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An Asymptomatic Pulmonary Arteriovenous Malformation Case Mimicking a Cavitary Lung Lesion

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Abstract

Cavitary lung lesions can be seen due to tuberculosis, malignancy, and rheumatological diseases. Pulmonary arteriovenous malformations are rare lesions that may contain cavitation. Our case is a pulmonary arteriovenous malformation encountered in a patient with rheumatoid arthritis who is receiving immunosuppressive therapy.

Keywords: Cavitary lung lesion, pulmonary arteriovenous malformation, solitary pulmonary nodule

Introduction

Pulmonary arteriovenous malformations (PAVM) are rare abnormal vascular structures which are formed by the direct connection of the pulmonary artery and vein without reaching the capillary network. The radiologic finding of a PAVM on non-contrast CT (Computed Tomography) is a well-circumscribed, non-calcified nodule with blood vessels. They may contain cavitation in Thorax CT. Our case is a pulmonary arteriovenous malformation encountered in a patient with rheumatoid arthritis who is receiving immunosuppressive therapy.

A 55-year-old female was admitted to our clinic with intermittent blunt back pain on the right side. Due to the patient's symptoms, a non-contrast thorax computed tomography (CT) was performed at an external clinic and CT findings showed 2 × 2 cm pleural-based soft tissue density lesion with polylobule contours containing microcavitation in the right lower lobe laterobasal segment (Figure 1a). The patient was followed up for 20 years with the diagnosis of rheumatoid arthritis (RA). Her regular treatment was prednisolone 5 mg/day (≥5 years) and leflunomide 20 mg/day. She had 5 pack-years smoking history and was an ex-smoker for 20 years. The patient does not have a history of tuberculosis or COVID-19 infection. In physical examination, oxygen saturation was 98% on room air, blood pressure was 118/72 mmHg, heart rate was 85/min, and body temperature was 36.8°C. A respiratory system examination and laboratory findings were normal. A chest x-ray showed normal findings.

Case Presentation

Although sputum was induced, it could not be obtained. After 14 days of gemifiloxasin 320 mg/day treatment, positron emission tomography–computed tomography was performed because of malignancy suspicion. Although low fluorodeoxyglucose (FDG) uptake in the pleura-based 2 × 2 cm well-defined lesion was observed, malignancy could not be excluded (Figure 1b-c). No symptom was presented at the follow-up. In the third month, control contrast-enhanced thorax CT illustrated that lesion size was stable, and a homogeneous contrasting lesion was connected to a dilated artery and vein branch (Figure 2a-b). Radiologically, it is diagnosed as pulmonary arteriovenous malformation. Embolization and surgical treatment options were recommended to the patient, but since the patient did not accept any intervention, she was followed up clinically and radiologically with contrast-enhanced thorax CT.

Discussion

In this article, we demonstrated a rare pulmonary arteriovenous malformation (PAVM) case that presented as a nodular lesion including cavitation. Pulmonary arteriovenous malformations are abnormal structures that are formed by the direct connection of the pulmonary artery and vein without reaching the capillary network and causing intrapulmonary right-left shunt. It has been mentioned that 13%-55% of the patients with PAVM are asymptomatic in the different series in the literature.[1,2] It is a rare disease and can often accompany hereditary hemorrhagic telangiectasia (HHT).[3] Pulmonary arteriovenous malformations are usually single and most frequently located in subpleural region of left lower lobe and right lower lobe. Multiple lesions tend to be located in the bilateral lower lobes. While symptomatic cases often present with exertional dyspnea, the degree of dyspnea varies based on the size of the shunt. If right-left shunt is more than 20% of the systemic cardiac output, it presents with cyanosis and clubbing as a result of chronic hypoxemia. Complaints such as epistaxis and melena should also be questioned due to accompanying HHT. As in our case, PAVMs are observed as peripherally located homogeneous nodules with smooth lobulated contours on thorax CT. When intravenous iodized contrast material is applied, feeding artery and draining vein contrasted homogenously in images at the pulmonary arterial phase. In our case, diagnosis is made similarly.

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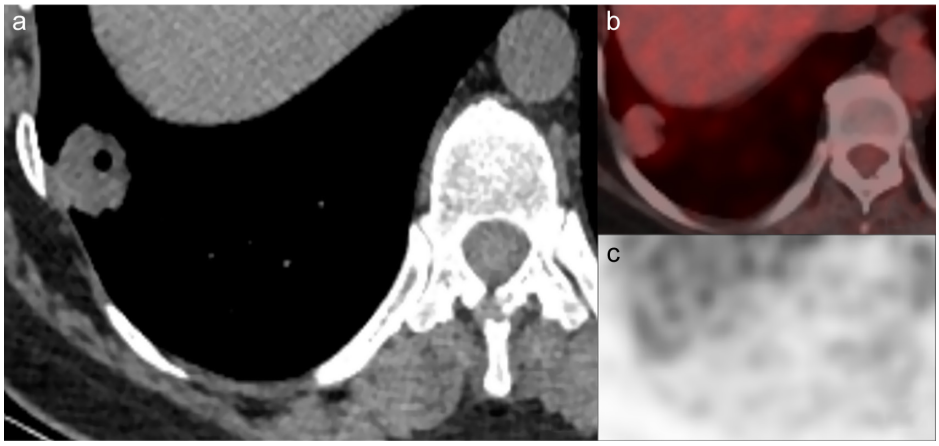

Figure 1. In non-contrast CT images (a), a pleural-based lesion with a size of 19 × 18 mm with polylobulated contours is selected in the lower quadrant of the right hemithorax. Due to the micro-cavitation observed medial to the lesion, the lesion was considered premalignant and referred to PET/CT. Sixty minutes after the injection of 187 MBq 18F-FDG, whole-body PET/CT imaging was performed (b-c). Low FDG uptake was observed in the lesion, close to the blood pool (BP) level. (Lesion SUVmax: 2.45, mediastinal BP SUVmax: 3.17). For this reason, delayed imaging was performed at the third hour of the injection and a decrease in the level of FDG uptake was observed similar to the blood pool and evaluated in favor of benign processes. PET/CT, positron emission tomography–computed tomography; FDG, fluorodeoxyglucose.

It has been previously reported in the literature that enlarged malformation sacs can also be observed as cystic or cavitary formations. Selected cases should be treated with embolization or surgical methods.

The most common extra-articular organ involvement of RA is lung involvement. Interstitial fibrosis, pleurisy, and rheumatoid nodules are known as pulmonary lesions of RA. Pulmonary nodules are frequently seen in male, seropositive patients, and in patients with subcutaneous nodules. Rarely, necrobiotic cavities may develop in rheumatoid nodules.[4-6]

When cavitary lung lesions are detected in a patient who is diagnosed with RA and treated with anti-tumor necrosis factor (anti-TNF) drugs for a long time, tuberculosis infection should be considered in the differential diagnosis. Pulmonary tuberculosis lesions are most often located in the upper lobe or lower lobe superior; however, they can be seen in atypical localizations, often appearing in the form of consolidation, tree-in-bud lesions, nodules, and cavitations.

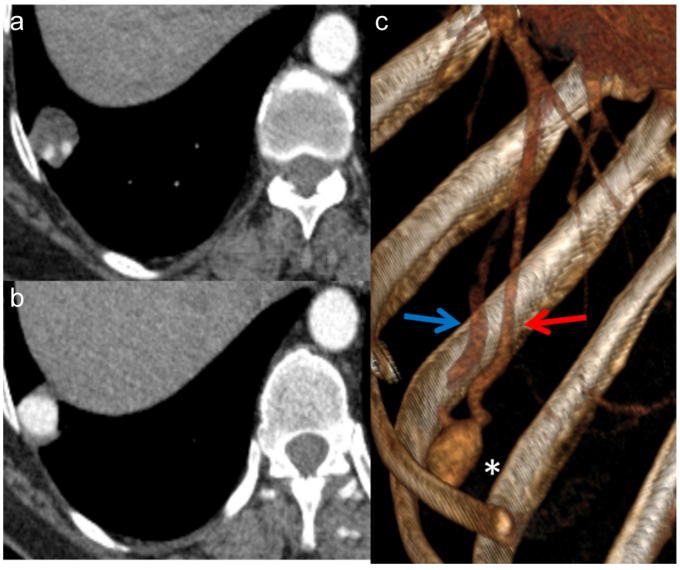

Figure 2. The follow-up contrast-enhanced CT (CECT) 3 months later revealed a stable nodule with contrast-enhancement of dilated feeding artery, vein (a), and the aneurysm (b). The 3D contrast-enhanced CT reconstructions showed dilated feeding artery (red arrow), dilated vein (blue arrow), and aneurysmal lesion (white asterisk) (c). CT, computed tomography.

Because our case was immunosuppressive with the diagnosis of RA, in the differential diagnosis of the cavitary lesion defined in non-contrast thorax CT, malignancies, rheumatoid pulmonary nodules, and infections, especially tuberculosis, were considered. Bronchoscopy was planned to obtain bronchial lavage for the patient who could not produce sputum, but it could not be performed because the patient did not accept the procedure. In the patient's control contrast-enhanced thorax CT, contrast enhancement of the artery and vein in the lesion could be evaluated radiologically. The fact the patient was asymptomatic, the physical examination and laboratory tests were normal, and the size of the lesion was stable in the follow-up CT supported the diagnosis of PAVM. Although there are treatment options such as surgery or embolization in symptomatic cases, since our patient was asymptomatic and did not accept the treatments, she was followed up clinically and radiologically with contrast-enhanced thorax CT.

Considering pulmonary arteriovenous malformations may progress to complications such as bleeding and rupture even if they are asymptomatic, lesions with a malformation diameter greater than 2 cm or a feeding artery diameter greater than 3 mm should be treated.[1,7] It is reported in previous research that the success rate is high in cases with embolization. It is a less invasive and easier method compared to surgery.[7] Parenchyma-conserving surgical treatment should be preferred in cases where embolization fails, in cases with bleeding, and in contrast material allergy.[8] Depending on the size and location of the lesion, local excision, segmentectomy, lobectomy, or pneumonectomy may be preferred.[1,7,8]

Pulmonary arteriovenous malformations are nodular lesions located subpleural mostly in the lower lobes. It should be considered in the differential diagnosis of cavitary lung nodules.

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