



A Unique Management Strategy for Migrated Biliary Stent Causing Duodenal Perforation

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ABSTRACT

Distal stent migration leading to duodenal perforation is an uncommon complication of endoscopic biliary plastic stent placement. We present a case in which a patient with a migrated biliary plastic stent that perforated through the duodenum was managed expectantly until a duodenocolic fistula formed prior to endoscopic removal.

KEYWORDS: biliary stent migration; duodenocolic fistula; ERCP

INTRODUCTION

Endoscopically placed plastic biliary stents are used to treat a variety of malignant and benign biliary pathology. Stent migration occurs in 9%–11% of patients with a roughly even distribution between proximal and distal migration, typically without major sequelae.^{1,2} Among cases of distal migration, duodenal injury and perforation occur 36% and 4% of the time, respectively.² Duodenocolic fistula is a previously described, but exceedingly rare complication of stent migration.^{3–5}

CASE REPORT

A 65-year-old woman with history of Bismuth type IV cholangiocarcinoma complicated by biliary obstruction who had undergone endoscopic retrograde cholangiopancreatography 2 months previously with placement of 2 straight-type, plastic 8.5 French by 12 cm stents (Advanix, Boston Scientific, Marlborough, MA) presented for planned stent exchange. She underwent endoscopic retrograde cholangiopancreatography with removal of her old stents and placement of 2 new straight-type, plastic 8.5 French by 12 cm stents (Advanix, Boston Scientific), 1 into the right hepatic system and 1 into the left hepatic system. There were no complications noted during stent exchange. One month later, abdominal computed tomography (CT) obtained to restage her cholangiocarcinoma revealed the left stent had migrated distally. It was penetrating the duodenal wall and contacting the wall of the transverse colon with associated mural thickening and inflammatory stranding, but no free air or evidence of perforation (Figure 1). She was sent to the emergency department where her examination was notable for mild upper abdominal discomfort without rebound or guarding, unchanged since her cancer diagnosis. She was afebrile, hemodynamically stable, and laboratory tests including a complete blood count, lactate, and liver blood tests were all normal. Given her clinical stability and involvement of her colon by the stent, with concern for early development of a fistula, a strategy of close monitoring was pursued. This approach aimed to allow a mature duodenocolic fistula to fully form, reducing the risk of inducing peritonitis during interval stent retrieval and avoiding the possible scenario of having to close a difficult to identify colonic defect. Her diet was advanced to regular, and she was discharged from the hospital after a 2-day stay. She was seen in clinic every 2 weeks and had a repeat CT before her 2-week visit that was unchanged.

Repeat abdominal CT obtained 6 weeks later showed the caudal end of the stent had migrated into the transverse colon, whereas the cephalic end remained in the duodenum without associated pneumoperitoneum or fluid collection (Figure 1). Consequently, endoscopy-guided stent retrieval was pursued. Esophagogastroduodenoscopy was performed first and revealed one plastic stent protruding from the ampullary orifice, whereas the other stent was on the contralateral wall protruding from the duodenum (Figure 2). The duodenal fistula site was surface marked using single hemoclip. A colonoscopy was then performed. The migrated stent was found in the transverse colon (Figure 3). It was removed with a snare, and the colonic side of the fistula was closed with 2 hemostatic clips. After the colonoscopy,

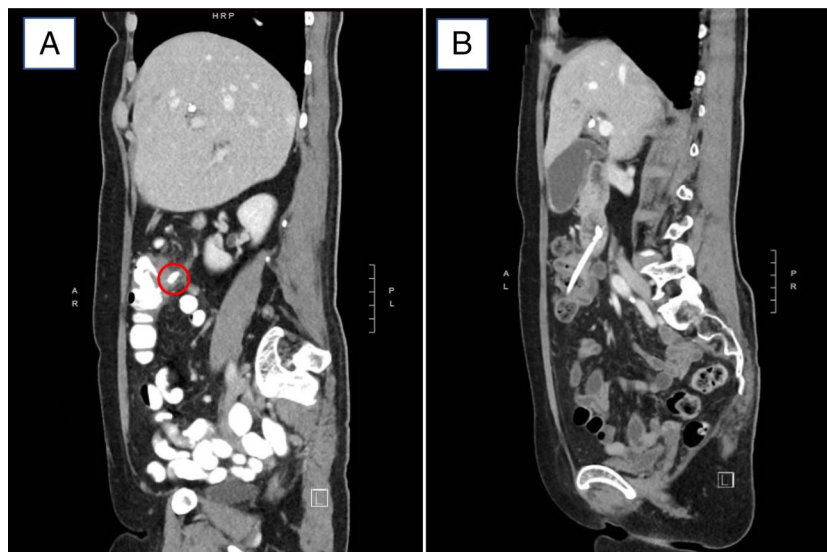


Figure 1. (A) Initial sagittal CT showing biliary stent (red circle) penetrating through duodenum and abutting the wall of the transverse colon with associated mural thickening and inflammatory stranding, but no evidence of perforation. (B) Follow-up sagittal CT showing biliary stent penetrating through duodenum into transverse colon. CT, computed tomography.

another esophagogastroduodenoscopy was performed using the standard endoscope. With the aid of fluoroscopy, a 0.035 Dreamwire (Boston Scientific) was placed to ensure the fistula site was correct, after which one 11/6t over the scope clip (Ovesco Endoscopy) was placed to close the duodenal side of the fistula (Figure 4). Finally, the remaining plastic stent protruding from the ampulla was removed, and 2 uncovered metal stents were placed into the right and left hepatic ducts. She was clinically stable and tolerated a regular diet the day after the procedure. Consequently, no imaging was obtained, and she was discharged home. She remained clinically well at follow-up 2 months later.

DISCUSSION

Plastic biliary stent migration leading to duodenal perforation is rare phenomenon, occurring in less than 1% of cases.² To the

best of our knowledge, there are only 3 reported cases of migrated biliary stents, leading to duodenocolic fistula formation.

Ang et al³ described a patient who had 2 biliary stents placed for cholangitis and was subsequently lost to follow-up. He presented 3 years later with Gram-negative rod bacteremia. A CT scan revealed a duodenocolic fistula with one of the stents spanning the fistula. It was believed the fistula facilitated colonization of the biliary system with colonic flora. He underwent laparotomy with resection of the fistula tract. In another published case by Pathak et al, a patient had a stent placed for biliary obstruction because of a pancreatic neuroendocrine tumor.⁴ A CT scan 6 months later incidentally revealed the stent had migrated and created a duodenocolic fistula. She underwent endoscopic retrieval of the stent, although the fistula was not closed, and she remained asymptomatic. In the final case reported by Ha et al,⁵ a patient underwent stent placement for obstruction because of cholangiocarcinoma.

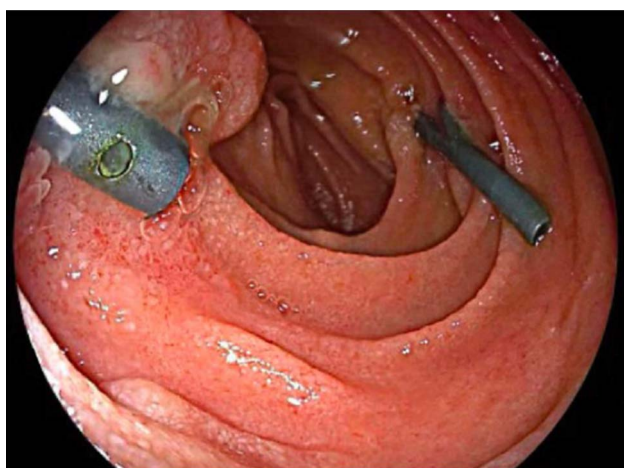


Figure 2. Endoscopic view of one stent protruding from the ampullary orifice and another stent protruding from the duodenum.

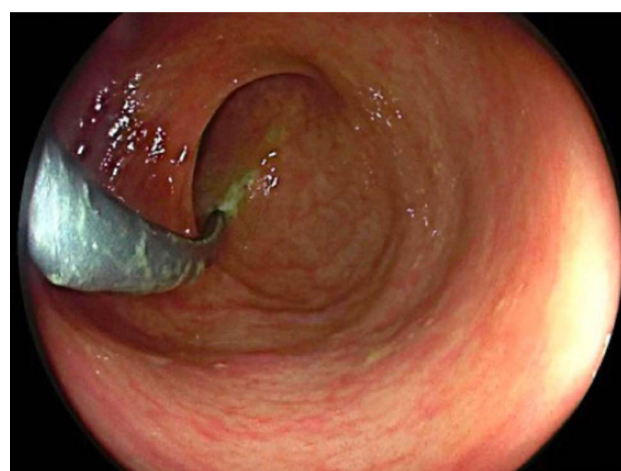


Figure 3. Migrated biliary stent in the transverse colon.

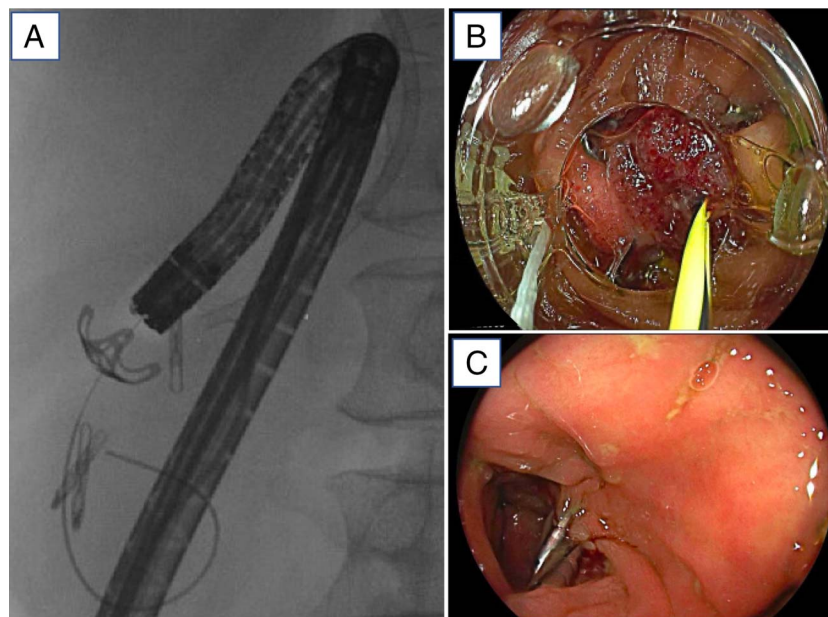


Figure 4. (A) Endoscopic retrograde cholangiopancreatography showing Dreamwire (Boston Scientific) passing through the duodenocolic fistula with hemostatic clips in place on the colonic side and an over the scope clip (Ovesco Endoscopy) in place on the duodenal side. (B) Endoscopic view of over the scope clip (Ovesco Endoscopy) in place on the duodenal side of the fistula. (C) Endoscopic view of hemoclips in place on the colonic side of the fistula.

One week later, a CT incidentally revealed the stent had perforated through the duodenum, leading to a duodenocolic fistula. The patient underwent laparotomy with resection of the fistula tract and the tumor mass.

Risk factors for migration of plastic biliary stents include benign strictures, straight vs pigtail stents, and lack of side flaps.^{1,2,6,7} In addition, distal migration of stents is more likely with proximal strictures.⁶ However, the retrospective nature and heterogeneity of these studies, including the indication for stenting, and types of stents used, make it difficult to draw firm conclusions.

Our case represents a unique management strategy for duodenal perforation secondary to migrated biliary stents with involvement of adjacent colon. In these cases, clinicians should maintain a high degree of suspicion for impending fistulization. In clinically stable patients, intentionally delaying stent retrieval may allow a mature fistulous tract to form between the duodenum and the adjacent colon. A duodenocolic fistula may decrease the risk of enteric contents spilling into the peritoneum at the time of stent removal. In patients who are not capable of close follow-up or do not have involvement of neighboring bowel, consideration should be given to endoscopic management during the index presentation. In select patients, the strategy used in this case has the potential to decrease the morbidity associated with this rare adverse event.

DISCLOSURES

Author contributions: T. Walradt contributed to the drafting of the initial manuscript. All authors contributed to the concepts,

design, literature review, and editing of the manuscript. M. Ryou is the article guarantor.

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Informed consent was obtained for this case report.

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REFERENCES

- Arhan M, Odemiş B, Parlak E, Ertuğrul I, Başar O. Migration of biliary plastic stents: Experience of a tertiary center. *Surg Endosc* 2009;23(4):769–75.
- Yuan XL, Ye LS, Liu Q, et al. Risk factors for distal migration of biliary plastic stents and related duodenal injury. *Surg Endosc* 2020;34(4):1722–8.
- Ang BK, Wee SB, Kaushik SP, Low CH. Duodenal-colic fistula resulting from migration of a biliary stent: A case report. *Gastrointest Endosc* 1998; 48(1):80–3.
- Pathak KA, de Souza LJ. Duodenocolic fistula: An unusual sequela of stent migration. *Endoscopy* 2001;33(8):731.
- Ha JPY, Leung LH, Tang CN, Li MKW. Silent duodenocolic fistula secondary to biliary stent migration. *Surg Pract* 2007;11(3):127–9.
- Kawaguchi Y, Ogawa M, Kawashima Y, et al. Risk factors for proximal migration of biliary tube stents. *World J Gastroenterol* 2014;20(5): 1318–24.
- Kwon CI, Gromski MA, Oh HC, et al. Additional flap on plastic stents for improved antimigration effect in the treatment of post-cholecystectomy bile leak. *Endosc Int Open* 2018;6(4):E489–E494.

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