

Letter to the editor

Non-resolving traumatic pneumothorax: is open thoracotomy still relevant?

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Persistent pneumothorax remains one of the frequent complications following chest injuries. The management poses a challenge to trauma surgeons in determining the time and method for intervention. In literature, the incidence of persistent pneumothorax is reported between 4-23%. (1) Most of these cases would require surgery due to prolonged chest tubes and inadequate ventilation. However, the timing of the operation is a challenge and may determine the type of intervention. (2) Video-assisted thoracoscopic surgery (VATS) has shown to have shorter and faster recovery. But its success much depends on the early operation. Open thoracotomy is a major surgery which is associated with multiple postoperative complications, hence most opponents prefer expectant management. In extreme and prolonged cases, a thoracotomy is eventually needed to assist recovery. We present a case of persistent pneumothorax whom successfully treated with open thoracotomy. The pathology and treatment options are discussed.

A 35-year-old lorry driver had an alleged traffic accident with a motorcycle. While braking, he pushed forward and hit the steering wheel. He was brought fully conscious and alert by ambulance. There was no airway compromise, but he appears breathless. Bruises were seen across his chest region. Air entry was reduced on the right side with no evidence of tracheal deviation. The abdomen was soft and vital signs were reasonable.

Routine blood investigations such as full blood count, renal profile and arterial blood gases were unremarkable. Chest radiograph revealed a right pneumothorax. (Figure 1)



Figure 1: Right pneumothorax on initial chest radiograph

A chest tube was inserted immediately over the right side. However, he became tachypnea severely and requires intubation and ventilation. Despite the chest tube and low-pressure suction, the lung did not expand, and the patient was unable to wean from the ventilation. There was a presence of continuous bubbling within the underwater seal. A repeat chest radiograph on day seven trauma revealed another massive right pneumothorax despite an in-situ thoracostomy tube. (Figure 2)

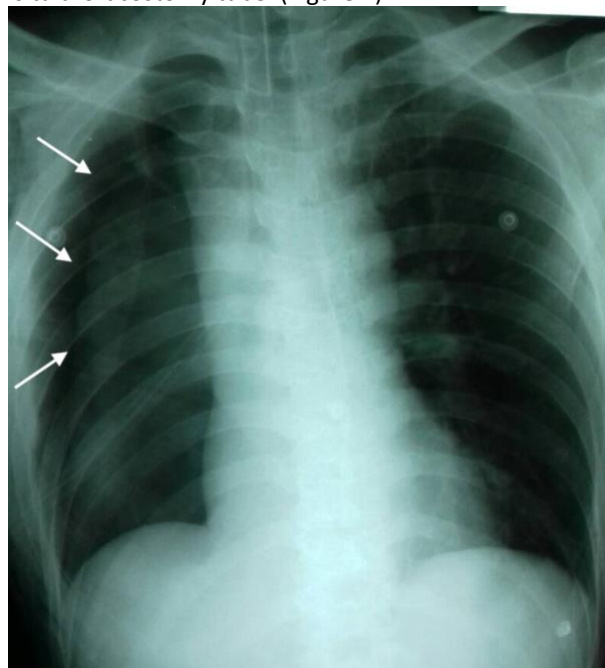


Figure 2: Persistent pneumothorax despite an in-situ thoracostomy tube (white arrow showing the pleural line)

A computed tomography (CT) thorax was performed and revealed a collapsed right lung and a large pneumothorax. There was also the presence of air bleb and bullae. (Figure 3) He underwent posterolateral thoracotomy which revealed a small air leak at the upper lobe. (Figure 4) The puncture is secured with an underrunning suture and confirmed with Jacuzzi test. Post-operative was uneventful.

Pneumothorax is a common condition encountered in a most traumatic event. The presentation ranges from slow and progressive or causing tension within the thorax cavity. Identification and recognition are relatively straightforward looking at the mechanism of injuries and typical symptoms and signs. Patient in simple pneumothorax presents with progressive shortness of breath and reduced or absent air entry upon auscultation. A tension pneumothorax, on the

other hand, may manifest with haemodynamically instability and silent lung. The latter condition requires immediate intervention.



Figure 3: Collapse right lung with presence of bleb and bullae on thorax CT scan

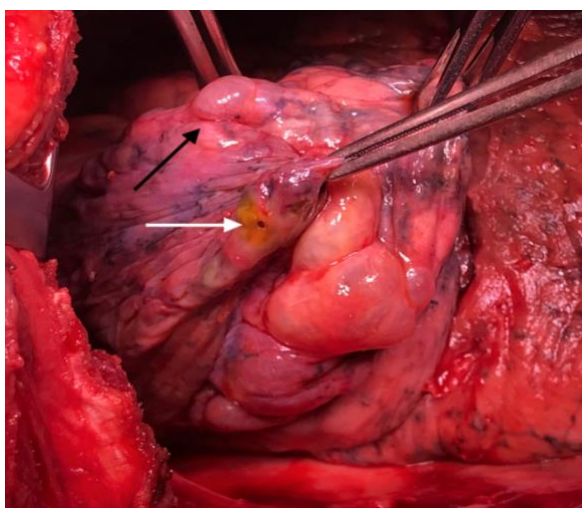


Figure 4: Small air leak at the upper lobe (white arrow) and bullae (black arrow)

Thoracostomy or chest tube remains the primary treatment for most thoracic injuries. The use is simple, quick and efficient for the majority of pneumothorax. (3) Once the lung is fully expanded, the tube is removed, and the patient would be ready to go home. However, the challenge arises in cases with persistent pneumothorax. The definition of persistent pneumothorax varies among studies. One study suggested between five to seven days (4) while another study considers 48 hours following chest tube insertion. (5) Most common aetiology includes a significant laceration and parenchyma destruction, rupture bullae, bleb and communication between the pleural and bronchiole as a case in a bronchopleural fistula. These injuries cause substantial disruption of the lung tissue integrity. The morbidity related to this condition is evident in our patient with difficulty to wean and extubate and in need of continued ventilation support.

The intervention required in a persistent pneumothorax varies from expectant management and active response. Studies have shown the feasibility of both approaches

although the healing time differs with faster resolution in the latter. (6) However, with a sizable laceration or significant air leak, expectant management tend to fail. This condition requires surgical intermediation. Video-assisted thoracoscopic surgery (VATS) has shown to be a safe and feasible method in dealing with persistent pneumohaemothorax. (7) However, success is commonly reported in early intervention and high-volume centre. This procedure requires technical expertise and resources which is not always accessible.

Open thoracotomy is another option in long-standing pneumothorax associated with a significant air leak. Nevertheless, a thoracotomy is not without any complication. A detail preoperative assessment and preparation is needed before a thoracotomy. Complications include postoperative pain, sensory loss, infection leading to empyema and recurrence due to stump or inherent bullae leak. (8) The decision and preparation of thoracotomy should involve the patient, trauma surgeons and anaesthetist. The choice of thoracotomy incision depends on the haemodynamic stability and access to the injured region. A posterolateral thoracotomy is an excellent choice for a stable patient which provides direct access to the whole lung structures. Assistance from the anaesthetist to collapse the lung with a double lumen catheter would enhance visualisation and repair.

The surgical approach to the injury depends on the pathology and intraoperative findings. A presence of rupture air bleb or inherent bullae may require resection or staple of the area involved. This procedure should take into account the risk of stump blow out and extent of the wound. A small air leak could be repaired with a simple underrunning suture. A post-repair Jacuzzi test with positive pressure inflation would aid in assessing the repair and identifying other air leaks.

Persistent pneumothorax is a common complication of trauma. The resolution depends on the injuries sustained with surgery remains the last resort in the approach. Open thoracotomy is a safe and viable choice in persistent pneumothorax with a good outcome.

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