

## Young man with sudden chest pain

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### Case history

A 20-year-old Chinese man presented with a sudden onset of chest pain and shortness of breath. There was no history of trauma. He had no significant past medical history. Physical examination was essentially normal. An erect chest radiograph was obtained.

#### Q1 What are the radiological findings?

Posteroanterior chest radiograph (Fig. 1) showed a normal heart shadow. There was a small right apical pneumothorax. The visceral pleural line was stripped from the parietal layer, and lung markings are absent beyond the pleural line (Fig. 2). These findings were typical of a pneumothorax.

#### Q2 What are the causes of this condition?

Pneumothorax is produced by air in the interpleural space. Spontaneous pneumothorax results from a rupture of a subpleural bleb or bulla, typically affecting young men with a thin tall stature. Traumatic pneumothorax may occur secondary to rib fracture, contusion or laceration. Iatrogenic causes include tracheostomy, central venous catheterization and positive end-expiratory pressure ventilation. Other causes are variable including: neonatal diseases, malignancy, pulmonary infections, honeycomb lung, asthma, pulmonary infarction, Marfan syndrome and tuberous sclerosis.

#### Q3 Why is making this diagnosis important?

Prompt diagnosis is important because significant respiratory or cardiovascular complications can develop rapidly, even in small pneumothoraces. These may be easily missed clinically or even on admission chest radiographs. If untreated, one third of these patients develop tension pneumothorax.<sup>1</sup> Tension pneumotho-

rax is a potentially fatal condition where inspired air is trapped in the pleural space, with subsequent expansion of the pneumothorax, and compression of adjacent lung and mediastinum. It can lead to rapid cardiorespiratory arrest.

#### Q4 What are the pitfalls in radiological diagnosis?

On chest radiographs, one looks for the visceral pleura as a separate thin line with absence of more peripheral lung markings that usually occurs in the non dependent part of the radiograph. Pneumothorax is harder to detect in a supine chest wall. However, increased translucency, depression of the hemidiaphragm, double-diaphragm sign, deepening of the costophrenic sulcus on the affected area, or visualization of the cardiac undersurface all raise the possibility of a pneumothorax.<sup>1,2</sup> A lateral decubitus radiograph may be helpful in such cases. The double-diaphragm (or anterior sulcus) sign is seen on the supine radiograph as a curvilinear density over the right or left upper quadrant of the abdomen. It is produced by a small pneumothorax outlining the anterior costophrenic sulcus.<sup>3</sup> Tension pneumothorax is suggested by unilateral depression of the hemidiaphragm, and is important in the ventilated patient whose airway is splinted by positive pressure ventilation. If doubt exists, computed tomography is useful to detect a subtle pneumothorax.

#### Q5 Could a bronchogenic cyst give this radiological appearance?

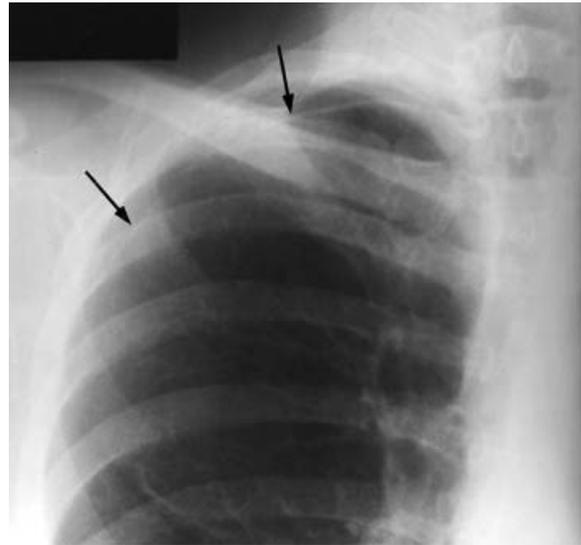
A bronchogenic cyst is a type of congenital cyst. It is thin-walled, and often contains cartilage and mucous glands with a respiratory or enteric mucosal lining.<sup>2</sup> On radiographs, bronchogenic cysts within the mediastinum appear as spherical masses with smooth outlines. They may be lobulated. Computed tomography may show a thin wall, with uniform density similar to water or soft tissue. In the latter case, it may be confused with a tumor. High density content within the cyst is usually due to calcium or a proteinaceous material. The radiographic findings in this patient are not compatible with a diagnosis of bronchogenic cyst because of the location and lesion appearance.

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**Figure 1** Posteroanterior chest radiograph shows a normal cardiac silhouette. The lung fields are unremarkable except for a curvilinear hyperlucent area in the right apex.



**Figure 2** Close up of Fig. 1. The view shows the pneumothorax (arrows) as a thin visceral pleural line with absence of more peripheral lung markings.

## References

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- 3 Ziter FMH, Wescott JL. Supine subpulmonary pneumothorax. *Am. J. Roentgenol.* 1981; **137**: 699–701.