



Traumatic Pneumothorax, Delayed Presentation Post-Blunt Chest Trauma in a Male Patient Aged 55 Years

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Abstract

The presence of air between the visceral and the parietal pleura following a traumatic mechanism leads to a clinical condition known as traumatic Pneumothorax. The injury can be edgeless, attributable to a motor vehicle accident, physical assault, falling from height; or penetrating for instance a bullet or knife injury. In other words, there is air entrapment between the lungs and the chest wall due to the accumulation of air in the related side of the collapsed lung. Sometimes a Tension Pneumothorax can also develop which is considered as one of the most dangerous types of pneumothoraxes and a preventable cause of death.

Background

A blunt chest trauma can precipitate into a Pneumothorax by one of the following four mechanisms: (1) alveolar rupture due to increased alveolar pressure, (2) paper bag effect (occurs if epiglottis is closed during sudden pressure increase in the tracheobronchial tree), (3) acceleration-deceleration injury, (4) pleural damage due to rib fractures [1-3]. Initially, patients may experience chest pain, dyspnea, anxiety, tachypnea, tachycardia, hyper-resonance, and decreased respiratory sounds on the pneumothorax side [4]. Later, signs such as diminished consciousness, tracheal deviation, hypotension, distension of cervical veins, and cyanosis may be apparent, with the development of tension pneumothorax being the concern [4].

Case Presentation

This case demonstrates the delayed occurrence of pneumothorax in a patient with a blunt trauma chest with multiple rib fractures. After slipping on ice and falling onto the left side of the chest, a 55-year-old man reported to the emergency department at Scunthorpe General Hospital with complaints of left-sided chest and shoulder pain. He did not experience any loss of consciousness, vomiting, or head injuries.

PMH: Hypertension and Pre-Diabetes

Medication: Antihypertensive not on any anticoagulants

At the time of examination, the patient was alert, and afebrile, with a pulse rate of 68, BP 138/72, RR 19/min, and 96% SPO₂ on room air. Chest examination revealed localized tenderness across the left lateral chest wall without restricted air entry, and normal breath sounds without any apparent signs of external chest injury or surgical emphysema.

Bed side USG: E-FAST: Negative. No hemopneumothorax on arrival.

X-ray chest: Multiple rib fracture with no hemopneumothorax visible/reported (Figure 1, 2).

The patient experienced persistent severe chest and thoracic pain for which he was given multiple analgesics including Codeine, Paracetamol, Ibuprofen, Oro-Morph, and IV Morphine. The patient was kept under continued observation in the A & E department wherein he also complained of simultaneous shortness of breath.

Vitals signs were stable with the patient being alert throughout the stay in A&E (Table 1).

A CT chest was undertaken with the Initial CT Chest showing multiple rib fractures from the 3rd to 7th ribs and there was an incidental finding of multiple bilateral hilar nodes measuring about 14 mm.

Further to this, CT Abdomen and CT pelvis were carried out after a few hours of the first CT chest to inspect for the cause of lymphadenopathy which revealed the development of left-sided

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Figure 1: X-ray chest on arrival, showed multiple rib fractures, no hemopneumothorax.

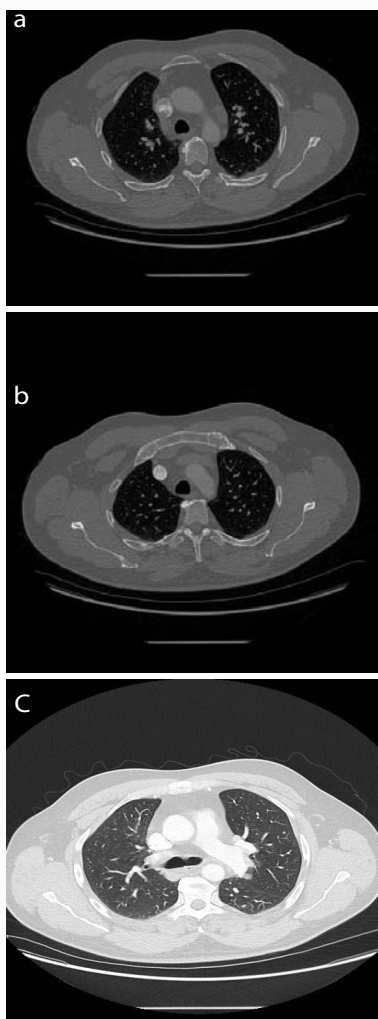


Figure 2(a-c): CT chest showed multiple rib fractures but no pneumothorax or hemothorax.

pneumothorax ((Figures 3-5).

The patient was admitted under surgical care after a chest tube was inserted to relieve the Pneumothorax. On discharge, the chest tube was removed and the patient was advised a follow up with Respiratory Medicine.

The patient was doing well post-discharge and was under follow

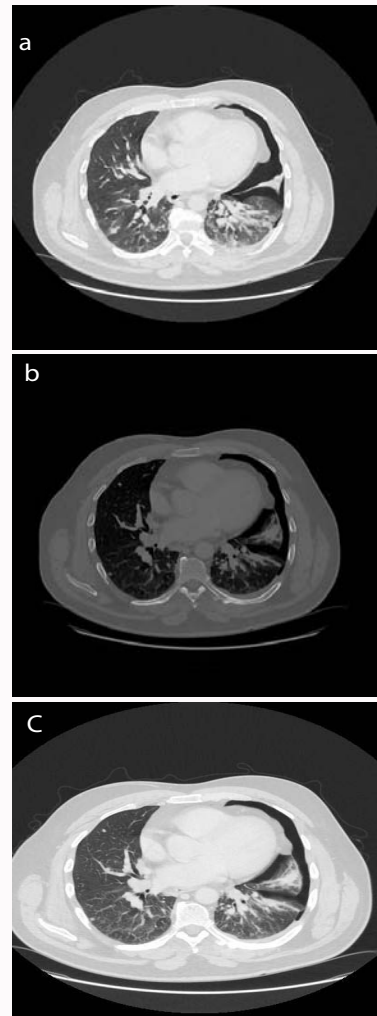


Figure 3(a-c): CT showing delayed development of pneumothorax after a fall.

Table 1: At the time of examination.

time / date	time/date	time/date	time/. date
1400. 2/12/23	1900. 2/12/23	2200. 2/12/23	0200. 3/12/23
HR: 61	HR: 58	HR :66	HR: 68
BP: 137/72	BP 157/ 72	BP: 147/74	BP: 131/68
SPO2: 96% (Air)	SPO2: 96% (AIR)	SPO2: 97% 2L O2	SPO2: 96% 2L O2.

of respiratory medicine.

Discussion

Pneumothorax is one of the complications following blunt trauma to the chest [5] with initial presentation of chest pain alone, but the mechanism of injury and severity of chest pain are important factors in deciding whether to keep the patient in the hospital for a longer period for observation [1]. Chest examination should be repeated to exclude delayed development of hemothorax or pneumothorax. The principles of approach to trauma patients should always be applied. In the primary survey, an Airway, Breathing, Circulation, Disability, and Exposure (ABCDE) approach should be performed [6,7]. An open and effective airway alone cannot suffice, rather, the rate, depth, and respiration pattern are equally significant. Supplementarily, the associated six life-threatening conditions namely, obstructed airway,

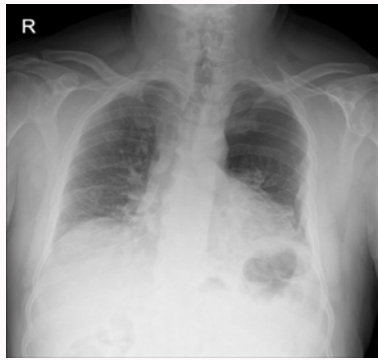


Figure 4: Repeated X-ray chest also revealed new pneumothorax.



Figure 5: X-ray chest with chest tube in place.

tension pneumothorax, open pneumothorax, massive hemothorax, flail chest, and cardiac tamponade, seen in a chest trauma, should be inspected for and treated appropriately at the primary survey [1,8].

After applying the ABCDE principles, the intensity of the injury needs to be evaluated by taking into account the vital signs, mechanism of injury, patient complaints, and general clinical presentation [9]. Often complications can become apparent 48 h to 72 h following the initial clinical manifestations [10]. Furthermore, the mechanism of trauma can facilitate prompt diagnosis and treatment by providing information about how the injury was sustained. Additionally, history and physical examination are crucial to promptly detect major injuries such as tension pneumothorax, massive hemothorax, and flail chest [1]. While conducting a physical examination, it is impertinent to scrutinize the chest for any asymmetry, palpation to detect crepitations, and also auscultation [1]. Although physical examination alone is considered to be insufficient for diagnosis mostly, it is still valuable and imperative [1]. Despite common belief, physical examination is associated with considerable sensitivity and specificity, particularly when it comes to diagnosing hemopneumothorax [9]. Patients deemed clinically stable with apparently no serious injuries after experiencing a high-energy trauma are susceptible to developing serious complications [11].

Conclusion

Pneumothorax is the most common life-threatening injury in blunt thoracic trauma and is associated with 40% to 50% of

patients with all types of thoracic trauma [12,13]. Consequently, pneumothorax warrants vigilant surveillance due to the possibility of the development of delayed pneumothorax [14], resulting in symptoms varying from mild chest pain to cardiovascular collapse and eventually death. Therefore, such patients should always be evaluated with skepticism. Whilst patients do not have serious symptoms, they should be followed up for 2 weeks after the trauma, because of the risk of complications such as delayed hemothorax and delayed pneumothorax [15].

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