

Case Report

Potentially fatal blunt chest trauma presenting as occult pneumothorax

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Occult pneumothorax (OPTX) after blunt chest trauma can rapidly progress to tension pneumothorax and is life-threatening if not properly diagnosed in the emergency department (ED). Therefore, early detection of OPTX in ED is of great concern. Herein, we report a case of OPTX diagnosed by computed tomography (CT). A 45-year old woman suffered severe head injury, craniofacial injury, and OPTX after a motorbike accident. She was successfully treated with the insertion of a chest tube in ED without mortality. ED physicians should suspect OPTX and arrange for chest CT scan in critical trauma cases with high injury severity score (ISS) and chest injury.

Keywords: occult pneumothorax; computed tomography; chest tube

INTRODUCTION

Thoracic injury accounts for 25% of all trauma deaths and pneumothorax (PTX) is the most common intrathoracic blunt chest injury [1]. Occult PTX (OPTX) is defined as PTX that can be detected via thoracic computed tomography (CT) rather than supine chest X-ray (CXR) [1-4]. OPTX may rapidly progress to tension PTX, with the potential to cause mortality during a primary or secondary survey with resuscitation in the emergency department (ED). Here, we report a case of left OPTX after blunt chest trauma.

Case Report

A 45-year-old woman was brought to our ED in

an ambulance after her motorbike collided with a truck. Initial examination revealed semicomatose state with severe head injury, craniofacial injury, and chest trauma. Her initial vital signs were unstable: body temperature, 36.2°C; pulse rate, 112 beats/min; respiration rate, 10 breaths/min; blood

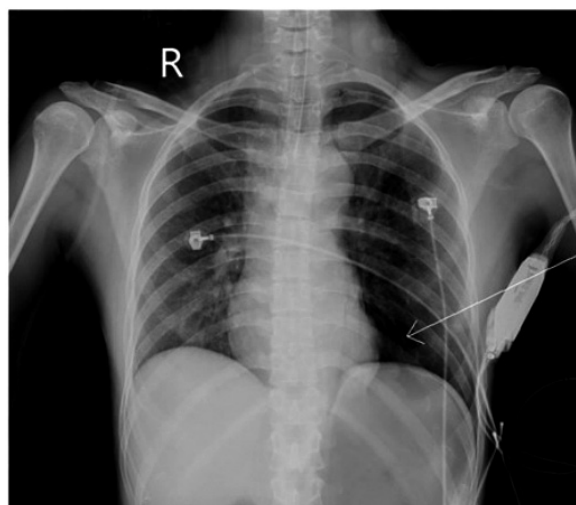


Figure. 1 Chest X-ray shows increased density in the retrocardiac region and lucent area in the left lower lung field (arrow).

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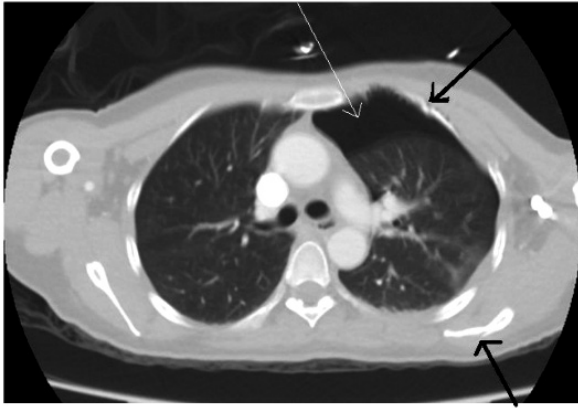


Figure. 2 Chest computed tomography shows left pneumothorax (white arrows) affecting the left second, third, and fourth ribs and left scapular bone fracture (black arrows).

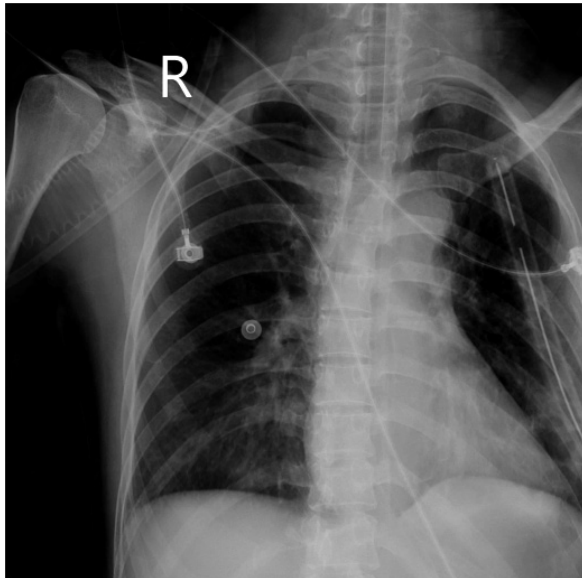


Figure. 3 Chest X-ray shows increased density in the retrocardiac region with a tube inserted into the left pleural cavity (arrow).

pressure, 82/49 mmHg; and Glasgow Coma Scale, 7 (E1M4V2). This patient's airway was secured by endotracheal intubation with 100% SPO₂ and hydration with 1000 mL of 0.9% normal saline. There were decreased breath sounds on the left. Portable CXR and focused abdominal sonography were immediately conducted. Initial CXR showed increased density in the retrocardiac region and lucent area in the left lower lung field without PTX or hemothorax (Figure 1). After positive response to fluid resuscitation and secured airway, the

patient's hemodynamic status became relatively stable and contrast-enhanced CT of the brain and chest was performed. The chest CT image revealed left PTX affecting the left second, third, and fourth ribs and left scapular bone fracture (Figure 2). The brain CT image revealed severe comminuted fractures of the left frontal, right occipital, bilateral temporal, and left facial bones, with mild right subdural hemorrhage without mass effects. A chest tube was inserted into the left pleural cavity (Figure 3). The patient was stabilized in the ED and subsequently admitted to the surgical intensive care unit for further observation and management. She was discharged 15 days after admission in stable condition.

Discussion

PTX refers to the presence of air in the pleural space between the parietal and visceral pleural cavities [2, 3]. In patients with blunt chest trauma, PTX is a common cause of rib fractures and subcutaneous emphysema. However, in the case of a small PTX, air tends to accumulate in the pleural space, which is difficult to visualize on supine CXR. This may be due to poor technique or inadequate reading of the chest study. Ball et al. reported that 55% of all pneumothoraces identified on thoracic or abdominal CT scans were not detected on preceding chest radiograph [1]. A sequential prospective evaluation of the same group revealed subcutaneous emphysema as the only independent predictor of OPTX after trauma [5]. However, subcutaneous emphysema is not obvious on initial chest radiograph. Although OPTX management is controversial, ED physicians often perform tube thoracostomy. It remains unclear whether patients with OPTX should simply be observed or treated with immediate tube thoracostomy (in consideration of the complications and side effects of this invasive procedure). However, the progression of PTX and risk of tension PTX may be life-threatening. PTX is a common manifestation of and preventable cause of death from thoracic injury [6, 7]. Therefore, early CT is indicated for the detection of OPTX in a hemodynamic stable patient and early treatment

is indicated to reduce mortality. In a systemic review, Caputo et al. reported that patients with a high injury severity score (ISS) who undergo whole-body CT have a lower overall mortality rate when compared with those who undergo selective scanning [8].

Conclusion

OPTX is commonly missed on CXRs of patients with chest injuries. To reduce morbidity and mortality, ED physicians should suspect OPTX and conduct early thoracic CT to detect major underlying issues in critical cases with stable vital signs, high ISS and chest injury.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Acknowledgements

None

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