

## Successful Surgical Treatment for an Aorto-esophageal Fistula due to a Descending Aortic Aneurysm

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The patient was a 68-year-old man who consulted another hospital with a chief complaint of dysphagia, and was referred to our hospital based on a suspicion of esophageal submucosal tumor. However, the patient was emergently admitted due to hematemesis and hypotension, which occurred immediately after the acquisition of computed tomographic (CT) images for further examinations at the outpatient clinic. Contrast-enhanced chest CT demonstrated a thoracic aortic aneurysm measuring 45 mm in maximal diameter, in addition to pneumatization adhering to mural thrombus, which appeared to be the esophagus. Upper gastrointestinal endoscopy also demonstrated ulcerative lesions accompanied by coagulations in the middle thoracic esophagus. Therefore, emergency surgery was performed based on a diagnosis of an aorto-esophageal fistula due to a descending aortic aneurysm. Graft replacement was performed under partial extracorporeal circulation, followed by total thoracic esophagectomy, esophagostomy, and gastrostomy after weaning from extracorporeal circulation. This study reports the course of a patient with an aorto-esophageal fistula due to a thoracic aortic aneurysm whose life was successfully saved by emergency surgery, together with literature. (*Ann Thorac Cardiovasc Surg* 2003; 9: 257–60)

**Key words:** aorto-esophageal fistula, aortic aneurysm, emergency surgery

### Introduction

An aorto-esophageal fistula rarely results from a thoracic aortic aneurysm, and the outcome of patients with such a disorder is poor. In this study, we encountered a patient with an aorto-esophageal fistula due to a thoracic aortic aneurysm who was successfully treated by emergency graft replacement and esophagectomy.

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### Case Report

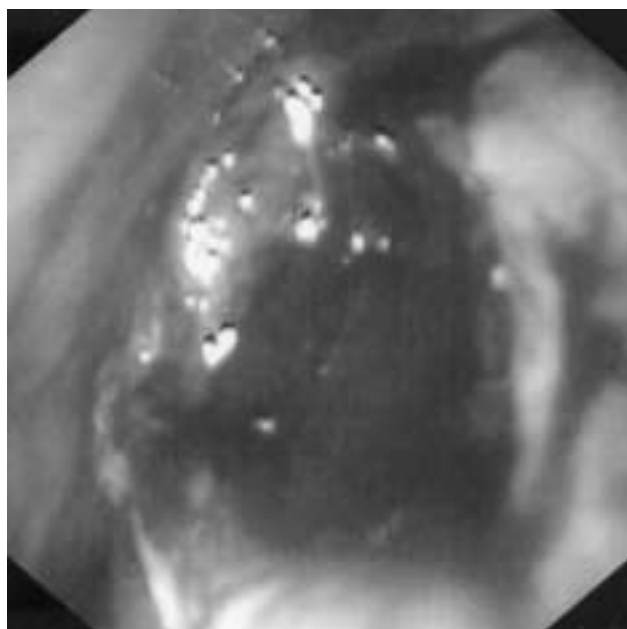
The patient was a 68-year-old man who consulted another hospital with a chief complaint of dysphagia in March 2002. Since esophagography demonstrated a smoothly lined compressive image in the middle thoracic esophagus, the patient was referred to our hospital based on a suspicion of esophageal submucosal tumor (Fig. 1). He had a history of diabetes mellitus, mild renal dysfunction, and gastric ulcers. On June 21, the patient was emergently admitted because of hematemesis and subsequent loss of consciousness, which occurred immediately after the acquisition of computed tomographic (CT) images for further examinations at the outpatient clinic. On admission, blood pressure was 76/32 mmHg, pulse rate was 150/min, and hemoglobin levels were 7.7 g/dl, demonstrating hemorrhagic shock. Hematemesis discontinued after transfer to the intensive care unit, and the patient recovered consciousness along with hemodynamic



**Fig. 1.** Preoperative esophagography.



**Fig. 2.** Preoperative contrast-enhanced chest CT.



**Fig. 3.** Preoperative upper gastrointestinal endoscopic view.

stabilization. Chest X-ray demonstrated a protruding shadow of the descending aorta. Contrast-enhanced chest CT images acquired at thoracic regions below the tracheal bifurcation before the occurrence of hematemesis also demonstrated a thoracic aortic aneurysm measuring 45 mm in maximal diameter extending toward the mediastinum, in addition to pneumatization adhering to mural thrombus, which appeared to be the esophagus (Fig. 2). However, there was no retention of pleural effusion. Based on the above symptoms and CT findings, the patient was diagnosed as having an aorto-esophageal fistula due to a thoracic aortic aneurysm, and emergency surgery was scheduled. When upper gastrointestinal endoscopy was performed under general anesthesia, ulcerations were detected in the esophagus 30 cm from the upper cutting tooth, which corresponded to the compressive region detected by esophagography (Fig. 3). Since the ulcer base was covered with clots, emergency surgery was performed after establishing a definitive diagnosis of an aorto-esophageal fistula due to a thoracic aortic aneurysm.

During the securing of the femoral artery and vein in the left inguinal region, thoracotomy was performed by posterolateral incision. Although there was no hematoma in the thoracic cavity, a fusiform descending aortic aneu-

rysm measuring 45 mm in maximal diameter was detected. Partial extracorporeal circulation was performed, an inflow cannula was inserted into the right atrium via the left femoral vein and an outflow cannula was inserted into the left femoral artery. However, the patient fell into a state of shock due to further hematemesis, and sufficient blood flow was not obtained because the blood was poorly pumped out of the femoral vein. Therefore, both the central and peripheral regions of the aneurysm were interrupted emergently, and stable circulation was maintained by additional blood from the left atrium. When the

aneurysm was incised, a fistula measuring 20 mm in diameter was ruptured in the esophagus. This fistula was transiently covered with the aneurysmal wall to prevent infections, and graft replacement was performed using the Dacron graft. After weaning from extracorporeal circulation, total thoracic esophagectomy, esophagostomy, and gastrostomy were performed because the esophagus might become a source of postoperative infections.

Although the patient complained of fever due to postoperative aspiration pneumonia, favorable relief was achieved, and reconstruction using a gastric tube was performed on August 8. Oral food intake became possible thereafter; however, the patient developed right spontaneous pneumothorax. Thoracoscopic partial pulmonary resection was performed on October 7 to treat the persistent fistula. Thereafter, the prognosis was good, and the patient was discharged on October 26.

## Discussion

Shimizu et al.<sup>1)</sup> reported that an aorto-esophageal fistula rarely results from a thoracic aortic aneurysm, and its frequency was only 5.2% of all cases of ruptured thoracic aortic aneurysm. Since Synder et al.<sup>2)</sup> reported the first patient who survived despite the presence of an aorto-esophageal fistula due to thoracic aortic aneurysm in 1983, only 12 such cases have been reported to date. Therefore, it is very difficult to save the lives of patients with an aorto-esophageal fistula due to a thoracic aortic aneurysm.

Most cases of thoracic aortic aneurysm are asymptomatic, and it is not readily detected by chest X-ray because the shadow of the mediastinum frequently overlaps that of the thoracic aortic aneurysm. Therefore, the risk of rupture is extremely high when certain symptoms are noted. The clinical symptoms of an aorto-esophageal fistula due to a thoracic aortic aneurysm generally consist of midthoracic chest pain, sentinel arterial hemorrhage and fatal hemorrhage as Chiari<sup>3)</sup> reported that these clinical symptoms are the trilogy of an aorto-esophageal fistula. In addition, since many patients with an aorto-esophageal fistula complain of dysphagia due to compression of the esophagus by the aortic aneurysm,<sup>2,4-6)</sup> differentiation from an esophageal submucosal tumor is important. In our patient, an esophageal submucosal tumor was initially suspected by a referring physician. Therefore, the differential diagnosis considering the possibility of a thoracic aortic aneurysm should always be required in patients with dysphagia. Among 12 patients

with an aorto-esophageal fistula due to a thoracic aortic aneurysm who were successfully treated, only one showed fatal massive hemorrhage following the silent stage.<sup>7)</sup> Therefore, emergency surgery should always be performed in patients showing three characteristic symptoms (hematemesis, dysphagia, and chest pain) before the occurrence of massive hemorrhage, considering the possibility of an aorto-esophageal fistula due to a thoracic aortic aneurysm. A definitive diagnosis can be established when ulcerations accompanied by coagulations are detected by endoscopy following confirmation of a thoracic aortic aneurysm by CT. However, since upper gastrointestinal endoscopy-induced hypertension may have increased the risk of further hemorrhage, endoscopy was performed in our patient under general anesthesia. Fortunately, hematemesis occurred in our patient while he was in the hospital, and emergency surgery was performed before the occurrence of further hemorrhage based on a diagnosis of an aorto-esophageal fistula due to a thoracic aortic aneurysm. Massive hematemesis was observed in our patient before aortic interruption, and partial extracorporeal circulation was initiated by pumping out the blood from the femoral vein and returning it via the femoral artery. Although sufficient blood flow was not obtained because the blood was poorly pumped out of the femoral vein, stable circulation was maintained thereafter by additional blood from the left atrium. We think that a delay before the initiation of surgery would have resulted in a fatal outcome.

Even when the general physical condition of patients with an aorto-esophageal fistula due to a thoracic aortic aneurysm transiently improves after graft replacement, many such patients may die from graft infections due to mediastinitis and pyothorax.<sup>8)</sup> An effective means against graft infections is omental wrapping.<sup>5)</sup> We retained the omentum because reconstruction using a gastric tube in a second operation was scheduled. To protect the esophagus from postoperative infections, the fistula was covered with the aneurysmal wall, and graft replacement and total thoracic esophagectomy were performed. Therefore, we judged that there was no risk of graft infections. Since the esophagus may become a source of postoperative infections, the treatment of the esophagus is a controversial point. In nine of the 12 patients with an aorto-esophageal fistula due to a thoracic aortic aneurysm who were successfully treated, esophagectomy was not initially performed, although the esophageal fistula was closed. However, esophagectomy was performed thereafter in two of these nine patients due to postoperative

mediastinitis.<sup>2,9)</sup> Therefore, we consider that esophagectomy should be performed in all such patients to prevent postoperative graft infections, if their general physical condition can tolerate surgical invasion. In our patient, both graft replacement and esophagectomy were performed simultaneously, and reconstruction using a gastric tube was secondarily performed after the improvement of his general physical condition. Consequently, the patient survived without any severe postoperative complications.

## Conclusions

We encountered a patient with an aorto-esophageal fistula due to a thoracic aortic aneurysm whose life was successfully saved by emergency surgery following a rapid diagnosis before the occurrence of a fatal massive hemorrhage. Therefore, we consider that as much as possible of the esophagus should be removed to prevent postoperative infections. This study reported a rare case of an aorto-esophageal fistula due to a thoracic aortic aneurysm, in which the patient was successfully treated by emergency surgery.

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