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GI/GU/Thoracic/Non-Vascular Interventions *Case Report*

Plastic biliary stent fracture: A rare complication of percutaneous biliary drain placement

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ABSTRACT

Stent placement at the time of endoscopic retrograde cholangiopancreatography (ERCP) is standard practice for biliary obstruction. While several complications can occur with an indwelling stent, stent fracture is rare. We present a case of plastic biliary stent fracture that occurred at the time of percutaneous biliary drain (PBD) placement as well as the successful endoscopic removal of the fractured stent. Stent fracture should be considered as a possible complication of PBD placement in patients with an indwelling biliary stent.

Keywords: Biliary stent fracture, Complication, Percutaneous biliary drain

INTRODUCTION

Endoscopic retrograde cholangiography with biliary stent placement is an accepted procedure used to relieve both malignant and benign biliary tract obstructions. This procedure is not without risks, and a number of complications have been previously described in the literature.[1] Bleeding, pain, pancreatitis, infection, and stent migration often present earlier, whereas stent obstruction due to tumor ingrowth or even viscus perforation can present as late complications.[2,3]

A less commonly reported complication is stent fracture, which has previously been described in both plastic and metal biliary stents. Stent fracture is a significant complication that should be addressed expeditiously given the risk for consequent biliary obstruction and cholangitis.[4-10] Although stent fracture is considered relatively rare, this complication is likely underreported due to challenges in detection, primarily in self-expanding metal stents (SEMSs).[9] There is similarly a paucity of information in the current literature regarding techniques for the removal of fractured biliary stents.[4,5]

Here, we report on a plastic biliary stent fracture that occurred during percutaneous biliary drain (PBD) exchange, and we describe an endoscopic approach used to successfully remove the stent fragments.

CASE REPORT

A 32-year-old male with known ulcerative colitis and primary sclerosing cholangitis was admitted with acute cholangitis 2 days following endoscopic retrograde cholangiopancreatography (ERCP) and left hepatic biliary stent placement.

ERCP had been completed before admission to evaluate for possible malignancy as cytology from brushings obtained 2.5 weeks earlier had revealed atypical cells. The right hepatic system was unable to be accessed at the time of ERCP due to significant stricturing. The upper bile duct and left hepatic duct (LHD) were balloon dilated, brushings were obtained, and one 7 French by 10 cm plastic stent (Cook Medical, Bloomington, Indiana) was placed into the left hepatic system.

On admission, a PBD (Cook Medical, Bloomington, Indiana) was placed by interventional radiology given inability to access the right hepatic duct (RHD) during the aforementioned ERCP. Given non-diagnostic cytology from his previous ERCP, the decision was made to obtain brushings from the RHD with PBD exchange to evaluate for cholangiocarcinoma. During the PBD exchange, the pigtail string remained within the patient after the catheter was removed over the guidewire. A 6 French dilator (Cook Medical, Bloomington, Indiana) was inserted over one of the ends of the pigtail string in an effort to free it, which was unusually difficult. The string was eventually freed with the use of the 6 French dilator, but fluoroscopy demonstrated that the indwelling left biliary stent had been fractured at the intra/extrahepatic juncture in the process [Figure 1a and b].

After a multidisciplinary discussion, it was felt that an attempt at endoscopic removal should be pursued to remove the fractured stent. The scout film demonstrated the fractured stent with the proximal end in the LHD and the distal end in the common bile duct. On inspection with the duodenoscope (Pentax, Tokyo, Japan), the distal end of the stent was noted to emerge from the major papilla along with the transhepatic drain. This was removed using a stent grabbing forceps. The LHD contained the proximal portion of the previously placed plastic biliary stent. The PBD was seen coursing through the right intrahepatic ducts to the duodenum. A long 0.035″ Soft Jagwire (Boston Scientific, Marlborough, Massachusetts) passed successfully into the left intrahepatic branches. The biliary tree was swept with a 4 mm dilating balloon (Cook Medical, Bloomington, Indiana) starting at the left intrahepatic ducts after a retrieval balloon could not be advanced beyond the proximal portion of the fragmented stent. Several attempts at retrieval of the fragmented stent were made, but were unsuccessful. Attention was then turned to the PBD. A long 0.035″ Jagwire (Boston Scientific, Marlborough, Massachusetts) was passed through the PBD into the duodenum. The retention string on the pigtail was cut and the drain was removed over the wire. The wire remained within the duodenum. The dilating balloon was again advanced into the left intrahepatic ducts proximal to the stent fragment, and the stent fragment was swept from the duct. Following completion of the ERCP, a new 8 French PBD catheter (Cook Medical, Bloomington, Indiana) was placed by interventional radiology over the maintained wire access in the right system [Figure 2a-e].

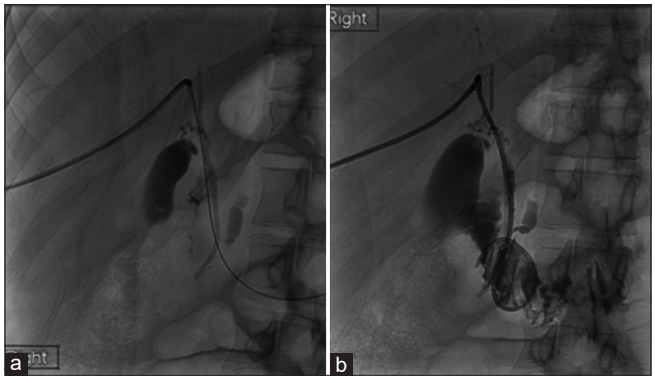

Figure 1: A 32-year-old male who presented with fever and abdominal pain and was found to have acute cholangitis 2 days following ERCP and left hepatic biliary stent placement. (a) Radiograph shows a dilator inserted over the end of the retained pigtail string to free it. (b) Radiograph shows a fractured left-sided biliary stent at the intrahepatic-extrahepatic juncture at the time of PBD placement. ERCP: Endoscopic retrograde cholangiopancreatography, PBD: Percutaneous biliary drain.

DISCUSSION

ERCP with biliary stenting is widely utilized to relieve both benign and malignant biliary tract obstructions. While numerous complications of biliary stenting have been described, stent fracture has only been described in a handful of cases, and only one prior case of a plastic stent fracture has been reported.[4-10] At present, no studies exist assessing differences in stent fracture risk between plastic stents and metal stents. In general, metal stents have lower risk of stent occlusion due to larger diameter, whereas plastic stents are more cost effective, but need replacement every 3 months due to the high risk of obstruction.[1,4] Stent fracture as a whole may be underreported due to lack of awareness and difficulty in detection primarily in SEMS, as others have posited.[9] Stent fractures in SEMS have been thought to occur secondary to metal fatigue or polyurethane cover damage.[6]

Plastic biliary stent fracture secondary to manipulation during PBD exchange as seen in this case has not previously been reported, but should be considered as a possible complication. We describe removal with a 4 mm dilating balloon sweep after a retrieval balloon could not be advanced beyond the proximal stent fragment. Alkhiari *et al*. described an endoscopic technique for removal of a self-expandable metal stent using rat-tooth forceps.[5] However, a purely endoscopic approach may not always be feasible. Dumonceau *et al*. reported failure to endoscopically remove the distal portion of a 10 French plastic biliary stent despite multiple attempts and the stent fragment had to be left in place.[4]

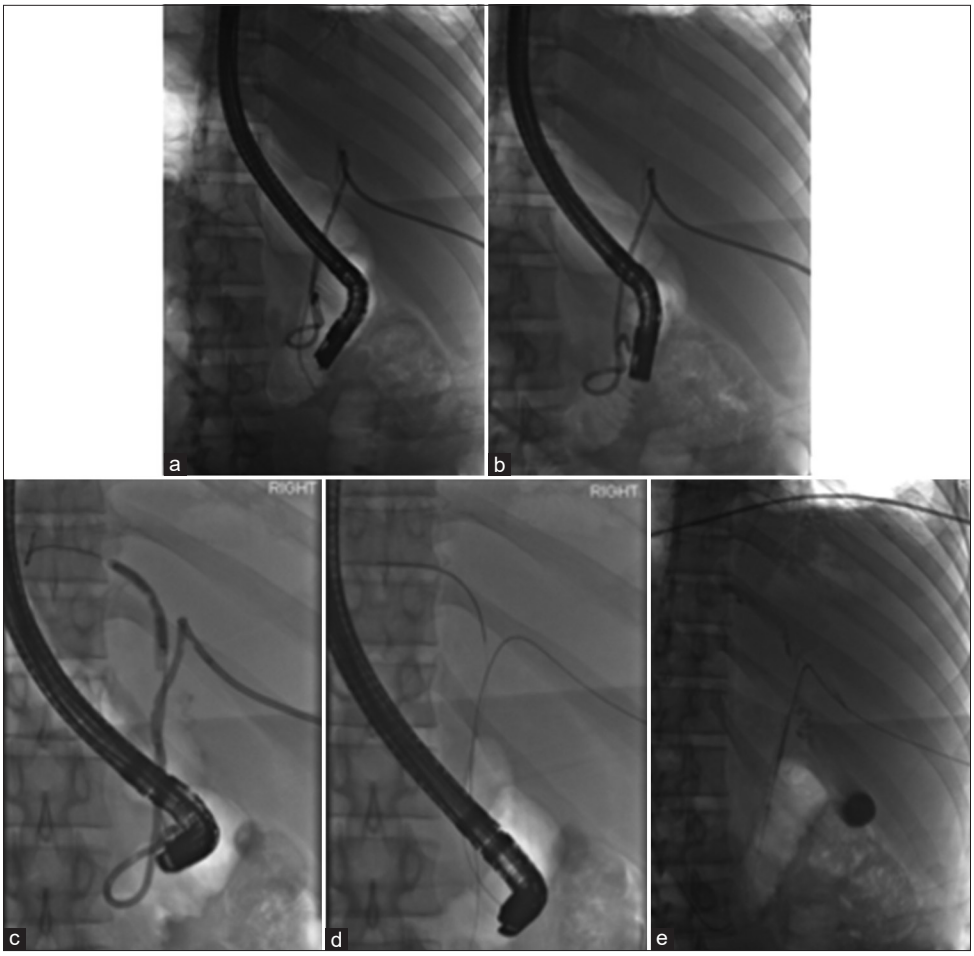

Figure 2: A 32-year-old male who presented with fever and abdominal pain and was found to have acute cholangitis 2 days following ERCP and left hepatic biliary stent placement. (a) Radiograph shows the distal portion of the fractured biliary stent in the CBD, while the proximal portion is seen in the LHD at time of ERC. (b) Radiograph shows the proximal portion of the fractured biliary stent in the LHD after the distal end was removed using a stent grabbing forceps. (c) Radiograph shows retrieval of the proximally migrated stent fragment with a 4 mm dilating balloon. (d) Radiograph shows successful removal of the fractured stent with the left- and right-sided wires in place. (e) Fluoroscopic image at completion of the procedure with percutaneous wire in place. ERCP: Endoscopic retrograde cholangiopancreatography, LHD: Left hepatic duct, CBD: Common bile duct.

CONCLUSION

We hope this report serves to increase awareness of fracture as a possible complication of PBD placement and exchange in patients with existing biliary stents. Further research may focus on factors including stent material, size, and placement, which are most likely to be associated with stent fracture so that this complication can be minimized in the future. We also hope that the endoscopic approach discussed in this report can guide future attempts at retrieval of stent fragments in patients with extensive biliary duct stricturing, should fracture occur.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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