A 15 year-old previously healthy boy came to our emergency department with complaints of persistent retrosternal chest pain with slight dyspnea on and off for one day. The chest pain occurred suddenly while he was studying for an exam and had progressed rapidly within a few hours. The pain was localized within the retrosternal area without radiation. It persisted without any relief factor and could be aggravated by taking a deep breath. The patient denied any recent trauma, strenuous exercise or a history of invasive procedures to the chest. His vital signs were stable without apparent respiratory distress. There was no subcutaneous emphysema or obvious lesion found around his chest and neck. Laboratory data revealed the white blood cell count of 19450/mL (segs 82.1% lymphocytes 11.5% monocytes 5.5%) and the C reactive protein of 0.042 mg/dL. Other biochemistry values were within normal limits. Plain radiographs of the chest revealed a continuous thin radiolucent rim of air following the cardiac silhouette and outlined by a fine line representing the pericardial sac (Fig. 1). The patient

Fig. 1 A continuous thin radiolucent rim of air follows the cardiac silhouette and is outlined by a fine line (arrows) representing the pericardial sac
was admitted to the chest surgical ward with an impression of spontaneous pneumopericardium and pneumomediastinum which was confirmed by chest computed tomography (CT) (Fig. 2). He was closely monitored and given conservative treatment with oxygen and intravenous antibiotics. The patient’s condition improved dramatically within 3 days after admission. He was then discharged with outpatient department follow-up 1 week later.

Pneumopericardium is a rare emergency condition that should not be overlooked. It is defined as a collection of air in the pericardial cavity, and was first described by Bricheteau in 1844 (1). Pneumopericardium is mostly induced by blunt or penetrating chest injury (2), or barotrauma (3). Other reported causes are invasive therapy or procedures (4,5), pericardiac fistula (6), and pericardiac infection (7). The potential complications of pneumopericardium, such as cardiac tamponade, can be life-threatening (2). Mortality resulting from cardiac tamponade can exceed 50% (7).

Symptoms of pneumopericardium include dyspnea, cyanosis, chest pain, palpitations and pain referred to the shoulder or back (1). Physical signs include shifting precordial tympany, and a succussion splash with metallic tinkling called a mill wheel murmur (bruit de Moulin) if fluid is present in the pericardium (8). Other symptoms like faint heart sounds or precordial resonance on percussion may be impractical to elicit in the emergency room environment.

Chest radiography may show a radiolucent band of air partially or completely surrounding the heart. It is referred to as the ‘halo sign’ (9). An upright lateral chest radiograph may show the superior surface of the diaphragm normally obscured by the heart base (continuous left hemidiaphragm sign) (10). Sometimes an electrocardiogram can show elevation of the ST segment and low voltage (2). Diagnosis can be confirmed by a chest CT scan.

Patients with acute hemodynamic deterioration should be further investigated and cardiac tamponade should be ruled out as soon as possible. In tension pneumopericardium, rapid fluid resuscitation and emergency pericardiocentesis are indicated followed by pericardial fenestration.

Fig. 2 Chest computed tomography scan shows pneumopericardium (arrows)
and pericardial drainage\(^{(2)}\). If the hemodynamic condition is stable, the patient can be monitored closely and treated with oxygen, bed rest, sedation, analgesics, and antibiotics\(^{(1)}\), and further prompt treatment of the underlying condition. The air usually can be absorbed spontaneously within 2 weeks\(^{(11)}\).

**References**