

Spontaneous pneumothorax (RCD code: VIII)

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Abstract

Pneumothorax is defined as the occurrence of air in the pleural space. From a clinical standpoint, pneumothorax can be classified as spontaneous (without an obvious triggering factor) or nonspontaneous. Primary spontaneous pneumothorax (PSP) is defined as the spontaneous presence of air in the pleural space in patients without clinically apparent lung disease. We present a case of a 26-year old man who reported chest pain at rest. A standard chest x-ray (CXR) picture on inspiration did not reveal any severe pathology, but a second imaging on expiration showed a large pneumothorax. In this case, the pneumothorax would have been undetected if only the inspiratory CXR was used. Lung ultrasonography (USG) can be used to diagnose radio-occult pneumothoraxes independent of the respiratory phase of the patient. JRCDD 2018; 3 (7): 236–238

Key words: rare disease, spontaneous pneumothorax, BLUE protocol, chest x-ray, pleural drainage

Case presentation

A 26 year old man arrived to the Emergency Department complaining of acute onset resting chest pain starting from the day before admission. The patient was in a good condition. The pain was localised to the left side of the chest, with increasing intensity during expiration. Prior to this event, the patient hadn't had any chronic diseases, nor had he been using any daily medication. He had no prior history of smoking, drug use or alcohol abuse. His vital signs were normal and the physical exam was unremarkable. Laboratory tests on admission showed an elevated white blood cell count (WBC: 13.000 cells per mL, high percentage of neutrophils). Other laboratory tests, including C-reactive protein, cardiac high-sensitivity troponin T, CK-MB, and total serum creatinine kinase concentration were within their respective reference ranges. A standard 12-lead electrocardiogram (ECG) showed a sinus rhythm with a heart rate of 70 beats per minute. A standard CXR was performed during inspiration. The radiologist's description was as follows: lungs without infiltration changes, diaphragmatic angles without fluid, and a heart shape within the normal range. According to the pulmonologist's recommendation, a second CXR was performed during the expiratory phase. In this case, the exam showed a left sided pneumothorax, with a width of

70mm. The patient was admitted to the surgical ward and underwent a thoracic drainage in the same day. The perioperative period was complicated by bleeding from the left pleural cavity and from the respiratory tract, and the patient expectorated a large amount of bloody sputum. After the surgery, the patient's general condition deteriorated. The patient was intubated and artificial ventilation was implemented, and transfusion of packed red blood cells was required. Suction drainage of the pleural cavity was maintained. On the next day, the patient was awakened, extubated, and was conscious with 15 points on the Glasgow Coma Scale. The subcutaneous pneumothorax had not increased during that time, and the drainage systems were functioning correctly. A control thoracic x-ray revealed an expanded left lung, diaphragmatic angles without fluid, and a correct drainage arrangement. After a few days of observation, the patient was discharged in a stable good condition.

Review of literature

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Figure 1. Chest x-ray picture performed on the inspiration breathing phase

taneous. Primary spontaneous pneumothorax (PSP) is defined as the spontaneous presence of air in the pleural space in patients without clinically apparent lung disease. In developed countries, PSP has an incidence of 7.4 to 18 cases (age-adjusted incidence) per 100,000 males annually, and 1.2 to 6 cases per 100,000 females annually [1]. PSP typically occurs in thin and tall patients. The main risk factors of PSP are the male sex and smoking tobacco. PSP may develop as a complication of Birt-Hogg-Dubé syndrome (BHDS), an inherited multiple cystic lung disease [2]. Specific symptoms are sudden chest pain, usually spontaneously subsiding within 24 h and dyspnoea. In minor pneumothoraxes, the patient can have a physical examination with no pathology detected. In more severe cases, both breath sounds and tactile fremitus are decreased and a hyper-resonant percussion can be noted. The majority of diagnoses can be confirmed with a routine CXR during deep inspiration. A significant phenomenon in PSP that facilitates the diagnosis is a contralateral shift of the trachea and mediastinum.

It was common clinical practice that a pneumothorax could only be diagnosed by using an inspiratory chest radiograph alone, and that an expiratory film gave no further information, while doubling both the cost of the investigation and the radiation dose to the patient. Therefore, expiratory x-rays should not routinely be performed [3]. In our case, the pneumothorax would have been overlooked if the investigation was based only on the inspiratory film.

Detection of a pneumothorax with lung ultrasound is a novel technique. Several studies demonstrated that a lung ultrasound is useful for diagnosis, particularly in emergency settings [4–7]. The sensitivity of a lung ultrasound in the detection of pneumothorax is higher than that of a conventional posterior–anterior chest radiography, and similar to that of computed tomography (ultrasonography is 90.9% sensitive and 98.2% specific, but chest radiography is 50.2% sensitive and 99.4% specific for the detection of pneumothorax) [6,7]. A chest x-ray creates a high percentage of false

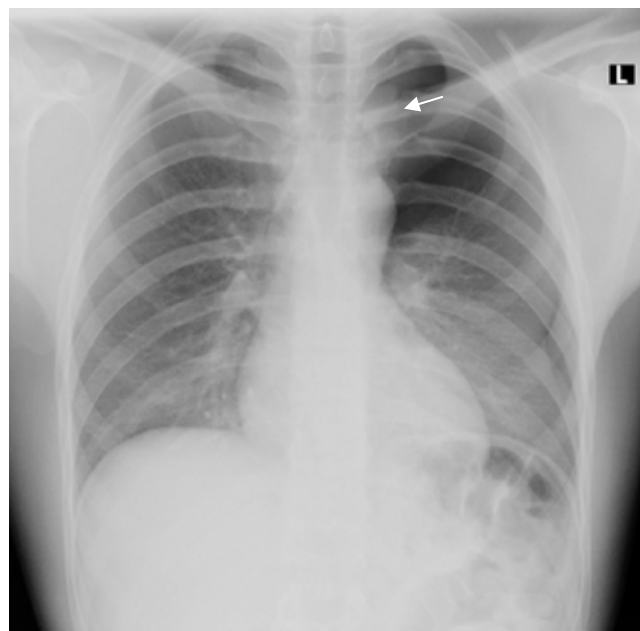


Figure 2. The same patient's x-ray chest picture performed on the expiration breathing phase. Pneumothorax is marked with an arrow

negative results and computed tomography has drawbacks that include radiation exposure, relatively limited availability and low cost-effectiveness. In contrast, a lung ultrasound provides an accurate diagnosis and can be used to quickly diagnose a pneumothorax at the bedside in any critical situation. In addition, it can be used to diagnose radio-occult pneumothoraxes independent of the respiratory phase [9,10]. A pneumothorax may be identified by the absence of lung sliding on a 2-dimensional view. Lung point is a sign commonly viewed as pathognomonic for a pneumothorax. This sign is a sudden change at the precise location between the normal pleura with underlying lung tissue and the pneumothorax. However, this sign may also be seen in the presence of bullous lung disease [11]. It should be noted that cases of iatrogenic pneumothorax are common, and lung ultrasonography still remains as the proper diagnostic method. In our case, basing only on preliminary medical records, the pneumothorax could have gone undiagnosed. Doubts by clinicians retarding using lung ultrasonography stem from the fact that ultrasonography has historically been considered a bad tool for assessing the lungs, and this conviction is present among many doctors. Another reason for the rare use of lung ultrasonography may be the lack of knowledge or experience of the test protocol, or limited equipment availability. In conclusion, lung ultrasonography should be recommended as the diagnostic method of choice in several common clinical situations, including in bariatric or agitated, dyspnoeic patients [8].

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