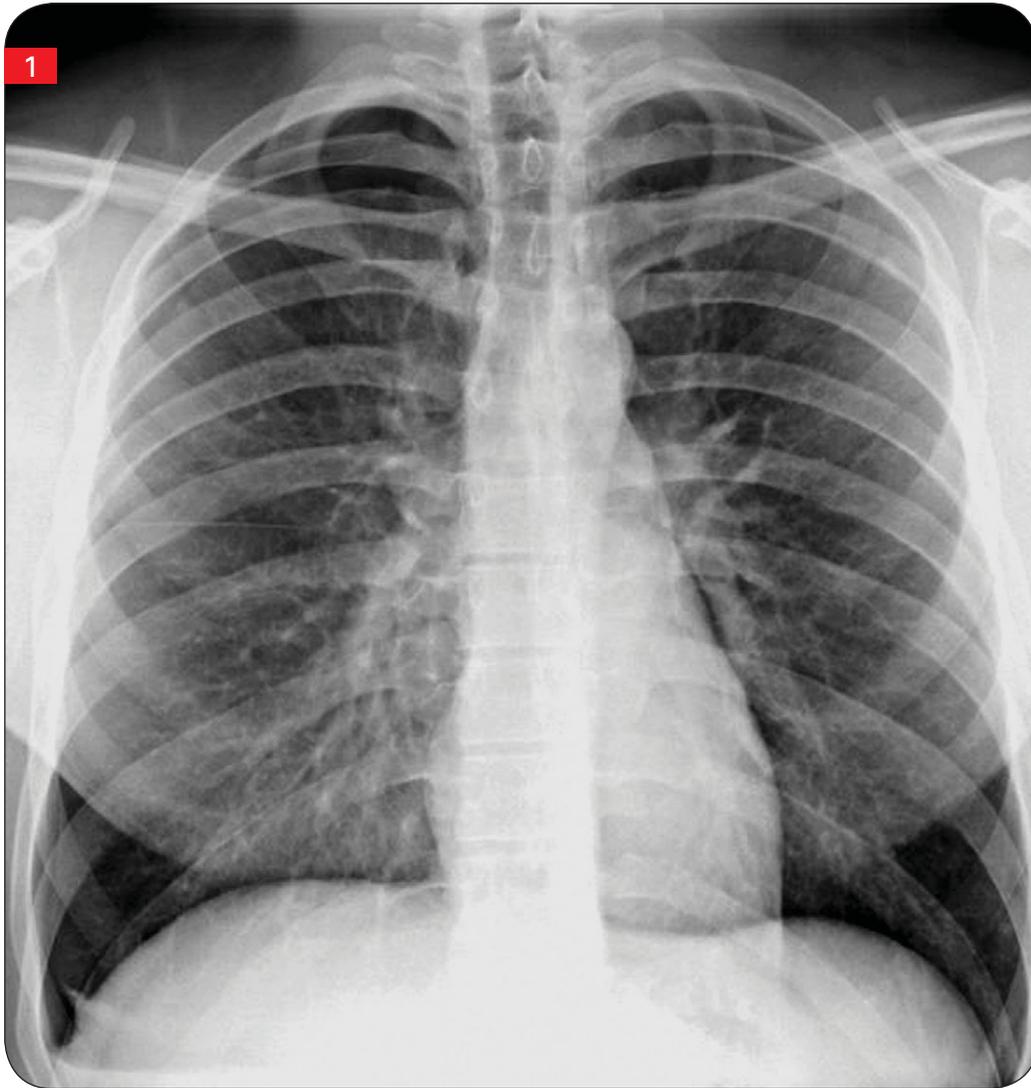


## PROBLEM

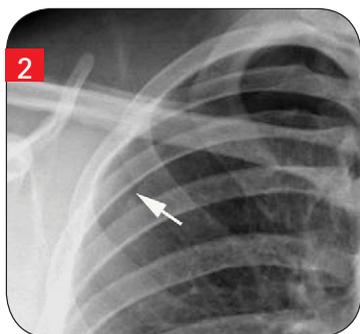


>> A 25-year-old man presents to the ED reporting a sudden onset of pleuritic chest pain. A radiograph is obtained (Figure 1).

**What is your diagnosis?**

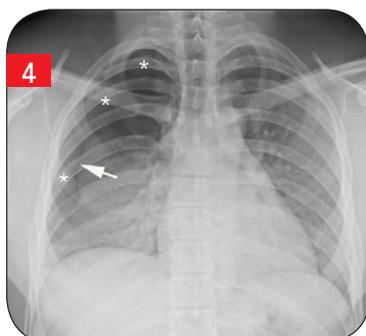
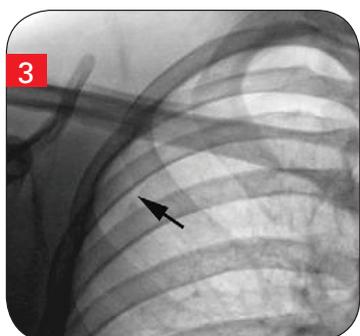
*Turn page for answer >>*

## ANSWER

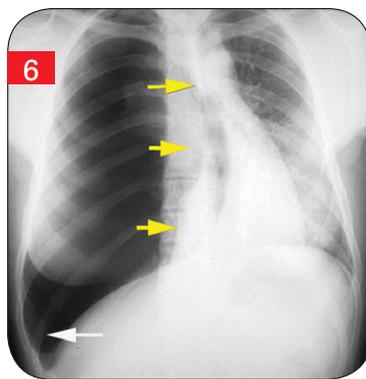


>> The patient has a spontaneous right-sided pneumothorax. In patients presenting with chest pain or a history of trauma, careful examination for evidence of pneumothorax is warranted. In Figure 2, the pleural edge can be visualized displaced from the chest wall (white arrow). Note that no lung markings are seen peripheral to the pleural line.

On routine chest radiographs, which are taken in the end-inspiration phase of respiration, small pneumothoraces may be difficult to visualize. Often, they are especially obscure in supine images, as the air tends to layer in the anterior pleural space. In some cases, inverting the image may make the pleural line easier to detect (black arrow, Figure 3).



When possible to obtain, repeat radiographs in end-expiration will accentuate the pneumothorax as a result of the decreased intrathoracic pressure. Figure 4 is an end-expiration radiograph from the same patient; here, the pleural line (white arrow) and lack of pleural markings (asterisks) are significantly more conspicuous. However, even with optimal technique, small pneumothoraces may be difficult to detect on x-ray imaging. A study by Ball et al found that chest radiography had a sensitivity of only 45% in the detection of pneumothorax in trauma patients.<sup>1</sup>



CT is a highly sensitive technique utilized to evaluate for pneumothorax and is readily available in most EDs. On CT, the pneumothorax can be directly visualized with the pleura displaced from the chest wall or mediastinum (white arrows, Figure 5).

When a large pneumothorax is detected, it is important to look for radiographic signs of tension pneumothorax. These include deepening of the costophrenic sulcus (white arrow, Figure 6) and mediastinal shift to the opposite side (yellow arrows, Figure 6).

Tension pneumothorax is a true emergency requiring immediate percutaneous decompression in order to relieve obstruction of venous return of blood to the heart.

### REFERENCE

1. Ball CG, Kirkpatrick AW, Laupland KB et al. Factors related to failure of radiographic recognition of occult posttraumatic pneumothoraces. *Am J Surg.* 2005;189(5):541-546.

See the June 2009 issue of EMERGENCY MEDICINE (pp 15-16) for a discussion of the use of ultrasound in diagnosing pneumothorax.

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