CASE REPORT

Surgical Relief of Small Bowel Obstruction by Migrated Biliary Stent: Extraction Without Enterotomy

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ABSTRACT

Background: Distal stent migration is a well-known complication following insertion of biliary stents. Most such cases can be managed expectantly, because the stents pass through the gastrointestinal tract. However, small bowel obstruction as a result of the stent mandates surgical intervention.

Methods: We report the case of a patient who had distal stent migration causing a small bowel obstruction. We successfully retrieved the stent without an enterotomy, by using a combination of laparoscopy, endoscopy, and fluoroscopy. Our unique technique greatly decreased the risk of bacterial peritonitis in this patient with decompensated cirrhosis and associated ascites, which in this patient population results in a high mortality.

Results: Management of small bowel obstruction secondary to biliary stent migration necessitates operative intervention. Retrieval of a dislodged stent can be performed safely without subjecting the patient to an enterotomy or a small bowel resection. Postoperative morbidity should be significantly reduced by this approach.

Conclusion: Retrieval of biliary stents in cases of small bowel obstruction without perforation may be successfully performed without enterotomy or bowel resection. A similar approach may be applied to other foreign bodies dislodged in the small bowel.

Key Words: Biliary stent migration, Surgical management of small bowel obstruction from biliary stent migration.

INTRODUCTION

Biliary stents are commonly placed to treat biliary obstruction secondary to benign or malignant disease. These stents become dislodged and migrate in about 7% of cases.[1] Distal migration may be managed expectantly, allowing the patient to pass the foreign body per rectum.[2] However, when a stent becomes lodged in the intestinal tract, removal is necessary.[3] Endoscopic techniques may be used to remove lodged stents in accessible areas. When these techniques fail, surgery is required. Complications of an untreated lodged biliary stent include penetration, perforation, and obstruction of the wall of the intestine.

We report a case in which a biliary stent was lodged perpendicular to the long axis of the intestine in the jejunum. After initial endoscopic attempts failed to retrieve the stent, the patient underwent surgery. Uniquely, the stent was removed without any enterotomy. By using fluoroscopy, the stent was located, and by using laparoscopy, the small bowel was visually identified. The stent was gently milked proximally into the second portion of the duodenum where it was removed with a gastric endoscope. This technique of stent retrieval provides an alternative treatment with lower morbidity for difficult to retrieve migrated biliary stents.

MATERIALS AND METHODS

A literature search was performed to find articles pertaining to biliary stent migration, associated complications, and management of such distal migrations.

CASE REPORT

A 59-year-old male with a history of diabetes mellitus, end-stage renal failure on chronic hemodialysis, and severe hepatitis C, for which he was being considered for liver transplantation, initially presented to the hospital with nausea and vomiting associated with abdominal pain. On physical examination, the patient was afebrile and had stable vital signs. Scleral icterus was present. The abdomen had generalized tenderness, was distended with a fluid wave, but there was no guarding. Laboratory examination was only significant for an elevated INR of 1.46, and elevated total and indirect

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bilirubin of 5.2 and 3.3, respectively. Stones and sludge along with a dilated common bile duct measuring 13mm were seen on an abdominal ultrasound. The patient was admitted for bowel rest with fluid hydration. An endoscopic ultrasound was performed confirming the presence of stones. An ERCP was performed with successful retrieval of stones and sludge in the common bile duct. A 10Fr by 4-cm biliary stent was placed to promote drainage. Post-ERCP, the patient had a complicated hospital course, involving bleeding, requiring blood transfusions, repeat upper endoscopy with cauterization near the stent placement site, followed by embolization of the gastroduodenal artery. The patient continued to have bleeding at which time re-embolization of the bleeding vessel was performed. At this time, a stent was noted in the left lower quadrant. On day 10 after stent placement, the patient developed symptoms of a small bowel obstruction, and a CT scan of the abdomen and pelvis was obtained, which showed a moderate small bowel obstruction at the level of the mid to distal ileum secondary to a dislodged biliary catheter (**Figures 1** and **2**). A nasogastric tube was placed with bilious output. Given the likelihood that the obstruction was not going to resolve expectantly as suggested by the high output from the nasogastric tube, the decision was made to surgically relieve the obstruction.

The abdominal cavity was entered under direct visualization through a supraumbilical incision, and a blunt-tipped Hasson trocar was inserted. The abdomen was insufflated, and a 5-mm port was inserted in the epigastrium, also along the midline. The abdominal cavity was surveyed showing cirrhotic liver, dilated loops of bowel with no evidence of perforation or ischemia, and a large amount of clear, straw-colored ascites. Due to the bowel distension, the distal collapsed small intestine was unable to be visualized. Finding the transition zone by using bowel graspers was considered dangerous. However, the CT scan suggested its location in the left lower quadrant. A portable fluoroscope was directed over the left lower quadrant, and the location of the stent was identified. Simultaneously, the laparoscopic camera was directed at this location, and the involved loop of small bowel was visually identified and grasped with bowel graspers. The ports were removed, and the 2 midline port sites were connected over a handport to create a mini-laparotomy. The abdominal cavity was reentered, and the loop of bowel with the stent was exteriorized. Two liters of ascitic fluid was suctioned away. The small bowel with the dislodged stent was identified and palpated within the lumen of the jejunum.

Figure 1. CT Scan demonstrating stent in the left lower quadrant.

Figure 2. Abdominal x-ray demonstrating stent in the left lower quadrant with dilated loops of small bowel.

Given the risk of peritonitis, the decision was made to avoid entering the bowel or performing a resection. The distance to the Ligament of Treitz was shorter than the distance to the ileocecal valve. Additionally, milking the stent distally through intestines with a narrower caliber would be associated with an increased risk of bleeding and bowel injury. The stent was gently milked back in a bi-manual manner from its position in the distal jejunum towards the duodenum. The stent was worked intraluminally and around the ligament of Treitz with some difficulty, and across the spine through the third and fourth

portion of the duodenum. It was successfully pushed into the right upper quadrant into the second portion. At this time, upper endoscopy was successfully performed to retrieve the stent **(Figure 3)**. The abdominal cavity was examined for any bowel injury; none was identified. The fascia was carefully closed and skin stapled. The patient was taken to the recovery room, intubated, but in stable and satisfactory condition. Blood loss was minimal. The patient was resuscitated in the recovery room and extubated on postoperative day one. He was kept on bowel rest, and parenteral nutrition was initiated. He remained off pressors, without any evidence of bleeding. Bowel function returned, and the patient tolerated a diet. One week after surgery, the patient's liver failure progressively worsened. He developed sepsis secondary to a line infection, with subsequent multi-system organ failure. The patient eventually expired 2 weeks after surgery.

DISCUSSION

Biliary stenting is a well-established procedure for management of pancreatic, gallbladder, and liver disease. Migration is a well-known complication associated with stent placements. Proximal migration of the stent up the biliary tree may present with biliary obstruction or be asymptomatic. Risk factors include short stents or large-diameter stents.[2] Stents migrating distally usually pass through the intestines without any problem.[3] In fact, up to 86% of all ingested foreign bodies pass through the intestinal tract.[4] Known risk factors for distal migration include papillary stenosis, omission of sphincterotomy, use of plastic stents, and stenting of benign lesions.[1,3,4] It is hypothesized that malignant lesions of the biliary tree anchor the stent, thereby preventing it from dislodging downstream. Patient-specific risk factors include adhesions, diverticular disease, and hernias.[5–7] There are multiple interesting case reports in the literature of patients presenting with perforation, fistulae, and abscesses being successfully managed endoscopically or resection or abscess drainage or enterotomy/colotomy, or a combination.[1,3,4,6–9] Patients have done well overall, with the majority recovering uneventfully.

Figure 3. Intraoperative EGD seen under flouroscopy.

Complications, when they occur, can be classified as penetration, perforation, and obstruction.[1] Most distally migrated stents can be managed endoscopically, with the duodenum being the most common site of migration.[10,11] Stents migrating to the small bowel or colon that fail expectant management, require surgical intervention. In our case, the use of fluoroscopy as an adjunct to laparotomy helped identify the location of the migrated stent. This was otherwise not feasible laparoscopically, given the extent of the bowel distension and decreased visualization. A large open incision would increase postoperative recovery time, increase bleeding, and increase insensible fluid loss, particularly true for our patient with end-stage liver disease who had ascites and was coagulopathic.

In the present case, our patient had stenting across a benign lesion with a plastic stent, two postulated risk factors for stent migration. Additionally, in this particular case, the preoperative course was complicated by multiple episodes of bleeding requiring repeat endoscopy. There is a small possibility that the stent may have been dislodged from direct force from the endoscope. Furthermore, embolization of the bleeding vessel may have contributed to the stent migration, secondary to the resulting ischemia.

The incidence of bacterial peritonitis is high in patients with liver failure, reported to be between 20% and 60%.[12] In our patient, relieving the obstruction with an enterotomy would pose a significant risk for developing infected ascites. Given the patient's decompensated condition, peritonitis had a high chance of causing death. In avoiding an enterotomy, we were able to mitigate the risk of developing peritonitis and its sequelae. In fact, our patient recovered from the operation with resolution of the small bowel obstruction and postoperative ileus. However, his tenuous medical condition, coupled with his chronic conditions, need for invasive monitoring and poor nutrition, was the ultimate cause of his inability to recover from illness.

CONCLUSION

Patients with long-term biliary stents should be followed closely. While the morbidity and mortality is small, it can be serious. Patients with gastrointestinal symptoms with known stents should be thoroughly worked up for the pathology requiring stent placement, as well as for the possibility of stent migration. We advocate aggressive intervention in the management of patients with distal biliary migration presenting with complications. Patients with obstruction secondary to biliary migration should be operated on early; this would prevent the stent from embedding itself in the wall of the colon or small bowel. Furthermore, even when the stent has embedded itself in the wall, early intervention would prevent progression to eventual perforation.

When surgical intervention is warranted, we advocate the use of intraoperative fluoroscopy, because it is extremely valuable in providing information on the exact location as well as the orientation of the stent relative to the small bowel. This information would then help avoid a large laparotomy incision and determine whether extraction is possible without enterotomy. The orientation may provide clues to whether the stent can be milked back for endoscopic retrieval, much like in gallstone ileus. If the long axis stent lies along the direction of the small bowel, milking, either laparoscopic or digital, may be attempted. On the other hand, if the long axis of the stent is perpendicular, milking should be undertaken with greater care, because there is a greater risk of causing perforation or the stent may have already embedded within the bowel wall. In the latter case, a small bowel resection would be advisable. Furthermore, use of fluoroscopy in combination with laparoscopy would help minimize the incision length, affecting postoperative recovery.

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