

A Complete Transection of Larynx

Y Noorizan, MBBCh*, Y K Chew, MBBS**, A Khir, MS**, S Brito-Mutunayagam, MS***

*Department of Otorhinolaryngology, Head and Neck Surgery, **University Kebangsaan Malaysia Medical Centre, Jalan Yaakob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, ***Hospital Pakar Sultanah Fatimah, 84000 Muar, Johor, ****Hospital Ampang, Jalan Mewah Utara, Pandan Mewah, 68000 Ampang, Selangor

SUMMARY

Acute laryngeal injury is a rare, potentially lethal injury. It often poses difficulty in airway management. Commonly described are external laryngeal or blunt injuries. We report a case of penetrating neck injury resulting in complete transection of cricoid cartilage. A lady presented with a large, deep slash wound in her neck from a knife injury. There was complete laryngotracheal separation. The airway was secured before she was taken to the operating theatre. A tracheostomy was performed. Exploration revealed the cricoid ring was cut horizontally into two. Anastomosis of the cartilaginous framework was undertaken. Fiberoptic laryngoscopy showed bilateral vocal cords paralysis. After two months the patient recovered without airway compromise, she regains her voice. Repeat laryngoscopy showed good mobility of the vocal cords. In conclusion surgical reconstruction should be meticulously done to ensure good respiratory and phonatory abilities.

KEY WORDS:

Cricotracheal separation, Laryngeal trauma

INTRODUCTION

Acute laryngeal injury is a rare but potentially lethal injury. It often poses difficulty in airway management. Establishing an appropriate airway is the top most priority in such cases. Complications of this injury are chronic airway obstruction and voice compromise. Hence the aim of repair of the larynx is to provide a patent airway and voice preservation. Commonly described are external laryngeal trauma or blunt injury to the neck as a result of road traffic accidents, contact sports and 'clotheslines' type accidents. We report a case of penetrating neck injury resulting in complete transection of cricoid cartilage.

CASE REPORT

In May 2007, a thirty-nine years old lady was brought into our Accident and Emergency Department with neck trauma. She was an assault victim whose neck was slaughtered with a sharp knife by robbers. On examination, she was alert and was still able to communicate using gestures. Her blood pressure was within normal limit with a tachycardic pulse. Her neck revealed a large and deep laceration wound extending from side to side measuring about 15cm, lacerating both sternocleidomastoid muscles. Bleeding was seen mainly from the muscles. Her trachea was exposed and she was breathing through the gaping wound. Immediately a cuffed

endotracheal tube was placed into the exposed airway. It is to secure the airway and preventing her from aspirating blood. Upon suctioning the airway, minimal blood was noted. The patient was stabilized and brought to the operating theatre for exploration under general anaesthesia.

Ventilation was performed via the endotracheal tube. A tracheostomy was performed below the level of the slash wound at the fourth tracheal ring. Exploration of the neck revealed the right sternocleidomastoid muscle was partially cut, the left SCM and all the strap muscles were completely cut. The carotid arteries and internal jugular veins were intact. The right thyroid gland was superficially injured. A linear clean cut of the airway across the cricoid ring was observed. It was cut into two complete horizontal halves. The undersurface of the vocal folds were viewed at the upper end of the cut airway. After careful inspection, both vocal cords looked uninjured. No other endolaryngeal mucosal laceration was seen. The oesophagus was intact. The recurrent laryngeal nerves could not be identified.

The cricoid ends were approximated. Meticulous end to end anastomosis of the cricoid ring was done. The posterior half of the rings were closed using three interrupted suturing with Vicryl 3.0, then the anterior half were closed using interrupted method with Dafilon 3.0. The pretracheal fascia and the muscles were repaired with Vicryl 3.0. The thyroid gland was treated conservatively as it was only minimally bleeding. A Ryles tube and two Radivac drains were inserted. IV Ceftriaxone and Metronidazole were started.

Post operatively she was alert and comfortably breathing via the tracheostomy tube. Fiberoptic laryngoscopy showed bilateral vocal cord palsy. After two weeks her wound healed well and she was discharged home with the tracheostomy and feeding via Ryles tube. Six weeks post trauma, she did not have difficulty breathing at rest and on exertion. She was readmitted to wean off the tracheostomy and the Ryles tube. No stridor was noted on occlusion of the tracheostomy. At two months follow up she began to regain her voice but was high pitched. Repeat laryngoscopy showed equal bilateral movement of the vocal cords with a small glottic chink on phonation. She has no problem with aspiration.

DISCUSSION

Laryngeal injuries are uncommon but potentially fatal conditions. The mechanism can be blunt trauma, penetrating trauma, inhalation injury or injury caused by caustic ingestion. Majority of penetrating injuries are caused

This article was accepted: 11 May 2009

Corresponding Author: Noorizan Binti Yahya, Department of Otorhinolaryngology, Head and Neck Surgery, University Kebangsaan Malaysia Medical Centre, Jalan Yaakob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia Email: noorizan_yahya@yahoo.com



Fig. 1: Showing the cricoid cartilage was cut into two complete rings. The tracheostomy was performed below the wound level.

by gunshot and knife wounds¹. In gunshot wounds, the velocity and mass of the bullet will determine the degree of soft tissue injury to the larynx, the higher velocity will cause more damage. Knife injuries usually result in less tissue damage. However, it can be associated with lacerations of the cricothyroid membrane, injuries of vessels and nerves some distance from the wound. In both penetrating and blunt laryngeal injury, complications with regard to chronic airway obstruction and voice compromise are high.

In the literature review, penetrating laryngeal injuries are rarely discussed. Typically a victim with this type of injury may not survive long enough to get medical help as the trachea may have retracted inferiorly. In terms of management, the first priority is to establish an airway. CT neck is advisable when a blunt injury is suspected^{2,3}. However, in a penetrating injury like in this case, it may not be recommended as the injury is very obvious that immediate exploration is required. Once the airway was temporarily secured with endotracheal tube, a tracheotomy should be performed before exploration is done. Other than protecting

the airway, we could not predict the outcome of the cricoid anastomosis and the recurrent laryngeal nerves function. Optimally the tracheotomy should be performed lower than usual, at the fourth to fifth rings of the trachea to avoid further damage to existing injuries¹. Although endolaryngeal stenting is usually advisable following repair of the cartilaginous framework, in this case it was not inserted due to the nature of the injury involving two complete half of a cricoid ring. It is thought that the completeness of the cricoid ring is important in maintaining the patency of the subglottic area.

Postoperatively a fiberoptic laryngoscopy is done to assess the vocal cords movement. Ideally direct laryngoscopy and bronchoscopy using spontaneous respiration general anaesthesia would be done to ascertain subglottic stenosis. It was not done as clinically the patient was breathing comfortably with no stridor. Should the recurrent laryngeal nerves were cut, neurotomy is advisable⁴. Repeated laryngoscopy is necessary to assess the vocal cord functions. Further management would depend on unilateral vs bilateral paralysis, addressing problems of airway compromise, aspiration and dysphonia.

In conclusion a prompt action when properly performed may be life saving. Assessment of the injury should include injury to the larynx, major vessels, recurrent laryngeal nerves and oesophagus. Surgical reconstruction with restoration of laryngotracheal framework should be meticulously done to ensure good respiratory and phonatory abilities as well as normal swallowing.

REFERENCES

1. James B, Snow Jr, MD, John Jacob Ballenger, MD. Trauma to the larynx. Ballenger's Otorhinolaryngology Head and Neck Surgery, Sixteenth Edition 2003; 51: 1168-84.
2. D Goldenberg. A Golz. R Flax-Goldenberg. HZ Jaochims. Severe laryngeal injury caused by blunt trauma to the neck. J Laryngol Otol 1997; 111(12): 1174-76.
3. Kohli A. Bhadoria P. Bhalotra A. Anand R. Goyal P. An unusual laryngeal injury. Indian J. Anaesth. 2007; 51(1): 57-59.
4. Chou FF. Su CY. Jeng SF. Hsu KL. Lu KY. Neurotomy of the recurrent laryngeal nerve. Journal of the American College of Surgeon 2003; 197(1): 52-7.