

Management of a Self-Inflicted Laryngeal Injury

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We present a case of deliberate self-inflicted trauma to the airway. The patient presented with a slit throat secondary to attempted suicide. The patient had a GCS score of 15 in the emergency department with an ability to maintain his own airway and phonation. A cuffed tracheostomy tube was inserted through the wound to maintain the airway. The patient had full wound exploration and repair of anterior tracheal wall. Repeat laryngoscopy and bronchoscopy was done postoperatively which revealed left vocal cord palsy which recovered completely after 2 weeks.

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Cut-throat injury is a unique form of trauma that is potentially devastating and associated with significant airway problems as well as substantial emotional, physical and financial burden on the community and hospital resources¹. The causes of throat injuries are usually due to gunshot or a knife wound either accidental, suicidal or homicidal.

Airway injuries are considered of utmost priority in the management of trauma. The American College of Surgeons in its Advanced Trauma Life Support (ATLS) program emphasizes the recognition of ventilatory compromise and accuracy of ventilations as being of primary importance².

The neck is divided into three zones; zone I includes the thoracic inlet which extends up to the level of the cricothyroid membrane. Zone I and its injuries are treated by thoracic surgeon. Zone II extends from the cricothyroid membrane to the angle of the mandible. Zone III is above the angle of the mandible and treated as a head injury³.

In general, zone II wounds have a lower mortality because hemorrhage can be controlled with direct pressure and the anatomic structures are easily accessible for surgical exploration⁴.

Airway management in neck trauma is difficult for multiple reasons including injury to the airway and distortion of anatomical landmarks. Profuse bleeding might prevent visualization of the vocal cords at laryngoscopy. The use of emergency tracheostomy is usually performed as a rescue measure, but can be difficult in cases of low neck injury⁵.

The aim of this case report is to emphasize the need for proper and prompt airway management in laryngeal trauma cases.

THE CASE

A twenty-seven-year-old man presented with a slit throat secondary to attempted suicide. The patient was awake, coherent and able to verbalize. On arrival, his heart rate was 102 BPM, blood pressure was 129/80 mmHg, respiration was 19 breaths per minute and oxygen saturation was 100% on room air.

On inspection, 6 cm laceration was found at zone II of the neck associated with hesitation marks on the left side and exposure of the trachea, see figure 1. The patient was breathing through the wound as well as through his larynx, no active bleeding or large hematoma, see figure 1.



Figure 1: Zone II Wound in the Neck

Cuffed tracheostomy tube was inserted through the wound. Pre-operative assessment by the anesthetist revealed that the patient was ASA 1E with long neck and a Mallampati score of 2, which suggests relative ease of intubation of the trachea by the oral route^{6,7}. Transnasal flexible laryngoscopy was done and the vocal cords were seen to be fully mobile bilaterally. Anesthesia was then induced with the patient breathing oxygen and sevoflurane spontaneously through the tracheostomy tube. Endotracheal intubation was attempted, the trial failed due to the presence of laryngeal edema. The visualization of the larynx was judged to be a Cormack and Lehane level 2a, since the view with direct laryngoscopy had a full view of the arytenoid cartilages and a partial view of the glottis. This Cormack and Lehane score signifies an incidence of difficult intubation of 7% as investigated by Yentis and Lee in elective cases⁸.

Sixty cm gum elastic bougie (GEB) was used to aid endotracheal intubation. The bougie was placed between the vocal cords into the trachea, and the trachea was then intubated, with prior removal of the tracheostomy tube. The trachea was intubated with a size 7 endotracheal tube, which was then pushed distal to the tracheal laceration, see figure 2. Placement of the tube was confirmed by chest auscultation and by end-tidal carbon dioxide readings.

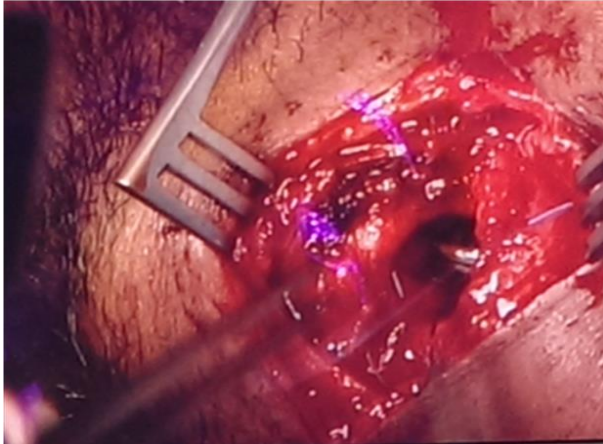


Figure 2: Visualization of the ET Tube beyond the Laceration

Surgical inspection revealed a deep-neck wound at the level of the sub-glottis, see figure 3. The platysma and strap muscles were divided by the injury. There were no injuries to the posterior wall of the trachea or to the superior laryngeal nerves as they were visualized intra-operatively. The vascular bundles of the neck bilaterally including the carotid artery jugular vein and thyroid arteries were intact. Repair of the trachea along with the strap muscles and platysma was done uneventfully. A flexible bronchoscopy was then performed through the endotracheal tube to ensure no distal airway injuries had been missed. The patient was kept electively intubated and transferred to the Intensive Care Unit; he was breathing spontaneously and was sedated with a remifentanyl infusion overnight.

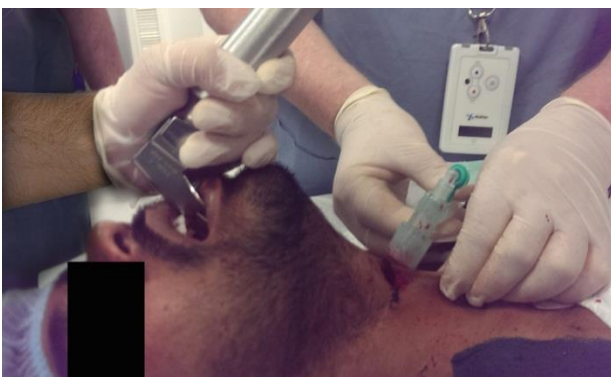


Figure 3: Maintenance of the Airway Using the Stoma during Intubation

Prior to extubation, transnasal laryngoscopy and endotracheal bronchoscopy were repeated in the ICU. No signs of supraglottic injury, inflammation or surgical emphysema were noted

postoperatively. The patient was extubated and found to have regular breathing with the ability to phonate. On the third day, nasopharyngoscopy was repeated and the patient was found to have supraglottic edema with left vocal fold immobility with incomplete vocal folds closure. The patient was given dexamethasone for the prevention of edema preoperatively and this was continued during the postoperative period.

Flexible laryngoscopy was performed six days post-injury and the left vocal cord palsy was noted, but with patient able to phonate normally. At 2-week follow-up visit, flexible laryngoscopy was performed and both vocal cords were mobile.

DISCUSSION

The key to saving the life of a severe trauma patient are definitive airway management, proper oxygenation, and stabilizing the circulation by early restoration of homeostasis as emphasized by Ono et al⁹.

Management of acute blunt and penetrating external laryngeal trauma has improved significantly post World War II due to early management of injuries, preservation of the airway and maintenance of normal and functional anatomy¹⁰⁻¹⁴.

The initial management of the airway in the emergency department is crucial to avoid hypoxia and to prevent blood and secretions entering the airway. Early management of the airway is crucial because any delay in securing an airway will result in edema, which would obscure the view at laryngoscopy and obstruct the airway².

The use of dexamethasone in multiple doses decreases airway edema and the incidence of complications post extubation according to the Meta analysis by Fan et al who found that steroids decrease laryngeal edema after extubation by 62% and that of subsequent reintubation by 71% whether through single or multiple doses¹⁵.

Maintaining spontaneous breathing of the patient before, during and after intubation is an important factor in the management. Muscle relaxants are usually used to ease intubation, but in case of airway compromise, it could be deleterious to the patient due to difficulty in maintaining airway, risk of aspiration, and risk of emphysema¹⁶. Negative pressure ventilation in a patient with localized injury to the airway reduces the possibility of air tracking which might lead to wound dehiscence, pneumothorax, pneumo-mediastinum, subcutaneous emphysema and even pneumoperitoneum¹⁷⁻²⁰. Khan et al described pneumothorax, and pneumoperitoneum occurring in a patient which could have been avoided by maintaining the patient on spontaneous ventilation¹⁷.

We deliberately kept the patient breathing spontaneously through the endotracheal tube post-operatively. The patient was maintained on a remifentanyl infusion to tolerate the endotracheal tube.

The patient was assessed daily by the ENT team and underwent repeated flexible nasal endoscopies to assess the mobility and status of his upper airway. Initial post-operative

assessment revealed right vocal cord paresis that was secondary to laryngeal bruising as the recurrent laryngeal nerve was not involved in the injury. The paresis recovered fully and the patient had fully mobile normal bilateral cords upon discharge with a normal voice.

CONCLUSION

A case of self-inflicted airway injury in a twenty-seven-year-old male was managed through multidisciplinary team approach where close collaboration between anesthetists and surgeons managed to secure the airway and repair the injury. The patient had a full recovery.

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