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CASE REPORT

Treating bilio-duodenal obstruction: Combining new endoscopic technique with 6 Fr stent introducer

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Abstract

Periampullary cancer may cause not only biliary but also duodenal obstructions. In patients with concomitant duodenal obstructions, endoscopic biliary stenting remains technically difficult and may often require percutaneous transhepatic biliary drainage. We describe a method of metal stent placement *via* a thin forward-viewing endoscope in patients with simultaneous biliary and duodenal obstruction. In two consecutive patients with biliary and duodenal obstruction due to pancreatic cancer, a new biliary metal stent mounted in a slim delivery catheter was placed *via* a thin forward viewing endoscope after passage across the duodenal stenosis without balloon dilation. In both patients, with our new placement technique, metallic stents were successfully placed in a short time without adverse events. After biliary stenting, one patient received curative resection and the other received duodenal stenting for palliation. Metallic stent placement with a forward-viewing thin endoscope is a beneficial technique, which can avoid percutaneous drainage in patients with bilio-duodenal obstructions due to periampullary cancer.

INTRODUCTION

Patients with periampullary malignancies occasionally experience not only biliary but also duodenal obstructions. Although biliary obstruction usually occurs first and is followed by duodenal obstruction, the two occur simultaneously in some cases. These patients often require percutaneous biliary stenting because the endoscopic procedure is difficult.

A new commercially available self-expandable metallic stent (SEMS) mounted in an extra slim delivery catheter can be passed through the working channel of a thin endoscope. Here, we assessed the outcome of metal stent placement *via* a thin forward-viewing endoscope in two patients with simultaneous biliary and duodenal obstruction.

CASE REPORT

Two consecutive patients with simultaneous biliary and duodenal obstructions due to pancreatic cancer between No-

Table 1 Summary of studied patients

Case	Age/sex	Level of duodenal obstruction	Level of biliary obstruction	Comorbidity	Purpose of biliary stenting	Subsequent procedures
1	79/F	Pars Ⅱ	Distal	None	Presurgical decompression	Pancreatico-duodenectomy
2	81/M	Pars Ⅱ	Distal	Advanced esophageal cancer	Palliation	Duodenal and esophageal stenting

vember 2009 and January 2010 were investigated (Table 1). In both patients, duodenal obstructions did not allow the passage of a duodenoscope across the stricture without a dilating procedure. The patients underwent placement of SEMS *via* a slim forward-viewing gastroscope (GIF XP-240, Olympus, Tokyo, Japan) (a valid length of 1030 mm, an outer diameter of 7.7 mm, a working channel diameter of 2.2 mm). The SEMS used is a new uncovered SEMS, Zilver® 635 stent (10 mm in diameter) (Cook, Bloomington, IN, USA) which is a laser-cut nitinol stent mounted in an extra slim (6-Fr) delivery catheter. The study was approved by our institutional review board (OHASHI #21-017), and written informed consent was obtained from the patients.

A slim endoscope was inserted perorally and passed across the stricture. The ampulla was endoscopically visualized by retroflexing the endoscope in the distal second portion of duodenum. An endoscopic retrograde cholangiopancreatography (ERCP) catheter (PR-109Q, Olympus) was advanced into the bile duct using a wire-guided cannulation technique with a 0.025 "hydrophilic guidewire (Surf®, Piolax Medical Devices, Inc. Kanagawa, Japan). Then, the guidewire was replaced with a 0.035" Jagwire (Boston Scientific Inc., Natick, MA, USA), endoscopic papillary balloon dilation was performed with an 8-mm balloon dilator (Eliminator® PET biliary balloon dilator, ConMed, Utica, NY, USA), and the SEMS was released under endoscopic and fluoroscopic control.

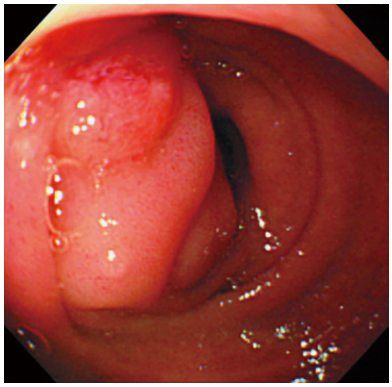

Figure 1 Endoscopic view of the forward-viewing endoscope showing duodenal stricture at the second portion of duodenum.

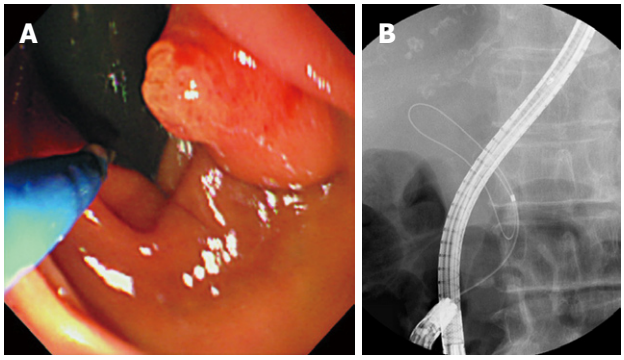

Figure 2 Selective biliary cannulation conducted with a thin forward-viewing endoscope. A: Endoscopic view showing endoscopic retrograde cholangiopancreatography (ERCP) catheter approaching to the papilla; B: X-ray picture showing common bile duct cannulation conducted with wire-guided technique without contrast injection.

Case 1

A 79-year-old woman was admitted to our hospital due to obstructive jaundice. Computed tomography (CT) revealed pancreatic cancer with duodenal invasion. The patient underwent ERCP for biliary stenting, during which a duodenoscope (JF-260V, 12.6 mm outer diameter, Olympus) could not be passed across the stricture in the second portion of duodenum. Despite the presence of duodenal stricture, she was able to take soft food orally.

The new stenting procedure with a thin forward-viewing endoscope was employed. In brief, a slim endoscope was inserted perorally and easily passed across the stricture (Figure 1). After successful biliary cannulation (Figure 2), a Zilver® 635 stent (8 cm in length) was placed and deployed at the optimal position (Figure 3). The entire procedure took 35 min, and no complications were encountered.

After biliary stenting, her cancer was considered resectable based on the assessment with detailed examinations. The patient successfully underwent pancreatico-duodenectomy on day 14 after stenting when her jaundice was relieved. The resected specimen revealed duodenal invasion from pancreatic cancer. Since then, the patient has received adjuvant chemotherapy with S-1.

Case 2

An 81-year-old man was admitted for epigastric pain, nausea and vomiting. Ultrasonography and CT revealed a 40-mm pancreatic mass with invasion to the extrahepatic bile duct, duodenum and portal vein. In addition, esophagogastroduodenoscopy revealed an advanced cancer in the lower part of esophagus and a duodenal stenosis due to pancreatic cancer. The cancer was therefore considered unresectable. Because of these gastrointestinal obstructions, the patient could not take food orally and both biliary and duodenal stenting for palliation were scheduled. Liver function tests showed abnormal results, although

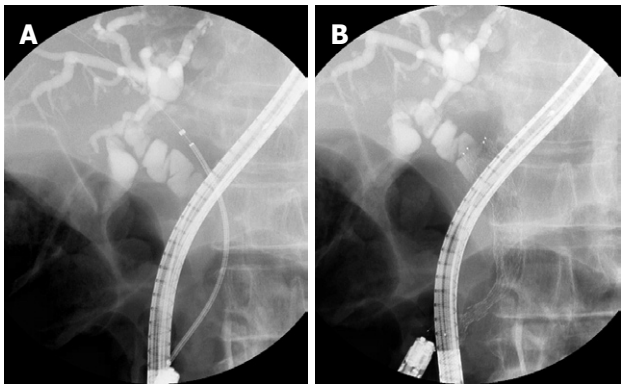

Figure 3 Biliary self-expandable metallic stent (SEMS) placement *via* a thin forward-viewing endoscope. A: An extra slim delivery catheter is inserted properly into the bile duct; B: SEMS is successfully placed.

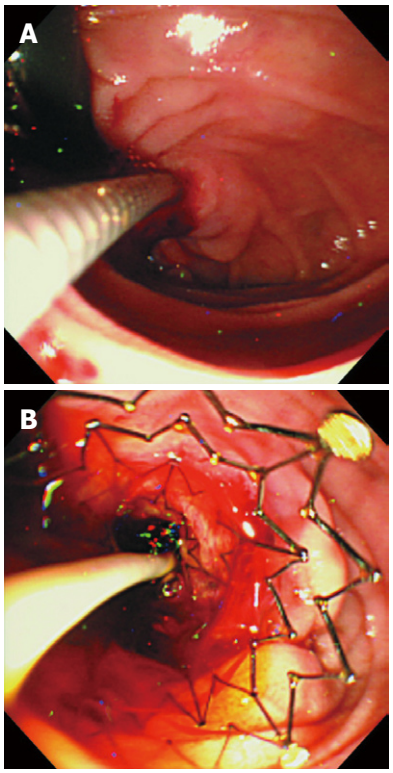

Figure 4 Endoscopic view showing biliary metallic stent placement *via* a thin forward-viewing endoscope. A: The delivery catheter is successfully introduced into the bile duct; B: SEMS is successfully placed.

jaundice was not identified. We carried out biliary stenting first in view of a treatment strategy based on scheduled palliative stenting, both biliary and duodenal[1].

Because it was impossible to pass a large-caliber side-viewing duodenoscope (JF-260V, Olympus) through the duodenal stricture, we employed the new biliary stenting procedure with a thin forward-viewing endoscope as in Case 1 and subsequently placed a duodenal stent. A thin endoscope was easily passed across the duodenal as well as esophageal obstruction, after which a Zilver® 635 stent (8 cm in length) was successfully placed without difficulty, even through the endoscope was retroflexed as in Case 1 (Figure 4). The total procedure time was 22 min.

Figure 5 X-ray picture indicating successful placement of biliary, duodenal and esophageal stents.

No procedure-related complications were found.

On day 10 after biliary stent placement, the patient underwent stent placement at the duodenal stricture. A duodenal stent (Niti-S® Pyloric/Duodenal Uncovered Stent, Taewoong Medical Inc. Seoul, Korea) was successfully placed with a through-the-scope placement procedure at the optimal position. Two weeks after the duodenal stenting, the patient also underwent stent placement at the esophageal obstruction with an Ultraflex™ (Boston Scientific) (Figure 5). Biliary, duodenal and esophageal stenting improved his dietary status, allowing intake of solid food.

DISCUSSION

We report here the successful endoscopic placement of a biliary SEMS using a thin forward-viewing endoscope in two patients with simultaneous biliary and duodenal obstructions. One patient underwent the procedure for presurgical decompression and the other for palliation.

The combination of biliary and duodenal obstruction in patients with periampullary cancer is relatively frequent, as 23% of the patients had both biliary and duodenal obstructions in a retrospective study of unresectable pancreatic head cancer[2]. In most cases, duodenal obstruction occurs after biliary obstruction, but simultaneous obstruction also occasionally occurs. Because stent placement in these simultaneous cases is more complicated, these patients often require percutaneous biliary stenting. Even if a duodenoscope can be passed across the duodenal stricture when a duodenal stent is first placed, access to the ampulla may be hampered by stent mesh covering the papilla. Biliary stenting before duodenal stenting is therefore recommended for these patients[1]. However, because the stricture is usually too narrow to allow passage of a large-caliber duodenoscope, hydrostatic balloon dilation is frequently required[2,3]. Even after dilation, passage of a side-viewing duodenoscope across the obstruction is sometimes difficult, and is at a risk for duodenal perforation owing to the presence of acute angulation in the duodenum. Because the endoscope used in the present study is much thinner and forward-viewing, we were able to pass it easily and safely across the stricture under direct vision. The present technique thus has the great advantage of allowing the easier and safer emplacement of a biliary stent than a previously published technique of biliary stenting after a duodenal dilation with a side-viewing duo-

denoscope in patients with combined biliary and duodenal obstruction[2,3].

Although usually selected when endoscopic stenting is difficult, percutaneous stenting has two drawbacks, namely a compromised quality of life owing to the need for an indwelling percutaneous transhepatic biliary drainage (PTBD) catheter for at least one week before stent placement, and the risk of cancer implantation in the catheter tract. A retrospective analysis of patients who underwent PTBD before resection of extrahepatic cholangiocarcinoma showed that catheter tract cancer-implantation develops in 6%[4]. Catheter tract cancer-implantation is reportedly observed in patients with pancreatic cancer as well as cholangiocarcinoma[5]. In recent years, endoscopic ultrasound (EUS)-guided biliary drainage has been introduced as an alternative to PTBD when ERCP is unsuccessful. However, this procedure is associated with procedure-specific complications, such as bile leak-attributable peritonitis[6,7], in addition to bleeding and cholangitis from stent dysfunction. Theoretically, it may cause cancer implantation in the peritoneal cavity and fistula track as in the case of PTBD. Transpapillary stenting is the only procedure conducted *via* a natural route and so must be the most desirable technique for presurgical as well as palliative decompression.

Recently, cholangiographic or cholangioscopic procedures with an ultra-slim endoscope have been reported[8,9]. A prospective comparison of transnasal ERCP with an ultrathin forward-viewing endoscope *vs* conventional ERCP with a large caliber side-viewing duodenoscope has reported no statistically significant difference in the rates or times of cannulation, albeit that the success rate of cannulation with the transnasal method is lower. The endoscope used in the present study (7.7 mm in diameter) is slightly larger than that used in the previous study (5.9 mm in diameter)[8]. Unlike the previous study, we introduced the endoscope into the duodenum perorally but were nevertheless able to accomplish biliary cannulation and stenting, without any difficulty. One previous case report of stent placement using an ultrathin forward-viewing endoscope *per os* has appeared[10], in which a patient with choledocholithiasis who received placement of two 5-Fr hand-made stents, subsequently underwent sphincterotomy and stone removal using a peroral ultrathin endoscope after relief of cholangitis. With plastic stents, thin endoscopes with a narrower working channel are restricted to accepting only 6 Fr or thinner stents. However, larger stents are generally more favorable than smaller ones, particularly for palliative use. We consider that the use of the new SEMS mounted in an extra slim delivery catheter takes full advantage of the possibilities of a thin endoscope with a thinner working channel.

When duodenal tumor invasion extends to the major papilla, endoscopic identification of the papilla is frequently difficult. Even if the papilla can be found, it is generally impossible to access the bile duct because of the difficulty of aligning the catheter with the bile duct axis. Under these conditions, therefore, stent placement would likely be difficult even with the present method and a percutaneous or EUS-guided transenteric procedure may be required instead. However, the number of such cases appears to be limited. The present report is a preliminary result with only two cases, and further study with more patients is warranted.

In conclusion, placement of the new SEMS mounted in an extra slim delivery catheter *via* a thin forward-viewing endoscope appears to be a safe and effective procedure for either presurgical or palliative decompression in patients with malignant biliary and duodenal obstruction. This study is preliminary, however, and further evaluation in a larger number of patients is warranted.

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