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Case Report

Pulmonary artery pseudoaneurysm showing rapid growth in a patient with lung cancer[☆]

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ARTICLE INFO

Article history:

Received 9 June 2020

Revised 27 July 2020

Accepted 28 July 2020

Keywords:

Pulmonary artery pseudoaneurysm

Lung cancer

Squamous cell carcinoma

Hemoptysis

Misdiagnosis

Hematoma

ABSTRACT

Pulmonary artery pseudoaneurysm is rare and is usually associated with infection. In this report, we describe the case of a patient with pulmonary artery pseudoaneurysm in association with pulmonary squamous cell carcinoma. A 64-year-old man with a previous history of lung cancer showed massive hemoptysis and large consolidation in the right lower lung. Emergency radiologist interpreted this lesion as cancer progression or hematoma. Thus, emergency bronchial and intercostal angiography were performed. However, during admission, the patient presented with another episode of massive hemoptysis. A thoracic radiologist reviewed the previous computed tomography scans and noted the presence of a large hematoma in the right lower lobe of the lung; a pseudoaneurysm was seen within the hematoma arising from the pulmonary artery. On follow up computed tomography, the pseudoaneurysm showed rapid growth. Thus, the patient underwent embolization for the branch of the right lower lobar pulmonary artery using coil and histoacryl. Misdiagnosis of pulmonary artery pseudoaneurysm could be fatal; hence, radiologists should be familiar with the features of pulmonary artery pseudoaneurysm.

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Introduction

Pulmonary artery pseudoaneurysm is a rare and life-threatening condition [1]. The most common cause of pulmonary artery pseudoaneurysm is infection. Historically, the tuberculosis-related pulmonary artery pseudoaneurysm,

called Rasmussen's aneurysm, is a well-known cause for hemoptysis in tuberculosis [2]. Pulmonary artery pseudoaneurysm can be associated with pulmonary hypertension, vasculitis, or primary or metastatic lung cancer [1]. Here, we report the case of a pulmonary artery pseudoaneurysm that demonstrated rapid growth in a patient with primary lung cancer.

[☆] Competing Interests: The authors have declared that no competing interests exist.

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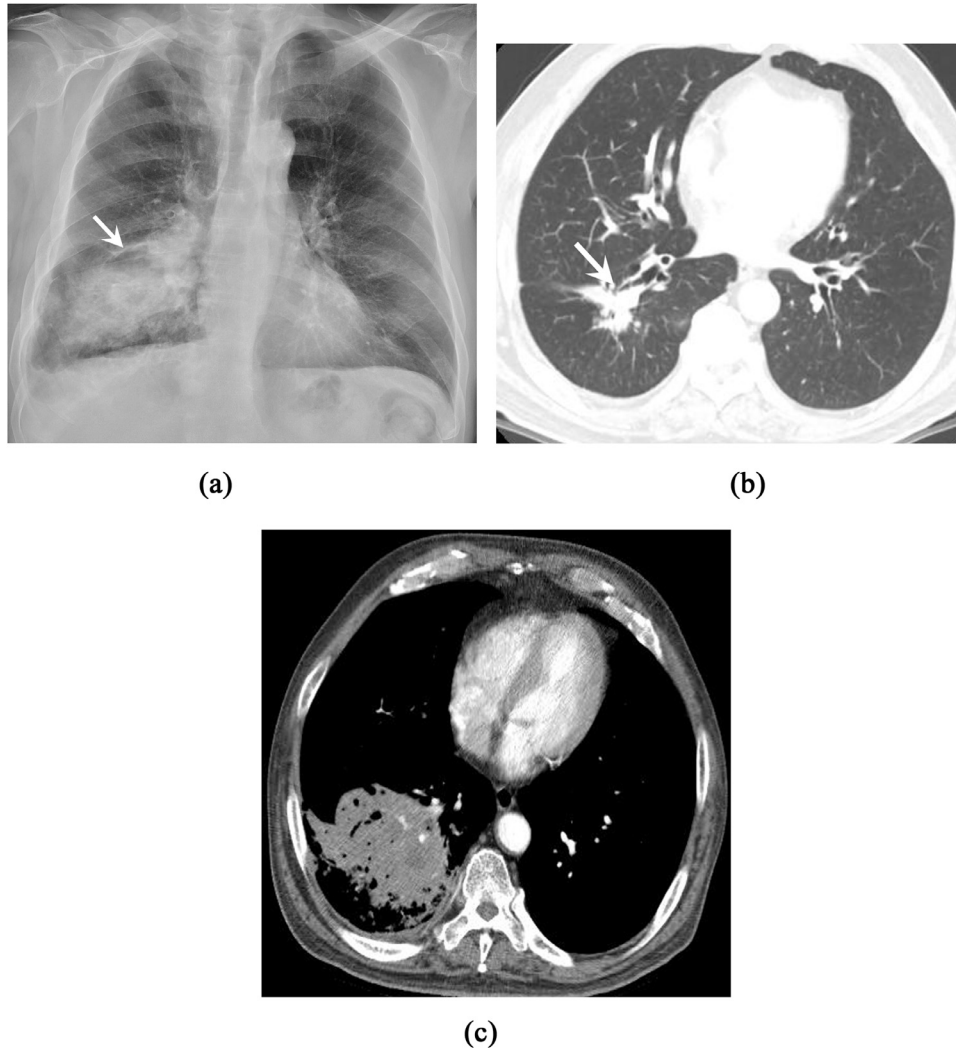


Fig. 1 – Chest radiograph and computed tomography (CT) scans in a 64-year-old man who presented with hemoptysis. (A) Chest radiograph shows dense consolidation (arrow) in the right lower lung zone. (B) Chest CT scan on lung window setting obtained 6 months ago shows an irregular shaped lung cancer (arrow) in the right lower lobe. (C) Chest CT scan obtained on the day of hemoptysis demonstrates a large soft tissue density lesion at the previous cancer site. Some air bubbles are noted in the peripheral portion of the mass; thus, tumor necrosis is suspected. CT, computed tomography.

Case presentation

A 64-year-old man was admitted to our hospital with massive hemoptysis (300 mL). His breathing was hoarse on auscultation. He revealed a relevant history of squamous cell carcinoma of the right lower lobe of the lung. A chest radiograph showed a newly appeared large consolidation in the right lower lung zone (Fig. 1A). Further, a chest computed tomography (CT) scan showed a large soft tissue density lesion at the previous cancer site (Figs. 1B and C). A radiologist on night duty interpreted this lesion as cancer progression or hematoma. For the treatment of hemoptysis, emergency bronchial and intercostal angiography were performed, which revealed abnormal staining in the right lower lung zone. Thus, the patient underwent arterial embolization with polyvinyl alcohol particles. Upon admission, the patient's symptoms

gradually improved. On the sixth day of hospitalization, the patient underwent radiation therapy for the lung cancer. On the 12th day of hospitalization, the patient presented with another episode of massive hemoptysis (300 mL). A thoracic radiologist reviewed the previous CT scans. The CT scan obtained in the emergency room showed a large hematoma in the right lower lobe of the lung and a contrast media filling sac, measuring approximately 1.5 cm at the center of the hematoma. Thus, we presumed that the pseudoaneurysm arose from the pulmonary artery (Fig. 2A). Further, the CT scan for radiation therapy obtained on the 6th day of hospitalization showed an increase in the size of the pseudoaneurysm to 2.5 cm (Fig. 2B). Hence, additional interventional angiography was performed, which revealed an aneurysmal sac measuring approximately 6.5 cm × 3.7 cm, from the branch of the right lower lobar artery (Fig. 2C). Embolization was achieved using 3 tungsten coils, 4 mm in diameter and 10 mm long, and a

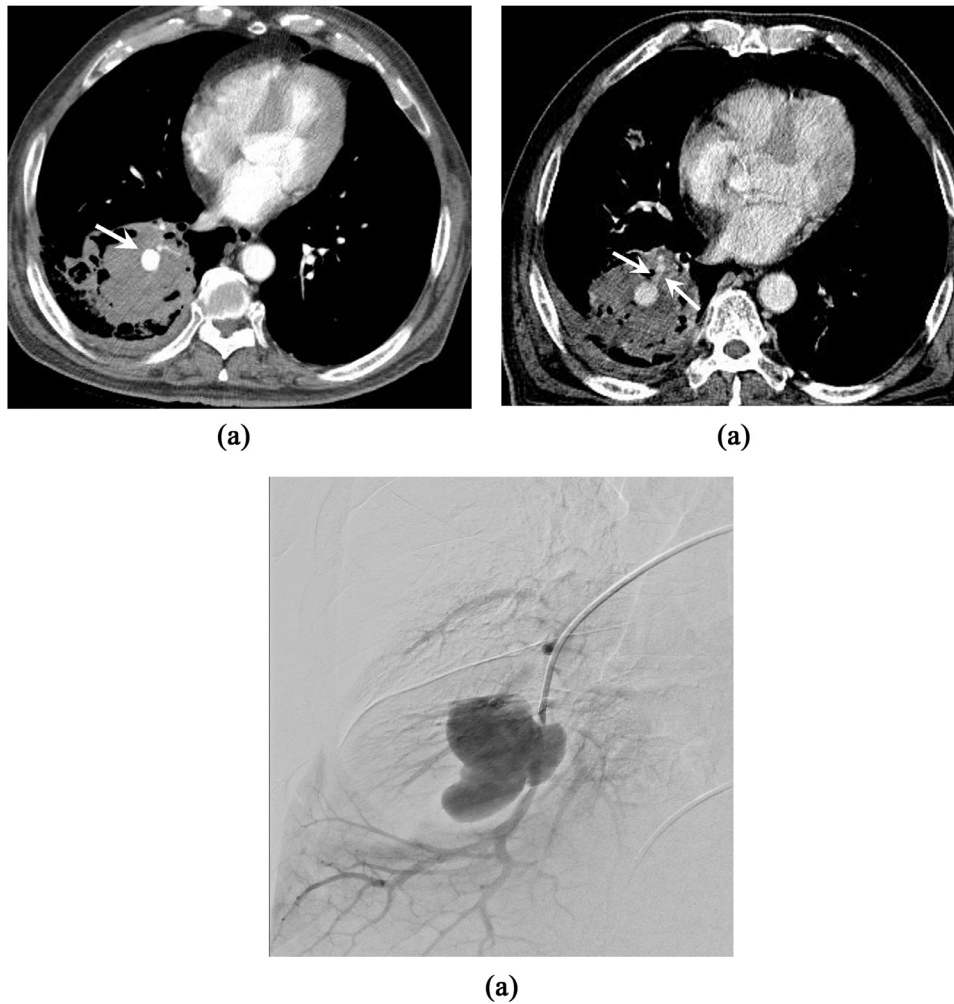


Fig. 2 – Chest computed tomography (CT) scans in a 64-year-old man with pulmonary artery pseudoaneurysm. (A) A 1.5 cm contrast media filling sac (arrow) seen in the right lower lobe, probably arising from the right lower lobar pulmonary artery. (B) Chest CT scan obtained on the sixth day of hospitalization for the planning of the radiation therapy shows interval increase in the pseudoaneurysm. Note the aneurysmal neck (arrows) arising from the right lower lobar pulmonary artery. (C) Conventional angiography with selection of the right lower lobar pulmonary artery demonstrates a lobulated pseudoaneurysm arising from the right lower lobar artery. CT, computed tomography.

4.5 mL mixture of histoacryl and lipiodol mixture (1:2). Hemoptysis reduced to less than 5 mL per day and stopped after 20 days. One month later, radiation therapy was performed. The CT scan obtained at that stage revealed a complete resolution of the hematoma, and a large air cavity was noted (Fig. 3A). The patient was discharged, and a follow-up 5 months later revealed that he was well, with no recurrence of hemoptysis.

Discussion

Pulmonary artery pseudoaneurysm is the focal dilation of a segment of the pulmonary artery. Unlike true aneurysm, pseudoaneurysm involves only the external layers of the arterial wall [3]. Because of relatively low resistance of the surround-

ing tissue, a pseudoaneurysm is more likely to rupture than a true aneurysm [4]. The reported mortality rate associated with the rupturing of a pulmonary artery pseudoaneurysm is as high as 50%; death is owing to aspiration and asphyxia after intrapulmonary hemorrhage [1,4].

Pulmonary artery pseudoaneurysm is rare, and its incidence ranges from 5% to 11% among patients who have undergone embolization because of hemoptysis. Infection (75%), idiopathic factors (29%), and trauma (17%) are the common causes for pulmonary artery pseudoaneurysm [1]. Occurrence of a pseudoaneurysm with a tumor is rare; however, it has been reported to develop with right ventricular myxoma, metastatic sarcoma, and hemangiopericytoma [5–7]. To the best of our knowledge, there are only a few reports of its association with primary lung cancer [1,8–11]. In these reports, the major pathological type of primary lung cancer involved in pulmonary artery pseudoaneurysm was

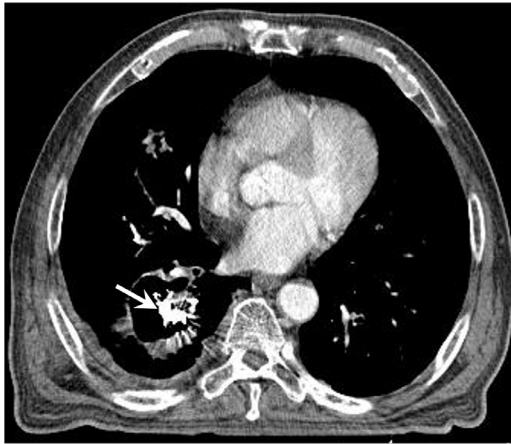


Fig. 3 – Chest CT scan for radiation therapy obtained 1 month later shows a large air cyst at the previous hematoma site. Note the high-density embolization materials (arrow) within the cyst. CT, computed tomography.

squamous cell carcinoma, and it was commonly combined with tumor necrosis [8]. Our patient also had squamous cell carcinoma, and we believed it could be combined with tumor necrosis. The suggested pathogenesis for a pulmonary artery pseudoaneurysm associated with malignancy is the direct tumoral invasion to the vessel, which results in erosion of the vascular wall and pseudoaneurysm formation [9–11]. Zhang et al. suggested that pulmonary artery pseudoaneurysm in lung cancer may be caused by the rupturing of the pulmonary artery with tumor encasement owing to tumor necrosis [8].

The clinical manifestations of pulmonary artery pseudoaneurysm vary according to the size, location, and underlying diseases. Symptoms include cough, shortness of breath, and hemoptysis, including massive hemoptysis; in some cases, patients may not show any symptoms [1,2]. Infection related with pulmonary artery pseudoaneurysm might manifest as fever [1]. Our patient presented with hemoptysis.

On chest radiographs, pulmonary artery pseudoaneurysms can be detected as round, well-circumscribed nodules, or a hilar enlargement [2]. On CT scans, a pulmonary artery pseudoaneurysm is seen as a contrast media filling sac, usually adjacent to or within the preexisting mass, cavity, or consolidation [1,2]. The reported size of the pulmonary artery pseudoaneurysm ranges from 0.6 to 6.0 cm [1,8]. In our patient, the size of the pseudoaneurysm was 1.5, 3.2, and 6.5 cm on the initial CT scan, follow-up CT scan, and angiogram, respectively.

Chen et al. reported that the interval between the diagnosis of lung cancer and pulmonary artery pseudoaneurysm ranges from 5 to 9 months. In this report, all patients received chemotherapy or radiation therapy [1]. Akpınar et al. also reported a case of pulmonary artery pseudoaneurysm that developed 6 months after the diagnosis of lung cancer [10]. However, in 2 other reports, patients were diagnosed with lung cancer and pseudoaneurysm at the same time [9,11]. Our patient had a 10-month history of lung cancer prior to the formation of the pseudoaneurysm.

Interventional angiography is the treatment of choice for pulmonary artery pseudoaneurysm [2,8]. Embolization of the aneurysm's feeding vessel, direct coil embolization, or endovascular stents, are the reported effective occlusion modalities. Our patient underwent glue and direct coil embolization.

In our patient, pulmonary artery pseudoaneurysm was misdiagnosed. The follow-up CT scan and conventional angiography showed that the pulmonary artery pseudoaneurysm demonstrated rapid growth, and this could be a sign of impending rupture.

Conclusion

In this paper, we reported a case of pulmonary artery pseudoaneurysm developed in a patient with a 10-month history of pulmonary squamous cell carcinoma. In patients with lung cancer, hemoptysis is a common symptom. However, the cause of hemoptysis may vary, and a misdiagnosis of pulmonary artery pseudoaneurysm can be fatal. Thus, radiologists should be familiar with the features of a pulmonary artery pseudoaneurysm.

Patient Consent

Written informed consent was not necessary because no patient data has been included in the manuscript.

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