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Original Research Article

# Tracheostomy Challenges: Case Series Insights

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**Abstract:**
Difficulties arising during tracheostomy tube insertion can be fatal if the airway is not managed adequately. In ENT practice, a difficult airway is a commonly encountered problem that often requires expert decision-making to create a surgical airway. This report highlights cases of difficult tracheostomies performed at our centre, underscoring the complexities and critical nature of airway management in emergency situations. Through detailed case analysis, we aim to illustrate the challenges faced and the strategies employed to ensure successful outcomes in patients with compromised airways. Our findings emphasize the importance of preparedness, skill, and swift intervention in managing difficult airways to prevent life-threatening consequences.
**Introduction:** Effective airway management can often present significant challenges, particularly in the field of otolaryngology (ENT). One frequently encountered issue is the difficult airway, which often necessitates expert decision-making to create a surgical airway. Patients presenting with stridor, combined with both a difficult airway and a challenging tracheostomy, can face life-threatening complications. This report highlights cases of difficult tracheostomies managed at our centre, underscoring the critical importance of skilled intervention in such scenarios.
**Keywords:** Difficult tracheostomy, Difficult airway, Calcified trachea, Short neck, Tracheomalacia.


## Introduction

**Case 1:** A 5-year-old girl was brought to the emergency department with a severe cut-throat injury. She was gasping for breath, and her oxygen saturation levels were rapidly declining. An immediate attempt was made to intubate the patient. However, glottic and supraglottic oedema severely obstructed the view, complicating the introduction of the endotracheal tube. Despite these challenges, an undersized endotracheal tube was eventually inserted, but it failed to maintain adequate oxygenation.

Given the failure to stabilize the patient with the undersized endotracheal tube, an urgent surgical tracheostomy was deemed necessary. It was noted that the neck injury had already been sutured at the primary care center, adding complexity to the case.

The anatomy of the neck was highly distorted due to the injury and previous suturing. Normal anatomical landmarks were not palpable, complicating the procedure. An incision was made, revealing a tracheoesophageal fistula. Despite these challenges, the presence of the endotracheal tube provided some guidance. The endotracheal tube was successfully utilized to locate the trachea, and the tracheostomy tube was inserted. The tracheostomy was performed successfully, and the patient's airway was secured. This intervention was critical in stabilizing the patient and ensuring adequate oxygenation.

**Case 2:** A 15-year-old girl presented to the ENT emergency department six hours after sustaining a strangulation injury to her neck. On arrival, her oxygen saturation was rapidly declining. Anaesthesia was immediately called to perform endotracheal intubation. Despite two attempts, the endotracheal tube could not be inserted due to severe laryngeal oedema. Tracheostomy was deemed necessary as a last resort to secure the patient's airway and stabilize her condition. During the procedure, anatomical landmarks were difficult to identify. Emphysema in the tissues increased the distance between the skin and the trachea, making it challenging to determine the correct depth for the tracheostomy. The increased depth required to reach the trachea added to the complexity of the procedure. Despite these challenges, the tracheostomy was successfully performed by carefully assessing the position of the trachea based on clinical judgment and palpation. Following the

tracheostomy, the patient's oxygen saturation improved, and her condition stabilized.

**Case 3:** A 45-year-old male presented to the ENT emergency department with swelling in the neck and mild tenderness, along with crepitus upon examination. Initial management involved conservative measures. However, two days later, he developed sudden onset of severe breathing difficulty, necessitating immediate intervention. Upon evaluation, it was discovered that the patient had developed tracheomalacia, a condition where the tracheal walls weaken and become prone to collapse. This was likely a result of pressure injury or trauma to the neck region, causing softening of the tracheal cartilage. During the emergency tracheostomy procedure, the trachea was notably soft and pliable, resembling mucosal tissue rather than the usual firmness of cartilage. Despite the challenging condition of the trachea, the procedure was successfully performed, and a tracheostomy tube was inserted to secure the patient's airway. This intervention promptly stabilized his respiratory status.

**Case 4:** A 60-year-old diabetic male was admitted to the ENT emergency with a deep neck space abscess, which was drained successfully, and he initially showed clinical stability. However, during an evening meal, he suddenly developed stridor, indicating airway obstruction likely due to aspiration of food particles. Given the urgency of the situation, emergency tracheostomy was deemed necessary. The procedure, however, posed significant challenges due to the patient's extensive neck abscess and the associated risk of bleeding. The neck anatomy was distorted, with fibrosis complicating the identification of surgical planes. Additionally, the patient's limited neck extension further complicated the procedure.

Recognizing the critical need to secure the airway promptly, the surgical team opted for a cricothyroidotomy as a temporary measure to restore adequate breathing. This interim step allowed for stabilization of the patient's condition while preparations were made for a more definitive tracheostomy (Fig 1).

**Figure 1: Huge neck abscess**

**Case 5:** A case of 65 year old male presented with stridor in emergency department. He was lean and thin. Indirect laryngoscopy showed supraglottic malignancy with transglottic extension. Patient was taken for tracheostomy under local anaesthesia. It seemed to be easy tracheostomy. The trachea was exposed easily. But when trachea was attempted to excise, it came out to be calcified and hard. It was not possible to cut it with knife. Bone cutter was used to make a hole in trachea and tracheostomy tube was then inserted.

**Case 6:** A 70-year-old male presented to the emergency department with acute stridor following a recent fever. On examination, he was diagnosed with bilateral vocal cord abductor palsy on indirect laryngoscopy.

The patient's acute stridor indicated significant airway obstruction due to bilateral abductor palsy of the vocal cords. Due to the severity of the airway obstruction, an immediate tracheostomy was planned despite anticipated difficulties due to the patient's short neck. The patient's short neck posed challenges during the procedure. Dissection of the trachea was complicated, and only a small portion of the suprasternal trachea was visualised. Despite these challenges, the tracheostomy was successfully performed with minor difficulty. The procedure aimed to secure the airway effectively. Following the tracheostomy, the patient's breathing improved, and his condition stabilised. He was closely monitored postoperatively for any complications related to the procedure or underlying condition.

**Case 7:** A 13 year old female presented in ENT emergency after barotrauma triggered by accidental insertion of high pressure motor pump in oral cavity which was accidentally switched on. She came with complain of difficulty in breathing, pleuritic chest pain, dysphagia for one day. Subcutaneous emphysema was evident from neck crackling. Breath sound was found diminished on right side more than left below 5th intercostal space .There was stony dullness on right side with decreased vocal fremitus and vocal resonance. Lungs were clear but heart sound was faint. X-ray plates showed pleural effusion on right side with prominent subcutaneous emphysema in neck region. Later on 6th day she developed right sided hydropneumothorax .with collapse of right lung parenchyma. Bilateral infraclavicular needles were placed to relieve air under tension. We attempted a tracheostomy using a portex cuffed tracheostomy tube sized 7. But the skin to tracheal distance was very large due to the subcutaneous emphysema, the tube kept coming out anterior to the trachea. Repeated attempts at placing the tracheostomy tube proved unsuccessful. Then, an attempt was made to insert an endotracheal tube size 7 into the stoma which was immediately successful (Fig 2), (Fig 3).

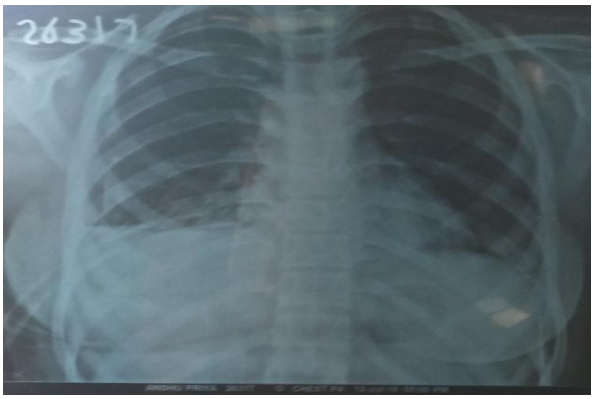

**Figure 2: Chest X ray PA view showing hydropneumothorax**

**Figure 3: Lateral view X-ray showing surgical emphysema**

**Case 8:** A 71 year old female presented to the emergency department with acute onset stridor following a recent episode of fever. The patient had a known diagnosis of anaplastic thyroid cancer (ATC), which was diagnosed three months prior. He had been receiving palliative treatment, including radiation therapy. The patient's medical history was otherwise unremarkable. On examination, the patient appeared in significant respiratory distress, exhibiting marked inspiratory stridor and tachypnea. His oxygen saturation was 88% on room air. An urgent indirect laryngoscopy revealed bilateral vocal cord abductor palsy, causing critical airway. Considering the severity of the airway obstruction and the rapid deterioration of the patient's respiratory status, an immediate tracheostomy was planned. Given the known aggressive and infiltrative nature of ATC, the surgical team anticipated potential complications. Incision was made, which could be extended into an apron flap if necessary. Elevating the subcutaneous flap was difficult because of

bleeding, exposing a hard, haemorrhagic thyroid mass stuck to nearby tissues. To manage the mass better, the mass was retracted to one side. The trachea was then located and secured for the tracheostomy. Tracheostomy was done laterally on the trachea as mass was stuck to the trachea in the anterior wall(Fig 4),(Fig 5).

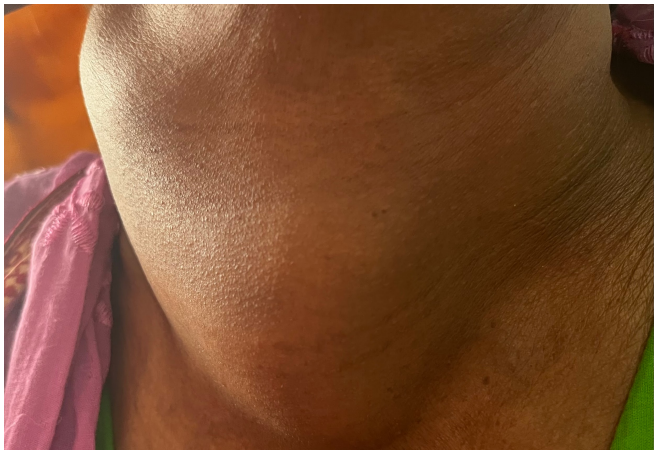

**Figure 4: Anaplastic thyroid carcinoma**

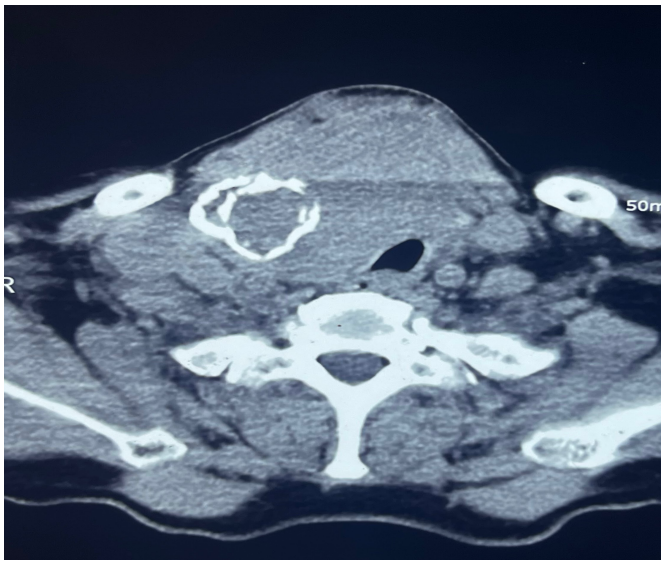

**Figure 5: Huge tracheal mass shifting trachea to one side**

## Discussion

Airway management is a crucial skill that every clinician handling emergencies must master. A difficult tracheostomy occurs when inserting the tracheostomy tube becomes impossible. In situations where severe hypoxemia rapidly develops, an immediate invasive intervention is necessary. However, cricothyroidotomy techniques are not commonly used as they do not provide effective ventilation [1]. Several factors can make a tracheostomy difficult. Surgical emphysema, which increases the distance between the skin and trachea, necessitates extra caution to avoid further laryngeal injury. Difficult tracheostomy insertions are often seen in patients with obesity due to this increased distance. In the morbidly obese population, complications from tracheostomy occur in about 25% of cases, with a mortality rate of 2%, primarily due to the loss of airway accessibility [2]. Cervical lipectomy tracheostomy has been effectively used to improve access to the trachea before performing a tracheostomy [3].Adjustable length tracheostomy tubes are now been inserted which can be adjusted depending upon the depth are now in use for the morbidly obese patients [4]. Endotracheal tubes are very useful in such cases as can be used as a temporary measure to gain airway access and come over the impending crisis. The same may also be applied in patients with morbid obesity where the anterior tracheal to skin distance is increased. Deep neck space infection makes intubation difficult and emergency tracheostomy is commonly used method to stabilise airway. However dissection in tissue plans are distorted due to abscess and performing tracheostomy in neck abscess patients is challenging [5]. Performing a tracheostomy in children is challenging due to their

distinct anatomical features compared to adults. Significant complications during the procedure include major bleeding, injury to the back wall of the trachea, pneumothorax, and even death, with the risk of these severe outcomes being around 6%. [6,7,8]

## Conclusion

A difficult tracheostomy is defined as the inability to insert the tracheostomy tube. Difficulties arising during tracheostomy tube insertion can be rapidly fatal if the airway is not adequately controlled. We would like to emphasise that surgical tracheostomies may lead to unanticipated difficulties in airway control and we should be ready with the measures to overshoot the difficulties in conventional tracheostomy.

## Disclosures

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**Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

**Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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