CLINICAL VIGNETTE

Chest Pain in an Adolescent

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Case

A 17-year-old male with prior Raynaud's phenomenon, not on medications, presented to his primary care office accompanied by his mother for intermittent chest pain over the past month. His chest pain would occur 1-2 times a week, lasting around 5 minutes, and was described as a sharp pain. Exercise and certain movements, such as jumping, lying on his back, and deep breaths would trigger his chest pain, but the patient was unable to trigger the pain. There was no associated diaphoresis or pain radiation, fatigue, loss of consciousness, syncope, or light-headedness. The pain had worsened over the past few days, became unremitting, and was associated with a nonproductive cough. He denied any recent viral illnesses, other cold-like symptoms, trauma, recent travel, contact sports, smoking, or drug use. Ibuprofen provided only mild relief. Chest pain was not present in the office.

On physical exam, his vital signs were stable - blood pressure 113/77, afebrile, HR 95, pulse ox 96%, weight 118lbs, height 5'6". EKG showed NSR. He was well appearing, sitting comfortably, in no distress. Physical exam was remarkable for decreased breath sounds over his right lower lobe. A chest x-ray showed a large right pneumothorax with collapse of the right lung and mild leftward mediastinal shift (Figure 1). He was sent to the emergency room.

A chest tube was placed and removed two days later. Follow-up chest x-ray showed recurrence of the pneumothorax. Because of the recurrence, he was taken to the operating room and underwent VATS (video-assisted thoracoscopic surgery) with right thoracoscopic pleurodesis using doxycycline and right upper lobe wedge resection of 3 apical blebs. His chest tube was removed 3 days later, and he was discharged home in stable condition with unknown etiology of the spontaneous pneumothorax.

Discussion

A pneumothorax occurs when air becomes trapped between the visceral and parietal pleural space. A pneumothorax is classified as either spontaneous or traumatic. Spontaneous pneumothorax occurs without any trauma or intervention, while a traumatic pneumothorax occurs in response to an inciting injury. A spontaneous pneumothorax is further differentiated into either primary or secondary. Patients with primary spontaneous pneumothorax (PSP) do not have underlying lung disease while patients with a secondary spontaneous pneumothorax have predisposing lung disease.

Common causes of a secondary spontaneous pneumothorax include COPD/asthma, pneumonia, foreign body aspiration, Cystic Fibrosis and connective tissue disease.[1] Spontaneous pneumothorax is uncommon in children and occurs more often in males. The occurrence rate in males is 7.4 to 18 cases per 100,000 per year, with females having 1.2 to 6 cases per 100,000 per year.[2] Other risk factors for primary spontaneous pneumothorax include a tall and thin body habitus and a history of irritant inhalation use such as tobacco. Children with asthma have higher rates of pneumothorax.[3] Symptoms occur mostly at rest and are frequently described as sudden unilateral chest pain, lasting up to 24 hours. Physical exam may be unremarkable, or include tachycardia, tachypnea, and decreased breath sounds over the affected lung. Diagnoses are made clinically with an upright posteroanterior chest x-ray. Radiographs will show the visceral pleural line with an area that does not contain any lung markings.

Once the diagnosis of PSP is made, the stability of the patient is assessed and the pneumothorax size established. Since PSP is uncommon in the pediatric population, the current treatment recommendations are guided by adult data.[3] In the ACCP guidelines, a small adult pneumothorax has less than 3cm distance between the apex-to-cupola, while a large pneumothorax has greater than 3cm distance.[4] Although size has not been standardized in the pediatric population, most follow ACCP adult guidelines or categorize based on of the percentage of lung space.

The goal of treatment is to re-expand the lung and prevent recurrence. Patients are given supplemental oxygen to help re-absorb the pleural gas space. Other treatment options include close observation, needle aspiration, chest tube placement, VATS procedure, thoracotomy, chemical pleurodesis, or a combination. VATS procedure and chemical pleurodesis, which is the use of tetracyclines or talc to disrupt the pleural space, can help to prevent recurrence.[5]

Although PSP is uncommon in the pediatric population, does occur, and management is based on size of the pneumothorax and patient clinical stability. History and physical exam is crucial for the prompt diagnosis and management. Recurrence is common (35% in males), but fortunately deaths are rare.[6]

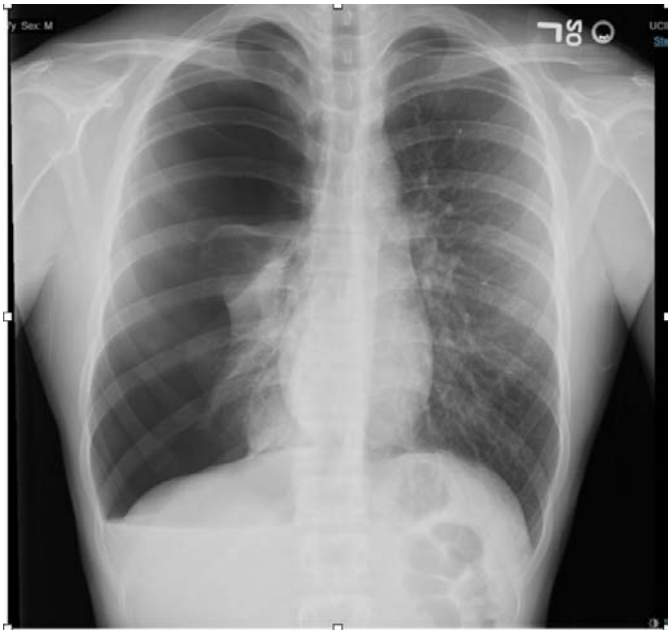

Figure 1. Large right pneumothorax with collapse of the right lung and mild leftward mediastinal shift.

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