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Pulmonary Pseudocysts Following Blunt Trauma with Myriad of Radiological Appearances: Case Report

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Abstract

Traumatic pulmonary pseudocysts (TPP) are rare clinical entities seen following blunt traumatic injuries to thorax. These present as multiple varying sized cystic or cavitary lesions in the parenchyma on chest imaging and may closely mimic cystic lung disease and cavitary lesions in acute settings and may mimic lung abscess, bronchiectasis and pulmonary neoplasms on imaging in the resolving phase or should they persist. It is imperative to know the radiological appearance of acute as well as resolved traumatic lung cysts to avoid a diagnostic confusion with other differentials of pneumatoceles and cavitary lesions to ensure proper surgical management. These are known to resolve with time, and this is an important feature to differentiate it from other clinical conditions.

Keywords: Traumatic Pulmonary Pseudocyst (TPP); Pneumatocele; Blunt Trauma Chest; Lung Cyst

Abbreviations: TPP: Traumatic Pulmonary Pseudocysts; CECT: Contrast Enhanced Computed Tomography; ICU: Intensive Care Unit; CT: Computed Tomography

Introduction

TPP's are seen following blunt traumatic injuries to thorax most commonly in settings of road traffic accidents. Usually pleuro-parenchymal abnormalities like pneumo-hemothorax, contusions, hematomas, lacerations are expected with blunt traumatic thoracic injuries along with rib fractures and flail chest. However atypical radiological appearances like multiple cystic or cavitary lesions, pulmonary nodules or a mass lesion may be seen with acute and resolving traumatic lungs pseudocysts which are considered a rare clinical entity. An awareness of its various radiological presentations is imperative to avoid diagnostic confusion. We herein are discussing a case of traumatic pulmonary pseudocysts in a young male who suffered a road traffic accident and was managed at out hospital.

Case Report

A 39-year-old young male was brought to the accident and emergency department of this hospital with a history of road traffic accident sustained thirty minutes back. He was driving a car which got toppled. He reported having difficulty in breathing along with severe right sided chest pain since then. On examination, he was conscious and oriented. He did not report any hemoptysis, oral or nasal bleeding, vomiting, loss of consciousness, alteration in sensorium or any abnormal jerky movements. His blood pressure was 100/65mmHg bedside and pulse was 78/minutes. He was able to maintain oxygen saturation of 95% on oxygen support at 7litre/minutes. On primary survey, there was reduced oxygen entry in right lung and tenderness in right hemithorax along the anterior chest wall. Rest of the primary survey was normal. He was continued on oxygen support and was started on intravenous fluids, intravenous analgesics and broad-spectrum antibiotics. Subsequently he was admitted in high dependency unit and the blood samples for haematological and serum biochemistry were reported within normal limits. A posterior-anterior erect chest radiograph showed shaft of left clavicle fracture along with fracture of multiple ribs on both sides. There were small lucent lesions seen in right upper and mid zone along with a thick-walled cavity in right middle zone. No significant hemo-pneumothorax was noted. An urgent contrast enhanced computed tomography (CECT) of chest and abdomen was done which confirmed the radiographic findings and in addition showed fracture of spinous processes of first through fifth thoracic vertebrae along with pneumomediastinum and small right sided pneumothorax. There were multiple small cystic lesions reported as pneumatoceles

noted in both lungs(right>left). A large thick-walled cavity with dependent blood was noted in apical segment of RUL. With these radiological findings available, an intercostal drainage tube with underwater seal was placed in right hemithorax.

On day third of admission, he was operated for fracture of left tibial shaft by closed reduction, internal fixation and intramedullary nailing under spinal anaesthesia. Post op period was uneventful. By fifth day of admission, the drain output of chest tube became minimal. He was continued with intravenous broad-spectrum antibiotics, analgesics and other supportive measures like chest physiotherapy. On eighth day of admission his chest tube was removed. A repeat CT of thorax showed near complete resolution of pnematoceles, reduction in the size of cavitary lesion and satisfactory expansion of both lungs with no evidence of hemo-pneumothorax. The patient was discharged on fifteenth day of hospital admission in a comfortable state and was advised for a review follow-up after one month. A chest CT repeated after one month of discharge showed a homogeneously opaque mass with hypodense contents at the site of previous lung cavity in RUL. The patient was asymptomatic and did not offer any respiratory complaints. Another follow-up chest CT after six months revealed the mass to persist with reduction in its size. No abnormal contrast enhancement or any arterio-venous communication was noted in relation to this lesion. It is understood to have represented a chronic organized parenchymal cavity in right lung as sequaelae to previous thoracic trauma with intralesional hematoma. Presently eight months have elapsed, and the patient is asymptomatic and has resumed his normal routine daily activities completely.

Discussion

Traumatic thoracic injuries usually present with parenchymal contusions, lacerations, alveolar haemorrhages, hemo-pneumothorax and injuries to bony thorax. A nomenclature of TPP is best suited since these are mainly formed by interlobar interstitum and don't contain an epithelial lining or true bronchial elements [1]. The overall incidence of traumatic lung cysts is extremely rare. These usually present with parenchymal cystic and cavitary lesions. The understood mechanism in formation of traumatic pseudocyst is sudden increased negative intrathoracic pressure following a blunt trauma which is followed by shearing of pulmonary parenchyma due to alveolar rupture without rupture of pleura. It is also understood that greater compliance of chest wall in younger patients explains their usual presentation in young population following blunt thoracic injuries [2].

Their overall incidence is more common in pediatric and younger population, typically in second or third decades. Sorsdahl and Powell reported that about of 85% of TPP patients with under the age of 30 years with males more commonly affected [3]. The velocity of the impact and degree of chest wall displacement upon impact also plays a role in the distribution of the lesions with high velocity lesions seen more commonly in the peripheral lung parenchyma whereas low velocity impacts presenting with central parenchymal lesion and major bronchial disruption [4]. Their usual clinical presentation is with hemoptysis, cough, chest pain and difficulty in breathing. A low-grade fever is also expected as an unusual clinical presentation and does not necessarily indicate infection. The laboratory investigations may show increase leucocyte count otherwise no significant alteration in lab parameters is associated with them. The findings on plain radiographs are usually non-specific and may present with air-space or ground glass opacities, hemo-pneumothorax and bony injuries. An accurate diagnosis of traumatic pseudocysts by plain radiographs is not usually achieved if these cysts are small in size, there is low index of suspicion or if the severity of trauma is less. It also depends on patient position, thus often in intensive care unit (ICU) settings with blunt thoracic injuries this diagnosis is not achieved. Computed tomography (CT) of thorax is the excellent imaging modality with near hundred percent sensitivity.

In an acute setting following blunt thoracic trauma, pseudocysts usually appear as single or multiple lung cysts with varying sizes in a single segment or multisegmental or multilobar distributions. These may also appear as thin or thick walled cavitary lesion which may show hemorrhage or clear contents or an air-fluid level. Traumatic lung cysts are known to resolve with time, and this is an important differential nature while considering other common causes of lung cysts or cavitary lesions like post-infective bronchiectasis with secondary infection, tubercular cavities, lung abscesses, hydatid cysts, congenital conditions like sequestration or bronchogenic cyst apart from neoplastic conditions likely cavitating neoplasms. Diffuse cystic lung disease like emphysema is also an important diagnostic differential. It is thus important worth mentioning the antecedent history of trauma to accurately diagnose them. The management is usually conservative and are known to carry an excellent prognosis. Usual management with oxygen supplementation, analgesics and chest physiotherapy is rewarding. The surgical interventions are usually not indicated. The role of prophylactic antibiotics is debatable.

In this case, the resolving traumatic cavity in the right lung showed an atypical feature. With passage of time this cavity got shrunk however it persisted with a mass like appearance on plain radiographs which showed hypodense contents with an average HU of 13-25 on CT suggesting a chronic organised cavity containing altered blood products. Sequential imaging showed it to persist although its size was reduced. The lesion was non-enhancing on contrast administration and didn't reveal features of a vascular malformation as a result of trauma. To our knowledge such a radiological appearance of these pseudocysts has not been mentioned before in existing literature. (Figure 1-4)

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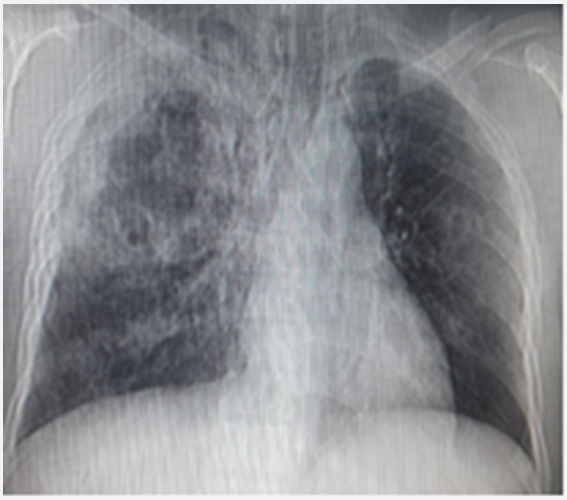

Figure 1: Plain radiograph of chest shows an ill-defined thick-walled cavity in right upper and middle zone, small cystic lesions in middle zones of both lungs and fracture in shaft of left clavicle.

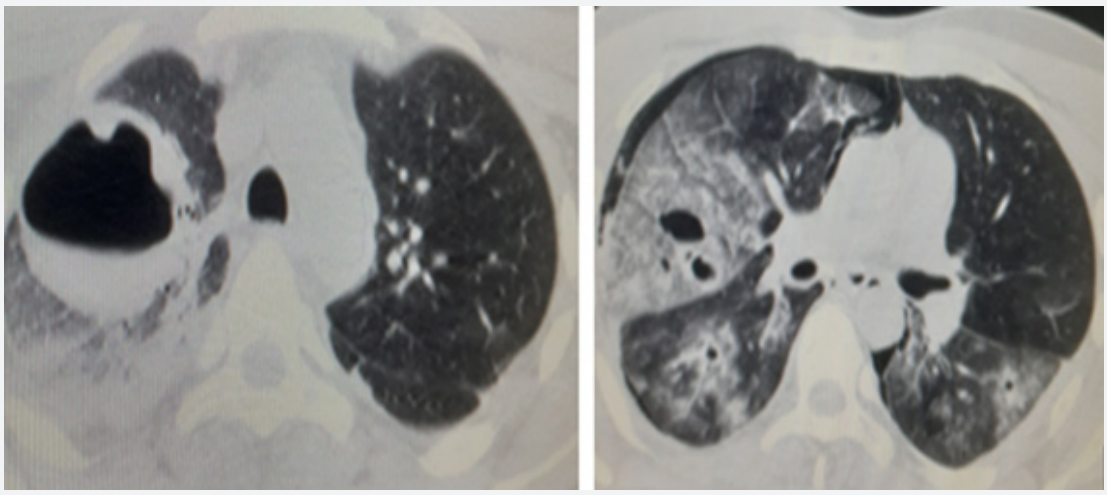

Figure 2: CECT thorax lung window shows thick-walled cavity in right upper lobe with dependent fluid. Multiple small parenchymal cystic lesions also noted in both lungs.

Figure 3: A repeat CT thorax after two weeks showing complete resolution of parenchymal cysts.

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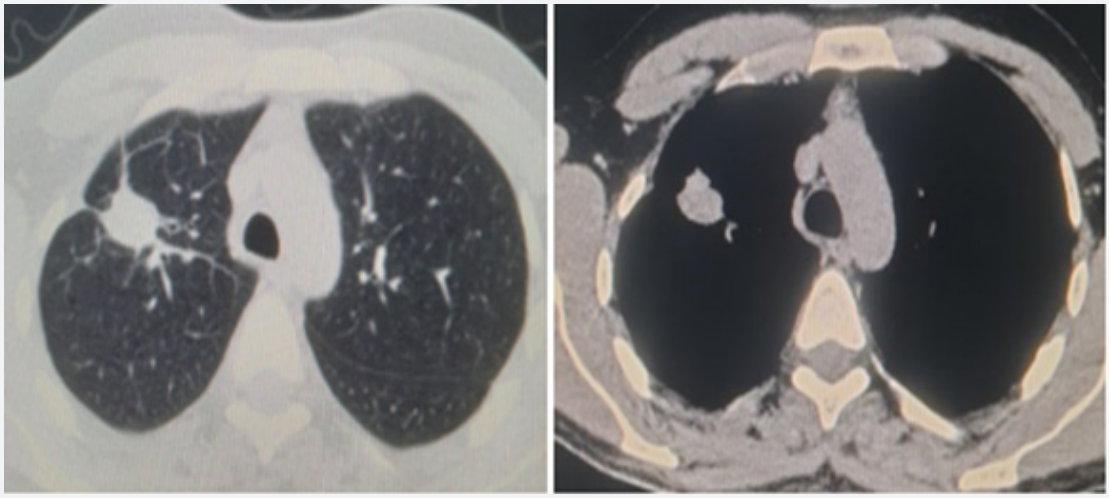

Figure 4: A repeat CT thorax in axial lung and mediastinal windows after six months of trauma showing a residual homogeneous mass with hypodense contents replacing the cavity in right upper lobe.

Conclusion

Traumatic lung pseudocysts are extremely rare radiological presentations in patients with blunt thoracic trauma. CT is the diagnostic imaging modality with excellent sensitivity; however, an antecedent history of trauma should be made available to radiologists to avoid misdiagnosis.

Patients Consent

Consent was taken from the patient to use medical data for research and publication purpose.

Author Contributions

All authors were actively involved in managing this patient and have substantially contributed in designing, drafting and editing the manuscript.

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