

TRACHEA INJURY IN A POLYTRAUMA PATIENT WITH AN INTRATHORACIC MIGRATION OF FOREIGN BODIES

Sh Othman S^{1,4}, Wan Ahmed WA^{1,4}, Abu Bakar MA^{2,4}, and Mamat AZ^{3,4}.

¹Department of Radiology, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

²Department of Emergency Medicine, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

³Department of Surgery, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

⁴Hospital Universiti Sains Malaysia, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

Correspondence:

Wan Aireene Wan Ahmed,
Department of Radiology,
School of Medical Sciences,
Universiti Sains Malaysia,
Jalan Raja Perempuan Zainab 2,
16150 Kubang Kerian, Kelantan, Malaysia.
Email: waireene@usm.my

Abstract:

Traumatic airway injuries with intrathoracic foreign body migration are rare but can be severe and life-threatening. Prompt clinical suspicion is crucial to secure the airway and prevent further respiratory distress. Imaging is important in depicting the nature of the injury and its possible complications. We are reporting the case of a 26-year-old motorcyclist who was involved in a high-velocity road traffic accident and had extensive polytrauma with an airway injury. He was intubated and required an urgent thoracostomy for the pneumothorax. Computed tomography revealed trachea injury with intrathoracic and mediastinal foreign body migration. The patient was planned for a thoracotomy or video-assisted thoracoscopic surgery (VATS) approach for the removal of the foreign bodies. However, his condition gradually deteriorated, and he passed away due to a severe head injury.

Keywords: Trachea Injury, Penetrating Airway Injury, Foreign Body Mediastinal Migration

Introduction

Traumatic airway injuries, particularly involving the trachea, are relatively rare. It requires a high level of clinical suspicion to reach the diagnosis. Migration of foreign bodies into the intrathoracic cavity and mediastinum due to trauma is much rarer. This could be due to the possibility of underreporting or the very nature of its rare occurrence. Although foreign body migration is infrequent, it is significant and life-threatening, especially when involving sharp objects. Immediate imaging evaluation is important for an accurate diagnosis and detection of the foreign body. We present a case of a young man who was involved in a high-impact road traffic accident with extensive polytrauma, penetrating soft tissue injury and migratory foreign bodies.

Case presentation

A 26-year-old motorcyclist was presented to the emergency unit following a road traffic accident. On arrival at the hospital, his Glasgow Coma Scale was 3/15 requiring intubation and mechanical ventilation for airway protection. There were multiple jagged laceration wounds over the chin and anterior aspect of neck zone 2. There was no

active bleeding from the wounds and no visible foreign body. He was resuscitated with blood transfusion and fluid resuscitation. Prophylaxis intravenous antibiotics were administered. The initial chest radiograph (CXR) post-left thoracostomy on Figure 1 showed bilateral pneumothorax (right more than left).

Computed tomography (CT) scan of the chest (Figure 2) demonstrated a focal anterior trachea contour deformity, with adjacent soft tissue indenting into the wall defect suggestive of trachea injury. Multiple air-pockets representing pneumomediastinum were seen along the left paratracheal region. There was also a defect beneath the skin and subcutaneous tissue at the anterior neck with multiple high-density foreign bodies seen within. Right pneumothorax, bilateral haemothorax and lung contusions were also seen (Figure 3).

In Figure 4, multiple high-density materials are seen in the right hilar region adjacent to the right main bronchus and along the right posterior costal pleural surface of the right lower lobe, indicating intrathoracic migration of foreign bodies. The oesophageal nasogastric tube had no communication with the adjacent trachea or left main bronchus.

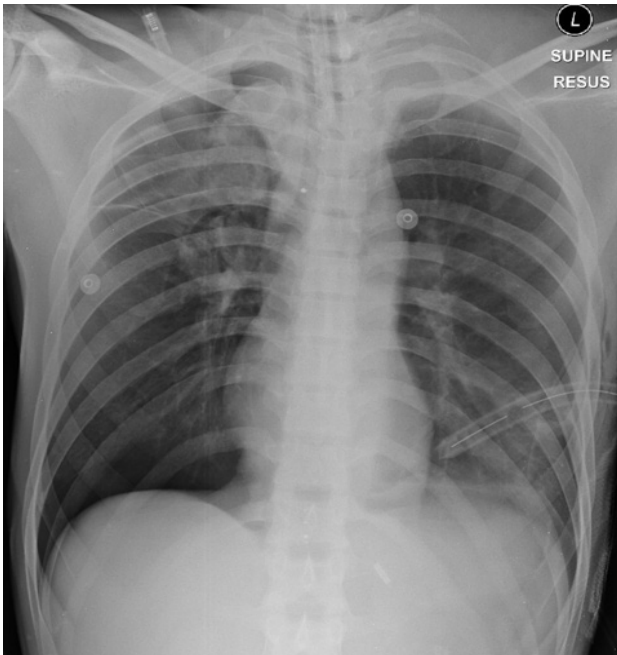


Figure 1: Portable chest radiograph post-left thoracostomy shows bilateral pneumothorax.

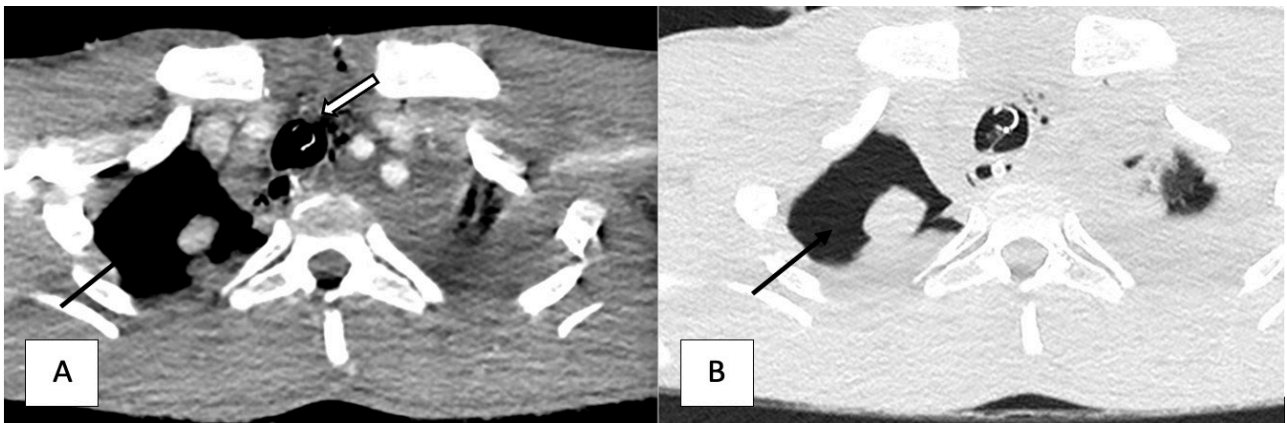


Figure 2: (A) Axial CT at the level of upper thorax in soft tissue window and (B) lung window, demonstrates multiple air-pockets (pneumomediastinum) along the left paratracheal region with right pneumothorax (black arrow). The presence of focal anterior tracheal contour deformity, with adjacent soft tissue indenting into the wall defect (white arrow) are suggestive of trachea injury.

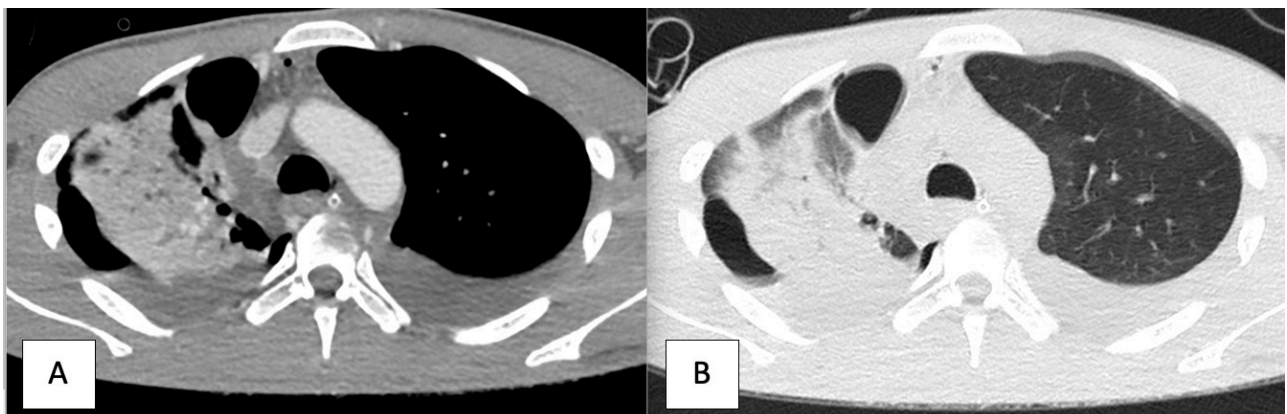


Figure 3: Axial contrast CT Thorax (A and B) in soft tissue and lung window demonstrates right pneumothorax, bilateral haemothorax and right lung contusion.

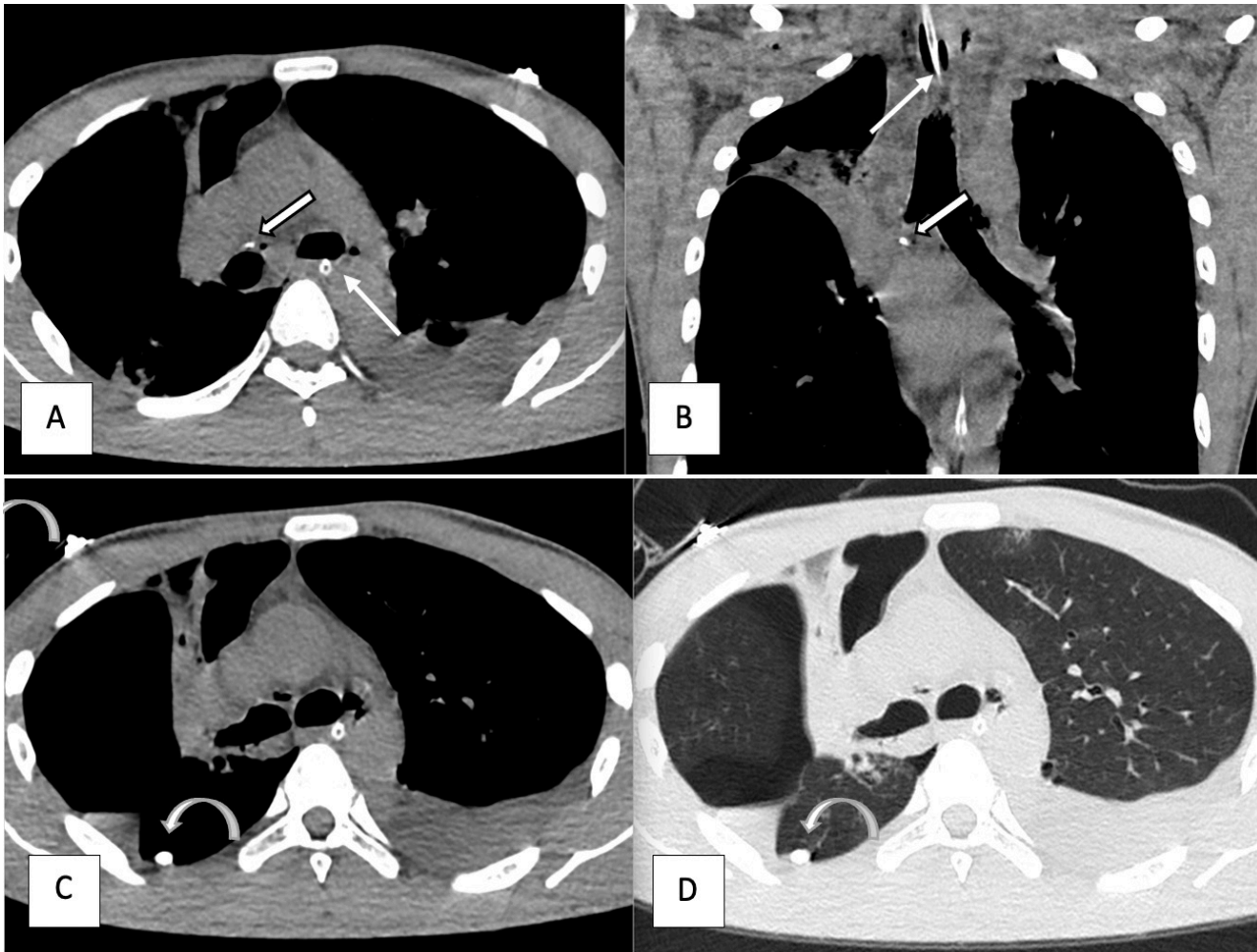


Figure 4: Non-contrast CT thorax at the level of carina in axial and coronal (A - D), show multiple high-density materials at the right hilar region adjacent to the right main bronchus (straight arrow) and at posterior costal pleural surface of the right lower lobe (curved arrow) representing the intrathoracic migration of foreign bodies. Lung contusions with collapse associated with right pneumothorax are also seen (D). Nasogastric tube (white long arrow) within the esophagus shows no communication with the adjacent trachea.

There was also evidence of azygous vein injury as depicted in Figure 5. In the contrasted image, there were focal hyperdensities adjacent to the azygos vein with surrounding fat streakiness. Since these were not visualized in the non-contrast study, the findings were likely suggestive of an azygos vein injury causing extravasation of contrast.

The patient also sustained other severe injuries which include multiple intracranial haemorrhages, generalized cerebral oedema and multiple fractures including facial bones, left first rib, cervical (including C2 Hangman fracture) and thoracic spines. Subsequently, the patient was sent to the operating room for an urgent external ventricular drainage (EVD) catheter insertion. He was transferred to the intensive care unit for close observation and planned for thoracotomy or video-assisted thoracoscopic surgery (VATS) later for removal of the foreign bodies, as his haemodynamic was stable, and there was not much drainage from the chest tube which would have suggested active bleeding in the thorax. However, his condition

gradually deteriorated, and he passed away on day 4 of admission with a severe head injury as the cause of death.

Discussion

In a trauma setting, trachea injuries are considered uncommon, either with blunt or penetrating trauma. A delay in diagnosis may occur due to the rarity of the injury, unexpected clinical and radiologic manifestations, and being obscured by other, much more common, associated injuries such as intracranial or intrabdominal injuries (1, 2). In our patient, the diagnosis was immediately made when there was evidence of jagged laceration wounds over the anterior of the neck combined with the radiographic sign of pneumothorax.

Trachea injuries can be evaluated in multi-sliced CT scan using both soft tissue and lung window setting. The findings are usually a combination of indirect and direct signs. The most common indirect findings are pneumomediastinum, deep cervical emphysema, paratracheal air pockets,

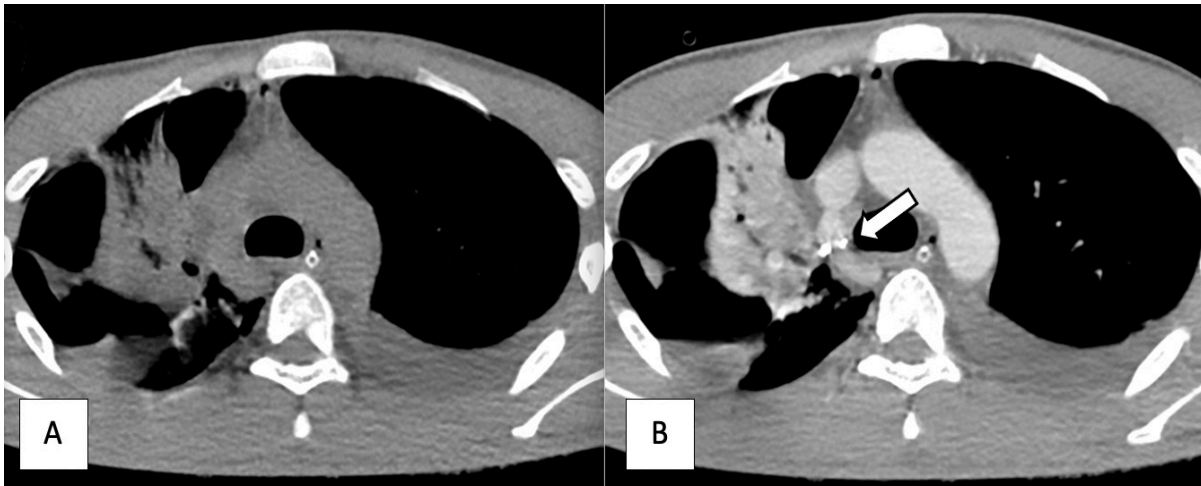


Figure 5: (A) Axial CT at the level of mid thorax in non-contrast and (B) contrast. In the contrasted image, there are multiple high-density foreign bodies which were not visualized in non-contrast study (white arrow) adjacent to the azygos vein associated with surrounding fat streakiness.

pneumothorax and pneumoretroperitoneum. The direct signs are discontinuity of the trachea wall, focal trachea contour deformity, trachea ring fracture or abnormal communication with other structures (2). Both indirect and direct signs are present in our case.

This case represents a rare case of trachea injury resulting in extensive migration of foreign bodies into the mediastinum and the lung. The nature of the migratory process was unclear initially. Different routes of foreign body migration reaching the intrathoracic and mediastinal had been described in the literature including direct transcutaneous penetration, vascular route, or aspiration. A high-speed motor vehicle accident, as in this case, has the potential to produce such an injury. During trauma or the presence of direct impact, foreign bodies can penetrate the soft tissues through open wounds and lacerations (3). Our patient had a laceration wound in the neck which was most likely the opening route for the foreign bodies to enter the mediastinum. He also had an azygos vein injury which was the most possible pathway for migration to the lower mediastinum and the lung.

Another interesting fact about the case was that the timeline of the migration from the point of impact happened very quickly. In the literature, the cases that were described had a longer time frame for the migration, a few months or years later (3, 4). Al-Jalahma et al. (5), mentioned migration of sharp foreign body into the mediastinal structure, penetrating the pericardium and right-sided heart chamber, which occurs over a few years after the trauma.

In trauma patients with trachea injury and pneumothorax, we should carefully assess and find the exact causes and complications. As we have seen in previous case reports, there were cases where the foreign body was overlooked during the initial assessment. Thus, some of them were presented again with complications such as recurrent

pneumonia, lung abscess, pulmonary gangrene, empyema, cardiac tamponade, and chest pain. If the foreign bodies are sharp objects, the potential for migration is high, and there is also a higher risk for a vascular injury which is life-threatening. Thus, there should be a proper plan for removal after the initial diagnosis. Although there have been reports of successful foreign body removal using VATS (6), this is only possible if the patient is stable and can tolerate single lung ventilation during the procedure. The thoracotomy approach is by no means inferior and gives better access despite inflicting a bigger wound on the patient. In this case, localization of the foreign body by the radiologist was of utmost importance to guide the cardiothoracic surgeon, so that it could be correctly removed using limited wedge resection.

Conclusion

This is a rare case of extensive intrathoracic and mediastinal foreign body migration through a single laceration in the neck. The presence of pneumothorax on initial CXR may alert the physician to the possibility of direct penetration or injury to the airway which would require an urgent CT scan. Radiologists should also be aware of the potential complications and must ascertain any airway injuries and the presence of foreign bodies while interpreting the images. The decision for trachea repair and the removal of foreign bodies should be made immediately by a cardiothoracic surgeon after the initial diagnosis to prevent devastating complications. The thoracotomy approach gives better access for the localization of foreign bodies despite a bigger wound inflicted on the patient.

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Informed consent

Informed consent was obtained from the patient's relative regarding publishing this clinical case in an academic journal.

Competing interests

The authors declare that they have no competing interests.

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