Answer

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The correct diagnosis is B, and Figure 1 (shown on page 290) demonstrates a primary spontaneous pneumothorax with 100% collapse of the right lung with no mediastinal shift. Of interest, this patient had atypical sound transmission and increased breath sounds on the involved side. The patient had a chest tube inserted with a Heimlich valve attached. Within 1 week the tube was removed. A follow-up chest x-ray at 2 weeks showed no recurrence.

Discussion

Pneumothorax occurs when air leaks into the pleural space from the lung through a defect in the visceral pleura, or from the external environment through a defect in the skin and parietal pleura. Primary spontaneous pneumothorax occurs when a previously well person ruptures a subpleural bleb.[1,2] Secondary pneumothorax occurs in people with underlying pulmonary disease including pneumonia, asthma, cancer or a variety of other conditions. Primary pneumothoraces account for 80% of spontaneous pneumothoraces, and up to 80% of these occur in smokers.[3,4]

The patient described in this case had a primary spontaneous pneumothorax. The most common symptoms are chest pain and shortness of breath,[1,2] although patients occasionally present with cough or hemoptysis. The chest pain is typically pleuritic, anterior and sudden in onset. The most common signs of pneumothorax are tachypnea, tachycardia, hyperressonance to percussion, decreased tactile fremitus and diminished breath sounds on the involved side.[5] If pneumothoraces become very large or develop tension, patients may appear distressed or clinically ill, with cyanosis, hypotension, respiratory distress, tracheal deviation and significant hypoxia.

Normal breath sounds, described as vesicular, have a blowing quality and are heard on inspiration and during the first third of expiration. They are produced in the large airways and become dampened as the sound is transmitted through air-filled pulmonary tissue. Bronchial breath sounds, most often associated with lung consolidation, are heard in inspiration and throughout expiration, with a small pause between.[5] Their quality is more coarse, and can be simulated by placing a stethoscope over the sternum and listening to tracheal airflow. Bronchial sounds are audible in the periphery only when the lung tissue is more "solid" because solids conduct sound better than air or liquid. Bronchial sounds are, therefore, unattenuated large airway sounds.

In the setting of unilateral pneumothorax, there is a cushion of air between the chest wall and affected lung, which dampens sound transmission. This most often leads to a decrease in breath sounds. Chest percussion causes internal structures to vibrate. These vibrations are detected palpably and audibly. Percussion of the normal chest produces a sound described as resonant. When larger volumes of air are present, thoracic structures are more able to vibrate and resonate; therefore pneumothorax often causes hyper-resonance on the affected side.[6]

Unfortunately, the physical findings of pneumothorax are often subtle and unreliable. Patients may have unusual findings,[7] normal findings[8] or, as illustrated by this case, paradoxical findings. When spontaneous pneumothorax is a likelihood, clinicians should maintain a high index of suspicion, perform a careful examination and have a low threshold for ordering chest x-rays — even if classic signs are absent.

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For the Challenge, see page 290.

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