

## 전후두절제술로 치료한 기관식도루 1예

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### A Case of Tracheoesophageal Fistula Treated by Total Laryngectomy

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A 47-year-old man was referred for TEF. He underwent tracheostomy three months ago to maintain prolonged ventilator care. Computed tomography (CT) scan and fiberoptic examination showed bilateral vocal cord palsy with median fixation and about 2 inch sized long segmental tracheoesophageal fistula (TEF) tract along the necrotic cricoid and tracheal cartilages. Narrow field total laryngectomy was performed to remove devitalized cartilages and mucosa, and repair TEF. He discharged without complication except mild stenotic change of tracheal fenestration 19 days later. **Korean J Bronchoesophagol 2013;19:25-27**

**KEY WORDS** Tracheoesophageal fistula · Total laryngectomy.

### Introduction

TEF formation is an uncommon problem which can be resulted from a spectrum of disease processes. The acquired type of TEF may be caused by malignancies or hosts of non-malignant entities. TEF from malignancy is a devastating complication, primary tumor is located usually in esophagus, lung, trachea, larynx, thyroid, and lymph nodes.<sup>1)</sup> Etiologic factors of acquired nonmalignant TEFs are penetrating trauma, granulomatous mediastinal infections, prior esophageal surgery, prior tracheal surgery, injuries resulted from airway procedures, indwelling stents, and AIDS. However, the most common cause of nonmalignant TEF is a result of mechanical ventilation.<sup>2)</sup> This complication is generally occurs either as a result of posterior wall perforation during a procedure or posterior wall erosion caused by excessive cuff pressures or

tube abrasion. Surgical correction is required because spontaneous closure is rare in this patients.

The most noted treatment of a nonmalignant TEF is a one-stage primary surgical repair including esophageal closure, segmental tracheal resection, and primary reconstruction definitely corrects the fistula and should be the preferred closure method.<sup>3)</sup> Large number of postintubation TEFs can be repaired via low cervical collar approach. In cases of small TEFs with normal trachea, tracheal resection is not essential. The fistula can be repaired from the side, instead of through the tracheal transection.<sup>4)</sup> If the tracheal defect is larger or in cases with significant scar on the tracheal aspect of the fistula, small amount of esophagus can be left in place on tracheal side of TEF. It can be used in the repair to prevent tracheal narrowing.

Large TEFs with circumferentially damaged trachea requires tracheal resection and reconstruction. This procedure is more complicated, but exposure of operative field is better than lateral approach. It does need to be noted that extensive, complicated TEFs require a more involved tracheal resection and reconstruction. Here, we report a case of total laryngectomy and fistula repair due to extensive, severe TEF combined with tracheomalacia and bilateral immobile vocal cord after tracheostomy.

논문접수일: 2013년 6월 4일 / 심사완료일: 2013년 6월 10일

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### Case

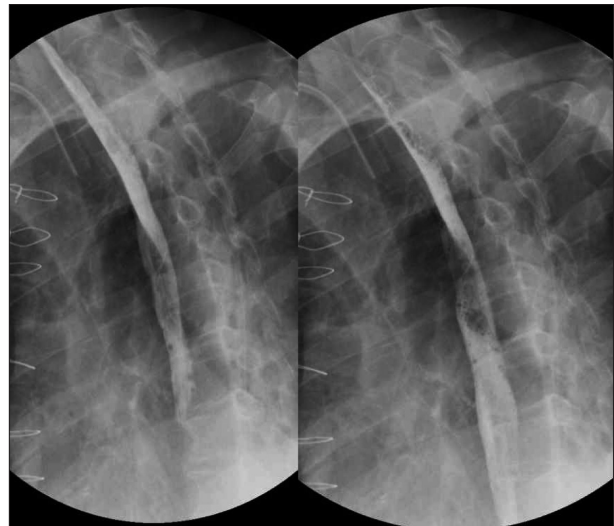
A 47-year-old man presented to the emergency room for postintubation TEF. This patient underwent tracheostomy three months ago in order to sustain prolonged ventilator care for myocardial infarction and continuous renal replacement therapy due to chronic renal failure. There was a dyspnea attack to this patient. On computed tomography (CT) scan (Fig. 1) and fiberoptic laryngoscopic examination (Fig. 2), there was bilateral immobile vocal cord with median fixation, obliteration of glottic airway, long segmental tracheoesophageal fistula tract in the lower neck with injury and necrosis of cricoid and cervical tracheal cartilages. This patient hospitalized to cardiovascular surgery department first and undergone coronary artery bypass graft surgery. After stabilization of general condition, he transferred to otolaryngology department and took total laryngectomy and TEF repair under general anesthesia.

During the operation, narrow-field total laryngectomy was done. After skin incision and flap elevation, trachea and larynx were exposed. Tracheal resection below the fistula was done first. We could not save enough length of tracheal cartilage due to extensive necrotic and malatic change. Then laryngectomy was done just above thyroid cartilage superiorly. Trimming of mucosa around the TEF site and primary repair was done. The operation ended with tracheal fenestration, and primary closure of incised skin.

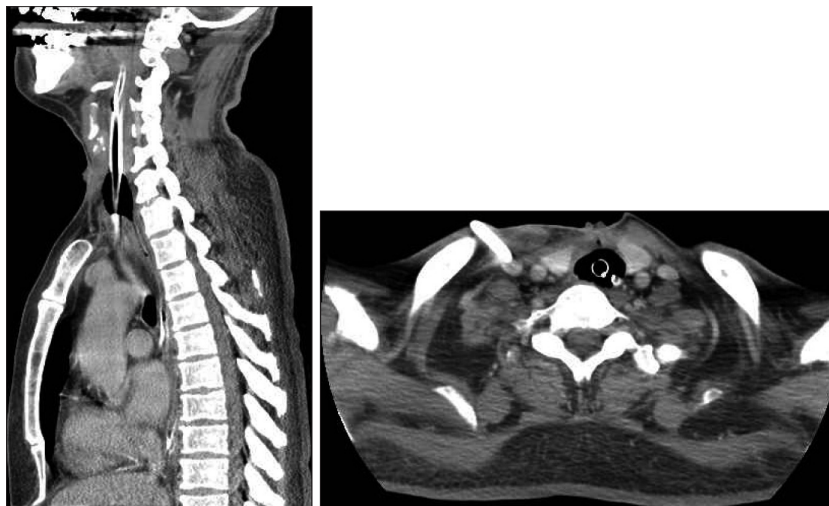
There was no extraluminal leakage or passage disturbance of gastrografin on esophagography (Fig. 3) which was done on the 9th day of postoperative course, this patients started oral feeding with liquid diet. With successful soft diet feeding with no complications such as aspiration or leakage, he discharged at 19 days after operation. At outpatient clinic follow



**Fig. 2.** Fiberoptic exam of the patients shows both immobile vocal cord combined severe saliva pooling.



**Fig. 3.** Postoperative esophagography of the patient at nine days after the operation. No extraluminal leakage of contrast is seen.



**Fig. 1.** Initial sagittal and axial image of CT scan at dyspnea attack of the patient. Long segmental TEF in the lower neck area is seen.

up at two months after, there was mild stenotic change of tracheostoma, dilatation was done and tracheal cannula reinserted to sustain enough diameter of stoma.

## Discussion

TEF is a rare complication of endotracheal intubation or tracheostomy. The process occurs either as a result of posterior tracheal wall perforation during procedure or erosion of posterior wall caused by excessive cuff pressures or tube abrasion.<sup>5)</sup>

Symptoms of TEF may include choking, coughing with feedings, aspiration of food contents, gastric distention, positive cuff leak, dyspnea, repeating pneumonia, and copious secretions.

Plain chest radiographs showing esophageal dilatation with air distal to TEF may be subtle, but they are pathognomonic findings of TEFs. Plain radiography might show the cuff of the tracheostomy tube outside of the tracheal lumen. Diagnosis of TEF can be made by CT scan, barium or water-soluble contrast esophagography.<sup>6)</sup> Esophagography and esophagoscopy is recommended to ensure optimal diagnostic accuracy for TEF.<sup>7)</sup>

When the diagnosis of TEF has been confirmed, by placing the tracheostomy tube cuff distal to the fistula, tracheobronchial soliage can be minimized. Reflux of gastric contents can be prevented by placing gastrostomy or jejunostomy tube. Generally, surgical correction is required because spontaneous closure of TEF is rare.<sup>8)</sup>

The most noted operative approach of a nonmalignant TEF

is a one-stage primary surgical repair.<sup>9)</sup> Other surgeons indicate that one-staged operation including esophageal closure, segmental tracheal resection, and primary reconstruction definitely corrects the fistula and should be preferred for treatment of TEF. It does need to be noted that large complicated TEFs require more resection of involved trachea and reconstruction.

In this case, patient with large TEF was successfully treated with fistula repair and total laryngectomy whose larynx is not functioning at all. Apart from small TEF, an extended surgery such total laryngectomy should be considered as a candidate of treatment options for large and complicated TEFs.

## REFERENCES

- 1) Burt M, Diehl W, Martini N. Malignant esophagorespiratory fistula: management options and survival. *Ann Thorac Surg* 1991;52:1222-9.
- 2) Bartlett RH. A procedure for management of acquired tracheoesophageal fistula in ventilator patients. *J Thorac Cardiovasc Surg* 1976;71:89-95.
- 3) Csikos M, Horvath O, Petri A, Szendrenyi V, Olah T. Surgical treatment of acquired, benign esophagorespiratory fistulas. *Zentralbl Chir* 2004;129:104-7.
- 4) Mathisen DJ, Grillo HC, Wain JC. Management of acquired nonmalignant tracheoesophageal fistula. *Ann Thorac Surg* 1991;52:759-65.
- 5) Sue RD, Susanto I. Long-term complications of artificial airways. *Clin Chest Med* 2003;24:457-71.
- 6) Johnson JF, Sueoka BL, Mulligan ME. Tracheoesophageal fistula: diagnosis with CT. *Pediatr Radiol* 1985;15:134-5.
- 7) Shanmuganathan K, Mirvis SE. Imaging diagnosis of nonaortic thoracic injury. *Radiol Clin N Am* 1999;37:533-51.
- 8) Reed MF, Mathisen DJ. Tracheoesophageal fistula. *Chest Surg Clin N Am* 2003;13:271-89.
- 9) Fiala P, Cernohorsky S, Cermak J. Tracheal stenosis complicated with tracheoesophageal fistula. *Eur J Cardiothorac Surg* 2004;25:127-30.