

Case Report

Afferent Loop Syndrome after Total Gastrectomy Using Roux-en-Y Reconstruction : A Report of Two Cases

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ABSTRACT

Introduction : Afferent loop syndrome is a postoperative complication of Roux-en-Y or Billroth II reconstruction which occurs owing to elevated internal pressure of an afferent loop.

Case presentation : We report on 2 patients with afferent loop syndrome after total gastrectomy and Roux-en-Y reconstruction for gastric carcinoma. The first patient was an 82-year-old man who had undergone the procedures 2 years earlier. He presented with abdominal distention and pain during hospitalization to treatment pneumonia. Computed tomographic (CT) examination of the abdomen showed pronounced dilatation of the afferent loop. The second patient was a 60-year-old man who presented with epigastralgia and repeated vomiting. CT examination showed obvious dilatation of the afferent loop. Therefore, both patients underwent emergent laparotomy, in which obstruction of the jejunojejunostomy by strangulation and an internal hernia were observed. Both patients underwent adhesiolysis of the obstructed small intestine without intestinal resection. The patients were discharged without severe complications.

Conclusions : If a patient has undergone total gastrectomy and Roux-en-Y reconstruction and then presents with abdominal pain, the possibility of afferent loop syndrome should be considered. Moreover, recognizing a dilated afferent loop with CT is useful for prompt diagnosis of afferent loop syndrome.

(Jikeikai Med J 2019 ; 66 : 47-52)

Key words : afferent loop syndrome, total gastrectomy, Roux-en-Y reconstruction

INTRODUCTION

Afferent loop syndrome is a rare complication of gastrectomy which can occur in patients after Billroth II or Roux-en-Y reconstruction^{1,2}. Afferent loop syndrome has several possible causes, including an internal hernia, strangulation, volvulus, local recurrence, anastomosis stenosis, and bezoars². This condition often induces small bowel ischemia, necrosis, perforation, and severe pancreatitis. To pre-

vent these problems, an accurate preoperative diagnosis and prompt surgical treatment are essential. Afferent loop syndrome can be difficult to diagnose because its symptoms are often nonspecific. If diagnosis is delayed, life-threatening events, such as peritonitis due to bowel necrosis, perforation, and severe pancreatitis, might occur. Here we report on 2 patients who underwent total gastrectomy and Roux-en-Y reconstruction for gastric carcinoma and 2 years later had abdominal pain due to afferent loop syndrome. An

Received : August 5, 2019 / Accepted : October 23, 2019

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ileus operation was performed, and the afferent loop obstruction was successfully repaired with adhesiotomy.

CASE REPORT

Case 1

An 82-year-old man who had undergone total gastrectomy and Roux-en-Y reconstruction was admitted 2 years

later to The Jikei University Daisan Hospital for severe pneumonia. While being treated, the patient complained of abdominal pain and nausea. A computed tomographic (CT) examination revealed small bowel obstruction in the center and the left side of the abdomen (Fig. 1-1). Hematologic examinations showed elevated levels of white blood cells (16,700/ μ l) and hepatobiliary enzymes (Table 1). The patient underwent emergency surgery for small bowel ob-

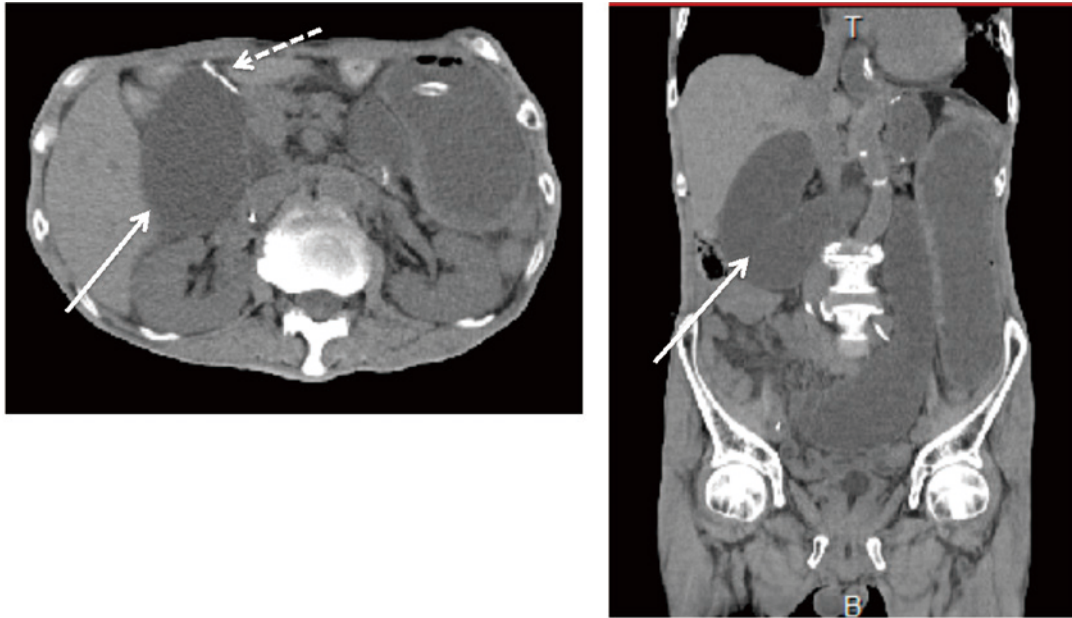


Fig. 1-1. preoperative images of case 1
Abdominal computed tomography on admission revealed dilated duodenal stump (white arrow) with a staple line (dashed arrow).

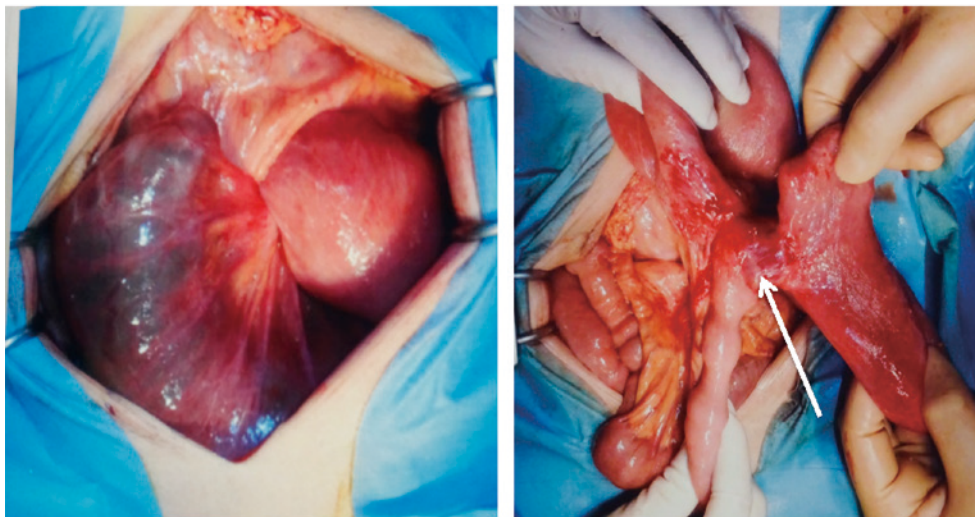


Fig. 1-2. Intraoperative findings of case 1
Operative findings showed that the small bowel was markedly distended over the adhesion band (white arrow) but was not strangulated.

Table 1. Results of blood examination on admission (case 1)

WBC	16,700/ μ L
RBC	346×10^4 / μ L
Hb	11.2 g/dL
Ht	33.2%
Plt	11.4×10^4 / μ L
PT	45%
PT-INR	1.55
APTT	40.8 sec
T-Bil	1.4 mg/dL
D-Bil	0.6 mg/dL
AST	196 IU/L
ALT	182 IU/L
LDH	288 IU/L
γ GTP	91 IU/L
TP	4.4 g/dL
Alb	2.1 g/dL
Amy	24 IU/L
CK	81 U/L
Na	149 mEq/L
K	4.0 mEq/L
Cl	114 mEq/L
BUN	42 mg/dL
Cr	0.73 mg/dL
CRP	6.6 mg/dL

WBC : white blood cell, RBC : red blood cell, Hb : hemoglobin, Ht : hematocrit, Plt : platelet, PT : prothrombin time, PT-INR : prothrombin time-international normalized ratio, APTT : activated partial thromboplastin time, T-Bil : total bilirubin, D-Bil : direct bilirubin, AST : aspartate aminotransferase, ALT : alanine aminotransferase, LDH : lactate dehydrogenase, γ GTP : γ -glutamyl trans peptidase, TP : total protein, Alb : albumin, Amy : amylase, CK : creatine kinase, Na : sodium, K : potassium, Cl : chloride, BUN : blood urea nitrogen, Cr : creatinine, CRP : C-reactive protein

struction. During surgery the jejunum was observed to be extremely dilated over the adhesion band but was not strangulated, and ascites was not massive (Fig. 1-2) ; therefore, adhesiolysis was performed. The patient recovered well and started oral intake on postoperative day 3. The patient was transferred to a rehabilitation facility 13 days after sur-

Table 2. Results of blood examination on admission (case 2)

WBC	5,200/ μ L
RBC	400×10^4 / μ L
Hb	12.5 g/d L
Ht	36.2%
Plt	16.8×10^4 / μ L
PT	69%
PT-INR	1.2
APTT	22.9 sec
T-Bil	1.3 mg/dL
D-Bil	0.6 mg/dL
AST	29 IU/L
ALT	38 IU/L
LDH	289 IU/L
γ GTP	74 IU/L
TP	6.7 g/dL
Alb	4.1 g/dL
Amy	107 IU/L
CK	91 U/L
Na	141 mEq/L
K	3.8 mEq/L
Cl	104 mEq/L
BUN	14 mg/dL
Cr	0.82 mg/dL
CRP	0.1 mg/dL

gery. A follow-up examination 2 years later showed no symptoms.

Case 2

A 60-year-old man had undergone total gastrectomy and Roux-en-Y reconstruction because of gastric cancer. The postoperative course was uneventful until epigastralgia and vomiting suddenly developed 2 year later. The patient was admitted to The Jikei University Daisan Hospital. The general condition progressively worsened, and reason initially suspected was intestinal obstruction due to adhesion or peritoneal dissemination from a recurrent gastric cancer. A CT examination with contrast enhancement showed a dilated afferent loop with ascites (Fig. 2-1). Hematologic ex-

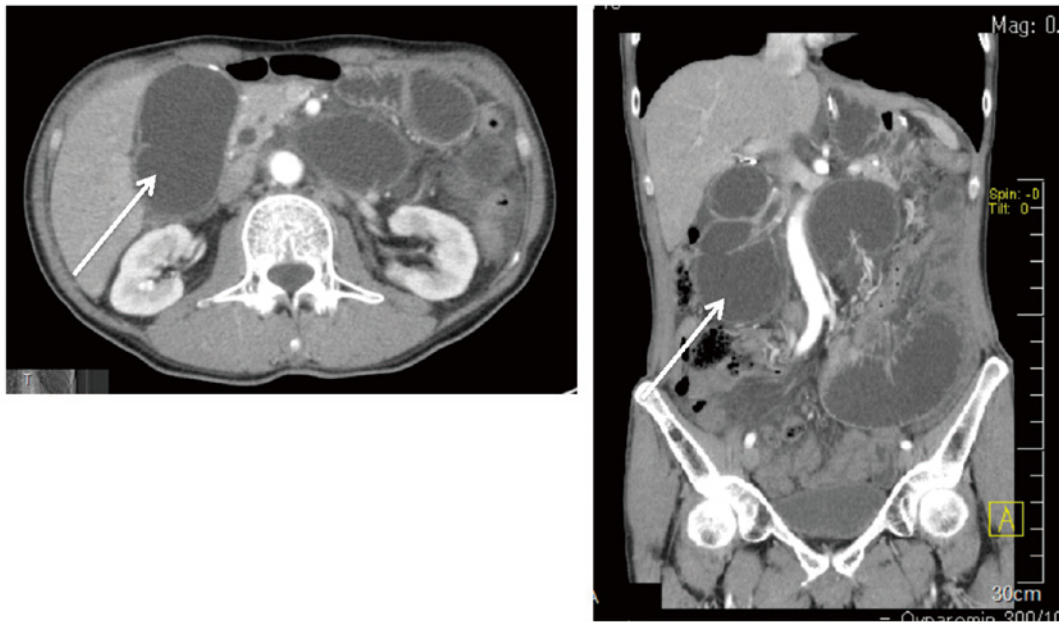


Fig. 2-1. Preoperative images of case 2

Contrast-enhanced abdominal computed tomography on admission revealed a dilated afferent loop with no evidence of an intestinal ischemia (white arrow).

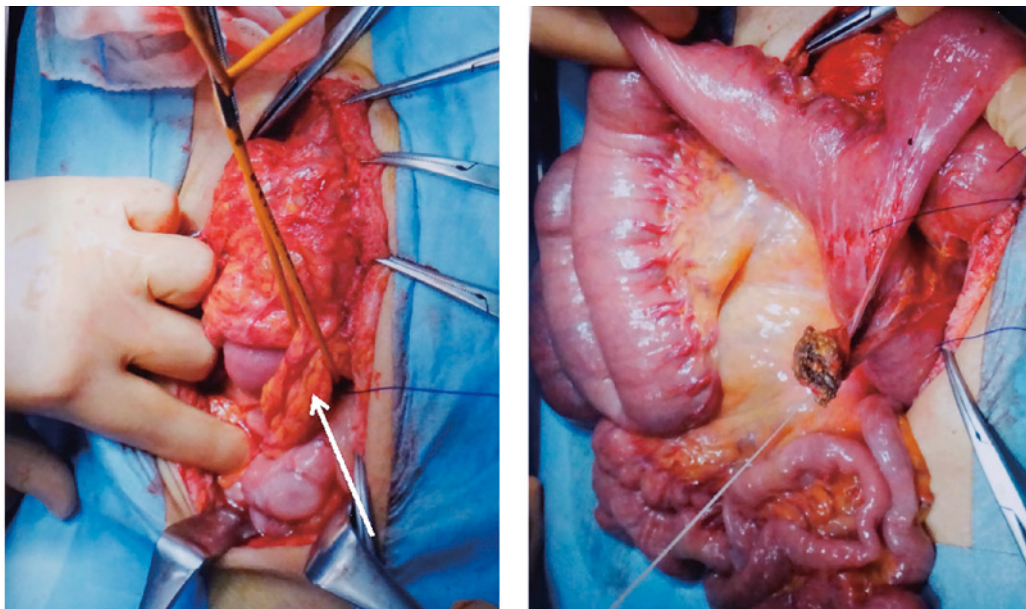


Fig. 2-2. Intraoperative findings of case 2

Operative findings showed an internal herniation of the small bowel through a rent in the mesentery around the Roux-en-Y anastomosis for the jejunojunostomy (white arrow). It had no sign of necrosis or perforation.

aminations showed slightly elevated levels of hepatobiliary enzymes (Table 2). On the basis of these findings, severe afferent loop syndrome was diagnosed. Emergency laparotomy was performed to release the intestinal obstruction. Observed during surgery was internal herniation of the

small intestine through a rent in the mesentery around the Roux-en-Y anastomosis for the jejunojunostomy (Fig. 2-2). The internal hernia was released, and, because ischemia of the small intestine was unlikely, intestinal resection was avoided. The patient was discharged without complica-

tions 9 days after surgery.

DISCUSSION

Afferent loop syndrome is a purely mechanical obstruction following gastrojejunostomy or jejunojunostomy. Afferent loop syndrome was reported in 1971¹ to occur in approximately 0.3% of patients and has recently been reported to have an overall incidence of 2%³. The reported causes of the obstruction in cases of afferent loop syndrome are mechanical obstruction of the afferent limb due to adhesions, internal hernias, volvulus, invagination, intestinal strangulation, incarcerated enterolith, and malignancy⁴. The optimal reconstruction method after total gastrectomy is generally the Roux-en-Y method. However, this method has several disadvantages, such as Roux-Y stasis syndrome⁵. Moreover, if hepatobiliary disease is suspected, endoscopically approaching the ampulla of Vater is extremely difficult^{6,7}.

Afferent loop syndrome can be a fatal condition owing to small bowel necrosis, perforation, or severe pancreatitis unless early intestinal decompression treatment is performed. Therefore, the time from onset to treatment is an important factor in the development of lethal complications of afferent loop syndrome. However, afferent loop syndrome can be difficult to diagnosis because its symptoms are nonspecific and can appear to be due to acute pancreatitis² or cholangitis^{8,9}. Plain abdominal X-ray examinations are often diagnostically useless because they show isolated distensions with little gas^{10,11}. The distended afferent limb might be considered to be a tumor unless it is free of gas. Ultrasonography can possibly be used to exclude other causes of biliary obstructions and to find the location of the dilated loop, characterized by liquid content and multilayer thickened walls, in the upper middle abdomen. Soon after the onset of obstruction, ultrasonography might observe facilitated peristaltic waves¹².

Playing a crucial role in diagnosing afferent loop syndrome is CT. Diagnostic landmarks with CT for afferent loop syndrome are a liquid-filled and U-shaped tubular structure, which does not opacity with oral contrast and usually surrounds the pancreatic head¹³. A common feature of afferent loop syndrome is the valvulae conniventes projecting into the lumen. Also detected as complications of afferent loop syndrome are biliary dilatation, pancreatitis en-

teroliths, and strangulation^{14,15}. In some cases, the use of contrast agents for CT might also help in the diagnosis of intestinal ischemia. If these characteristic findings are appreciated and understood, the risk of misdiagnosis might be reduced^{3,14}.

Once diagnosed, how afferent loop obstruction should be treated depends on its cause and the length of the afferent limb. Therapeutic strategies include surgical procedures, such as curable resection and surgical bypass, and nonsurgical treatments, such as drainage (external or internal), balloon dilation, and stent placement via the oral, direct percutaneous, or percutaneous transhepatic approach¹⁶. Conservative therapy has been unhelpful except for rare cases, such as chronic obstruction, or cases in patients with a disseminated malignancy. The initial treatment of choice has been a surgical procedure, but endoscopic treatment, transhepatic percutaneous enteral stenting, and direct percutaneous tube enterostomy have also been successfully performed^{3,17}. For the present patients, we performed adhesiolysis and repaired the internal hernia without resecting the small intestine.

To prevent afferent loop syndrome from being a complication of Roux-en-Y reconstruction, prophylactic closure of mesenteric defects is considered useful. Suturing with a nonabsorbable thread is reported to reduce the incidence of internal hernia¹⁸. On the other hand, closure of defects has been reported to not be associated with the incidence of internal hernia¹⁹. Therefore, the strategy for preventing hernia remains controversial.

CONCLUSION

If a patient undergoes gastrectomy and Roux-Y reconstruction and then presents with symptoms of intestinal obstruction, afferent loop syndrome should be considered as a differential diagnosis because a delayed diagnosis can lead to a life-threatening condition. In the present patients with afferent loop syndrome, we were able to obtain good outcomes through accurate diagnosis with CT and early intestinal decompression treatment.

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