

# Extensive Laryngotracheal Trauma

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## Citation

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## Abstract

Isolated laryngotracheal trauma is rare in modern days. Evaluation and treatment (time and mode of treatment) of these types of injury varies from patient to patient and surgeon to surgeon. Air way maintenance is the first priority irrespective of type and cause of trauma. We are reporting this case to give importance to do early tracheostomy in air way breach cases in spite of no stridor at presentation. Inexperience

Surgeon should wait till the proper radiological and clinical evaluations are not done. Delaying the surgical intervention for some time may give more favorable result as in our case.

## INTRODUCTION

Injury to the larynx is rare (less than 1% of all traumas). Mode and type of blunt trauma has play major role to the type of injury. It is usually associated with intracranial (13%), cervical spine (8%) and esophagus injury (3%)<sup>1</sup>. Upper airway injury should be considered in every patient of neck trauma. Dyspnoea and dysphonia are the main features which indicate laryngeal injury. CT is helpful for those who have mild to moderate injury. The primary aim is to protect the airway and secondarily successful management of the phonatory role of the larynx. Early recognition, accurate evaluation and appropriate treatment are the main principal to a successful outcome.

## CASE REPORT

A 35 year old male presented in casualty with an increasing neck swelling on the right side and face region after having a blunt trauma over the neck region by autorickshaw about 5 hrs back. There was history of change in voice and difficulty in swallowing. There was no history of respiratory distress, vomiting, loss of consciousness and disorientation. On examination there was surgical emphysema mainly present on the right side of neck and parotid region. There was blunting of the thyroid prominence and tenderness all along the larynx (Figure1). The voice was breathy and cough was effective. On coughing emphysema was increasing. There was no neurological deficit. Chest and abdominal examination was normal. Provisional diagnosis of isolated laryngeal trauma with air-way breach was made.

## Figure 1

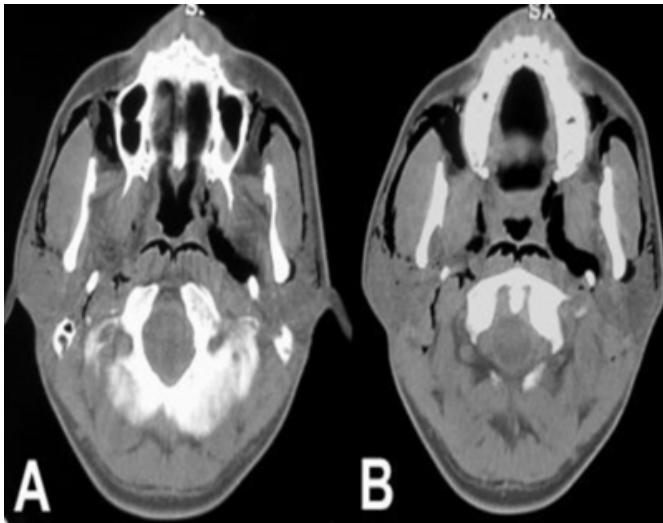
Figure 1: Clinical photograph showing surgical emphysema



CT scan showed surgical emphysema in the neck and parotid region mainly on the right side with minimal on the left side, right sided paramedian thyroid ala fracture with sub mucosal hematoma along the interior of larynx and subglottis narrowing (Figure2a and 2b). Vocal cords seem to be normal and no other associated vascular, esophagus and cervical spine injury. Scan also able to demonstrate site of air leak (crico-thyroid membrane region). Tracheostomy was done in view of severity of trauma, giving rest to the vocal cords and spontaneous closure of leak site. There was sign of resolution of emphysema in 3-4 days.

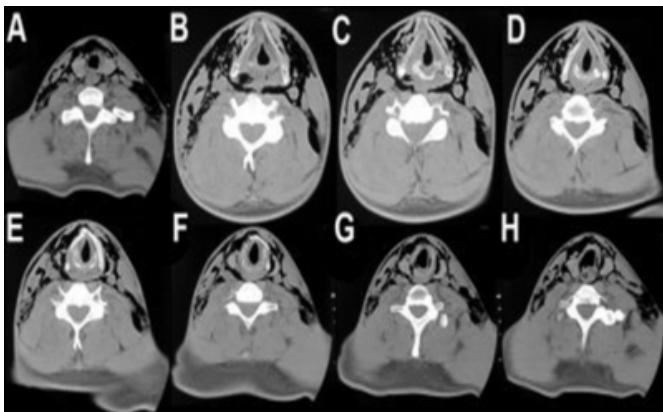
**Figure 2**

Figure 2a: CT scan showing surgical emphysema



**Figure 3**

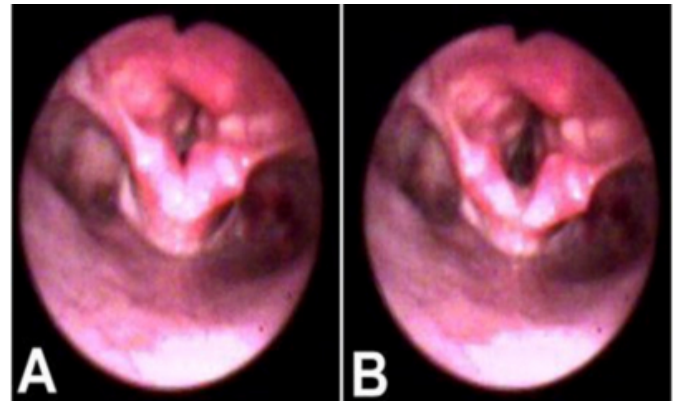
Figure 2b: Scan showing fracture, hematoma (B, C) and air leak (G)



Fiber optic laryngoscopy showed edematous larynx with normal mobility of vocal cords. There was collapse of airway at the level of subglottis region and below it (Figure 3a and 3b).

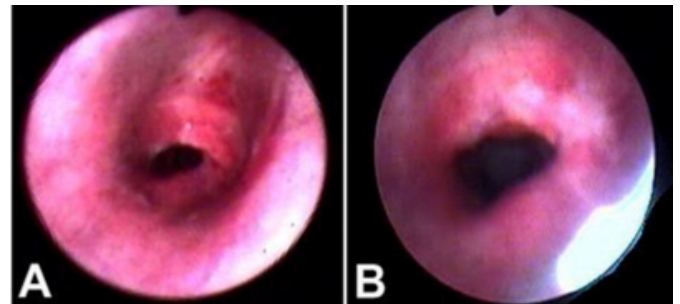
**Figure 4**

Figure 3a: Endoscopic view showing normal vocal cords



**Figure 5**

Figure 3b: Endoscopic view showing preoperative subglottis collapse (A) (B) Showing post operative (1 month follow-up) improvement in the airway



Surgical exploration was done with a horizontal incision at the level of cricothyroid membrane. Displaced thyroid cartilage was reduced and fixed with 4-0 proline by quilting sutures (Figure 4a). Cricoid cartilage was normal. There was displaced fracture of first tracheal ring. Fracture site overlapped each other and protrude in to the larynx (Figure 4b). First ring was partially excised and Mitomycin-c was applied locally for 3 minutes. After 7<sup>th</sup> day airway patency was checked by blocking the tube. After 15 day he was decanulated completely. His voice was improved and there was no stridor even on moderate exertion. Laryngoscopy done after 1 month which showed improvement in the subglottis diameter and well mobilized vocal cord with minimal edema of right sided cord.

Figure 6

Figure 4a: Intraoperative photograph showing fracture site A and after putting sutures B

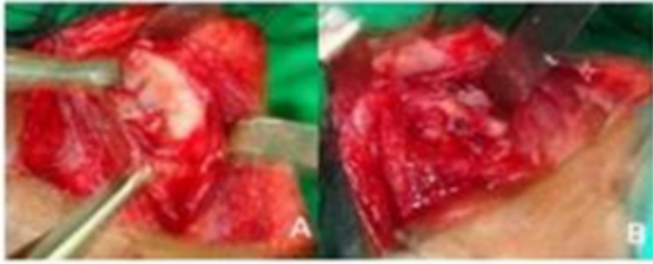


Figure 7

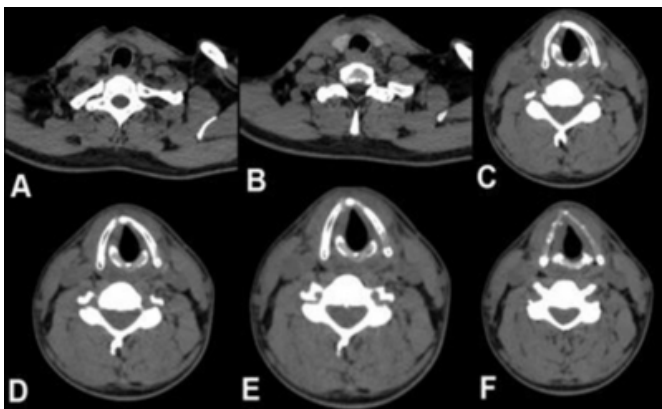
Figure 4b: Intraoperative photograph showing fracture of first tracheal ring



Follow-up CT scan showed normal alignment of thyroid cartilage and marked improvement in the sub glottic airway. He is doing well in the follow-ups.

Figure 8

Figure 5: Follow-up CT scan showing alignment of thyroid cartilage C, D, E with improved subglottic air way A,B



## DISCUSSION

Blunt Laryngo-tracheal trauma is rare but life threatening type of trauma. If it is missed, it produces serious airway problem and impaired voice production. It is rare because of increasing use of security system like seat belt, air bags. Blunt trauma may be of low or high velocity. High velocity impacts result in compound injury whereas low-velocity does not. These injuries are common in male because of their more involvement in outdoor activities though female tends to have slimmer, longer necks make them more vulnerable for trauma anatomically <sup>1</sup>. Type of Laryngo tracheal injury (contusion, edema, hematoma, laceration, avulsion, fracture and dislocation of laryngeal cartilages) depends upon the multiple factors. These factors are magnitude and direction of force, the position of cervical spine at impact, age and elasticity of laryngeal cartilages. Younger cartilage has more elasticity so that they can sustained more force as compare to older ones who have calcified rigid cartilages. Direct blows are most likely to injure the cartilages of the larynx, while flexion/extension injuries are most commonly associated with tracheal tears or laryngotracheal separation. When the trachea is damaged from a crushing injury, it may be the result of the trachea becoming compressed between the manubrium and the vertebral column. Blunt injuries to the chest may produce vertical tears in the membranous portion of the trachea or bronchi, usually within 2.5 cm of the carina <sup>2</sup>. These types of trauma can be classified either by region (supraglottic, glottic and subglottic) or by the type of tissue affected (skeleton or soft tissue). Symptoms of airway injury are depending up on the mechanism and duration of injury. Reports suggest that at least 25% of patients with laryngotracheal trauma requiring surgery have no physical evidence of such injury, and may not display symptoms until 24–48 hr after trauma <sup>3</sup>. Common symptoms are local contusion, subcutaneous emphysema, changes in the voice, such as hoarseness or inspiratory stridor, respiratory distress and hemoptysis. Subcutaneous or mediastinal emphysema are sometimes the only factors present in an injury to the distal trachea, and the airway otherwise appears surprisingly normal. Distal airway injury may present with subcutaneous emphysema and pneumothorax with minimal to a large air leak in which the lung fails to re-expand completely after placement of a chest tube. X-ray neck and additional CT scan of larynx and trachea are very useful in diagnosing the clinically missed injuries <sup>4</sup>. Scan in patient with minor injury and minimal symptoms with no evidence of airway compromise, do not provide extra information <sup>5</sup>. It is useful

for those who have seemingly mild to moderate injury with no air way compromise as in present case. Schaefer's classified the management according to the severity of trauma (Grade1-4) <sup>6</sup>. Primary care to the airway should not be delayed due to radiological findings because stable airway can rapidly progress to an acute airway obstruction. Patients with minor laryngeal injuries did well with medical management alone. On the other hand patients with major injuries invariably needed Tracheostomy and/or laryngeal repair. Timing of surgery showed significant correlation with the outcome in terms of voice and airway <sup>7</sup>. Displaced thyroid cartilage can be reduced and fixed by wire, Proline, miniplates with self tapping screws <sup>8</sup>. Stents should be used if there is widespread endolaryngeal mucosal laceration, disruption of the anterior commissure or a comminuted fracture is unstable despite using plates and titanium mesh. A successful outcome is considered to be no tracheostomy in the long term and no (or minimal) dysphonia.

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