

CASE REPORT

Laryngotracheal Separation Following Blunt Neck Injury

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Abstract

Blunt laryngotracheal injuries are rare. The signs and symptoms of blunt laryngotracheal trauma are not always specific to the extent or type of injury. A high index of suspicion should exist in any injury that may be associated with airway trauma. We report a 30-years man who had progressive shortness of breath following blunt neck injury. He had massive emphysema whereby an emergency tracheostomy with multiple fasciotomy was performed. During emergency tracheostomy, it was noted that he had anterior cricotracheal separation which was communicated posteriorly by mucosa and trachealis muscle.

Keywords: *Blunt neck injury, laryngotracheal disruption*

Introduction

Blunt trauma can result from acceleration–deceleration injuries from motor vehicle accidents, blows to the neck, or strangulation. Isolated laryngotracheal disruption that developed after blunt neck trauma can be rapidly lethal if the damaged airway is not diagnosed early. The diagnosis of isolated tracheal rupture is very important for treatment and prognosis. Typical findings on physical examination are soft tissue emphysema spread over the thorax, neck and face may

extend up to the scrotum. We describe a case of an anterior laryngotracheal injury from blunt cervical trauma.

Case report

A 30-year-old man alleged blunt injury over the neck 3 days prior to admission following RTA by motor vehicle. Then he had temporary loss of voice which recovered after two hours of injury. He also had progressive shortness of breath which worsen on lying flat, coughing out blood stained sputum and increasing neck swelling. There was no bleeding from the neck region or dysphagia.

Clinically he was conscious and vital signs were stable. He was severely tachypnoeic and oxygen saturation was falling, able to cough. There was stridor and no drooling of saliva. Neck examination revealed abrasion mark over the anterior neck, tenderness over the anterior part of the neck and subcutaneous emphysema extending from zygoma, anterior and posterior chest including the genitalia.

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There were good and equal vesicular breaths sound on both lungs fields. Other systemic examinations were unremarkable.

Radiological investigations revealed presence of cervical and chest emphysema (Fig 1). A diagnosis of Blunt laryngeal trauma was made and as there was rapidly increasing stridor, an emergency tracheostomy with difficulties and multiple fasciotomy was done. There was anterior cricotracheal separation. The tracheostomy tube was introduced through partially separated trachea and breathing reestablished approximately after 2 minutes. Patient was kept in ICU for batter observation. Emphysema totally subsided on 10th POD.

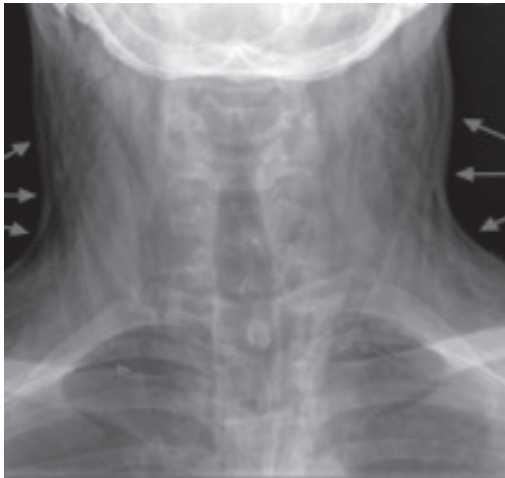


Fig.-1: X-ray soft tissue neck, on arrival

On a next setting after 20 days of previous operation he underwent for repair. Under G/A (anesthesia was maintained through the tracheostomy tube) a transcervical incision was made by making an elliptical incision around the tracheostomy site. Subplatysmal suprajugular upper and lower flap were elevated superiorly up to hyoid bone and inferiorly suprasternal notch respectively. Upon separating the strap muscles in the midline whole of the laryngotracheal skeleton was skeletonized from hyoid bone to the suprasternal trachea below. Endotracheal intubation was done withdrawing the tracheostomy tube.



Fig.-2: On OT table



Fig.-3: Just after tracheostomy

We noted lacerated injury in the cricotracheal junction. There was almost complete cocricotracheal separation except 3-4 mm area in the posterior part. Posterolateral soft part was repaired with 3/0 vicryl suture and the anterolateral part by 2/0 prolene suture and a size 8 cuffed tracheostomy tube was inserted below the repaired site. Post-operatively he was on nasogastric tube feeding. His recovery was uneventful. No respiratory distress experienced by the patient.

Repeat flexible laryngoscopy on the seventh post operative day revealed good airway with intact anastomosis site. Decanulation was done on 10th POD. He was maintaining a good voice and good airway. Patient was discharged on 13th POD.



Fig.-6: months after operation

Discussion

Cervical tracheal injuries are rare conditions to encounter in an emergency unit. Most of them occur as a result of blunt neck traumas. The incidence of laryngotracheal rupture has been reported to be about 1% in blunt trauma series,¹ and its report is often anecdotal. A significant number of patients die in the immediate post injury period from asphyxiation prior to the institution of any therapy. There is also a proportion of injuries which go undetected due to the presence of other major associated trauma.

The most important typical clinical findings are dyspnoea, stridor or soft tissue emphysema spread over the thorax, neck and face.² Unfortunately, the consequences of blunt laryngeal trauma may be quite nonspecific and correlate poorly with the severity of underlying injury.^{3,4,5} Based on the American College of Surgeons' Advanced Trauma Life Support protocol, a diagnosis of laryngeal injury is suggested by the presence of hoarseness, subcutaneous emphysema and palpable fracture.⁶ With this finding, it must be assumed that a violation of the upper aerodigestive tract has occurred. It is tantamount that early diagnosis and treatment be initiated because the mortality rate of unrecognized injury has been reported to be as high as 92%.⁷

Posterior membranous tear from blunt cervical trauma is the most common injury as a result of the trachea being compressed against the vertebral bodies.⁸ In this case, the hard outlet shell of helmet forced pressure to anterior trachea. In this situation, the force was eccentrically distributed against the trachea causing an anterior tracheal tear instead of the more common posterior membranous disruption.⁸

It is therefore important that such patients are not taken lightly. A high index of suspicion should exist in any injury that may be associated with airway trauma. The mainstay of the diagnosis and work-up of the patient with laryngotracheal trauma is the physical examination. A stepwise analysis of signs of injury to the cervical aerodigestive system should be performed. Quantification of subcutaneous emphysema may give important clues to the locus of injury. Massive emphysema as shown in this patient usually results from tears of the laryngo-tracheobronchial axis.

CT scans offer a clinical advantage in the identification of bony fractures, and

endoscopic examination has an advantage in the examination of clinical findings in the airway mucosa. In uncooperative multiple facial trauma patients, flexible nasopharyngoscopy have utilized with good success.¹ Even though a CT scan provides the best radiographic information about the larynx and cartilages, it should be used only for patients whose management course may be determined by its results.⁹ In massive injury as shown in this case, for which tracheostomy and open surgical exploration are required irrespective of the imaging findings, CT scan is not mandatory.¹⁰

Establishing an airway is the initial focal point in the management of these injuries. Patients with obvious airway compromise require immediate intervention. In our case, because of the extensive and increased subcutaneous emphysema and progressive airway distress, a tracheostomy was placed primarily to secure the airway, and secondarily to act as a route for subcutaneous air to escape. Tracheotomy rather than primary tracheal repair and endotracheal intubation were chosen for a number of reasons. Although there are reports of successful orotracheal intubation in laryngotracheal separation, the potential for disaster certainly exists. Placement of an endotracheal tube across an injured larynx can convert a simple mucosal laceration to a more complex management problem. In addition, other potential pitfalls with prolonged intubation such as accidental extubation, prolonged neuromuscular blockade, and pulmonary collapse or infection would be avoided.⁸ Therefore tracheostomy should be the preferred method of airway control utilized in blunt laryngotracheal trauma.¹ Elective intubation can be successfully performed under the following guidelines. It should be done under direct visualization only, performed by the most experienced personnel present, and preferably with a smaller tube

than would normally be utilized. The material and personnel required to perform an immediate tracheostomy should always be at hand.¹¹

The operative management of laryngotracheal injuries is dictated by the severity of laryngeal injury and the presence of associated injuries. If at all possible within 48 hours of the injury, endoscopy and surgical repair are performed. A delay of more than two weeks will allow scar tissue to form creating a more difficult and less satisfactory repair procedure.^{11,12,13} Systemic corticosteroids have been used sporadically in the treatment of laryngeal trauma in an effort to reduce edema and subsequent fibrosis, but no convincing clinical or experimental evidence supports such use. If used, they are most likely to be of benefit in the first few hours after injury.¹⁴ During exploration of the neck, whenever anterior tracheal injury is discovered, it is important to evaluate the posterior membranous trachea for any unsuspected injury.¹⁵ We conclude that a high level of suspicion should be maintained in the presence of neck trauma where there may be a high possibility of laryngotracheal injury. The safety of this management strategy depends on a high index of suspicion for injury and early diagnosis.

References

1. Fuhrman G, Stieg FH, Buerk CA. Blunt laryngeal trauma: classification and management protocol. *J Trauma* 1990;30:87-92.
2. Cassada DC, Muniyikwa MP, Moniz MP, et al. Acute injuries of the trachea and major bronchi: importance of early diagnosis. *Ann Thorac Surg* 2000; 69:1563-7.
3. Hosny A, Bhendwal S, Hosni A. Transection of cervical trachea following

- blunt trauma. *J Laryngol Otol* 1995;109: 250-1.
4. O'Keeffe LJ, Maw AR. The dangers of minor blunt laryngeal trauma. *J Laryngol Otol* 1992;106: 372-3.
 5. Rossbach MM, Johnson SB, Gomez M A, et al. Management of major tracheobronchial injuries: a 28-year experience. *Ann Thorac Surg* 1998; 65:182-6.
 6. Committee on Trauma, American College of Surgeons. Advanced trauma life support for doctors. Chicago, IL: American College of Surgeons, 2004:42-3.
 7. Goudy SL, Miller FB, Bumpous JM. Neck crepitation: evaluation and management of suspected upper aerodigestive tract injury. *Laryngoscope* 2002;112: 791-5.
 8. Marathe US, Tran LP. Pediatric neck trauma causing massive subcutaneous emphysema. *J Trauma* 2006; 61: 440-3.
 9. Schaefer SD, Brown OE. Selective application of CT in the management of laryngeal trauma. *Laryngoscope* 1983; 93: 1473-5.
 10. Gold SM, Gerber ME, Shott SR, Myer CM. Blunt laryngeal trauma in children. *Otolaryngol Head Neck Surgery* 1997; 123: 83-7.
 11. Gussack GS, Jurkovich GJ, Luterman A. Laryngotracheal trauma: a protocol approach to a rare injury. *Laryngoscope* 1986; 96: 660-5.
 12. Bryce DP. The surgical management of laryngotracheal injury. *J Laryngol Otol* 1972; 86: 547-87.
 13. Lejeune FE. Laryngotracheal separation. *Laryngoscope* 1978; 88: 1956-62.
 14. Schaefer SD. The treatment of acute external laryngeal injuries 'State of the art'. *Arch Otolaryngol Head Neck Surg* 1991;117:35-9.
 15. Grewal H, Rao PM, Mukerji S, Ivatury RR. Management of penetrating laryngotracheal injuries. *Head Neck* 1995;17: 494-502.