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Austere Management of Traumatic Thyroid Cartilage Laceration in a Peripheral Military Medical Unit: A Case Report

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Abstract

Background: Laceration of the thyroid cartilage can often be accompanied by trauma to tracheal rings. Hence securing the airway, followed by repair of the thyroid cartilage should be the approach for managing such injuries in emergency.

Case Summary: 23 yrs old male reported with alleged history of self-inflicted deep laceration on the anterior aspect of the neck through a sharp object. After securing the airway and applying compression on the wound, patient was taken to operating theatre and the wound was evaluated under general anesthesia. Intraoperatively, bilateral anterior jugular veins and left external jugular vein were lacerated along with the thyroid cartilage. All the vessels were ligated and thyroid cartilage repair was performed using non absorbable sutures after aligning the cartilage anatomy.

Conclusion: Lacerated thyroid cartilage requires urgent surgical repair as it forms a large part of the laryngeal framework and may be associated with compromise of the airway.

Keywords: Thyroid cartilage laceration; Laryngotracheal injury; Airway management; Penetrating neck trauma; Thyroid cartilage repair; Emergency surgery

Introduction

Laryngotracheal (LT) injuries are a rare but life-threatening emergency. LT trauma constitutes less than 1% of all trauma cases, but accounts for more than 75% of cases of immediate mortality. While the incidence of LT injury is 1 in 30,000 emergency admissions in the United States, the exact incidence in India is not known due to the paucity of large serial studies published on neck trauma. LT injuries are less common in the pediatric population because of the higher position and elastic nature of the larynx. The vital structures involved in ventilation, phonation and swallowing are present in a more compact space in the neck and are more prone to injury as they are not protected by a bony covering.

Consequently, even minor blunt or penetrating trauma can lead to catastrophic consequences, ranging from acute airway obstruction and vascular compromise to long-term complications such as dysphonia, dysphagia and laryngeal stenosis. We discuss one such case of the emergent surgical management of a self-inflicted thyroid cartilage laceration.

Case Report

A 23 yrs old male reported to emergency department of a primary health care in a peripheral set up at high altitude area with alleged history of self-inflicted deep laceration on anterior aspect of neck using a sharp object. Surgical call was placed and patient was evaluated as per ATLS guidelines of trauma management. Patient had profuse bleeding from the lacerated site which was controlled using compression bandage **(Figure 1)**.

After securing airway and placing 2 large bore IV lines, patient was immediately shifted to OT for further evaluation and management. Patient was placed under general anesthesia and wound was washed and debrided thoroughly.

Intraoperatively, the bilateral anterior jugular vein and left external jugular vein were lacerated along with lacerated thyroid cartilage **(Figures 2 and 3)**. All the vessels were dissected and ligated and thyroid cartilage repair was done by absorbable suture **(Figure 4)**. The underlying muscles were sutured, margins of wound were freshened up finally and skin closed with absorbable suture after ensuring hemostasis **(Figure 5)**.

Patient was extubated and was observed in ICU. Post op recovery was uneventful and patient was discharged on POD 7. On follow up patient had no long-term complications and had a well healed surgical scar.

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Figure 1-5: Clinical and intraoperative photographs demonstrating the management of traumatic thyroid cartilage laceration: (1) Initial presentation showing a deep anterior neck laceration with active hemorrhage and exposed thyroid cartilage; (2) Intraoperative view of the lacerated thyroid cartilage with a vertical fracture; (3) Dissection of the left anterior jugular vein during surgical exploration; (4) Repair of the thyroid cartilage with restoration of the laryngeal framework and achievement of hemostasis; and (5) Final wound closure following layered repair using absorbable subcutaneous sutures.

Result and Discussion

Laryngeal and tracheal injuries can be classified into blunt and penetrating trauma. Blunt neck trauma needs a systematic evaluation of laryngotracheal structures, the esophagus and cervical spine [1]. Penetrating laryngotracheal trauma is less common, but it carries substantial morbidity and mortality (reported as 5-10% of emergency room cases). Penetrating injuries include neck wounds that extend below the platysma.

Assessment of airway patency and hemodynamic stability remains the immediate priority in the emergency setting. Diagnostic imaging, particularly computed tomography, plays a pivotal role in delineating the extent of structural damage and guiding surgical intervention. Early surgical exploration is often indicated for patients with signs of unstable airway or suspected esophageal involvement to prevent secondary complications such as mediastinitis or airway obstruction [2]. Timely intervention, combined with a multidisciplinary approach, is essential to minimize long-term sequelae and optimize patient outcomes in cases of severe neck trauma. Effective management requires a high index of suspicion, as even seemingly minor injuries can harbor significant underlying vascular or neurological compromise. Clinicians must therefore maintain rigorous vigilance throughout the observation period, as clinical deterioration can manifest insidiously. The integration of advanced diagnostic imaging with rapid clinical assessment protocols ensures that critical injuries are identified before they become life-threatening, thereby facilitating surgical or endovascular stabilization. Furthermore, the implementation of standardized triage and monitoring pathways serves to streamline care, reducing variability in clinical practice and enhancing resource allocation. By fostering seamless communication across surgical, radiological and critical care teams, institutions can significantly optimize patient outcomes.

Repair of thyroid cartilage has been historically described as a complex endeavor requiring both meticulous anatomical reconstruction and functional preservation. Modern surgical techniques have refined this process, leveraging minimally invasive approaches and advanced biomaterials to restore structural integrity while safeguarding phonatory capacity. These advancements not only mitigate long-term complications but also improve the overall quality of life for patients. Furthermore, the integration of

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multidisciplinary rehabilitation protocols post-operatively ensures that recovery is not merely a clinical success, but a holistic restoration of physiological function. Through tailored speech therapy and structured follow-up, clinicians can effectively monitor vocal recovery. Use of mini plates and titanium screws have been advocated for open repair of thyroid cartilage framework but the availability and specialist requirement is advocated [3]. In peripheral centres where minimal resources are available, establishing a secure airway and primary open repair to restore the laryngotracheal framework should be the aim of surgeon. In this case, we used non absorbable suture to secure the fractured segment of thyroid cartilage and absorbable sutures to reapproximate the perichondrium and soft tissues. This meticulous approach, balancing structural integrity with tissue healing, ensures a stable structural foundation while minimizing the risk of long-term complications. Postoperative evaluation demonstrated satisfactory laryngeal alignment and improved phonatory function [4]. This conservative yet effective technique underscores the importance of surgical pragmatism in resource-limited settings. Ultimately, this strategy highlights that successful management of laryngeal trauma does not always necessitate highly specialized equipment [5], but rather relies on the precise application of fundamental surgical principles and anatomical reconstruction. Furthermore, the long-term follow-up revealed no signs of stenosis or functional deterioration, confirming the durability of the repair and the preservation of airway patency.

Conclusion

Laryngotracheal injury remains a complex clinical challenge that demands meticulous assessment and timely intervention. The integration of innovative yet accessible surgical techniques, as demonstrated in this case, provides a viable framework for improving patient outcomes in environments where advanced technological support may be constrained.

In essence, this report underscores the critical importance of surgical adaptability and clinical judgment in resource-limited settings. Ultimately, by prioritizing foundational mastery over technological dependency, surgeons can consistently achieve favorable results even under challenging conditions.

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