



## Trachea- Esophageal Fistula: Very Unusual, Dreadful Complication of Tracheostomy and Supraclavicular Island Flap

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### Abstract

Acquired trachea-esophageal fistula is rare and is mainly described in the adult population as a result of trauma, corrosive ingestion, foreign body, inflammatory process, or malignancy. Endotracheal cuff-related acquired trachea-esophageal fistula already reported in literature. Here we report a unusual case of tracheostomy tube cuff related trachea-esophageal fistula with a history of persistent cough and dysphagia over a period of months. She ultimately underwent fistula repair.

**Keywords:** Trachea-Esophageal Fistula; Tracheostomy Cuff; Supraclavicular Flap

### Introduction

Acquired trachea-esophageal fistula are most commonly due to malignancy. Benign fistulae are uncommon [1]. Acquired fistulae are frequently misdiagnosed. They are characterized by bouts of coughing while eating or drinking and with recurrent pulmonary infections [2]. Presentation may range from subclinical to severe respiratory distress. The index of suspicion is increased if the patient also presents with acute dysphagia. Diagnosis may be delayed if the patient presents only with respiratory symptoms [3].

### Case Report

A 64 year old lady was presented to our department with persistent cough and dysphagia one year back. She diagnosed with carcinoma right side supraglottic (cT3N1), and treated with radiation therapy (70Gy,35#) 10 month back. She underwent tracheostomy for respiratory distress during radiation therapy and nasogastric tube was inserted for feeding. But she was not able to get de-cannulated because of persistent cough more after taking orally liquid food and recurrent pulmonary infections. The physical examination was unremarkable except for inspiratory crackles

and diminished breath sounds heard at the lung bases. Pulmonary infection was treated intermittently with antibiotics but no significant improvement in cough. Multiple fiberoptic laryngoscopy revealed post radiation changes (edema) of larynx. Videofluoroscopy study revealed aspiration, suspicious of trachea-esophageal fistula. Endoscopic examination via tracheostomy stoma confirm the diagnosis of trachea-esophageal fistula. There was a fistula between posterior wall of trachea and anterior wall of esophageous of size approximately 1.5 x 2 cm, that was 5 cm distal from tracheostomy stoma. The site of fistula is same as cuff of tracheostomy tube. This may occur because of improper management of tracheostomy cuff and con-combatant use of a rigid, wide-bore nasogastric tube that aggravates injury of the sandwiched mucosa. Prolong vascular compression of the tracheal wall resulting in ischemia and subsequent ulceration and pressure necrosis.

Patient manage conservatively with supportive care, nil per orally, feeding via nasogastric tube and antibiotic cover. Cuffed Tracheostomy tube with long adjustable flanges inserted as cuff of tube distal to fistula for couple of months. But there is no significant improvement in symptoms. Endoscopic examination done again

which revealed fistula size increase up to 2.5 x 2.5 cm. Surgical approach is via an anterior low cervical incision as shown in figure. Fistula reached via left lateral approach and fistula tract excised. Esophageal opening freshened and closed primarily. Esophageal closure augmented with sternohyoid muscle. Tracheal wall repaired with left side supraclavicular flap.

## Discussion

Acquired fistulas between the trachea and the esophagus are unusual, serious and still challenging clinical entities. Iatrogenic, malignant and traumatic causes have now superseded infection, formerly the predominant a etiology of acquired trachea-esophageal fistula [4].

Presently, approximately 50% of acquired trachea-esophageal fistula are secondary to mediastinal malignancy [1]. Tumors arising from the esophagus, trachea, lungs, larynx, thyroid and regional lymph glands have all been reported as prerequisites to the formation of an acquired trachea-esophageal fistula. These trachea-esophageal fistula forms as a result of necrosis and tissue breakdown. This is secondary to tumour enlargement and invasion but may be exacerbated by radiotherapy and chemotherapy [5].

Of the non-malignant reports of acquired trachea-esophageal fistula in the literature, more than 75% are the result of endotracheal cuff-related trauma in patients subjected to prolonged mechanical ventilation. Secondary erosion of the tracheal and esophageal walls occurs with a 0.3 - 3% incidence in mechanically ventilated patients [4].

Acquired, nonmalignant trachea-esophageal fistula usually result from erosion of the tracheal and esophageal walls by endotracheal or tracheostomy tube cuffs, especially when a rigid nasogastric tube is in place or abrasion by tip of the tracheostomy tube cannula are responsible for the formation of trachea-esophageal fistula. It is observed in less than 1% of the patients undergoing endotracheal intubation or tracheostomy procedures [6]. This life-threatening condition is infrequent with the use of high-volume and low-pressure cuffs.

Factors implicated in the development of post-intubation trachea-esophageal fistula are prolonged duration of intubation, respiratory infections, esophageal infection, high cuff pressure, high airway pressure, excessive motion of tracheal tube, hypo-

tension, steroids, nasogastric tube, and advanced age. Reported mechanisms of injury include traumatic intubation, airway suctioning, and vascular compression of the tracheal wall resulting in ischaemia and subsequent ulceration. Tracheal wall ischaemia is a well-recognized complication secondary to prolonged endotracheal cuff over-inflation [7]. Poor nutrition, airway infection, hypotension, hypoxemia, anemia, diabetes, and steroid therapy are the predisposing factors.

Trachea-esophageal fistulas secondary to tracheal cuff related injuries usually become symptomatic within 4 weeks. Symptoms in the non-ventilated patient are related to repeated tracheal soiling[8]. 'Ono's sign' refers to the uncontrolled coughing after swallowing, often worse with carbonated drinks. Other features which should raise suspicions of an acquired trachea-esophageal fistula are: history of trauma, malignancy or ingestion of caustic substances; chest pain; hemoptysis; shortness of breath; dysphagia; hoarseness; pyrexia of unknown origin; repeated respiratory tract infections; and pneumonia [1].

The anesthetic management for repair of trachea-esophageal fistula, whether congenital or acquired, is a significant challenge for the anesthesiologist [8]. Common problems include difficulty with oxygenation and/or ventilation resulting from placement of the ETT in or above the fistula with subsequent gastric dilatation, atelectasis, or pulmonary changes related to recurrent aspiration.

The surgeon and anesthesiologist are competing for airway access. The site and size of the lesion must be carefully noted as this may dictate the anesthesiologist's approach. Fortunately, most trachea-esophageal fistulas presenting for surgical repair are in the upper two-thirds of the trachea [9].

Once the trachea-esophageal fistula is isolated, ventilation can continue without fear of soiling and gastric dilatation. There are reports in the literature of trachea-esophageal fistulas being repaired with the patient breathing spontaneously, although assisted ventilation was often necessary [9].

## Conclusion

In conclusion, trachea-esophageal fistula should be considered in tracheostomized and nasogastric feeding patients with unexplained persistent cough more associated with feeding.

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