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Unusual case of primary spontaneous hemopneumothorax in a young man with atypical tension pneumothorax: a case report

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Abstract

Background: Spontaneous life-threatening hemopneumothorax is an atypical but treatable entity of unexpected circulatory collapse in young patients, affecting 0.5–11.6% of patients with primary spontaneous pneumothorax. Spontaneous pneumothorax is a well-documented disorder with a classic clinical presentation of acute onset chest pain and shortness of breath. This disorder might be complicated by the development of hemopneumothorax or tension pneumothorax.

Case presentation: A 23-year-old Asian man was referred to the emergency room of Xiamen Chang Gung Memorial Hospital with a 1-day history of right-sided chest pain that had been aggravated for 1 hour. A physical examination revealed a young man who was awake and alert but in mild to moderate painful distress. His vital parameters were relatively stable at first. The examining physician noted slight tenderness along the right posterolateral chest wall along the eighth and tenth ribs. Primary spontaneous pneumothorax was considered, and a standing chest X-ray confirmed the diagnosis. A right thoracostomy tube was immediately placed under sterile conditions, and he was referred to the respiratory service. While in the respiratory department, approximately 420 mL of blood was drained from the thoracostomy tube over 15 minutes. Our patient developed obvious hemodynamic instability with hypovolemic shock and was subsequently admitted to the cardiothoracic surgical ward after fluid resuscitation. During the ensuing 4 hours after admission, 750 mL of blood was drained through the thoracostomy tube. A bedside chest X-ray was requested after he was temporarily hemodynamically stabilized. Primary spontaneous hemopneumothorax associated with right tension pneumothorax was considered based on the radiological impression and clinical signs. An emergency limited posterolateral thoracotomy was performed. A standing chest X-ray performed on day 6 of admission after the removal of the thoracostomy tube showed a complete re-expansion of his right lung. He remained stable and was discharged within 1 week.

Conclusions: The successful treatment of a large spontaneous hemopneumothorax depends on early recognition, proactive intervention, and early consideration by a cardiothoracic surgeon. Once the diagnosis is confirmed, early thoracotomy should be considered. Such an aggressive surgery not only leads to shorter hospitalization but also confers better long-term outcomes.

Keywords: Primary spontaneous hemopneumothorax, Spontaneous pneumothorax, Tension pneumothorax, Thoracotomy, Thoracostomy

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Background

Spontaneous hemopneumothorax (SHP) is a rare disorder that historically affects approximately 0.5–11.6% of patients with spontaneous pneumothorax (SP) and can be life-threatening [1, 2]. SHP was first described in 1876, and fatal cases were reported at the beginning of the last century. Non-traumatic hemopneumothorax is 30 times more common in men than in women, and the gender difference is considerably larger than that in SP [2]. Bleeding most commonly results from the rupture of a vascularized bulla or a torn adhesion between the visceral and parietal pleura [1–3]. Pneumothorax is defined as "air and frequently accompanied by a limited amount of blood or fluid in the pleural cavity" [1, 2]. SP is classified as primary or secondary. Primary SP (PSP) occurs in a previously healthy patient without underlying chronic lung disease or provoking factors, such as trauma, surgery, or diagnostic intervention, while secondary SP is associated with parenchymal lung disease, such as pulmonary fibrosis or emphysema [3]. SHP is a condition in which more than 400 mL of blood has accumulated within the pleural space in association with SP. The clinical presentation can be dramatic due to the hemodynamic instability with hypovolemic shock [4]. When blood loss is substantial, early placement of an intrapleural chest drain is necessary, and thoracotomy may be required to achieve hemostasis [1–3].

Tension pneumothorax (TP) is usually associated with mechanical ventilation or trauma, and the incidence of spontaneous development is rare. Brims reported that spontaneous TP may complicate 1.1–3.2% of unrecognized pneumothoraces and may be life-threatening [5]. TP requires emergency needle decompression and tube thoracostomy due to obvious respiratory distress and signs of cardiovascular instability.

In this report, we describe an unusual case of a young Asian man who presented to our emergency room (ER) with right-sided chest pain; he was diagnosed as having primary SHP associated with spontaneous right TP diagnosed by radiographic imaging and intraoperative findings. We discuss the clinical presentation, risk factors, and therapeutic options.

Case presentation

A 23-year-old Asian man was referred to the ER of Xiamen Chang Gung Memorial Hospital with a 1-day history of right-sided chest pain that had been aggravated for 1 hour. He had no known medical illnesses and was well until the evening prior to presentation, at which time he developed obvious right-sided chest pain radiating to his ipsilateral shoulder with persistent chest tightness. This tightness was described as sticking in nature, significantly worse on deep inspiration and with movement, and relieved by leaning forward or lying down. There was an associated dry cough but no hemoptysis. There was no history of trauma, injury, difficulty in breathing, or palpitations. He was tall and thin and described himself as otherwise quite healthy. He had never previously been admitted to a hospital. He reported no significant chronic medical history, such as primary hypertension, any type of heart disease, disturbed microcirculation, peripheral neuropathy, diabetes mellitus, an impaired immune system, malignancies, leukemia, the long-term administration of corticosteroids, liver cirrhosis, renal failure, urinary tract infection, or hemodialysis. He also reported no history of infection, such as tuberculosis, any type of hepatitis, or acquired immunodeficiency syndrome (AIDS). There was no prior history of traumas, blood transfusions, surgical procedures, or other serious events in his medical history. He had not lived in an epidemic area and had no history of toxin or radioactive exposure. He denied a personal or family history of bleeding diathesis but reported a 10-year history of smoking 8–10 cigarettes per day. He was an office worker by occupation. He had experienced similar symptoms on one occasion 4 years previously. No abnormalities were detected at that time, and his symptoms resolved.

A physical examination (PE) revealed a young man who was awake and alert but in mild to moderate painful distress. His respiratory rate was 22–26 breaths/minute with an oxygen saturation of 97%. His pulse was 96 beats/minute, his blood pressure was 115/74 mmHg, and his temperature was 36.7 °C. The examining physician noted slight tenderness along the right posterolateral chest wall along the eighth and tenth ribs. Breath sounds and percussion were documented as normal. An electrocardiogram revealed sinus rhythm with a normal axis. PSP was considered, and a standing chest X-ray (CXR) was requested. The radiographic findings revealed a right-sided PSP (approximately 30%) with a small amount of pleural effusion (Fig. 1). A right thoracostomy tube (28-F, straight) was immediately placed under sterile conditions; approximately 50 mL of light red pleural effusion flowed out from the chest tube after placement, and good fluctuation of the water column in the drainage reservoir was observed. Another CXR was performed to evaluate the position of the thoracostomy tube and re-expansion of his right lung (Fig. 2). Our patient's vital signs stabilized, and his right-sided chest pain was apparently alleviated after chest tube placement; therefore, he was referred to the respiratory service with parenteral analgesia.

While in the respiratory department, approximately 420 mL of blood was drained from the thoracostomy tube over 15 minutes. He developed obvious hemodynamic instability with hypovolemic shock (his blood pressure dropped from 110/70 to 75/50 mmHg),