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Esophagotracheal Fistula: A Life-Threatening Complication of Prolonged Ventilation

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Abstract | **Case Report**

Esophagotracheal fistula (ETF) is a rare and severe complication of prolonged tracheal intubation, often caused by ischemia of the tracheoesophageal walls. Its diagnosis is challenging and may be delayed, with bronchoscopic esophagotracheal examination and cervicothoracic computed tomography (CT) being the preferred diagnostic tools [1, 2]. Treatment varies depending on the clinical presentation and the severity of associated pulmonary damage. Prognosis is closely linked to the extent and nature of secondary complications. This report highlights a rare case of ETF following prolonged tracheal intubation.

Keywords: Cervicothoracic CT scan, Esophagotracheal fistula, intubation, prolonged ventilation.

INTRODUCTION

Esophagotracheal fistula is a rare but serious complication of prolonged tracheal intubation, occurring in approximately 0.5% of cases, with a mortality rate ranging from 6% to 12% [1, 2]. This complication presents significant diagnostic and therapeutic challenges. In this report, we present a case of ETF and discuss its risk factors as well as preventive and therapeutic measures.

CASE PRESENTATION

A 65-year-old man was admitted to the intensive care unit (ICU) with nephrogenic acute pulmonary edema. He required intubation and mechanical ventilation for 18 days because of severe heart failure complicated by acute renal failure. Despite prolonged ventilatory support, he continued to exhibit respiratory distress and persistent dyspnea.

During his ICU stay, he developed marked abdominal distension with tympanic percussion over the gastric region. A cervicothoracic CT scan revealed an esophagotracheal fistula at the level of T3, measuring 6 mm in length and 3 mm in diameter (Figure 1), together with alveolo-interstitial changes compatible with inhalation pneumonia and signs of superinfection associated with significant gastric air distension (Figure 2). Bronchoscopic esophagotracheal examination confirmed the diagnosis (Figure 3).

The patient underwent surgical repair of the fistula via myoplasty. Postoperatively, he demonstrated significant clinical improvement: progressive weaning from mechanical ventilation, resolution of respiratory distress, and reduction of abdominal distension. Follow-up examinations documented overall recovery, and close postoperative monitoring revealed steady progress without major complications.

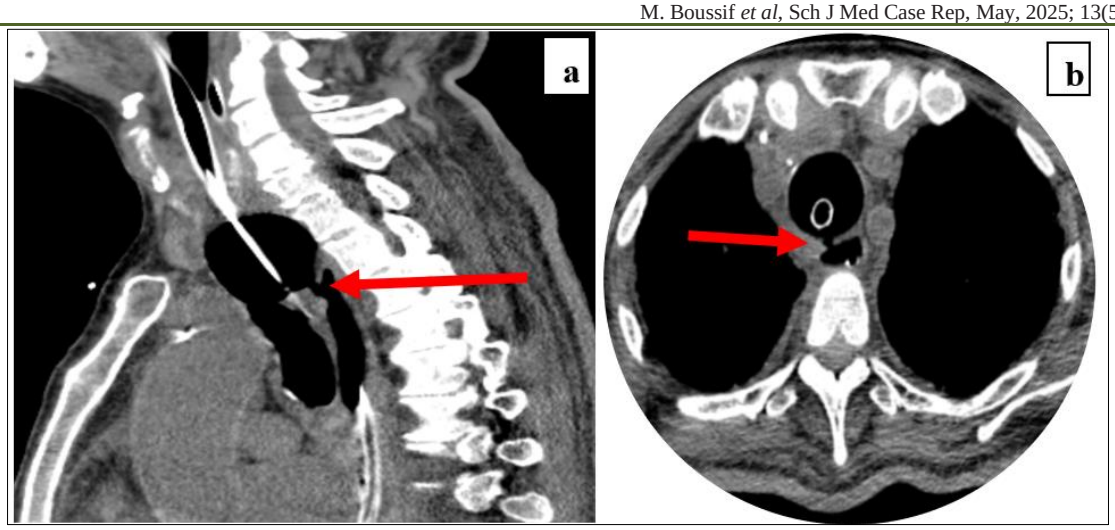

Figure 1: CT scan in sagittal and axial views of the cervicothoracic junction demonstrating an esophagotracheal fistula at the T3 level (red arrow)

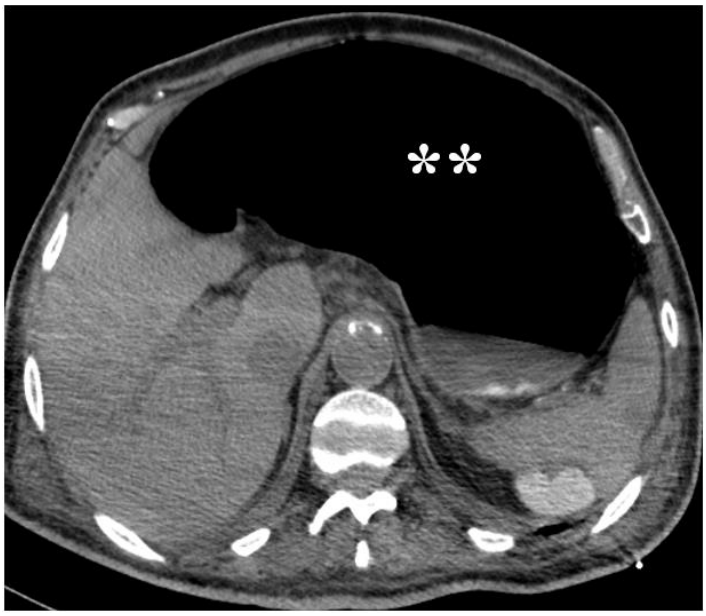

Figure 2: CT scan in axial view of the abdomen showing gaseous distension of the stomach (**) secondary to air passage into the esophagus through the fistula

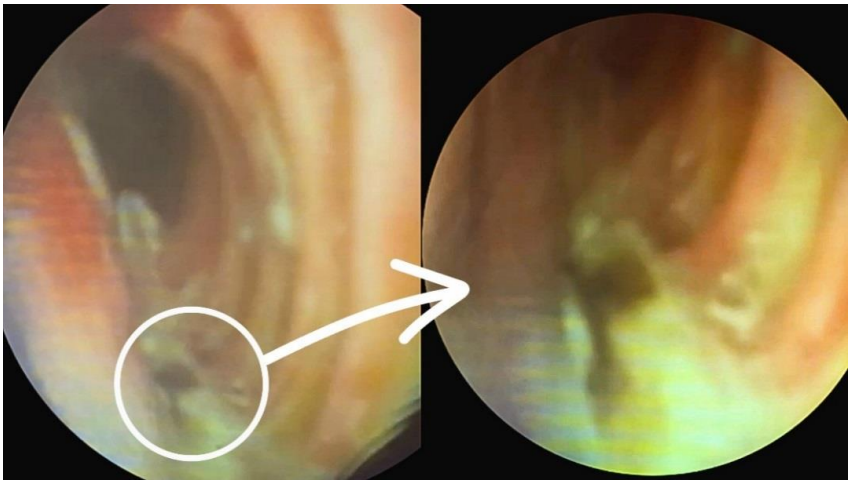

Figure 3: Bronchoscopic image depicting the fistula in the posterior wall of the trachea

DISCUSSION

Esophagotracheal fistula is a rare but serious complication of tracheostomy and prolonged mechanical ventilation, representing the most common form of acquired non-neoplastic esophagotracheal fistulas. First described in the 1960s by Flege and Thomas, these lesions were related to overinflation of the tracheal tube cuffs. The development of ETF can be attributed to several factors, such as direct trauma to the tracheal and esophageal walls during tracheostomy, prolonged pressure due to improper tube positioning, and cuff overinflation. Other contributing factors include mucosal lesions caused by large-caliber gastric tubes or fungal infections. Risk factors such as shock, immunosuppression, and malnutrition can also increase the likelihood of developing this complication [3, 4].

In our case, the main contributing factors were prolonged mechanical ventilation (more than 3 weeks) without regular monitoring of cuff pressure, as well as the inflammatory state resulting from sepsis and cardiac decompensation in an elderly patient. ETF should be suspected when there is difficulty weaning from the ventilator, gastric content aspiration through the tracheal tube, gastrointestinal distension, or recurrent aspiration pneumonia. The diagnosis is confirmed by bronchoscopy, which allows visualization of the fistula and assessment of mucosal fibrosis. Cervicothoracic CT scans help identify the fistula and evaluate associated pulmonary damage, while esophageal contrast studies can confirm the diagnosis in 70% of cases, particularly in awake patients who are capable of swallowing.

Initial treatment focuses on preventing aspiration of gastric contents through the fistula by resting the esophagus, managing gastric stasis, and treating associated bronchopulmonary infections. Nutritional support, either parenterally or through jejunostomy, is crucial for malnourished and hypercatabolic patients. Surgical treatment is generally considered later, depending on the severity of the lesion. Surgical options include tracheal resection and anastomosis with esophageal suturing in two layers, protected by myoplasty. Resection is typically performed on the esophagus to preserve tissue for repair of the tracheal membranous wall. Double stents may be used in palliative cases. Prevention of ETF focuses on controlling cuff pressure and performing tracheostomy under continuous fiberoptic guidance. Prognosis is associated with a high recurrence rate and significant mortality, ranging from 6.3% to 12.5% [5-7].

CONCLUSION

Although esophagotracheal fistula is a rare complication of tracheostomy and prolonged mechanical ventilation, it should be suspected and investigated in cases of difficulty weaning from the ventilator or recurrent pneumonias; therefore, an urgent CT scan is essential for establishing the diagnosis. Preventive strategies focus on reducing trauma during tracheostomy, careful management of tracheal aspirations, and controlling cuff pressure.

Conflicts of Interest: The authors declare no conflicts of interest.

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