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Case Report

A huge traumatic pulmonary pseudocyst

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Abstract

Traumatic pulmonary pseudocyst (TPP) is a rare complication following blunt trauma. We report a 26-year-old male patient who presented to the emergency room with internal bleeding and shock. Huge TPP (14 cm in diameter) was seen on whole-body computed tomography scan and complicated with bronchial bleeding. He deteriorated to respiratory failure soon after arriving at the emergency room. TPPs imply high-energy impact on the chest region and frequently complicated with pulmonary contusions, hemo- and pneumo-thorax, multiple rib fractures, flail chest, and concurrent with abdominal injuries. Emergency physicians should be aware of such rare entity and manage correctly.

Keywords: chest blunt injury; pneumatocele; traumatic pulmonary pseudocyst

1. Introduction

Traumatic pulmonary pseudocyst (TPP) is a rare complication following blunt or penetrating chest trauma. TPPs can occur at any age, but children and young adults are most commonly affected[1–5]. Chest X-ray alone is not reliable to recognize these pseudocysts, especially when the pseudocysts contain bloody material among the destructed lung parenchyma. Computed tomography (CT) scan is more sensitive in such condition[1–4,6,7]. TPPs imply high-energy impact on the chest region and frequently complicated with pulmonary parenchymal contusions, hemo- and pneumo-thorax, multiple rib fractures, flail chest, and possible concurrent abdominal injuries[4].

2. Case report

A 26-year-old male motorcyclist suffered from shortness of breath, severe right chest and back pain after his motorcycle collided with a car, and was transported to the emergency room. He was restless but clear. He has no history of significant illness. The blood pressure was 144/67 mmHg, pulse rate was 106 per minutes, and oxygen saturation measured by pulse oximetry was 96%. On physical examination, there was tenderness on the right side of the chest and back without apparent open wounds. Breath sounds were diminished on the right side without paradoxical chest wall movement. His white blood cell count was 27.89 × 103/μL. Chest X-ray revealed haziness over the whole of right lung with multiple rib fractures (Fig. 1). Moderate free fluid accumulation was recognized by bedside ultrasound sonography in Morrison's pouch and around the right kidney. CT scan showed a huge horseshoe-shaped pulmonary cavitary lesion as well as extensive consolidation in the right lung with minimal hemo-pneumothorax, fractures at the posterior part of right second to ninth ribs, liver laceration (Grade II), right renal laceration (Grade V), and retroperitoneal hematoma (Fig. 2).

The patient developed hypoxemia and shock within 1 hour after arrival. He was intubated and bloody secretion was drained from the endotracheal tube continuously. The patient received emergent exploratory laparotomy, right nephrectomy, right lower lobe lobectomy and intrapleural pneumolysis under the extracorporeal membrane oxygenation (ECMO) support. Mediastinotomy with exploration via transthoracic approach was performed on the second day. He was extubated and discharged under stable condition 2 months later.

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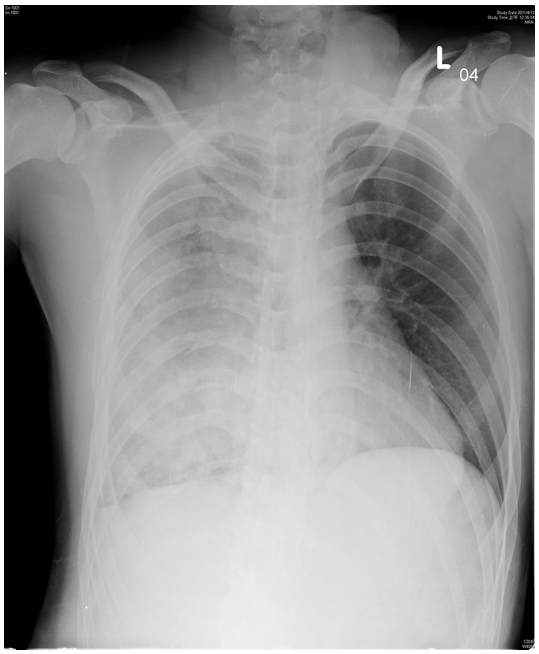

Fig. 1. Supine chest X-ray showed right side consolidation.

3. Discussion

Traumatic pulmonary pseudocyst (TPP) is a rare disease following blunt chest trauma. The incidence is reported less than 3%[1]. These cystic lesions, which contain air and blood, have no lining epithelium as compared with true cysts. Thus, TPPs were defined as "pseudocysts".

TPPs are more prevalent in young population below the age of 30 years because their chest walls are more elastic and susceptible to greater transmission of kinetic energy through impact. Following the blunt impact, sudden compression and decompression may cause tearing and laceration of the lung parenchyma. The blood and free air then escape and accumulate into it until the pressure in the cavity achieves a balance inside the affected lung.

Clinical manifestations of TPP are cough, hemoptysis, dyspnea, leukocytosis, and chest pain. However, the symptoms vary and to some extent are also attributed to the coexisting injury such as pulmonary contusions. These cavitary lesions are not always apparent on chest radiograph and can be easily masked by the coexisting opacities of lung contusion. The estimated diagnostic accuracy of chest radiograph alone for TPPs is 24–50%[2–3]. The diagnosis of choice is computed tomography (CT) in which a cavitary lesion with air-fluid level can be seen easily within the lung parenchyma[4–6]. The lesions can be single or multiple, spherical, oval, or irregular horseshoe-like shape in our case.

Lower lung lobes are the most common sites of TPPs. Those of less than 4 cm in diameter are usually unilateral, whereas those of more than 4 cm are usually seen in patients with multiple injuries[1,3]. Such characteristic was also found in our case: CT scan showed hemo-pneumothorax, multiple rib fractures, scapula fracture, as well as liver and kidney laceration with internal bleeding.

The clinical course of TPPs is usually self-limiting and resolves spontaneously within 1 to 4 months[4,5]. However, complications such as bronchial bleeding and secondary infection may occur. Surgical resection or percutaneous

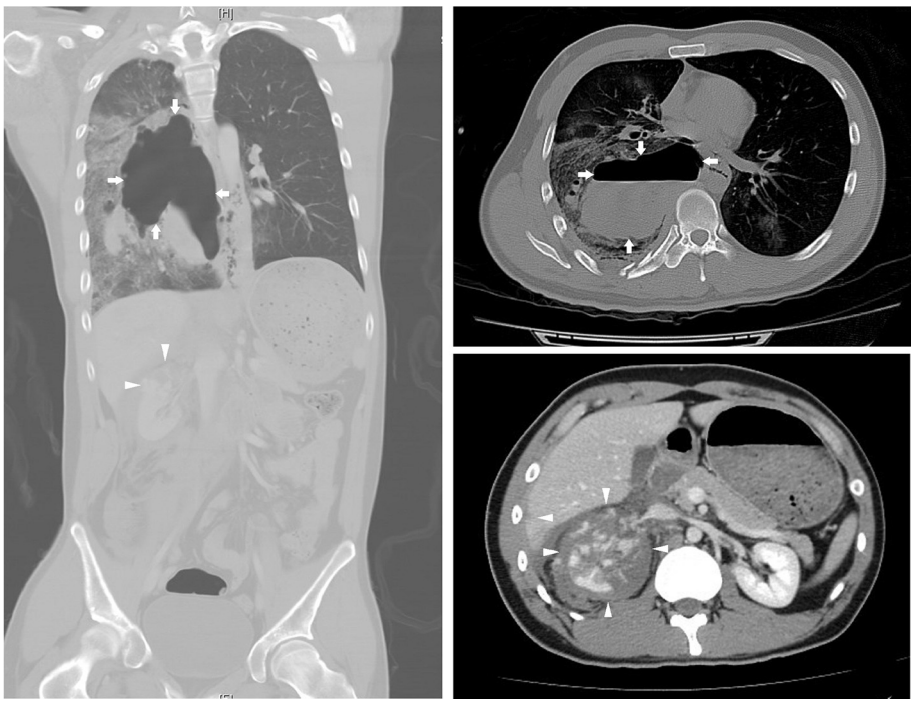

Fig. 2. CT scan revealed huge horseshoe-shaped traumatic pulmonary pseudocyst, measuring 84.38×138.70×70.24 mm (arrows), liver laceration (Grade II), and kidney laceration (Grade V) (arrowheads).

drainage is usually reserved for complicated cases, such as tension TPPs, severe bleeding, and infected TPPs[1,2,4,5]. Our patient underwent emergency surgery because the continuous bronchial bleeding and the huge size of TPP exceeded the possibility of a simple wedge resection. Antibiotics should be used once there are symptoms and signs of infection. Percutaneous drainage is needed if there is abscess formation. Some advocates suggest early lobectomy if the infected pseudocysts exceed 6 cm, progress to extensive lung abscess, or not respond to conservative treatment[1]. Use of antibiotic prophylaxis is controversial[1–3].

At the emergency room (ER), the approach for all trauma patients should start with primary survey and immediate resuscitation. In our patient, traumatic pulmonary pseudocyst is diagnosed incidentally when CT was performed to survey more life-threatening lesions such as massive hemothorax, pulmonary contusion or internal bleeding. The pseudocyst was very large (84.38×138.70×70.24 mm), and was developed before ventilator support which was thought to play a part in the development of TPPs[1].

It is important for the emergency physicians to understand that TPP itself poses no contraindication for mechanical ventilation or chest tube insertion. However, conventional mechanical ventilation may induce secondary pneumothorax as a result of TPP rupture under high airway pressure[1]. Thus, we used lower tidal volume with higher positive end expiratory pressure (PEEP) to ventilate our patient, just as managing patients with adult respiratory distress syndrome (ARDS). However, the appropriate setting of ventilation support for TPPs needs further investigation.

4. Conclusion

Although TPP is a rare disease following blunt chest trauma, the physicians in the emergency department should be aware of this rare clinical entity. TPPs exceed 4 cm in diameter should raise the suspicion of multiple injuries and significant pulmonary contusion. Moreover, mechanical ventilation or chest tube insertion should not be delayed whenever indicated.

Conflicts of interest

We declare that we have no conflicts of interest.

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