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Case Report

Tracheo-Esophageal Fistula: A Case Report

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Abstract: Tracheo-esophageal fistula (TEF) is a rare and complex surgical condition, often resulting from trauma or previous thoracic interventions. We present a case of a 20-year-old male with a history of bamboo injury in 2019, complicated by right lobectomy and pericardial effusion treated with anti-tuberculosis therapy. The patient underwent esophageal fistula closure in February 2023 and feeding jejunostomy in April 2023. He subsequently developed inability to swallow even saliva, necessitating surgical repair of TEF. Anesthetic management was challenging due to the difficult airway and proximity of the fistula to the carina. A flexometallic endotracheal tube (ETT) was placed via fiber-optic bronchoscope, and anesthesia was maintained with oxygen, air, sevoflurane, and atracurium infusion. Postoperatively, the ETT was converted to nasal intubation to facilitate airway hygiene and prevent complications. This case highlights the anesthetic and surgical challenges in TEF repair and underscores the importance of meticulous preoperative planning, intraoperative management, and postoperative care.

Keywords: Tracheo-Esophageal Fistula, Difficult Airway, Fiber-Optic Intubation, Surgical Repair.

INTRODUCTION

Tracheo-esophageal fistula (TEF) is an abnormal communication between the trachea and esophagus, which may be congenital or acquired. Acquired TEFs are rare and can result from trauma, malignancy, prolonged intubation, infections, or iatrogenic causes [1]. Traumatic TEFs following thoracic injuries pose significant surgical and anesthetic challenges due to altered thoracic anatomy and potential for airway compromise [2]. Early identification and repair are essential to prevent recurrent pulmonary infections, aspiration, and malnutrition [3].

The incidence of post-traumatic TEF in adults is low, and management requires a multidisciplinary approach involving thoracic surgeons, anesthesiologists, and critical care teams [4]. Airway management is particularly challenging, as the proximity of the fistula to the carina may lead to inadequate ventilation and risk of gastric distension during positive pressure ventilation [5]. Flexible fiber-optic intubation with a cuffed flexometallic endotracheal tube is commonly employed to isolate the fistula and maintain adequate ventilation [6].

Post-traumatic TEFs often coexist with other thoracic complications, including pericardial effusion, pulmonary resections, and esophageal injuries, which may necessitate prior interventions such as lobectomy, anti-tuberculosis therapy, or esophageal repair [7]. Nutritional support, often via feeding jejunostomy, is critical in the preoperative period to optimize patient outcomes [8]. Careful intraoperative anesthetic management, including the use of opioid-sparing analgesia and local infiltration, contributes to postoperative recovery and reduces the risk of fistula recurrence [9].

This case report details the anesthetic and surgical management of a 20-year-old male with a history of bamboo injury, thoracotomy with right lobectomy, pericardial effusion, previous esophageal fistula repair, and feeding jejunostomy, who underwent successful TEF repair with meticulous perioperative planning [10].

CASE REPORT

A 20-year-old male presented with inability to swallow saliva following prior esophageal fistula repair and feeding jejunostomy. The patient's history included

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a bamboo injury in 2019, resulting in thoracotomy with right lobectomy, and pericardial effusion treated with anti-tuberculosis medication. Esophageal fistula closure was performed in February 2023, and feeding jejunostomy in April 2023.

On general examination, the patient was conscious, oriented, afebrile, with respiratory rate 18/min, blood pressure 100/60 mmHg, and pulse 82/min. Respiratory examination revealed clear lungs with equal air entry bilaterally. Cardiovascular examination was unremarkable. Airway assessment demonstrated Mallampati grade I, thyromental distance >6.5 cm, intact and fixed dentition.

Preoperative optimization included incentive spirometry and adequate hydration. Anesthesia induction posed a difficult airway challenge due to the fistula located 19–21 cm from the upper esophageal sphincter and 6–7 cm from the carina. A 7.0 mm flexometallic ETT was placed under fiber-optic bronchoscope guidance. (Figure 1 and Figure 2) Induction agents included ondansetron 0.2 mg/kg, midazolam 1 mg, fentanyl 2 mcg/kg, glycopyrrolate 0.2 mg, lignocaine 1.5 mg/kg, and propofol 2 mg/kg. Ventilation was confirmed before administering atracurium 0.5 mg/kg.

Figure 1

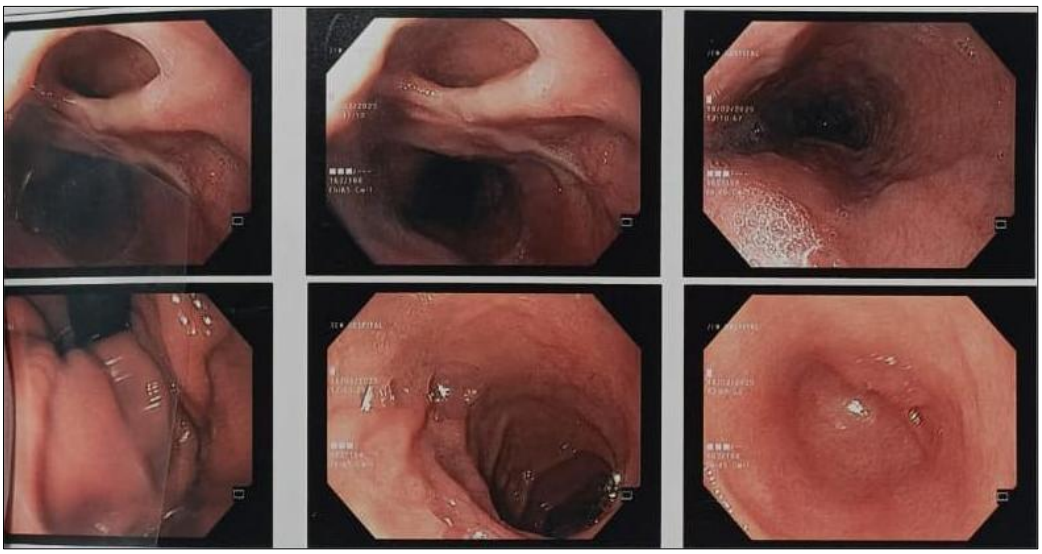

Figure 2

Anesthesia was maintained with oxygen, air, sevoflurane, and atracurium infusion. Analgesia included diclofenac 1 mg/kg, paracetamol 15 mg/kg, tramadol 50 mg, and local infiltration at the incision site. At the end of surgery, the flexometallic ETT was converted to a 7 mm north polar nasal intubation tube to facilitate airway hygiene, reduce coughing, and enable easier weaning. ECG was normal, and 2D echocardiography revealed LVEF 55% with no regional wall motion abnormalities.

DISCUSSION

TEF repair in adult post-traumatic patients is rare and requires complex anesthetic and surgical management. Pre-existing thoracic surgery, esophageal interventions, and pericardial complications complicate airway management and perioperative care [11]. Fiber-optic-guided flexometallic intubation remains the gold standard for patients with proximal TEF to ensure ventilation without gastric insufflation and minimize risk of aspiration [12].

Optimal preoperative preparation, including respiratory exercises and nutritional support via feeding jejunostomy, enhances postoperative recovery and reduces pulmonary complications [13]. The selection of induction and maintenance agents, along with multimodal analgesia including NSAIDs, opioids, and local infiltration, contributes to hemodynamic stability and reduces stress on the repaired airway [14]. Postoperative nasal intubation facilitates airway hygiene, minimizes oral secretions, and allows for gradual weaning in complex TEF cases [15].

This case underscores the importance of individualized, multidisciplinary management in TEF repair, particularly in patients with prior thoracic surgeries and esophageal interventions. Early identification of anatomical landmarks, careful airway management, and postoperative care are critical to prevent complications and improve patient outcomes.

CONCLUSION

TEF repair in adults following trauma and prior thoracic surgery is challenging but feasible with meticulous perioperative planning. Fiber-optic-guided intubation, multimodal anesthesia, and postoperative airway management are essential components for successful surgical outcomes. Multidisciplinary coordination is crucial in managing complex cases to minimize complications and optimize recovery.

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