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## Double PTEG (percutaneous trans-esophageal gastro-tubing) was useful in nutrition and decompression for a gastric cancer patient with pyloric stenosis: a case report

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### ABSTRACT

#### Background

For gastric cancer patients with strong pyloric stenosis, decompression by nasogastric tube insertion for gastric distension and central venous nutrition management have been performed. However long-term indwelling of the nasogastric tube is accompanied by pain, and Central venous catheter placement is inferior to enteral nutrition from infection risk and nutritional viewpoint. Furthermore, these generally require management in hospitalization.

#### Case presentation

An 81-year-old male was referred to our hospital for gastric cancer accompanied by pyloric stenosis. Blood test resulted in low nutrition and anemia. CT showed thickening of the wall from the anterior gastric part to the pylorus and enlargement of 50mm in the regional lymph node, and gastric distention. We planned resection after preoperative chemotherapy. We performed double PTEG (Percutaneous Tran Esophageal Gastro-tubing) from cervical co-wound for decompression and nutrition management of the stomach. Total laparoscopic gastrectomy was performed on day 114 after insertion of the double PTEG. During which time he had been good nutrition and no gastric distention with stayed at home for 42 days. On the 10th postoperative day, he was clinically released from hospital without any complications.

#### Conclusions

We conducted a new management to reduce and nourish patients with gastric cancer who had a pyloric stenosis by double PTEG (percutaneous trans-esophageal gastro-tubing), and can perform curative surgery after preoperative chemotherapy including home management period.

**Keyword:** Pyloric stenosis; Gastric cancer; Nutrition management; Decompression; PTEG; Double PTEG

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## Background

Gastric cancer patients with pyloric stenosis require both gastric decompression and nutritional management. Even if the patient is eligible for surgery, decompression is required for a long time beforehand. Conventionally, decompression has been performed using a nasogastric tube, but this is uncomfortable for the patient, causing throat discomfort and other symptoms.

Patients are also incapable of oral ingestion, and must be managed nutritionally by other methods. Intravenous hyperalimentation (IVH) has generally been used, but carries a risk of central venous (CV) catheter infection.<sup>[3]</sup> IVH is also inferior to enteral nutrition as a nutritional technique. As nutritional status affects surgical outcome, IVH is insufficient for preoperative nutritional management.<sup>[4]</sup> Nasogastric tube use and IVH also generally require hospitalization.

To resolve these problems, we used double percutaneous transesophageal gastrotubing (PTEG) inserted via a single incision for decompression and nutritional management as a new form of management in a patient with gastric cancer and pyloric stenosis, and successfully performed curative surgery following preopera-

tive chemotherapy including a period of management at home.

## Case presentation

An 81-year-old man presented at a local clinic complaining of loss of appetite and heartburn. Upper gastrointestinal endoscopy revealed that this was due to a tumor in the lesser curvature of the gastric antrum, which was causing pyloric stenosis. He was referred to our department and immediately admitted for treatment.

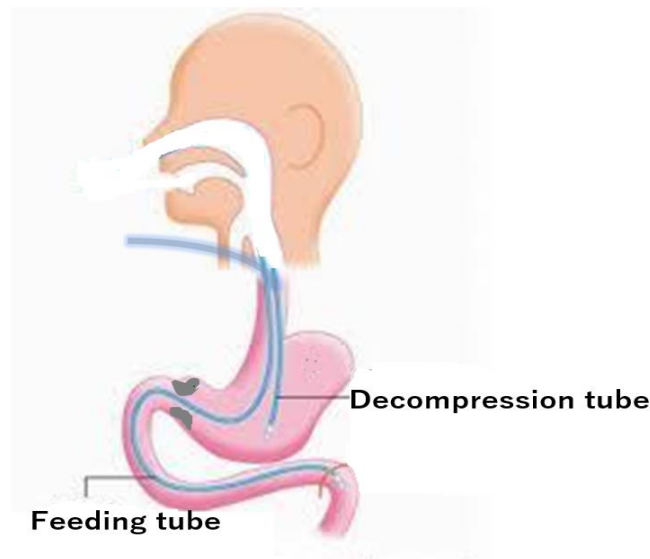
Upper gastrointestinal endoscopy revealed a type 2 lesion extending from the gastric angle to the lesser curvature of the antrum, with associated pyloric stenosis. The endoscope (GIF-H290Z) was unable to pass through the pylorus.

Blood biochemistry tests revealed malnutrition, with albumin 2.9 g/dl, retinol-binding protein 0.7 mg/dl, and prealbumin 6.3 mg/dl, and mild anemia, with Hb 8.2 g/dl. Body weight was 59.8 kg. Thickening of the gastric wall from the antrum to the pylorus and associated gastric dilatation were evident on computed tomography (CT). Regional lymph node enlargement was present, with the No. 3 lymph node measuring 50 mm and the No. 6 lymph node 30 mm in size. No signs of distant metastasis were apparent (Figure 1).



**Figure 1.** The gastric wall was thickened from the antrum to the pylorus, and the stomach was dilated. Pronounced lymph node enlargement was evident.

The patient was suitable for preoperative chemotherapy, and double PTEG was inserted for the dual purposes of decompression and nutrition (Figure 2).

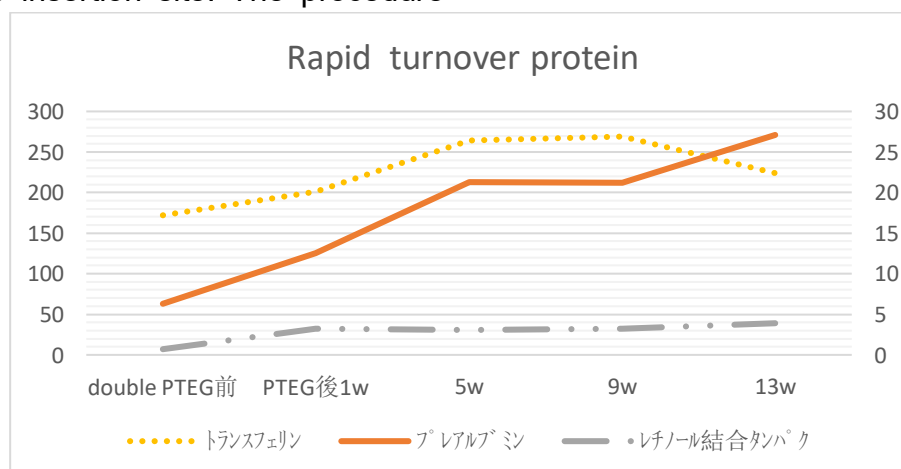


**Figure 2.** The double PTEG insertion site. a) 15-Fr PTEG tube; b) 12-Fr internal drainage tube.

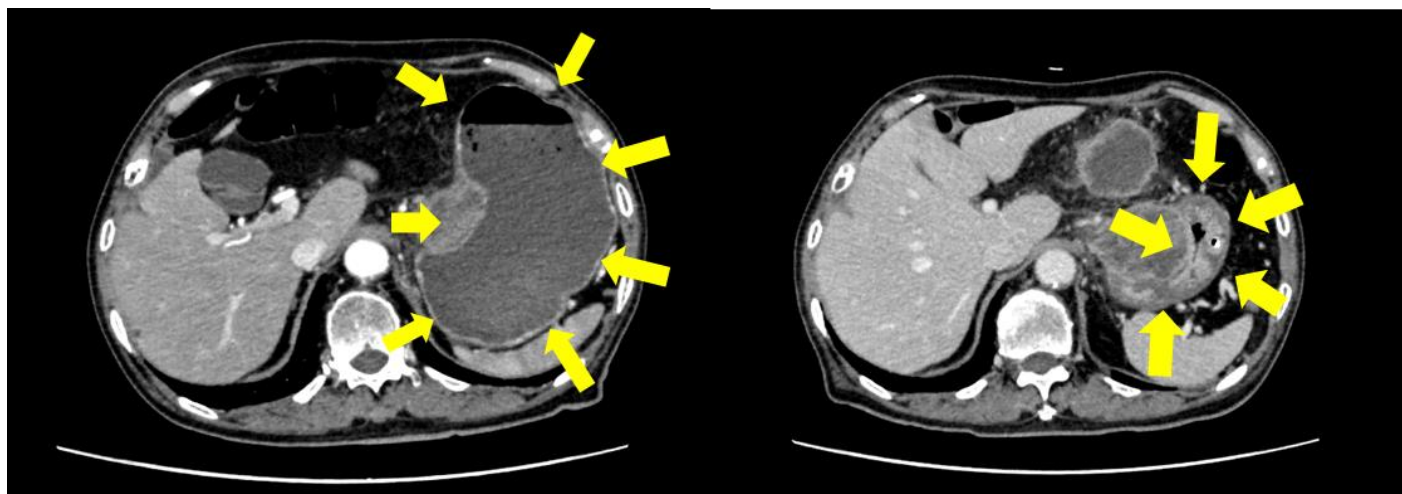
The following procedure for double PTEG insertion was used. A PTEG Kit® (Sumitomo Bakelite, Tokyo) was used. Following the normal PTEG procedure, a guidewire was inserted into the stomach, after which a dilator was inserted over the guidewire and a further, thicker-diameter guidewire was also inserted as far as the stomach. A sheath was inserted over the second guidewire, and the guidewire was advanced to a point approximately 10 cm on the anal side from the ligament of Treitz. These guidewires were then used to place a 15-Fr PTEG tube in the jejunum for nutritional purposes and a 12-Fr internal drainage tube in the stomach for decompression, and these were anchored at the insertion site. The procedure

took 35 min. No intraor postoperative complications were encountered.

Nutritional management comprised 1,500 kcal/day of predigested diet plus 1,000 ml/day of fluids, administered from the day after double PETG insertion to the day before surgery. Albumin improved from 2.9 g/dl to 3.7 g/dl, retinol-binding protein from 0.7 mg/dl to 3.9 mg/dl, and prealbumin from 6.3 mg/dl to 27.1 mg/dl (Figure 3). Weight loss was small, with weight decreasing from 59.8 kg on admission to 57.7 kg before surgery. Good gastric decompression was achieved with the decompression tube (Figure 4).



**Figure 3.** After double PTEG insertion, feeding with enteral nutrition at 1,500 kcal/day increased the level of RTPs.



**Figure 4.** Good decompression was achieved via the 15-Fr PTEG tube inserted during double PTEG insertion.

Chemotherapy comprised 2 courses of TS1 plus CDDP, after which clear contraction of the lymph nodes occurred. Preoperatively, the patient spent 42 days at home, and laparoscopic total gastrectomy was performed on Day 114 after double PTEG insertion. During the procedure, the double PTEG was replaced with a regular PTEG, and enteral nutrition was started soon after surgery. There were no postoperative complications.

## Discussion

This case used double PTEG, a new management technique based on PTEG, to manage a gastric cancer patient with pyloric stenosis.

PTEG was proposed in 1994 and developed by Oishi *et al.* as a method of intestinal decompression for the palliative care of patients with intestinal obstruction due to carcinomatous peritonitis, and is now also used as enteral nutrition tubing. [1] Percutaneous access is a non-surgical, non-endoscopic procedure carried out under ultrasound and fluoroscopic guidance. The PTEG insertion site is not in the peritoneum, and so this procedure can also be performed for patients with severe ascites or tumor infiltration of the anterior gastric wall, which are contraindications for percutaneous endoscopic gastrostomy (PEG). This procedure has been suggested as a useful and safe alternative to PEG for decompression and enteral nutrition in

patients with intestinal obstruction due to malignant tumor. [2]

We performed the new management technique of double PTEG for our patient. No complications were associated with the insertion procedure, which required only a short time. After insertion, good decompression was achieved, and no symptoms of nausea, vomiting, or abdominal distension were evident during the long period until surgery. Adequate decompression also contributed to the absence of postoperative suture failure.

The use of enteral nutrition for nutritional management increased levels of rapid-turnover proteins (RTPs) and albumin. One of the double PTEG tubes was left in place postoperatively on the anal side of the anastomosis site, enabling successful nutritional management by enteral nutrition to be continued. Food consumption generally diminishes in post-gastrectomy patients, making this supplementary nutrition valuable.

This patient also required a long period of preoperative chemotherapy, but double PTEG enabled almost half of this time to be spent at home. As he would have required continuous hospitalization had conventional methods of decompression and nutritional management been used, double PTEG helped to improve quality of life (QOL) for the patient.

This is a single report, and procedure-related complications and problems associated with long-term indwelling may not have become apparent. There have also been reports of PTEG causing cervical discomfort. Although our patient did not exhibit any distress this issue should be further investigated in future.

Although data from more patients must be gathered, it appears possible that this technique may be useful in comparison with CV nutritional management and decompression with a nasogastric tube in terms of surgical outcomes, discomfort due to tube placement, and duration of hospitalization.

### Conclusions

Gastric cancer patients with pyloric stenosis require both gastric decompression and nutrition. Double PTEG, in which decompression and nutrition are both performed via the same cervical incision, is an extremely rational technique that enables simultaneous decompression and nutritional therapy, and offers a useful alternative to the use of a conventional nasogastric tube and IVH.

### Ethics Statement

Written informed consent was obtained from the patient prior to presenting the case.

### Author Contributions

All authors listed, have made substantial, direct and intellectual contribution to the work, and approved it for publication.

### Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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