



## Case Report

## Double percutaneous transesophageal gastrotubing precluded high risk surgery for intestinal malignant lymphoma

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## ARTICLE INFO

## Keywords:

Percutaneous transesophageal gastrotubing  
Malignant lymphoma  
Small intestine  
Bowel obstruction  
Diffuse large B-Cell lymphoma

## ABSTRACT

Primary gastrointestinal lymphoma is relatively rare and typically treated by chemotherapy. In some cases, surgery for obstruction in the proximal small intestine is challenging and has a high risk for anastomotic leakage. An 80-year-old woman presented to our hospital with vomiting and abdominal distension. Enteroscopy showed a type 2 circumferential tumor in the proximal jejunum 6 cm on the anal side from Treitz ligament. Biopsy showed solid and diffuse proliferation of large atypical cells with round and irregular nuclei. On immunohistochemistry, these cells were positive for CD20, CD79a, and CD138. Diffuse large B-cell lymphoma (DLBCL) was diagnosed and classified as Ann Arbor stage IIE and Lugano classification stage II 2 and scored 1 point on the International Prognostic Index (i.e., low risk). Given the risk of anastomotic leakage due to lesions and residual obstructive enteritis, surgery was not performed. The patient received double percutaneous transesophageal gastrotubing (dPTEG) to facilitate decompression and enteral nutrition. Enteral nutrition and chemotherapy were initiated immediately after dPTEG insertion. After one course of rituximab plus cyclophosphamide, hydroxydaunorubicin, oncovin, and prednisone (R-CHOP), the tumor showed a partial response, and the obstruction was improved. Oral ingestion was started, and the dPTEG tube was removed. After six courses of R-CHOP, enhanced CT, positron emission tomography-CT, and serum interleukin-2 levels indicated complete treatment response. During treatment, gastrointestinal perforation did not occur, oral intake was good, and careful follow-up will be continued. dPTEG for obstructive small intestinal DLBCL could help avoid high-risk surgery, and a complete response to chemotherapy was achieved.

## 1. Introduction

Primary gastrointestinal lymphoma accounts for approximately 30% of all extranodal lymphomas and 1%–8% of all gastrointestinal malignant tumors [1]. The main treatment for stage II or greater primary gastrointestinal non-Hodgkin's lymphoma (PGINHL) is 6–8 courses of chemotherapy. Common courses include cyclophosphamide, hydroxydaunorubicin, oncovin, and prednisone (CHOP) or rituximab plus CHOP (R-CHOP) [2].

PGINHL presents clinically with an abdominal mass, intestinal obstruction, weight loss, and melena and often causes gastrointestinal perforation [1]. In particular, cases with bowel obstruction require continuous intestinal decompression, which can make oral ingestion difficult. This in turn can interrupt chemotherapy administration and thus often requires surgical resection. However, for patients with an obstruction in the proximal small intestine, surgery has a high risk of anastomotic leakage due to residual obstructive enteritis and other anatomical reasons [3].

**Abbreviations:** CHOP, cyclophosphamide, hydroxydaunorubicin, oncovin, and prednisone; DLBCL, diffuse large B-cell lymphoma; dPTEG, double percutaneous transesophageal gastrotubing; PEG, percutaneous endoscopic gastrostomy; PGINHL, primary gastrointestinal non-Hodgkin's lymphoma; PTEG, percutaneous transesophageal gastro-tubing; R-CHOP, rituximab plus cyclophosphamide, hydroxydaunorubicin, oncovin, and prednisone.

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<https://doi.org/10.1016/j.amsu.2021.102198>

Received 30 January 2021; Received in revised form 23 February 2021; Accepted 23 February 2021

Available online 27 February 2021

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Double percutaneous transesophageal gastrotubing (dPTEG) is a novel treatment that can achieve both intestinal decompression and enteral nutrition [4]. Previously, we reported that preoperative dPTEG was effective for pyloric stenosis in gastric cancer patients [5]. To our knowledge, no reports have described the use of dPTEG to support patients with small bowel obstructive malignant lymphoma. Herein, we present a case in which dPTEG was successfully performed for obstructive diffuse large B-cell lymphoma (DLBCL) in the proximal jejunum. Consequently, high-risk surgery was avoided, chemotherapy was administered uninterrupted, and a complete response to treatment was achieved.

The work has been reported in line with the SCARE criteria [6].

## 2. Presentation of case

An 80-year-old woman experiencing vomiting and abdominal distension was admitted to our hospital by ambulance. She had a medical history of acute myocardial infarction. She had no significant family and pharmacologic history. Blood testing on admission indicated that blood levels for lactate dehydrogenase (310 IU/l) and soluble interleukin-2 receptor (sIL-2; 885 U/ml) were elevated. All other data were normal. Abdominal enhanced computed tomography (CT) showed dilation from the stomach to the proximal jejunum, wall thickening 6 cm distal from the Treitz ligament, and multiple mesenteric lymphadenopathy (Fig. 1).

Enteroscopy revealed a type 2 circumferential tumor at the proximal jejunum, 90 cm from the incisors (Fig. 2). A mucosal biopsy of the tumor showed solid and diffuse proliferation of large atypical cells with round and irregular nuclei. In subsequent immunohistochemistry analysis, tumor cells stained positively for CD20, CD79a, and CD138. DLBCL was diagnosed and classified as Ann Arbor stage IIE and Lugano classification stage II-2 and received 1 point on the International Prognostic Index (i.e., low risk). After hospitalization, a transnasal ileus tube was inserted, and decompression and elective surgery were performed. However, since the lesions were near the Treitz ligament and there was residual obstructive enteritis, there was an appreciable risk for anastomotic leakage. Consequently, instead of surgery, dPTEG was performed for



Fig. 1. Enhanced computed tomography (coronary) imaging taken before treatment.

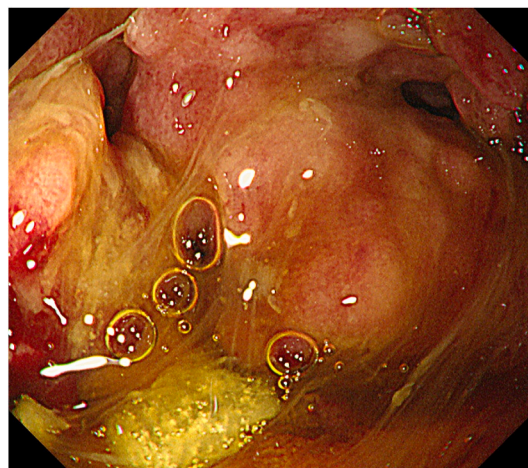


Fig. 2. Enteroscopy imaging underwent before treatment. Enteroscopy showed a type 2 circumferential tumor at the proximal jejunum 90 cm distal to the incisors.

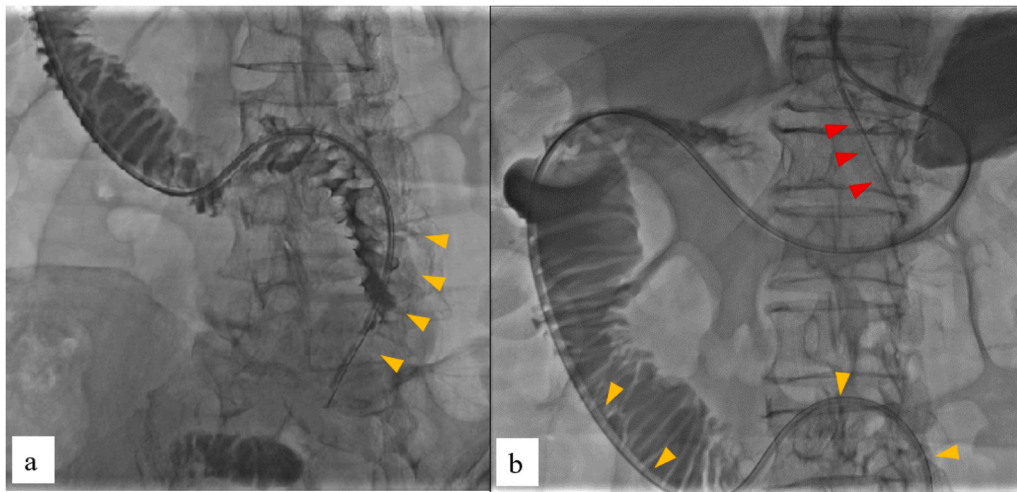
both decompression and enteral nutrition. Chemotherapy was also administered.

The protocol used for dPTEG was approved by the Ethics Committee for Biomedical Research of the International University of Health and Welfare Hospital, and the patient provided informed consent.

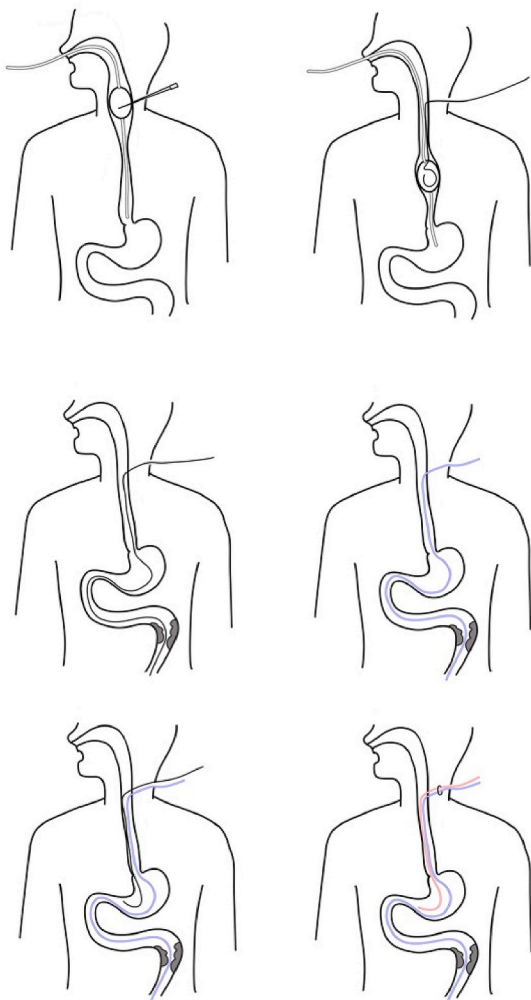
## 3. dPTEG procedure

While in the supine position, the left neck extension was placed in the posterior flexion position. The procedure was performed under constant fluoroscopic control by a well trained team of a surgeon and an interventional radiologist. A cervical ultrasound image was used to confirm the absence of cervical blood vessels running from the left neck to the puncture line. A rupture-free balloon catheter was inserted via the nasal cavity into the esophagus. Once in position, it was inflated with a dilute contrast material and punctured under ultrasound guidance. A guidewire was inserted from the puncture needle and guided into the esophagus. Using fluoroscopic guidance, the guidewire was placed on the anal side over the stenosis. Thereafter, a dilator was inserted over the guidewire, and the track was dilated. A 12-Fr, 115-cm PTEG tube was inserted and served as the feeding tube. Moreover, a 12-Fr drainage tube with multiple holes was placed in the stomach to serve as the gastric decompression tube (Fig. 3a and b, Fig. 4). The procedure time was 31 minutes. Enteral nutrition was started at 480 kcal on the day after the procedure and was progressively increased 1440 kcal on day 7.

Four days after dPTEG insertion, 375 mg/m<sup>2</sup> rituximab, 750 mg/m<sup>2</sup> cyclophosphamide, 50 mg/m<sup>2</sup> doxorubicin, 1.4 mg/m<sup>2</sup> vincristine, and 100 mg/m<sup>2</sup> prednisolone were administered. After one course of R-CHOP, the patient's tumor showed a partial response and the obstruction was reduced, so oral ingestion was started (Fig. 5). The nutrition tube was removed after oral intake was commenced, and the decompression tube was removed 37 days after insertion. After six courses of R-CHOP, enhanced CT, positron emission tomography-CT, and sIL-2 revealed a complete response to treatment. We used Rapid Turnover Protein (RTP) as an index for nutritional intake. Before the nutrition tube insertion, the measured levels of prealbumin, retinol, and transferrin were 7.0 mg/dl, 0.5 mg/dl, and 161 mg/dl, respectively. Twenty-two days after insertion, prealbumin, retinol, and transferrin levels all improved to 18.4 mg/dl, 1.8 mg/dl, and 172 mg/dl, respectively. Over the course of treatment, gastrointestinal perforation did not occur, oral intake was good, and careful follow-up every 2 weeks was continued and no tumor recurrence has been identified for 4 months.



**Fig. 3.** Fluoroscopic imaging of the dPTEG procedure. (a) Placement of the nutrition tube on the anal side of the stenosis (yellow arrowheads). (b) Placement of the decompression tube in the stomach (red arrowheads). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 4.** Schema for the dPTEG.



**Fig. 5.** Enhanced computed tomography imaging after one course of R-CHOP. The tumor showed a partial response to chemotherapy, and the obstruction was improved as shown by computed tomography (yellow arrowheads). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

#### 4. Discussion

Performing dPTEG in a patient with obstructive small intestinal DLBCL allowed for uninterrupted R-CHOP therapy and helped avoid high-risk surgery. Moreover, the patient showed a complete treatment response without any complications.

In their systemic review of 1524 patients across 23 studies, Lightner et al. [7] demonstrated that PGINHL accounted for 5%–20% of all extranodal non-Hodgkin’s lymphomas and only 2% and 0.2% of small and large intestinal malignancies, respectively. The main presentation of

PGINHL was abdominal pain (59.3%), with melena, change in defecation habits, and bowel obstruction representing other prevalent symptoms. Moreover, PGINHLs occurred most frequently in the ileocecum (37.2%) and were classified most commonly as DLBCLs (53.6%). Endoscopy was mainly used for providing a definitive diagnosis, and the most common treatment was the combination of chemotherapy and surgery (60.7%), followed by chemotherapy alone (20.5%), surgery alone (11.7%), and radiation therapy (7.0%). Emergency surgery due to gastrointestinal perforation, bowel obstruction, and bleeding was performed in 20.9% of the patients. Operative procedure ranged from segmental resection to bowel resection and incorporated the vascular pedicle and lymph node basin. In nine studies [8–16], 43% of the patients who underwent combined surgery and received chemotherapy showed improvement in overall survival. However, because the treatment strategies differ depending on the primary tumor site, there is currently no consensus on definitive indications for conducting surgery or on the timing for surgery. In summary, PGINHL has many gastrointestinal complications that require surgery, and surgery generally improves prognosis.

However, few studies have reported about surgery for obstructive PGINHL in the proximal jejunum. We speculate this is due to the limited mobility of the jejunum caused by the presence of the Treitz ligament, complicated feeding vessel running [3], residual obstructive enteritis due to bowel obstruction, technical challenges associated with anastomosis, and high risk for anastomotic leakage.

In the present case, the tumor developed in the jejunum 6 cm from the Treitz ligament, causing severe obstructive enteritis of the oral small intestine, even after an intestinal decompression of the ileus tube. Consequently, undernutrition due to bowel obstruction remained. Therefore, we considered an anastomosis procedure to be extremely high risk. We also considered that general anesthesia is unsafe because the patient had low cardiac function due to a previous myocardial infarction. Therefore, we believed that performing dPTEG could prove efficacious and preclude the need for a high-risk surgery.

PTEG is a cervical esophageal fistula construction procedure first described by Oishi et al., in 1994 [4]. PTEG is used mainly for enteral nutrition, intestinal decompression, and percutaneous endoscopic gastrostomy (PEG). PTEG is useful for post-gastrectomy cases in which performing PEG is difficult due to the presence of intervening organs. Moreover, PTEG has advantages for patients with massive ascites and highly advanced gastric cancer with pyloric stenosis [4]. Usually, PTEG is performed for either enteral nutrition or intestinal decompression. However, we have previously reported that dPTEG, which was indicated for enteral nutrition and decompression, proved efficacious in a patient indicated for gastric cancer surgery for pyloric stenosis [5].

In the present case, dPTEG allowed for both enteral nutrition and decompression, which improved the patients' nutritional status, as evaluated by RTP, relatively quickly. This in turn allowed for early administration of R-CHOP. Moreover, when decompression was no longer necessary and oral ingestion became possible, dPTEG could be easily removed. After removal, the fistula was closed after approximately 1 week, and the cervical esthetics were preserved.

Since dPTEG can have complications, such as thyroid and vascular injury, careful cervical evaluation by preoperative CT and ultrasonography by a well-trained operator is required. In addition, given the risks associated with myelosuppression, dPTEG should be avoided in chemotherapy patients who are prone to bleeding. Furthermore, in 6.3% of patients who received chemotherapy alone, delayed gastrointestinal perforation due to tumor shrinkage was reported [2]. Therefore, careful follow-up is required even after successful chemotherapy.

## 5. Conclusions

Performing dPTEG for obstructive small intestinal DLBCL precluded the use of high-risk surgery and facilitated a complete response to chemotherapy.

## Ethical approval

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

## Funding sources

The authors declare that they have no funding for this research reported.

## Author contribution

HT: study design, data collection, data analysis, writing.

TK, HO: critical revision.

YS: final approval of the article.

Any other authors: data collection.

All authors read and approved the final manuscript.

## Registration of research studies

This paper is case report. The authors don't need to register this work.

## Guarantor

Hideyuki Takeuchi, the corresponding author of this manuscript accept full responsibility for the work and the conduct of the study, access to the data and controlled the decision to publish.

## Provenance and peer review

Not commissioned, externally peer reviewed.

## Declaration of competing interest

The authors declare that they have no competing interests.

## Acknowledgements

Not applicable.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amsu.2021.102198>.

Abdominal enhanced computed tomography showed dilation from the stomach to the proximal jejunum and wall thickening 6 cm distal from the ligament of Treitz (yellow arrowheads). Multiple mesenteric lymphadenopathy was also evident.

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