

# A Case of Percutaneous Transesophageal Jejunostomy after Subtotal Esophagectomy

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## Abstract

An 80-year-old woman who underwent subtotal esophagectomy with gastric tube reconstruction for esophageal cancer developed carcinoma of the left upper gingiva. The local recurrence of the gingival carcinoma resulted in trismus and prevented oral intake. Then she underwent a percutaneous transesophageal jejunostomy tube placement in the preserved cervical esophagus. Enteral feeding continued for three months with no complications until oral intake was possible. A percutaneous transesophageal jejunostomy is possible using the postoperatively preserved cervical esophagus.

**Key words:** Percutaneous transesophageal jejunostomy, subtotal esophagectomy, esophageal cancer, PTEG, enteral feeding

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## Introduction

A percutaneous transesophageal approach is for enteral feeding tube placement[1-3]. We realized we could perform the percutaneous transesophageal approach even for patients who had undergone subtotal esophagectomy, a surgical procedure that preserves the cervical esophagus. However, no studies have reported the percutaneous transesophageal approach for post-subtotal esophagectomy patients. Thus, we report a case of percutaneous transesophageal jejunostomy for a patient who had undergone subtotal esophagectomy.

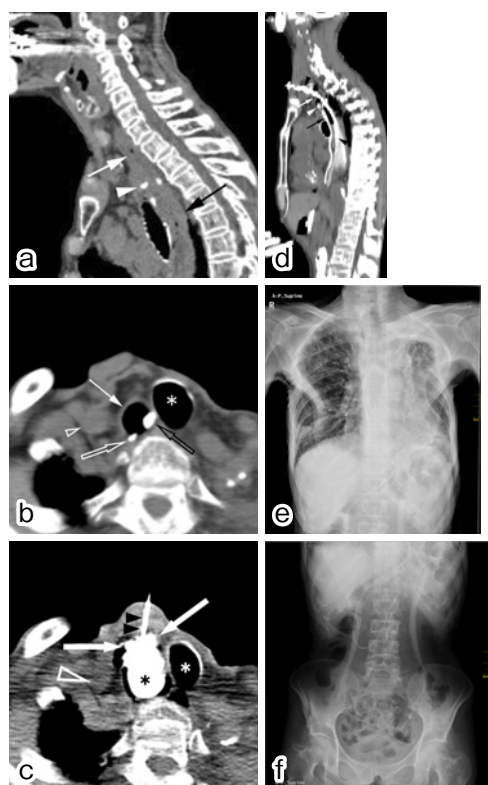
## Case Report

This case reports an 80-year-old woman who underwent subtotal esophagectomy with gastric tube reconstruction through the posterior mediastinal route for esophageal cancer when she was 66 years old. The patient also underwent left upper lobectomy for lung cancer when she was 73 years

old. The patient developed carcinoma of the left upper gingiva. Although the patient underwent resection for gingival carcinoma and left neck lymph node dissection, there was a local cancer recurrence. The local recurrence of the gingival carcinoma resulted in trismus, which prevented oral intake. Thus, the patient would need long-term enteral feeding.

It would be difficult to perform a percutaneous endoscopic gastrojejunostomy tube placement under general anesthesia. The patient had undergone subtotal esophagectomy, and trismus was present. A computed tomography (CT) scan showed that the anastomosis between the esophagus and the gastric tube reconstruction was at the caudal end of the cervical esophagus, and the cervical esophagus was preserved (**Fig. 1a**). Therefore, we placed a percutaneous transesophageal jejunostomy tube in the preserved cervical esophagus. The patient provided written informed consent to publish this case report and any accompanying images.

We used an enteral feeding kit (PTEG Kit<sup>®</sup> Sumitomo Bakelite CO., LTD., Tokyo, Japan). The patient underwent all procedures under sedation with dexmedetomidine (Nipro



**Figure 1.** An 80-year-old woman who had undergone resection for gingival carcinoma, left neck lymph node dissection, and subtotal esophagectomy.

**a.** Sagittal multi-planar reconstruction of preoperative CT data. The cervical esophagus (white arrows) remains on the oral side of the esophagogastric junction (white arrowhead). Gastric tube reconstruction (black arrow).

**b.** A horizontal cross-sectional CT image inferior border to the caudal side of the thyroid gland. The preserved cervical esophagus (white arrow) can be punctured percutaneously between the right common carotid artery (white hollow arrowhead) and the trachea (white asterisk). Nasogastric catheter (black hollow arrow). Surgical staple for use in lymph node dissection (white hollow arrow).

**c.** CT fluoroscopy image during the procedure. The first balloon puncture was unsuccessful. The image shows the second puncture. The rupture free balloon in the esophagus (black asterisk). 15-cm-long, 18-gage puncture needle (black arrowheads). Contrast medium leaked out of the balloon after the first puncture (white arrows). The right common carotid artery (white hollow arrowhead). The trachea (white asterisk).

**d.** Sagittal multi-planar reconstruction of CT data after percutaneous transesophageal jejunostomy. The puncture site of the esophagus is the remaining normal cervical esophagus after subtotal esophagectomy. The percutaneous transesophageal approach is possible. Preserved cervical esophagus (white arrow). Gastric tube reconstruction (black arrow). Esophagogastric junction (white arrowhead). Indwelling catheter (black arrowhead).

**e, f.** Chest and abdominal radiographs after percutaneous transesophageal jejunostomy. A 15-Fr., 70-cm, button-type indwelling catheter was inserted through the neck and the tip was placed in the jejunum.

Co., Ltd., Osaka, Japan) and local anesthesia with 1% lidocaine (Xylocaine, Aspen Japan, Tokyo, Japan). The right cervical region was selected as the puncture point since the left cervical region had undergone dissection, and the cervical esophagus had deviated to the right due to the effects after surgery. The patient was placed in a supine position. A 10-Fr., 100-cm nasogastric catheter (Nipro gastric catheter, Nipro Corporation, Osaka, Japan) was inserted through the nasal cavity. A 0.035-inch, 200-cm straight guidewire was inserted through the nasogastric catheter. The nasogastric catheter was then replaced over the wire with a 14-Fr., 70-cm rupture free balloon catheter, included in the enteral feeding kit. The catheter balloon was the puncture target for approaching the esophageal lumen. An ultrasound examination of the cervical region was performed to determine the route of the esophageal puncture. The trachea, right lobe of the thyroid gland, and the right common carotid artery were identified. These organs surrounded the cervical esophagus, and a safe puncture route could not be secured under ultrasound guidance. A CT of the cervical region was performed next. According to the CT, it was determined that a puncture route to the esophagus could be secured on the caudal side of the thyroid gland (**Fig. 1b**). The balloon catheter was inserted into the gastric tube. And the balloon was inflated with 10 mL of iodinated water-soluble contrast medium (Iopamidol 300 mg iodine/mL, Oypalomin<sup>®</sup> 300 Injection, Fuji Pharma Co, Tokyo, Japan) diluted in saline to a concentration of 150 mg iodine/mL. Under CT fluoroscopy, the balloon catheter was withdrawn until the balloon was positioned at a level containing the planned puncture route. A 1-cm skin incision was made on the puncture route. The balloon was punctured with the 15-cm-long, 18-gage puncture needle that came with the kit. At the first puncture, the contrast medium was not poured out of the needle, and the puncture was considered unsuccessful. At the second puncture, the contrast medium was poured out (**Fig. 1c**). The end of a 0.035-inch, 100-cm J-tip guidewire was inserted in the balloon through the needle. A guidewire and balloon were then advanced with the balloon catheter into the gastrointestinal tract. After removing the balloon catheter only, the guidewire end was advanced to the jejunum. An 18-Fr. peel-away sheath was inserted over the wire, and a 15-Fr., 70-cm, the button-type indwelling catheter was inserted through the peel-away sheath and placed (**Fig. 1d**). The tip of the indwelling catheter was placed in the jejunum (**Fig. 1e** and **f**).

Then enteral feeding was started and continued with no complications for three months until oral intake was possible.

## Discussion

An enteral feeding tube placement with a percutaneous transesophageal approach is not used in patients following subtotal esophagectomy with gastric tube reconstruction. It is common to perform surgical jejunostomy tube placement [4]. We conjecture that this is perhaps because surgeons de-

cide that a percutaneous approach to the esophagus after esophagectomy is not feasible. No study has reported the percutaneous transesophageal approach for post-subtotal esophagectomy patients. However, in subtotal esophagectomy, the cervical esophagus is preserved. Thus, we believe that the percutaneous transesophageal approach is possible after subtotal esophagectomy. CT-guided puncture was needed in this case because the patient had the neck resection for gingival carcinoma, so the puncture route between the thyroid and common carotid arteries could not be secured on ultrasound. In patients with a history of only subtotal esophagectomy, the cervical region's normal structure would have also been preserved, and an ultrasound-guided esophageal approach might be feasible. In this case, two punctures were required. After the first puncture, contrast medium leakage was observed from the balloon. The needle tip reached the balloon, but the insertion of the needle into the balloon was considered inadequate. The contrast medium in the balloon was too thick and obscured the needle. If the CT fluoroscopic image's window width was widened to prioritize needle visibility, the visibility of the organs around the puncture route became poor. Therefore, for puncture under CT fluoroscopy, the contrast medium in the balloon should have been thin.

Enteral feeding following subtotal esophagectomy is commonly performed by jejunostomy [4, 5]. Direct percutaneous endoscopic jejunostomy and radiologically inserted jejunostomy are jejunostomy placement techniques that do not require laparotomy [5, 6]. Direct percutaneous endoscopic jejunostomy is reportedly technically impossible in 38% [6]. The technical failure rate of a radiologically inserted jejunostomy is between 5% and 15%. Although it is lower than direct percutaneous endoscopic jejunostomy, the major complication rate is reportedly 13% [7].

On the other hand, the success rate of the percutaneous transesophageal approach is between 94% and 100%, and the reported major complication rate is between 0% and 5% [1-3]. The only major complication reported was aspiration pneumonia during percutaneous transesophageal gastrostomy tube insertion [3]. There are also some advantages to percutaneous transesophageal jejunostomy. Enteral feeding can be started immediately after placement since the puncture site is far from the tube tip [2]. There is no peristomal leakage because the position of the esophagus does not move inside the body like the jejunum [2]. The percutaneous trans-

esophageal approach is a technique that can be performed percutaneously when malignant obstructions occur after subtotal esophagectomy and decompression is needed [3]. Abdominal organ injury cannot occur [1]. Placement is possible in patients with ascites and peritoneal carcinomatosis [1].

A percutaneous transesophageal jejunostomy is possible using the postoperatively preserved cervical esophagus.

**Conflict of Interest:** None

**Ethical Statement:** Informed consent was obtained from the patient to publish this case report and accompanying images. And this case report was approved by our institutional review board.

**Disclaimer:** Atsushi Komemushi is one of the Editorial Board members of *Interventional Radiology*. This author was not involved in the peer-review or decision-making process for this paper.

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