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Just Pediatrics

Long and Lean: Profile of an Adolescent Male With Spontaneous Pneumothorax

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Walter, not his real name, is a tall, lean, 18-year-old male who presents to the emergency department with chief complaints of worsening left-sided chest pain radiating to his back and left shoulder, dyspnea, and a dry cough. On physical examination, he is afebrile; his heart rate is 60 beats per minute with regular rhythm and without murmurs, rubs, or gallops; his respiratory rate is 20 breaths per minute; his blood pressure is 130/68; and his oxygen saturation is 98% on room air. His height is 77.8 inches (>95th percentile) and his weight is 171 pounds (>75th percentile) with a body mass index of 19.9. His wing span is 197.5 cm. There are no breath sounds heard in the left lung apex but the remainder of the lungs are clear to auscultation. An AP and lateral chest X-ray is obtained (Figure 1). He is diagnosed with a left-sided spontaneous pneumothorax and placed on 100% high-flow oxygen via facemask to attempt to resorb the pneumothorax. There was no improvement in the first hour so a chest tube is inserted and placed to wall suction at 20 cm H_2O. There is a significant decrease in the size of the pneumothorax on chest X-ray taken 1 hour after the chest tube was inserted and Walter's dyspnea also improved.

The incidence of spontaneous pneumothorax is approximately 3 per 100,000, occurring predominately in thin males with lower BMI (Chang et al., 2015). There is no history of underlying lung disease. It is most commonly detected with a chest X-ray (anterior-posterior view), which demonstrates a flattened diaphragm and hyperlucency and may have the potential for a mediastinal shift in cases of tension pneumothorax (Murthy et al., 2015). Ultrasound has also been shown to assist the practitioner in ruling out spontaneous pneumothorax. Rapid increase in chest height (distance between the lung apex and costophrenic angle) in relation to static lung growth occurs in adolescent males with spontaneous pneumothorax and this may increase the likelihood of occurrence in this population (Chang et al., 2015). Bullae may develop in the lung parenchyma near the apex as the lung attempts to “stretch” within this space. When these bullae rupture, a spontaneous pneumothorax occurs (Chiu et al., 2014).

The initial size of the pneumothorax will determine the treatment, but there may also be a high risk of recurrence. Chiu et al. (2014) found that patients with a small pneumothorax that responded to high-flow oxygen were less likely to have recurrence and surgical treatment reduces the rate of recurrence of a pneumothorax on the same side; however, there is still a risk of occurrence of a pneumothorax on the other side. Treatments include needle aspiration, chest tube placement, or video-assisted thoracoscopic surgery (VATS). Williams et al. (2018) noted that those patients who underwent a VATS procedure for initial episodes versus nonoperative management with chest tube placement alone had a decreased total length of stay, lower cost, and lower rate of hospital readmission.

Walter's profile is typical of the adolescent male who presents with a spontaneous pneumothorax. He is tall and thin and also has a family history of 2 uncles and 2 male cousins who also had pneumothoraces in their late teens and early 20s. Of note, Walter also plays a variety of brass musical instruments, which can cause

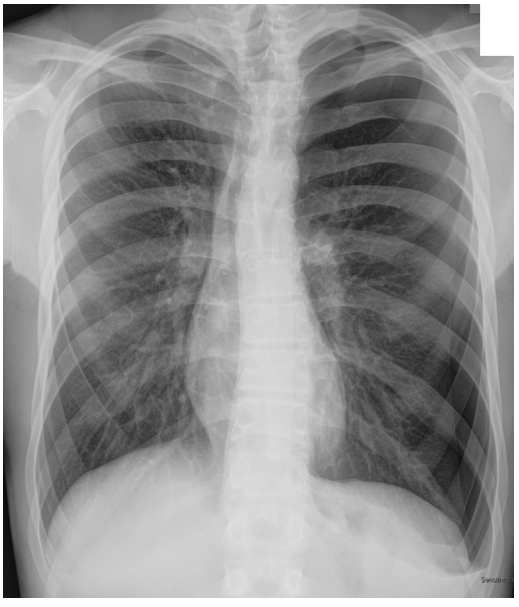

Figure 1. Moderate-sized left pneumothorax. Right lung is clear. There is a slight shift of the mediastinal structures to the right. The osseous structures are normal, but there is a mild dextroscoliosis of the thoracic spine.

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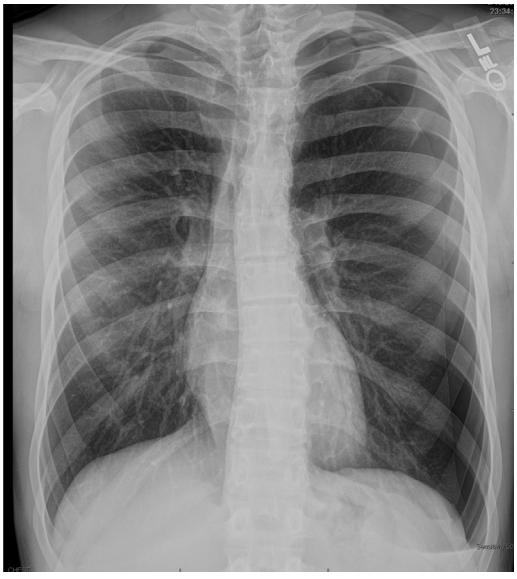

Figure 2. Moderate-sized left apical and lateral pneumothorax. There is blunting of the costophrenic angle due to a small amount of pleural fluid (hydropneumothorax). The right lung is clear.

an increase in intrathoracic pressure. He recalls the start of the chest pain after a fall, landing on his back. He gradually noticed worsening of the pain and cough, which prompted a visit to his health care provider who ordered the initial chest X-ray. After a 6-day hospital stay (with a chest tube for 4 days), he was released. He was restricted from playing any brass instruments for 2 weeks. At jazz band practice exactly 2 weeks later, he once again experienced chest pain, marking the start of another left-sided pneumothorax. This subsequent pneumothorax was noted to be very small on chest X-ray and did not require a chest tube and the pain diminished over the course of the next several days. He experienced several more episodes over the next 4 months with triggers such as sneezing or turning sharply to one side resulting in chest pain (Figure 2). He required another chest tube and then pleurodesis to obliterate the pleural space and promote the adhesion of the parietal and visceral layers of the lung pleura. There were no further pneumothoraces involving the left lung. Unfortunately, 2 years later, he experienced similar episodes with his right lung and eventually had further pleurodesis treatment.

So when you encounter a tall, thin adolescent male with sudden onset of chest pain in your radiology department, consider spontaneous pneumothorax in the differential. Look at the patient and listen to the history and think of Walter.

Conflict of interest

None.

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