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Au Naturel: Trans-papillary Endoscopic Drainage of an Infected Biloma

Monique Barakat, MD, PhD*, Shivangi Kothari, MD*, Saurabh Sethi, MD, MPH, and Subhas Banerjee, MD

Division of Gastroenterology, Stanford University, CA, USA

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Biloma; drainage; trans-papillary; endoscopy; ERCP; stents

Case presentation and evolution

A 35-year-old man was transferred to our tertiary care academic medical center from an outside urgent care facility where he had complained of a 3-day history of right upper quadrant abdominal pain, jaundice, and fever of up to 39.1° C. His past medical history was notable for cholecystitis and gallstone pancreatitis 6 months previously, managed at an outside facility by laparoscopic converted to open cholecystectomy. The surgery was complicated by an inadvertent injury to the right hepatic duct and resultant bile leak for which intraoperative primary repair was performed and a surgical drain was placed. On post-operative day 6, his drain was removed and he was discharged home.

Vital signs at his current presentation were notable for a heart rate of 117 beats/min, temperature of 38.2°C, blood pressure of 106/68 mm of Hg and respiratory rate of 17/min. Physical examination revealed right upper quadrant abdominal tenderness without guarding or rigidity. His WBC count was 8.2 K/ μ L (4.0 – 11.0 K/ μ L) with 85% neutrophils. Other abnormal laboratory results included a total bilirubin of 6.0 mg/dL (normal <1.4 mg/dL), alkaline phosphatase of 423 U/L (normal <130 U/L), and alanine aminotransferase (ALT) of 240 U/L (normal <60 U/L). An abdominal ultrasound reported a 4.7 cm collection in the gallbladder fossa with an associated fluid/debris level raising concern for an infected biloma. Moderate intrahepatic biliary dilation was also seen (Figure 1A). A computerized tomography (CT) scan of the abdomen demonstrated a fluid collection in the gallbladder fossa which appeared complex, containing internal debris. Intrahepatic biliary dilation was noted with possible compression effect at the level of the fluid collection (Figure 1B). The overall clinical picture suggested a biloma that was possibly infected and juxtaposed hilar biliary obstruction with concern for cholangitis.

Corresponding Author: Subhas Banerjee, MD, Associate Professor of Medicine, Division of Gastroenterology & Hepatology, Stanford University School of Medicine, 300 Pasteur Drive, MC:5244, Stanford, CA 94305, Tel: 650-723-2623, Fax: 650-498-5174, sbanerje@stanford.edu.

*These authors contributed equally to this manuscript

The interventional radiology team was consulted, but they felt that the biloma would not be easily amenable to percutaneous drainage due to its location. The patient was therefore referred to interventional endoscopy to perform endoscopic retrograde cholangiography (ERCP) for management of the biliary obstruction. At ERCP, contrast injection revealed a tight common hepatic duct stricture commencing just distal to the bifurcation and extending a short distance into the right and left main hepatic ducts (Figure 2). Extravasation of contrast was noted from a bile duct defect just below the bifurcation, opacifying the biloma (Figure 2). Given that the biloma communicated with the bile duct, a decision was made to advance a transpapillary stent into the biloma cavity in order to accomplish drainage. Guidewires were advanced into the right and left main hepatic ducts and through the bile duct defect into the biloma cavity. Two 7 Fr x 12 cm plastic stents were then advanced into the left and right main hepatic ducts for stricture management. An additional 7 Fr x 12 cm plastic stent was advanced across the ampulla into the biloma cavity. Advancement of the third stent into the biloma cavity resulted in drainage of a significant volume of pus (Figure 2).

Drainage of the biloma and decompression of the biliary tree immediately improved the patient's abdominal pain and resolved the fever. His bilirubin concentrations decreased from 6 to 3.9 mg/dL the day following the procedure. An abdominal ultrasound 2 days post-procedure revealed a decrease in the size of the biloma and marked improvement in biliary dilation (Figure 3A). He was discharged home on oral antibiotics. An ultrasound performed one week later showed complete resolution of the biloma (Figure 3B).

A repeat ERCP performed approximately 2 weeks later also confirmed biloma resolution (Figure 4A). The biloma stent had been extruded with closure of the cavity, with contrast filling only a small residual track related to the stent (Figure 4B). The biloma stent was removed. At subsequent ERCP, the hilar stenosis was noted to persist, indicating a post-inflammatory fibrotic stricture rather than simple external compression related to the biloma.

Discussion

Bile leaks may result from bile duct injury sustained during hepatobiliary surgery, or develop following traumatic injuries to the liver and bile ducts; most are transient, small, and of scant clinical significance.¹ Some bile leaks persist and may result in bilomas, or collections of bile located outside of the bile ducts within the intrahepatic or extrahepatic space.² Small, asymptomatic bilomas may resolve spontaneously, but large, or symptomatic smaller collections require intervention. Endoscopic interventions have been largely limited to managing bile duct injuries and the consequent bile leaks causative of biloma formation. Management of bile leaks is typically accomplished by ERCP with placement of a biliary stent or sphincterotomy.²

Bilomas were historically managed with surgical drain placement, but typical management today comprises percutaneous drain placement by interventional radiologists.³ Therapeutic endoscopy offers a potential alternative approach to management. A few case reports and small case series have described endoscopic ultrasound (EUS)-guided drainage.⁴⁻⁶ In this case, drainage of a biloma was accomplished by placement of a natural orifice (trans-

papillary) stent at ERCP without utilizing EUS. To our knowledge, this represents the first report of trans-papillary biloma drainage accomplished entirely at ERCP.

Post-operative bile leaks occur in up to 1.1% of patients undergoing laparoscopic cholecystectomy,⁷ but only a fraction of these patients develop clinically significant bilomas. Bile leaks may be inferred when ultrasound (US), CT scan or magnetic resonance cholangiopancreatography (MRCP) reveal a biloma.⁸ Bile leaks can be diagnosed non-invasively by cholescintigraphy using ^{99m}Tc-hepatic iminodiacetic acid (HIDA scan), or at ERCP, by visualization of radiotracer or contrast extravasation respectively from the bile duct.⁸ Bilomas may be asymptomatic or may manifest with abdominal pain and distention, jaundice, fever and sepsis, as in this case.²

Small incidentally-noted post-operative peri-hepatic fluid collections often resolve spontaneously. Although surgical management usually resolves larger bilomas, this approach is associated with significant postoperative complications and a 1.7% rate of postoperative mortality.⁹ Direct percutaneous or percutaneous trans-hepatic drainage by interventional radiologists has therefore emerged as the primary management approach for bilomas, with surgery reserved for refractory cases.³ Adverse events including sepsis, cholangitis, hemobilia, hemothorax, pneumothorax and hemoperitoneum are reported in up to 2.5% of patients undergoing interventional radiology guided drainage.⁸

The invasive nature and significant rate of adverse events associated with these interventional radiology-based biloma management approaches has encouraged therapeutic endoscopists to explore purely endoscopic management approaches. EUS-based endoscopic approaches include aspiration of the biloma cavity alone, or endoscopic trans-gastric stent and/or biliary stent placement. These limited reports of EUS-based biloma management indicate rapid and complete resolution in many of these cases.^{4–6} Nevertheless, endoscopic therapy has not become a widely-adopted modality, in part due to typical referral patterns that direct patients with bilomas to interventional radiologists, unless there are contraindications to percutaneous drainage.

In this case, percutaneous drainage was not possible due to the relatively inaccessible location of the biloma, which was however easily accessible through the bile duct wall defect, making it amenable to trans-papillary drainage at ERCP. This technique, though not previously reported, is conceptually similar to trans-papillary drainage of a pancreatic pseudocyst communicating with the pancreatic duct.¹⁰ This purely endoscopic approach may be considered as a first-line therapy for biloma management in select patients with a communicating bile duct wall defect.

References

1. Elboim CM, Goldman L, Hann L, et al. Significance of post-cholecystectomy subhepatic fluid collections. *Ann Surg.* 1983; 198:137–41. [PubMed: 6870369]
2. Binmoeller KF, Katon RM, Shneidman R. Endoscopic management of postoperative biliary leaks: review of 77 cases and report of two cases with biloma formation. *Am J Gastroenterol.* 1991; 86:227–31. [PubMed: 1992640]
3. Chen XP, Peng SY, Peng CH, et al. A ten-year study on non-surgical treatment of postoperative bile leakage. *World J Gastroenterol.* 2002; 8:937–42. [PubMed: 12378646]

4. Baron TH. Combined endoscopic transgastric and transpapillary drainage of an infected biloma. *Endoscopy*. 2006; 38:436. [PubMed: 16680658]
5. Ponnudurai R, George A, Sachithanandan S, et al. Endoscopic ultrasound-guided drainage of a biloma: a novel approach. *Endoscopy*. 2006; 38:199. [PubMed: 16479434]
6. Shami VM, Talreja JP, Mahajan A, et al. EUS-guided drainage of bilomas: a new alternative? *Gastrointest Endosc*. 2008; 67:136–40. [PubMed: 18155436]
7. Barkun AN, Rezieg M, Mehta SN, et al. Postcholecystectomy biliary leaks in the laparoscopic era: risk factors, presentation, and management. McGill Gallstone Treatment Group. *Gastrointest Endosc*. 1997; 45:277–82. [PubMed: 9087834]
8. Mueller PR, Ferrucci JT Jr, Simeone JF, et al. Detection and drainage of bilomas: special considerations. *AJR Am J Roentgenol*. 1983; 140:715–20. [PubMed: 6601377]
9. Sicklick JK, Camp MS, Lillemoe KD, et al. Surgical management of bile duct injuries sustained during laparoscopic cholecystectomy: perioperative results in 200 patients. *Ann Surg*. 2005; 241:786–92. discussion 793–5. [PubMed: 15849514]
10. Catalano MF, Geenen JE, Schmalz MJ, et al. Treatment of pancreatic pseudocysts with ductal communication by transpapillary pancreatic duct endoprosthesis. *Gastrointest Endosc*. 1995; 42:214–8. [PubMed: 7498685]

Key Points

- Bile leaks, usually resulting from bile duct injury following trauma or surgery, can lead to formation of a biloma - a collection of bile located outside of the bile ducts.
- Bilomas may be asymptomatic or may become infected, and manifest with abdominal pain and distention, jaundice, fever and/or sepsis.
- A purely endoscopic trans-papillary approach to biloma drainage may be considered as first-line therapy when there is an associated communicating bile duct wall defect.

Figure 1.
(A) Abdominal ultrasound demonstrating a 4.7 cm fluid collection in the gallbladder fossa.
(B) CT scan demonstrating a contained fluid collection in the gallbladder fossa (red arrow) with intrahepatic biliary dilation (blue arrows).

Figure 2. Cholangiogram demonstrating contrast extravasation with opacification of the biloma cavity (A) and a tight common hepatic duct stricture with intrahepatic biliary dilation (B)). (C) Stent advanced through the bile duct wall defect into the biloma cavity. (D) Pus extruding from the stent placed into the biloma cavity.

Figure 3.

(A) Abdominal ultrasound 2 days after ERCP demonstrating a decrease in the size of the biloma and marked improvement in biliary dilation. (B) Abdominal ultrasound 1 week later revealing complete resolution of the biloma.

Figure 4.
(A) Biliary stent (yellow arrow) and stent extending from the biloma cavity (endoscopic image) (B). Cholangiogram demonstrating resolution of the biloma (red arrow at site of prior biloma).

Figure 5.
Schematic drawing of the biliary anatomy pre (A) and post (B) endoscopic stent placement for biloma drainage.