Transverse Cervicothoracic Stabbing: Multidisciplinary Management of a Surgical Emergency

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Case Report

Abstract

Tracheobronchial injuries are closely related to orotracheal intubations and chest traumas. Stabbing injuries are very rare and often life threatening because of the damage to vital structures such as the respiratory tract and large arterial or venous vessels. Early diagnosis and treatment of penetrating neck injuries increase survival rates. We report a case of the tracheobronchial section with a penetrating stabbing wound on the left laterocervical area associated with contralateral pneumothorax, requiring urgent surgical pulmonary repair, tracheal suture, and tracheotomy. Prompt action with a multidisciplinary approach resulted in a favorable outcome.

Keywords: Tracheal disease, penetrating wounds, airway management, stab wounds

Introduction

In penetrating neck injuries, the platysma muscle is dissected. The occurrence of tracheobronchial lesions is increasing owing to the increased incidences of complicated orotracheal intubations, other than thoracic blunt traumas. Neck injury as a result of a penetrating trauma represents a small percentage of these patients (1).

According to their location, neck wounds are classified into three areas: Area I, from clavicles to the lower edge of the cricoid cartilage; Area II (most commonly affected by penetrating injuries), from the lower edge of the cricoid cartilage to the angle of the jaw; and Area III, from the angle of the jaw to the skull base (2). Lesions in neck area can include vascular, aerodigestive tract, salivary gland, neurological tissue or structures, and bone.

Life-threatening structures that may be affected include the pharynx; esophagus; trachea; thyroid gland; innominate artery; brachiocephalic vein; subclavian artery and vein; common, internal, and external carotid arteries; jugular vein; and vertebral artery (3).

There are a few extremely rare cases in which several structures are simultaneously damaged, such as the trachea, azygos lobes, lateral jugular veins, and/or carotid artery, but such damage does not necessarily lead to immediate death (4).

The main determinant of survival, regardless of the injury mechanism or anatomical location, is the time lag prior to diagnosis and treatment. Early diagnosis and primary repair lead to a reduction in complications and better results in the short, medium, and long term. Unfortunately, most patients die before receiving appropriate care (4).

The analysis of specific cases of stab wounds in extreme situations could make us redefine the protocols

Case Presentation

We report the case of a 49-year-old male using nasal drugs admitted to the emergency department of our hospital with a left laterocervical stabbing wound after a street brawl.

Upon examination, the patient was conscious and showed tachycardia, tachypnea, and hypoxemia

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with an oxygen saturation of 85%, tensions maintained in the normal range. On auscultation, bilateral hypoventilation was appreciated, more pronounced in the right hemithorax. Initial physical examination revealed a 2-cm penetrating wound in the III left cervical area associated with the air leak and progressive subcutaneous emphysema. Given the unfavorable evolution and increasing breathlessness, endotracheal intubation was performed. Subsequently, additional tests were conducted.

Anteroposterior radiograph showed right extensive pneumothorax with complete atelectasis (Figure 1). Neck–chest computed tomography (CT) angiography: Extensive anterior subcutaneous emphysema extending caudally, and mediastinal plane dissection. Large right pneumothorax with complete atelectasis. Right posterolateral tracheal injury about 3 cm above the carina (Figure 2a-c). Given these findings, the ear nose throat and thoracic surgeons decided to perform an urgent intervention.

An anterior cervical approach was used (5). The pre-laryngeal muscles and the thyroid isthmus were sectioned to provide a thorough exploration from the cricoid cartilage to the 7th tracheal ring. An "L"-shaped laceration was located in left tracheal portion between the 6th and 7th tracheal rings close to the esophagus (Figure 3a). Esophagus did not appear to be damaged. A 3/0 absorbable monofilament direct suture was used for the tracheal injury. After this, a tracheotomy was performed in the third tracheal ring for selective left lung endotracheal intubation.

The wound had an oblique path from left to right, with an exit orifice in the lower right tracheal region. A right posterolateral thoracotomy (at the 5th level of the intercostal space) was performed, showing a torn azygos lobe and tracheal laceration (Figure 3b). Azygos vein stapling was performed using 45-mm vascular Endo Gia. After this, a direct suture of the tracheal lac-

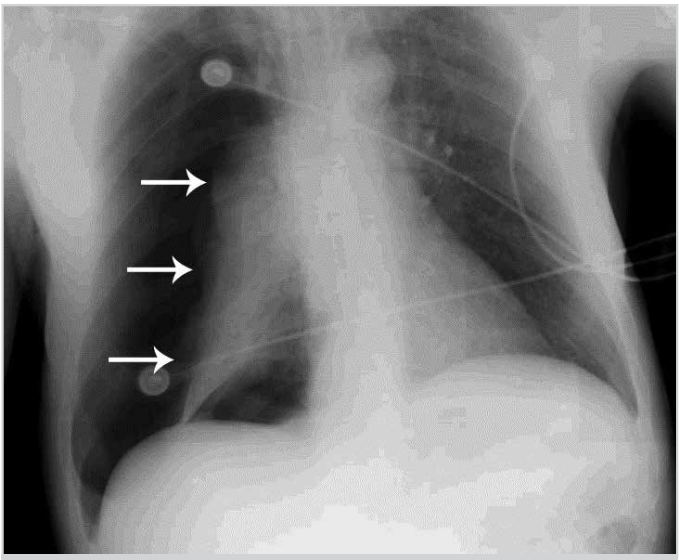

Figure 1. Anteroposterior radiograph showing right extensive pneumothorax with complete atelectasis

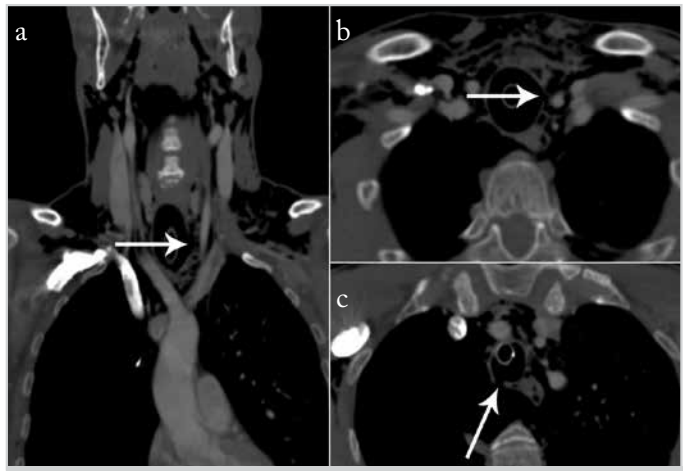

Figure 2. a-c. (a) Neck–chest computed tomography angiography. Left tracheal wall injury (Arrow) with penetration through the subcutaneous tissue and muscular plane. (b) Neck-chest CT angiography showing tracheal perforation (arrow). (c) Right posterior tracheal wall lesion corresponding to the stab output path (arrow)

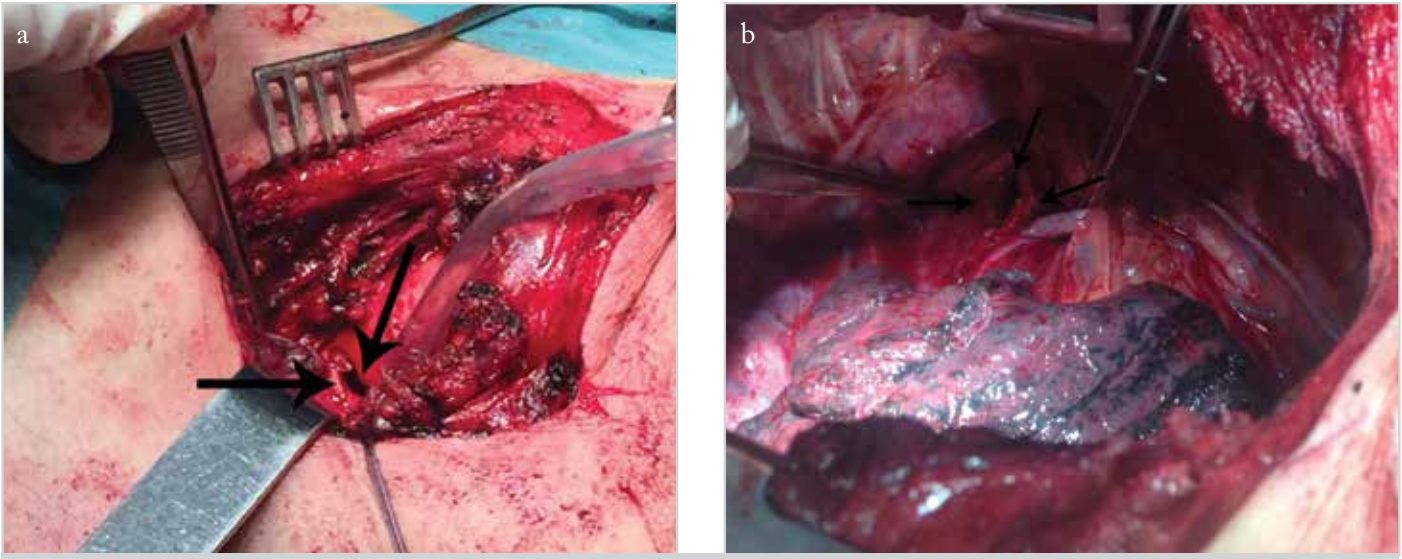

Figure 3. a, b. (a) Anterior cervical approach. Tracheal injury corresponding to the input path of the lesion in left cervical region. (b) Right posterolateral thoracotomy. Tracheal lesion in the right thoracic region with exit path (area pointed by the clamp)

eration was performed, which was reinforced with a mediastinal pleuraplasty.

The patient's stay in the intensive unit care was uneventful, after which he was transferred to a normal ward and then discharged after a week of hospitalization. The specialized management of tracheotomy performed in subsequent patient and visits by specialized professionals allowed early decannulation and prevented additional surgical interventions.

Discussion

Early diagnosis and treatment of penetrating neck injuries translates into a significant increase in life expectancy. Therefore, optimization of available resources is necessary to achieve the best results in such critical situations.

It is transcendental to preserve the airway by endotracheal intubation in patients with respiratory distress. Urgent intubation is necessary even in cases wherein a fiber-optic-guided intubation (which provides greater security) is not possible because a delay could be life threatening (6). It has been shown that a fiber-optic-guided intubation decreases the probabilities of creating a false route in a fractured tracheobronchial tree but should only be performed when there is no breathing difficulty.

The development of imaging techniques has shown a remarkable improvement over surgical explorations in hemodynamically stable patients, providing further planning optimization. However, surgical exploration remains of choice in patients with hemodynamic instability. Thorax CT continues to be an essential test in the diagnosis of penetrating injuries of the tracheobronchial tree. Although a normal result does not rule out airway involvement, it is a helpful tool in situations that may cause acute asphyxia, including mediastinal emphysema, tension pneumothorax or hemothorax, as well as other injuries such as rib fractures and subcutaneous emphysema (7).

More specific tests, such as CT angiography, provide superior accuracy in vascular, aerodigestive, bone, and glandular lesions, facilitating decision-making pertaining to surgeries (7).
The use of suture material stimulates the healing process and also facilitates a decrease in the probability of complications in the postoperative period (8).

In the reported case, the patient was hemodynamically stable but presented respiratory distress; thus, an endotracheal intubation not guided by fiber-optic bronchoscopy was performed as a first step to preserve the airway. Subsequently, complementary imaging studies were conducted to assess the location and nature of lesions for undertaking an urgent open surgery. The wound had an oblique path from left to right, with an exit orifice in the lower right tracheal region; thus, it was very difficult to provide a selective intubation of the left main bronchus. Therefore, it was decided to make a selective left lung intubation through a tracheotomy before the 4th intercostal space using the right posterolateral approach.

Damage to vital structures after a thoracic penetrating trauma often causes the patient's death before receiving health assistance; thus, it is uncommon to treat such cases in hospitals. A multidisciplinary approach and flexible adaptation to respiratory and bleeding problems are the landmarks in these cases. In this case, early and confident teamwork decisions were made, enabling patient survival after a complex handling.

Conclusion

Lesions of the tracheobronchial tree need an urgent and decisive decision because a delay in action may reduce the possibilities of survival. Therefore, it is essential to develop a multidisciplinary collaboration to handle these cases as quickly, flexibly, and effectively as possible.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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