

Challenges in the Initial Management of Complete Tracheal Transection after Blunt Neck Trauma

Blunt Complete Transection of Trachea



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Introduction

Tracheal transection after blunt trauma is a rare case presented at the emergency department. It is challenging in its diagnosis and treatment. Deceleration with shearing forces and a strong impact against the cervical spine are the possible known mechanisms of closed injury to cervical trachea [1]. The injury includes fracture of the tracheal cartilage rings with or without lesions of deep neck structures as larynx, oesophagus, nerves and vessels. The little experience of trauma team with this rare entity may result in negligence or delay of its appropriate management.

Road traffic accident is not the only cause of these blunt life-threatening injuries. In our experience and in relevance to the scant data in literature [2,3], unusual cases of tracheal transection include patients with attempted hanging, and clothesline injury who may arrive to the hospital alive and may have a benefit of intensive medical care and surgical intervention.

Pre-hospital airway management is crucial for life-saving of such patients. It is an important task of Emergency Medical Service (EMS) systems involving placement of laryngeal mask airway or endotracheal tube. However, success of pre-hospital endotracheal intubation requires more clinical exposure, well-skill and experience that necessitate increasing of the training programs for rescuers or initial use of disposable laryngeal tubes which requires a less experience.

Clinical suspicion of cervical tracheal injuries on presentation is the key for further diagnostic workup: Absence of specific symptoms or signs increases the diagnostic challenge, with a variation in clinical presentation including neck contusions, cough, dyspnea, cyanosis, cough, hemoptysis, and voice changes. We emphasize careful history taking in line with interpretation of initial clinical and imaging findings particularly presence of subcutaneous emphysema in face and neck, pneumothorax, and pneumomediastinum increases the clinical suspicion for tracheal injuries.

Patient may present without respiratory distress when the trachea is not completely separated and the distance between the transected ends is not large enough to cause respiratory compromise. However, airway obstruction may develop suddenly after attempt of endotracheal intubation, neck extension or coughing.

The initial evaluation and treatment of suspected tracheal or tracheo-laryngeal injuries after blunt neck trauma should be achieved in adherence to the protocol of Advanced Trauma Life Support (ATLS). The first priority is to ensure a safe and secure airway. The acronym ABCDE (airway, breathing, circulation, disability, exposure/environment) is essential to identify and treat life-threatening injuries. After adequate airway maintenance and cervical spine protection, the next steps involve assessing the patient's breathing and ventilation, circulation with appropriate hemorrhage control, disability (neurologic status) using the Glasgow Coma Scale, and then exposing the patient completely with prevention of hypothermia [4].

The challenge of initial endotracheal intubation, despite its role in life-saving, is related to the possibility of false passage, increasing the gap between the transected ends with fatal airway obstruction, and the injury to vocal cords during difficult intubation. Moreover, laceration of the friable membranous part of the trachea can occur after careless intubation or tracheostomy. Thus, for patient with blunt neck trauma, we recommend the initial use of small sized endotracheal tubes, guidance with flexible laryngoscopy and fiberoptic intubation which have an effective role for establishing airway access mainly in patients with difficult airways.

Initial tracheostomy ensures the adequacy of airway, and may be recommended over intubation to avoid the possible dangers associated with endotracheal tubes, and it may substitute endotracheal intubation when it is difficult to be performed. However, the blind tracheostomy may aggravate the

condition as it may result in retraction of the distal end of the transected trachea into the thoracic cavity [1]. Thus, we don't encourage intubation or tracheostomy in absence of severe respiratory distress or unstable hemodynamics, and when the diagnosis of tracheal injury is not confirmed in a stable patient. Cricothyroidotomy is not recommended when blunt injuries of larynx and trachea are suspected, as it may result in extensive laryngotracheal trauma.

Imaging studies are carried out when there is a high clinical suspicion of tracheal injury after hemodynamic stabilization. Computed tomography (CT) may provide important findings suggestive of significant tracheal injury which include abruption of airway, extra-luminal position of the endotracheal tube, abnormal air escape in the neck, skeleton injuries, pneumothorax and pneumomediastinum. The axial, coronal and sagittal views on CT should be evaluated and carefully interpreted.

Bronchoscopy is the gold standard to confirm tracheal injury and to determine its site and extent. It should be performed when there is a high index of suspicion on imaging studies. Urgent surgical intervention is mandatory after bronchoscopic confirmation of the tracheal injury. Intraoperative inspection of the tracheal tree with bronchoscopy after surgical repair is important to ensure perfect repair and to avoid negligence of other injuries. Fiber optic bronchoscopy is preferred but if it is available at emergency department, rigid bronchoscopy may be valuable.

Early surgical repair of tracheal transection and associated cervical injuries helps to preserve the function of these important structures. The distal end of transected trachea should be elevated and brought to the skin with stay sutures till

achievement of anastomosis, to prevent retraction of trachea into chest. When the laryngeal injury is severe or complete, the surgical repair may be difficult with an option to laryngectomy or permanent end tracheostoma [5]. Patients should have a tracheostomy placed before or during surgical repair, which is kept in place until postoperative safe decannulation.

As a cardiothoracic surgeons involved in the trauma team, we draw the attention of all members in the emergency department to the importance of awareness and high index suspicion of tracheal injury associated with blunt neck trauma. The successful outcome depends on: First, multi-disciplinary team management consisted of anesthesiologist, otolaryngologist, and general and cardiothoracic surgeons; Second, careful and intensive airway management; Third, early imaging workup when the clinical manifestations are suggestive of a life-threatening injury; and Fourth, early surgical intervention after bronchoscopic confirmation of a large tracheal injury.

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