Percutaneous Transhepatic Biliary Drainage Complicated by Bilothorax

Stephanie H. Kim, PhD¹ Steven M. Zangan, MD²

¹Pritzker School of Medicine, University of Chicago, Chicago, Illinois

²Department of Radiology, University of Chicago, Chicago, Illinois

Address for correspondence Stephanie H. Kim, PhD, Pritzker School of Medicine, 924 E. 57th St., Room 104, Chicago, IL 60637-5415 (e-mail: stephkim@uchicago.edu).

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Abstract

Keywords

- transhepatic biliary drainage
- bilothorax
- pleural
- complication
- interventional radiology

Percutaneous transhepatic biliary drainage (PTBD) is a well-established and safe technique for the management of biliary obstructions and leaks. While approach is variable based on operator preference, patient anatomy, and indications; PTBD is commonly performed via a right-sided intercostal route. With a right-sided approach, pleural complications may be encountered. The authors describe a case of a right PTBD complicated by a leak into the pleural space, with the subsequent development of bilothorax.

Objectives: Upon completion of this article, the reader will be able to discuss the incidence, diagnoses, and management of bilothorax complicating percutaneous biliary drainage.

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Case Report

A 61-year-old man with alcoholic cirrhosis underwent orthotopic liver transplantation. On routine follow-up, he had signs and symptoms of biliary obstruction, and magnetic resonance cholangiopancreatography confirmed an anastomotic biliary stricture. He was referred for percutaneous transhepatic biliary drainage. Using a right-sided

intercostal approach, a peripheral right hepatic duct was accessed by an AccuStick set (Boston Scientific, Natick, MA). A cholangiogram demonstrated anastomotic narrowing and multifocal intrahepatic strictures consistent with ischemic cholangiopathy (►Fig. 1). Over a 0.035-in. wire, an 8.5F internal-external multiple side hole biliary catheter (Cook, Bloomington, IN) was placed and left to bag drainage (►Fig. 2).

Five days after the placement, during routine clinical follow-up, the drain was noted to be dislodged and the patient returned to interventional radiology for evaluation. Evaluation of the existing drain showed retraction of the drain with multiple side holes outside of the biliary tree (►Fig. 3). The drain was replaced and properly positioned. Two days following this replacement, the patient became septic and a computed tomographic scan revealed large bilateral pleural effusions, greater on the right (►Fig. 4). He returned to the interventional radiology department and underwent thoracentesis, resulting in drainage of 600 mL bilious fluid. Given the findings, a tunneled PleurX (CareFusion, San Diego, CA) catheter was placed for long-term drainage. A cholangiogram at this time demonstrated a leak into the right pleural space (►Fig. 5), and the percutaneous transhepatic biliary drainage (PTBD) was upsized to 10F.

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Fig. 1 Cholangiography demonstrates multifocal intrahepatic strictures and an anastomotic stricture (arrow). Posttransplant ischemic cholangiopathy often occurs due to hepatic arterial insufficiency or occlusion.

Despite the satisfactory biliary diversion and pleural drainage, the patients' clinical course worsened and he died in the hospital.

Discussion

PTBD is a well-established and safe technique for the management of biliary obstructions and leaks.¹⁻³ Per Society of

Fig. 2 The internal-external drain is well positioned with the pigtail in the small bowel and the side holes in the biliary tree. Arrow, marker showing the most lateral extent of the side holes.

Fig. 3 With the drain retracted, the side holes are now outside the biliary tree; the marker band noted in ►Fig 2 is not visualized on this image. This retraction resulted in bile leaking outside the liver and into the pleural space.

Interventional Radiology standards, major complications of this procedure occur in 0.5 to 2.5%.³ Major complications include sepsis, hemorrhage, pleural complications, infectious (abscess, peritonitis, cholecystitis, pancreatitis), and death. Sepsis and hemorrhage are the most common, occurring in up to 2.5% of the cases.

Fig. 4 The size of the right pleural effusion (E) and findings on cholangiogram makes bilothorax a leading consideration.

Fig. 5 There is free communication of bile with the pleural space. (a) The drain traverses the pleural reflections (blue). (b) There is contrast extravasation into the pleural space (black arrowhead).

In a series of 230 PTBD utilizing a right-sided intercostal approach, 3.3% of patients had pleural complications, with only one bilious effusion.⁴ Bilious effusions are commonly called “bilothorax” or “cholethorax.”⁵ While pleural complications are relatively rare, it is not uncommon to traverse the pleural space during the procedure.⁶ Starting at the xiphoid process, pleural reflections descend across the costochondral junction of the 8th rib down to the 10th rib. Posteriorly, the reflections end at the level of L1. On the right, PTBD is typically performed at the 9th to 11th intercostal space; if possible, staying below the 10th rib and anterior to the midaxillary line minimizes the chances of crossing the pleura. While a left-sided approach lessens the potential for pleural complications, it is not always preferable or feasible. The costal and xiphoid margins may limit access, and when the patient is sedated shallow inspirations make this window even smaller. The operator’s hands are also constantly in the field and exposed to radiation. Finally, when the obstruction is distal or near the confluence, unilateral drainage of the larger right lobe is typically sufficient, making a left-sided approach redundant and unnecessary.

In the case presented here, the bilothorax was likely exacerbated by dislodgement of the drain. Once the side holes were outside the ducts, bile could freely communicate with the pleural space. The authors typically use a suture and an adhesive locking bandage to secure tubes that can help

mitigate external causes of dislodgement, but tubes may retract internally with constant respiration motion, especially if the drain takes a relatively superiorly arcing path. It is important not to affix the catheter rigidly at skin level, since some slack must be present or the catheter may coil in the intraperitoneal space.

Bilious pleural effusions should be suspected in patients with dyspnea, ipsilateral pleuritic chest pain, or septicemia, especially when the catheter has been dislodged. Tube thoracostomy with fluid culture and analysis and empiric antibiotic treatment should be considered. It has been suggested that a ratio of total bilirubin (effusion) to serum bilirubin > 1 is indicative of a bilothorax. Video-assisted thoracoscopic decortication has been employed as a more aggressive option in the setting of minimal drainage.⁷ Due to the potential for rapid clinical deterioration, prompt evaluation and treatment are warranted if there is clinical suspicion of bilothorax following PTBD.

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