Transhepatic intraperitoneally migrated biliary stent: A rare finding during laparoscopic cholecystectomy

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INTRODUCTION

Biliary stenting is now a widely accessible, minimally invasive procedure being performed across both the developing and developed world. Stenting is useful in the narrowing of the biliary tree for both benign and malignant diseases, along with its utilisation in the treatment of post-operative bile leaks.[1] However, due to increase in the number of these procedures performed over the last 10 years, a greater understanding of the morbidity involved has emerged, of which a practising surgeon needs to be aware. While the most common complication of stenting continues to remain as stent occlusion, stent migration is not an infrequent problem either, occurring in up to 10% of cases. Distal migration frequently leads to spontaneous passage of the stent, proximal migration can result in a variety of problems. We here describe a rare case of transhepatic intraperitoneal migration of a double-pigtail, plastic stent and present a comprehensive review of literature.

Keywords: Bile duct, biliary stent, endoscopic retrograde cholangiopancreatography, endoscopy, laparoscopic cholecystectomy, minimal access surgery

CASE REPORT

A 35-year-old woman presented to the department of surgery outpatient clinic of the apex public referral centre of the province with severe right upper abdominal pain and high-grade fever. Ultrasonography revealed multiple, highly reflective, echogenic foci in the gallbladder lumen with posterior acoustic shadowing and peri-cholecystic oedema, accompanied by a dilated common bile duct (CBD) with thickened walls. She was diagnosed to be a case of acute cholecystitis with biliary sepsis and admitted and started on intravenous hepatic/intrahepatic structures.[2‑14] We here present this rare case of a transhepatic intraperitoneally migrated stent, which was incidentally detected on laparoscopic cholecystectomy, and a comprehensive review of literature [Table 1].
fluids, antibiotics and analgesics. After a week, she had improved enough to be sent to the department of medical gastroenterology for reference. Endoscopic retrograde cholangiopancreatography was performed with sphincterotomy and CBD stone removal, following which a double-pigtail, plastic biliary stent was inserted.

After cholecystitis had resolved, a decision of laparoscopic cholecystectomy was made. Due to the patient's inadequate financial condition, a pre-operative magnetic resonance cholangiopancreatography or computed tomography imaging could not be performed. However, intra-operatively present was an unexpected finding. After the dissection of the Calot's triangle, the protruding tip of the biliary stent was abruptly visualized [Figure 1]. Apparently, the stent had undergone transhepatic migration, with its tip rupturing the right hepatic duct (RHD), and had come to lie in the peritoneal cavity, without itself causing any apparent symptoms.

The stent was pulled out through the rupture in RHD and endo-suturing was done. Cholecystectomy was performed as usual and the port sites closed with a drain inserted. The patient had a full recovery within a week, following which the drain was removed. She was followed up for 6 months with no further significant event.

**DISCUSSION**

Stent migration has been reported to cause a host of problems from the benign to the catastrophic, commonly including small bowel obstruction, penetration, perforation, sepsis, fistulae, abscesses or appendicitis.[1] Up to 10% of cases of stenting have been found to have migration, usually being into the duodenum from where they can be retrieved endoscopically.[1] Much rarer is the penetration and/or perforation of hepatic/intrahepatic structures by a migrated stent.

After a comprehensive review of literature on the MEDLINE database along with searching of reference lists of review papers, we identified 13 prior reported cases of stent penetrating an intrahepatic structure across the world [Table 1].[2‑14] with the earliest case report dating back to 1988, describing stent-induced formation of broncho-pleuro-biliary fistula, leading to bilipysis and

| Author (years) | Type of stent | Indication for stenting | Location of migrated stent | Associated complication(s) |
|---------------|---------------|-------------------------|----------------------------|---------------------------|
| Dasmahapatra and Pepper (1988)[3] | Plastic | Obstructive jaundice due to metastasis at porta hepatitis | Tip piercing liver, right dome of diaphragm and pleura | Broncho-pleuro-biliary fistula with right-sided pleural effusion and bilipysis |
| Richenberg et al. (1996)[3] | Tannenbaum type, plastic | Calculous cholecystitis with choledocholithiasis and pancreatitis | Tip piercing liver, right dome of diaphragm and pleura | Pleuro-biliary fistula with right-sided pleural effusion |
| Tan et al. (1996)[4] | 12 F, 7.5 cm, miller double mushroom type | Cholangiocarcinoma at porta hepatitis | Proximal end of stent broken and pierced abdominal wall | Abdominal wall abscess |
| Jendresen and Svendsen (2001)[6] | Plastic | Biliary stricture post-iatrogenic bile duct injury | Tip piercing liver capsule and coming to lie intraperitoneally | None |
| Liebich-Bartholain et al. (2001)[7] | 7 F, 10 cm, plastic | Pancreatic tumour | Tip piercing liver, right dome of diaphragm and pleura | Biliary pneumonitis |
| Mahadeva et al. (2003)[7] | 10 F, 7 cm, Amsterdam type, straight, plastic | Peri-ampullary carcinoma | Tip piercing liver and reaching into stomach | Hepatico-gastric fistulation and upper GI bleed; severe anaemia |
| Shah et al. (2004)[8] | Unreported | Unreported | Tip causing large liver perforation | Unreported |
| Hutchins et al. (2012)[9] | 10 F, 7 cm, Cotton-Huibregts plastic | Bismuth type 1 cholangiocarcinoma | Tip piercing liver capsule and coming to lie intraperitoneally | Fluid collection intraperitoneally |
| Antonsen et al. (2013)[10] | Unreported | Unreported | Tip piercing right lobe of liver, dome of diaphragm and pleura | Bilio-pulmonary fistula leading to respiratory failure and death |
| Lee et al. (2013)[11] | 15 F, 15 cm, flanged, plastic | Obstructive jaundice due to IgG4 related disease | Tip piercing diaphragm and pericardium | Pericardio-biliary fistula leading to cardiac tamponade |
| Odemis et al. (2014)[12] | Plastic | Distal biliary stenosis due to chronic pancreatitis | Tip piercing liver capsule and coming to lie intraperitoneally | Liver abscess |
| Paranandi et al. (2015)[13] | 10 F, 15 cm, straight, plastic | Biliary stenosis due to IgG4-related disease | Tip piercing diaphragm and pericardium | Hemopericardium, supraventricular tachycardia |
| Choi and Paik (2018)[14] | 7 F, 10 cm, double pigtail, plastic | Stricture of intrahepatic duct | Tip piercing right lobe of liver, dome of diaphragm and pleura | Right-sided liver abscess and pleural effusion |
| Current case | Double pigtail, plastic | Cholecystitis, choledocholithiasis and biliary sepsis | Tip piercing right intrahepatic duct and coming to lie intraperitoneally | None |

G1: Gastrointestinal
pleural effusion.\textsuperscript{2} All 13 of these cases, along with ours, had used plastic stents (unreported in two cases), which have been found to be more commonly associated with migration compared to metallic stent which, however, suffer from greater risk of occlusion.\textsuperscript{[1]} Interestingly, some of these cases also included stents widely advertised as having additional specifications by their manufacturers to prevent migration, including the Miller-double-mushroom type, the Cotton–Huibregtse type and the Amsterdam type.\textsuperscript{[4,7,9]} It is also critical to recognise that migration can produce lethal sequelae such as pericardio-biliary fistula causing hemopericardium in two cases\textsuperscript{[11,13]} and bilio-pulmonary fistula leading to respiratory failure in another.\textsuperscript{[10]} Surprisingly, even double-pigtail stents which have a lower incidence of stent displacement\textsuperscript{[4]} found representation, as used in this case and in Choi and Paik.\textsuperscript{[14]} Here, we had a proximally migrating causing rupture of RHD which was repaired primarily. Because of this and the pre-operative sphincterotomy, post-operative biliary leak did not occur.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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