

Emergent airway management in blunt tracheal trauma: A novel use of the mini-tracheostomy kit

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ABSTRACT

Aim: To report and discuss a novel way of managing the airway in a difficult case of anterior tracheal wall disruption caused by blunt trauma to the neck. **Background:** Tracheal injury resulting in laceration of the windpipe may present with either one or many of the multitude of problems such as respiratory distress, hoarseness of voice and subcutaneous emphysema. Most often it requires surgical intervention. **Case Description:** We hereby present the novel use of a mini-tracheostomy kit as an aid in the cannot-intubate-cannot-ventilate situation of a 30-year-old patient presenting with severe features of blunt tracheal injury. The airway was established critically with the use of the mini-tracheostomy kit in a "cannot-intubate-cannot-ventilate" situation during surgical tracheostomy and a potentially disastrous cardiorespiratory arrest situation was averted. **Conclusion:** Timely presence of airway equipment, adequate preparation, a willingness to innovate and a team approach are of paramount importance in dealing with difficult airway situations that are presented in myriad and complex ways. **Clinical Significance:** The stylet of mini-tracheostomy kit can be used in emergent airway management especially in clinical situations mimicking ours specifically as a guide for insertion of the standard tracheostomy tube.

Keywords: Blunt trauma neck, tracheal injury, tracheostomy

Blunt injury to the upper airway due to trauma is a rare occurrence and the cricoid cartilage is commonly the affected site.^[1-3] In most cases, the establishment of an airway is often warranted.^[3,4] Definitive airway management consists of tracheostomy which most often needs to be performed in emergency settings.^[5-7]

Here, we report the successful use of the stylet of mini-tracheostomy kit in a case of a tracheal tear in a patient with blunt neck trauma which got complicated during emergency tracheostomy resulting in the formation of a false tract.

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Case Description

A 30-year old male patient weighing 60 kg, a victim of road traffic accident who sustained a head injury (depressed skull fracture) and loss of consciousness, had associated hoarseness of voice and difficulty in breathing. He was posted for emergent tracheostomy under local anaesthesia with monitored anaesthesia care. On examination, the patient was conscious (GCS of 15), in respiratory distress and there was a bruise extending from the left shoulder to right across the neck in the front. On examination of the neck, crepitus and tenderness were present on the anterior part of the neck. Computed tomography (CT) scan of neck revealed a tear on the anterior tracheal wall extending from C6 to T1 vertebrae level with loss of anterior tracheal wall and surgical emphysema into the surroundings [Figure 1]. Routine

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investigations and surveys of other body parts were grossly normal.

In the operating room, baseline values in the form of a heart rate of 112 bpm, blood pressure of 160/90 mmHg and a respiratory rate of 36–38/min with use of accessory muscles. Significantly the oxygen saturation was only 86–88% on oxygen supplementation by polymask. After administration of the local anaesthetic agent (lignocaine 2%), surgical tracheostomy was commenced with oxygen supplementation (100% oxygen by Bain's circuit). Dissection revealed a tracheal rent on the anterior tracheal wall, measuring 2 × 1 cm was observed at the site where the stoma should have been made [Figure 2]. Initially attempts were made to pass the tracheostomy tube through this tracheal rent. Further, failure of such attempts and an impending cardiorespiratory arrest situation prompted the passage of an endotracheal tube after direct laryngoscopy. Post intubation, the oxygenation of the patient improved, ventilation was partially effective due to leak of air from the tracheal rent. Subsequently, another attempt to negotiate tracheostomy tube through the rent also resulted in the failure in passing the tracheostomy tube into the tracheal lumen. Repeated failures and concomitant brainstorming between the anaesthesia and surgical team led to the exploring of the possibility of introducing the stylet of MINITRAC set (PORTEX) into the tracheal opening carefully [Figure 3]. The tracheostomy tube was then successfully negotiated over the stylet and subsequent intubation was confirmed by capnography tracing and bilateral air entry on auscultation following which the tracheostomy tube was secured. The subsequent stay in hospital was uneventful, and the patient was later discharged and referred to a higher institute for surgical repair of the laryngotracheal injury.

Discussion

Though rare, traumatic injury to the larynx and trachea is disastrous and is often camouflaged by effects of trauma on other major organ systems. Subtle clinical signs such as hoarseness, dyspnoea, dysphagia, emphysema and haemoptysis are indicators of airway and gastrointestinal tract injury in the neck.^[2-4]

In our case, surgical tracheostomy under local anaesthesia was planned as the patient was haemodynamically stable without significant surgical emphysema or change in anatomy. Though fiberoptic bronchoscopy (FOB) guided intubation is an option, the incidence of respiratory distress in this patient, as well as the probability of FOB to aggravate tracheal injury to cause complete laryngotracheal separation in already injured trachea, prompted us to abandon this option.^[8] A smaller size tracheostomy tube (7.5 mm) was selected in our patient in anticipation of tracheal mucosal oedema because of injury. In our case, the short, curved and firm nature of the stylet helped in negotiating a small-sized tracheostomy tube into the tracheal lumen beyond the rent. We also believe that the stylet helped in reducing the number of attempts to secure the airway which could have resulted in the disastrous complete tracheal

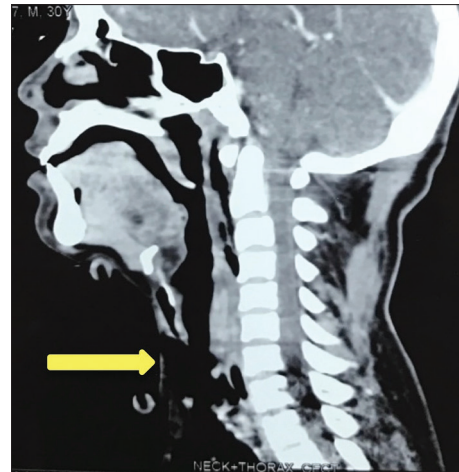


Figure 1: CT scan (sagittal plane) showing anterior extent and location (arrow) of tracheal injury

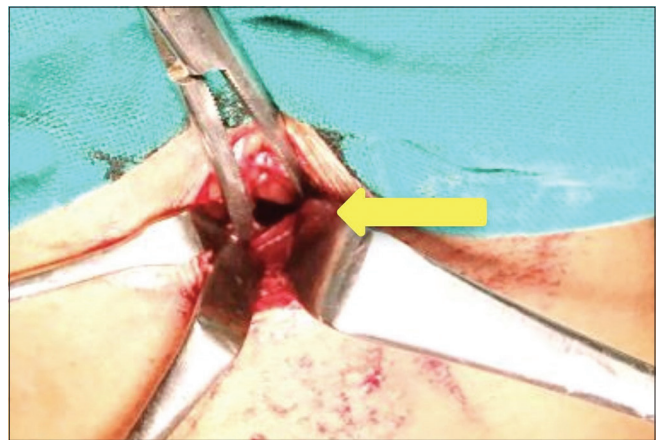


Figure 2: The tracheal rent (arrow) in anterior tracheal wall

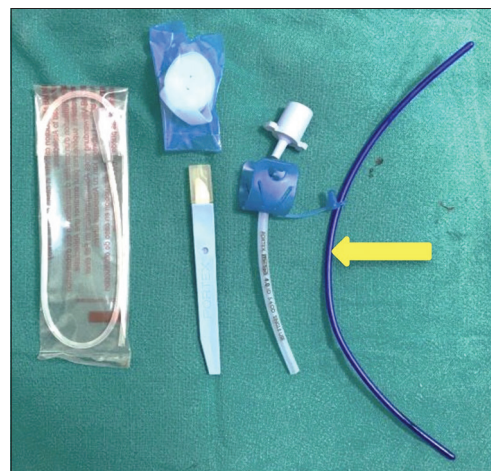


Figure 3: The MINI-TRACHEOSTOMY kit. On the extreme right (arrow) is the stylet of the kit which was used to negotiate the tracheal injury and secure airway

disruption. Stylets are not helpful in oxygenation, however, we could accomplish tracheostomy tube insertion in the first attempt.

Evidence for the management of injured upper airway favours tracheostomy under local anaesthesia as the most favoured option, however, there are caveats. Endotracheal intubation can be considered especially in emergent situations and the passage of endotracheal tube across the defect and elective mechanical ventilation to facilitate healing of the injured site has been tried in selective cases as modalities such as high-flow oxygen ventilation, sedation protocols and even cardiopulmonary bypass.^[9]

To conclude, the presence of life-threatening laryngotracheal trauma even in the absence of signs and symptoms of an external injury is a real possibility and securing the airway at the earliest remains top priority. While awake fibre-optic intubation can be an alternative to or assist in tracheostomy in patients with airway injury who are haemodynamically stable and not in respiratory distress, novel methods such as use of stylet of mini-tracheostomy kit can be of great help for guiding the entry of airway devices in patients with disturbed and mangled airway anatomy.^[10]

Conclusion

Access to various airway devices, adequate preparation, a team approach and out-of-box thinking is of paramount importance in dealing with difficult airway scenarios.

Clinical significance

This depiction of clinical events in this paper is relevant to primary care physicians especially those exposed to emergent airway management scenarios in that it provides a novel strategy to be considered in difficult airway situations related to head and neck trauma.

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Conflicts of interest

There are no conflicts of interest.

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