUSSION

Complication rates of 0 to 20% have been reported for transjugular liver biopsy,^{5-7,10-13} including both major and minor complications. Minor complications ranged from postprocedure fever to accidental arterial puncture or subcapsular hematoma. Major complications in several series included serious hemorrhage, arrhythmia, and death occurring at a rate of 0 to 2.8%.^{4-7,9,11} The majority of these complications occurred in patients with thrombocytopenia or prolonged aPTT. In addition to these predisposing factors, significant complications also occurred more frequently when multiple needle passes within the liver were needed to obtain adequate tissue samples.

Although capsular perforation and subsequent intraperitoneal hemorrhage have been the most common serious complication reported in several series, we have recently observed serious bleeding complications in two patients secondary to an arterial pseudoaneurysm and an arteriportal fistula, both of which required emergent management.^{3-8,11,14,15} In these two cases, significant symptoms or changes in hematocrit values were not observed until days after the biopsy.

The literature describes the occasional complication of major hemorrhage and death associated with this procedure; however, the bleeding described has been secondary to puncture of the liver capsule leading to

Figure 2 (A) Hepatic artery angiogram demonstrates a pseudoaneurysm of right hepatic artery branch. (B) A microcatheter and a coaxial technique was used to the right hepatic artery branch supplying the pseudoaneurysm. (C) Platinum microcoils were deposited across the origin and proximal to the pseudoaneurysm, effectively amputating the flow to the small vessel. (D) Completion arteriogram of the right hepatic artery demonstrates absence of the aneurysm with antegrade arterial flow to the remainder of the right hepatic lobe.

intraabdominal hemorrhage.^{9,10,12,13} These complications are typically recognized immediately and before any significant change in the patient's clinical condition.¹³ Hepatic artery pseudoaneurysm and arterioportal fistula leading to significant hemorrhage are less frequently reported in the literature. After each of our cases there was no immediate indication either clinically or fluoroscopically that a severe complication had occurred. Rather, the patients presented with clinical and laboratory findings days after the procedure. Identification of significant bleeding prompted immediate hepatic arteriography and subsequent embolization in each case. Coil and or gel-foam slurry embolization was used to control the bleeding in the patients. Subcapsular bleeding recurred in one of the patients due to severe capsular

stretching, ultimately leading to infarction of a significant portion of his liver. However, the patient slowly improved clinically following embolization of the peripheral bleeding branches.

In patients with coagulopathy, exacerbation of hemorrhage complicating transjugular liver biopsy may occur because the physiological tamponade from the surrounding liver parenchyma may not be sufficient to control the bleeding.^{3,14} Additionally, as blind passes are made into the liver parenchyma, the possibility of creating an arteriovenous fistula exists. Inadvertent damage of the arterial wall is also possible, and it is unknown how often clinically silent pseudoaneurysms are formed and spontaneously thrombose.^{10,12-14,16} As seen in our case, the rupture of a pseudoaneurysm into hepatic

Figure 3 (A) Hepatic arteriogram demonstrated early filling of a venous structure representing an iatrogenic arteriovenous shunt. (B) Hepatic angiogram after selective embolization demonstrates the absence of an arteriovenous shunt.

parenchyma or peritoneum can result in life-threatening hemorrhage.¹³ Although routine postprocedure arteriography is clearly not indicated given the low incidence of major complications, clinicians and patients should be aware that serious delayed complications may occur.

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