

Pneumomediastinum and subcutaneous emphysema secondary to blunt laryngeal trauma- favourable outcome with conservative approach: a case report

Abstract: Laryngeal trauma due to blunt injuries are relatively uncommon and potentially life threatening. Prompt diagnosis is important as serious airway compromise may be seen. Impaired voice production is a secondary concern. Associated cervical spine, esophagus, trachea and vascular injuries also need evaluation. The management should be tailored to fit each individual case. A proper initial management has a direct impact on patient's survival and long term quality of life. A case report involving conservative management of extensive pneumomediastinum and subcutaneous emphysema following blunt laryngeal trauma with favourable outcome is presented. The imaging findings of the case pre- and post management are also described.

Keywords: larynx; pneumomediastinum; subcutaneous emphysema; vocal cords; conservative

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Introduction: Blunt laryngotracheal injury is rare and may have fatal consequences if unrecognized. This injury is unique because it affects not only the maintenance but also the quality of life [1]. The short term goal of therapy is airway maintenance. But the ultimate goal is to restore the laryngeal functions to near normal. Option between conservative management and active surgical management varies from case to case depending upon the extent of aerodigestive injury [2].

Case report: A 21-year-old construction worker fell accidentally from first floor and sustained blunt injuries over face and neck from the direct impact of raw material lying on the ground. He complained of pain and swelling over face and neck along with bleeding from the nose and difficulty in speaking. On physical examination, abrasions, ecchymosis and swelling were seen over the midface and neck. On palpation, tenderness and crepitus were also present in the region involved. There was no respiratory difficulty, dysphagia or odynophagia. His vitals were stable. On indirect laryngoscopy, inflammation of left vocal cord was seen. X-ray soft tissue neck was done which revealed air in prevertebral space. Plain CT neck and chest was done which showed extensive subcutaneous emphysema in the tissue planes of the neck (Figure 1a, 1b). Of significant interest was to see the portal of air entry into the subcutaneous tissue to be through the region of glottis on left side along with the thickening of left vocal cord (Figure 2a, 2b). There was splaying of the cricoid ala (Figure 3). There were multiple fractures involving nasal bones and maxillary bones. Esophagus and cervical spinal cord were normal. Air was also extending into mediastinum (Figure 4). No pneumothorax was there. The patient was managed conservatively with steroids and antibiotics to decrease inflammation and to prevent mediastinitis. Tracheostomy or endotracheal intubation was not considered as there was no respiratory compromise. After 1 week, CECT was done to rule out abscess formation or mediastinitis and to

see degree of emphysema left. Review CT revealed significant decrease in both subcutaneous emphysema of the neck (Figure 5a, 5b) and pneumomediastinum (Figure 6) . No complications were seen. The patient was followed for few months. There was no difficulty in breathing or swallowing. However, a little change in patient's voice was noticed. So, the patient was managed under steroid cover and close observation without active surgical intervention with good recovery.

Discussion: The larynx and trachea are well protected by the mandibular projection, sternum and cervical spine; so the laryngotracheal injuries are quite rare [3]. The reported incidence varies widely from 1 in 137,000 inpatient admissions to 1 in 125 trauma admissions. 50% of upper airway injuries involve the cricoids cartilage and cricothyroid membrane [4]. The pre-treatment mortality also varies widely.

The diagnosis of penetrating laryngeal injury is quite obvious but blunt laryngeal injury requires high clinical suspicion. It is often associated with head injury, facial fractures, cervical spine or vascular injuries, so may be missed. The accompanying history is very important. The patient may present with progressive dyspnoea, stridor, hoarseness of voice, hemoptysis, dysphagia, odynophagia and local tenderness, crepitus and swelling [5]. Lateral cervical X-ray may show subcutaneous emphysema and cervical vertebral injuries and posteroanterior chest X-ray may reveal pneumomediastinum and associated injuries. Laryngoscopy may be done to assess the airway patency above the trachea, vocal cord movements and injury to laryngeal mucosa. CT is the modality of choice for assessing the laryngeal architecture and evaluation of associated injuries. CT is not done in patients who require direct operative interventions. It is also not done in those cases in which minor injury is suspected.

Schaefer-Fuhrman classification is followed which divides laryngotracheal injuries into five groups. Conservative management is for the group 1 and some group 2 patients and involves observation. The rest require surgical intervention like tracheostomy, stent placement and exploration and repair. Indications for surgical repair include large mucosal lacerations, lacerations involving the free margin of the vocal cord, exposed cartilage, multiple and displaced cartilage fractures, arytenoids avulsion or dislocation and immobility of vocal cords. The definite goal of therapy is to restore all laryngeal functions like ventilation, airway protection, phonation and deglutition. The most common complication is granulation tissue formation which is sequelae to both laryngotracheal injury and surgery [6]. However, the management of laryngotracheal injury is still controversial and should be individualized. Follow up is recommended to evaluate long term complications like laryngeal stenosis, breathing difficulties, pulmonary aspiration and dysphonia. Monitoring is required for recovery of vocal fold paralysis and for neurovascular injury [7].

Conclusion

Panendoscopy and radiological imaging is required to assess the severity of aerodigestive injury in blunt neck trauma and the treatment should be individualized.

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Figure Legends

- Figure1** Plain CT neck coronal (a) and midsagittal (b) images shows extensive surgical emphysema in various tissue planes.
- Figure2** Serial axial images (a, b) at the level of glottis showing thickening of left vocal cord. The defect in the left vocal fold which is the portal of air entry in the subcutaneous plane of neck is also shown.
- Figure3** Splaying of cricoids cartilage is noticed.
- Figure4** Axial image at the level of carina in lung window shows pneumomediastinum.
- Figure5** CECT coronal (a) and midsagittal (b) images show significant resorption of surgical emphysema after 1 week of conservative management.
- Figure6** Axial image at the level of carina in lung window after 1 week of conservative treatment shows almost complete disappearance of pneumomediastinum.