Complete cervical tracheal transection caused by blunt neck trauma: Case report

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ABSTRACT

This study aimed to report the survival of a rare case of complete tracheal transection followed by blunt neck trauma. A 66-year-old man was presented in the emergency room after a motorcycle accident in which a rope was wrapped around his neck. Although alert, he was in respiratory distress. A computed tomographic scan showed transection of the cervical trachea. Emergency neck exploration revealed that the tracheal laceration had been cut from the tracheal anterior third ring to the posterior first ring and the anterior esophageal wall had ruptured. Laryngectomy, tracheostomy, and esophagopharyngeal anastomosis were performed. Prompt airway management and immediate neck exploration is important for survival in these cases.

Key words: Blunt injuries; rupture; trachea.

INTRODUCTION

Traumatic tracheal injury after blunt neck trauma is rare; however, most patients with complete tracheal transection usually die at the scene due to loss of airway.[1] The few, who survive and arrive at a hospital, pose a diagnostic and therapeutic challenge to the trauma team. These patients may suffer fatal outcomes when misdiagnosed or long-term complications, if treated improperly.[2] Early diagnosis and treatment of tracheal injuries lead to the best outcome. Nevertheless, emergency physicians have limited experience in these cases and have reached no consensus on its management.[3]

In this paper, our experience with one survivor of complete cervical tracheal transection caused by blunt neck trauma combined with esophageal rupture and review of the relevant medical literature were reported.

CASE REPORT

A 66-year-old man was presented in the emergency room after a motorcycle accident in which a rope was wrapped around his neck. Although alert, he was in respiratory distress. His motor and sensory neurologic signs were normal.

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 cutaneous emphysema in the chest wall and lower neck (Fig. 2). Routine blood samples taken on admission showed a leukocytosis of 12,450/microliters, hemoglobin concentration of 14.4 g/dl, and C-reactive protein of 0.04 mg/dl. The results of the blood chemistry were as follows: serum glucose 170 mg/dL, BUN 20.7 mg/dL, creatinine 0.86 mg/dL, albumin 3.7 g/dL, creatine phosphokinase 320 IU/L, and LDH 244 IU/L. The serum electrolytes and blood gas parameters were as follows: sodium 138 mEq/L, potassium 3.6 mEq/L, chloride 104 mEq/L, pH 7.37, pCO₂ 46.3 mmHg, pO₂ 36.4 mmHg, and bicarbonate 26.3 mmol/L in room air.

Approximately 90 minutes after arrival in the emergency room, neck exploration was performed by an otorhinolaryngology surgeon. Apron incision was done and subplatysmal flap was made from hyoid bone level to substernal notch level. The tracheal laceration had been cut from the tracheal anterior third ring to the posterior first ring (Fig. 3). Urgently, endotracheal tube insertion was done at the lower part of lacerated trachea. Exposed larynx showed frangibility with esophageal rupture. Thus, total laryngectomy was performed, and closed thoracostomy was carried out for right pneumothorax. Esophagopharyngeal anastomosis was conducted by thoracic surgeon for esophageal rupture, which was pedunculated on the anterior wall; the posterior wall was intact. The patient was managed postoperatively with pain control and antibiotics. As an abscess formation was found at the left of the tracheostomy site, an iatrogenic fistula formation was made for the pharyngocutaneous fistula. Fistula repair was performed four times during the following one year and fistula recurrence was not reported up to the following next year. The patient is now in tracheostomy state and able to feed orally.

**DISCUSSION**

The incidence of traumatic tracheal injuries seems to be roughly 0.5% to 2% among individuals sustaining blunt trauma, including blunt trauma to the neck. Main types of blunt injuries are high-impact blunt compression injuries such as motor vehicles accidents (59%), followed by crush injuries (27%). In blunt injuries, intrathoracic trachea and main stem bronchi injury account for 62%, cervical trachea 23%, and lower bronchi 15%. Most common presentations are respiratory distress, dyspnea, poor gas exchange, and hemoptysis. Cyanosis and serious respiratory embarrassment is present in 30% of the cases. Another common symptom is hoarseness or dysphonia, occurring in 46% of the patients. The most common signs of airway injury reported in most series are cutaneous emphysema (35%-85%), pneumothorax...
(20%-50%), and hemoptysis (14%-25%); however, the lack of specificity and the occult nature of the injury frequently result in a delayed diagnosis.\[8\]

Deep cervical emphysema and pneumomediastinum are seen in 60% of the patients with tracheobronchial injuries.\[4,7,8\] Blunt trauma is often associated with multiple injuries involving not only the chest, but also the abdomen, head, and orthopedic structures.\[4,9\] Cervical trauma of the airway frequently involves the esophagus, recurrent laryngeal nerves, cervical spine and spinal cord, larynx, and carotid arteries and jugular veins.\[9\] Combined transection of the cervical trachea and esophagus, as a result of blunt trauma, is a rare injury accounting for less than 1% of trauma cases seen in major centers.\[10\]

Many tracheobronchial injuries are not diagnosed immediately (25-68%). Delayed diagnosis is more commonly seen with left-sided injuries.\[4,8\] Physicians need to maintain a high index of suspicion related to nonspecific signs such as dyspnea, cough, subcutaneous emphysema, and hemoptysis.\[11\] The mechanism of injury, vocal changes, and rapidly expanding subcutaneous emphysema in the neck are important clues.\[11\] Clinical examination is followed by radiologic imaging, angiography, computed tomography, and tracheo-bronchiosphagoscopy.\[12\]

Accurate interpretation of the chest radiograph is essential in the early diagnosis of occult upper-airway injury.\[13\] The preponderant findings on chest radiograph include subcutaneous emphysema, pneumomediastinum, pneumothorax, and air surrounding the mainstem bronchi.\[13\] The best diagnostic investigation is bronchoscopy; flexible bronchoscopy should be carried out first to determine the location and extent of the injury.\[5,14-16\] However, the bronchoscopic procedure is precarious and characterized by abundant bleeding in the respiratory tract and a rapid drop in arterial oxygen saturation, which are all factors precluding diagnostic confirmation.\[5\]

A CT scan can be performed if diagnosis is uncertain on plain films.\[7,11\] Preoperative CT can be useful in assessing isolated laryngeal injuries or other unsuspected chest injuries that should be dealt with at the time of surgical exploration. CT is contraindicated in hemodynamically unstable trauma patients or patients with unstable airways.\[9\] Helical CT with 3D reconstruction should be considered a suitable ‘screening’ test in a trauma patient suspected of tracheal rupture and may help the clinician in the decision to perform a bronchoscopy on the patient.\[6\]

The primary initial goals are stabilization of the airway, reversal of shock, relief of the pneumothorax, and determination of the extent and location of injury.\[4,8\] The management of tracheobronchial injuries, depending on the severity, consists of emergency operation in cases of tracheal rupture, hemorrhage or esophageal injury, or of selective operation.\[12\] Patients who show respiratory distress, are unstable hemodynamically, or who have clinical suspicion of an airway injury should be intubated immediately with in-line cervical stabilization, preferably with the guidance of a flexible bronchoscope, as described previously.\[4,11\] Airway manipulation can exacerbate a tracheal injury, hence careful orotracheal intubation is considered to be the only option available before transport.\[14\]

Debridement and primary repair is the treatment of choice and good postoperative recovery has been reported.\[5\] Surgical repair is indicated when a transmural tear longer than 1 cm causes a pneumothorax unrelied by tube thoracostomy. Complete transection of the trachea should be managed by careful suturing and being cautious to avoid damage to the recurrent laryngeal nerves. While small lacerations have been successfully managed conservatively, primary repair of a tracheobronchial rupture is the treatment of choice.\[9\] For most cervical tracheal injuries, urgent tracheostomy is the best method for airway control.\[14\] Patients with suspected tracheal injuries, who are clinically stable and oxygenating at greater than 90% SpO\(_2\), should not be intubated and treated only with high flow oxygen. This recommendation may have to be urgently modified in patients presenting with hypovolemic shock or altered mental status from brain injuries.\[13,16\] In this case, patient was unstable and unable to maintain airway. Urgent orotracheal intubation was done. Even though the endotracheal tube was placed out of trachea, ventilation and oxygenation was maintained by positive ventilation. As the case stands above, if the patient is unstable, it is our belief that oral intubation should not be delayed and urgent orotracheal intubation must be considered.

The prognosis of the patient is largely dependent on an early diagnosis and good interdisciplinary management.\[12\] Prompt airway management and immediate neck exploration is important for survival in these cases.

Conflict of interest: None declared.

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Künt boyun travmasının neden olduğu komplet servikal trakeal transeksiyon: Olgu sunumu

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