

Asphyxial death Due to Fracture of Thyroid Cartilage, Cricoid Cartilage and Arytenoid Cartilage as Result of Blunt Trauma of Neck in a Motorcycle Accident: An Autopsy Report

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Abstract

Laryngeal fracture is rare but fatal traumatic injury which is mainly caused by severe blunt trauma from interpersonal violence, motor vehicle accident or sports injuries. Laryngeal fracture can lead to severe airway collapse and death. Mortality decreases to less than 5% once the airways made patent and laryngeal injuries are corrected. People must take motorcycle riding safety course to learn how to ride safely. Always follow traffic rules. The motor vehicle accident can be prevented largely through public awareness and education.

Keywords: Laryngeal fracture, Contusion, Thyroid cartilage, Cricoid cartilage, Arytenoid cartilage

Introduction

Fracture of larynx is very infrequent and potentially fatal traumatic injury with documented incidence of 1 in 30000 cases present to tertiary care trauma centre^{1,2,3,4}. Rarity of this injury is due to elasticity and mobility of cartilaginous laryngotracheal complex, and protection offered by mandible and sternum⁵. Laryngeal injuries mainly caused by severe blunt trauma from interpersonal violence, motor vehicle accident or sports injuries. Laryngeal fractures may be missed by clinician due

to its rare occurrence, often go undiagnosed and have delayed referral due to low physician experience^{3,4}. Laryngeal fracture can lead to severe airway collapse and death². Laryngeal trauma has mortality 80% in prehospitalization⁶. Mortality decreases to less than 5% once the airways made patent and laryngeal injuries are corrected⁷. The laryngeal skeleton is made of three unpaired larger cartilages (thyroid, cricoid and epiglottis) and three smaller paired cartilages (arytenoid, cuneiform and corniculate cartilages), all connected by membranes, ligaments and muscles⁸.

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Case report: A sealed dead body of 22 years old male brought by police to mortuary Lucknow, for autopsy to find out cause of death by motor vehicle accident. Family members gave history that the dead person was going on motorcycle with very high speed and suddenly collided with the back of four-wheeler and died due to injuries to neck.

Autopsy Finding: Autopsy was performed at Mortuary, King George's Medical University Lucknow with post-mortem. The body was that of an average build male, of age 22 years. Rigor mortis was present all over the body. Post-mortem lividity was present on the back and dependant parts of the body in supine position. Nails were cyanosed. A contusion of size 5cm×3cm was present at lateral aspect of right arm which was 12 cm below from right acromion process and 10 cm above from right cubital fossa. An abraded contusion of size 4cm×2cm was present below body of mandible on left side, which was 6 cm from left angle of mandible and 5 cm below and lateral to chin. Another abraded contusion of size 2cm×2cm was present, 6 cm below to first contusion. There was no other external injury present on the body. No injury present on scalp, on opening cranial cavity there was no injury to meninges and brain tissue. Cranial and facial bone was intact. On opening thoracic and abdominal cavity, heart, lungs and all visceral organs were congested and intact.

On neck dissection, strap muscles of neck were highly contused at various places. Thyroid cartilage was fracture anteriorly and linearly down the thyroid prominence and both the wing of thyroid was flattened (Figure 1). Cricoid cartilage was fractured at upper central portion of anterior surface (Figure 2). Contusion present at posterior aspect of anterior aspect of cricoid. Left arytenoid was fractured at its base and dislocated anteriorly. Entire laryngeal apparatus was filled with clotted blood. Tracheal rings were intact. Epiglottis and trachea were congested. Hyoid bone was intact.

Death was due to sudden blockage of respiratory passage as a result of fracture thyroid cartilage, cricoid cartilage and arytenoid cartilage.

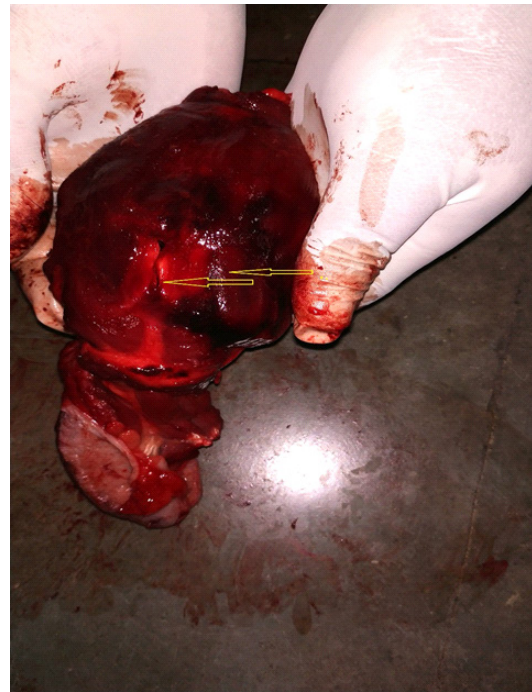


Figure 1. Thyroid cartilage fracture. (SHOWN BY YELLOW ARROW)

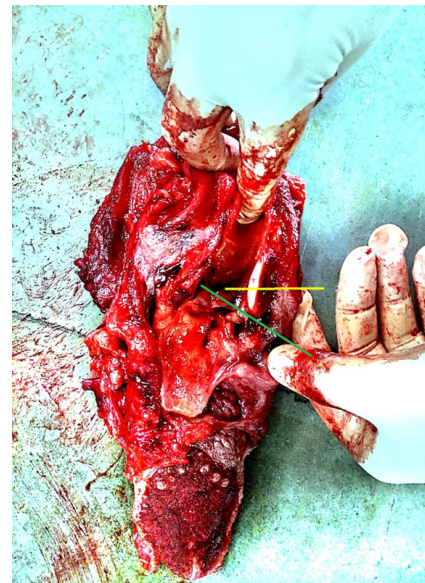


Figure 2. Cricoid cartilage fracture (shown by yellow line) and arytenoid cartilage fracture (shown by green line)

Discussion

Laryngeal fracture is a rare type of injury. Blunt anterior trauma to neck from motor vehicle accident, interpersonal assault or sport injury is most common cause of laryngeal fracture^{3,9}. Motor vehicle collision accounts for 59% of all blunt airways' trauma¹⁰. In

motor vehicle accident, the major cause of laryngeal fracture is direct anterior impact on larynx^{1,11,12}. But in recent years laryngeal fracture has a decreasing tendency due to improvement of airbags and abundant safety devices for riders¹³. Penetrating neck trauma due to gun shot or stab wound is second leading cause¹⁴. In our case laryngeal trauma was from direct impact in motor vehicle accident.

The mortality rate in laryngeal fracture for blunt trauma is more than 40%, whereas for penetrating trauma, it is less than 20%, reflecting greater severity of injury in blunt trauma⁵. The overall mortality rate of laryngeal trauma is 17.9% to 40%, with associated severe airways injury and multiple organ injury many patients died before reaching tertiary care centre¹⁴. Open laryngeal fractures are quite rare, and likely to be missed only by failure to examine the neck. On the contrary, fractures of laryngeal framework appear more likely to be open internally through mucosa rather than skin and therefore more likely to be missed by external examination¹⁵. In our case, there was no external wound present on the neck. Fracture of thyroid, cricoid and arytenoid were seen only after dissection of neck. This may be caused by high torsional force leading to over extension of neck during the accident.

Fracture of thyroid cartilage occur when it is forced against the cervical spine, eventually, it reaches maximal flexibility, springs back into position, resulting in an anterior linear fracture down the thyroid prominence¹⁶. The same mechanism is applicable in our case wherein the patient's neck collided against the back of four-wheeler.

Conclusion

People have to take a motorcycle riding safety course to learn how to ride safely. People should be aware of road condition or obstruction at road. Always follow traffic rules. The motor vehicle accident can be prevented largely through public awareness and education. Traffic police should be more alert and ensures strict implementation of the legislation regarding roads traffic.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required

Consent: Informed consent was taken from the relative of deceased's for publishing the photographs and sharing the information of the deceased.

Source of funding: Not required

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