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Case Report

Successful management of traumatic giant pulmonary hematoma in poly-trauma patient

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ABSTRACT

Traumatic pulmonary giant hematoma, resulting from blunt trauma, is a relatively rare event. Here, we report the rare case of a patient with a giant traumatic pulmonary hematoma that was associated with blunt trauma. A 50-year-old man was admitted to our medical center after a fall from a height of 5 m. He was diagnosed with pulmonary contusion, and tests showed a huge pulmonary hematoma of approximately $8.2 \times 5.3 \times 13.2$ cm in the left lung field along with other significant injuries. Treatment comprised of aggressive coagulation management, broad-spectrum antibiotics, and pulmonary hygiene. The patient's symptoms gradually improved and magnetic resonance scan revealed that he did not develop an abscess formation. No complications were seen at the 6 months follow-up visit. If the above mentioned measures would have failed to control the bleeding or secondary infection, then emergency surgery would have been warranted. Awareness of this kind of injury and efforts to reduce infection are important to guide the giant traumatic pulmonary hematoma to the benign course.

Introduction

Despite the increased use of restraint systems, diagnostic rates of traumatic pulmonary parenchyma injury are increasing owing to the commercialization of computed tomography (CT) [1]. The traumatic lung hematoma, such as traumatic pseudocysts, are a rare complication of blunt chest injury in which increased pressure on pulmonary parenchyma causes its laceration without rupture of the pleura [2]. There are few reports on the clinical course of traumatic giant pulmonary hematoma. Complications arising from such injuries, such as abscess formation or uncontrolled hemorrhage may need surgical treatment. However, the risk involved in the surgical treatment of patients with poly-trauma is very high; therefore, it is important to be aware if the lesion is going to lead to a complicated clinical course. We report the case of man with a giant traumatic pulmonary hematoma who was successfully treated using conservative management.

Case

A 50-year-old man with hypertension and diabetes was admitted to our medical center after sustaining a fall from a height of 5 m. The patient was in a stupor and showed symptoms of hemoptysis. His blood pressure and heart rate were 92/54 mm Hg, and 104 beats/

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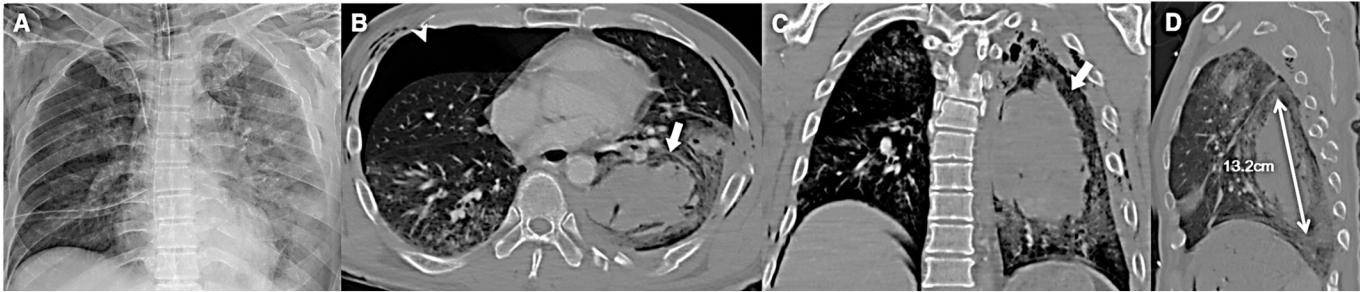


Fig. 1. Initial image work-up in the emergency room. (A) Chest X-ray showing left pulmonary congestion. (B) Computed tomography (CT) scan of the chest, showing pulmonary contusion and pulmonary huge hematoma about $8.2 \times 5.3 \times 13.2$ cm in the left lung field (white arrow) and right pneumothorax (arrowhead). (C) Coronal view of chest CT scan showing a huge hematoma (white arrow). (D) Sagittal view of chest CT scan showing a huge hematoma about 13.2 cm.

min, respectively. Brain CT scan revealed traumatic cerebral contusion, and depressed left parietal skull fracture. Chest CT scan showed multiple rib fractures with pneumothorax, left clavicle fracture, left scapular fracture, and pulmonary contusion with a huge pulmonary hematoma about $8.2 \times 5.3 \times 13.2$ cm in the left lung field (Figs. 1, 2, 3 and 4A, B, C, D). Moreover, lumbar spine compression fracture, and femoral intertrochanteric fracture on the left side were noted on abdominal CT scan. His hemoglobin level was 9.5 g/dL, and the injury severity score was 27. The patient regained consciousness after moving to the intensive care unit; however, hemoptysis persisted. We initially opined that surgical resection of hematoma might improve his symptoms. However, in his current condition, it would have been a high risk to consider surgery since the option of lobectomy would have necessitated removal of half the left lung. Therefore, immediate surgical resection was not suitable for damage control. Hence, we decided to perform surgery only if hemoptysis increased or signs of infection were noted. Aggressive coagulation management was started. He was treated using broad-spectrum antibiotics and tracheostomy was performed 3 days after his admission. Essentially, maintaining fluid balance, administration of diuretics, and pulmonary hygiene were performed.

The clinical course was complicated with aspiration pneumonia and hemodynamic instability because of poly-trauma. However, hemoptysis and inflammation levels of the patient gradually decreased. One month later, *Staphylococcus aureus* was found in his sputum although the hematoma had shrunk slightly in the CT scan ($7.2 \times 5.2 \times 12.8$ cm, Fig. 2A, B). We initially considered percutaneous hematoma drainage; however, because of identification of a bronchopleural fistula, we decided against it (Fig. 2C). After a long stay in the intensive care unit with selective antibiotics and maintaining pulmonary hygiene, the patient gradually stabilized, and was finally weaned from mechanical ventilation. Two months after undergoing orthopedic surgery, chest magnetic resonance imaging (MRI) demonstrated a hyper-intense lesion on both T1 and T2-weighted images, compatible with hematoma without abscess formation (Fig. 3A, B). After confirming the lesion, the patient was transferred for rehabilitation. No complications were observed and he was discharged to be followed up in the outpatient clinic after a period of 6 months (Fig. 4A, B, C). Finally, our patient demonstrated a benign clinical course.

Discussion

The etiology of traumatic pulmonary hematoma or pseudocyst is usually associated with blunt chest trauma. Motor vehicle accidents and falls have been reported as the most common mechanisms of injury; however, there is limited data on the prevalence of traumatic pulmonary hematoma or pseudocyst according to the mechanism of the injury [3]. In particular, there is less information on large traumatic pulmonary hematomas. Pulmonary contusion is frequent sequelae of blunt chest trauma, and, if significant, shear forces are encountered during energy transfer to the chest wall, possibly resulting in pulmonary laceration and parenchymal destruction [4].

Manifestations of traumatic pulmonary hematoma are hemoptysis, chest pain, cough, dyspnea, mild fever, and leukocytosis [5]. Hemoptysis is a common feature of traumatic pulmonary hematoma, though usually minor and rarely life-threatening [6].

A diagnosis was primarily determined by CT scan, as it is the first diagnostic imaging study performed in most trauma cases, because of its ease of use in emergency circumstances. In addition, MRI is useful, for distinguishing the hematoma from other pathologies such as an inflammatory collection or abscess [7].

Most small traumatic pulmonary hematomas resolve spontaneously similar to pulmonary pseudocyst [2]. Sometimes in traumatic pulmonary pseudocysts, secondary infections are observed often leading to serious complications that may be lethal. The indications for surgery or drainage were persistent sepsis and clinical deterioration despite antibiotic therapy. If a septic course develops, the initial treatment should be guided by sputum culture and is similar to that of uncomplicated non-traumatic lung abscess [4]. Early exploratory thoracotomy should be considered in patients with prolonged fever and pulmonary deterioration. Giulio et al. suggested that if unremitting signs of sepsis are present after 72 h of antibiotic therapy, CT-guided percutaneous drainage should be considered [2]. In case of persistent hemoptysis, closure of the bronchial connection is required. Treatment options include video-assisted thoracic surgery or open surgery [1]. However, most patients with poly-trauma have other significant injuries due to significant shear forces, given the severity of the trauma. Therefore, it is difficult to decide on surgery.

Our patient sustained a giant pulmonary hematoma due to a fall, and the treatment for the same was not well established. The case

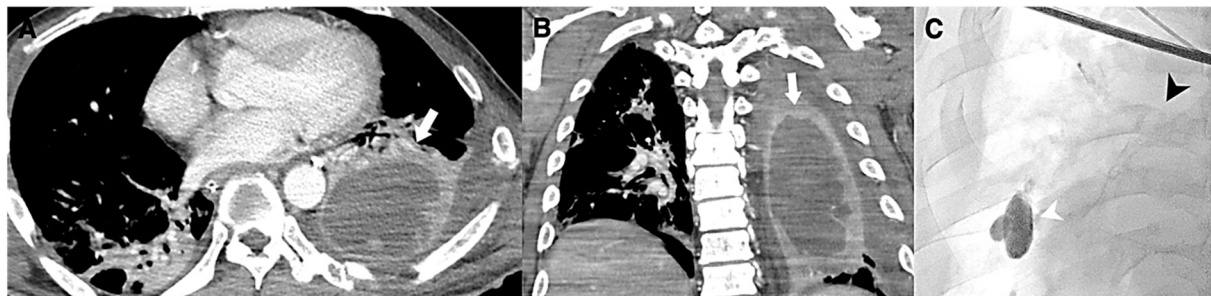


Fig. 2. Examinations after 1 month. (A) Chest CT scan showing huge hematoma about $7.2 \times 5.2 \times 12.8$ cm (white arrow). (B) Coronal view of chest CT scan showing a huge hematoma (white arrow). (C) Ultrasound guided tubography showing bronchopleural fistula in the left lung. Hematoma (white arrowhead), bronchus (black arrowhead).

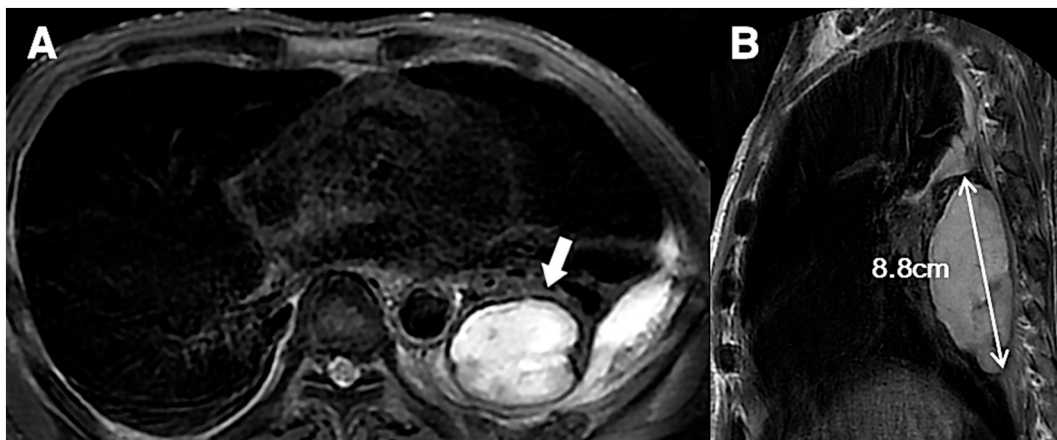


Fig. 3. Examinations after 2 month. (A) Chest magnetic resonance imaging (MRI) examination demonstrating the characteristic signal pattern of a hyper-intense lesion on T1-weighted images, compatible with hematoma (white arrow). (B) Sagittal view of chest MRI scan showing a huge hematoma about 8.8 cm.



Fig. 4. Examinations after follow-up. (A) Chest CT scan 2 month later showing pulmonary hematoma about $5.4 \times 4.2 \times 8.8$ cm (white arrow). (B) Chest CT scan 4 month later showing pulmonary hematoma about $3.0 \times 2.4 \times 5.9$ cm (white arrow). (C) Chest CT scan 6 month later showing pulmonary hematoma about $2.3 \times 2.0 \times 4.2$ cm (white arrow).

of this patient emphasizes the value of aggressive coagulation management and infection control. If these measures failed to control the bleeding or secondary infection, emergency surgery was warranted. After MRI confirmed that the lesion did not show abscess formation, the patient was closely followed up. During the 6 month follow-up period, the patient improved without taking oral antibiotics. Finally, our patient demonstrated a benign clinical course through aggressive coagulation management and infection control.

In conclusion, we described the case of a giant traumatic pulmonary hematoma associated with blunt chest trauma that was successfully treated non-surgically. Through aggressive coagulation management, pulmonary hygiene, and administration of broad-spectrum antibiotics, the hematoma resolved gradually with a benign clinical course. Awareness of this severe injury and its clinical significance is important for successful management of traumatic giant pulmonary hematoma.

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CRedit authorship contribution statement

SS collected the case data and drafted the manuscript.

Declaration of competing interest

The authors declare that they have no competing interests.

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We certify that this case report is our own work and all sources of information used in this report have been fully acknowledged.

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