

# An Extremely Unusual Complication of Biliary Metallic Stenting: Transhepatic Entero-Peritoneal Fistula

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## Abstract

Biliary self-expanding metal stents (SEMSs) are most commonly used for establishment of drainage in case of malignant biliary obstruction. The most common complication associated with these stents is migration, which is usually distal. However, proximal migration of SEMS is less common. Here, we present a case of malignant extrahepatic biliary obstruction due to gallbladder cancer, which underwent SEMS placement and later had proximal migration of SEMS leading to perforation of liver capsule and pneumoperitoneum.

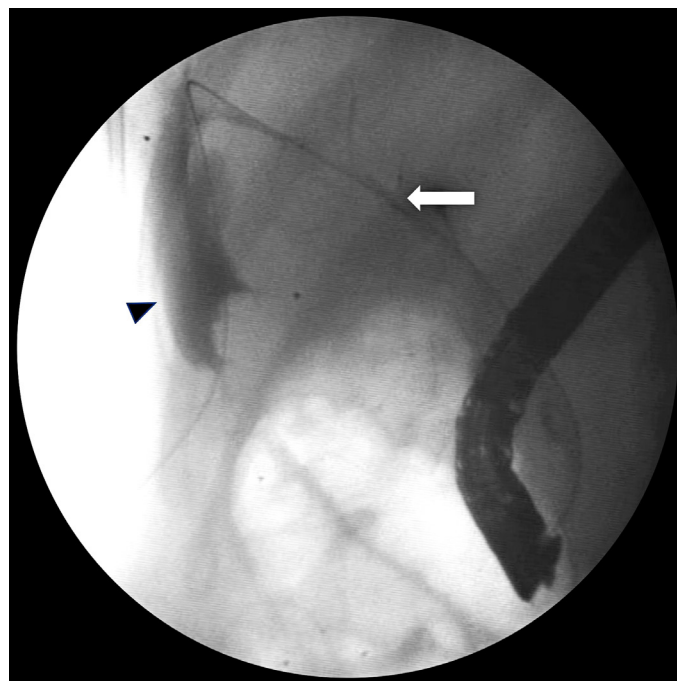
**Keywords:** Biliary tract neoplasms, cholangiopancreatography, endoscopic retrograde, self-expandable metallic stents

## INTRODUCTION

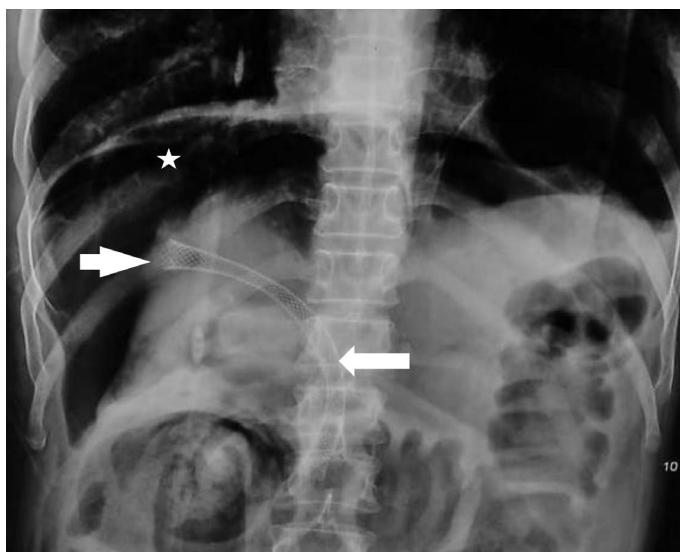
Self-expanding metal stents (SEMSs) are commonly used for pre-operative or palliative biliary drainage in patients with extrahepatic biliary obstruction, especially of malignant etiology.<sup>1</sup> Because of longer patency rates, placement of SEMS is associated with low incidence of stent dysfunction and re-interventions as compared with plastic stents.<sup>1</sup> Complications associated with SEMS placement include stent dysfunction, migration, clogging, tissue ingrowth, tissue overgrowth, cholecystitis, and pancreatitis.<sup>2</sup> Migration rate as high as 15% has been reported with FCSEMS.<sup>3,4</sup> Here, we report an extremely uncommon complication of endoscopic SEMS placement for hilar biliary obstruction.

## CASE PRESENTATION

A 73-year-old man with type 2 diabetes presented to us with 1-month history of painless progressive jaundice with generalized pruritus associated with anorexia and weight loss of 5 kg in 1 month. He gave history of laparoscopic converted into open cholecystectomy for symptomatic cholelithiasis 4 months ago at a remote place. On examination, he had icterus and 2-cm firm, nontender, palpable liver below costal margin. Total leukocyte count was 14000/mm<sup>3</sup>. Total bilirubin was 20 mg/dl, and alkaline phosphatase was 1240 U/l. Magnetic resonance cholangiopancreatography (MRCP) showed dilated common hepatic duct, right and left hepatic duct, and intrahepatic biliary radicle dilatation. Distal common bile duct was normal, and there was a stricture at hilum. Histopathology of resected gall bladder was reviewed, and it turned out to be adenocarcinoma of the gall bladder. Considering malignant extrahepatic biliary obstruction, endoscopic biliary drainage by endoscopic cholangiopancreatography (ERCP) was attempted but was not successful. Percutaneous transhepatic biliary drainage (PTBD) of right biliary system with internalization was performed. After stabilization, the patient was posted for endoscopic biliary drainage and SEMS placement via rendezvous procedure (Figure 1). 1 cm × 10 cm biliary uncovered SEMS (UCSEMS) (Wallstent, Boston Scientific) was placed across biliary stricture via rendezvous procedure. After ERCP day 2, the patient started having abdominal



**Figure 1.** Resea Cholangiogram showing decompressed biliary system with guidewire in PTBD tract (arrow) and leakage of contrast into peritoneal cavity through PTBD tract (arrowhead)



**Figure 2.** X-ray image of the abdomen showing CBD stent in situ (small arrow) with proximal end of the stent reaching liver surface (big arrow) and air under diaphragm (star)



**Figure 3.** CT image showing proximally migrated stent perforating through liver capsule (arrow) and causing pneumoperitoneum (star)

pain and distension and developed sepsis and hypotension. Abdominal X-ray imaging was done, which showed a large amount of air under diaphragm displacing the liver with proximal end of the stent seen reaching liver surface (Figure 2). Urgent abdominal CT imaging was performed, which showed the proximal end of the stent perforating liver capsule and causing pneumoperitoneum (Figure 3). The stent was removed on an urgent basis, but the patient subsequently succumbed to septic shock. Informed consent for publication was taken from patient's relatives.

## DISCUSSION

Endoscopic biliary stenting is a commonly used drainage procedure in patients with extrahepatic biliary obstruction.<sup>1</sup> Stents are made of either plastic or metal. Plastic stents contain materials such as Teflon, polyurethane, and polyethylene and are available in various sizes and shapes.<sup>5</sup> Use of plastic stents in malignant biliary obstruction is reserved for patients with short life expectancy due to low patency rate of 3-6 months.<sup>5,6</sup>

Metal stents are composed of alloys of various metals, such as nitinol, platinum, or elgiloy. These stents have excellent flexibility as well as

radial expansion force and are available in various sizes and designs. Metal stents are available as covered, partially covered, or uncovered. Polytetrafluoroethylene and silicone membranes are commonly used in covered stents. Covered stents are used mainly for benign biliary strictures, whereas uncovered stents are used mainly for malignant biliary obstruction. Because of their large diameter, metal stents have higher patency rate.<sup>1,5</sup>

However, biliary stenting is associated with certain complications. Common complications seen with plastic stent placement are stent dysfunction, stent clogging, and stent migration in 40%, 33%, and 6% of the cases, respectively.<sup>2</sup> Migration occurs most commonly distally, which, on rare occasion, may lead to bowel perforation. In addition to stent dysfunction, stent clogging, and stent migration, other common complications seen with metal stent placement include tumor ingrowth, tumor outgrowth, and cholecystitis.<sup>1,2</sup> Stent migration is very uncommon with uncovered stent and is seen in fewer than 1% cases. Migration rate with covered metal stents reaches as high as 15%.<sup>2</sup>

ERCP fails in 10%-20% cases because of various reasons such as inability to achieve papillary cannulation, difficult anatomy, or tight stricture.<sup>7</sup> Rendezvous procedure is a salvage procedure after failed ERCP, which combines percutaneous radiological and endoscopic interventions. In rendezvous procedure, PTBD with internalization of pigtail catheter into duodenum is performed first. Subsequently, ERCP is performed with the help of guidewire passed through PTBD catheter.<sup>8</sup> In our case, PTBD with internalization of the catheter was performed after failed initial ERCP. Subsequently, ERCP was done, and 1 cm × 10 cm UCSEMS was placed over the guidewire passed through PTBD catheter. As discussed, migration rate with uncovered stents is less than 1%. In most cases, migration occurs distally. Proximal migration is extremely uncommon, especially with uncovered and partially covered stents, and has been reported in case reports and case series.<sup>9-11</sup>

On literature review, we could find only one case of proximally migrated biliary stent that caused perforation of liver capsule and formation of hepatogastric fistula.<sup>12</sup> However, this complication was with plastic stent and not with metal stent. We could not find any case of proximally migrated uncovered metal stent causing perforation of liver capsule and leading to pneumoperitoneum. This is the first case that reports this extremely unusual complication of biliary metal stent placement.

One factor that might have contributed to the proximal migration of stent in our case would be excess length of the stent. Stent was deployed over the guidewire placed through the route of PTBD. We speculate that short route of PTBD tract might have misguided us in judging the proximal end of the stent during placement, and hence, the stent might have been placed relatively high in the biliary tract, which subsequently led to proximal migration and perforation of liver capsule.

In conclusion, proximal migration of uncovered SEMS is very uncommon but can occur. Proximal migration can lead to disastrous complications such as perforation of liver capsule and pneumoperitoneum. This is similar to the rare occurrence of bowel perforation with distal migration. Extra precaution is needed when stent is placed using rendezvous procedure.

**Informed Consent:** Written informed consent was obtained from patient who participated in this study.

**Peer-review:** Externally peer-reviewed.

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