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# Jejunogastric intussusception after distal gastrectomy with Roux-en-Y reconstruction: A case report

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## ABSTRACT

**INTRODUCTION:** Jejunogastric intussusception is a rare complication after gastric operation. Intussusception after gastric operation occurs mostly at the gastrojejunal anastomosis site and Braun anastomosis site of Billroth II reconstruction, and at the Y anastomosis site of Roux-en-Y reconstruction. However, jejunogastric intussusception after distal gastrectomy with Roux-en-Y reconstruction is very rare. We report a surgical case of jejunogastric intussusception after distal gastrectomy for gastric cancer treatment.

**PRESENTATION OF CASE:** An 82-year-old woman underwent laparoscopic distal gastrectomy for early gastric cancer treatment. Reconstruction was performed using Roux-en-Y anastomosis. Oral intake was started on postoperative day 4, however vomiting and high-grade fever occurred on postoperative day 12, after which oral intake became difficult.

**DISCUSSION:** Anastomotic stenosis of the gastrojejunostomy was suspected, and various examinations were performed. Gastroendoscopy and computed tomography revealed an elevated lesion with ring-like folds protruding through the anastomosis site into the remnant stomach. Reoperation was performed on postoperative day 28 after a diagnosis of jejunogastric intussusception was made. It failed to reduce the intussusception, so partial resection of the gastrojejunal anastomosis was performed and Roux-en-Y reconstruction was repeated. Reconstruction was conducted after taking into consideration the recurrence of intussusception.

**CONCLUSION:** Jejunogastric intussusceptions after distal gastrectomy is a rare complication; however, when it occurs, early diagnosis and appropriate management are necessary.

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## 1. Introduction

Intussusception occurs in patients of various ages because of various factors. It may appear as a complication after gastric operation [1]. Jejunogastric intussusception (JGI) is a rare complication after gastrectomy that has been reported to occur in only 0.07–2.1% of patients [2]. We present a case of JGI after distal gastrectomy with Roux-en-Y reconstruction. Presented case has been reported in line with the SCARE criteria [3].

## 2. Case presentation

A 82-year-old woman experienced epigastralgia and was admitted to a primary care hospital. She underwent upper gastrointestinal (GI) endoscopy, which showed an ulcerative lesion in the

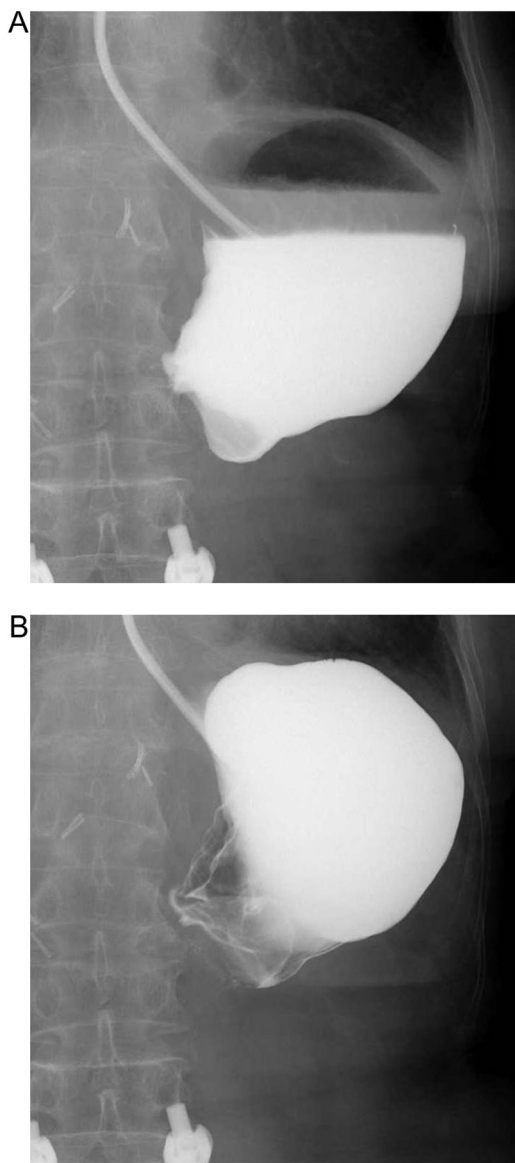
gastric antrum. After endoscopic biopsy, the lesion was diagnosed as well-differentiated adenocarcinoma; therefore, she was referred to our institution. Because computed tomography (CT) revealed no lymph node metastasis and distant metastasis, we diagnosed her condition as early gastric cancer and planned a laparoscopic distal gastrectomy.

The patient underwent laparoscopic-assisted distal gastrectomy with Roux-en-Y reconstruction at the retrocolic route. Gastrojejunal anastomosis was created using linear staplers. After a 40-cm limb was made from the jejunum, the greater curvature of the remnant stomach and Roux limb was anastomosed in an end-to-side fashion. The gastrojejunal anastomosis was fixed with sutures at the hole of the mesentery of the transverse colon. The distance of the blind-end of the jejunal stump from the anastomosis was approximately 30 mm.

Oral intake was started on postoperative day 4. However, vomiting and high-grade fever occurred on postoperative day 12. The patient was diagnosed with pneumonia caused by aspiration, oral intake was stopped, and she received an infusion solution. Because pneumonia improved on postoperative day 18, oral intake

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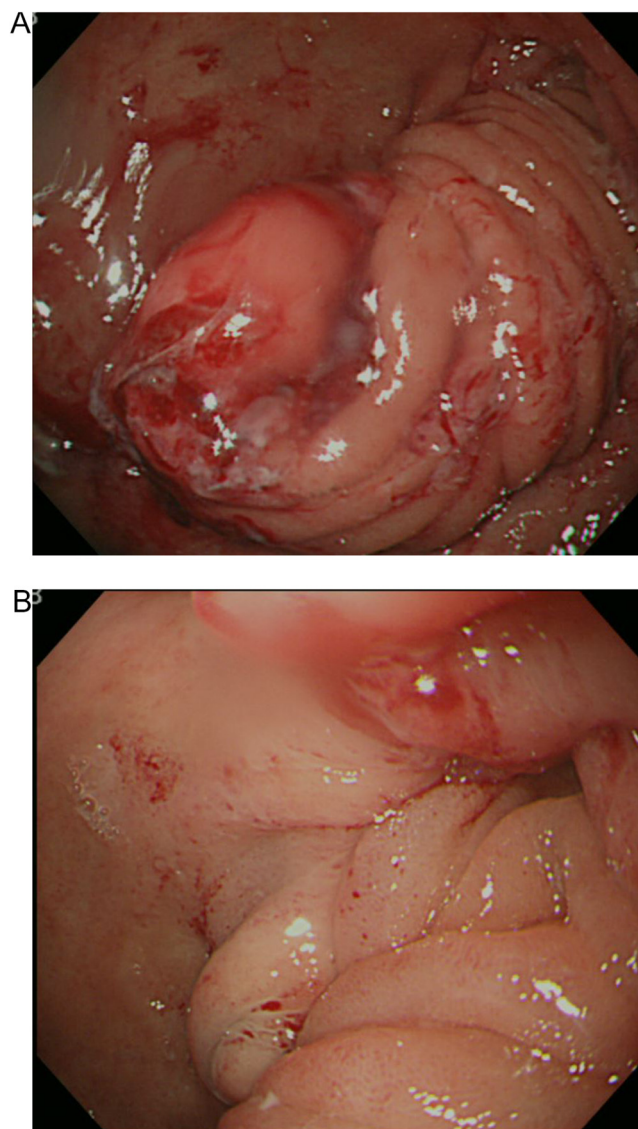
E-mail address: [fkawano@med.miyazaki-u.ac.jp](mailto:fkawano@med.miyazaki-u.ac.jp) (F. Kawano).



**Fig. 1.** Upper gastrointestinal series showing a dilated gastric pouch with air-fluid level (A) and an elevated lesion projecting into the stomach at the anastomosis site (B). No passage of the anastomosis site was observed even when applying pressure onto the stomach.

was restarted; however, vomiting and epigastric distension reappeared. Gastrojejunostomy stricture was suspected and an upper GI series was performed, which revealed a dilated gastric pouch with air-fluid level and no passage of the Roux-en-Y limb (Fig. 1). Furthermore, the gastrojejunal anastomosis site had an elevated lesion. Gastroendoscopy revealed elevated lesion with ring-like folds protruding through the anastomosis site into the remnant stomach, and anastomotic stenosis in the gastrojejunal anastomosis site (Fig. 2). The elevated lesion had a green caterpillar-like appearance, and it was suspected to be the turned-over jejunum of the Roux-en-Y limb. The endoscope could not pass through the anastomosis site. CT also showed the elevated lesion protruding into the remnant stomach (Fig. 3).

JGI was diagnosed based on examination findings. Because there was no ischemia of the anastomosis site, endoscopic reduction of JGI was attempted twice; however, both attempts were unsuccessful. Owing to the patient's chronic course and JGI improvement could not be expected, reoperation was planned.



**Fig. 2.** Gastrointestinal endoscopy showing an elevated lesion with ring-like folds protruding, and with a green caterpillar-like appearance, through the anastomosis site into the remnant stomach (A). The anastomosis site was stenosed, and an endoscope could not pass through it (B).

The patient underwent relaparotomy on postoperative day 28. Extensive adhesion in the upper abdominal quadrant was recognized, and adhesiotomy to expose the remnant stomach was necessary. We attempted to reduce the intussusception, but failed because of sclerosis of the gastrojejunal anastomosis. Therefore, partial remnant gastric resection including that of the gastrojejunal anastomosis of the Roux-en-Y limb was done, and Roux-en-Y reconstruction was performed again. Gastrojejunal anastomosis was created in an end-to-side fashion using linear staplers, as in the initial operation. The length of the afferent jejunal stump was made as short as possible. To prevent thickening of the afferent jejunal stump, seromuscular suturing of jejunal stump was not performed. Owing to prevent inversion, the jejunal stump was sutured and fixed to the remnant stomach.

The resected specimen showed that the jejunal stump was inverted into the remnant stomach and had a polypoid lesion resembling a spring coil. Microscopic observation showed that—the intestinal mucosa, submucosa, and muscularis propria were completely converged, and chronic inflammatory infiltration and fibrosis were present. Foreign body granulomatous reaction with



**Fig. 3.** Abdominal computed tomography scan showing the elevated lesion protruding to the remnant stomach (A). A metallic piece which seems to be linear stapler was recognized inside the elevated lesion (B).

suture materials was observed at the center of the leading point. Ischemic and necrotic changes were not found (Fig. 4).

There was no recurrence of intussusception postoperatively. However, stenosis of the gastrojejunal anastomosis occurred and the patient needed tube feeding. The stenotic symptom gradually improved, and oral intake became possible. She recovered and was discharged 30 days after the reoperation. She has survived for 7 years postoperatively without abdominal symptoms.

### 3. Discussion

Currently, anastomotic problems after gastrectomy are the most concerning complications. It is necessary to detect gastroduodenal or gastrojejunal anastomosis because they make oral intake difficult. JGI was first reported by Bozzi [4] in a patient who underwent gastrojejunostomy. Thereafter, there have been <200 cases reported in literature from 2000 to 2010 [5], and the incidence rate is only 0.07–2.1% [1,6,7].

In most reports, intussusception after gastrectomy occurred at the gastrojejunal anastomosis site and Braun anastomosis site of Billroth II reconstruction, and Y anastomosis site of the Roux-en-

Y reconstruction. Reports on gastric bypass in bariatric surgery are also increasing. However, JGI after distal gastrectomy with Roux-en-Y reconstruction is very rare. Currently, Roux-en-Y reconstruction after distal gastrectomy is generally accepted operation method in Japan. Three cases of intussusception occurring after distal gastrectomy with Roux-en-Y reconstruction, besides the current cases, have been reported to dates [8–10].

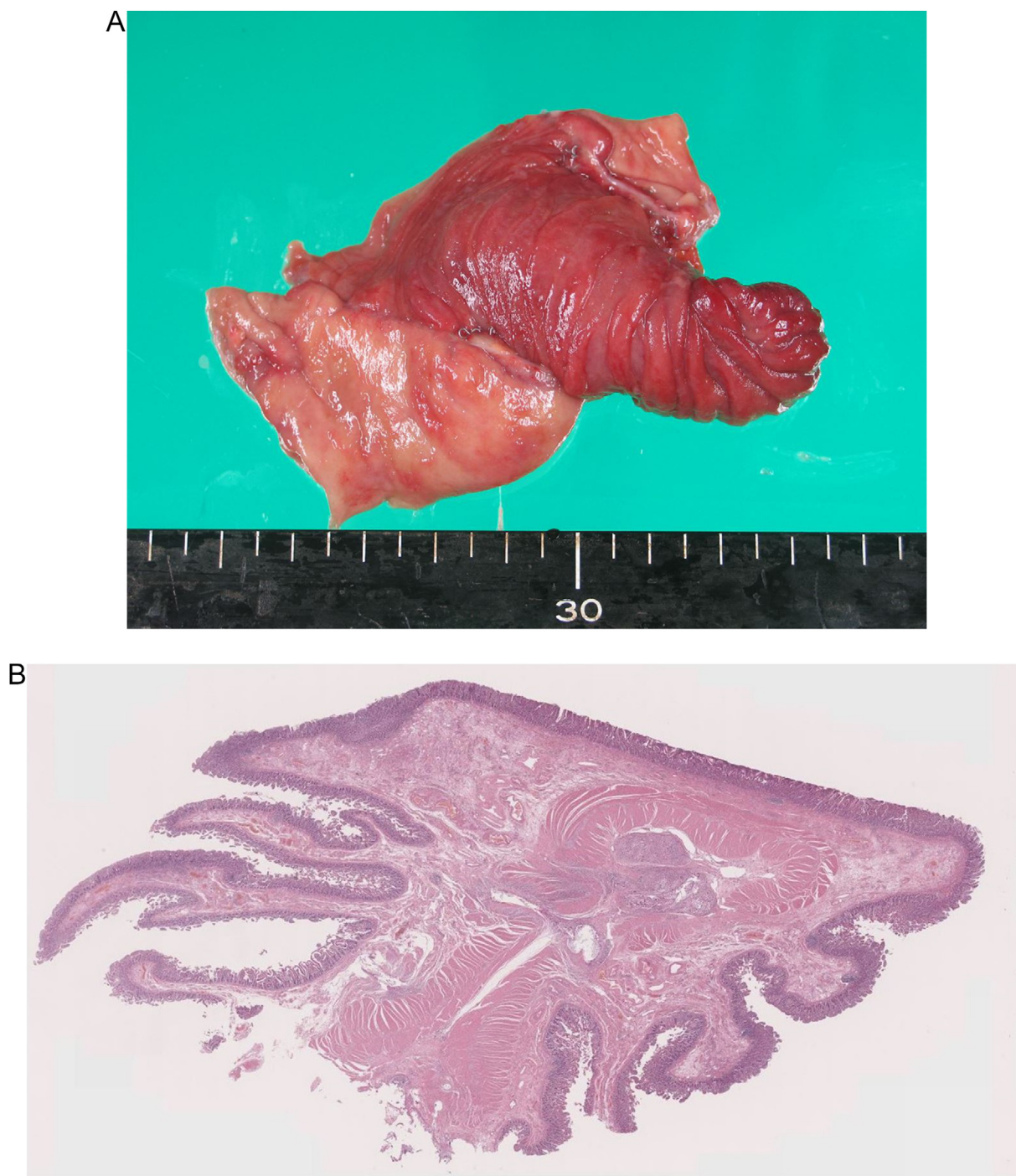
Various factors cause intussusception after gastrectomy. Kitasato et al. [7] reported that intussusception is caused by both mechanical and functional factors. It is believed that JGI is related to excessive lifting of the jejunal stump, excessive peristalsis, a large anastomosis hole and other factors in Roux-en-Y reconstruction after distal gastrectomy. The intussusception has an isoperistaltic direction into the remnant stomach, and burying of the jejunal stump in the Roux-en-Y anastomosis creates a lump and become the tip of the intussusception. Therefore, the length of the jejunal stump and a large anastomosis hole are also causative factors. Although there are other contributing factors, it seems that they are related to and overlapping with each other.

The period from gastric operation to the occurrence of intussusception varies widely. In past reports, the period ranged from 5 days to 25 years [6,11]. Early diagnosis of JGI is important but difficult [4]. The classic triad of acute JGI includes epigastric pain, vomiting, and a palpable mass; however, this presents in only 50% of patients [12]. It was believed that constriction of the gastrojejunal anastomosis site postoperatively leads to this complication. However, JGI was diagnosed only through an upper GI series in this case. The most important diagnostic tool is upper GI endoscopy for visualization of anastomosis and intraluminal lesions. Endoscopic examination usually recognizes lesion protruding into the stomach. Although there are differences in the macroscopic appearance depending on the degree or ischemia of the intestinal intussusception, characteristic features are observed in many cases. The lesion shows a spring-like and green caterpillar-like appearance, protruding through the anastomosis site into the stomach. The characteristic findings were observed in this case, which made the diagnose is easy. CT is also useful, and it is important in determining JGI as suspected cause in cases of lesions protruding from anastomosis site [13]. If a protruding lesion is continuous with the jejunum or has a metal piece and calcification inside the tissue, JGI should be strongly suspected.

The treatment for JGI is reduction of the intussusception or resection of the anastomosis site. Endoscopic reduction of JGI has been reported in some cases [14,15]. If endoscopic reduction is successful, surgical treatment may be avoided. However, there is a significant risk of recurrence after endoscopic reduction [16]. Furthermore, when peritoneal signs and enteric ischemia are suspected, endoscopic treatment should not be suggested [12,17]. Therefore, surgical treatment is necessary in many cases. The surgical method, including reduction of the limb and resection, take-down, and revision of the anastomosis, depends on the intraoperative findings [18]. In the early period after onset and in the absence of ischemia of the gastrojejunal anastomosis site, reduction of intussusception may be attempted. We decided that resection of the anastomosis site and reconstruction were necessary to prevent recurrence. For acute JGI with peritonitis and ischemic sign, prompt surgical intervention is crucial for successful outcomes [2]. Loi et al. [12] reported that emergency surgery within 48 h can lead to a better prognosis and the mortality rate is about 10%. The timing of surgical intervention should be carefully decided.

It is also necessary to pay attention to JGI prevention. As mentioned earlier, it is desirable to avoid an excessive length of the afferent jejunal stump in the anastomosis site, a thickened jejunal stump, and a large anastomosis hole. Since experiencing this case, we have been performing surgery with an appropriate length of the afferent jejunal stump, avoiding seromuscular suturing of





**Fig. 4.** Macroscopically, the jejunal stump was inverted into the remnant stomach and showed a polypoid lesion resembling a spring coil (A). Microscopically, the intestinal mucosa, submucosa, and muscularis propria were completely covered and foreign body granulomatous reaction with suture materials was observed in the center of the leading point (B).

the jejuna stump, and the jejunal stump was sutured and fixed to the remnant stomach. Although JGI does not occur in all cases, it is necessary to eliminate the generation factors as much as possible.

#### 4. Conclusion

This case highlights that JGI is a rare complication after distal gastrectomy; however, it requires early diagnosis and appropriate management. In the presence of abdominal pain and vomiting after

gastrectomy, JGI should also be considered in the differential diagnosis. It is also necessary to pay attention to JGI prevention during gastrectomy.

#### Conflict of interest statement

I have no conflicts of interest to disclose concerning this case report.

## Funding

I have no funding and sponsors associated with this case report.

## Ethical approval

The ethical approval has been exempted as it was not necessary in this case report by our institution.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contributions

Fumiaki K contributed to operation, follow-up and writing the manuscript.

Yoshiro F, Takuto I, Shinsuke T, Kunihide N and Atsushi N contributed to writing the manuscript.

Kousei T and Hironobu N contributed to operation.

## Guarantor

Fumiaki Kawano.

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