

Laryngotracheal disruption caused by blunt neck injury

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Citation

S Putra, A Mazita, M Marina. *Laryngotracheal disruption caused by blunt neck injury*. The Internet Journal of Head and Neck Surgery. 2008 Volume 3 Number 1.

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 35-year-old Indonesian man who had progressive shortness of breath following blunt neck injury. He had massive emphysema whereby an emergency tracheostomy was performed followed by tracheostomy. During emergency tracheostomy, it was noted that he had a horizontal anterior tracheal injury which was communicated posteriorly by mucosa and trachealis muscle. Primary end-to-end anastomosis was performed successfully.

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. We describe a case of an anterior tracheal injury from blunt cervical trauma.

CASE REPORT

A 35-year-old Indonesian man alleged an industrial accident when his 'sarung' around the neck was caught into a running machine causing neck strangulation two days prior to admission. Following that he had temporary loss of voice which recovered after a day 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, pink and vital signs were stable. He was mildly tachypnoeic, and able to cough. There was no drooling of saliva. Neck examination revealed abrasion mark over the anterior neck with intact laryngeal framework and subcutaneous emphysema extending to zygoma, anterior and posterior chest. There were good and equal vesicular breath sound on both lungs. Other systems were unremarkable. Flexible nasolaryngopharyngoscope revealed blood clots

above the glottis and laceration wound over anterior part of second and third tracheal ring. Boths vocal movement were equal.

Radiological investigations revealed presence of cervical emphysema (Fig 1). A diagnosis of laryngeal trauma was made and we proceed with endotracheal intubation followed by emergency tracheostomy. Upon separating the strap muscles we noted endotracheal tube through the tracheal injury over second and third tracheal ring. It was communicated posteriorly only by mucosa and trachealis muscle. Mucosa and tracheal ends was sutured with absorbable suture and a size 8 cuffed tracheostomy tube was inserted below the injured site(at the different site from the existing tracheal opening). Post-operatively he was started on nasogastric tube feeding. His recovery was uneventful. Repeat flexible nasolaryngopharyngoscope on seventh post operative day revealed good airway with intact anastomosed site. He was discharged well on the eighth post operative day after decannulation of tracheostomy tube. Unfortunately he did not turn up for follow up.

Figure 1

Figure 1: Lateral neck radiograph shows subcutaneous emphysema.



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 series¹ 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 our case, the sarung which got caught in the machine gradually forced pressure to anterior tracheal. In this situation, the forced 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 laryngotracheobronchial 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.^{11,13} 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.

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