

# Drainage Tubeless (DRESS) Bypass Surgery as the Best Palliative Care for Unresectable Thoracic Esophageal Cancer with and without Esophago-Respiratory Fistula

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**Approximately half of the patients with esophageal cancer are diagnosed at an advanced stage with inoperable disease. The technique of bypass surgery, which is one of the palliative procedures for esophageal cancer, usually requires the insertion of a drainage tube for clearing secretions from the blind remnant esophagus. Since the artificial drainage tube is sometimes problematic for the patient after discharge from the hospital, drainage tubeless (DRESS) surgery might be preferable. The authors demonstrated the utility of DRESS bypass surgery by adding esophagostomy in the right supraclavicular region in three patients with unresectable esophageal cancer with and without esophago-respiratory fistula. All patients had been able to take per-orally and discharged the hospital. Two of three patients are alive with per-oral intake at 1 year later. This DRESS bypass surgery technique, which has not hardly reported in the literature, could release the patients from the tube trouble after the discharge from the hospital and give the patients the better quality of life.**

**Keywords:** drainage tubeless bypass surgery, unresectable esophageal cancer, esophageal stricture, esophago-respiratory fistula, palliative surgery

## Introduction

Esophageal cancer is reportedly the eighth most common malignancy and the sixth cause of death due to malignancies all over the world, with approximately half of the patients being diagnosed at an advanced stage with inoperable disease.<sup>1,2)</sup> Most of those patients have

complaints of dysphagia due to esophageal strictures, or respiratory symptoms due to esophago-respiratory fistulas, and require palliative therapy to improve their quality of life or need to undergo definitive chemoradiotherapy, which is associated with an expected approximately 30% complete response rate and 10% 5-year survival rate. The technique of bypass surgery, which is one of the palliative procedures for esophageal cancer, has improved since it was initially separately reported by Kirschner and Postlethwait.<sup>3,4)</sup> However, standard bypass surgery requires the insertion of a drainage tube for clearing secretions from the blind remnant esophagus above the stricture or in case of development of an esophago-respiratory fistula due to progressive esophageal cancer.<sup>5-8)</sup> Since the artificial drainage tube is sometimes problematic for the patient after discharge from the hospital, drainage tubeless (DRESS) surgery might be preferable.

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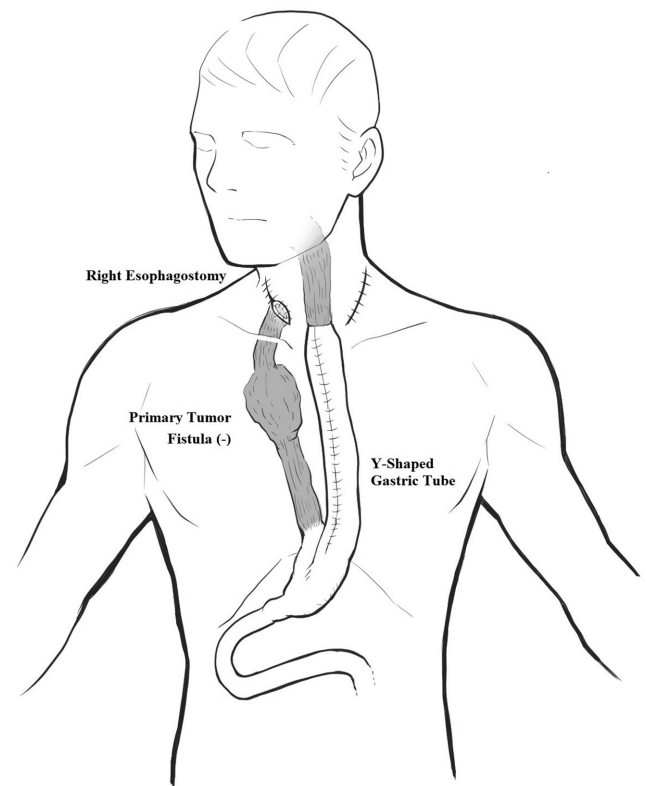
In this report, the authors demonstrated the utility of DRESS bypass surgery by adding esophagostomy in the right supraclavicular region in patients with unresectable esophageal cancer.

## Patients and Surgical Procedures

The patients with unresectable thoracic esophageal cancer with and without esophago-respiratory fistula underwent DRESS bypass surgery in University of Miyazaki Hospital between April in 2016 and December 2017. The patients with other organ metastasis including lymph node metastasis categorized M1a were excluded as the contraindication case since the prolonged prognosis could not be expected after bypass surgery.

The vertical incision was made in the bilateral neck, and the cervical esophagus was pulled up by taping from the left cervical incision and interrupted as high up in the neck as possible, to facilitate creation of the cervical esophagostomy in the right supraclavicular region. For this, a vertical incision was made in the right side of the neck and the sternocleidomastoid muscle was resected. Subsequently, a broad skin flap was raised to facilitate esophagostomy and inverted, and the esophagostomy was created by pulling up the oral end of the interrupted esophagus. A wide skin flap was sutured to the esophagus using the parachute technique, to avoid tear and subsidence of the oral side of the esophagus into the upper mediastinum. The esophagostomy required no drainage tube since there was no blind pocket at the oral end of the obstructed esophagus, thus avoiding the occurrence of a mediastinal abscess due to rupture of a blind pocket.

Two types of gastric tube bypass surgery were adopted depend on the patient's condition with or without esophago-respiratory fistula. One of the bypass surgery using a Y-shaped gastric tube was adopted for the patients without esophago-respiratory fistula. The Y-shaped gastric tube was pulled up via the retrosternal route and a hand-sewn layer to layer anastomosis for esophagogastric anastomosis was performed via a left cervical incision. Then, the feeding jejunostomy to facilitate alimentation was performed (Fig. 1). By contrast, the other gastric tube bypass surgery with Roux-en-Y reconstruction was adopted to enable oral alimentation for the patients with esophago-respiratory fistula. Roux-en-Y reconstruction was performed to prevent the direct esophagogastric reflux to esophago-respiratory fistula although the procedure took longer time compared to the former bypass surgery using a Y-shaped gastric tube. The gastric tube was pulled up via



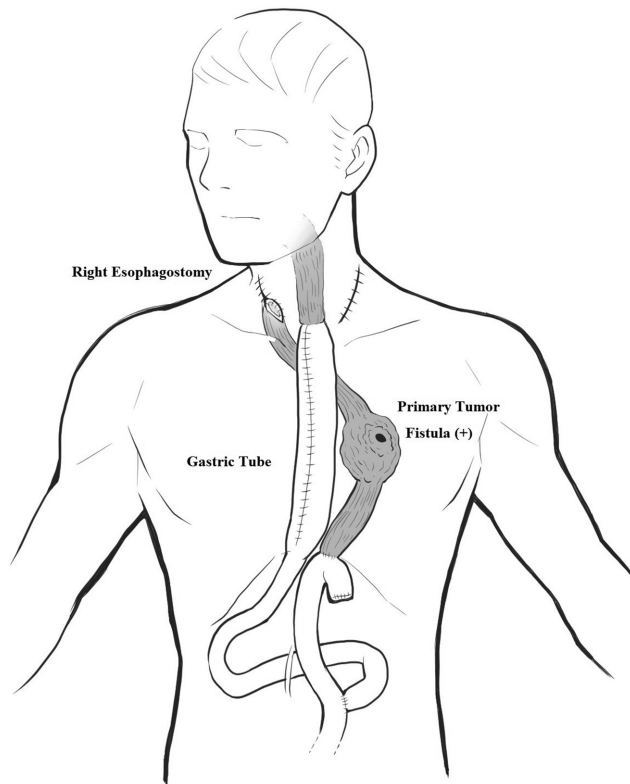
**Fig. 1** DRESS Y-shaped gastric tube bypass surgery is adopted for the unresectable esophageal cancer patients without esophago-respiratory fistulas. DRESS: drainage tubeless

the retrosternal route and stapling esophagogastric anastomosis was performed via a left cervical incision and the feeding jejunostomy to facilitate alimentation were performed (Fig. 2). These bypass procedures with esophagostomy in the right supraclavicular region required no artificial drainage tube, and since there was no blind pocket of the obstructed esophagus, the potential for mediastinitis due to rupture of the blind pocket was eliminated.

## Results

### Patient without esophago-respiratory fistula

The patient was an octogenarian female with esophageal squamous cell carcinoma invading the left main bronchus without an esophago-bronchial fistula. Esophageal obstruction due to esophageal cancer caused severe dysphagia and weight loss. Computed tomography and positron emission tomography revealed no lymph node or distant organ metastasis. With appropriate informed consent, a Y-shaped gastric tube bypass surgery, esophagostomy in the right supraclavicular region as presented in Fig. 1, and feeding jejunostomy to facilitate alimentation



**Fig. 2** DRESS gastric tube bypass surgery is adopted for the unresectable esophageal cancer patients with esophago-respiratory fistulas. DRESS: drainage tubeless

were performed prior to radiotherapy. The patient attend the hospital as an outpatient keeping the condition with per-oral intake at 1 year later after surgery.

### Patient with an esophago-respiratory fistula before any therapy

The patient was a male in his seventies with esophageal squamous cell carcinoma invading the descending aorta and the right lung, with an esophago-pulmonary fistula. Esophageal obstruction due to esophageal cancer caused severe dysphagia and weight loss of 8 kg over 2 months. Computed tomography and positron emission tomography revealed no lymph node or distant organ metastasis. Although definitive chemoradiotherapy was initially planned, it was not performed due to development of a lung abscess resulting from progression of the esophago-pulmonary fistula. Therefore, bilateral esophagostomy was created by interruption of the esophagus in the same manner as in Case 1, and a feeding jejunostomy was created as part of the therapy for the lung abscess to avoid the inflow of saliva through the fistulas and to improve nutrition. After definitive chemoradiotherapy, an

aortic stent was placed to prevent aortic rupture because the descending aorta was explored to esophageal lumen due to good response for chemoradiotherapy. Subsequently, with the patient's informed consent, gastric tube bypass surgery with Roux-en-Y reconstruction was performed to enable oral alimentation as in **Fig. 2**. The patient died because of cancer keeping the condition with per-oral intake 6 months later after surgery.

### Patient with esophago-respiratory fistula after induction of chemoradiotherapy

A female patient in her seventies presented with esophageal squamous cell carcinoma invading the left bronchus without an esophago-bronchial fistula. Esophageal obstruction due to esophageal cancer caused severe dysphagia and weight loss of 12 kg over the previous 2 months. Computed tomography and positron emission tomography revealed mediastinal lymph node metastasis, but no distant organ metastasis. She underwent induction chemoradiotherapy with 40Gy irradiation and 5-fluoro-uracil and cisplatin. Esophagectomy was planned since computed tomography after the induction of chemoradiotherapy indicated an excellent therapeutic response to the therapy. However, the patient developed high fever on the morning of the scheduled esophagectomy. Computed tomography performed at this time revealed a large esophago-bronchial fistula. Therefore, the scheduled esophagectomy was changed to bypass surgery using a gastric tube with Roux-en-Y reconstruction, esophagostomy, and feeding jejunostomy, in the same manner as in **Fig. 2**. The patient attend the hospital as an outpatient keeping the condition with per-oral intake at one year later after surgery without cancer regression.

### Discussion

Metallic stent therapy is a well-known palliative procedure for malignant esophageal stricture with or without esophago-respiratory fistula due to its minimum invasiveness, which is its most noteworthy feature.<sup>9,10</sup> Aoki et al. strongly recommends that stent intubation should be the first therapeutic choice in such cases since it enables oral food intake during the survival period and is associated with low in-hospital mortality.<sup>9</sup> In contrast, radiotherapy with or without chemotherapy is commonly adopted for patients with unresectable esophageal cancer, due to the high morbidity secondary to severe complications after stent insertion, in the form of hematemesis, gastrointestinal hemorrhage, or pneumonia; in fact, the

high incidence of treatment-related death following stent insertion was noted even in cases with good performance status preoperatively.<sup>10)</sup> Hence, there is still no consensus regarding the safety and efficacy of esophageal stenting.

On the other hand, Burt et al. reported that the median survival period of patients with esophago-respiratory fistula due to advanced esophageal cancer was 35 days, and that 17% of patients survived for more than 1 year after bypass surgery.<sup>11)</sup> In addition, Meunier et al. recommended bypass surgery for young patients to prolong their survival and improve their quality of life by allowing food intake although a high incidence of mortality and morbidity related to the cervical fistula due to poor nutrition and low immune status was reported.<sup>12,13)</sup> Therefore, various modifications have been made to the bypass surgery to improve its results, which have resulted in improved short- and long-term outcomes.<sup>5-8,14)</sup> However, one of the most important problems of the procedure is the drainage tube required for the secretions in the remnant esophagus above the stricture and in cases with esophagi-respiratory fistula because rupture of the esophagus due to accumulated secretions might lead to upper mediastinal abscess formation.<sup>8)</sup> However, the drainage tube itself might cause problems by getting dislodged or obstructed by viscous secretions. These concerns regarding the drainage tube might increase the patient's discomfort after discharge from the hospital. Therefore, the authors perform the modified bypass surgery that requires no drainage tube in some situations.

In lieu of the drainage tube, the authors performed right esophagostomy in the patients. The difficulty of the procedure and high incidence of morbidity following esophagostomy in the right supraclavicular region have been previously reported.<sup>5)</sup> The authors modified and improved the standard esophagostomy procedure to avoid these morbidities. Following a vertical incision and resection of the sternocleidomastoid muscle, a wide skin flap is created such as skin flap in mastectomy for breast cancer, and subsequently sutured to the esophagus using the parachute technique to avoid tear and subsidence of the oral side of the esophagus into the upper mediastinum. Postoperative care of the esophagostomy is very simple, merely requiring application of a small gauze patch since the amount of esophageal secretions is very small, making it very easy for patients to care for the stoma after discharge from the hospital. After the introduction of these modifications, we have not experienced any morbidities or complaints from the patients concerning the esophagostomy. In addition, endoscopic examination of the esophagus can be easily

performed through the esophagostomy, allowing evaluation of the efficacy of radiotherapy and chemotherapy. This might be another advantage of esophagostomy because endoscopic examination provides the surgeon or physician with valuable information to guide subsequent therapy.

The authors alter the treatment for malignant strictures of the distal esophagus with or without esophago-respiratory fistula. Bypass surgery using a Y-shaped gastric tube results in loss of gastric fundic function and might precipitate esophagogastric reflux with increased abdominal pressure. Thus, the authors recommend that Postlethwait type bypass surgery using a Y-shaped gastric tube should be adopted for patients without esophago-respiratory fistulas, as demonstrated in Case 1. Because those patients without esophago-respiratory fistula does not need to prevent pneumonia or lung abscess from influx of gastric juice through the esophago-respiratory fistula. In contrast, the authors adopt the Kirschner-type Roux-en-Y procedure in patients with esophagi-respiratory fistulas, maintaining a distance of 40 cm between esophago-jejuno and jejuno-jejuno anastomoses to avoid reflux of digestive secretions although this procedure requires multiple anastomoses, which may be troublesome. These procedures enabled successful per-oral intake and discharge from the hospital in Cases 2 and 3.

In conclusion, DRESS bypass surgery eliminates the problems associated with the drainage tube and enables per-oral food intake. Surgeons should familiarize themselves with various surgical techniques even if out of their expertise because minor modifications to the surgical procedure might help improve not only the short- and long-term outcomes of the surgery but also the patients' quality of life.

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## Ethical Approval

This report was approved by University of Miyazaki Hospital Clinical Research Assist Center. (No. O-0182) and in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## Informed Consent

Informed consent was obtained from all individual participants included in the study.

## Disclosure Statement

The authors have not been any supported by any organization in the present report.

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