



# Removal of proximally migrated biliary stents by using single-operator cholangioscopy

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**Background and Aims:** Migration is a late adverse event of biliary stent placement. It occurs in 1% to 20% of cases and is associated with a diverse array of adverse events. In this article, we report our take on endoscopic extraction of proximally migrated biliary stents by the use of single-operator cholangioscopy.

**Methods:** This report includes 3 patients who were found to have proximal stent migration while being treated for biliary stones. One patient had a migrated metal stent, and the other 2 had plastic stents. Single-operator cholangioscopy was used to retrieve the stents in all patients. The SpyBite biopsy forceps accessory was used to extract the metal stent, whereas the SpyBasket and the SpySnare were used to extract the plastic stents.

**Results:** All patients underwent successful stent removal by the techniques described in this report, with no immediate adverse events, and they completed more than 4 weeks of follow-up care with no further adverse events.

**Conclusions:** Digital single-operator cholangioscopy with SpyBasket, retrieval snare, and SpyBite biopsy forceps can be useful tools to remove migrated plastic and metallic stents, respectively. (VideoGIE 2020;5:213-6.)

Migration is a late adverse event of biliary stent placement. It is estimated to occur in approximately 5% of plastic and partially covered metallic stents, 1% of uncovered metallic stents, and up to 20% of fully covered metallic stents.<sup>1,2</sup> The possible adverse events that can result from stent migration can sometimes be severe and life threatening.<sup>3</sup> The literature includes reports of adverse events that can be broadly classified into perforation or obstruction of the intestines, intra-abdominal sepsis, fistula formation, appendicitis, and necrotizing fasciitis.<sup>3-5</sup> On rare occasions, other cavities or organs can be affected, such as the pleura or the pancreas. It is, therefore, useful to advance our knowledge of the available tools and techniques of removal.<sup>6-11</sup> In this article, we report our take on endoscopic extraction of proximally migrated biliary stents by the use of single-operator cholangioscopy (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)).

## PATIENTS

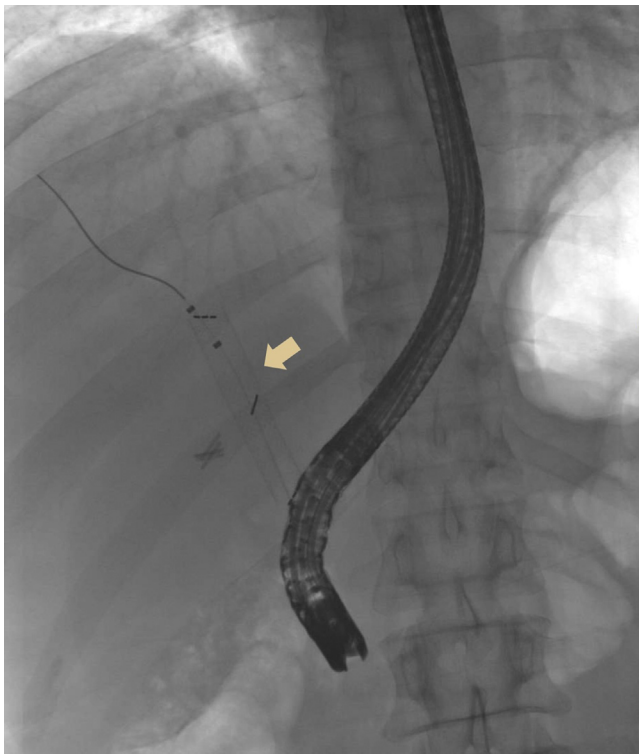
Three patients were found to have proximal stent migration while being treated for biliary stones. The first patient was a 40-year-old man with a history of recurrent primary sclerosing cholangitis, who had been a candidate for liver transplantation. However, his plans for liver transplantation were put to rest when he went into

symptomatic remission after biliary stent placement. During his follow-up care in an outside facility, he experienced abdominal pain and was found on imaging to have a triangular stone impacted at the common bile duct (CBD) bifurcation. Mechanical lithotripsy, nevertheless, was not attempted at the original center because of the high risk of triggering another episode of cholangitis if the stone was not fully retrieved. Therefore, he was referred for cholangioscopy and laser lithotripsy.

Because of the severe primary sclerosing cholangitis—induced stenoses that were found in the biliary system, the patient needed multiple treatment sessions. During the fifth session, we placed a 6-cm × 10-mm metal stent in the CBD. The stent was found to have migrated proximally and was partially occluded by stones at the subsequent procedure (Fig. 1).

The second patient, by contrast, was a 61-year-old man with no comorbidities. He presented to another center with the typical signs and symptoms of biliary stones and was found to have a stone in the CBD. He was treated at the original center, and a plastic stent was inserted. However, subsequent ERCP showed that the stent had migrated to the right hepatic duct, and the patient was referred to our center after 2 unsuccessful attempts at removal.

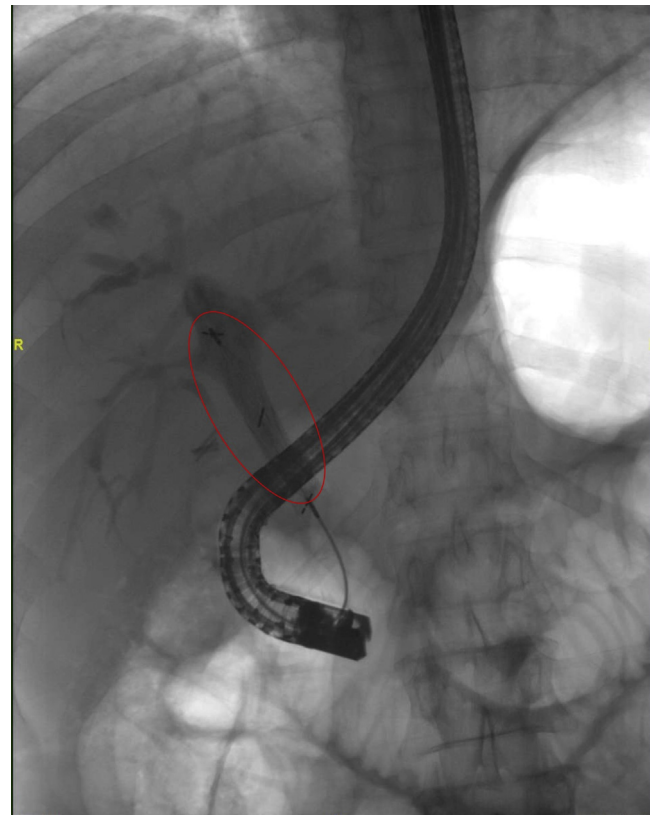
The last patient was a 74-year-old man who presented to the emergency department in an outside hospital with epigastric pain and vomiting for 2 days. The initial



**Figure 1.** Fluoroscopic view of migrated metal stent in patient 1 (yellow arrow).



**Figure 2.** Attempt to remove stent with an extraction balloon (yellow arrow).

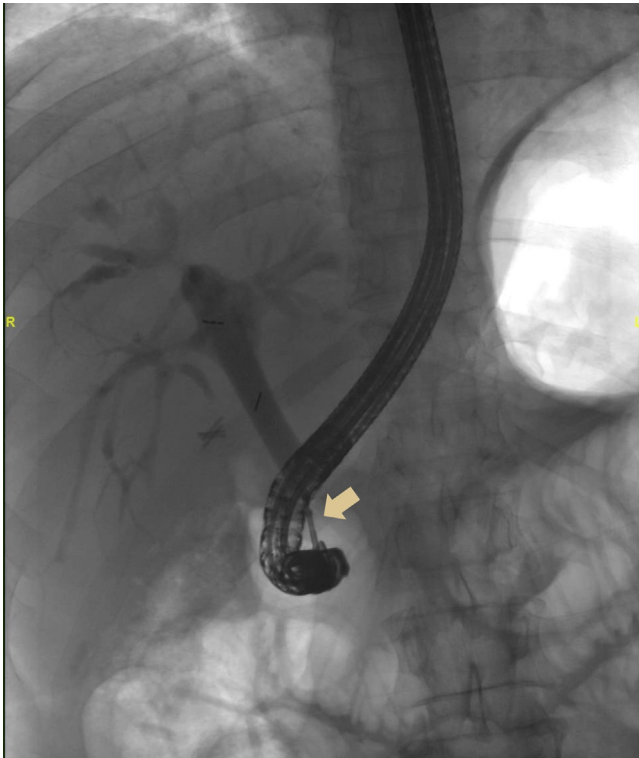


**Figure 3.** Attempt to remove migrated metal stent with a retrieval basket (red oval).

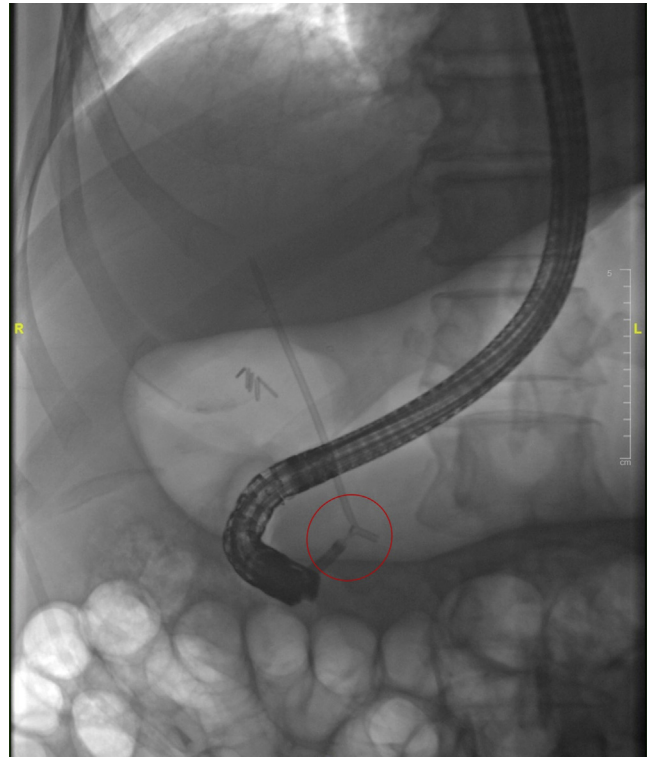
investigations showed that he had elevated liver enzymes, and imaging showed biliary stones that were complicated by acute pancreatitis. Therefore, he was admitted and symptomatically treated until his condition became stable enough to allow transfer; he then was referred to our hospital for stone removal. When he arrived, he underwent standard ERCP, and most of his stones were removed by the usual techniques, including wide sphincterotomy, balloon extraction, and mechanical lithotripsy. However, the patient still had large, impacted stones in the intrahepatic ducts, which could not be removed by these methods. We, therefore, inserted a plastic stent and scheduled him for another treatment session with cholangioscopy. Like the other 2 patients, this patient was found to have a migrated stent during the following procedure.

## PROCEDURE

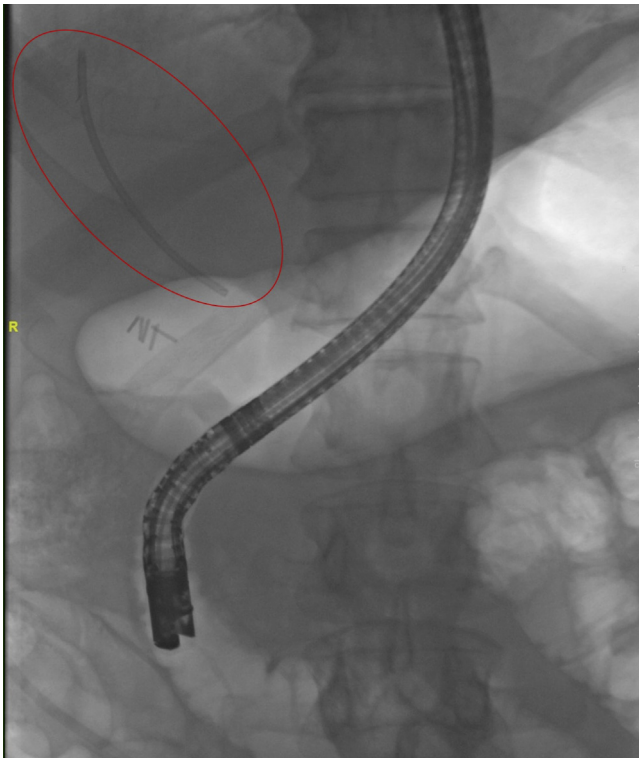
The digital, single-operator cholangioscope (Boston Scientific SpyGlass DS; Boston Scientific, Marlborough, Mass, USA) was used to retrieve the stents in all patients. Before trying to extract the stents with the SpyScope (Boston Scientific), we exhausted most of the usual options. These options included inflating a stone extraction balloon to mobilize the stent (Fig. 2), followed by introducing a stone retrieval basket (Fig. 3), then attempting to grasp



**Figure 4.** Attempt to remove migrated metal stent with biopsy forceps.



**Figure 6.** Plastic stent being extracted with SpySnare in patient 2.



**Figure 5.** Fluoroscopic view of migrated plastic stent in patient 2 (red oval).

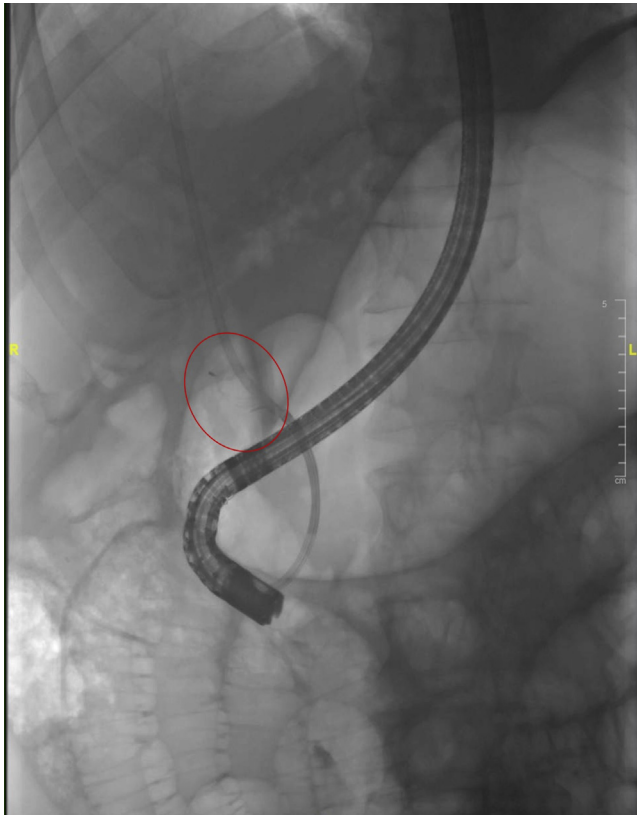
the distal end of the stent with a regular ERCP biopsy forceps (Fig. 4). It is noteworthy, however, to mention that the snare-over-guidewire technique was not tried in this series.<sup>12,13</sup>

When all of these attempts failed with the first patient, the digital SpyGlass and its SpyBite biopsy forceps accessory (Boston Scientific) were used to lock the distal edge of the stent and directly pull it out.

Because the plastic stents in the other 2 patients moved more proximally to occupy the CBD and right hepatic ducts (Fig. 5), introducing the aforementioned accessories was also not useful. Furthermore, because the plastic stents were not as adherent to the walls of the ducts as the first patient's metallic stent, attempts to grasp them with the SpyBite biopsy forceps were more challenging. Therefore, the SpySnare (Boston Scientific) (Fig. 6) and the SpyBasket accessories (Boston Scientific) (Fig. 7) were used to remove them.

## OUTCOME

All patients underwent successful stent removal by the techniques described in this report, and they completed more than 4 weeks of follow-up care with no further adverse events.



**Figure 7.** Plastic stent being extracted with SpyBasket in patient 3.

## DISCLOSURE

*All authors disclosed no financial relationships relevant to this publication.*

*Abbreviation: CBD, common bile duct.*

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