

The Light at the End of the Tunnel

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ABSTRACT

Approximately 5%–10% of common bile duct (CBD) stones cannot be removed by conventional methods because of altered anatomy. Percutaneous transhepatic cholangioscopic lithotomy has been cited as a viable alternative. A 69-year-old woman with a history of Roux-en-Y was found to have a lesion obstructing the CBD. A cholangioscope was advanced through a percutaneous transhepatic sheath and demonstrated an obstructing stone in the CBD that was removed with lithotripsy. The rate of successful stone removal with percutaneous transhepatic cholangioscopic lithotomy is 90%, with complication rates similar to endoscopic retrograde cholangiopancreatography and is an option in patients with altered surgical anatomy.

INTRODUCTION

Biliary colic is a common clinical condition that can manifest from various sources and clinical conditions. Management relies on identifying and treating the underlying etiology. In the case of biliary tree pathology secondary to stone obstruction, the best treatment is typically removal of the offending stone. Current standard practice is to perform an endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy and evacuation of any obstructing stones. The clear majority of clinical conditions related to an obstructing stone can be managed successfully in this manner. However, up to 10% of common bile duct (CBD) stones cannot be removed by conventional methods owing to altered anatomy.¹ This is mainly secondary to difficult access of the ampulla, which is typically a result of intestinal rerouting surgery such as Roux-en-Y gastric bypass and Billroth II gastrectomy. Other causes include very large stones or stones located in a narrow proximal segment. Percutaneous transhepatic cholangioscopic lithotomy (PTCSL) has been cited as a viable alternative to these difficult situations. Because PTCSL is time consuming, more involved, and requires expertise, it is often an underutilized technique for stone removal. We present a case of PTCSL that demonstrates its usefulness in the setting of a complex clinical situation.

CASE REPORT

A 69-year-old woman with a history of Roux-en-Y surgery presented with a 3-week history of abdominal pain and jaundice. Her laboratory results revealed a total bilirubin of 5.3 mg/dL, alkaline phosphatase of 1,293 mg/dL, alanine aminotransferase of 79 mg/dL, and aspartate aminotransferase of 121 mg/dL. On a computed tomography scan, she had an intraductal polypoid soft-tissue density lesion measuring 17 × 20 × 18 mm, obstructing the CBD with 17-mm dilation. She underwent single balloon ERCP; however, cannulation of the CBD was unsuccessful due to a long afferent limb.

A percutaneous transhepatic cholangiogram was performed, demonstrating severe biliary dilation with an abrupt occlusive filling defect in the CBD concerning for malignancy. Brush biopsy and forceps biopsy were performed, and an internal-external biliary drain was placed. Biopsy results were negative for malignancy that was thought to be a false-negative, given the computed tomography and fluoroscopic appearance. The patient then returned to the hospital with sepsis from multiple sources including *Clostridium difficile* colitis, a urinary tract infection, and peritonitis of unclear etiology. Because of her clinical condition, she was

deemed to not be a surgical candidate for a diagnostic and therapeutic Whipple procedure. Thus, she underwent cholangioscopic examination (SpyGlass, Boston Scientific, Marlborough, MA) through percutaneous access.

After removal of the previous biliary drain over a wire, a 12-F Check-Flo Introducer Sheath (Cook Medical, Bloomington, IN) was advanced into the biliary system. The cholangioscope was advanced through the sheath and demonstrated an obstructing stone measuring approximately 25 mm in diameter and several centimeters in length (Figure 1). Lithotripsy was then performed (50–75 W, every cycle 1–5 pulses). A 5-F Fogarty balloon catheter (Edwards Lifescience, Irvine, CA) was used to push the stone fragments into the small bowel (Figure 2). This process was repeated several times over 2 sessions with an internal/external biliary drain placement between sessions (27 days). The total procedure time was 1 hour and 30 minutes and 1 hour and 52 minutes for the first and second procedure, respectively. The patient's drain was removed 2 weeks later with normal laboratory verification. Pathology reports from intraprocedural bile duct brushing were benign and follow-up imaging is pending.

DISCUSSION

The first introduction of PTCSL was in 1981 by Nimura to treat hepatolithiasis.² Since then, with the advances of computer technology, imaging techniques, display resolution, and camera amplification, the technique has been transformed into a more powerful tool. Although PTCSL is a challenging procedure for those unaccustomed to its technical nuances, it provides an incredibly useful alternative to conventional methods for several reasons. In groups who are experienced

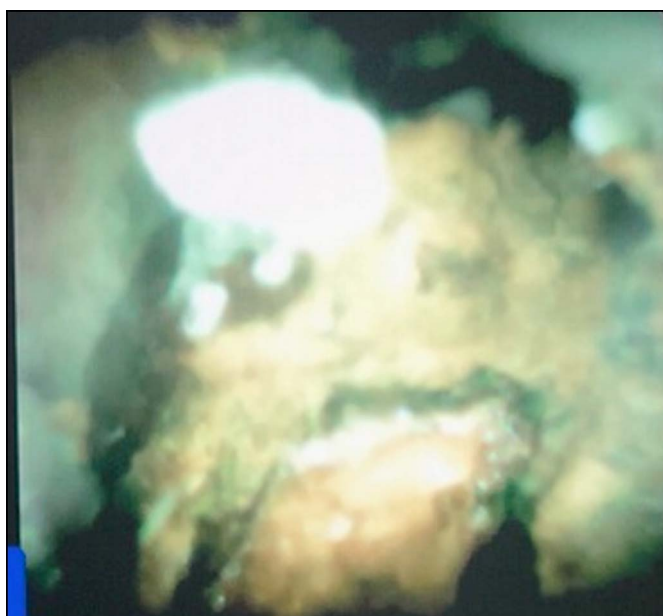


Figure 1. A visualized stone on cholangioscopy seen in the distal common bile duct obstructing the lumen.

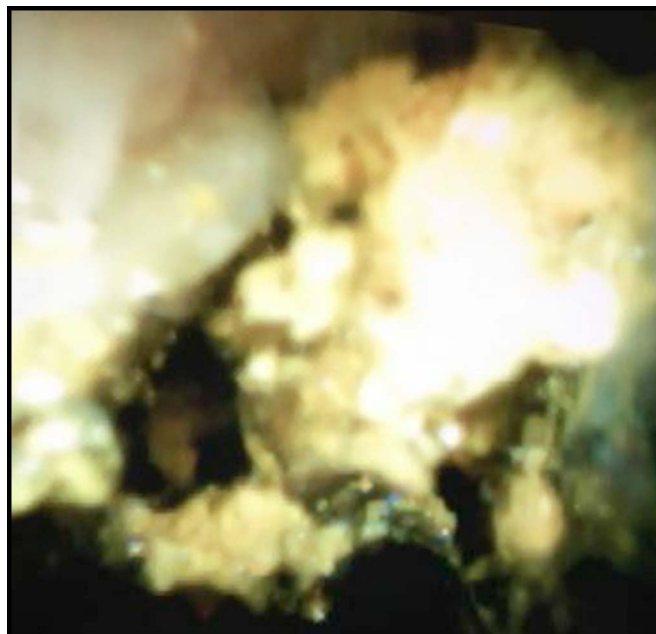


Figure 2. Distal common bile duct stone viewed on cholangioscopy after lithotripsy is applied.

with percutaneous transhepatic access, the rate of successful stone removal is close to 90% and up to 100%.^{1,3} The complication rates are similar to ERCP and less than laparoscopic-assisted techniques. In addition, it has been suggested that complication rates of ERCP in patients with altered anatomy are elevated.⁴

There are certainly other techniques in development, but they are adorned with similar complication rates and depend more heavily on operator skill. For instance, the use of percutaneous lithotomy using a basket with or without sphincterotomy under fluoroscopy is another option but carries a similar complication rate to that of ERCP.⁵ This approach is also limited by its inability to capture stones at the ampulla of Vater and stones of a small size that are not well visualized with fluoroscopy (Figure 3). PTCSL is regarded as a safe and very well tolerated procedure in any age group despite its time investment, skill requirement, and higher cost.^{1,6,7} Only 4% of patients have major complications, which include pericatheter bile leak <16%, hemorrhage/hemobilia 2%–13.8%, septic shock 3%–5%, pancreatitis 0%–4%, pneumothorax, hemothorax, bilithorax <1.0%, contrast reaction <2%, and death 0.9%.¹⁰

In addition to its safety, percutaneous transhepatic cholangioscopy provides precise diagnostic information to the clinician with a more powerful ability to deliver targeted care as a result of the high diagnostic accuracy.⁸ The utilization of PTCSL is not as widespread as envisioned mainly because its use is restricted until conventional methods have failed or are deemed to be too high risk. The scarcity of this procedure is apparent in the literature because there are less than 50

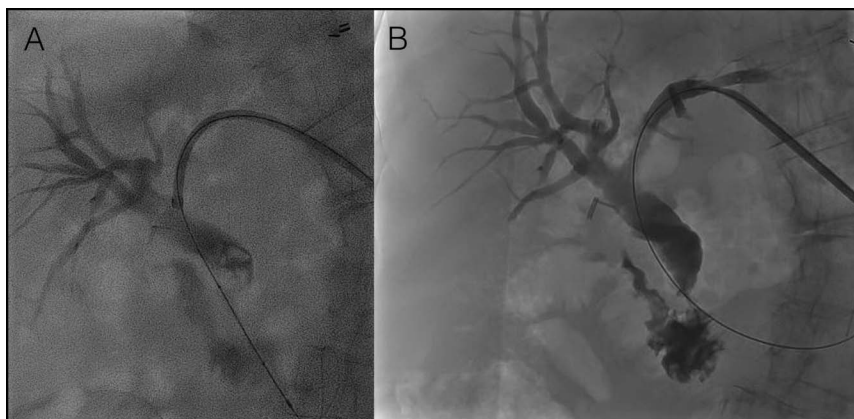


Figure 3. Fluoroscopic imaging showing (A) the presence of a distal filling defect in the common bile duct and (B) the clearance of the previously detected filling defect.

published cases of PTCSL per year on average, indicating a possible underutilization. This case serves to corroborate the efforts of other case series showing PTCSL to be an enticing alternative to removing CBD stones in patients with surgically altered anatomy.

DISCLOSURES

Author contributions: R. Mando and D. Ceballos wrote the manuscript. M. Kumar, O. Abdul-Rahim, and M. Mizrahi edited the manuscript. R. Mando is the article guarantor.

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Informed consent was obtained for this case report.

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