Percutaneous transhepatic cholangioscopy with intraductal electrohydraulic lithotripsy for management of choledocholithiasis in an inaccessible papilla

Guru Trikudanathan, MD,[1] Dupinder Singh, MD,[1] Prashant Shrestha, MD,[2] Martin L. Freeman, MD[1]

An 81-year-old woman with a history of hypertension, hyperlipidemia, and dementia presented with nausea and vomiting; CT of the abdomen suggested gastric outlet obstruction from a soft-tissue mass at the level of the duodenum (Fig. 1). Upper endoscopy confirmed a malignant-appearing stricture in the second portion of the duodenum, which did not permit the passage of a pediatric gastroscope.

The patient underwent exploratory laparotomy, which confirmed a well-differentiated duodenal adenocarcinoma, and she received a palliative surgical gastrojejunostomy. Her course was complicated by obstructive jaundice secondary to multiple bile duct stones. Owing to the inaccessibility of her papilla, she underwent percutaneous transhepatic cholangiography, and after conversion to an internal/external biliary drain, she experienced cholangitis, which was treated with antibiotic agents. For stone fragmentation, percutaneous transhepatic cholangioscopy was planned.

With the patient under general anesthesia in a supine position, a 14F sheath was advanced into the left intrahepatic duct under fluoroscopy, and a 0.035 guidewire was coiled in the duodenum (Fig. 2). A dilating balloon was advanced, and the biliary orifice was gently dilated to 8 mm (Fig. 3). A 10F single-operator cholangioscope (Digital

Figure 1. Contrast-enhanced CT view of abdomen showing soft-tissue mass in the duodenum causing gastric outlet obstruction.

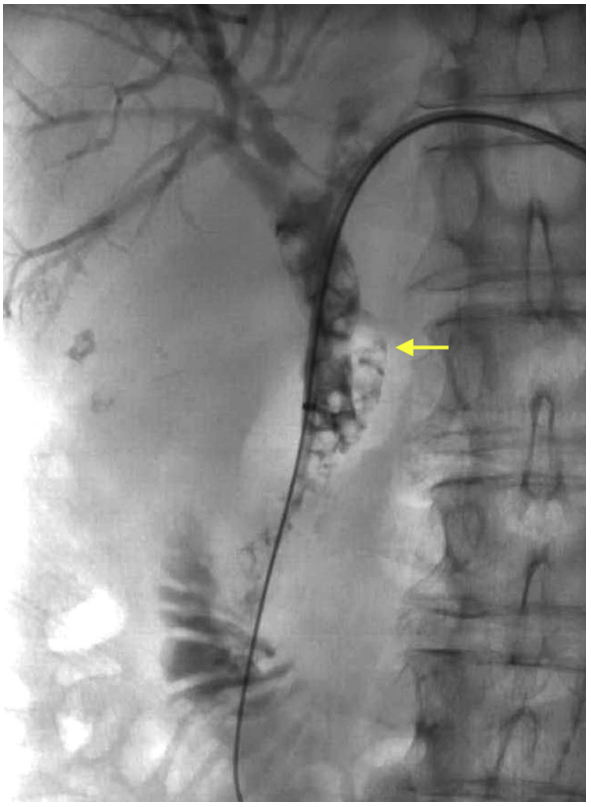

Figure 2. Cholangiogram showing multiple filling defects consistent with stones, a 14F sheath in the left intrahepatic duct, and 0.035 guidewire coiled in the duodenum.

Written transcript of the video audio is available online at www.VideoGIE.org.

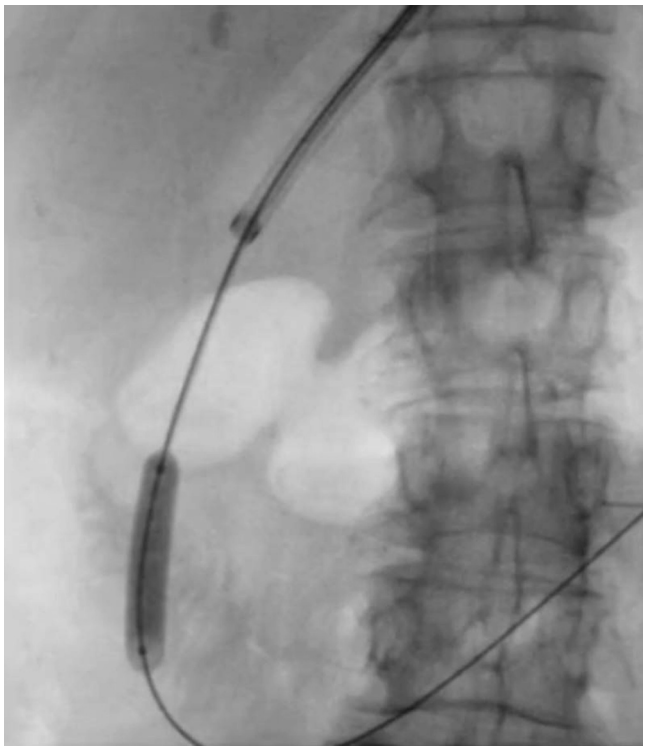

Figure 3. Fluoroscopic view showing biliary orifice dilation with an 8-mm dilation balloon.

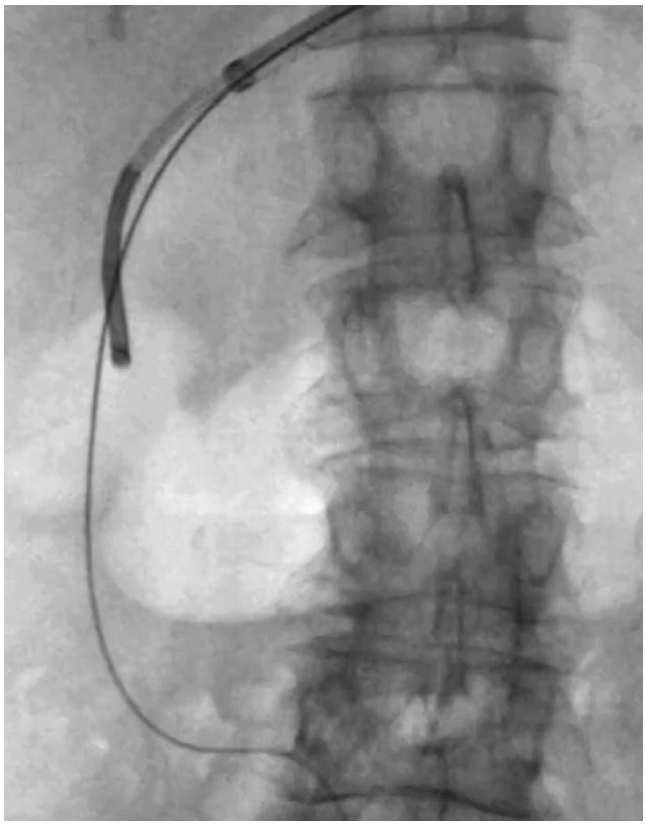

Figure 4. Fluoroscopic view showing advancement of digital cholangioscope into the bile duct.

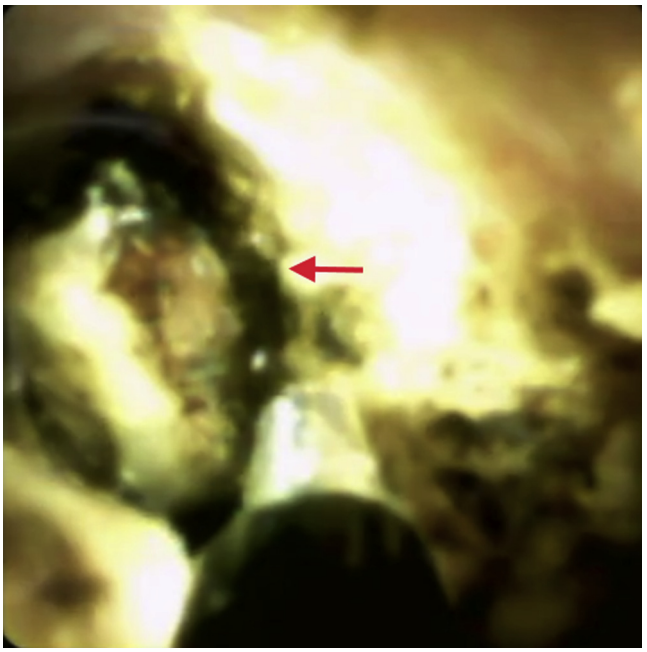

Figure 5. Digital cholangioscopic image showing intraductal electrohydraulic lithotripsy under direct visualization.

Spyglass DS, Boston Scientific, Natick, Mass) was advanced into the left intrahepatic duct (Fig. 4), and a large cluster of impacted pigment stones was visualized. An electrohydraulic lithotripsy (EHL) catheter was advanced through the working channel, and intraductal lithotripsy was performed under direct and fluoroscopic visualization (Fig. 5). The stone fragments were pushed out of the bile duct into the duodenum by use of an 8-mm stone balloon (Fogarty Balloon, Edwards Life Sciences, Irvine, Calif). Cholangioscopy showed almost complete clearance of the duct, which was further confirmed by cholangiogram (Fig. 6). The sheath was withdrawn, and a new 14F Flexima internal/external drain (Boston Scientific) was advanced into the left intrahepatic duct. The patient was discharged the same day with oral antibiotic agents prescribed for 1 week and has been followed up for the past 6 months without any adverse events.

Advantages of the digital cholangioscope include its superior image quality, the 4-way steerability, and easy accommodation of electrohydraulic probes. It is important to remember that, in general, adverse events occur during percutaneous access and subsequent tract dilation, whereas cholangioscopy is usually safe, especially in the hands of an experienced therapeutic endoscopist. Potential adverse events related to tract dilation include perforation, in addition to hemobilia, cholangitis, bacteremia, and percutaneous drainage catheter occlusion. For any cholangioscopic lithotripsy device, direct application to the duct wall, rather than to the stone, can result in bleeding (which can obscure our visibility), bile duct wall

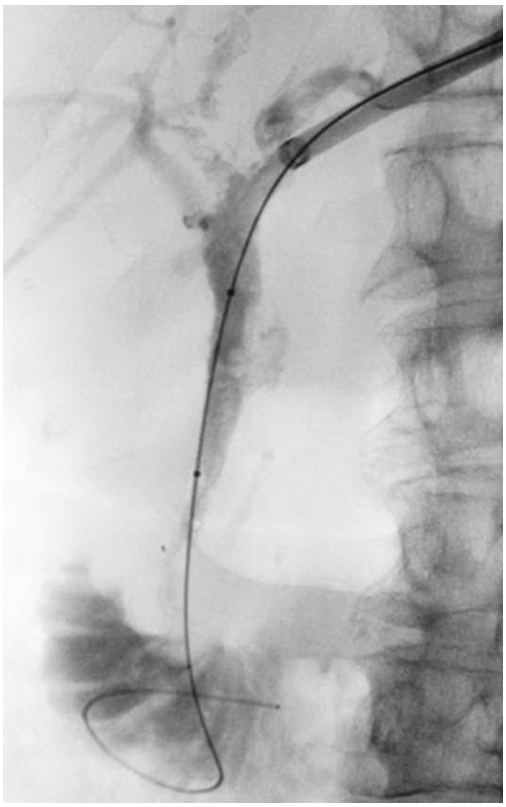

Figure 6. Cholangiogram showing almost complete clearance of stones after intraductal lithotripsy.

injuries, or both. Finally, this technique should not be used when there is active cholangitis, given the increased risk of intrahepatic abscess infection from biliary manipulation, which could result in bacteremia and sepsis.

This video (Video 1, available online at www.VideoGIE.org) demonstrates the successful use of percutaneous transhepatic cholangioscopy with intraductal electrohydraulic lithotripsy (EHL), a technique that should be considered when anatomic considerations preclude the traditional per-oral approach for ERCP.

DISCLOSURE

Dr Freeman is a consultant for Boston Scientific, Cook Medical, XLumena Corp, and Neometrics. All other authors disclosed no financial relationships relevant to this publication.

Abbreviation: EHL, electrohydraulic lithotripsy.

Division of Gastroenterology, Hepatology, and Nutrition (1); Department of Radiology, Division of Interventional Radiology, University of Minnesota, Minneapolis, Minnesota, USA (2).

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