

## Rare case of survivor after accidental hanging and complete tracheal transection

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**Abstract:** Blunt trauma is a rare cause of complete tracheal transection (CTT). We present a young adult male, with CTT after accidental hanging with men scarf. Initially, he had non-significant signs, and then respiratory distress occurred with immediate orotracheal intubation. Computed tomography and bronchoscopy confirmed the diagnosis of CTT. Intraoperatively, tracheostomy tube was placed followed by surgical repair of cricotracheal separation and injured posterior wall of the trachea. The patient was decannulated after 3 weeks. The medical treatment and voice training continued after decannulation for unilateral vocal cord paresis as a result of unilateral injury of recurrent laryngeal nerve. In conclusion, initial airway securing with rapid stepwise diagnosis and early surgical repair are helpful for life-saving of a patient with CTT due to blunt trauma.

**Keywords:** Trachea, airway, trauma, injury

### INTRODUCTION

Complete transection of cervical trachea after blunt neck trauma is a rare life-threatening injury, as most patients suffered immediate death related to loss of airway function [1]. We present a survivor case due to accidental hanging with a scarf resulted in complete tracheal transection. The surgical repair was carried out after effective airway management and early rapid diagnostic workup of tracheal injury.

### CASE

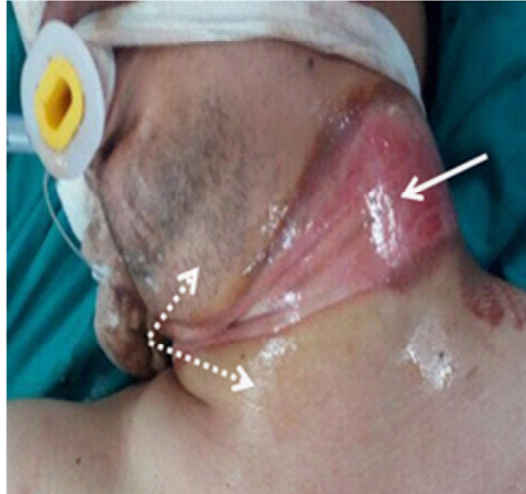
A 25-year-old male presented at emergency department one hour after accidental hanging with men scarf. He had neck contusion, neck and face swelling, and hoarseness of voice associated with stable hemodynamics and full consciousness. After initial chest x-ray imaging, he developed respiratory distress with peripheral capillary oxygen saturation (SpO<sub>2</sub>) of 80% requiring for endotracheal intubation, which was carried out with improvement of SpO<sub>2</sub> to 95%. Computed tomography showed subcutaneous emphysema, bilateral pneumothorax, air escape in the lower part of the neck around the endotracheal tube. Bilateral intercostal chest tubes were placed. Routine Laboratory studies were normal. Bronchoscopy confirmed presence of tracheal injury below the cricoid cartilage. Patient was transferred to the operating room, where collar incision was performed with neck exploration which revealed complete tracheal transection with a tear in its posterior wall and a contusion of right recurrent laryngeal nerve. Tracheostomy tube was placed with removal of orotracheal tube. The cricotracheal anastomosis was performed using absorbable interrupted 3/0 sutures, with repair of disrupted posterior wall using absorbable continuous 4/0 sutures. After operation, patient was transferred to intensive care unit ICU where the standard care was done. Decannulation was carried out after 21 days of operation and the patient was discharged on medications included anti-inflammatory, anti-reflux and neurotonics, in addition to voice training at department of phonetics for vocal cord paresis.

### DISCUSSION

Accidental hanging is unusual cause of blunt neck trauma. Complete tracheal transection was previously reported after attempted hanging [2], with a very rare chance for survival and successful management at hospital. Laryngotracheal separation caused by hanging usually associated with mortality at the scene with unknown true incidence [3].

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Most of tracheobronchial injuries from blunt trauma are located within 2.5 cm of the carina, with about 4% involving the cervical trachea [4]. About 63% of cases with blunt injuries to the cervical trachea had complete cervical transections [5].



**Fig1.** Skin contusion (arrow) with neck and face swelling (dotted arrow) due to accidental hanging



**Fig2.** Axial view of chest computed tomography showing pneumomediastinum (arrow) and bilateral pneumothorax (dotted arrows)

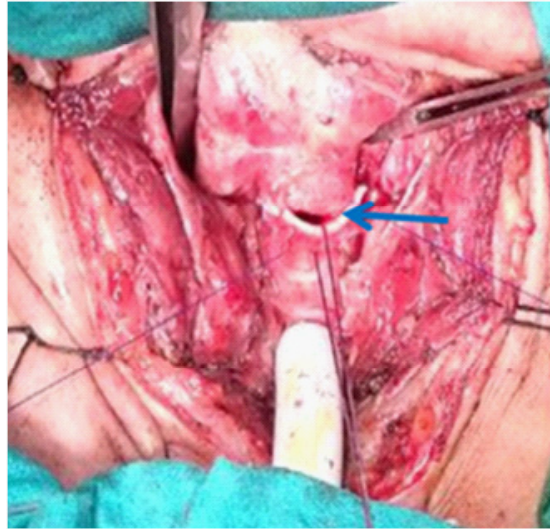
Blunt injury of cervical trachea is mostly caused by a direct trauma or sudden hyperextension. Direct cervical traumas cause injuries in the trachea as a result of the impact from hard and stable vertebrae [6].

Complete transection of cervical trachea due to blunt trauma requires a high index of suspicion for timely diagnosis [7]. Clinical manifestations may be non-specific correlating poorly with the severity of injuries[8]. The suspicious signs of a significant tracheal injury include hoarseness of voice, dyspnea, subcutaneous emphysema, pneumothorax and pneumomediastinum.

Patient may present initially with no signs of respiratory distress when there is no large separation between the cricoid cartilage and trachea as the adjacent soft tissue may act as pseudo-airway, till airway obstruction due to attempts of intubation, cough or neck extension occurs [2].

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We followed a step-wise diagnostic workup after clinical suspicion of tracheal injury. On initial chest x-ray of our case, there was subcutaneous emphysema and pneumothorax, thus we indicated CT scan as the diagnosis was uncertain on chest x-ray. The beneficial role of CT is related to its role in assessment of laryngeal, tracheal and intra-thoracic injuries. CT was done after endotracheal intubation and stabilization of hemodynamics. Moreover, CT scan helps our next diagnostic decision to perform a bronchoscopy, which acts as a gold standard tool in this instance, determining the site and extent of the tracheal injury [9].



**Fig3.** Intra-operative image showing stay sutures at transected ends of trachea with re-approximation of both ends (arrow)

Securing airway is the main step in initial management of a patient with an unstable airway. Direct laryngoscopy and orotracheal intubation under direct visualization, using a small endotracheal tube has been reported as a safe and effective technique [10]. However, the pressure over a fractured cricoid during intubation may dislocate it or result in fatal airway obstruction [11]. The blind attempts of intubation may worsen the upper airway injury or create a false passage [12].

At our initial airway management, there was no need for tracheostomy as endotracheal intubation was successfully placed. Routine tracheostomy is not performed except when endotracheal intubation failed [13], or the safety of endotracheal intubation is reduced by concomitant craniomaxillofacial injuries [14].

Once tracheal injury was confirmed, we proceeded to the surgical repair, as the early correction of tracheobronchial injuries is associated with better long-term outcome. However, the potential complications after surgery include septic complications, anastomotic dehiscence, airway stenosis, and phonation problems associated with laryngeal and recurrent laryngeal nerve injuries [15].

Intra-operatively, we performed a collar incision which provides good access to cervical trachea, which is also useful if there is a vascular injury as it enables the surgeon to explore the carotid sheath via extension of the incision along the border of the sternocleidomastoid muscle [16].

During the operative repair, we avoided extensive circumferential mobilization of injury edges to avoid the risk to devascularize the anastomosis and create healing problems with anastomotic dehiscence and/or later on airway stenosis and subsequent infection [17]. The repair was done with absorbable sutures with the knots tied on the outside to avoid the development of granulomas that may erode into the lumen [18].

Our case has unilateral vocal cord paresis which recovered after medical therapy and required voice training.

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Injury of recurrent laryngeal nerve was previously reported in about 60% of patients with complete transection of the cervical trachea[19]. Extent of vocal cord paralysis has a variable prognosis which range from spontaneous recovery to permanent paralysis requiring further intervention[20].

### CONCLUSION

Complete transection of cervical trachea due to blunt trauma associated with high rate of mortality at scene of trauma, however, alive patients presenting to the emergency department can survive with a high index of suspicion, early diagnosis, careful rapid airway securing, and early surgical repair of the tracheal transection and concomitant injuries.

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