

Repairing Bronchoesophageal Tube Fistula Using A Contralateral Latissimus Dorsi Musculocutaneous Flap

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Summary: A postoperative aerodigestive fistula is one of the rare but critical complications after esophagectomy, and management is challenging. The essential keys to successful treatment of these fistula are thorough debridement and complete closure followed by separation of the respiratory and digestive tract. We present a case of a recurrent bronchoesophageal fistula between the left main bronchus and neo esophagus, which was successfully treated through a contralateral approach. The fistula was debrided and closed primarily through a right thoracotomy, and the interposition of a pedicled latissimus dorsi musculocutaneous flap from the right side was carried out. The patient was able to resume oral feeding at 16th postoperative day. (*Plast Reconstr Surg Glob Open* 2017;5:e1484; doi: 10.1097/GOX.0000000000001484; Published online 26 September 2017.)

CASE REPORT

A 61-year-old man who was presented with a bronchoesophageal fistula between the left main bronchus and the neo esophagus reconstructed with gastric tube pull up. Initially, the patient was diagnosed with esophageal cancer (cT2N0M0 stageIB) and underwent transthoracic esophagectomy with laparoscopic-assisted digestive tract reconstruction by gastric tube pull up in June 2011. Early postoperative course was good enough to begin a soft diet at day 7. Although the first barium swallow test performed on postoperative day 9 showed no signs of any abnormalities, the patient had the sudden onset of dyspnea, choking, and coughing. The next barium swallow test on postoperative day 16 showed an apparent evidence of fistula formation between the left main bronchus and the staple line along the gastric lesser curvature. Nonsurgical treatments, including endoscopic clipping and stenting, were tried several times, but the fistula was refractory. The patient was unable to tolerate oral feeding, and a feeding jejunostomy was created. After the improvement of the patient's systemic nutrition status, endoscopic fistula resection and primary closure was performed again in August 2013, but failed.

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Finally, the patient was referred to the department of plastic and reconstructive surgery for treatment of the fistula 27 months after the initial esophagectomy. A fistula resection and closure, combined with the LD muscle flap coverage, was planned. Though the distance to the fistula was closer via the left thoracic cavity, a right-sided approach was preferable as it kept away from the aorta (Fig. 1). The flap was constructed along the right anterior edge of the LD muscle with a 6×20 cm skin island. After flap elevation, standard thoracotomy was performed by the general surgical team. The right anterior fifth rib was removed to access the thoracic space. Under single-lung ventilation, the lesion was approached through the posterior mediastinum (Fig. 2A). After a division of the fistula, the sizes of the defects were found to be 1×1 cm at the bronchus side and 1.5×4 cm at the gastric tube side, respectively. Preparations of the edges were made to expose viable mucosa of each aperture. Primary closure with 3-0 polydioxanone suture in Gambee style was made to repair both apertures (Fig. 2B). The LD musculocutaneous flap was planted to plug into the space between the repaired apertures. The flap route into the thoracic cavity was created by dissecting the first intercostal space muscles. The flap was put into a position along the mediastinum. The muscle side of the flap was then sutured with the bronchus side. The deepithelized skin island of the flap was sutured with the gastric-tube side to reinforce the primarily closed aperture (Fig. 3).

The patient gradually improved after reconstructive surgery, with dyspnea and coughing resolved and oral intake improved. Additional barium contrast swallows were performed with results showing no signs of fistula remaining. The jejunostomy was closed in 2 weeks. Since his dis-

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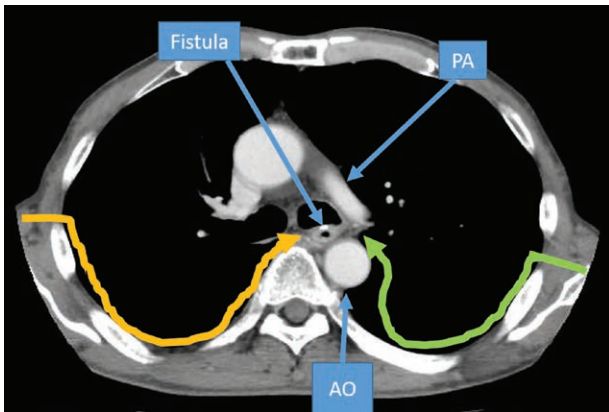


Fig. 1. Ipsilateral approach (green arrow) and contralateral approach (orange arrow) of the fistula. Contralateral approach can avoid the obstruction posed by the aorta and the pulmonary artery.

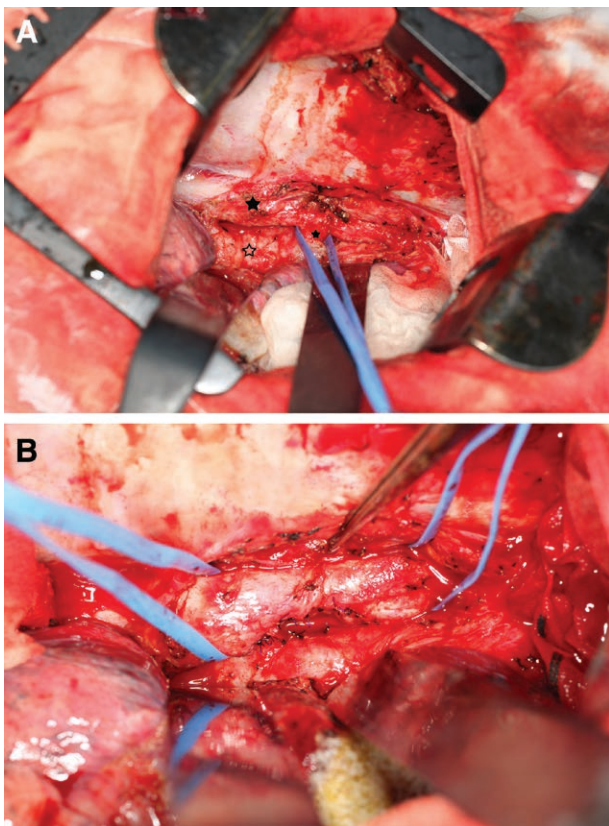


Fig. 2. A, Intraoperative view of the aerodigestive fistula (asterisk) between left main bronchus (white star) and gastric tube (black star). B, After primary closure with 3-0 polydioxanone suture of each aperture.

charge, he has been followed at an outpatient clinic every 3 months. As of 1 year and 3 months of closing the fistula, he was doing well clinically with no signs of recurrence.

DISCUSSION

An aerodigestive fistula is an uncommon yet life-threatening complication of locally advanced cancer even before surgery. Whether after conservative management or surgi-

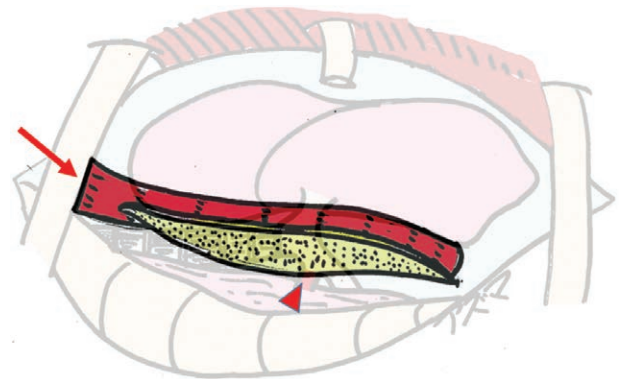


Fig. 3. A schematic illustration showing the muscle (arrow) inset in the pleural cavity and cover where the fistula (arrow head) was.

cal repair, these fistulae are often refractory and may cause aspiration pneumonia or infection of the mediastinum.

The essence of surgical repair of the fistula can be summarized as follows: covering the primarily closed aperture using a vascularized flap with no tension and separating each aperture with flap tissue to prevent recurrence of fistula.^{1,2} This principle was proposed by Arnold and Pairolero,³ who stated that drainage, muscle transposition, and obliteration must be done in a step-wise sequence with no “short cuts.” Several other surgical options have been mentioned. Polyglactin mesh covered by a serratus anterior muscle flap⁴ or a split LD muscle flap⁵ are a few examples.

The treatment is fundamentally the same as for the other aerodigestive fistulae. Although the fistula was located on the left side, we chose the contralateral LD musculocutaneous flap because the approach can avoid the obstruction posed by the aorta and the pulmonary artery, also because the right pleural cavity was less inflamed and scarred. LD musculocutaneous flap at the contralateral side has a long enough rotation arc to reach the lesion without any tension at the pedicle through a safer posterior mediastinum route. The contralateral approach could be an excellent option for the treatment of bronchoesophageal fistula.

SUMMARY

We present a case of a recurrent bronchoesophageal fistula between the left main bronchus and neoesophagus after primary esophagectomy with gastric tube reconstruction. The fistula was debrided and closed primarily through a right thoracotomy, and the interposition of pedicled latissimus dorsi (LD) musculocutaneous flap was carried out. We used a contralateral approach to keep away from the aorta, and this was an excellent option for the reconstruction. The patient was able to resume oral feeding at 16th postoperative day. It took about 28 months from the initial esophagectomy.

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