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T-drain esophagostomy under thoracoscopy for intrathoracic esophagogastric anastomotic leakage following esophagectomy for esophagogastric junction cancer: A case report

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ABSTRACT

INTRODUCTION: Intrathoracic esophagogastric anastomotic leakage is considered the most severe complication. We successfully performed T-drain esophagostomy under thoracoscopy for intrathoracic esophagogastric anastomotic leakage.

PRESENTATION OF CASE: A 44-year-old man visited a local hospital because of vomiting during the night. Upon examination, the patient was diagnosed with c-T2N0M0 stage II adenocarcinoma in Barrett's esophagus. We performed laparoscopic proximal gastrectomy and lower esophagectomy and gastric conduit reconstruction using the posterior mediastinal route with intrathoracic anastomosis under thoracoscopy. The patient developed fever, chest pain and dyspnea on postoperative day 5. We diagnosed anastomotic leakage and performed reoperation via thoracoscopy. The perforation, which was approximately 8 mm in length, was found on the back side of the esophagogastric anastomosis. There was no clear finding of necrosis in the gastric tube or the esophagus. After sufficiently detaching the thoracic cavity, a T-drain was inserted through the perforation and fixed. After fistula formation, the T-drain was slowly phased out. The postoperative course was uneventful.

DISCUSSION: It is important to note that early treatment of severe leaks is mandatory to limit related mortality. However, current therapies for treating anastomotic leakage are still inefficient and controversial.

CONCLUSION: T-drain esophagostomy under thoracoscopy for intrathoracic esophagogastric anastomotic leakage could be minimally invasive and effective.

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1. Introduction

Intrathoracic esophagogastric anastomotic leakage is often considered the most severe complication following esophagectomy. Intrathoracic anastomotic leakage is associated with significant mortality [1]. Therefore, early treatment of leakage is mandatory to limit the associated mortality [2]. The principles of management of anastomotic leakage include drainage of the pleural and mediastinal cavities, intravenous broad-spectrum antibiotics, gastric decompression, and enteral or parenteral nutritional support. In fact, it is difficult to establish a standard strategy for treatment.

Here, we present a case of severe intrathoracic anastomotic leakage after esophagectomy for esophageal cancer successfully treated

with a T-drain (Fujisystems corporation) placement, which was sufficient drainage.

This manuscript has been reported in line with the SCARE guidelines [3].

2. Presentation of case

A 44-year-old man visited a local hospital because of vomiting during the night. He underwent subtotal colectomy 6 months after birth due to megacolon. Upper gastrointestinal endoscopy revealed a 1/3 circumference ill-demarcated depressed lesion with redness in Barrett's esophagus (Fig. 1a, b). Biopsy revealed adenocarcinoma of the esophagus, consistent with Barrett's adenocarcinoma. Endoscopic ultrasound (EUS) findings revealed that the lesion was located in the fourth layer and in contact with the fifth layer (Fig. 1c). The lesion could not be identified by computed tomography (CT), and there was no swelling lymph node or distant metastasis (Fig. 1d). Thus, we diagnosed c-T2N0M0 stage II adenocarcinoma in Barrett's esophagus.

Abbreviations: CT, Computed tomography; EUS, Enhanced ultrasound.

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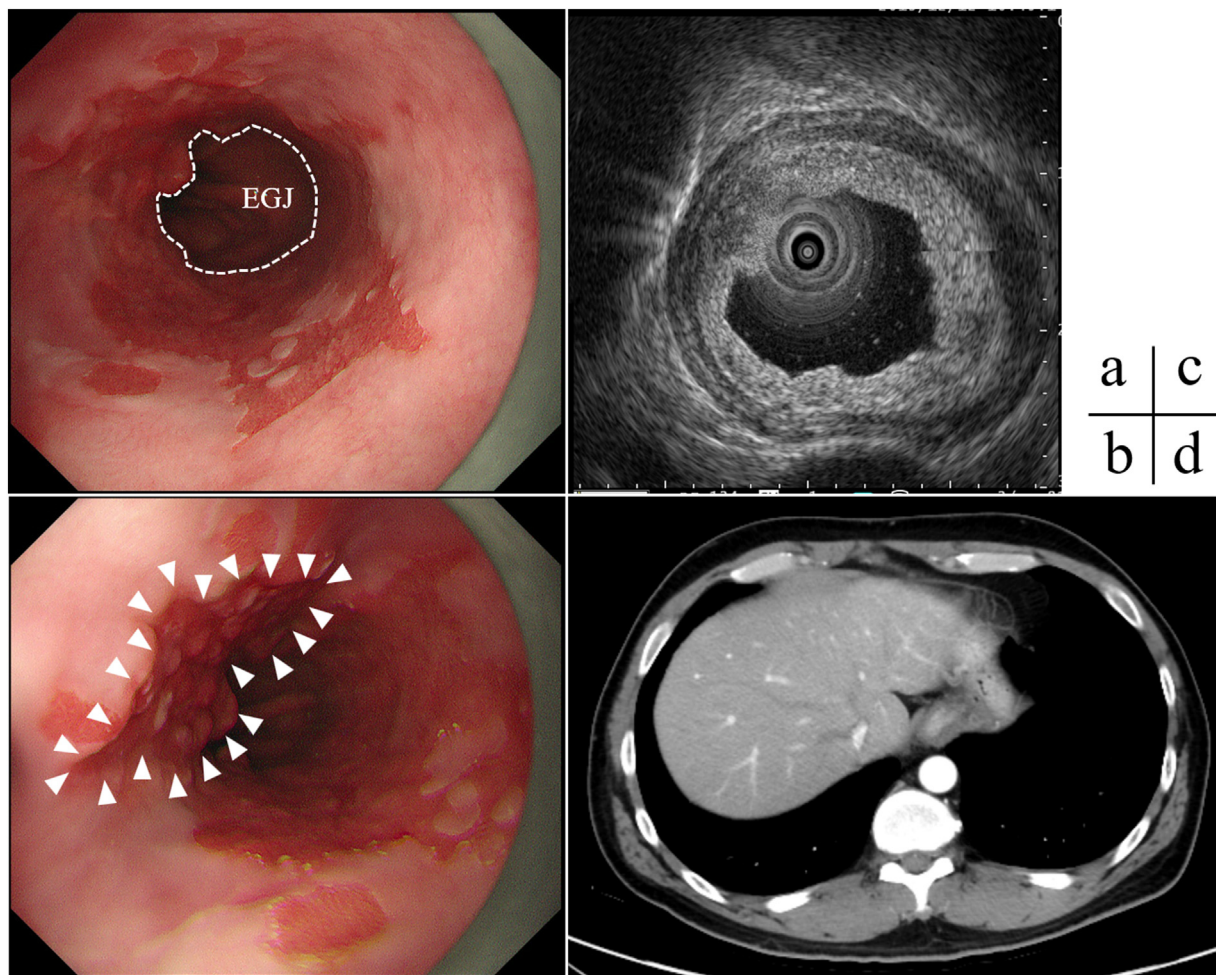


Fig. 1. Preoperative findings of esophagogastric junction cancer.

- a: Long segment Barrett's esophagus (LSBE) was noted on endoscopy.
 b: A 1/3 circumference ill-demarcated depressed lesion with redness in Barrett's esophagus was noted (arrowheads).
 c: EUS finding (20 MHz). The tumor was located in the fourth layer and in contact with the fifth layer.
 d: The tumor could not be identified by CT, and there was no swelling of the lymph nodes.

We performed laparoscopic proximal gastrectomy and lower esophagectomy with the patient in a supine position and gastric conduit reconstruction using the posterior mediastinal route with intrathoracic anastomosis under thoracoscopy with the patient in a semiprone position. We performed esophagogastric anastomosis using the overlap method, and the staple entry hole was intracorporeally closed with continuous full-layer suturing using barbed sutures (3-0 V-LOC™180, Medtronic plc, Dublin, Ireland). A BLAKE™ Silicone Drain 19Fr (Ethicon, Inc) was placed near the anastomosis. The operation was finished. The operation duration was 340 min, and blood loss was 50 mL.

The patient developed fever, chest pain and dyspnea on postoperative day 5. Dirty fluid was observed from the chest drain. We suspected anastomotic leakage and performed CT examination. CT revealed pneumomediastinum around the anastomosis, bilateral pleural effusion and atelectasis, while the contrast effect of the gastric conduit was preserved (Fig. 2a). An emergency operation was performed via thoracoscopy with the patient in a semiprone position. There was a large amount of dirty effusion in the thoracic cavity, and the pleura were covered with purulent fibrous materials. The perforation, which was approximately 8 mm in length, was found at the end of the esophagogastric anastomosis (Fig. 3a). There was no clear finding of necrosis in the gastric conduit or the esophagus. We performed sufficiently deterring of the thoracic cavity.

A T-drain was inserted through the perforation and fixed with an elastic suture because the tissue around the perforation seemed to be too weak to perform primary suture (Fig. 3b, c). Portable Low-Pressure Suction Drains (Clio Drain Vac® irrigation type 10 mm, Sumitomo Bakelite Co., Ltd. Tokyo, Japan) were placed and fixed in the front and back of the anastomosis (Fig. 3d). Furthermore, two BLAKE™ Silicone Drain 24Fr (Ethicon, Inc) were placed in the thoracic cavity (apex and bottom) and connected to a 300 mL J-VAC™ Reservoir (Ethicon, Inc). The operation duration was 144 min, and blood loss was 5 mL.

We performed tracheal extubation on postoperative day 2. The suction of the T-Drain was 46 cmH₂O using a Thopaz™ draining system (Medela AG). Intravenous antibiotics were administered until postoperative day 21. Total parenteral nutritional support was started on postoperative day 4. The drainage tubes except for the T-drain were removed by postoperative day 36. There was no anastomotic leakage on fluoroscopic examination (Fig. 2b), and oral intake was started on postoperative day 41. After fistula formation, the T-shaped portion of the T-drain was cut off by peroral endoscopic treatment (Fig. 2c) and phased out slowly.

The patient was discharged on postoperative day 69.

Histopathological examination revealed type 0-IIc esophagogastric junction cancer with a tumor size of 28 × 18 mm, well differentiated adenocarcinoma in Barrett's esophagus, and

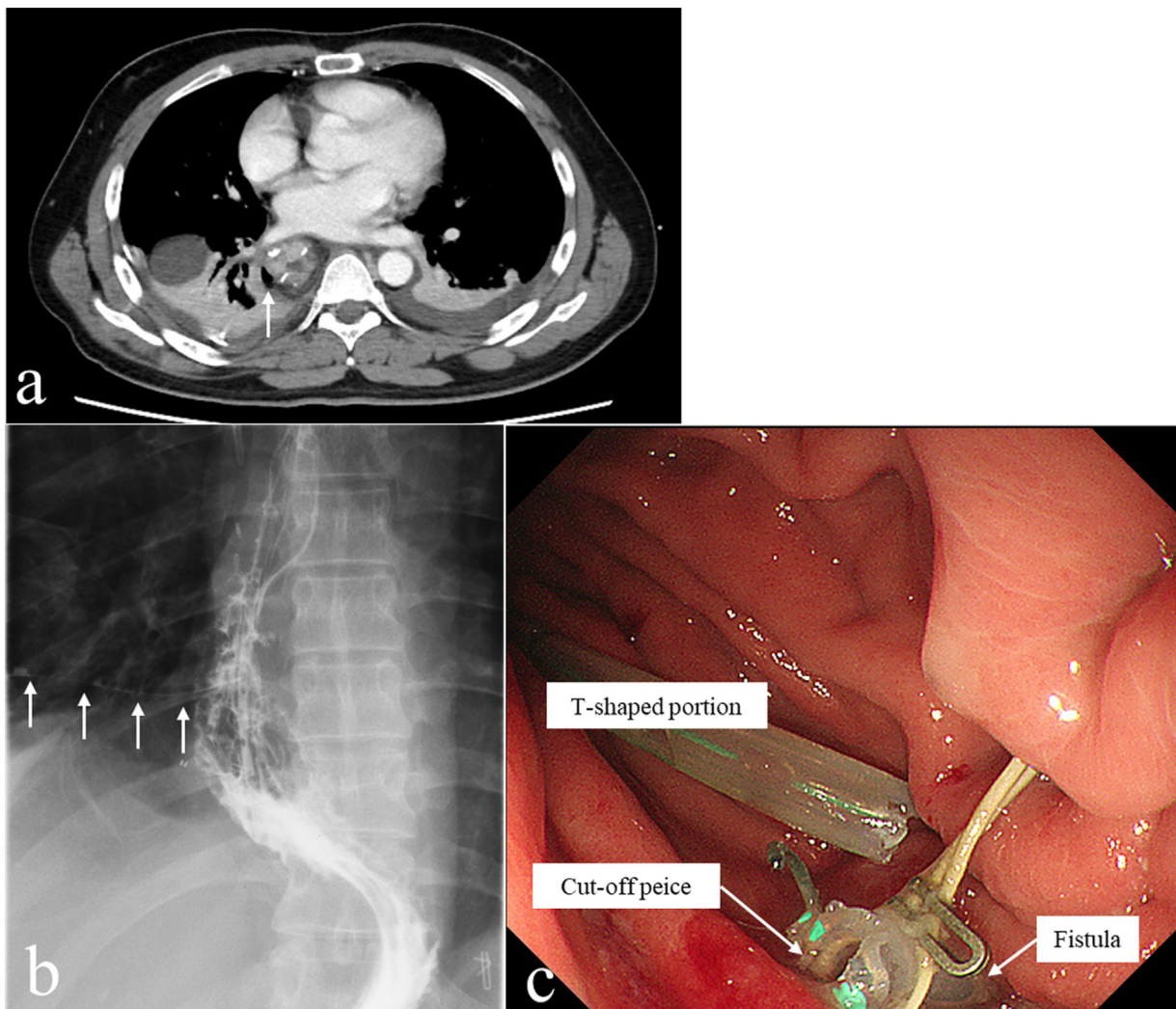


Fig. 2. Pre- and postoperative imaging findings.

a: CT showed pneumomediastinum around the anastomosis, bilateral pleural effusion and atelectasis.

b: There was no anastomotic leakage on fluoroscopic examination. The arrow indicates the T-drain.

c: The T-shaped portion of the T-drain was cut off by peroral endoscopic treatment.

pT1b(SM), ly0, v0, pIM0, pPM0, pDM0, pRM0, pN0, pM0, and pstageIIA.

3. Discussion

We successfully performed T-drain esophagostomy for intrathoracic esophagogastric anastomotic leakage following esophagectomy for esophagogastric junction cancer. With careful case selection, this therapy could be an appropriate therapeutic option that avoids further surgical treatment.

Intrathoracic esophagogastric anastomotic leakage following esophagectomy for esophageal cancer is the most feared complication. According to previous studies, the incidence of anastomotic leakage is approximately 8.0–27.7% [4,5] and results in a mortality of 3.4–6.1% [6,7]. Guo J. et al. [1] reported that once intrathoracic anastomotic leakage following esophagectomy is diagnosed or highly suspected, individualized management strategies should be implemented according to the size of the leak, the extent of the abscess, and the status of the patient. However, current therapies for treating anastomotic leakage are still inefficient. Therapies range from aggressive surgical treatment to conservative treatment, although the optimal therapy is still con-

troversial. Conservative therapy, such as placement of chest drains and gastrointestinal tubes, vacuum-assisted closure (VAC), and implantation of self-expanding stents [8–13], which avoids surgical treatment, is often applied in patients with poor physical condition. Lara Schaheen et al. reported that if stenting and wound vacuum are used, undrained mediastinal contamination and persistent leakage require surgical intervention [14]. On the other hand, surgical treatments include anastomosis repair, abscess debridement, thoracic cavity flushing, and placement of several drainage and flush tubes. Eizaguirre E. et al. reported that the mortality of patients who received reoperation is high [15], suggesting that it is important to carefully select patients who should undergo surgical treatment. It is important to note that early treatment of severe leaks is mandatory to limit related mortality [2].

Surgical treatment was selected for our patient because his general condition was stable. We believe that surgical treatment is more effective than conservative therapy in terms of abscess debridement, thoracic cavity flushing, and placement of several drainage and flush tubes. We performed detouring of the thoracic cavity and T-drain esophagostomy in this patient.

It was difficult to perform reconstruction as a 2nd staged operation because there was no organ of reconstruction due to subtotal colectomy and severe adhesion of the small intestine. Therefore,

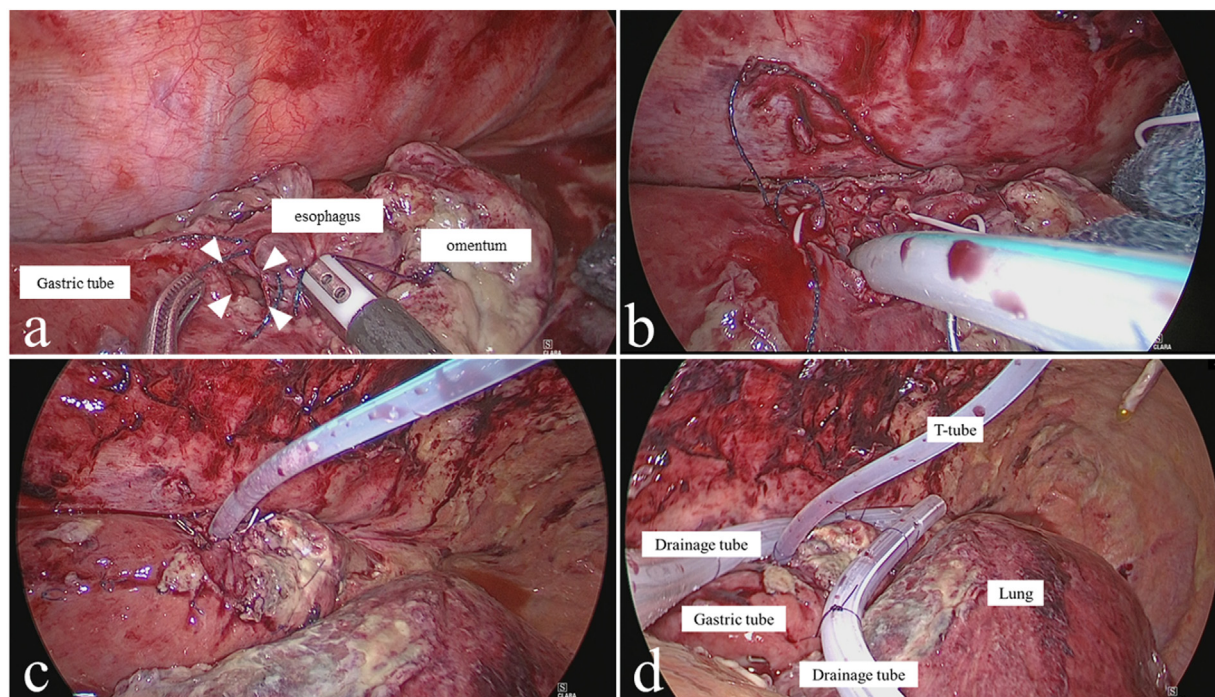


Fig. 3. Findings on reoperation.

a: The perforation was found on the back side of the esophagogastric anastomosis (arrowheads).

b: The T-drain was inserted through the perforation.

c: The T-drain was fixed with an elastic suture.

d: Portable low-pressure suction drains were placed and fixed in the front and back of the anastomosis.

we have to perform surgical treatment in a one-stage operation. Fortunately, CT before reoperation showed that the contrast effect of the gastric tube was preserved. We determined that there was no requirement for removal of the gastric tube and planned to perform esophagostomy using a T-drain. The T-drain can decompress the pressure of the intestinal tract and promote fistula formation. We set the suction pressure of the T-Drain to 46 cm H₂O because the suction pressure of drainage tubes placed in the front and back of anastomosis was 36 cmH₂O. As a result, we avoided further surgical treatment. There are many reports on using the T-drain as a minimally invasive treatment in esophageal perforation, although there are few reports on using the T-drain to treat intrathoracic anastomotic leakage. Izumi D. et al. [16] reported that T-tube drainage and wrapping with the intercostal muscle flap is a useful treatment for intrathoracic anastomotic leakage with severe inflammation. They performed T-tube placement through a left anterolateral thoracotomy at the sixth intercostal space. To the best of our knowledge, this is the first report of T-drain esophagostomy under thoracoscopy. However, necrosis of the gastric tube may not be indication for this treatment. In such cases, the gastric tube should be removed. We believe that our strategy of T-drain esophagostomy under thoracoscopy is a viable minimally invasive treatment for patients who have good general condition and preserves blood flow of the gastric tube.

4. Conclusion

T-drain esophagostomy under thoracoscopy for intrathoracic esophagogastric anastomotic leakage following esophagectomy can be a minimally invasive and effective treatment.

Declaration of Competing Interest

The authors declare that they have no competing interests.

Sources of funding

The authors declare that they received no funding support for this report.

Ethical approval

Ethical approval for this report has been exempted by our institution.

Consent

Consent to publish was obtained from this patient, and the identity of this patient was protected.

Author contribution

TT is the first author and prepared the manuscript under the supervision of SK and HB.

TT and SK performed the surgery. HS and KH performed perioperative therapy.

Registration of research studies

Not applicable.

Guarantor

Toshikatsu Tsuji, corresponding author of this article.

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