

## Partial stent-in-stent placement of biliary metallic stents using a short double-balloon enteroscopy

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and with short-term hospitalization, even in patients with surgically altered anatomies.

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### Abstract

Endoscopic intervention is less invasive than percutaneous or surgical approaches and should be considered the primary drainage procedure in most cases with obstructive jaundice. Recently, therapeutic endoscopic retrograde cholangiopancreatography (ERCP) using double-balloon enteroscopy (DBE) has been shown to be feasible and effective, even in patients with surgically altered anatomies. On the other hand, endoscopic partial stent-in-stent (PSIS) placement of self-expandable metallic stents (SEMSs) for malignant hilar biliary obstruction in conventional ERCP has also been shown to be feasible, safe and effective. We performed PSIS placement of SEMSs for malignant hilar biliary obstruction due to liver metastasis using a short DBE in a patient with Roux-en-Y anastomosis and achieved technical and clinical success. This procedure can result in quick relief from obstructive jaundice in a single session

### INTRODUCTION

Endoscopic intervention is less invasive than percutaneous or surgical approaches and should be considered the primary drainage procedure in most cases with obstructive jaundice. Recently therapeutic endoscopic retrograde cholangiopancreatography (ERCP) using double-balloon enteroscopy (DBE) has been shown to be safe and feasible, even in patients with surgically altered anatomies<sup>[1-4]</sup>. On the other hand, the placement of biliary stents is effective for the palliation of unresectable malignant hilar biliary obstruction in conventional ERCP<sup>[5-8]</sup>. In particular, as we previously described, endoscopic partial stent-in-stent (PSIS) placement of self-expandable metallic

stents (SEMSs) for malignant hilar biliary obstruction has been shown to be feasible, safe and effective<sup>[7,8]</sup>, but it can be technically challenging. We report a case of a postoperative surgical patient who was managed successfully with a PSIS placement of SEMSs for malignant hilar biliary obstruction using a short DBE.

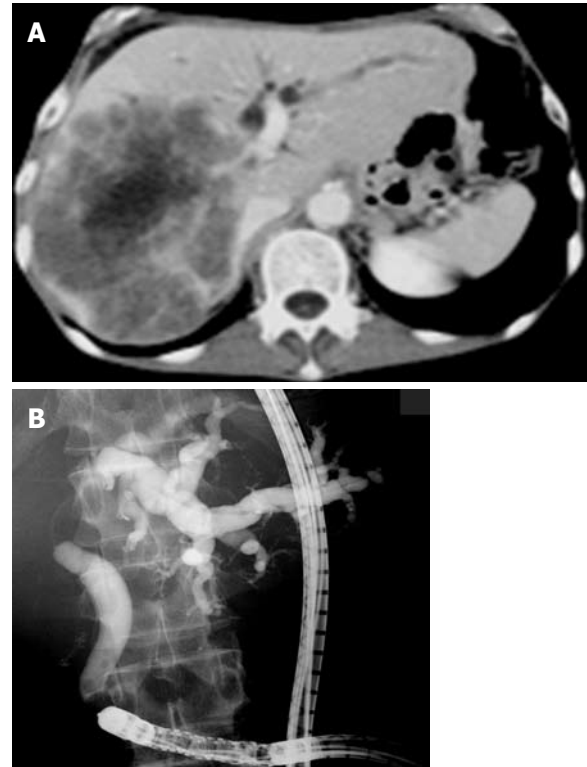
## CASE REPORT

A 63-year-old male underwent total gastrectomy with Roux-en-Y reconstruction and sigmoidectomy due to simultaneous gastric and sigmoid colon cancer. Despite treatment with adjuvant chemotherapy, the patient's liver and lymph node metastases increased and caused obstructive jaundice, but no cholangitis. Computed tomography imaging showed dilation of the left intrahepatic bile duct due to liver metastasis, which occupied the right lobe (Figure 1A). For endoscopic biliary drainage, endoscopic retrograde cholangiography with a short DBE, EC-450BI5 (Fujifilm, Tokyo, Japan), was performed. The cholangiography revealed hilar biliary obstruction and a dilated left intrahepatic bile duct with tumor invasion extending to the bifurcation of the left lateral sectional bile duct branches (Figure 1B). After needle-knife sphincterotomy, a 0.035-inch guidewire was passed selectively into the left lateral superior bile duct branch (B3). The first uncovered SEMS (Zeostent 10 mm × 80 mm; Zeon Medical Inc., Tokyo, Japan) was deployed, with the proximal end in B3 and the distal end in the common bile duct. The guidewire remained in place, and the delivery system was removed. Subsequently, the wire was passed by catheter into the left lateral inferior bile duct branch (B2) through the mesh of the initial SEMS. Following balloon dilation (8 mm) at the stricture (Figure 2A), the second uncovered SEMS (Zeostent 10 mm × 100 mm) was smoothly deployed, with the proximal end in B2 through the mesh of the initial SEMS, forming a PSIS (Figure 2B). The patient was immediately relieved of jaundice and left our hospital in 7 d. He recovered enough to receive another round of chemotherapy on an outpatient basis.

## DISCUSSION

In patients with surgically altered anatomy and long afferent limbs, ERCP by gastroenteroscopy, colonoscopy, or standard duodenoscopy is technically challenging and often unsuccessful because of an inability to reach the papilla or bilioenteric anastomosis. Recently, the use of a DBE or single-balloon enteroscopy has made therapeutic ERCP-including sphincterotomy, stone extraction, dilation of bilioenteric anastomotic stricture, and biliary stent placement-feasible and effective, even in patients with surgically altered anatomies<sup>[1-4]</sup>.

According to a recent report on endoscopic intervention for the relief of malignant hilar biliary obstruction, the placement of SEMSs offers advantages over plastic endoprostheses in terms of stent patency and the number of reinterventions needed<sup>[5]</sup>. In addition, endoscopic PSIS

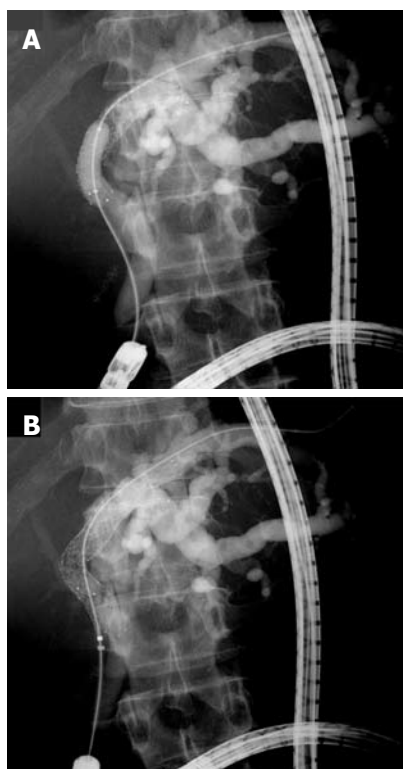


**Figure 1** The hilar biliary obstruction due to liver metastasis occupying the right lobe and a dilated left intrahepatic bile duct with tumor invasion extending to the bifurcation of the lateral bile duct branch. A: Computed tomography image; B: Cholangiography.

placement of SEMSs for malignant hilar biliary obstruction has been shown to be feasible, safe and effective in conventional ERCP<sup>[5-8]</sup>. We previously reported that this procedure is safe and effective even in cancer patients receiving chemotherapy<sup>[8]</sup>.

Therefore, in this case of a cancer patient with Roux-en-Y anastomosis, we used a short DBE to perform PSIS placement of SEMSs for malignant hilar biliary obstruction and achieved technical and clinical success. Almost all conventional accessories, including uncovered SEMS, were available, as we used a short DBE with a working channel of 2.8 mm in diameter and a 152 cm in length.

Percutaneous stent insertion for malignant obstructive jaundice had significantly higher 30-d mortality than the endoscopic method (33% *vs* 15%,  $P = 0.016$ ) in a randomized trial<sup>[9]</sup>. Complications related with percutaneous transhepatic biliary drainage (PTBD), including intraperitoneal hemorrhage, hemobilia, bile leakage, and pleural complications, can be avoided by using endoscopic drainage<sup>[10]</sup>. In our cases, 2 PTBD routes would have been required for the placement of 2 SEMSs at B2 and B3, respectively. In addition, 2 sessions would have been required for the placement of the SEMSs, that is, the SEMSs are usually placed one week after the initial PTBD. The endoscopic procedure could protect our patient from the risks associated with more invasive drainage procedures, such as PTBD and surgical drainage, the latter of which is associated with high morbidity and mortality rates. Furthermore, the patient needed no further long-term hospitalization



**Figure 2** A partial stent-in-stent placement of biliary metallic stents using a short double-balloon enteroscopy. A: Following the placement of the first self-expandable metallic stent (SEMS), balloon dilation was performed at the stricture; B: The second SEMS was deployed through the mesh of the initial SEMS.

for the treatment of obstructive jaundice for the duration of his life. We think that this procedure is also indicated for patients in whom PTBD cannot be performed for various reasons, such as patients with severe coagulopathy, thrombocytopenia, a large amount of ascites, or an anatomically inaccessible location, e.g., patients with Chilaiditi syndrome.

In conclusion, endoscopic PSIS placement of SEMSs for the treatment of malignant hilar biliary obstruction using a short DBE was proved to be feasible and effective

in a patient with Roux-en-Y anastomosis. This procedure can result in quick relief from obstructive jaundice in a single session and with short-term hospitalization, even in patients with surgically altered anatomies.

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