

Case Report

Customized surgical approach to small bowel perforation secondary to biliary stent migration: a case report and review of the literature

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Received: 23 April 2024

Revised: 18 May 2024

Accepted: 21 May 2024

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ABSTRACT

Endoscopic placement of a biliary stent to treat benign or malignant biliary obstructions is a well-established practice and may prevent the need for further surgical intervention. It can be associated with complications including occlusion, cholangitis, bleeding, as well as, late complications of migration and perforation. Stent migration and perforation, proximal or distal, are relatively uncommon with an overall incidence of 6 and 1% respectively. We reported a case of distal biliary plastic stent migration with delayed small bowel perforation which required surgical intervention.

Keywords: Biliary stent, Bowel perforation, Stent migration

INTRODUCTION

Endoscopic placement of a biliary stent to treat biliary obstructions secondary to benign or malignant disease is a well-established practice and may prevent further surgical intervention.¹ Endoscopic stenting was initially described in 1980 by Soehendra et al. However, is associated with complications including occlusion, cholangitis, and bleeding, as well as, late complications of migration and perforation. Stent migration, proximal or distal, is relatively uncommon with an overall incidence of 6%.²

Biliary stents can be classified by size and material as either metal or plastic, each with its own set of considerations. While less expensive, plastic stents have been associated with increased rates of migration due to their straight shape. Metal stents, on the contrary, have been described with relatively rare cases of migration due to their interwoven alloy wire shape with proximal and

distal flaring added to help anchor the stent. Distal migration of plastic stents has been known to cause intestinal perforation in approximately 1%, requiring immediate intervention.³ Many factors including papillary stenosis, omission of sphincterotomy, plastic stents and benign lesions have been reported to increase the risk of distal migration and eventual perforation.¹

We reported a case of distal biliary plastic stent migration with the late complication of small bowel perforation which required surgical intervention.

CASE REPORT

A 79-year-old male presented with persistent lower abdominal pain associated with nausea and vomiting. On examination, the abdomen had multiple old midline vertical scars of laparotomies, generalized tenderness, localized guarding and rebound in the suprapubic area. The past medical history was significant for cholangitis

for which he had undergone endoscopic retrograde cholangiopancreatography (ERCP) and common bile duct plastic stent placement 18 months prior for a non-malignant common bile duct stricture. An attempt to retrieve the stent has been unsuccessful three months prior. Significant paraclinical findings included white blood cells of 14.6, normal chemistries and lactic acid:1.6. Computed tomography (CT) of the abdomen and pelvis revealed biliary stent had migrated into the small bowel loops, and the stent had perforated the wall with an adjacent abscess in the lower pelvis (Figure 1).



Figure 1 (A-C): CT finding of migrated biliary stent with small bowel perforation and localized abscess formation.



Figure 2: Intra-operative finding of stent half-way outside the small bowel.

After initial resuscitation, the patient was taken to the operating room. Laparotomy was done via a transverse incision just above the abscess location to avoid unnecessary extensive adhesiolysis if it would be done via midline laparotomy or other approaches. Intra-operative findings were migrating biliary stent and perforated small bowel in the pelvis somewhere in the ileal area (Figure 2).

The stent was removed and the bowel was repaired primarily. His postoperative course was uneventful and was discharged from hospital on postoperative day four. The patient is alive and remained asymptomatic after 20 months of follow up.

DISCUSSION

Since ERCP stenting was described initially in 1980, the procedure and the available stents have been improved and became part of current guidelines.⁴ As mentioned above, despite being very helpful in relieving biliary obstruction, there is always risk of being complicated by migration and consequently perforation into other organs, which carries about 10%-31% mortality.^{1-3,5} It may migrate into some other unusual organ or far locations including pericardium, causing broncho-biliary fistula, as foreign body causing recurrent pilonidal abscess.⁶⁻⁸ However, most commonly it migrates proximally into intra hepatic bile ducts or distally into the gastrointestinal lumen.⁹

Here we are discussing different risk factors that can increase the risk of stent migration.

Previous inflammation and infections or obstructions

Inflammation and infection in the biliary tract can lead to an increased risk of biliary stent migration by increasing the chance of tortuosity of the bile duct, altering bile flow dynamics and increasing peristalsis, which can increase bile duct pressure leading to dislodging the stent.^{5,10} In addition, the presence of any obstruction can cause migration toward the other side by altering the direction of the bile flow. For instance, distal biliary duct stone, debris, or stenotic Oddi's sphincter can cause proximal migration.¹¹

By treating the underlying risk factors including antibiotic therapy for cholangitis, stone removal, sphincterotomy for spastic sphincter and medical management of autoimmune disease like primary sclerosing cholangitis the risk of migration will be less.¹²

Previous surgical interventions

Stent migration has been reported as high as 54% post liver transplantation. Any scar tissue or acute change of the diameter of the bile duct leads to acute change of bile flow which can increase the risk of stent migration. In addition, placement of stent can be challenging due to altered normal anatomy which may lead to guidewire entrapment or stent malposition.¹³

Stent type

Two different types of stents are available commercially including plastic (i.e., polyethylene, polyurethane and "Teflon") and metallic stents. Plastic stents are less expensive and usually used for temporary relief of obstruction in benign settings. They have higher risk of obstruction causing further cholangitis and migration compared with metallic stents with duodenum as the most common site for perforation. Therefore, they have to be changed every 3-6 months. On the other hand self-expanding metal stents have larger diameter and longer

patency time which make them a good choice for relieving the obstruction secondary to malignancies and for those with longer life expectancy.

Metallic stents are classified in two types: covered and uncovered. The covered stents are removable but they can cause cholecystitis by obstructing cystic duct and also higher risk of migration because they do not let the surrounding tissue to be embedded into the stent. On the other hand, uncovered metallic stents are not removable but are associated with less risk of migration and cholecystitis.¹⁴

Treatment

Regardless of symptoms the migrated stent should be removed. Depending on the severity of the symptoms and the location of the stent it can be removed endoscopically or surgically. Any intestinal wall weakness due to pre-existing diverticulitis, abdominal wall hernia, previous surgery causing small bowel adhesions, or inflammatory bowel disease may increase the risk of bowel perforation secondary to stent migration. Endoscopic interventions including balloon extractions, snare or basket retrieval have been described with success rate above 90%. However, any evidence of bowel perforation or peritonitis warrants surgery.¹⁵

CONCLUSION

Small bowel perforation due to stent migration although rare, carries about 30% mortality. This case reminds surgeon to include it in their differential diagnosis and highlights the fact that a customized limited open surgical approach, can offer more direct access while avoiding extensive adhesiolysis and potential bowel injuries.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Hassanesfahani M, Brar K, Keating L, Louis MA, Mandava N. Customized surgical approach to small bowel perforation secondary to biliary stent migration: a case report and review of the literature. *Int Surg J* 2024;11:970-2.