

## Malignant Afferent Loop Obstruction Following Pancreaticoduodenectomy: Report of Two Cases

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### Abstract

We report two cases of malignant afferent loop obstruction following pancreaticoduodenectomy (PD). Case 1. A 70-year-old woman, who had undergone PD for pancreatic cancer, was referred to our hospital because of fever, jaundice, and abdominal pain. Ultrasonography and abdominal computed tomography demonstrated dilatation of a small bowel loop in the right upper quadrant. Laparotomy confirmed the diagnosis of local recurrent tumor causing occlusion of the afferent limb, and Roux-en-Y bypass was performed. Case 2. A 72-year-old man, who had undergone PD for cancer of the major papilla, was hospitalized with a high-grade fever and epigastric pain. Ultrasonography and abdominal computed tomography revealed a dilated afferent loop and multiple masses in liver. At laparotomy, widespread carcinomatosis was found to have caused afferent loop obstruction, and surgical bypass was performed. In conclusion, the surgical bypass seems to be an effective palliative treatment for afferent loop syndrome after PD.

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**Key words:** surgical bypass, recurrent tumor, malignant afferent loop obstruction

### Introduction

Afferent loop syndrome is a rare complication that occurs after Billroth type II gastrojejunostomy with partial gastrectomy<sup>1</sup>. However, afferent loop occlusion is also an extremely rare complication of other surgical procedures, such as pancreaticoduodenectomy (PD)<sup>2-7</sup>. We report two cases of malignant afferent loop obstruction following PD and discuss the definitive management of these cases.

### Case Reports

Case 1: A 70-year-old woman was referred to our hospital because of fever, jaundice, and abdominal pain. Two years earlier, the patient had undergone a Whipple resection with Child's reconstruction for cancer of the head of the pancreas. One year after the surgery, she developed jaundice because of tumor recurrence at the biliary anastomotic site and a biliary metallic stent was placed to relieve the anastomotic stricture.

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Fig. 1A Ultrasonography demonstrated a dilated afferent loop (about 5 cm in diameter) in the right upper quadrant.

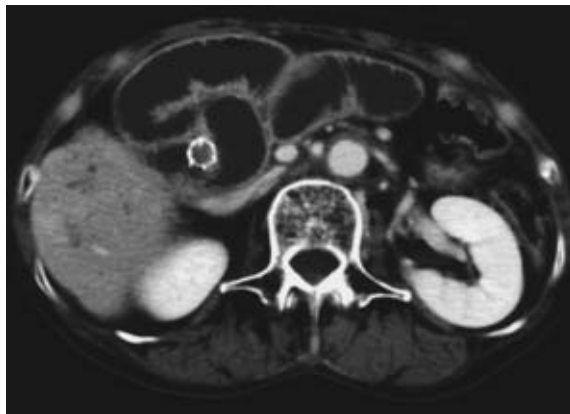


Fig. 1B Abdominal computed tomography revealed a 5-cm-long fluid-dense tubular structure.

Physical examination revealed jaundice and slight tenderness in the right upper abdomen. Laboratory findings included total bilirubin, 5.9 mg/dl (direct, 5.0 mg/dl); aspartate aminotransferase, 74 IU/L; and alkaline phosphatase, 800 IU/L. The serum level of carcinoembryonic antigen was 7.9 ng/ml.

Ultrasonography demonstrated a dilated afferent loop (about 5 cm in diameter) in the right upper quadrant and biliary metallic stent within the dilated loop (**Fig. 1A**). Abdominal computed tomography revealed a 5-cm-long fluid-density tubular structure (**Fig. 1B**). These findings strongly suggested the

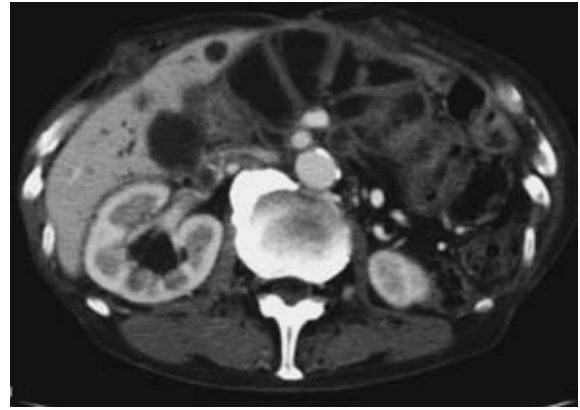


Fig. 2 Ultrasonography and abdominal computed tomography revealed dilated loops, biliary ductal dilatation, and multiple masses in the liver.

diagnosis of afferent loop obstruction.

We attempted endoscopic drainage of the obstructed blind loop, but this procedure was not successful because we could not reach the orifice of the obstructed loop. Laparotomy confirmed the diagnosis of local recurrent tumor causing occlusion of the jejunal limb downstream from the choledochojejunostomy. Thus, Roux-en-Y bypass was performed (**Fig. 3A**), and the postoperative course was uneventful. The patient had remained well until she died of widespread carcinomatosis 4 months after the operation.

Case 2: A 72-year-old man, who had undergone a radical PD for cancer of the major papilla 1 year earlier, was hospitalized with a high-grade fever and epigastric pain. Physical examination revealed right upper quadrant distension with epigastric tenderness. Laboratory tests revealed the following abnormalities: white blood count, 11,300 /mm<sup>3</sup>, aspartate aminotransferase, 78 IU/L, alanine aminotransferase, 48 IU/L, and alkaline phosphatase, 1,589 IU/L. The tumor markers were as follows: carbohydrate antigen 19-9 106 U/ml, and carcinoembryonic antigen 5.7 ng/ml.

Ultrasonography and abdominal computed tomography revealed dilatation of an afferent loop, biliary ductal dilatation, and multiple masses in the liver (**Fig. 2**). Endoscopic drainage of the afferent loop was attempted but was unsuccessful because of postoperative anatomic changes. Percutaneous transhepatic drainage was contraindicated by the

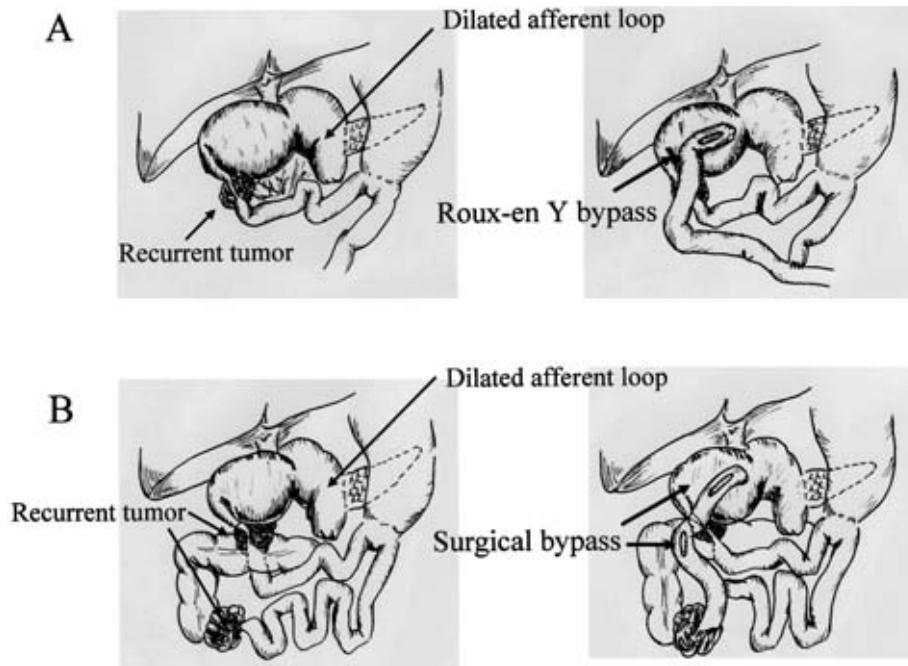


Fig. 3 **A**—Case 1. Obstruction of a jejunal limb downstream from the choledochojejunostomy due to recurrent tumor required a Roux-en-Y bypass. **B**—Case 2. Widespread carcinomatosis resulted in the obstruction of an afferent limb proximal to the choledochojejunostomy and terminal ileum. Jejunojejunal and jejunocolonic bypasses were performed.

presence of liver metastases.

Laparotomy confirmed the diagnosis of widespread carcinomatosis causing afferent loop obstruction. Recurrent tumors were obstructing the afferent limb proximal to choledochojejunostomy and the terminal ileum. Therefore, surgical bypass was conducted as shown in **Figure 3B**. The patient did well postoperatively and had an improved quality of life until he died 1 month later.

### Discussion

Afferent loop syndrome is an unusual complication of gastrectomy with Billroth II reconstruction<sup>1</sup>. The reported incidence of afferent loop syndrome ranges from 0.2% to 20%<sup>1</sup>. This syndrome results from obstruction of the duodenum or jejunum at any site proximal to the gastrojejunal anastomosis by a variety of postoperative complications. The cause of afferent loop obstruction can be benign or malignant. Benign causes include internal hernia, adhesion, volvulus and torsion, and malignant occlusion is generally caused by recurrent tumor or metastasis<sup>6</sup>. Malignant occlusion often presents as chronic,

progressive, partial obstruction and the diagnosis is frequently difficult to establish by biochemical or radiological means. Furthermore, the definitive therapy in debilitated patients remains controversial<sup>6,7</sup>.

We have presented two cases of afferent loop obstruction due to local recurrence after PD with Child's reconstruction. Eleven reported cases of afferent loop obstruction after PD have been reported<sup>2-7</sup>. Howard<sup>2</sup> has reported two cases in which the efferent jejunal conduit obstruction between the proximal pancreaticojejunostomy and the distal choledochojejunostomy led to repeated episodes of acute pancreatitis without jaundice. Honda et al.<sup>3</sup> have presented a case of acute afferent loop obstruction caused by severe adhesions following PD for bile duct cancer. To our knowledge, there have been only 7 reported cases, including our cases, of malignant afferent loop syndrome. All patients had undergone PD for pancreas head cancer (n=2), common bile duct cancer (n=2), cancer of the major papilla (n=2), or cecal cancer (n=1), and presented in a chronic manner. Although six patients developed jaundice, one patient had epigastric pain and fever.

The treatments performed in these cases varied widely, and included surgical bypass, percutaneous drainage, and endoscopic drainage. Therefore, there is still no agreement on the choice of the most appropriate method for malignant afferent loop obstruction.

Treatments for obstructive blind loop can be classified as surgical or nonsurgical. Nonsurgical approaches include external drainage via percutaneous or transhepatic routes and internal drainage by endoscopic stenting at the stenotic site. Berzreh<sup>8</sup> has reported that percutaneous catheter drainage was a successful method of palliation in the treatment of closed-loop small bowel due to recurrent adenocarcinoma of the colon. Moriura<sup>4</sup> has also used this procedure for afferent loop occlusion caused by peritoneal recurrence of colon cancer following PD. However, this procedure has potential complications, including peritoneal spillage of bowel contents, septicemia, and local infection<sup>4,7,8</sup>. Moreover, coexisting biliary obstruction at or above the bilioenteric anastomosis might be problematic for relieving jaundice and should be investigated in the preprocedural period<sup>7</sup>. On the other hand, biliary catheters and metallic stents have been successfully placed for relief of afferent loop syndrome. Lee et al.<sup>9</sup> conducted percutaneous transhepatic duodenal drainage followed by infusion of fluorouracil and leucovorin in two cases of recurrent gastric cancer. Caldiocott et al.<sup>10</sup> placed a metallic stent transhepatically for palliation of malignant afferent loop obstruction. Yao et al.<sup>11</sup> concluded that percutaneous transhepatic duodenal drainage provides effective palliation for both afferent loop obstruction and biliary stasis. Percutaneous transhepatic catheter drainage might be a useful alternative method of palliation in patients with unacceptable surgical risks, especially in patients presenting as secondary obstructive jaundice following PD with Child's reconstruction. However, this procedure may cause septicemia as a result of ascending cholangitis<sup>7</sup>. The combined effect of the increasing intrabiliary pressure and reflux of bacteria in the obstructive loop would lead to severe cholangitis even if biliary drainage were effective<sup>7</sup>. Because neither of our patients showed marked

biliary ductal dilatation and because patient 2 had multiple liver metastases, percutaneous transhepatic drainage was not performed.

Endoscopic management has also been reported<sup>6,12</sup>. Transoral catheters have been placed endoscopically for diagnostic and therapeutic purposes and provides satisfactory palliation with improvement in symptoms such as abdominal pain and vomiting. Nakagawa et al.<sup>12</sup> reported that endoscopic balloon dilation was effective for the treatment of afferent loop syndrome after gastrectomy with a Billroth II operation. However, the endoscopic approach is temporary and must be considered as a preparation for more definitive methods of palliation, such as surgery<sup>11</sup>. In our cases, this method was attempted but could not be achieved technically because of the previous operative reconstruction.

For the management of afferent loop syndrome, surgical revision such as jejunojejunostomy or Roux-en-Y conversion has been the established<sup>13</sup>. According to Moriura et al.<sup>4</sup>, surgical procedures were performed successfully in 75% of patients with jaundice caused by afferent loop obstruction. However, in patients with malignant afferent loop obstruction, surgical therapy may not always be possible because of the patient's debilitated state or disseminated tumor<sup>6,7</sup>. Because both our patients had remained well without an unacceptable surgical risk and because other treatments were unsuccessful, surgical bypass was proposed to decompress the obstructive loop. The surgical treatment was a successful method of palliation because fever and epigastric pain resolved immediately and percutaneous drainage catheters were not needed before or after surgery.

In conclusion, surgical palliation such as a Roux-en-Y bypass seems to be effective in the treatment of malignant afferent loop obstruction after PD and may improve quality of life in the postprocedural period.

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