Abstract
An 85-year-old man presenting with jaundice and a right upper abdominal mass was admitted. He had a history of distal gastrectomy with Billroth-II reconstruction for gastric cancer. Computed tomography revealed a locally advanced tumor in the head of the pancreas, which invaded the third portion of the duodenum. Marked dilatation of the stump of the duodenum and intrahepatic hepatic bile duct were confirmed. Percutaneous transhepatic biliary and duodenal drainage were immediately performed via the papilla of Vater to treat acute cholangitis and prevent impending rupture of the duodenum. After the improvement of cholangitis, a duodenal metallic stent 22mm in width was placed in the stenotic site (length, 40mm) of the duodenum via the route used for percutaneous transhepatic biliary drainage. The malignant stenosis and jaundice improved, without complications. Oral intake was begun the day after stenting, and the stent remained patent during the patient’s life.

Key words: malignant bowel obstruction, pancreatic cancer, self-expandable metallic stent

Introduction
Malignant duodenal obstruction frequently occurs in advanced hepatobiliary cancers. It is always symptomatic and difficult to treat by curative surgery. Treatment options are usually palliative and include gastrojejunal bypass.

Endoscopic duodenal stenting was reported to be an effective treatment option for malignant duodenal obstruction in recent series. It is thus being increasingly used as a minimally invasive, palliative treatment. However, duodenal stenting is difficult to perform endoscopically in patients who have undergone gastrointestinal reconstruction.

We successfully performed duodenal stenting via the percutaneous transhepatic biliary drainage (PTBD) route in a patient with malignant duodenal obstruction caused by pancreatic cancer who had previously undergone Billroth-II reconstruction. Duodenal stenosis and biliary obstruction were concurrently treated successfully. This technique is simple and one of the most effective options for patients who have a history of gastric surgery.

Case Report
An 85-year-old man presenting with jaundice and a right upper abdominal mass was admitted to our department. He had a history of distal gastrectomy with Billroth-II reconstruction for gastric cancer. On laboratory tests, the total bilirubin level was 3.85mg/dL, the amylase level 1,471IU/L, the platelet count 10.5 × 10^4/μL, the aspartate aminotransferase level 749IU/L, alanine aminotransferase level 698IU/L, and the C-reactive protein level 5.46mg/dL. An abdominal computed tomographic scan revealed a locally advanced tumor in the head of the pancreas, which invaded the third portion of the duodenum and the common bile duct (Fig. 1). The abdominal mass was found to be caused by marked dilatation of the duodenal stump due to tumor innervation.
Biliary drainage was planned to treat the severe acute cholangitis and prevent impending rupture of the duodenum. However, endoscopic retrograde drainage and stenting of the duodenum were unsuccessful because of severe invasion of pancreatic cancer to the duodenum (Fig. 2). First, ultrasound-guided PTBD was performed from the left lobe of the liver. Duodenography via the PTBD tube revealed severe duodenal stenosis (length, 40mm) on the oral side of Treiz’s ligament (Fig. 3a). An 8-French multi-holed PTBD drainage tube (EV Drainage® catheter, HAKKO CO., Tokyo) was therefore placed in the duodenum. This drainage tube acted as a stent in the common bile duct to alleviate jaundice and a drainage tube for the duodenum. The acute cholangitis improved, and the impending rupture of the duodenum was prevented. The jaundice and dilatation of the duodenal stump improved within a week. Then, the PTBD tube was easily advanced through the stenotic segment to the oral side of duodenum (Fig. 3b). Finally, we used the PTBD access route and fluoroscopic assistance to place a self-expandable metallic stent (SEMS) (WallFlex duodenal stent®, Microvasive, Boston Scientific Corp., Natick, MA, USA), measuring 6cm in length and 22mm in diameter, in the duodenum to alleviate the stenosis (Fig. 4a). The SEMS was released carefully to avoid covering the papilla of Vater. Then, the biliary drainage tube was replaced with a thicker 10-French stent. The stent reached its full patency 12 hours after placement (Fig. 4b). Oral intake was started the next day after stenting. No procedure-related complications occurred, and patency was maintained during the last 3 months of the patient’s life.

Discussion
Duodenal stenting via the PTBD route is an effective treatment option when an endoscopic approach is precluded by factors such as gastrointestinal reconstruction. This technique can be used to manage biliary obstruction and malignant duodenal stenosis simultaneously, without performing endoscopy. Biliary drainage via a retrograde endoscopic approach is technically difficult to perform in patients who have undergone Billroth-II and Roux-en Y reconstruction. Moreover, it is difficult to access the duodenal loop in the presence of marked duodenal stenosis, such as that confirmed in our patient5. In our case, retrograde biliary drainage was precluded by the high pressure of the duodenal stump caused by tumor-induced stenosis. The risk of iatrogenic duodenal perforation was considered high if cannulation with a guide wire was performed. However, because our patient had severe cholangitis and im-

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Fig. 1 An abdominal computed tomographic scan with multiplanar reconstruction on admission revealed that a locally advanced tumor arising in the pancreatic head and invading the third portion of the duodenum (T) and the common bile duct (C) was evident. There was marked dilatation of the duodenal stump (D) associated with Billroth-II reconstruction and increased computed tomographic density around the duodenum.

Fig. 2 Endoscopic retrograde drainage and stenting of the duodenum were unsuccessful because of severe invasion of pancreatic cancer to the duodenum.
pending rupture of the duodenum, indicating an oncologic emergency, the approach was simple and immediately implemented without complications. Cannulation was performed with a guide wire, and SEMS placement via the PTBD route was easy because the access route was short, and the stent was inserted in an anterograde manner.

The unresectable and recurrence rates of pancreatic and biliary cancers are higher than those of other cancers\(^6\). Biliary obstruction and acute cholangitis are frequently encountered in advanced cancer and local recurrence in the duodenum\(^7\). In such cases, duodenal stenting via the PTBD route may be an effective treatment strategy when endoscopic treatment has failed. Acute cholangitis in elderly patients is associated with high mortality and morbidity, even after successful biliary drainage\(^8\). Moreover, duodenal rupture is often a lethal event in elderly patients. Therefore, our technique may be effective, practical, and associated with minimum surgical stress in selected patients.

To our knowledge, this is the first report describing the placement of a metallic stent in the duodenum via the percutaneous transhepatic route, without performing endoscopy. We consider this technique an effective treatment option for the management of malignant duodenal obstruction in patients with a history of gastric surgery.

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Fig. 3  a, b: A duodenogram taken via the drainage tube 7 days after duodenal drainage showed that a stenotic segment due to pancreatic cancer (a), 40mm in length was confirmed in the third portion of duodenum (arrow). The duodenum and bile duct dilatation emplaced one week after PTBD. The PTBD tube was easily advanced through the stenotic segment to the oral side of duodenum (b). T; Tumor of duodenum, C; common bile duct, D; duodenum stump.

Fig. 4  a, b: Double duodenal stenting by percutaneous transhepatic technique. An uncovered duodenal metallic stent, 6cm in length and 22mm in diameter, was inserted to the third portion of the duodenum (a). The stent reached its full patency 12 hours after placement (b). T; Tumor of duodenum, C; common bile duct, D; duodenum stump.
References


