

CASE REPORT

A case of delayed gastric conduit emptying after subtotal esophagectomy with simultaneous pulmonary resection

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Abstract: We report a case of delayed gastric conduit emptying (DGCE) after surgery for esophageal cancer. A 67-year-old man who visited a hospital because of dysphagia and was referred for a diagnosis of esophageal cancer. Contrast-enhanced computed tomography (CT) showed wall thickening of the middle thoracic esophagus and an enlarged abdominal lymph nodes and a spiculated pulmonary shadow 25×20 mm in size in right lower lobe that was highly suspected as a primary lung cancer. Preoperative chemotherapy was introduced due to advanced esophageal cancer, both the esophageal tumor and the pulmonary lesion were found to be shrunk. Even after a detailed examination, the shadow in the right lower lobe of the lung could not be ruled out for malignancy, a simultaneous surgery was conducted. The patient underwent S10 segmentectomy followed by subtotal esophagectomy and the posterior mediastinal route reconstruction using a gastric conduit. Gastrografin radiography revealed stasis of the reconstructed gastric conduit on postoperative day (POD) 8. CT and upper gastrointestinal endoscopy showed that the gastric conduit was pulled into the right thoracic cavity caused by pulmonary resection and developed inflammatory changes, causing DGCE. The DGCE eventually improved with conservative treatment and the patient was discharged on POD 68. *J. Med. Invest.* 72:189-193, February, 2025

Keywords: *delayed gastric conduit empty, esophagectomy, pulmonary resection, simultaneous surgery*

INTRODUCTION

The frequency of synchronous double cancer in esophageal cancer is relatively high at 7%. However, synchronous with lung cancer is relatively rare at 1%, and esophagectomy and pulmonary resection is further rare (1). Treatment strategies should be considered for each case, taking into account the degree of tumor progression, comorbidities, and general condition of the patient. Especially, simultaneous thoracic surgery such as esophagectomy combined with pulmonary resection is rare and invasive, and it should be conducted considering more complications rather than esophagectomy alone. These precise therapeutic experiences are informative and essential to perform pulmonary resection as well as esophagectomy and minimize severe complications after surgery. In this article, we report a case of delayed gastric conduit emptying after surgery for esophageal cancer with simultaneous pulmonary resection.

CASE REPORT

A 67-year-old man visited a local physician with dysphagia. He was diagnosed as esophageal cancer and referred to our department. He had a medical history of hypertension, glaucoma, bacteremia, and a smoking (Brinkman Index : 800) and drinking history. His height was 165 cm, body weight was 53 kg, and Body Mass Index was 19.5 kg/m². Hugh-Jones classification

was class I. PS is better. No abnormal findings in blood count and biochemical findings, tumor marker. CEA 9.0 ng/mL, SCC 0.66 ng/mL. Upper gastrointestinal endoscopy revealed a type 2 tumor in the lower esophagus, and was located at 30-40 cm from the dentition and it was consistent with esophago-cardiac junction (Fig. 1a, b). A histopathological examination confirmed squamous cell carcinoma of biopsied specimens from the esophageal tumor. Chest CT showed wall thickening of the lower esophagus (Fig. 1c), and a spiculated pulmonary shadow 25×20 mm in size in the right lower lobe of the emphysematous lung that was highly suspected as a primary lung cancer. A wall-thickness and a peripheral infiltrative shadow in posterior basal segment of the right lung was identified as well as an esophageal tumor (Fig. 1d). Respiratory function tests showed an obstructive ventilatory impairment with a one-second rate (FEV1.0%) of 65%.

The patient was diagnosed with esophageal cancer cT3N1 (Number 1) M0 cStageIII according to UICC 8th TNM classification (2). Sputum tests, tuberculosis tests, bronchoalveolar lavage and biopsy tests by bronchoscopy were performed for the abnormal shadow in the right lower lobe of the lung, but no malignant findings were found. One course of preoperative 5-fluorouracil/cisplatin plus docetaxel combined chemotherapy that we previously reported (3) was introduced. Esophageal cancer was judged partial response as RECISTver.1.1 (4) and a lung abnormal shadow was also shrunk (Fig. 2a-d). Positron emission tomography-computed tomography (PET-CT) showed no significant FDG accumulation on known tumor lesions, and there was no new tumorous lesion. Based on the above, simultaneous surgery was performed for esophageal cancer and suspected right lower lobe lung cancer. The patient first underwent thoracoscopic S10 segmentectomy, followed by thoracoscopic sub-total esophagectomy, laparoscopic gastric tube creation, and reconstruction through the posterior mediastinum. Bilateral vagus nerves were transected and pyloroplasty was not performed. A

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nasogastric tube was placed postoperatively to prevent gastric stasis. Surgery time was 713 minutes, and blood loss was approximately 100 ml. The pathological examination diagnosed esophageal cancer from the middle to the lower esophagus, 3cm long, squamous cell carcinoma, ypT1a-EP, INFb, ly0, v0, IM0, PM0, DM0, RM0, N0(0/37), M0, ypStage 0, and the tumor regression grade was Grade 2; There were no malignant findings

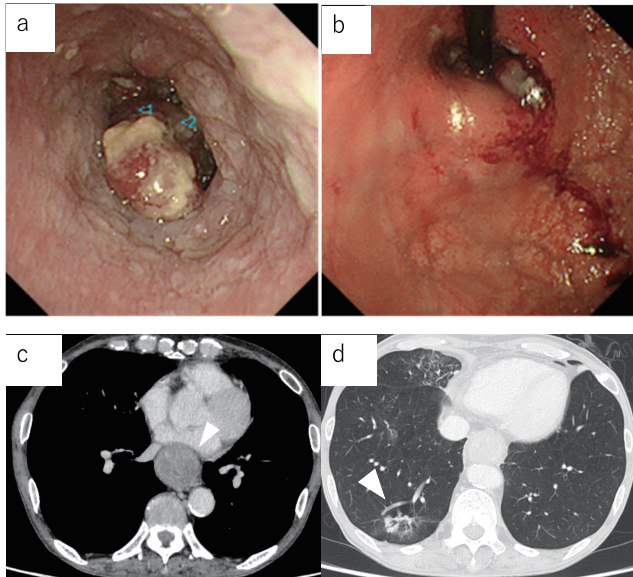


Fig. 1. Endoscopic and CT findings before chemotherapy
 a, b) Upper gastrointestinal endoscopic findings: A fully circumferential type 2 tumor was found from middle to lower thoracic esophagus.
 c) Thoracic computed tomography: wall thickness (arrowhead) was found in the lower thoracic esophagus.
 d) An infiltrative shadow in the right posterior basal segment (arrowhead) was identified.

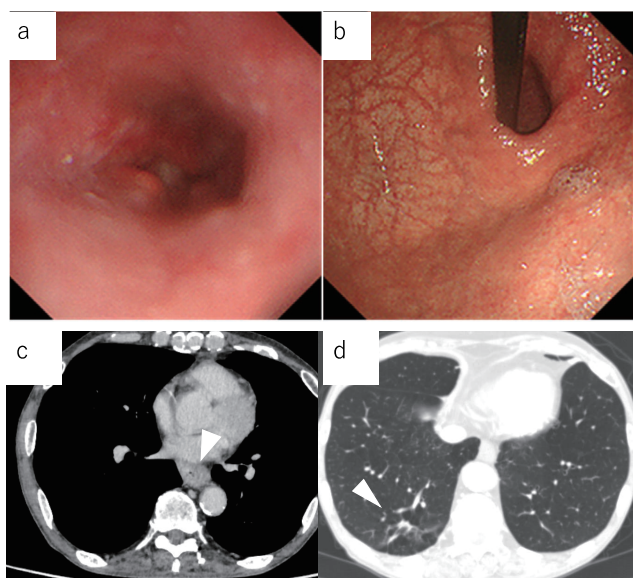


Fig. 2. Endoscopic and CT findings after chemotherapy
 a) Thoracic computed tomography: Wall thickness of the lower thoracic esophagus (arrowhead) decreased.
 b) An infiltrative lung shadow (arrowhead) were shrunk.

in the S10, and it was concluded that it was difficult to distinguish between cancer and inflammation. The thoracic drain was managed at -15 cmH₂O and removed after confirming that the drainage volume was less than 200 ml on POD4. A nasogastric tube was removed after confirming that there was no discharge on POD 7. Esophagography on POD 8 showed that there was no anastomotic complication, but was gastric stasis (Fig. 3a). Plain CT scan revealed severe congestion in the reconstructed gastric conduit, and the gastric conduit was pulled at the lung resection site, causing thickening of the stomach wall (Fig. 4 a-c), and nasogastric tube was re-inserted on POD 9. Endoscopy was performed on POD 11 and 29, and although there was no problem with passage through the pylorus, extensive inflammatory findings were observed in the gastric mucosa (Fig. 5). Infusion of Daikenchuto, Proton Pump Inhibitor, and Mosapride Citrate Hydrate was started via a nasogastric tube. As fluoroscopy on the POD 35 confirmed that gastric distension had improved and that the contrast medium had passed into the duodenum (Fig. 3b), he started oral intake and finally discharged on POD 68.

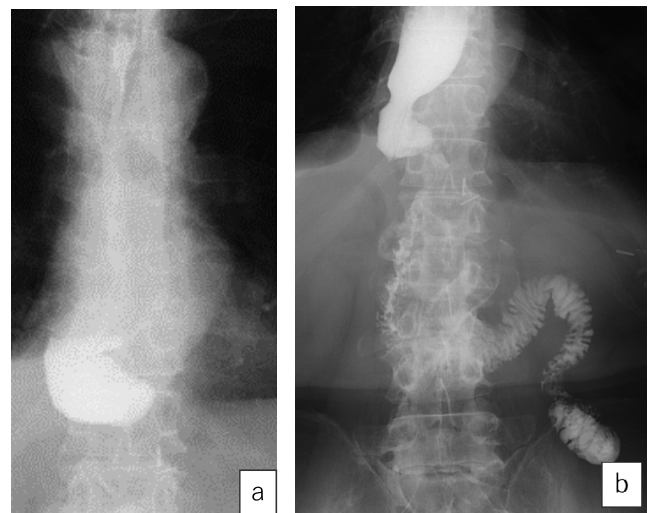


Fig. 3. Postoperative fluoroscopy
 a) Right-side deviation of the antrum of gastric conduit and stagnation of contrast material were observed (POD 8).
 b) Gastric distension improved and passage of the contrast medium into the duodenum was confirmed (POD 35)

DISCUSSION

In this case, pulmonary resection was performed simultaneously with esophagectomy, resulting in inflammation of the gastric conduit due to traction on the side of the pulmonary resection, which resulted in delayed gastric conduit emptying (DGCE). DGCE is caused by complex factors such as decreased gastric motility due to bilateral vagotomy or vascular resection, intrathoracic negative pressure, morphology of the gastric tube, and reconstruction route (5, 6). During surgery, bilateral vagotomy with adequate lymph node dissection is inevitable, which induces degeneration of the myenteric plexus and significantly weakens gastric contractile activity (7)

Lei Z. *et al.* (8) reported that DGE occurs in approximately 20% of cases after esophagectomy, with a lower incidence with gastric tube reconstruction than with whole stomach, and most cases improved with conservative therapy or endoscopic dilatation. Rove JY *et al.* (9) reported gastric tube revision surgery (conduit

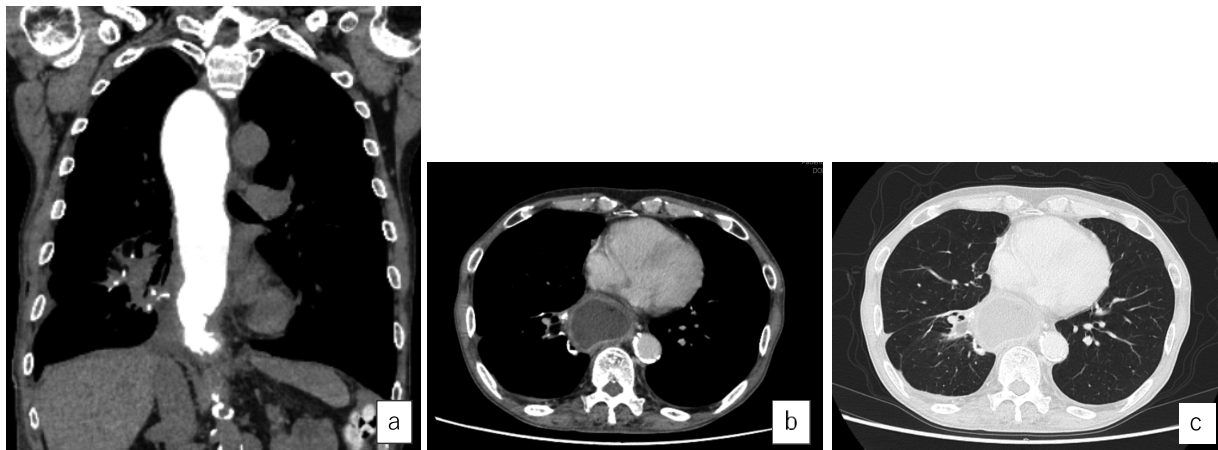


Fig. 4. Plain CT

- a) There was severe congestion of the reconstructed gastric conduit (POD 9).
 b, c) The gastric conduit was pulled at the lung resection site, causing thickening of the stomach wall (POD 19).

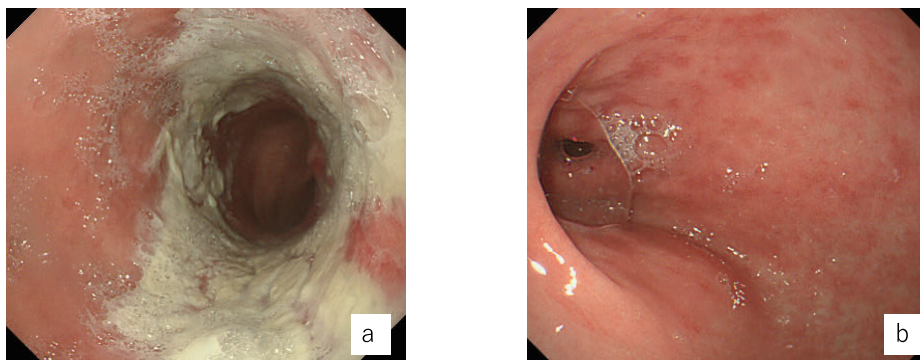


Fig. 5. Endoscopic findings after surgery

- a) Extensive inflammatory findings were observed in the gastric mucosa.
 b) The pyloric ring was displaced to the left, but there was no problem with passage.

revision) for DGCE is performed in cases that do not improve conservatively due to complications of an excessively long gastric tube that bends over the diaphragm or paraesophageal hernia after posterior mediastinal route gastric tube reconstruction. The time of onset of DGCE is divided into early onset within 14 days after surgery and late onset after 15 days, but most of DGCE requiring surgery had late onset. In our case, the onset was early on POD 8, and he was able to avoid surgical treatment because the symptoms improved with conservative treatment including placement of a nasogastric tube.

Although there are few reports of DGCE after esophagectomy and pulmonary resection, DGCE was reported to tend to be more frequent in the dislocation of the gastric conduit after McKeown esophagectomy and was caused by the gastric conduit being pulled toward the thoracic cavity and distended by the negative respiratory pressure (10). Esophageal cancer sometimes combines with lung cancer as concomitant double cancer; however, there is few report about surgical treatments relate to esophagectomy and pulmonary resection. In cases with concomitant pulmonary masses, the site and stage of the pulmonary mass should also be taken into consideration to decide treatment plans. In reports of simultaneous resection for double cancers, esophageal and lung, most cases involved simultaneous resection of the right lung, and there were no reports of DGCE as

a postoperative complication.(11, 12)

In this case, chest CT findings strongly suggested a malignant tumor in the right lower lobe, but bronchoscopy did not lead to a definitive diagnosis. Even if lung cancer was assumed, esophageal cancer treatment was considered appropriate given the stage of progression, so preoperative chemotherapy was administered first. As both the esophageal cancer and the lung tumor had shrunk, it was decided to consider surgery as the next treatment for the double cancer.

A simultaneous surgery includes lobectomy, esophagectomy, and reconstruction is suspected to be curative and allows early return to society; however, it is a long surgery and the surgical invasiveness is large. There are variations of two-stage surgery: radical resection of either the lung or esophagus, followed by the remaining surgery, or resection of the lung and esophagus, followed by two-stage esophageal reconstruction. The advantages of this two-stage procedure are shorter operation time and less invasiveness and the disadvantages are that complications may delay or make reconstruction impossible, and options for gastrointestinal reconstruction routes are limited (11). In addition, when reconstruction is performed in a two-stage procedure, adhesions can increase the difficulty of the surgery and lead to further complications (11, 13). In this case, the lung tumor was on the right side, and we decided to perform S10 segmentectomy

without lymphadenectomy simultaneously for both diagnosis and treatment. Since the area of lung resection was small and the patient was able to tolerate surgery, we decided to perform esophageal resection and reconstruction in one-stage. When performing lung resection at the same time, it was necessary to consider the reconstruction route, taking into account the possibility of intrathoracic pressure of the reconstructed organs and traction in the space after pulmonary resection (14). Regarding the reconstructive route, Yamazaki *et al.* (15) studied the retrosternal and posterior mediastinal routes and reported shorter operative time, fewer complications during feeding tube insertion, and fewer suture failures in the posterior mediastinal route group. In addition, Inoue *et al.* (16) reported that the sterno-tracheal distance <13 mm is a risk factor for suture failure. A retrosternal route would have been preferable to avoid the effects of pulmonary resection, but because the sterno-tracheal distance in this case was 9.4 mm, the posterior mediastinal route was reluctantly selected, and a nasogastric tube was placed for decompression. Decompression using a nasogastric tube was performed for 1 week after surgery, but a postoperative Gastrografin radiography showed that the antrum of the gastric conduit was pulled toward the right thoracic cavity, and inflammation of the gastric mucosa was also observed, resulting in DGCE.

Although the tumor may have disappeared after chemotherapy, the pathological examination results did not result in a definitive diagnosis of lung cancer, and two-stage surgery, resection of the lung and esophagus followed by esophageal reconstruction, may have been considered. When esophageal cancer surgery and right-sided pulmonary resection are performed simultaneously, it is preferable to use a reconstruction route other than the posterior mediastinal route if possible. For reconstruction, the subcutaneous route or the retrosternal route must be used while preserving the pleura and taking measures to prevent contact between the resected lung site and the gastric conduit.

Regarding prognosis, it has been reported that the longest survival for patients who underwent incomplete resection or non-operative resection was 18 months (17), and if radical resection of both esophagus and lung is possible, there is a possibility of long-term survival (12). Due to advances in chemotherapy and minimally invasive surgery, it is possible that the number of patients undergoing simultaneous surgery for esophageal cancer and lung cancer will increase in the future, and more attention should be paid to postoperative complications, including DGCE.

CONCLUSION

We experienced a case of delayed gastric conduit empty after simultaneous pulmonary resection and esophagectomy. Severe delayed gastric conduit emptying should be kept in mind as one of the postoperative complications that can lead to long-term fasting and pneumonia.

CONFLICTS OF INTEREST

All authors have no conflicts of interest associated with this study.

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