Persistent Primary Spontaneous Pneumothorax in a Young Smoker in Qatar

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Received: November 2025. Accepted: December 2025; Published: January/February 2026.
Citation: Sahar A. Al-Kurbi. Persistent Primary Spontaneous Pneumothorax in a Young Smoker in Qatar. World Family Medicine. January/February 2026; 24(1): 47 - 53 DOI: 10.5742/MEWFM.2026.2401025

Abstract

A 19 year old male patient presented with sharp right-sided chest pain. He was diagnosed with a large right pneumothorax after a chest XR. Early diagnosis led to the prompt transfer of the patient to secondary care, where he received appropriate management. This case illustrates the importance of a detailed history and physical examination, as well as early diagnosis of a serious medical emergency, since a young patient can initially compensate well despite the severe pneumothorax on imaging.

Keywords:
Pneumothorax, primary spontaneous pneumothorax, bulbectomy, chest tube, VATS

Case presentation

A 19 years old male patient came to the clinic with a sharp, stabbing, right-sided chest pain that started 10 minutes prior to presentation while he was driving. The pain is worse with inspiration. He also had a mild cough that started 2 weeks ago with common cold symptoms. He denied any history of trauma, fever, productive cough, shortness of breath, or radiation of the pain. He is a chronic smoker with a 4-pack-year history. No recent travel history. He expected that this was a musculoskeletal pain, as he took a cold shower in the morning. No past medical or surgical history. No known allergies.

On examination, his vital signs were within normal. Temperature: 37 C, blood pressure: 121/81 mmHg, heart rate: 85, respiratory rate: 20, oxygen saturation: 99%. He was a thin male with BMI of 21. Sitting comfortably on the bed, he was comfortable, speaking full sentences, and wasn't tachypneic. Chest examination was normal without hyper-resonance on percussion; there was bilateral air heard over the lungs, no wheezing or rhonchi. No chest wall tenderness to palpation.

A chest XR was ordered to rule out spontaneous pneumothorax, since the patient was young, thin, and a smoker. Chest XR showed a right-sided large pneumothorax with left-sided shifting of mediastinum elements (Figure 1). EMS were called, and the patient was transferred urgently to Hamad Medical Corporation Emergency Department via ambulance. Upon arrival to the ED, the patient developed shortness of breath and tachypnea (his respiratory rate was 28); his other vital signs remained stable. Chest XR was repeated (Figure 2), which showed worsening of the pneumothorax and a complete right-sided lung collapse. A chest tube was inserted, which resulted in full lung expansion (Figure 3) and improvement in the patient's chest pain and dyspnea.

He was admitted for observation. On the third day, however, a repeated chest x-ray showed a redemonstration of right-sided pneumothorax. Thus, the thoracic surgery team were consulted, and a high-resolution CT scan was ordered (Figure 4). The CT scan showed right apical lung bullae around 20 mm, moderate right pneumothorax, and partial collapse of the right lung. Then the patient underwent VATS bullectomy and pleurectomy. Post-operatively, a chest x-ray showed lung re-expansion. The patient was discharged home with follow-up in the thoracic surgery clinic.

Figure 1 First chest x-ray showing Large right pneumothorax with left sided shifting of mediastinum elements

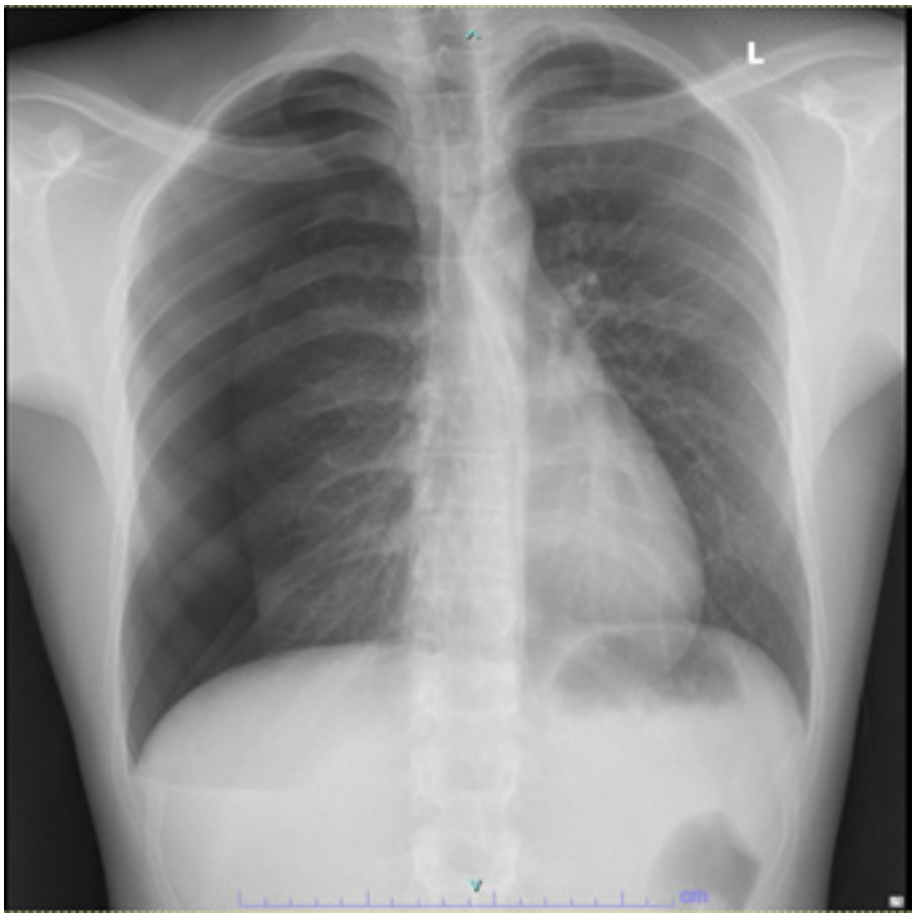

Figure 2 showing right sided pneumothorax with right lung collapse

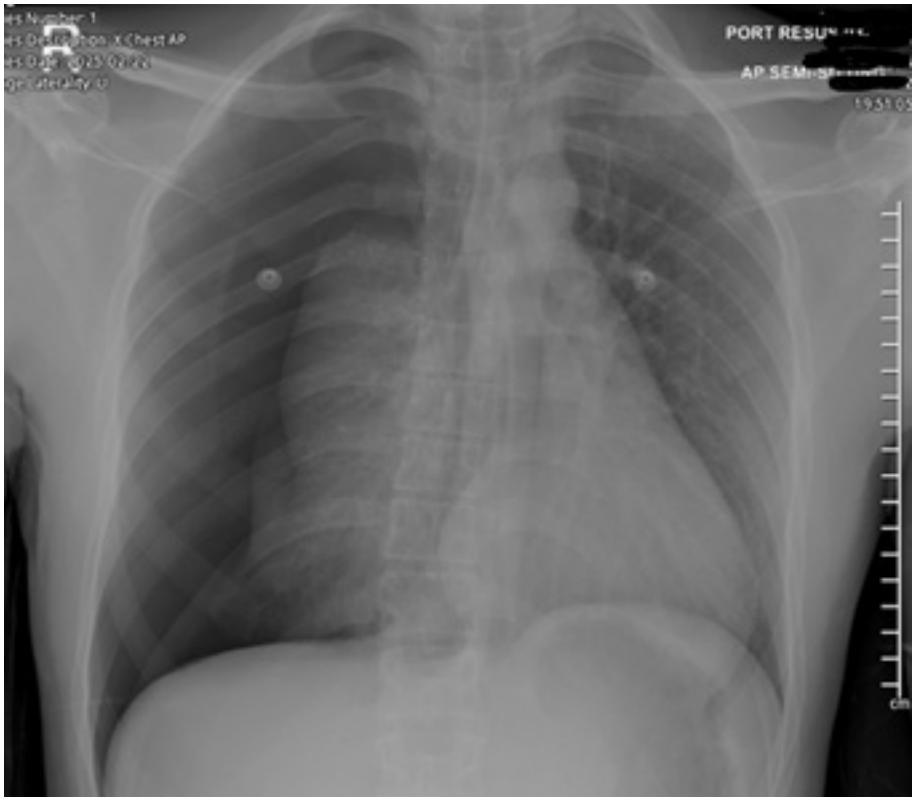

Figure 3 showing lung re-expansion after chest tube insertion

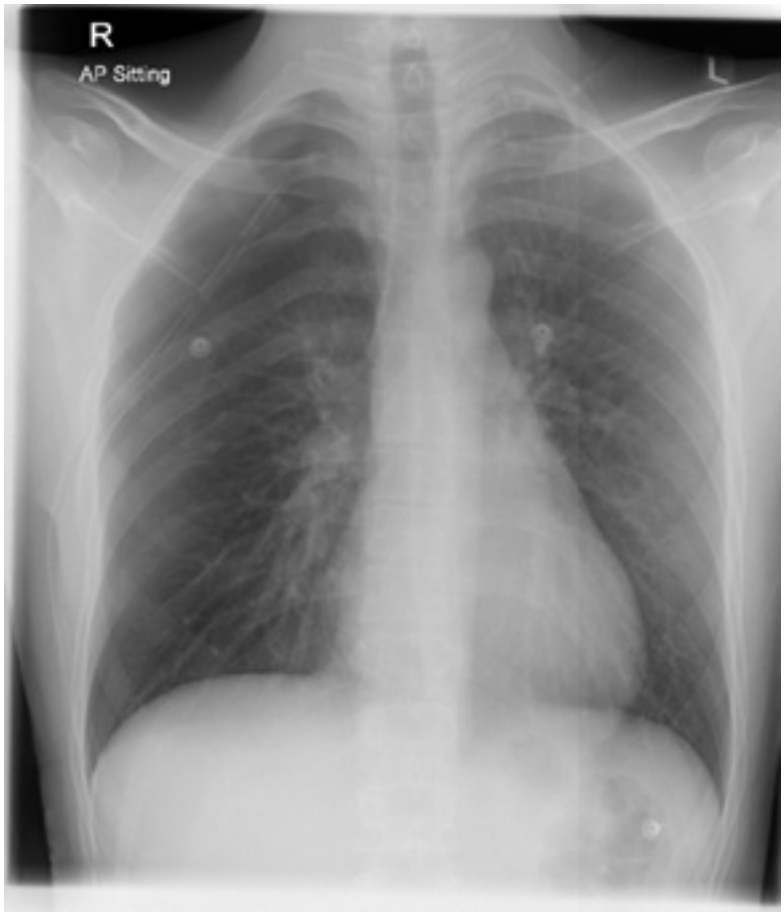

Figure 4: Coronal CT scan showing right apical lung bullae and right pneumothorax with partial collapse of the right lung

Discussion

Spontaneous pneumothorax is defined as air or gas that accumulates in the pleural space without an external precipitating factor [1,2]. Primary spontaneous pneumothorax happens in patients without underlying lung disease [1]. It happens at 20-30 years of age [2]. It is more common in men compared to women, with a ratio of 3:1 [1, 3]. The most important risk factor for developing PSP is smoking [1]. In a study conducted in Sweden, smoking increases the relative risk of the first attack of pneumothorax by a factor of 22 in men and 9 in women. Other risk factors include tall, thin body habitus, pregnancy, Marfan syndrome, and familial pneumothorax [2].

PSP presents as an acute episode of pleuritic chest pain. The differential diagnosis of pleuritic chest pain ranges from life-threatening diseases that need prompt diagnosis and treatment in secondary care to simple illnesses that can be managed with conservative management in primary care. In a primary care setting, the most important task of the physician is to rule out alarming symptoms. In this case, the patient's young age, gender, and smoking history were all risk factors for pneumothorax [4]. On examination, hyper-resonance and diminished breath sounds are noted on the affected side. Diagnosis is clinical but is confirmed by an upright posteroanterior (PA) chest radiograph [1]. The difficulty does not lie in the diagnosis but in having a low threshold for clinical suspicion in a stable patient without an obvious precipitating factor. A patient's condition can shift from stable vitals to respiratory failure very quickly [4].

The recurrence in PSP ranges from 25% to 54%, with underlying chronic lung disease as a significant factor for recurrence [3]. In a Spanish study, PSP recurrence rarely happens 3 years following the first episode. Moreover, smoking cessation decreases the risk of PSP recurrence by a factor of 4 [5]. Thereby, smoking cessation is crucial to prevent recurrence [4]. In addition, it was found to be higher in patients with lung blebs or bullae who were managed conservatively and those who have low haemoglobin and low leukocytes [6].

In a retrospective study done in Qatar, risk factors for developing PSP in the 223 participants were male gender (90.7% of study participants), thin build (mean BMI of 21.7), and smoking history (51.2% of participants). The recurrence rate in the study was 2.66%. It has been mentioned that men dominate the population in Qatar with 74.9% compared to women due to a high number of male expatriates, thereby explaining the high gender difference in the study [7].

Treatment of PSP depends on the clinical presentation. It can range from conservative management to surgical intervention. In patients with small asymptomatic primary spontaneous pneumothorax, observation with follow-up in the outpatient setting in 2-4 weeks is appropriate. If patients become symptomatic, they need decompression with either a needle or a chest tube. When patients are unstable, large-needle decompression with a 14—16 gauge needle is used. After the patient becomes stable, a thoracostomy tube is inserted [2]. Some patients need surgical interventions such as VATS or thoracotomy. Indications for surgical interventions are continuous air leak, bilateral pneumothoraces, high-risk profession patients (divers and pilots), recurrent ipsilateral pneumothorax, and patients who have AIDS [2]. Some studies have found that VATs are superior to thoracotomy in terms of a lower rate of recurrence, lower length of hospitalization, faster functional recovery, and cosmetic results [3].

Conclusions

Pneumothorax, especially when it becomes a tension pneumothorax, is a life-threatening disease. This case illustrates the importance of a detailed history and physical examination, as well as early diagnosis of a serious medical emergency, since a young patient can initially compensate well despite the severe pneumothroax on imaging.

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