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Penetrating Tracheal injury- A surgical challenge

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Abstract

Penetrating Neck injury is rare and tracheal rupture is seen only in 14% cases. Tracheal injury can lead to serious consequences due to airway obstruction, bleeding, aspiration and severe sympathetic stimulation. We are reporting two cases of anterior tracheal rupture following assault with knife. About 95% of tracheal injury results from ballistic and knife injuries. In first case emergency tracheostomy was done through the same wound. In second case emergency tracheostomy was done from the non-injured area after fibreoptic guided orotracheal intubation. We opted for barium esophagography over gastrografin swallow.

Introduction

Direct tracheal injury is a rare injury, accounting for less than 1% of traumatic injury and 14% of penetrating neck injuries.[1,2] Majority of such cases are seen in zone II of the Neck that is from cricoid cartilage to the angle of mandible.[1,3] These injuries occur most commonly from assault with sharp objects like knife, scissor and ballistic injuries.[1] Surgical exploration is a major challenge for surgeons due to dense arrangement of vital structures which cannot be examined or assessed by physical examination.[3] In neck injuries the management should be within the golden hour to prevent aspiration of blood through the tracheal opening. Here we are reporting surgically treated two cases of anterior tracheal injury following assault with knife.

Case Report

Within 3 months we got two cases of Penetrating cervical injury in Emergency Department of Subharti Hospital and University.

In first case a 35year male presented with respiratory distress, altered sensorium and bleeding from neck wound. Patient had an alleged history of self - inflicted injury from knife after some family feud. Pulse was 130/min and B.P. was 90/60 mm of Hg. SpO_2 was 88% at the time of admission. On examination size of wound was around 4x1cm. Wound was about 1cm above the thyroid cartilage. Blood and air during expiratory phase were coming from the wound site. Anterior tracheal wall was ruptured (Fig. 1). Patient was shifted to the emergency operation theatre. Within 2mins massive spurt of blood occurred and patient collapsed ECG showing a flat line. Wound incision was extended transversely and bleeding from left internal jugular vein was controlled by ligation. An emergency tracheostomy was done through the primary injury wound that was anteriorly at the level of around 2-3 tracheal rings. Cardiopulmonary resuscitation was started simultaneously and O-ve blood was released and transfused. After 10min of cardiopulmonary resuscitation patient revived. Patient was kept in intensive care unit for monitoring with nil per oral status. Patient was kept on mechanical ventilation for 1 day. Patient was conscious and vitals were normal in postoperative period. Patient was orally allowed after interpreting barium esophagography. As there was no esophageal injury. Post-operative course was uneventful.

Fig. 1: Tear in anterior tracheal wall through which emergency tracheostomy was done

In second case a 9years male presented with alleged history of injury by a knife while playing with his elder brother. On examination patient was conscious with pulse 110/min and BP 120/70mm of Hg. On examination a wound of around 3x1cm was present in the anterior part of the trachea. Wound was around 1cm above the thyroid cartilage. Orotracheal intubation was done under fiber optic guidance. Vocal cords were mobile. Under general anaesthesia, wound exploration was done. Primary repair of tracheal wall tear was done by prolene 3-0 around the endotracheal tube(Fig. 2, 3). After primary repair low tracheostomy was done through a separate incision(Fig. 4, 5). Patient was kept in intensive care unit for monitoring with nil per oral status. Patient was orally allowed after interpreting barium esophagography. As there was no esophageal injury. Post-operative course was uneventful.

Fig. 2: Tear in anterior wall of trachea

Fig. 3: Sutured anterior wall of trachea with prolene 3-0

Barium esophagography was done in these cases in postoperative period. Esophageal injury was not seen in our series (Fig. 4, 5, 6 and 7).

Fig. 4: AP view of barium swallow of 1st case

Fig. 5: Lateral view of barium swallow of 1st case

Fig. 6: AP view of barium swallow of 2nd case

Fig. 7: Lateral view of barium swallow of 2nd case

Discussion

Tracheal injury is a rare entity accounting for less than 1% of traumatic injury and 14% of penetrating neck injuries.[1,2] Cervical trachea is most vulnerable for such injury because of its exposed anatomical position.[4,5] Due to incomplete cartilaginous tracheal ring posteriorly, membranous posterior trachea is more prone for injury. These injuries commonly result from assault with sharp objects (Knife) and Ballistic injuries.[1,6] Knife injury was present in our series.

These injuries are quite challenging to the surgeons as these are compounded by vessel injuries, airway obstruction, esophageal injury and severe sympathetic stimulation.[3] In our series, tracheal and right internal jugular vein injury were present in first case and only tracheal injury was present in second case.

Breathlessness, dysphonia, recurrent cough, subcutaneous emphysema, and air leak through open wound suggest tracheal injury.[1] First priority in tracheal injury is to establish an airway.[7] In our first case, we performed emergency tracheostomy because patient was in respiratory distress with SpO_2 88%. In second patient endotracheal intubation was done under fiber optic guidance.

Fiber optic allows identification of tracheal lumen and injury and helps in orotracheal intubation. Endotracheal tube acts as a stent and one can repair tracheal tear around the tube. In Second case we repaired the tracheal tear around the endotracheal tube. Orotracheal intubation should be attempted in all such cases except those with massive maxillofacial trauma.[3]

Esophageal injury is commonly associated with tracheal injury as it is intimately associated with the trachea at all levels and it may cause severe mediastinitis.[4,8] Barium esophagography following plain radiography was performed in our series. Esophageal injury was not present in our series(Fig. 4, 5, 6 and 7). We opted for barium swallow over the gastrograffin swallow due to less false positive rates and barium is not toxic as gastrograffin if aspirated during the procedure.[9]

If the patient is asphyxiating, the quickest way to secure the airway is to intubate the distal open end of trachea through the wound followed by tracheostomy and primary repair of trachea.[1,4]

In our series, first case collapsed due to excessive bleeding so we performed emergency tracheostomy under local anaesthesia after extending the wound incision because trachea was not visible through the primary wound due to bleeding from left internal jugular vein. We also ligated the left internal jugular vein to stop bleeding.

Conclusion

Airway management is crucial and life-saving in penetrating tracheal injury. It can be managed with different airway technique such as fiber optic guided orotracheal intubation or emergency tracheostomy. Swift management of surgeons and anesthetists teams in penetrating tracheal wound is beneficial.

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