

Case Report

Case report of rare cause of small bowel obstruction: distal migration of metal biliary stent requiring enterotomy

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ABSTRACT

Endoscopic biliary stent placement is a mainstay in the management of biliary strictures both malignant and benign. Distal stent migration is a known complication of metal biliary stents, however small bowel obstruction or perforation are rare. In this report from a tertiary referral centre, we detail a mid-small bowel obstruction caused by covered metal stent migration requiring a laparotomy and enterotomy for definitive management. A 69-year-old male was admitted to the Sunshine Coast University Hospital with obstructive jaundice on a background of previous metal biliary stent placement. On day 3 of his admission, he developed worsening abdominal pain. Cross-sectional imaging demonstrated distal migration of his stent to his mid-jejunum, causing a high-grade small bowel obstruction. He underwent laparotomy to retrieve the stent. He recovered well and underwent a percutaneous transhepatic cholangiogram with stent replacement. In this case, distal biliary stent migration causes a small bowel obstruction. Whilst uncommon, risk factors including previous intra-abdominal operation can be used to identify patients unlikely to achieve successful expectant management of distal migration.

Keywords: Case report, Distal stent migration, Enterotomy, Laparotomy, Metal biliary stent, Small bowel obstruction

INTRODUCTION

Endoscopic biliary stent placement is a mainstay in the management of benign and malignant biliary strictures. Stent migration is a known complication of biliary stents. Whilst distal migration can often be managed expectantly, complications requiring intervention can include bowel obstruction, perforation, and enteric fistulas formation.¹ The most common site of perforation from distal biliary migration is the duodenum, and the most common type of migrated stent is plastic stent.² Whilst management of bowel perforation due to distal migration usually requires surgery, the management of bowel obstruction without perforation is less well explored in the literature, with reported management ranging from non-operative, to endoscopic, to surgical. Furthermore, the introduction of fully-covered metal

stents and various novel anchoring devices has made migration less common and there are no case reports to our knowledge of small bowel obstruction caused by a fully covered metal biliary stent.³ Here in we report a case of a high grade mid-small bowel obstruction secondary to distal migration of fully covered metal biliary stent, without evidence of bowel perforation. This was managed successfully with laparotomy, enterotomy and primary closure.

CASE REPORT

A 69-year-old male presented November 2023 to the Sunshine Coast University Hospital, Australia with two weeks of lethargy, abdominal pain and obstructive jaundice. He had a history of a benign distal common bile duct stricture secondary to chronic alcohol-induced

pancreatitis. This has been managed with a 10 mm×6 cm self-expanding covered metal biliary stent inserted in June 2021. His other background included gastro-esophageal reflux disease and a previous laparoscopic cholecystectomy. His blood tests revealed an elevated white cell count to $13.4 \times 10^9/L$ (normal range $4.5-11 \times 10^9/L$) and a total and conjugated bilirubin of $210 \mu\text{mol/L}$ (normal range $<20.5 \mu\text{mol/L}$) and $160 \mu\text{mol/L}$ (normal range $<5.1 \mu\text{mol/L}$) respectively. A computed tomography (CT) scan demonstrated a partially inferiorly migrated biliary stent with the tip in contact with segment D3 of the duodenum with resultant stent obstruction. The patient was admitted under the local gastroenterology service, commenced on broad-spectrum intravenous antibiotics, and planned for inpatient endoscopic retrograde cholangiopancreatography (ERCP). On his third day of admission, the patient developed worsening abdominal pain and vomiting. Examination findings included a distended, generally tender abdomen without signs of guarding. Abdominal X-ray was performed which showed dilated small bowel loops and a foreign body with the appearance of a biliary stent in the left pelvis (Figure 1). A subsequent CT scan confirmed biliary stent migration to the mid-jejunum causing small bowel obstruction, without evidence of perforation (Figure 2). The patient was managed with an emergency lower midline laparotomy. Intra-operative findings included an intra-loop small bowel adhesion in the mid-jejunum, resulting in a 180 degrees bend (Figure 3). The migrated biliary stent was impacted in the proximal segment of this bend causing complete luminal obstruction (Figure 4). There was no perforation identified. A 1 cm enterotomy was performed, and the stent was successfully retrieved (Figure 5). The enterotomy was then closed transversely with interrupted 3-0 polydioxanone suture. The patient had an uncomplicated recovery post-operatively. Repeat ERCP was complicated by inability to cannulate the common bile duct thus a percutaneous transhepatic cholangiogram (PTC) and placement of internal/external biliary drain was performed. He has had two subsequent biliary dilatations via PTC and replacement of his stent. On outpatient review his serum bilirubin has normalized and he is continuing to recover well.



Figure 1: abdominal X-ray of patient demonstrating dilated loops of small bowel, and radiolucent cylindrical object in the pelvis suspicious for distally migrated biliary stent.

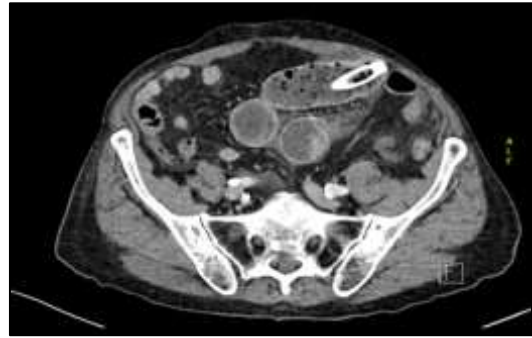


Figure 2: Axial slice of computed tomography with portal venous contrast demonstrating radiolucent biliary stent in a loop of jejunum, with proximal faecalization and distension.



Figure 3: intra-operative finding of transition point at mid-jejunum.



Figure 4: Inter-loop adhesion discovered during laparotomy for small bowel obstruction, likely related to previous intra-abdominal operations.



Figure 5: Intra-operative photograph of metal biliary stent delivered through enterotomy.

DISCUSSION

Stent migration is a known complication of biliary stents. Rates of stent migration vary depending on the type of stent, indication and anchoring technique, but migration rate sits between 5 and 10%.²⁻⁵ A more recent multicenter study specifically looking at fully covered self-expanding metal stents such as that used in this case cite a migration rate of 10.7%.⁵ Distal migration can usually be managed expectantly as uncomplicated passage per rectum is the norm.⁶ However, complications of distal stent migration include bowel obstruction, perforation, and there are even rare case reports of colonic fistulas because of prolonged implantation into the small bowel wall.¹ The most common site of obstruction and perforation from distal biliary migration is the duodenum, and the most common type of migrated stent is plastic stent.²

It is thought that this patient's interloop adhesion-presumably secondary to his previous laparoscopic cholecystectomy-prevented uncomplicated distal passage. Indeed, the stent was found intraoperatively to be impacted at the level of this adhesion. As such, we suggest that expectant management of distal stent migration is less reliable in patients with significant previous abdominal surgical history, or history of known intra-abdominal adhesions. Whilst metal stents address the common issue of occlusion encountered with plastic stents, the rate of stent migration with metal stents appears in several studies to be increased, particularly covered metal stents.³ Interestingly, there are very few case reports of metal biliary stent migration causing small bowel obstruction.⁷ This may either be due to metal stents having a reduced tendency to block the intestinal lumen, or because of their more recent introduction into the standards of care of biliary obstruction.

A potential mechanism for migration of this patient's metal stent was stent blockage leading to the patient's presentation with pain and obstructive jaundice. Subsequent stent migration may have occurred because of pressure build up in the biliary system proximal to the stent. Management of distal biliary stent migration complicated by small bowel obstruction or perforation is a point of contention. Recommendations range from endoscopic retrieval, laparoscopy, and open surgical repair.^{2,7-11}

Management decisions depend on the location of the offending biliary stent and whether peritonitis is present. There are no robust prospective trials given the rarity of the condition. There are a few case reports detailing management with endoscopic retrieval, however in these cases the stents were either located in more endoscopically-accessible areas of the bowel or operative management was contraindicated due to patient factors.^{9,10} We suggest that obstruction at the level of the jejunum due to a biliary stent necessitates surgical management given endoscopic management is not possible.

CONCLUSION

In conclusion, we present the rare case of a migrated metal biliary stent becoming impacted in the mid small bowel with resultant small bowel obstruction. The case was managed with emergency laparotomy and enterotomy. We suggest that caution be taken in pursuing expectant management of distal stent migration in patients likely to have significant intra-abdominal adhesions, due to an elevated risk of complication. Biliary stent migration complicated by obstruction should be managed endoscopically if early and feasible and surgically if endoscopic management fails or intestinal perforation occurs.

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