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CASE REPORT | BILIARY

Management of a Persistent Cystic Duct Stump Leak Following Cholecystectomy With Percutaneous Transabdominal Cystic Duct Stump Embolization

Craig S. Brown, MD[1], Mamadou Sanogo, MD[2], Arpan Patel, MD[3], Allison R. Schulman, MD, MPH[3], Krishnan Raghavendran, MBBS[1], and Patrick E. Georgoff, MD[1]

[1]*Department of Surgery, Section of Acute Care Surgery, University of Michigan, Ann Arbor, MI*
[2]*Department of Radiology, Section of Interventional Radiology, University of Michigan, Ann Arbor, MI*
[3]*Department of Gastroenterology and Hepatology, University of Michigan, Ann Arbor, MI*

ABSTRACT

Cystic duct stump leak remains a difficult clinical problem despite advancements in endoscopic techniques. When these minimally invasive strategies fail, patients are often subject to high morbidity and mortality associated with open surgical exploration. We report the successful treatment of persistent biliary leak from the cystic duct stump following cholecystectomy using percutaneous transabdominal access of the cystic duct and coil embolization.

INTRODUCTION

Cystic duct stump leaks occur in 0.12% of cholecystectomies.[1] Initial management is typically endoscopic and includes sphincterotomy or biliary stenting.[2,3] With failure rates as high as 10%, alternative approaches to the treatment of cystic duct stump leaks may be required.[4] We describe the management of a patient with persistent cystic duct stump leak despite the use of common bile duct (CBD) stents. A percutaneous transabdominal cystic duct stump cannulation and coil embolization technique was employed.

CASE REPORT

A 64-year-old woman presented with signs and symptoms of acute cholecystitis. She was taken to the operating room and underwent an attempted laparoscopic cholecystectomy, which was converted to an open operation secondary to extensive adhesions and scarring. A surgical drain was left in the gallbladder fossa. On postoperative day 1, the patient developed a bile leak. Endoscopic retrograde cholangiopancreatography was performed confirming the presence of a cystic duct stump leak (Figure 1). A single plastic stent was placed with no improvement in external bilious drainage. Repeat endoscopic retrograde cholangiopancreatography confirmed ongoing leak, and 2 plastic stents were placed. She was initially hospitalized for a total of 12 days.

Four weeks later, repeat cholangiogram demonstrated that the leak persisted despite a well-placed stent (confirmed by fluoroscopy). At that point, a 10 mm × 8 cm covered metal biliary stent was placed, which traversed the cystic duct and remained in place for 3 months. Despite this intervention, 300 cc/d of bilious fluid persisted through the external drain. The patient did not show any signs of sepsis. A multidisciplinary meeting was arranged to discuss alternative treatment options. Endoscopic choledochoscopy with embolization and coiling of the cystic duct stump was attempted but despite the use of a 0.018-inch flexible guidewire, the cystic duct stump could not be deeply cannulated. Percutaneous transhepatic embolization of the cystic duct stump was also attempted but was unsuccessful in reducing the biliary leak. As an alternative to open surgical exploration and choledocho- or hepaticojejunostomy, the decision was made to attempt cystic duct stump access and coil embolization via the epithelialized percutaneous right upper quadrant drain tract under fluoroscopic guidance (Figure 2).

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Correspondence: Craig Brown, MD, Department of Surgery, Section of Acute Care Surgery, University of Michigan, 1500 E Medical Center Dr, Ann Arbor, MI 48109 (brcraig@med.umich.edu).

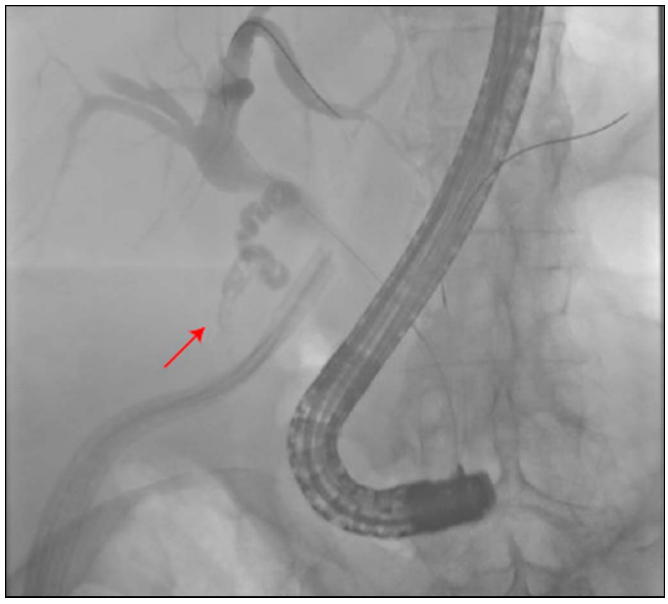

Figure 1. Endoscopic retrograde cholangiopancreatogram demonstrating cystic duct stump leak. Contrast extravasation can be seen from the cystic duct stump confirming leak (arrow). Contrast was not seen directly emptying into the percutaneous drain, although drain output was bilious appearing.

Follow-up cholangiogram confirmed the resolution of the cystic duct stump leak, and the biliary stent was successfully removed. She had no complications from any of her endoscopic or percutaneous procedures and spent a total of 27 days as an inpatient over the course of her treatment.

DISCUSSION

The majority of cystic duct stump leaks heal spontaneously when bile is shunted past the defect. This is most commonly accomplished with endoscopic stenting and sphincterotomy or percutaneous transhepatic biliary drainage.[4] Percutaneous or endoscopic coil embolization, fibrin glue, and gelatin sponge injection are alternative approaches for refractory cases. These treatments avoid the significant morbidity of open surgical exploration.[5–10] These techniques can also be utilized for biliary leaks at alternative sites, such as from the duct of Luschka or from higher-order biliary radicals.[11,12] In this case, cystic duct embolization was accomplished via an existing epithelialized percutaneous drain tract. This innovative and technically challenging feat has previously been described in a few other case series. It is, however, not without complications, including migration of embolization of coils into the common bile duct causing obstruction.[13,14] Endoscopic approaches involve known complications associated with cannulation of the biliary tree including perforation and postprocedural pancreatitis, among others, while percutaneous approaches may result in inadvertent solid or hollow viscus injury. This case describes the challenges associated with managing cystic duct stump leaks and highlights a multidisciplinary approach that utilizes advanced minimally

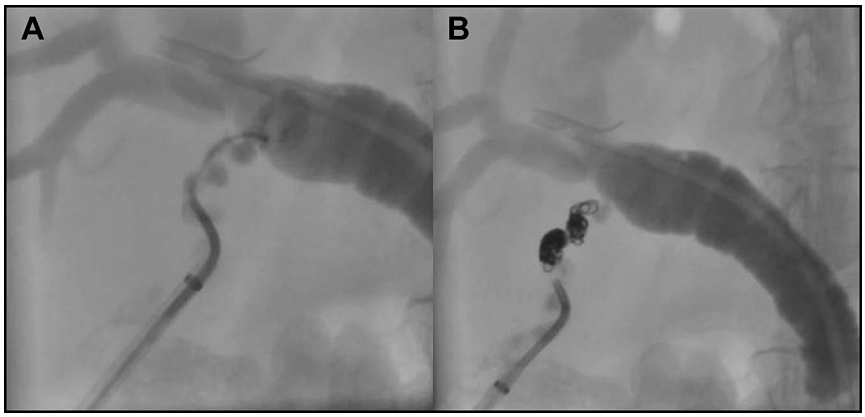

Figure 2. Fluoroscopic images during coil embolization procedure. (A) Percutaneous cystic duct stump cannulation using a 2.4 French Progreat microcatheter preloaded with a GT guidewire advanced coaxially through a Kumpe catheter. (B) Coil embolization of the cystic duct stump using a 6 mm × 20 cm concerto 3D coil followed by a 6 mm × 20 cm concerto helix coil and a 5 mm × 15 cm concerto helix coil. Finally, 10 mL of 3:1 lipiodol:n-BCA glue was injected along the cystic duct remnant as well as the drain tract.

invasive treatment options to avoid the morbidity associated with surgical repair.

DISCLOSURES

Author contributions: All authors designed, wrote, and edited the manuscript. CS Brown is the article guarantor.

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