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# Extreme dilatation of the interposed jejunal pouch after proximal gastrectomy associated with portal venous gas: A case report



Michinaga Takahashi\*, Shinji Goto, Tatsuya Ueno, Kentaro Shima, Koetsu Inoue, Daisuke Douchi, Orié Nishina, Hiroo Naito

Department of Surgery, South Miyagi Medical Center, 38-1 Aza Nishi, Ogawara, Shibata-gun, Miyagi, 989-1253 Japan

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## ABSTRACT

**INTRODUCTION:** The jejunal pouch interposition (JPI) after proximal gastrectomy (PG) was proposed as a reconstructive procedure to provide a gastric reservoir substitute and prevent postgastrectomy syndrome. However, food residue remaining in some of the pouches resulted in the adverse effect of abdominal bloating, thereby body weight loss. Here, we report a rare case with an extreme dilation of the interposed jejunal pouch (JP) 8 years after PG, requiring pouch resection.

**PRESENTATION OF CASE:** A 65-year-old-man who had undergone PG with an inverted U-shaped JPI for early gastric cancer 8 years previously, suffered from shock after right hip joint implantation. Abdominal enhanced CT scan revealed an extremely dilated JP accompanied by portal venous gas. After 5 months of conservative therapy, he underwent resection of the JP and gastric remnant with Roux-en-Y esophago-jejunosomy reconstruction. After the operation, the patient has remained in good health for over 3 years.

**DISCUSSION AND CONCLUSION:** Long-term operative outcome following pouch operation for gastric cancer still remains controversial. Surgical intervention should be considered when we encounter patients who have refractory pouch dilatation after surgery for gastric cancer.

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## 1. Introduction

Most studies on the reconstruction procedures after total gastrectomy (TG) or proximal gastrectomy (PG) have revealed that jejunal pouch interposition (JPI) is superior to the esophagogastrotomy, esophagojejunostomy, or jejunal interposition (JI) without pouch, in terms of food intake, body weight gain and postgastrectomy symptoms [1–7]. However, some studies have reported no benefit of JPI because of less food intake or more food residue in the pouch [8,9]. Herein, we report a rare case of an extreme dilation of the interposed jejunal pouch (JP) associated with shock state and portal venous gas (PVG) 8 years after PG. The patient was restored from the complication by the resection of the pouch and gastric remnant. The work has been reported in line with the SCARE criteria [10].

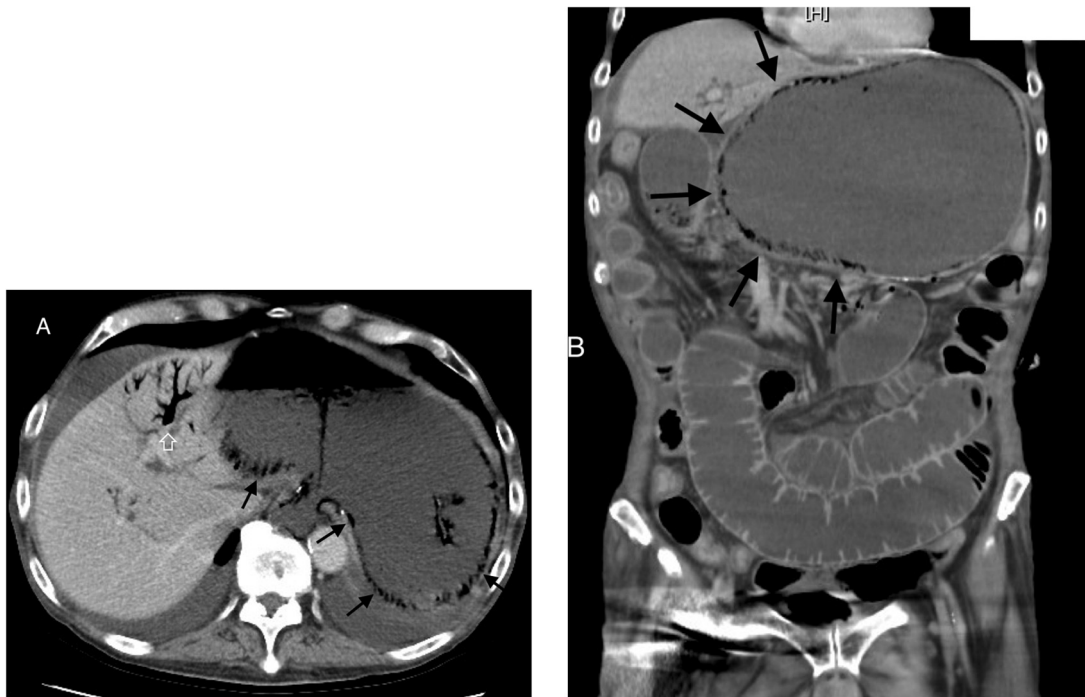
## 2. Presentation of case

A 65-year-old Japanese man, who had undergone PG with an inverted U-shaped JPI for the treatment of early gastric cancer 8 years ago, was admitted to our hospital for traumatic right femoral neck bone fracture. Before proposing operation in our orthopedic department, the patient was diagnosed with intestinal obstruction with the pouch dilatation. After recovering from this condition once, however, he suffered from shock state 7 days after hip joint implantation, and was referred to our department. Two years prior to this episode, he had experienced a similar shock state accompanied by pouch dilatation, and was treated with conservative therapy.

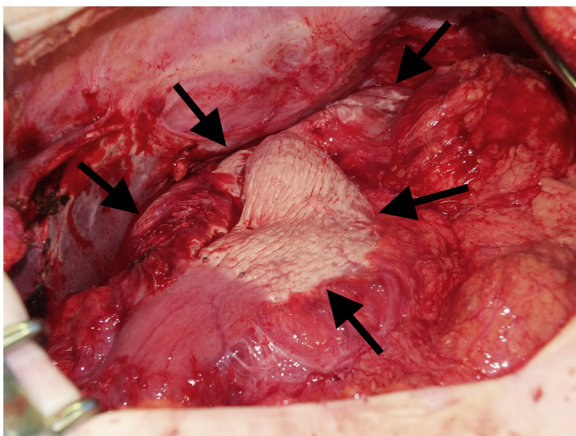
The patient was malnutrition with body mass index as low as 17.4. His blood pressure, heart rate, body temperature, and oxygen saturation were 53/36 mmHg, 101 bpm, 38.0 °C, and 99%, respectively. His abdomen was markedly distended with tenderness in the epigastric region, and bowel gurgling was silent. Laboratory examinations revealed acute inflammation with mild coagulation impairment. White blood cell, hemoglobin, and C-reactive protein levels were 21,400/μL, 9.6 g/dl, and 18.25 mg/dl, respectively. Liver and renal functions were not impaired, but total protein level was decreased to 3.66 g/dl. Abdominal contrast-enhanced CT scan revealed an extremely dilated JP and upper jejunum accompanied

\* Corresponding author.

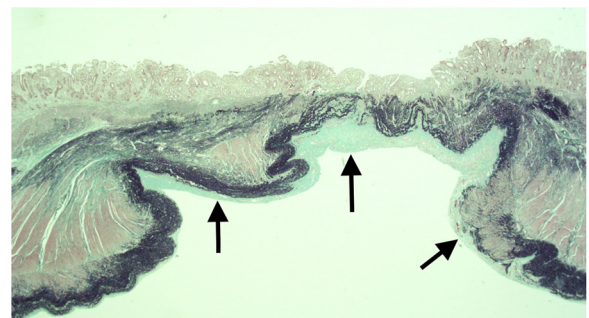
E-mail addresses: [michi-33@cb3.so-net.ne.jp](mailto:michi-33@cb3.so-net.ne.jp) (M. Takahashi), [s.goto@southmiyagi-mc.jp](mailto:s.goto@southmiyagi-mc.jp) (S. Goto), [t.ueno@southmiyagi-mc.jp](mailto:t.ueno@southmiyagi-mc.jp) (T. Ueno), [shima@surg1.med.tohoku.ac.jp](mailto:shima@surg1.med.tohoku.ac.jp) (K. Shima), [koetsu0303@surg1.med.tohoku.ac.jp](mailto:koetsu0303@surg1.med.tohoku.ac.jp) (K. Inoue), [d.douch@surg.med.tohoku.ac.jp](mailto:d.douch@surg.med.tohoku.ac.jp) (D. Douchi), [occhanmail0630@gmail.com](mailto:occhanmail0630@gmail.com) (O. Nishina), [h.naito@southmiyagi-mc.jp](mailto:h.naito@southmiyagi-mc.jp) (H. Naito).



**Fig. 1.** Axial (A) and Coronal (B) contrast-enhanced CT scan revealed an extremely dilated jejunal pouch accompanied by pneumatosis cystoides intestinalis (black arrow) and portal venous gas (white arrow) in the left hepatic lobe.



**Fig. 2.** Intraoperative picture showed a fibrous inverted U-shaped jejunal pouch with a whitish surface (black arrow).



**Fig. 3.** Elastic fibers (black-blue fibers) in the muscularis mucosae and the subserosa multiplied significantly, accompanied by diffuse fibrosis of the muscularis propria of the pouch. Collagen fibers (greenish fibers; black arrow) also multiplied at the serosal site. (Elastica-Masson stain  $\times 20$ ).

by pneumatosis cystoides intestinalis (PCI) in the pouch and PVG in the left hepatic lobe (Fig. 1A and B). He was diagnosed to have septic shock accompanied by PCI with PVG. Continuous decompression of the pouch via nasogastric tube and intravenous fluid infusion improved his condition promptly, but the pouch dilatation recurred soon after oral meal was ingested. After experiencing this condition repeatedly for 5 months, the patient consented to undergo resection of the pouch.

Laparotomy revealed a fibrous inverted U-shaped JP with a whitish surface (Fig. 2). The pouch was removed with gastric remnant, and conventional Roux-en-Y esophagojejunostomy reconstruction was performed. Macroscopic findings did not show any ulcerogenic or neoplastic lesion in resected pouch having 12 cm length. Histopathologic findings showed multiplying elastic fibers in the muscularis mucosae and subserosa accompanied by diffuse fibrosis of the muscularis propria. Collagen fibers had multiplied

significantly at the serosal site (Fig. 3), suggesting an intraoperative whitish appearance of the pouch.

The patient postoperatively had respiratory failure requiring a respirator for a week, and was discharged from the hospital 48 days after the operation. The patient has remained in good health with his food intake and body weight increasing for over 3 years.

**3. Discussion**

Many reconstruction techniques for the restoration of intestinal continuity after various type of gastrectomy have been proposed for the prevention of postgastrectomy syndromes [1,2].

The JPI after TG or PG was proposed as a reconstructive procedure to provide a gastric reservoir substitute and prevent postgastrectomy syndrome [1–4]. Short- and medium-term operative outcomes following JPI after PG seem to be superior to the conventional esophagogastrostomy or JI without pouch, regarding food intake, body weight and reflux esophagitis [5–7]. On the other hand, several reports indicated adverse effects of the JPI, causing more body weight loss [8,9], less food intake [8], and more food

residue in the pouch [9]. Refractory dilatation of the pouch after PG sometimes requires pouch resection [11,12]. Advantages in post-operative quality of life for JPI following PG decrease over time and become almost similar to those of conventional Roux-en-Y esophagojejunostomy after long-term follow-up [7].

Small intestinal motility plays a key role in the development of pouch dilatation. The migrating motor complex (MMC) is a cyclic pattern of phasic contractions present during the interdigestive state [1,13]. The MMC cycle is divided into four distinct phases, and phase III is considered to be a period of strong contractions to propel food to the aboral direction [13]. Mochiki et al. [8], revealed that the inverted J-shaped JPI following TG rarely developed phase III of the MMC or fed state compared to the patients with JI without pouch. Endo et al. [14] indicated that the lesser frequency and duration of bursts of contractile activity in the inverted J-shaped JPI after TG correlates with less food intake and slower pouch emptying. Because both the inverted U-shaped and the J-shaped pouches have an anti-peristaltic jejunal segment with a longitudinal incision, the characteristics of pouch motility seem almost identical to those present in motility disorders, showing fewer occurrence of phase III or bursts of contractile activity [8,14]. Thus, a certain proportion of the inverted U-shaped JPI after PG could not empty the food into the duodenum through the antrum, where the contractile activity is greater than that in the jejunum [1,13]. Impaired motility of the JPI might be one of the major causes of the pouch dilatation, although the length of the pouch might also affect pouch emptying [15]. In our case, the length of the pouch was 12 cm, which was not larger than past reported cases with good postoperative outcomes [5–7].

In histopathologic study, we found multiplying elastic and collagen fibers with extraordinary fibrosis of the pouch, which differed from the findings of the reported cases showing muscle layer hypertrophy [11], and thin walls with chronic inflammation [12]. The frequency and the severity of the pouch dilatation as well as different intervals between the initial operation and the pouch resection (8 years in our patient and 3.0 years [11] and 4.5 years [12] in past series) may be related to these different findings.

PVG with/without PCI was previously considered a lethal prognosis in gastrointestinal diseases. However, a recent study has revealed that PVG-PCI is not always associated with the intestinal necrosis, and surgical intervention is not necessary in many cases [16]. The causes of PVG-PCI were categorized into three pathogeneses: (1) infection, (2) intestinal mucosal damage with increased intraluminal pressure, and (3) mixed type [17]. The extreme pouch dilatation in our case seemed to have resulted from the increased intraluminal pressure due to chronically impaired motility of the pouch. This increased pressure contributed to mucosal impairment of the dilated pouch, leading to PVG-PCI. Simultaneous bacterial translocation associated with mucosal damage is the likely cause of the septic shock. The prompt recovery from the shock state after decompression of the pouch lends support to the above theory.

#### 4. Conclusion

We have presented a rare case of extreme dilatation of the inverted U-shaped JPI after PG. The patient recovered quickly by conservative therapy, but pouch dilatation recurred soon after resuming oral ingestion. Resection of the pouch and the gastric remnant with Roux-en-Y esophagojejunostomy reconstruction improved pouch-related symptoms dramatically. Early surgical intervention should be considered when patients who have undergone pouch operation for gastric cancer are suffering from refractory pouch dilatation.

#### Conflict of interest

All of the authors declare that they have no conflict of interest.

#### Funding

None.

#### Ethical approval

The clinical research approval committee in our hospital approved the manuscript. The committee's reference number was #16-11.

#### Author contribution

MT drafted the manuscript. SG and TU carried out the operation and postoperative management. HN reviewed and edited the manuscript. All authors read and approved the final manuscript.

#### Consent

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

#### Guarantor

Michinaga Takahashi.

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