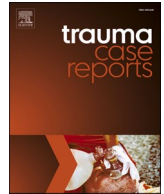




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## Case Report

# Transcervical intubation for massive self-inflicted neck wound transecting the epiglottis<sup>☆</sup>

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## ABSTRACT

**Background:** Penetrating trauma to the larynx is a rare phenomenon with a high risk of mortality and morbidity due to the density of vital structures in the area (Demetriades et al., 1996). Most commonly, this type of injury is due to a gunshot wound or knife injury (Snow and Ballenger, 2003). In cases of suicidal cutthroat injury, it is relatively rare to penetrate the airway (Symbas et al., 1976).

**Case report:** We present a case of self-penetrating trauma to the anterior neck allowing access for direct laryngeal visualization and transcervical intubation in the field. We describe the immediate workup, surgical intervention, and postoperative management. We focus on managing post-operative cough, secretion management, decannulation, and resultant dysphagia.

**Conclusion:** Penetrating laryngeal trauma resulting in airway transection is a rare but potentially fatal phenomenon in which airway management and aggressive post-operative care for severe coughing and dysphagia should be performed to help improve patient outcomes.

## Introduction

Penetrating airway trauma may be a significant cause of mortality and morbidity due to the density of vital structures in the neck [2]. In acute laryngeal injury, establishing a secure airway is of the utmost importance. Additionally, post-operative care aimed at restoring the laryngeal functions of breathing, airway protection, and swallowing requires complex treatment. We present a case of a self-inflicted laryngeal injury with anterior violation of the larynx and complete transection of the epiglottis enabling transcervical intubation.

## Case presentation

Emergency medical services were called to the scene for a 38-year-old patient with complex self-inflicted neck lacerations from a leather-working knife. One large laceration extended through the skin and strap muscles violating the pharynx and transecting the epiglottis just superior to the thyroid cartilage. The large size of the wound enabled the first responders to place a 6.0 endotracheal tube through the neck directly into the larynx (Fig. 1a & b). The patient was transported to our institution. CT angiography of the head and

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neck ruled out significant vascular injury.

The patient was then taken to the OR for revision tracheostomy and flexible bronchoscopy by the trauma surgery team and neck exploration with complex repair by the otolaryngology team. Flexible bronchoscopy was performed through the new tracheostomy site to clear blood products from the airway. Copious blood products were suctioned from bilateral lungs.

Neck exploration confirmed the absence of major vascular injury. The epiglottis was transected above the level of the petiole. Distal structures were intact. Complex repair began with re-approximation of the mucosa and cartilage of the epiglottis with 4-0 vicryl sutures. Closure of the strap muscles and subcutaneous tissue was followed by placement of Penrose drains bilaterally to decrease the potential for subcutaneous emphysema given the plan to wean the patient from sedation and ventilation as quickly as possible.

As anticipated, the patient experienced significant coughing, which is hypothesized to be secondary to epiglottic edema and stimulation along the distribution of the bilateral superior laryngeal nerves. The patient also experienced oozing from the neck wound at the sites of the Penrose drains that resolved with time. Despite vigorous coughing, there was no significant subcutaneous emphysema. Neuropathic cough was managed with 300 mg of gabapentin TID.

Post-operative rehabilitation planning required a more detailed understanding of his past medical history. The patient had previously suffered a traumatic brain injury requiring a gastrostomy tube and tracheostomy tube. Prior to this recent trauma, he was decannulated and eating per os without gastrostomy tube support. Given his history of substantial oropharyngeal dysphagia and current airway reactivity, an open gastrostomy was performed with feeding tube placement on post-op day four.

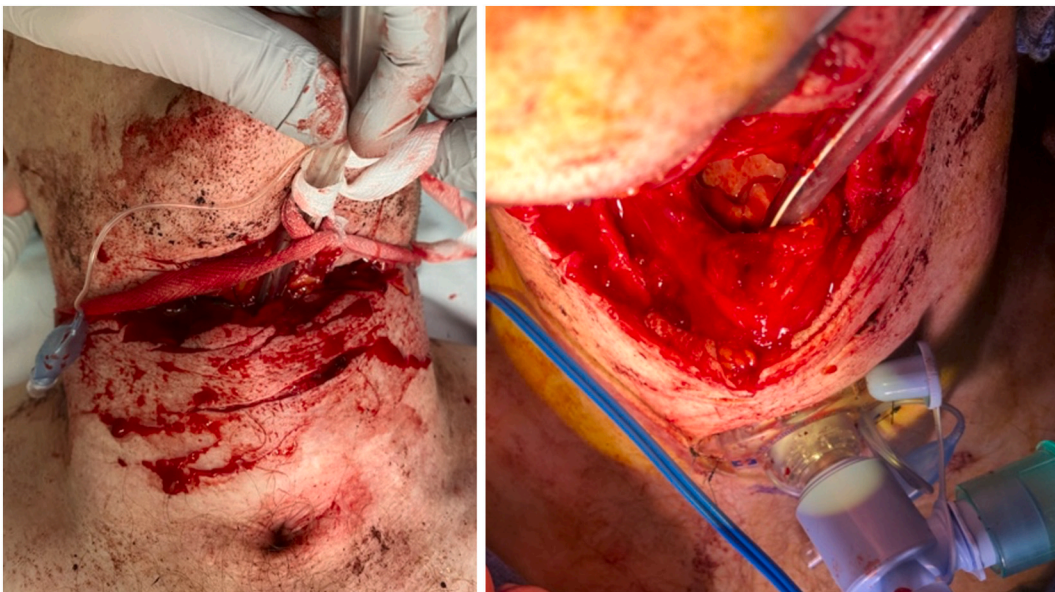
On post-op day eight, modified barium swallow showed significant pharyngeal dysphagia and large volume aspiration with cough reflex leading to NPO orders. Post-operative flexible laryngoscopy demonstrated a well-healed and minimally offset suture line (Fig. 2a & b). Although he met criteria for capping from an air hunger standpoint early on in his course, his significant upper airway secretions delayed decannulation for pulmonary toilet. Despite decannulation, he remains gastrostomy tube dependent and requires management of secretions with chemodenervation.

## Discussion

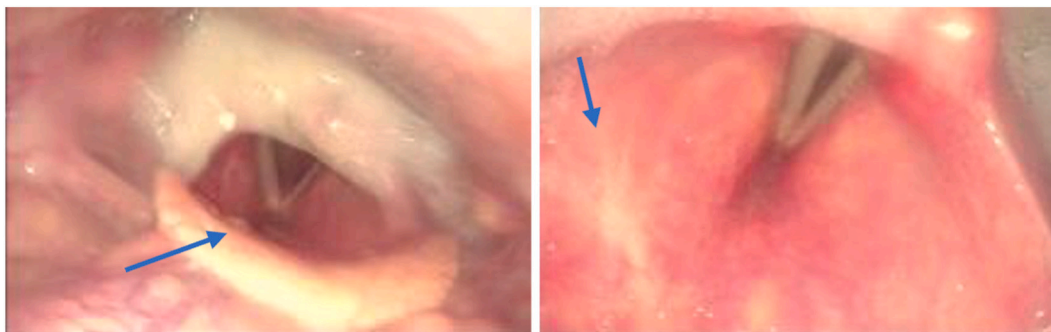
Laryngeal trauma is a rare phenomenon that often results from blunt or penetrating type traumas. Penetrating trauma to the larynx is usually due to a gunshot wound or knife injury. It can be a major cause of mortality and morbidity due to the presence of many vital structures in such a small area leading to the potential for small injuries to cause severe harm [1,2].

Self-inflicted knife wounds to the throat are typically limited to superficial and hesitation cuts; however, major neck injuries can also be seen [3–5]. It is relatively rare for suicidal cutthroat injuries to penetrate the airway [6]. Both history of TBI and self-inflicted penetrating injury increase the risk of future suicidal events [7,8]. Therefore, follow-up aimed at mental health is a priority for this patient.

Early airway management is critical in improving the prognosis for patients with penetrating airway compromise. In this case, the first responders quickly placed an endotracheal tube through the patient's neck and airway laceration. Once the patient arrived at our institution, the patient was promptly sent for CT before tracheostomy and neck exploration in the OR. Other case studies have highlighted the importance of saving time by bypassing a CT scan upon patient arrival in situations of penetrating airway compromise.



**Fig. 1.** Images of the patient taken in the OR. The prior tracheostomy site can be noted in the image of the patient at presentation (a). The endotracheal tube through the anterior neck wound, the tracheostomy, and intact posterior laryngeal structures (b).



**Fig. 2.** Flexible fiberoptic laryngoscopy. (a) The suture of surgical repair can be visualized above the petiole of the epiglottis (blue arrow). Pooled secretions are seen in the post-cricoid area and pyriform sinuses. (b) Mature scar noted on the laryngeal surface of the epiglottis (blue arrow).

Our patient, however, had a secure airway and no clinical signs of large vessel hemorrhage, so CTA was done to rule out subclinical major vascular injury [9,10].

Our patient also experienced significant post-operative coughing and dysphagia. Severe cough is expected after transection of the epiglottitis and in the setting of upper airway inflammation. The neuropathic component of the cough was addressed early with gabapentin as the cough could impede airway healing, patient care, and lead to subcutaneous emphysema. Penrose drains were also placed to establish an egress for air.

Additionally, the patient's prior traumatic brain injury resulted in dysphagia, making it challenging to discern baseline from injury-related dysphagia. As soon as the risk for subcutaneous emphysema subsided, the patient worked extensively with our Speech and Language Pathology colleagues on Passy-Muir valve and dysphagia exercises. Currently, the patient is still NPO but has demonstrated improvement in swallowing with time, continued swallowing therapy, decannulation, and secretion management. He has not developed aspiration-related complications such as pneumonia.

## Conclusion

Penetrating laryngeal trauma resulting in airway transection is a rare but potentially fatal phenomenon. Our case demonstrates that prompt airway management and aggressive post-operative care for severe coughing and dysphagia should be performed to help improve patient outcomes in patients with self-inflicted wounds to the neck.

## Consent for publication

Written informed consent was obtained from the patient to publish this case report and accompanying images.

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