



Cholangioscopy-guided retrieval basket and snare for the removal of biliary stones and retained prostheses

M. Phillip Fejleh, MD, Adarsh M. Thaker, MD, Stephen Kim, MD, V. Raman Muthusamy, MD, Alireza Sedarat, MD

Background and Aims: Certain pancreaticobiliary conditions remain challenging to treat using standard endoscopic techniques. Examples include difficult-to-remove gallstones and foreign objects in the bile ducts. Two tools designed for these purposes are the SpyGlass retrieval basket and the SpyGlass retrieval snare, which are passed through the cholangioscope channel for use under direct visualization. We present 3 cases in which these tools were used successfully.

Methods: Three cases using the SpyGlass retrieval basket and retrieval snare were reviewed for efficacy.

Results: Patient 1 had hepatitis C cirrhosis and underwent liver transplantation with T tube placement at the site of biliary anastomosis. Image-guided T tube removal by interventional radiology was unsuccessful. Endoscopic removal with the SpyGlass retrieval snare was completed. Patient 2 presented with cholangitis from an impacted common bile duct stone. Fragmentation with electrohydraulic lithotripsy was performed, and the fragments were removed with the SpyGlass retrieval basket. Patient 3 presented for removal of a migrated biliary stent. The stent was placed a year prior during an ERCP for treatment of choledocholithiasis. Initial removal attempt at an area hospital failed, so the patient was referred to our center, where the Spyglass retrieval snare was used to remove the biliary stent.

Conclusions: This case series demonstrates initial successes treating biliary pathologic conditions with the SpyGlass retrieval basket and retrieval snare, 2 tools designed for use under direct visualization with the cholangioscope. (VideoGIE 2019;4:232-4.)

Cholangioscopy is an important tool in the management of pancreaticobiliary diseases. Currently, a small number of accessories are available for use during cholangioscopy, including the electrohydraulic lithotriptor and through-the-cholangioscope biopsy forceps.¹ Two devices were recently introduced for use in treating pancreaticobiliary pathologic conditions using cholangioscopy: the SpyGlass retrieval basket and the SpyGlass retrieval snare (Boston Scientific, Marlborough, Mass, USA). We present 3 cases in which these devices were used for the treatment of a difficult-to-remove gallstone and 2 foreign objects in the biliary tree (Video 1, available online at www.VideoGIE.org).

CASE DESCRIPTIONS

Patient 1 was a 54-year-old man with hepatitis C cirrhosis and end-stage renal failure from hepatorenal syndrome who underwent liver transplantation with T tube placement at the site of biliary anastomosis. He presented

for routine outpatient image-guided T tube removal by interventional radiology that was unsuccessful because of the inability to pass a wire through the T tube into the duodenum. The patient was admitted with plans for ERCP the following day. His total bilirubin on admission was 0.9 mg/dL. Endoscopic removal of the T tube using transpapillary attempts with a snare and extraction balloon were unsuccessful. A SpyGlass retrieval snare under direct cholangioscopic visualization was then tried (Fig. 1). The T tube appeared to be impacted at the entry site to the bile duct at the level of the anastomosis. The SpyGlass retrieval snare was advanced through the cholangioscope and used to grasp the more distal portion of the tube, but the T tube was unable to be removed because of resistance at the level of the anastomosis. When the more proximal aspect of the T tube was snared, the entire T tube was withdrawn intact from the ampulla with mild resistance. A plastic biliary stent was placed to facilitate downstream drainage because the final cholangiogram demonstrated a small amount of contrast material exiting the bile duct through the T tube tract to the skin. The patient did well

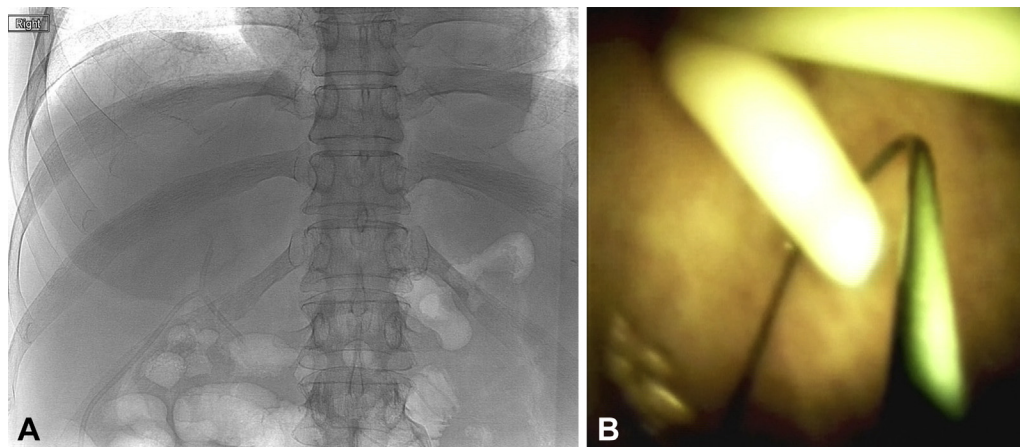


Figure 1. **A,** Scout film showing T tube in the right upper quadrant. **B,** Cholangioscopic view of grasping the impacted T tube by use of the retrieval snare.

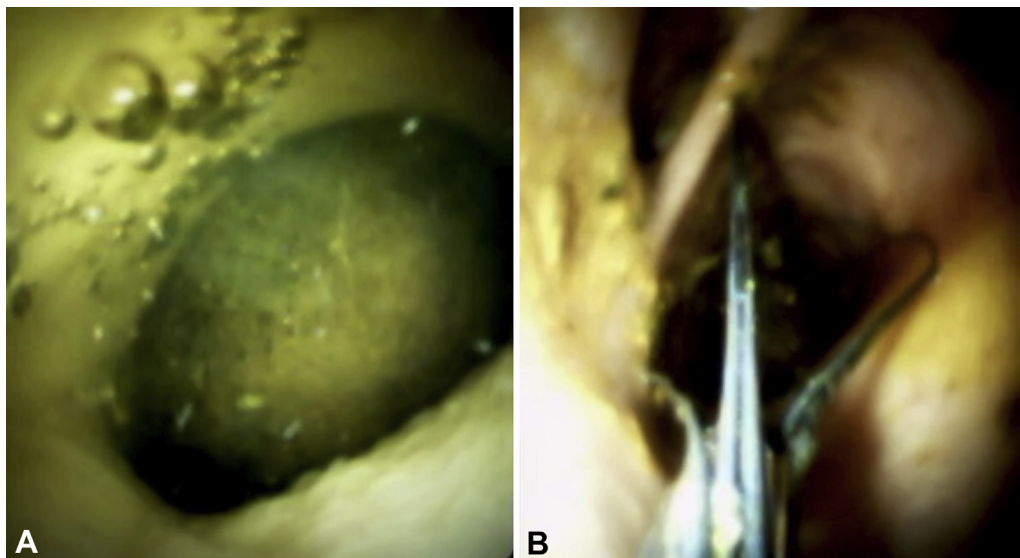


Figure 2. **A,** Cholangioscopic view of impacted gallstone in the distal common bile duct. **B,** Cholangioscopic view of retrieval basket collecting stone fragments after electrohydraulic lithotripsy.

after hospital discharge and underwent repeat ERCP for biliary stent removal a few months later.

Patient 2 was an 80-year-old man with cholangitis secondary to an impacted gallstone. The patient presented with fever and right upper-quadrant abdominal pain, with initial laboratory results notable for a total bilirubin of 2.5 mg/dL. CT demonstrated a 2.1-cm gallstone in the distal common bile duct and also cholelithiasis. ERCP was performed for attempted stone removal. An initial cholangiogram showed a large filling defect in the distal common bile duct. Because of the stone's size and the anticipated difficulty of removal, fragmentation with electrohydraulic lithotripsy set to medium power with 10 shots per fire was completed. The larger stone fragments were then removed under direct visualization by use of the SpyGlass retrieval basket (Fig. 2). Subsequent balloon papilloplasty and balloon sweeps were unsuccessful in duct clearance. To

completely clear the bile duct of smaller stone fragments, balloon papilloplasty and balloon sweep alternating with repeated lithotripsy and use of the SpyGlass retrieval basket were performed. A final occlusion cholangiogram showed no residual filling defects, and the common bile duct was clear on cholangioscopy. Two plastic biliary stents were placed. The patient has since had a laparoscopic cholecystectomy followed by biliary stent removal a few months later.

Patient 3 was a 34-year-old man who presented for removal of a biliary stent that had migrated proximally into the bile duct. The patient had choledocholithiasis the previous year and underwent ERCP with stone removal and biliary stent placement at that time. Since then he had undergone a laparoscopic cholecystectomy, but biliary stent removal was delayed because of other medical comorbidities. He

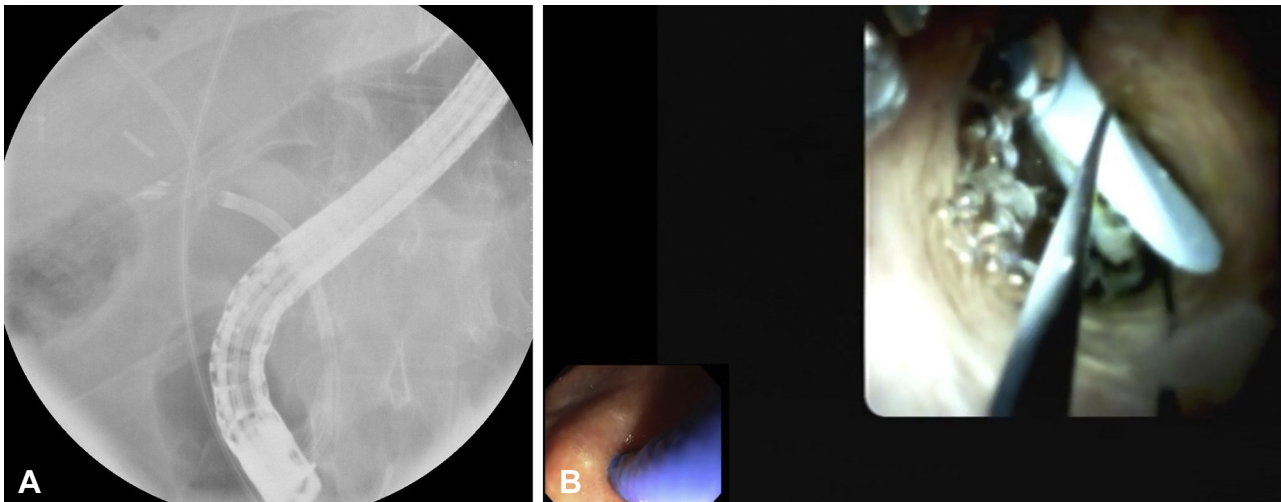


Figure 3. **A,** Fluoroscopic image showing the cholangioscope at the location of the migrated biliary stent. **B,** Cholangioscopic view of grasping the distal flange of the biliary stent with the retrieval snare.

presented to a local hospital for ERCP, where his laboratory results were notable for a total bilirubin of 4.7 mg/dL, aspartate aminotransferase of 144 U/L, and alanine aminotransferase of 190 U/L. Initial attempts at removal of the biliary stent with balloon sweep, biliary basket, and SpyGlass biopsy forceps were unsuccessful, so the patient was referred to our center for further management. Repeat ERCP was performed, and the biliary stent was noted to have migrated proximally into the biliary tree. The distal end of the stent appeared to have become impacted in the wall of the cystic duct stump when visualized with the cholangioscope. The SpyGlass retrieval snare was advanced through the cholangioscope, but the distal end of the stent was unable to be grasped by the snare because it could not be pushed away from the wall of the cystic duct stump. The flange of the stent was then snared, allowing advancement of the stent into the biliary tree to dislodge it from the cystic duct wall (Fig. 3). The stent was then pulled with ease through the ampulla and removed from the patient. A final cholangiogram showed no bile leak or other abnormalities. The patient has done well afterward, with no further interventions required.

We have demonstrated the successful use of a snare and basket designed for operation under direct visualization during cholangioscopy. These tools will likely assist with difficult cases of biliary and pancreatic pathologic

conditions, including problematic stones and foreign objects like plastic stents.

DISCLOSURE

Dr Kim, Dr Muthusamy, and Dr Sedarat are consultants for Boston Scientific. All other authors disclosed no financial relationships relevant to this publication.

REFERENCE

1. Komanduri S, Thosani N, Abu Dayyeh BK, et al. Cholangiopancreatography. *Gastrointest Endosc* 2016;84:209-21.

Vatche and Tamar Manoukian Division of Digestive Diseases, David Geffen School of Medicine at UCLA, Los Angeles, California, USA.

If you would like to chat with an author of this article, you may contact Dr Sedarat at asedarat@mednet.ucla.edu.

Copyright © 2019 American Society for Gastrointestinal Endoscopy. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.vgie.2019.03.001>