CASE REPORT

Anesthetic Challenge of Adult-acquired Tracheoesophageal Fistula Post-tracheostomy: A Case Posted for Tracheal Reconstruction Surgery

Vasanth D[1], Vijay Narayanan S[2]

Abstract

The commonest elective procedure performed on a critically ill patient is tracheostomy. The major complications may be divided based on the duration of the procedure: early, medium-early, and late postoperative. The commonest late complication of tracheostomy is a tracheoesophageal fistula (TEF). Tracheostomy tube may cause injury to the posterior wall of the trachea and also due to endotracheal tube (ET) cuff overinflation . Here reporting a case of acquired tracheoesophageal fistula post-tracheostomy of a 25-year-old male posted for tracheal reconstruction surgery.

Keywords: Post-tracheostomy complication, Tracheosophageal fistula, Tracheal reconstruction surgery.

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Introduction

Acquired tracheoesophageal fistula (TEF) is the rarest condition in adults. The most common etiologies are trauma and malignancy. Percutaneous tracheostomy is the important causative factor of TEF. Usually, normal laryngeal reflexes were lost in TEF due to the patent tract between the airway to the upper gastrointestinal tract. This may cause serious difficulties for anesthetists intraoperatively. Intraoperatively sharing of the airway with the surgeon challenges the anesthetist to prevent respiratory acidosis, hypercarbia, and hypoxia.

Case Description

A 25-year-old male patient with type II diabetes mellitus came with complaints of recurrent respiratory tract infection, and shortness of breath. He had past history of diabetic ketoacidosis (DKA) and respiratory failure for which he was intubated and on mechanical ventilation. After 5 days of intubation, planned for elective tracheostomy, which was done 5 months ago. Later he developed recurrent respiratory tract infection and shortness of breath. The patient was able to cough which prevented him from aspiration. He was diagnosed as having a tracheoesophageal fistula at C7–D1 level. All blood investigations were within normal limits. Video direct laryngoscope (VDL) was done to confirm the vocal cords position which was normal.

On examination, the patient was moderately built and well-nourished, conscious, and oriented, and he was able to speak by the closing tracheostomy tube. The patient was on Ryles tube no. 14 *in situ*. On systemic examination, his pulse rate was 84/minute, systolic blood pressure was 116 mm Hg, Diastolic blood pressure 82 mm Hg, SpO_2 100% @ room air and all other vital parameters were within normal limit. On auscultation, bilateral air entry was present without any added sounds. Other systemic examination findings were within the physiological normal limit.

Blood sugar levels were optimized. Chest X-ray lateral view showed the presence of a tracheostomy tube with subglottic stenosis (Fig. 1). Video and direct laryngoscopy showed subglottic stenosis with a small aperture. esophagoscopy showed tracheoesophageal fistula 18 cm which was away from incisors, approximately 2 cm long (tracheostomy tube could be seen through the defect).

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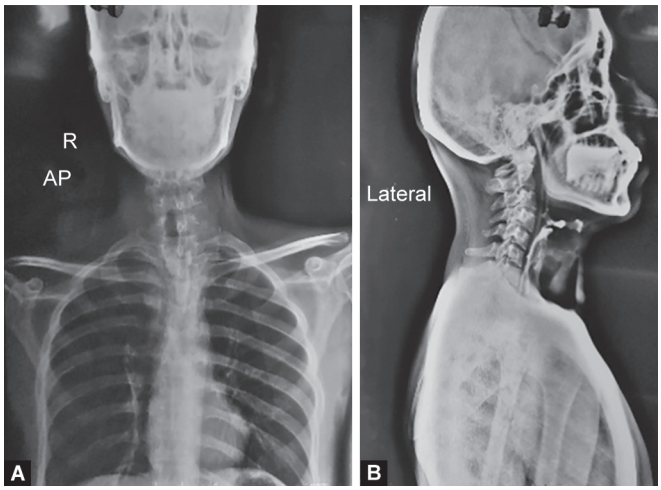

Figs 1A and B: X-ray—AP/LAT showing the tracheostomy tube *in situ*

Communication was present between the trachea and esophagus which was confirmed by a CT scan at C7–D1 level. He was posted for tracheal reconstruction surgery under American Society of Anesthesiologists (ASA) II.

Discussion

Tracheal reconstruction surgery was planned under general anesthesia. In the operation theater, two 18G IV cannulas were secured. SpO_2, NIBP, EEG, and $ETCO_2$ monitors were connected. Premedicated with Inj. midazolam 1 mg IV and Inj. glycopyrrolate 0.2 mg IV. Under aseptic precaution, induced with a tracheostomy tube *in situ* Inj. fentanyl 100 µg, Inj. propofol 120 mg, Inj. succinylcholine 100 mg and followed by removing the tracheostomy tube and placing the endotracheal tube (ET tube) through the tracheostomy stoma (Fig. 2). Maintained by oxygen and nitrous oxide 1:1 ratio with sevoflurane 2% dial concentration along with Inj. vecuronium 1 mg. Endotracheal tube (ET) was removed on and off from the distal segment of the dissected trachea for the repair. Before removing the ET tube, oxygenated with 100% O_2 and Inj. propofol 20 mg IV to prevent hypoxia and hypercarbia. These steps were prolonged apnea time given to repair the fistula and reinsert the ET tube, start ventilating again. Just before the completion of tracheal reconstruction, the Ryles tube introduced cephaloid direction through the proximal tracheal segment. Taken out orally, the ET tube railed through the Ryles tube and secured the airway (Fig. 3). Sevoflurane cut at the end of the surgery, N_2O cut once he regained spontaneous respiration. Reversed with Inj. neostigmine 3 mg IV and Inj. glycopyrrolate 0.6 mg IV. The patient was extubated on the table and his/her vitals were stable. The intra-op period was uneventful.

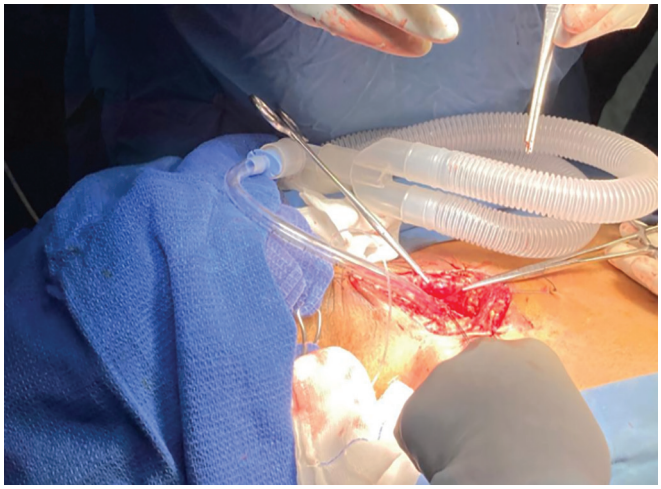

Fig. 2: ET tube placed through tracheostomy stoma

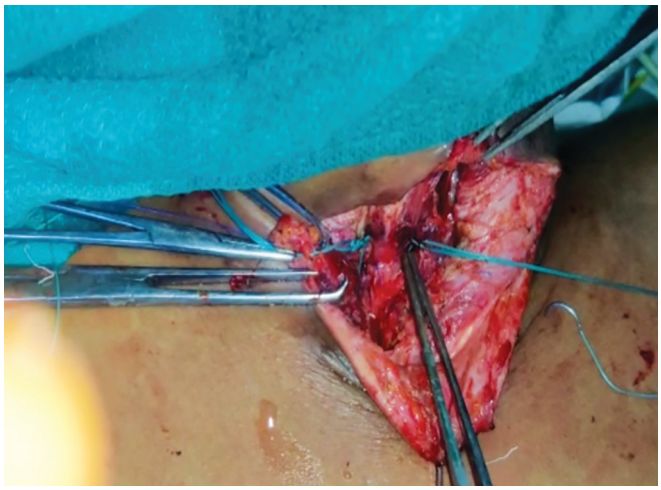

Fig. 3: Showing the complete repair of the defect

Adult-acquired tracheoesophageal fistula is one of the rarest conditions, the chances of survival are minimal because there is high mortality due to repeated aspiration and respiratory tract infection.[1] But in our case, the patient could cough out the regurgitant from gastrointestinal tract (GIT), which prevented him from aspiration and sepsis.[2] Mechanisms of tracheal injury were traumatic and prolonged intubation, repeated airway suctioning without proper technique, and ischemia of the tracheal wall due to excessive ET tube cuff pressure, prolonged endotracheal, and overinflation of tracheostomy tube cuff. This leads to ischemia, pressure necrosis, and tissue damage which leads to ulceration of the tracheal wall and the formation of a subsequent fistula between the trachea and esophagus.[3] So tracheostomy is necessary. As this patient's tracheoesophageal fistula at the level of C7–D1 and cuffed tracheostomy tube was beyond the fistula, so no need to worry about gastric dilatation and the patient was maintained on controlled ventilation. The patient was hemodynamically stable intraoperatively. To aid surgeons to locate and repair the fistula, it was necessary that the tracheostomy tube be replaced by a flexo-metallic tube, and a period of apnea was necessary. The sterile flexo-metallic tube was fixed with a suture near the connector (Fig. 4) and this prevented the displacement of the ET tube during the repair, before removing the ET tube oxygenated the patient with 100% O_2 along with Inj. propofol and vecuronium were given.[4,5] Thus, the plane of anesthesia was maintained during the apnea period and also prevented cough. Anesthetic challenges faced in our case were because of sharing of airways. Intermittent removal of the ET tube leads to hypoxia, hypercarbia, and airway edema, to overcome this continuously monitored with SpO_2 and $ETCO_2$. Oxygenated with 100% O_2 for 3 minutes before removing. Controlled ventilation to prevent hypoxia and quiet surgical field. Spontaneous ventilation may lead to laryngospasm and bronchospasm. Jet ventilation may cause barotrauma.[6]

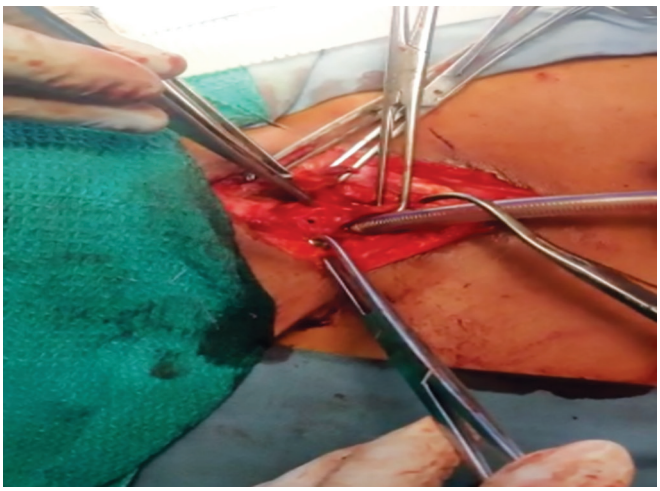

Fig. 4: The fistula and also flexo-metallic ET tube fixed to the chest wall to prevent displacement

Conclusion

Sharing the airway with the surgeon was the major challenge in our case, a proper planning and prior communication with the surgeon avoided the potential problems. Otherwise, these cases may end up with life-threatening complications during induction and intraoperative period.

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