

# EMERGENCY IMAGING

Keith D. Hentel, MD, and Kevin Mennitt, MD

FIGURE 1

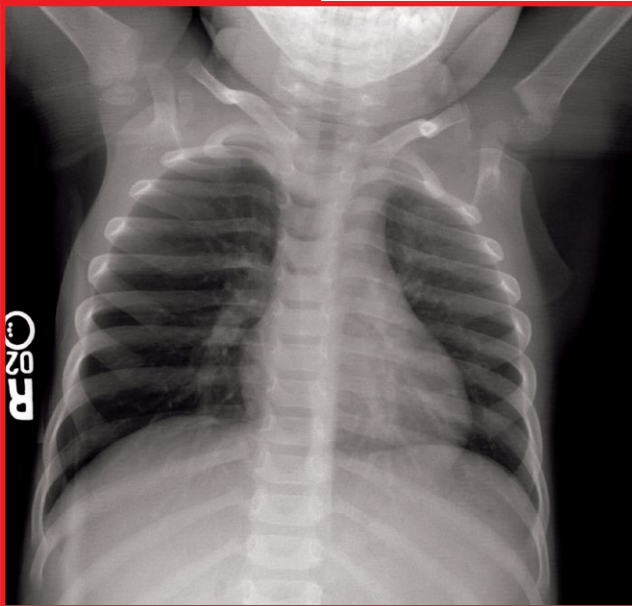


FIGURE 2

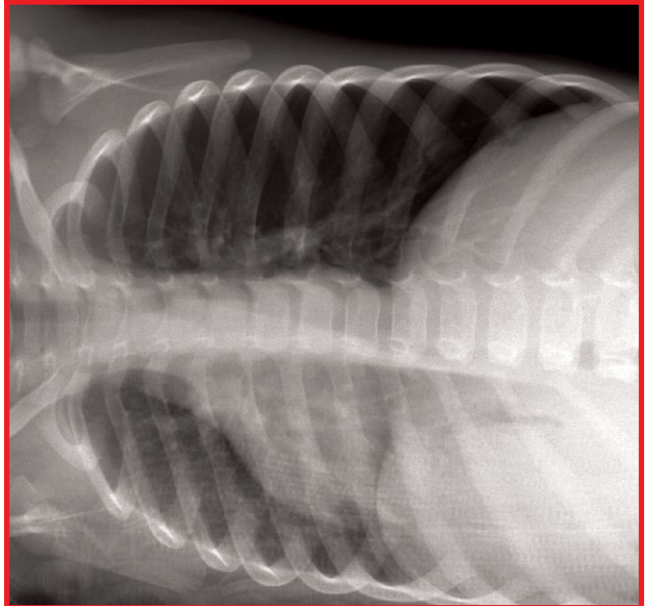
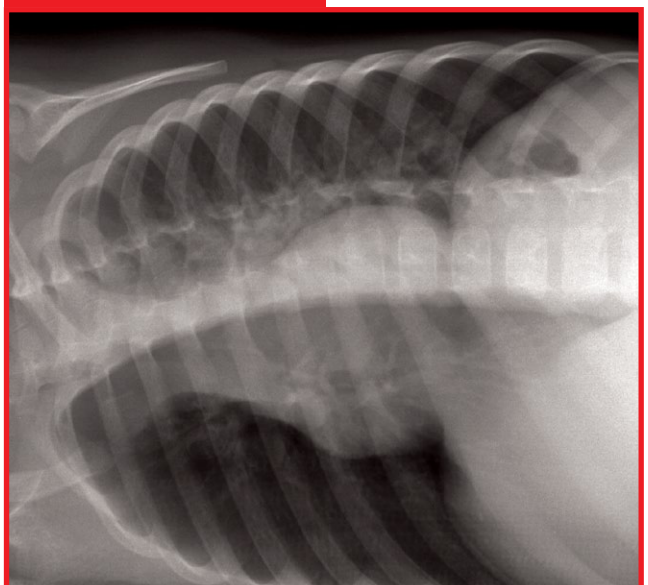


FIGURE 3



A 3-year-old boy presents to your ED with cough and persistent wheezing. The following radiographs are obtained: AP view of the chest (Figure 1), left lateral decubitus view (Figure 2), and right lateral decubitus view (Figure 3).

**What is your diagnosis?**

**Dr. Hentel**, editor of "Emergency Imaging," is an associate professor of clinical radiology at Weill Cornell Medical College in New York City. He is also chief of emergency/musculoskeletal imaging and the vice-chairman for clinical operation for the department of radiology at NewYork-Presbyterian Hospital/Weill Cornell Medical Center in New York City. He is a member of the EMERGENCY MEDICINE editorial board. **Dr. Mennitt** is an assistant professor of radiology at Weill Cornell Medical College and an assistant attending radiologist at NewYork-Presbyterian Hospital/Weill Cornell Medical Center.

CONTINUED

FIGURE 1

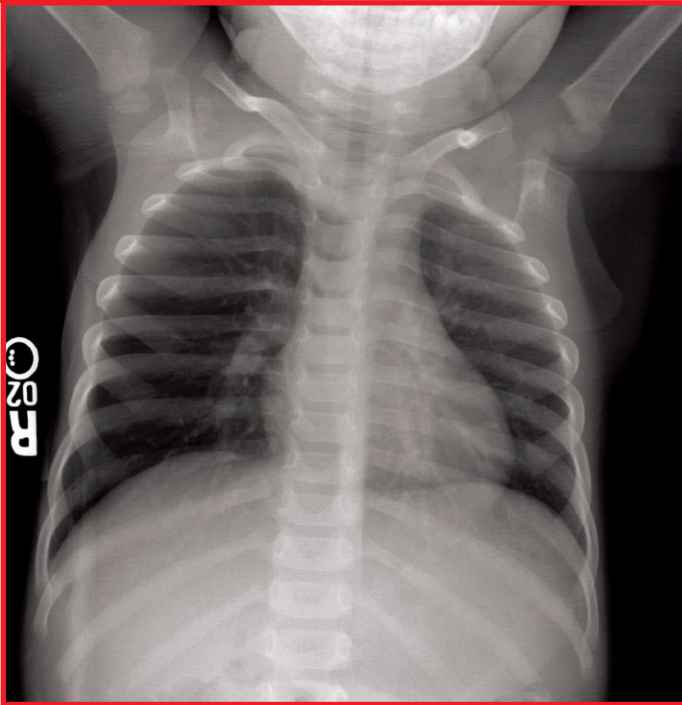
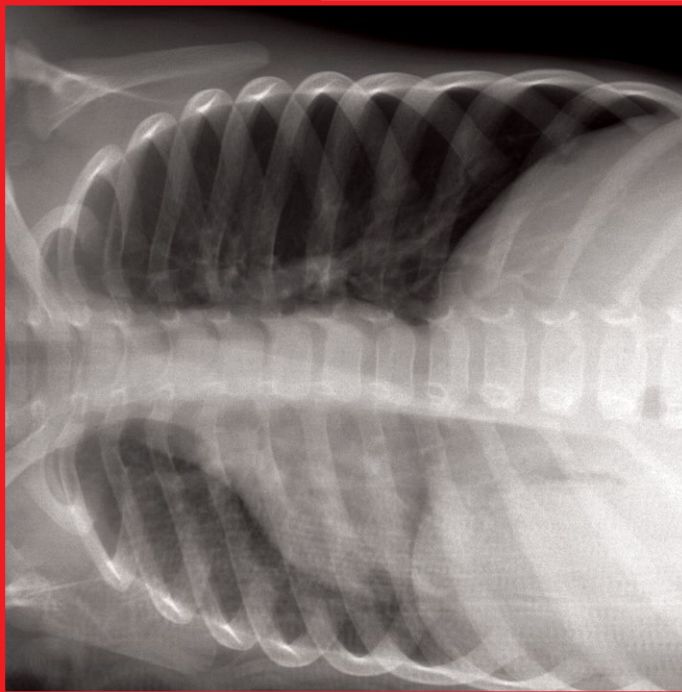


FIGURE 2



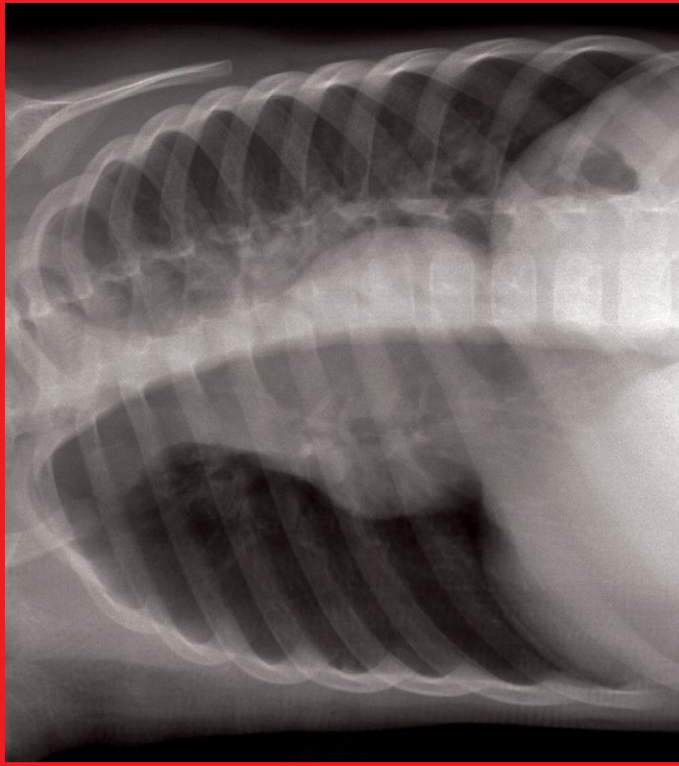
## ANSWER

The AP view of the chest (Figure 1) was initially interpreted as normal. However, as the patient continued to have coughing and wheezing, the possibility of an aspirated foreign body in the tracheobronchial tree was considered. In order to radiographically diagnose a foreign body within the tracheobronchial tree, one should look for evidence of air trapping with an end-expiratory film. In a young child who cannot reliably cooperate with breathing instructions, bilateral decubitus views may be used as an alternative to end-expiratory films. When available, fluoroscopy has also been utilized to provide a dynamic assessment.

A left lateral decubitus view is taken with the patient's left side against the x-ray table. Normally, the lung that is dependent (closer to the table) has decreased volume, because gravity and the weight of the chest force air out. On the left lateral decubitus view obtained in this case (Figure 2), the left lung is indeed smaller and slightly more opaque than the right lung. With a tracheobronchial obstruction, air is trapped in the dependent lung, and the lung remains inflated. On the right lateral decubitus view obtained in this case (Figure 3), the right lung remains greater in volume and more opaque than the left lung, indicating the presence of an obstruction in the right mainstem bronchus. The patient underwent bronchoscopy, and an aspirated peanut was removed.

While the findings in this case are suggestive of an aspirated foreign body, radiographs are not highly sensitive or specific for the detection of radiolucent foreign bodies. Radiographs often demonstrate normal findings, with a sensitivity of 68% reported in one study of 83 cases of bronchoscopy-proven foreign bodies.<sup>1</sup> In addition, findings that are typically not associated with foreign body aspiration, such as bilateral pneumonia, bilateral air trapping, upper lobe atelectasis, and upper lobe air trapping, may be present but should not be used to

FIGURE 3



rule out a foreign body.<sup>2</sup> Morbidity and mortality increase with delays in detecting aspirated foreign bodies; therefore, further evaluation, either with imaging or endoscopy, is recommended when initial imaging studies are negative but clinical suspicion persists.

CT, which should be performed utilizing low-dose technique, has been shown to be highly sensitive for the detection of suspected airway obstruction. The CT images may be reformatted to perform a virtual bronchoscopy, which can be used not only to detect the obstructing object but also to assist in planning for endoscopic removal.<sup>3</sup>

EM

#### REFERENCES

1. Svedström E, Puhakka H, Kero P. How accurate is chest radiography in the diagnosis of tracheobronchial foreign bodies in children? *Pediatr Radiol.* 1989;19(8):520-522.
2. Zerella JT, Dimler M, McGill LC, Pippus KJ. Foreign body aspiration in children: value of radiography and complications of bronchoscopy. *J Pediatr Surg.* 1998;33(11):1651-1654.
3. Adaletli I, Kurugoglu S, Ulsus, S et al. Utilization of low-dose multidetector CT and virtual bronchoscopy in children with suspected foreign body aspiration. *Pediatr Radiol.* 2007;37(1):33-40.