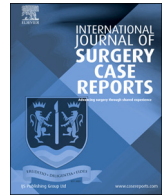


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Bilateral approach for thoracoscopic esophagectomy with lymph node dissection in the dorsal area of the thoracic aorta in patients with esophageal cancer: A report of two cases



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ABSTRACT

INTRODUCTION: The incidence of lymph node metastasis in the dorsal area of the thoracic aorta (DTA) is relatively low in patients with esophageal cancer. It is difficult to approach the DTA using surgical procedures, such as an open thoracotomy and thoracoscopy in the left decubitus position.

CASE PRESENTATION: Case 1: A 70-year-old man with esophageal cancer underwent thoracoscopic esophagectomy with mediastinal lymph node dissection via a right thoracoscopic approach, followed by lymphadenectomy in the DTA via left thoracoscopy in the prone position. Microscopic findings revealed two metastatic lymph nodes in the DTA. The definitive diagnosis was squamous cell carcinoma of the esophagus, and the pathological stage was T2N3M0 (Union for International Cancer Control [UICC], 7th edition). The patient showed lung metastasis 8 months after the surgery. Case 2: A 72-year-old man with esophageal cancer underwent esophagectomy via a bilateral approach in the prone position, using a similar procedure as in case 1. The definitive diagnosis was squamous cell carcinoma of the esophagus, and the pathological stage was T3N2M0. The patient showed a metastatic mediastinal lymph node 4 months after the surgery.

CONCLUSION: Bilateral thoracoscopic esophagectomy in the prone position can be safely performed, and it might be an alternative curative surgery for esophageal cancer. However, both our cases showed metastasis in the early postoperative period. The long-term outcome and significance of dissection of lymph nodes in the DTA in patients with esophageal cancer remains controversial. Further studies are required to establish the indications and efficacy of this therapeutic approach.

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1. Introduction

Lymph node metastasis in the dorsal area of the thoracic aorta (DTA) in patients with esophageal cancer is relatively rare [1], and thoracoscopic esophagectomy with lymph node dissection is difficult via a standard right thoracic approach. Thoracoscopic surgery for esophageal cancer via the left thoracic cavity has been reported in patients with situs inversus totalis [2–4]. However, there have been only few reports on thoracic surgery via a left thoracic approach for dissection of lymph nodes in the DTA among esophageal cancer patients [5]. Here, we present two cases

Abbreviations: DTA, dorsal area of the thoracic aorta; CT, computed tomography; PET, 18F 2-fluoro-2-deoxy-D-glucose positron emission tomography; SUVmax, maximum standardised uptake value.

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of esophageal cancer with lymph node metastasis in the DTA that successfully underwent thoracoscopic esophagectomy via a bilateral thoracoscopic approach performed in the prone position. Furthermore, we have discussed and reviewed relevant literature regarding the long-term outcome and significance of dissection of lymph nodes in the DTA among esophageal cancer patients.

2. Case presentation

2.1. Case 1

A 70-year-old man visited a physician with a complaint of difficulty in swallowing and was referred to our hospital. His medical history included hypertension, hyperlipidemia, and a vocal cord polyp. Upper gastrointestinal tract endoscopy showed a type 3 tumor in the upper thoracic esophagus. Endoscopic biopsy samples were obtained from the tumor, and analysis revealed squamous cell carcinoma of the esophagus. Computed tomography (CT) showed a thick wall in the upper esophagus and lymph node swelling

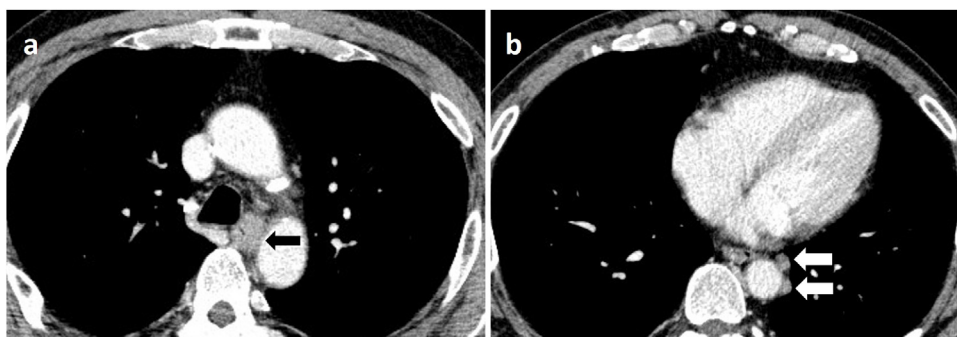


Fig. 1. Computed tomography images. Computed tomography images show a thick wall in the upper thoracic esophagus (a) and lymph node swelling in the dorsal area of the thoracic aorta (b).

around the bilateral recurrent laryngeal nerves and DTA (Fig. 1a, b). Positron emission tomography (PET) was performed, and the maximum standardized uptake value of the lymph nodes in the DTA was 3.1. The clinical TNM staging (TNM 7th edition) was T3N3M0 stage IIIB.

Two cycles of 5-fluorouracil (800 mg/m² from days 1–5) and cisplatin (80 mg/m² on day 1) were administered intravenously as neo-adjuvant chemotherapy [6], without any adverse events. We evaluated the effect of neo-adjuvant chemotherapy according to the tumor response to chemotherapy based on the response evaluation criteria in solid tumors (RECIST) [7], and noted stable disease (SD) for the primary tumor and the lymph nodes in the DTA. On PET, F-fluoro-2-deoxy-D-glucose accumulation in the lymph nodes in the DTA was not noted. CT showed significant shrinking one of three lymph nodes and no change in the size of the other two lymph nodes in the DTA. Thoracoscopic esophagectomy with lymph node dissection was planned. General anesthesia was administered with single-lumen endotracheal intubation for bilateral lung ventilation. Thoracoscopic esophagectomy with lymph node dissection via a bilateral thoracic approach was performed in the prone position under 8 mmHg of artificial pneumothorax. Thoracic esophagectomy and mediastinal lymph node dissection were performed using five ports via the right thoracic cavity. The thoracic duct was preserved. The operating field was changed from the right to the left thoracic cavity, and the left arm was raised, while the right arm was pulled down. The procedure via the left side approach was performed using four ports (Fig. 2) to dissect around the DTA according to the preoperative navigation CT findings (Fig. 3a). The thoracoscopic operational view is shown in Figs. 3b and c. Lymph nodes around the DTA were close to two left posterior intercostal arteries; therefore, these arteries were divided. Hand-assisted gastric

tube mobilization was performed in the supine position. The gastric tube was inserted through the post mediastinal route, and hand-sewn anastomosis was performed between the gastric tube and the esophagus in the neck. Chest tubes in both thoracic cavities were removed 2 days post-surgery. The definitive diagnosis was pathological T2N3M0 (G2, stage IIIC) squamous cell carcinoma of the esophagus. Barium studies revealed no leakage in the anastomosis; however, resumption of diet was delayed due to the endoscopic finding of delayed wound healing in the anastomotic area. The patient was discharged to home 26 days after the surgery (Table 1). CT and PET performed 8 months after the surgery revealed lung metastasis in the left lung, and the patient is being administered chemotherapy intravenously.

2.2. Case 2

A 72-year-old man with complaints of dysphagia and vomiting visited our hospital for the treatment of esophageal cancer. He had undergone appendectomy at 30 years of age.

Upper gastrointestinal tract endoscopy revealed esophageal stenosis due to a tumor present 36 cm from his incisor. Endoscopic biopsy indicated squamous cell carcinoma of the esophagus. CT showed a thick wall in the lower esophagus and lymph node swelling in the DTA (Fig. 4a). The clinical TNM staging (TNM 7th edition) was T3N2M0 stage IIIB. Neoadjuvant chemotherapy was performed according to the same protocol as in case 1, and no adverse events were noted. We evaluated the tumor response to chemotherapy based on RECIST [7], and noted SD for both the primary tumor and the lymph nodes in the DTA. Subtotal esophagectomy with lymph node dissection was planned. General anesthesia was administered as in case 1. Subtotal esophagectomy and lymph node dissection were performed via the right thoracic cavity, followed by dissection of the lymph nodes around the DTA. The procedure via the right thoracic approach was longer in case 2 than in case 1 owing to the hard adhesion of the right lung and pleura. The lymph nodes in the DTA were dissected via the left thoracic cavity, and the intercostal arteries were identified using preoperative three-dimensional CT for reference (Figs. 4b, c). The definitive diagnosis was pathological T3N2M0 (G2, stage IIIB) squamous cell carcinoma of the esophagus. The perioperative outcomes are shown in Table 1. The patient had melena on day 19 due to the sigmoid diverticulitis, which was subsequently treated conservatively. The patient was discharged 27 days after the surgery. CT and PET performed 4 months after the surgery revealed lymph node metastasis around the lower mediastinum and the DTA. The patient is currently being administered chemotherapy intravenously.

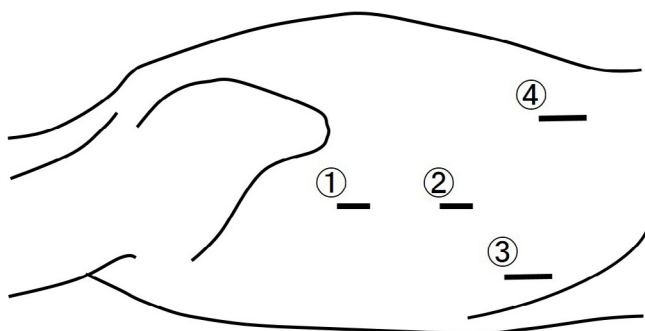


Fig. 2. Placement of the ports.

①: A 5-mm port is placed in the 5th intercostal space along the middle axillary line (grasping forceps). ②: A 5-mm port is placed in the 7th intercostal space along the middle axillary line (operator's use). ③: A 12-mm port is placed in the 8th intercostal space along the posterior axillary line (assistant's use). ④: A 12-mm port is placed in the 9th intercostal space along the posterior axillary line (camera port).

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