Percutaneous transhepatic cholangioscopy with electrohydraulic lithotripsy in a patient with choledocholithiasis complicating a benign stricture

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An 88-year-old woman with a history of orthotopic liver transplantation 25 years earlier for primary biliary cholangitis presented with jaundice and abdominal pain. Her initial post–liver transplantation course was complicated by choledocholithiasis and recurrent biliary strictures, requiring placement of a metal Wallstent (Boston Scientific, Natick, Mass, USA). She had done well for the previous 2 decades, with good allograft function. On admission, her laboratory results were notable for a bilirubin of 5.4 mg/dL (92 μmol/L) (previously 0.8 mg/dL [14 μmol/L] 4 months prior). Abdominal US showed intrahepatic biliary dilation and a common bile duct (CBD) stent in place, with narrowing at the proximal portion of the stent, possibly due to stones or sludge (Fig. 1).

PROCEDURE

ERCP showed a complete occlusion in the stent resulting from a combination of stones and tissue overgranulation (Fig. 2). Multiple attempts were made to advance a wire into the proximal biliary system, but passage was prevented by the occlusion. The interventional radiology service was consulted for percutaneous transhepatic cholangiography (PTC). The biliary system was accessed through the left hepatic duct because the right liver lobe was atrophic and right hepatic duct access would have required a high intercostal approach. During the procedure, they were unable to advance a catheter through the CBD stent (Fig. 3), and an external biliary drainage catheter was placed. The patient returned 2 months later for a combined PTC/ERCP rendezvous procedure (Video 1, available online at www.VideoGIE.org). The distal bile duct was explored with cholangioscopy by use of a Spyscope DS II (Boston Scientific) (outer diameter 3.5 mm). We were unable to visualize the distal extent of the stent because of significant angulations (Fig. 4), which have been described in a subset of post–liver transplantation patients because of compensatory donor lobe hypertrophy.[1] The cholangioscope was then introduced in an anterograde manner through a 12F (4-mm) Peel-Away sheath (Cook Medical, Bloomington, Ind, USA) (Fig. 5). This sheath was chosen because it does not have a diaphragm, which

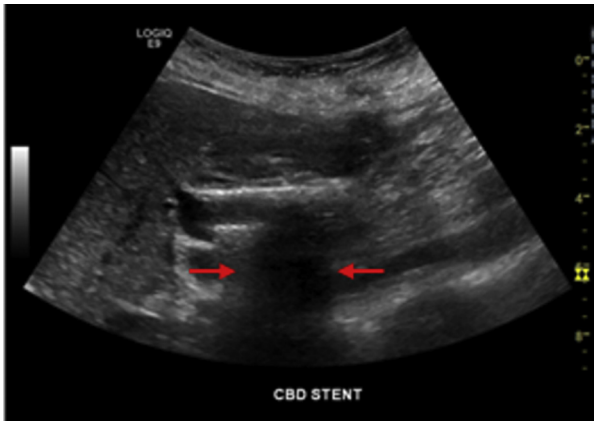

Figure 1. US image showing the indwelling common bile duct (CBD) stent with *arrows* pointing to shadowing due to suspected stones and sludge in the distal portion of the stent.

Figure 2. Cholangiogram from ERCP showing complete occlusion *(arrow)* due to filling defects in the distal portion of the metal stent.

Figure 3. Cholangiogram during percutaneous transhepatic cholangiography showing complete occlusion *(arrow)* and no contrast material passing through the metal stent.

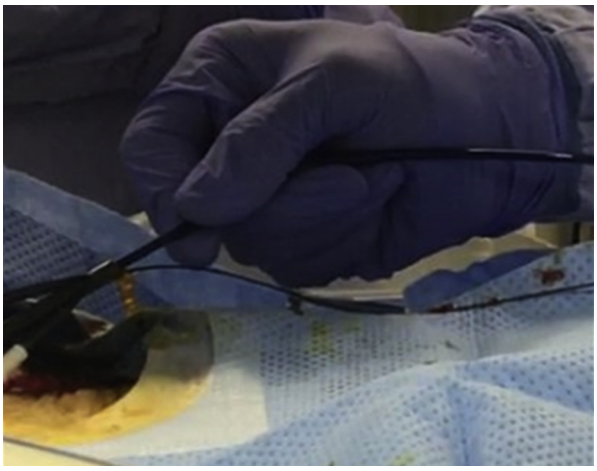

Figure 5. Passage of the cholangioscope through the 12F percutaneous access sheath.

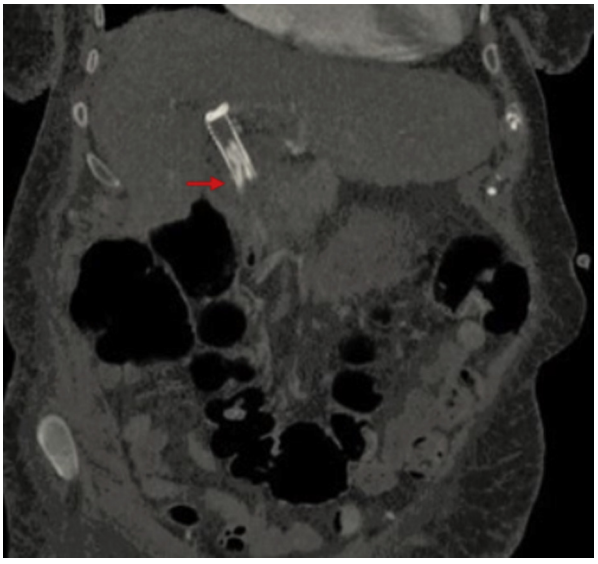

Figure 4. Coronal CT image showing the metal stent with *arrow* pointing to the distal end of the stent where we encountered significant angulations during cholangioscopy.

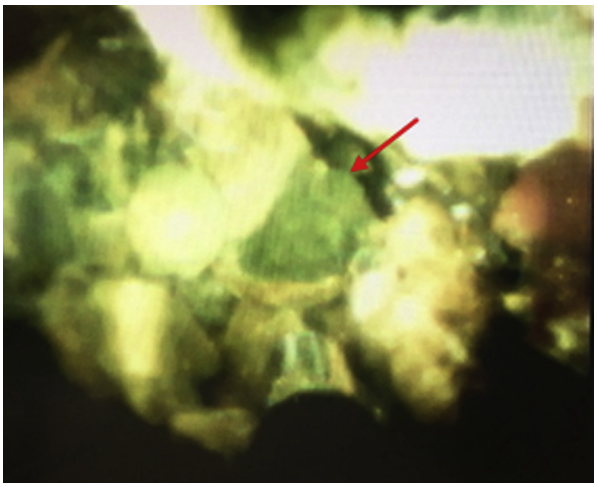

Figure 6. Multiple large stones *(arrow)* visualized during cholangioscopy. A 1.9F (0.6-mm) electrohydraulic lithotripsy probe is shown making contact with the stones.

might have damaged the cholangioscope. Multiple large stones were visualized in the CBD stent (Fig. 6). A 1.9F (0.6-mm) electrohydraulic lithotripsy (EHL) probe was passed through the cholangioscope channel. Lithotripsy was performed under direct visualization with a series of pulses of increasing power, up to 70 watts. The majority of the stone burden was treated, but some stones remained. A 12F (4-mm) Dawson-Mueller external drain was then placed, and the patient returned 2 weeks later for repeated EHL. After this treatment, the cholangioscope was then able to be advanced in an anterograde fashion into the duodenum. The PTC drain was converted to a 14F (4.7-mm) Fleixma (Boston Scientific) internal/external drain. Several weeks later, a retrievable 10- × 80-mm partially covered Wallflex (Boston Scientific) stent was placed, extending from the CBD past the ampulla and into the duodenum (Fig. 7). The biliary drain was removed. We planned to remove the partially covered stent in 1 year.

OUTCOME

The patient's bilirubin improved to 1.1 mg/dL (19 μmol/L). Unfortunately, before planned stent retrieval, the patient died of unrelated causes. This case highlights the need for a multidisciplinary approach in challenging cases of choledocholithiasis, ultimately using PTC. Indications include inability to access the ampulla because of surgically altered anatomy and management of large or intrahepatic stones. Adverse events such as bleeding can occur from nontargeted EHL of the biliary wall.[2] The single-use

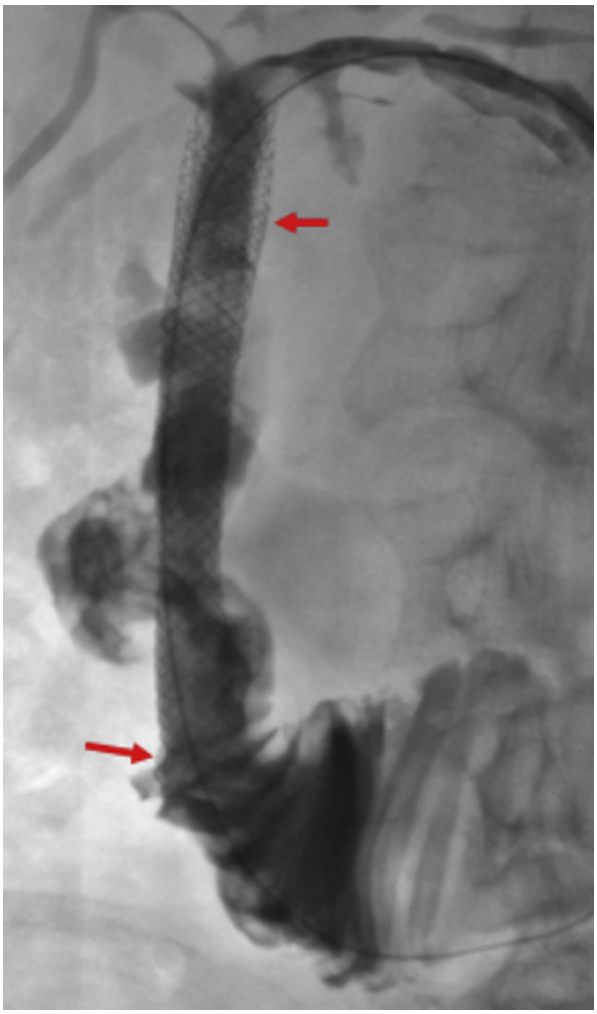

Figure 7. Final cholangiogram after placement of the secondary 10- × 80-mm partially covered Wallflex stent *(arrows)* extending from the common bile duct into the duodenum.

cholangioscope provided optimum tip deflection and maneuverability for a safe performance of EHL in this angulated bile duct. It is important to match the outer diameter of the cholangioscope (in millimeters) with the inner diameter of the introducer sheath (in French). This case also highlights the potential problems of placing a metal stent for benign disease.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviations: CBD, common bile duct; EHL, electrohydraulic lithotripsy; PTC, percutaneous transhepatic cholangiography.

REFERENCES

1. Sharma S, Gurakar A, Jabbour N. Biliary strictures following liver transplantation: past, present and preventative strategies. Liver Transpl 2008;14:759-69.
2. Ahmed S, Schlachter T, Hong K. Percutaneous transhepatic cholangioscopy. Tech Vasc Interv Radiol 2015;18:201-9.

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