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Case Report

Percutaneous transhepatic use of rigid bronchial forceps as bailout in difficult biliary stent retrieval

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ABSTRACT

Endoscopic retrieval of embedded, proximally migrated, or fractured plastic biliary stents may be technically challenging and sometimes unsuccessful. Percutaneous transhepatic techniques have previously been described to assist in such challenging cases. Here in, we describe a difficult case in which all commonly described endoscopic and percutaneous techniques failed to retrieve a proximally migrated, fractured, and looped plastic biliary stent. We finally successfully retrieved the plastic forceps after off-label utilization of rigid bronchial forceps via a percutaneous transhepatic approach. We describe the technique utilized in detail and this appears to be the first description of this off-label use in this challenging scenario.

Case

A 70-year-old man was admitted through the Emergency Room (ER) with gallstone pancreatitis and acute cholangitis. His clinical condition quickly worsened as he became septic requiring pressors. He underwent Endoscopic Retrograde Cholangiopancreatography (ERCP), which revealed two large Common bile duct (CBD) stones, biliary sludge and pus. Subsequently sphincterotomy and balloon sweep was performed. Worsening of hyperbilirubinemia prompted a repeat ERCP with balloon sweep and plastic stent placement 4 days later. Day 12 after admission, Interventional Radiology (IR) was consulted for percutaneous transhepatic drain placement and

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Core Tip: Off label use of rigid bronchial forceps via percutaneous biliary access may be helpful as bailout in difficult to remove embedded plastic biliary stent.

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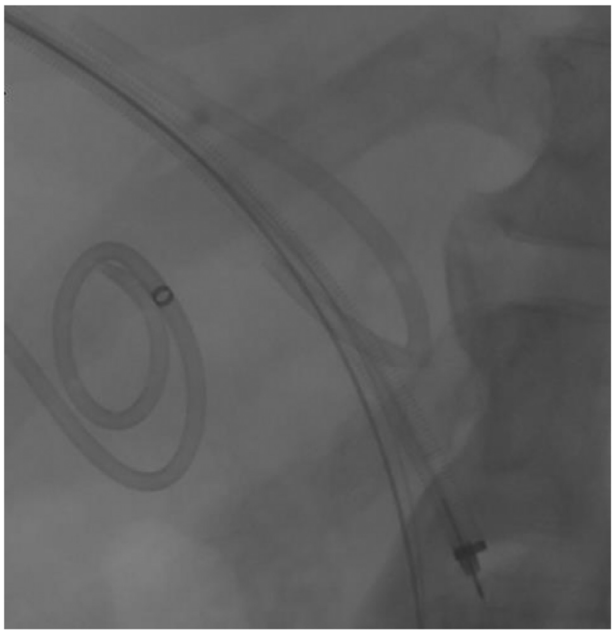

Fig. 1 – Fractured plastic biliary stent U-looped in the CBD and proximally migrated into the right biliary duct.

Fig. 2 – ERCP with balloon sweep in progress attempting to dislodge the looped, embedded and proximally migrated stent.

cholecystostomy tube in the setting of persistent hyperbilirubinemia, now 14.4 mg/dL with an alkaline phosphatase of 995 units/L and normal transaminases despite the two ERCP interventions, sphincterotomy and plastic stent placement.

IR successfully placed a 10-F percutaneous transhepatic biliary drain and 8.5-F percutaneous cholecystostomy tube. There was drainage from both tubes however, the patient's clinical status worsened with alkaline phosphatase, and bilirubin rising. With bilirubin now at 20.2 mg/dL, IR consult was placed for upsizing the percutaneous biliary drain and removing the plastic stent which was thought to be nonfunctional and therefore impeding biliary drainage.

The existing 10-F percutaneous drain was exchanged over a guidewire for a 12-F sheath, the plastic stent was snared distally using an EN Snare (Merit Medical, Utah). During retraction of the snared plastic stent into the sheath, it fractured through the snared distal part leaving the bulk of the stent U looped in the common bile duct, proximally migrated and embedded into the right hepatic ducts (Fig. 1).

Further attempts to snare the stent using EN Snare and Wittich stone retrieval basket (Cook Medical, Bloomington), alligator forceps (Cook Medical Bloomington), loop and snare techniques were unsuccessful. The procedure was abandoned due to concerns for exacerbating sepsis and prolonged fluoroscopy time and radiation dose (76 minutes, 3420 mGy). A 12-F Cook internal/external biliary drain (Cook Medical Bloomington) was then left in situ connected to a bag.

Once sepsis had improved a second attempt at retrieving the plastic stent now looped, proximally migrated, and stuck in the biliary tree as a foreign body was made. A rendezvous procedure with a Gastrointestinal endoscopist was performed and ERCP with balloon sweep (Fig. 2) was unable to dislodge the stent. Retrograde and antegrade (from percutaneous access) attempts with the Spy glass cholangioscope and SpyBite forceps (Boston scientific, Massachusetts) failed to effectively grasp the fractured stent firmly enough to retract it or mobilize it despite multiple attempts. This second attempt was aborted after prolonged fluoroscopy time and radiation dose (94.5 minutes; 2554 mGy). An internal/External biliary drain connected to a drainage bag was left in-situ.

A week later, a decision was made to attempt retrieval of the stent using rigid bronchial forceps on the hypothesis that it could better and more effective grasp. The existing percutaneous transhepatic access was upsized to accept a 16-F braided sheath, with an additional safety wire to preserve access. Under fluoroscopic guidance, the bronchial forceps were carefully manipulated to engage and fully grasp the plastic stent. The stent was then gently retracted into the sheath and outside the patient (Fig. 3).

Post retrieval digital subtraction cholangiogram showed no biliary or vascular injury (Fig. 4). The retrieved partially fractured stent is shown grasped by the bronchial forceps (Fig. 5). The utilized bronchial forceps are shown in Fig. 6a and 6b in open and closed positions. A 16-F biliary internal/external biliary drain was left in-situ. Total procedure time was 13 minutes compared to almost 3-5 hours from the 2 previous attempts described.

The patient's bilirubin and ALP started trending by the following morning and had normalized after 10 days. The remained hospitalized for 2 weeks after the stent procedure for management of his pancreatitis, but did not develop any fur-

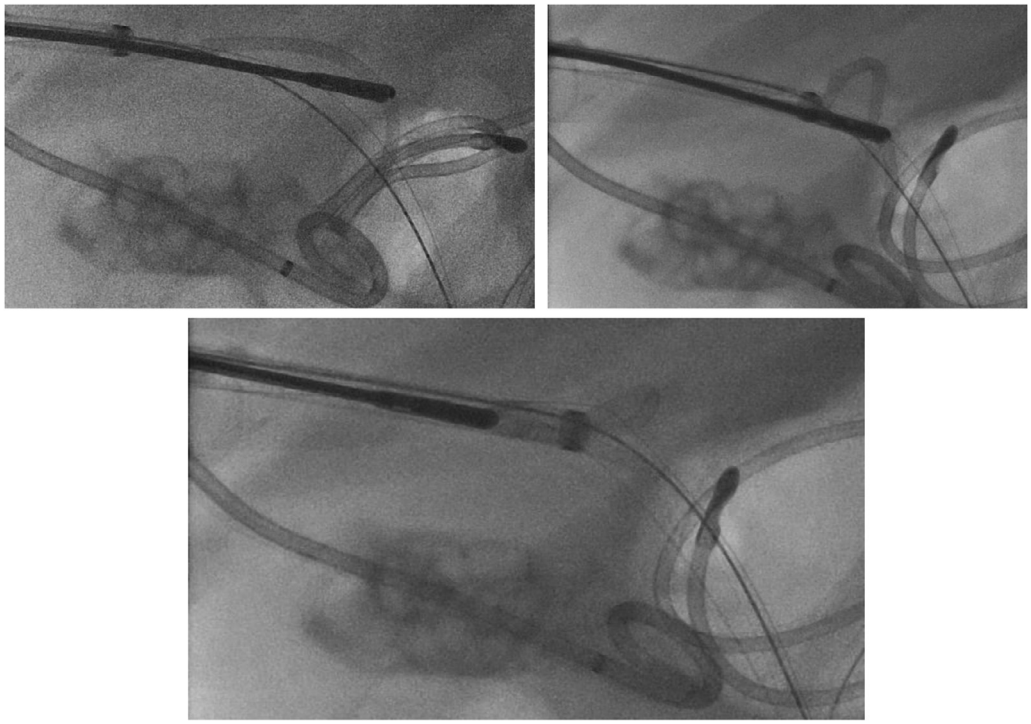

Fig. 3 – Rigid Bronchial forceps firmly grasping and effectively pulling the stent through the 16-F sheath.

Fig. 4 – Post retrieval Cholangiogram confirming no biliary tree injury or fistulous communication with vessels.

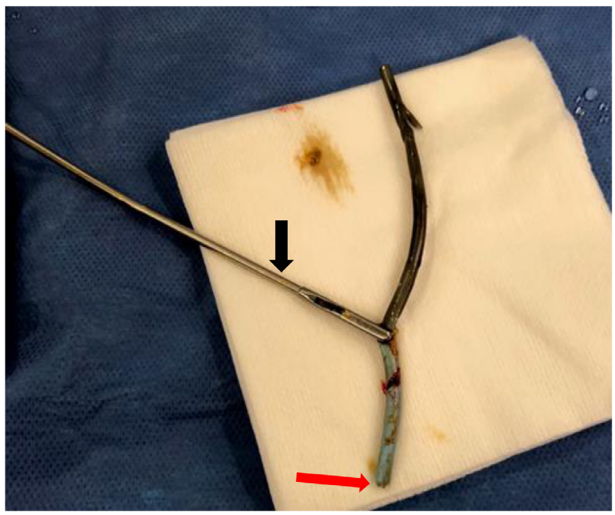

Fig. 5 – The retrieved biliary plastic stent grasped by the rigid bronchial forceps (black arrow), Notice the distal plastic stent fracture (red arrow) from initial attempted percutaneous snare retrieval.

ther liver issues or pancreatitis related collections. The percutaneous biliary drain was serially down sized to an 8-F drain over an 8-week period and eventually removed after confirming good internal drainage on cholangiogram through the drain.

The patient was then scheduled for elective choecystectomy.

Discussion

Endoscopic intervention is usually the preferred method for retrieval of malfunctioning plastic stents, because it is minimally invasive and technically successful in most cases. However, it can be challenging when there is proximal stent

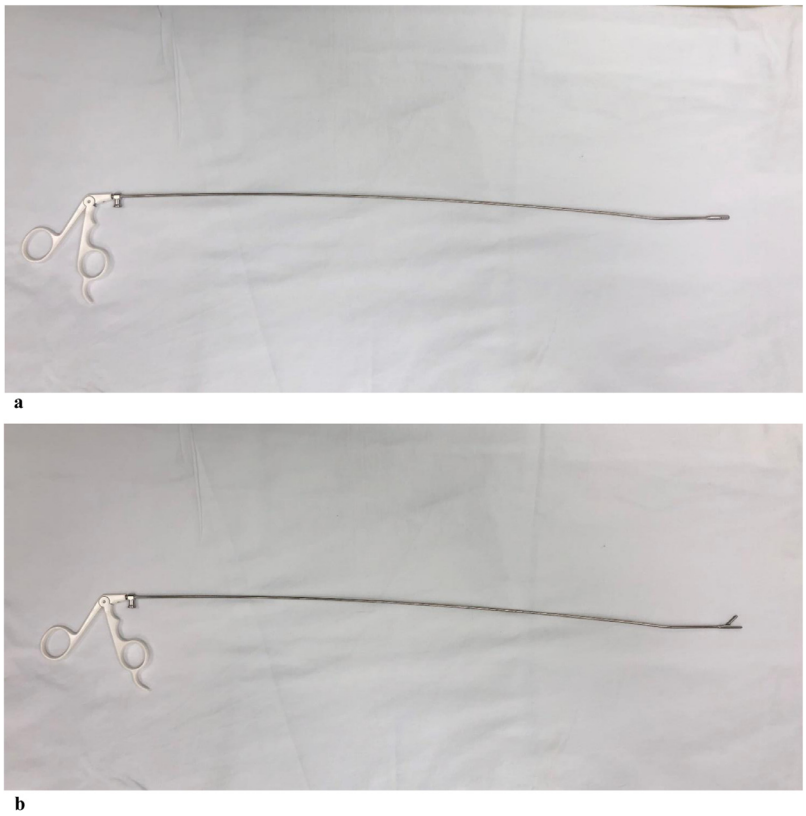

Fig. 6 – a and b. The forceps utilized for retrieval in closed (a) and open (b) position.

migration or stent fracture [1,2]. It is generally desirable to remove malfunctioning, proximally migrated, and fractured stents as they can serve as a nidus for infection and microlith formation and may contribute to clinical deterioration [3]. Even in patients that do well clinically, plastic stents that are left beyond their normal life-span eventually become symptomatic and a reported 76% will require surgical exploration [3].

Several endoscopic techniques have been well described in literature to salvage some of these situations (forceps, snare, through wiring, and balloon) but these are reported to be unsuccessful in 20%-30% of cases [4,5]. It is precisely these scenarios where percutaneous approaches may be better suited for expeditious retrieval, preventing retained nidi for infection, unnecessary surgical intervention, or prolonged radiation exposure. Percutaneous techniques are also well established in literature including snare, purpose-built forceps, stone retrieval baskets, loop and catheter techniques, and percutaneous cholangioscopic guided techniques [6,7]. In our case, all these techniques were attempted percutaneously but were unsuccessful. Ultimately for these percutaneous techniques to be successful they have to be able to have reasonable maneuverability to engage the stent and also establish effective grasp to successfully retract the stent.

This case demonstrated the effective and safe utility of rigid bronchial forceps in trouble shooting difficult to retrieve entrapped plastic stent/foreign body in the biliary tree. Off-label use of bronchial forceps to assist with difficult IVC filter retrieval has now been widely reported in many peer reviewed publications [8]. Therefore, extending the utility of these rigid forceps in the biliary tree appeared to be a reasonable last-ditch effort to extricate ourselves from a challenging and frustrating situation with a double embedded looped plastic stent.

Percutaneous transhepatic use of bronchial forceps in the biliary tree have been described once before, in the case report, the forceps were utilized to perform an endoluminal biopsy [9]. The article probably set the foundation for the development of more versatile forceps to perform the task of percutaneous endoluminal biliary biopsies. Different types of forceps for endoluminal procedures are now available and have been utilized in the biliary tree, 2 of which we tried to use but were not successful. Rigid bronchial forceps were able to provide us with stronger grasp and ability to provide enough traction to invert and fold over the firm plastic stent which the other forceps used were not able to. The rigid nature of the forceps allows for easy manipulation and potential ability to curve the forceps to provide a degree of required angulation and steerability.

Although bronchial forceps were safely and successfully utilized on this occasion, there is a potential to cause serious harm to biliary hila structures like the portal vein and hepatic arteries. Second, it also requires a larger sheath size—16 F compared to previously described forceps. Therefore, this off-label technique should be utilized primarily as a bail out technique in carefully selected cases.

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