



Images in Clinical Medicine

Bilateral traumatic pneumothoraces with bilateral deep sulcus signs



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A 33-year-old man was brought to our emergency department by ambulance after a traffic accident. On arrival, he was drowsy, and dyspnea was noted. He had a respiratory rate of 26 breaths/min, an oxygen saturation of 88% on a rebreather face mask, a blood pressure of 80/58 mmHg, and a pulse rate of 114 beats/min. The breath sounds over the anterior left side of his chest were decreased, and multiple abrasions were noted over the anterior chest wall. Needle decompression was performed immediately under the impression of tension pneumothorax. A supine chest radiograph revealed both lateral costophrenic angles were abnormally deepened with increased lucency (Fig. 1, arrows) and left rib fractures (Fig. 1, arrowheads). A chest tube was placed on the left side, and the chest computed tomography revealed bilateral pneumothoraces with lung collapse (Fig. 2). A chest tube was placed on the right side, and a repeat chest radiograph revealed decreases in both deepened and hyperlucent lateral costophrenic angles (Fig. 3). After resuscitation, he was transferred to the intensive care unit and discharged home in stable condition 1 month later.

Traumatic pneumothorax is an emergency, and is sometimes difficult to identify in critically ill patients. The majority of cases can be diagnosed on an upright posteroanterior chest radiograph [1]. However, only supine chest radiographs are possible in some patients, such as those who have undergone major trauma or are in the intensive care unit. Approximately 30% of pneumothoraces are undetected on supine radiographs because the visceral pleural

line is not commonly identifiable on radiographs of supine patients [2].

The deep sulcus sign, characterized by a deep, lucent lateral costophrenic angle, may be the only evidence of a pneumothorax

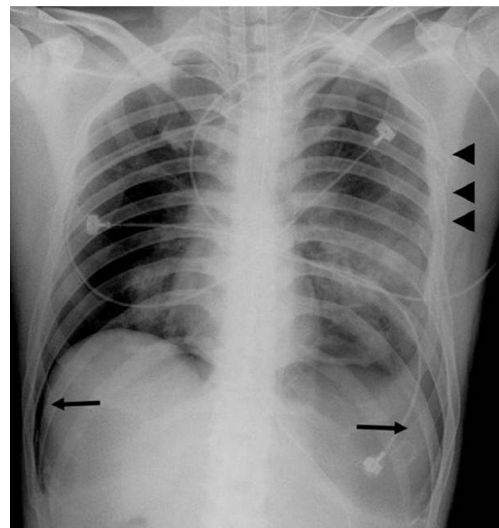


Fig. 1. Supine chest radiography shows bilateral deep sulcus signs (arrows) and multiple rib fractures (arrowheads).

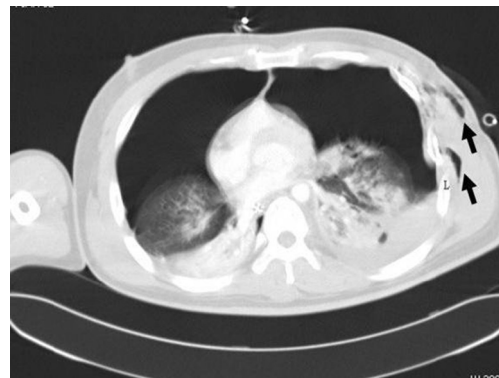


Fig. 2. Chest computed tomography reveals bilateral pneumothoraces and subcutaneous emphysema (arrows).

Conflicts of interest: none.

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Fig. 3. Repeat supine chest radiography after insertion of bilateral chest tubes shows absence of deep sulcus sign and consolidation (arrow).

on a supine chest radiograph. When a patient with a pneumothorax is lying supine, air in the pleural space tracks laterally and caudally along the nondependent portions of the pleural space, which may deepen the costophrenic angle and produce a deep sulcus sign [2].

In addition to the deep sulcus sign, relative lucency in the hypochondrial region in the supine chest radiograph of our patient was another clue suggesting a pneumothorax [2]. However, false-positive deep sulcus signs have been described in chest radiographs of patients with chronic obstructive pulmonary disease and those receiving mechanical ventilation with high tidal volumes [3].

Pneumothorax occurs in 15–20% of patients who have had blunt trauma, however, there is only a 3% probability of bilateral pneumothorax in association with thoracic trauma [4]. Whatever the etiology, the mortality rate of bilateral simultaneous pneumothorax is higher than that of unilateral or nonsimultaneous pneumothorax, and early diagnosis and treatment are critically important to the outcome [5].

Here, we described a case of bilateral traumatic pneumothoraces with bilateral deep sulcus signs on a supine chest radiograph. Emergency physicians should be familiar with the deep sulcus sign, because it is critical in the early management of major trauma.

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