

Spontaneous resolution of post-traumatic pulmonary artery pseudoaneurysm: Report of two cases

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ABSTRACT

Pulmonary artery aneurysm is a rare clinical entity with congenital or mycotic origin being most common causes. Post-traumatic pulmonary pseudoaneurysms are extremely rare. Unless diagnosed early and properly managed, these can be fatal. Only few cases have been reported in the literature with most (except the one) being diagnosed much later after the initial injury and managed surgically. Only one case has been reported following blunt trauma injury, which was diagnosed immediately using computed tomography scan and managed conservatively. Here, we report two cases of pulmonary artery pseudoaneurysm one following gunshot injury and other following blunt injury which was diagnosed on contrast enhanced computed tomography chest and managed conservatively.

KEY WORDS: Contrast enhanced computed tomography, pseudoaneurysm, pulmonary artery, trauma

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INTRODUCTION

Pulmonary pseudoaneurysm can have various etiologies including mycotic, syphilis, mycobacterial infection, atherosclerosis or emboli, vascular abnormalities such as cystic medial necrosis, Marfan syndrome, Behcet's disease, iatrogenic as a complication of pulmonary artery catheterization (0.2%)^[1] and post-traumatic.^[2] Post-traumatic pulmonary pseudoaneurysm is very rare with only 25 cases reported until 2011.^[3-5]

Post-traumatic pseudoaneurysms mainly result from penetrating gunshot and stab wounds, although four cases involving blunt injury have been reported.^[3] They have been diagnosed mainly on either contrast enhanced computed tomography (CECT) or pulmonary angiography. Most cases reported in the literature were diagnosed much later (week to years) after the initial injury and most were managed surgically.

We, hereby report two cases of post-traumatic pulmonary artery pseudoaneurysms: One following gunshot injury and the other following blunt injury, which were diagnosed by CECT and responded to conservative management.

CASE REPORTS

Case 1

A 32-year-old male patient presented in casualty with a history of assault and civilian, high velocity gunshot injury on the right side of the chest. He developed gradually progressive shortness of breath. On clinical examination, chest compression test was positive with reduced air entry on the right side with dullness on percussion. Small penetrating wound was present over the right chest with lacerated wound in scalp. Focused assessment with sonography for trauma (FAST) scan was positive. Intercostal drainage tube (ICD) was placed and it drained about 1 L of blood. Patient was sent for CECT chest and abdomen.

On computed tomography (CT) scan, there was right sided hemothorax with ICD tube *in situ*, fracture of right 6th rib with laceration and contusion of lower lobe of the right lung. There was rounded hyperdense lesion of attenuation similar to that of the vessel and measuring 1.3 cm in the right lower lobe in continuity with a branch of descending right pulmonary artery suggesting a pseudoaneurysm [Figure 1a and b]. Both entry and exit wound were well

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seen on CT images. This pseudoaneurysm was in the track of bullet and there was associated liver laceration with minimal hemoperitoneum.

Because of small size of pseudoaneurysm, absence of hemoptysis and stable clinical condition of patient, conservative management was planned. Follow-up CT pulmonary angiography was performed 1 week later, which revealed a significant reduction in size of pseudoaneurysm (0.7 cm) and surrounding lung contusion [Figure 1c]. Patient was discharged on conservative treatment and was kept on clinical follow-up.

Case 2

A 58-year-old female patient presented in casualty with complaints of right chest pain and difficulty in breathing following road traffic accident. On clinical examination, chest compression test was positive with bilateral basal reduced breath sounds. Chest radiograph revealed blunting of the left costophrenic (CP) angle. FAST scan was positive with fluid in bilateral CP angles. ICD was put in bilateral pleural space and patient was subjected to CECT chest and abdomen, which revealed bilateral basal lung contusion (left more than right) and hemothorax (left more than right). Patient was kept on conservative management. Patient developed gradual respiratory distress for which a repeat CECT chest was carried out at 1 week interval, which

revealed a 2.5 cm pseudoaneurysm in the right lower lobe [Figure 2a]. The surrounding lung parenchyma showed cavitory changes. Because of large size of pseudoaneurysm, thrombin injection within pseudoaneurysm was planned. After 1 week, pulmonary angiography was performed for injecting thrombin, but there was no opacification of aneurysmal sac [Figure 2b]. CECT chest was repeated at the same time, which revealed hypodensity at the site of sac suggesting spontaneous thrombosis of pseudoaneurysm [Figure 2c]. She was kept on follow-up and remained asymptomatic.

DISCUSSION

Pseudoaneurysms result from discontinuity of all layers of blood vessel and extravasated blood is contained by surrounding extravascular tissue or clot.^[6] This absence of true endothelial lining differentiates pseudoaneurysms from true aneurysms.

Pulmonary artery pseudoaneurysm after penetrating or blunt thoracic trauma is an exceedingly rare clinical finding, with only twenty five reported cases in the literature.^[5]

Traumatic pulmonary pseudoaneurysm most frequently presents with hemoptysis. Other less frequently reported symptoms include chest discomfort, respiratory distress,



Figure 1: (a and b) Axial and coronal contrast enhanced computed tomography (CECT) thorax images showing 1.3 cm pseudoaneurysm (white arrow) in the right lower lobe along the branch of descending right pulmonary artery with surrounding lung contusion and intercostal drainage tube *in-situ*. (c) Axial CECT image (follow-up scan after 1 week) showing 50% reduction in size of right lower pseudoaneurysm (white arrow) with resolution of lung contusion



Figure 2: (a) Axial contrast enhanced computed tomography (CECT) chest image revealed 2.5 cm pseudoaneurysm (white arrow) in the right lower lobe. (b and c) Pulmonary angiography (after 1 week) - no opacification of aneurysmal sac; CECT chest (follow-up scan after 1 week) - hypodensity at the site of sac (white arrow) suggesting spontaneous thrombosis of pseudoaneurysm

and cough. Pseudoaneurysms can be seen as suspicious opacity on chest radiograph, but definitive diagnosis requires CT with intravenous contrast and/or pulmonary artery angiogram.

CECT is now being increasingly used in trauma patients and has significantly improved management of these patients. Currently, CT is used when either chest radiograph is abnormal or patient has suffered a major injury or mode of injury is severe. On CECT, pseudoaneurysm appears as an enhancing mass adjacent to a vessel, which is isodense to central pulmonary arteries. CECT can easily diagnose even smaller pseudoaneurysms, which are difficult to be diagnosed by the chest radiograph. Angiography is definitive modality, which shows contained extravasation of contrast.

Various modalities available for treating pseudoaneurysms include: (a) trans-catheter embolization (treatment of choice), (b) thrombin injection, (c) emergency surgical ligation and (d) lobectomy. Now with increasing use of CT in management of trauma patients reported incidence of traumatic pulmonary pseudoaneurysms may increase especially smaller lesions in asymptomatic patients. Such patients can be managed conservatively under clinical and imaging follow-up. Symbas and Scott^[7] noted that larger pseudoaneurysms could bleed massively, whereas smaller go undetected. Because of low pressure within pulmonary vessels, smaller lesions are tamponaded by surrounding clot and a healing reaction in the form of fibrous tissue. In previously reported cases, surgery as well as non-surgical management (conservative or embolization) was adopted by the surgeons depending upon the size of pseudoaneurysm, symptoms and vitals of patient and results were variable. Accordingly, authors have suggested both type of management, but no definite guidelines are available.^[3,4] Of all the previously reported cases, spontaneous resolution has been described in only one.^[4]

Because of the small size of pseudoaneurysm, absence of hemoptysis and reduction in size of pseudoaneurysm on follow-up CT, our first patient was managed conservatively. While in second patient who had larger lesion, percutaneous thrombin injection was planned, but there was spontaneous thrombosis of pseudoaneurysmal sac. Both patients improved clinically and no deterioration occurred on follow-up.

In conclusion, not all diagnosed pulmonary pseudoaneurysms need to be treated by active management. Treatment modalities being used have inherent complications. Smaller lesions in asymptomatic, stable patients can be observed closely both clinically and with CECT chest.

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