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A CASE OF CHRONIC PULMONARY ASPERGILLOSIS DUE TO PULMONARY INFARCTION, MIMICKING CRYPTOGENIC ORGANISING PNEUMONIA

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ABSTRACT

A patient initially treated with corticosteroids for cryptogenic organising pneumonia following pulmonary infarction, developed a worsening condition with progressive cavitary formations in both lower lung lobes. Contrast-enhanced chest computed tomography revealed a pulmonary embolism, and serum anti-Aspergillus IgG antibody analysis yielded a strong positive result. Consequently, the patient was diagnosed with pulmonary infarction with Aspergillus infection; organising pneumonia in surrounding areas reflected the repair process. Following treatment with anticoagulants and antifungal agents, the patient was successfully discharged. Hence, pulmonary infarction should be considered in cases of refractory lung lesions.

KEYWORDS

Pulmonary aspergillosis, pulmonary infarction, organising pneumonia

LEARNING POINTS

- Pulmonary infarction should be considered in case of refractory lung lesions, even if the patient does not have the risk of embolism.
- Organising pneumonia should be assessed carefully because it may occur as a repair process of various lung diseases.

INTRODUCTION

Pulmonary infarction results from occlusion of the distal pulmonary artery, leading to ischaemic injury and further progressing to necrosis of the occluded lung tissue[1]. The risk of pulmonary infarction has been reported to be higher in younger patients without cardiopulmonary comorbidity[2]. Additionally, pulmonary infarction can be complicated by subsequent infections in the necrotic area[3]. Here, we report a case of chronic pulmonary aspergillosis following pulmonary infarction, which mimics cryptogenic organising pneumonia.

CASE DESCRIPTION

A 61-year-old woman presented with a persistent cough

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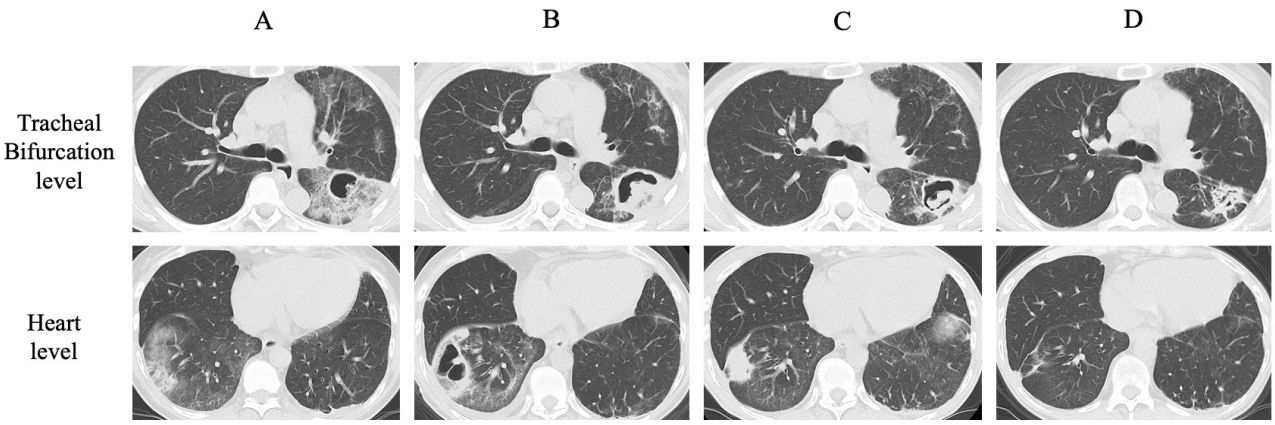

Figure 1. Chest computed tomography at the height of tracheal bifurcation and at the height of heart showed the shadows in both lower lung lobes on the initial admission (A), on the second admission (B), two months later from the initial admission (C), and six months later from the initial admission (D).

and dyspnoea she had for several months, seeking medical attention at our hospital. Initially, she received treatment for pneumonia with levofloxacin; however, her condition did not improve. She was referred to our department and upon examination, her vital signs were within the normal range, and auscultation revealed fine crackles in the right lower lung dorsally. Blood analysis showed an elevated C-reactive protein (CRP) level of 18.58 mg/dl. Tests for rheumatoid factor, antinuclear antibodies and antineutrophil cytoplasmic antibodies yielded negative results. The sputum culture did not indicate any significant bacterial presence. Chest computed tomography (CT) imaging revealed an infiltrative shadow in the left S6 with a cavity and ground-glass opacities in the periphery of the right lower lobe S7-8 *(Fig. 1A)*.

On the day of admission a bronchoscopy was performed, revealing findings consistent with mild chronic inflammatory cell infiltration and fibroblast proliferation with a fibroblastic plug in the transbronchial lung biopsy from the left S6 *(Fig. 2)*. Given the previous ineffectiveness of levofloxacin and the observed histological features, the diagnosis of cryptogenic organising pneumonia was established.

Treatment with methylprednisolone for organising pneumonia was initiated on the day of admission. With continued steroid therapy, CRP levels exhibited a declining trend and the patient's condition improved, ultimately leading to discharge on the 15th day. However, one-week post discharge, the patient presented with rusty sputum and fever. A chest CT revealed the enlargement of the cavity in the left S6 with elevation of scab-like portions and newly appearing cavities in the infiltrative shadow of the lower right lobe *(Fig. 1B)*. Given the presence of multiple cavity shadows with scab-like elevations, fungal infections – including chronic pulmonary aspergillosis – were suspected. On hospitalisation, a bronchoscopy was performed on the same day. Similar to the findings during the previous admission, histological features were consistent with organising pneumonia, and no fungal infection was detected. Tazobactam-piperacillin and liposomal amphotericin B were initiated. After confirming the negative result of the Cryptococcus antigen test, antifungal therapy was switched to voriconazole. Subsequently, strongly positive anti-Aspergillus IgG antibodies were identified (80 > AU/ml). On the 12th day of the second admission there was an increase in oxygen requirements, and a transthoracic echocardiogram

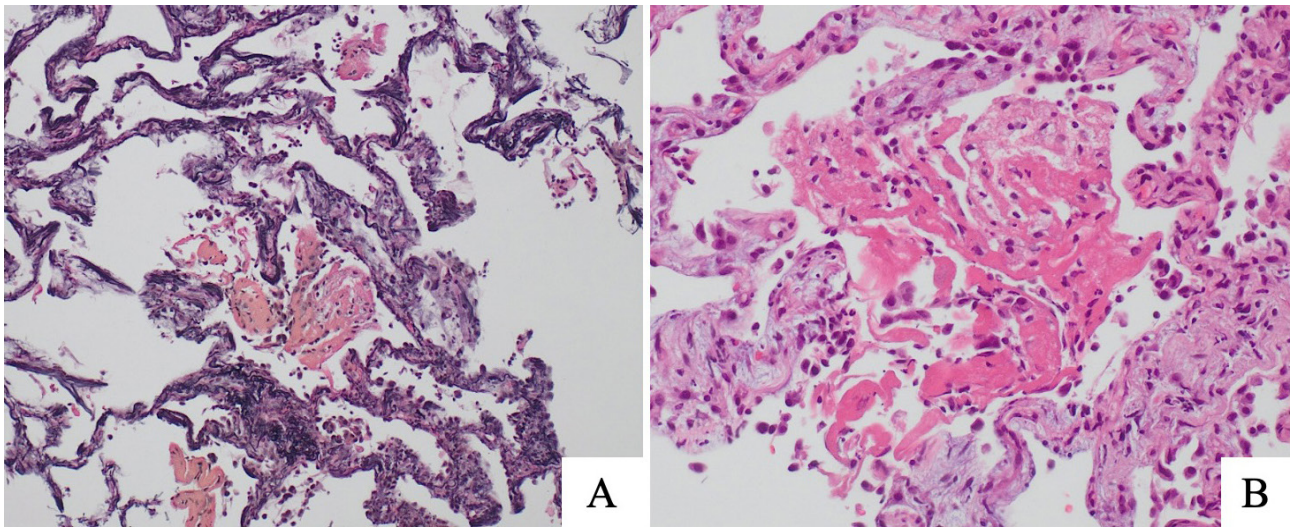

Figure 2. Pathological images of the lung specimen obtained through bronchoscope on the initial admission showed intra-alveolar fibrous exudate using Elastica-Van Gieson staining with 100× magnification (A) and using haematoxylin-eosin staining with 200× magnification (B).

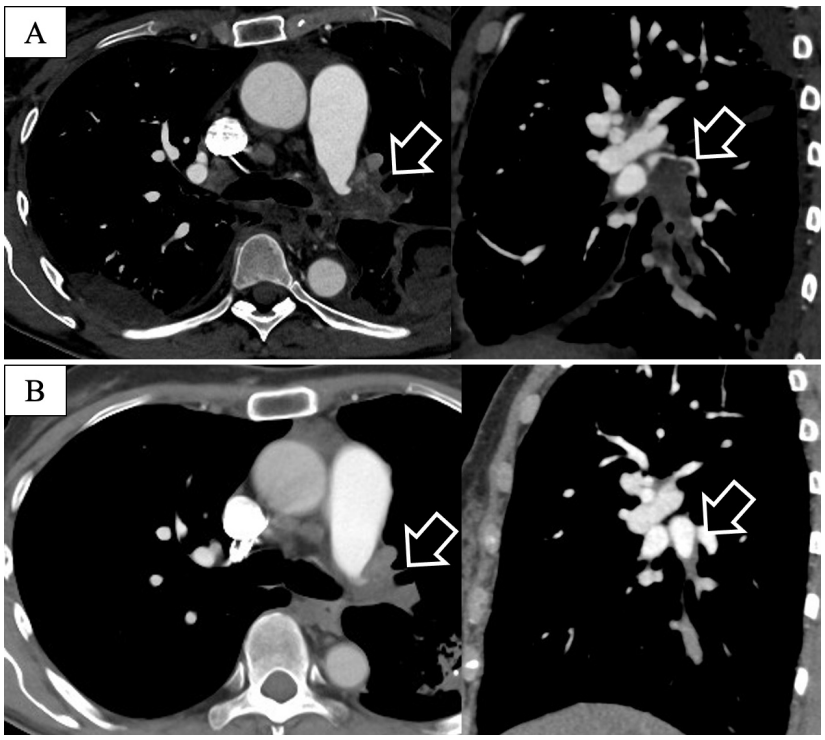

Figure 3. Enhanced computed tomography images showed thrombus in the left pulmonary artery bifurcation (left arrow) and in the right common basilar artery bifurcation (right arrow) on the 12th day of the second admission (A). The thrombus in the left pulmonary artery remained unchanged (left arrow), but the thrombus in the right basilar pulmonary artery has almost disappeared (right arrow) six months later from the initial admission (B).

revealed a marked elevation in the tricuspid regurgitation pressure gradient to 69 mmHg. A contrast-enhanced CT scan revealed bilateral pulmonary emboli *(Fig. 3A)*. The thrombi matched the distribution of shadows in the left S6 and lower right lobe where cavitary formations were observed. Finally, we reached the diagnosis of pulmonary infarction with Aspergillus infection and organising pneumonia in the surrounding areas.

Heparin and warfarin were initiated for pulmonary emboli. Despite requiring up to 3 litres of oxygen, the patient did not require oxygen at rest by the 29th day of the second admission. Recognising organising pneumonia as a secondary manifestation, steroids were tapered off. A thorough search for thrombogenicity revealed no abnormalities, thereby ruling out deep vein thrombosis, malignancy or vasculitis. The patient was discharged home on the 32nd day of the second admission.

After the initiation of warfarin and voriconazole, the cavity in the right lower lobe rapidly disappeared and in the left S6 shrank, with the surrounding shadows mostly resolving *(Fig.1C and 1D)*. Six months after her visit, there was no significant change in the thrombus beyond the left pulmonary artery branch; however, the thrombus beyond the right main pulmonary artery was notably diminished in size *(Fig. 3B)*.

DISCUSSION

We present a case of pulmonary infarction concomitant with chronic pulmonary aspergillosis, exhibiting features reminiscent of cryptogenic organising pneumonia. Chronological CT and thrombus images are depicted in *Fig. 1, 2 and 4*.

The aetiology of venous thrombosis can be categorised into genetic and acquired factors. In this instance, investigations into protein C, protein S and antithrombin deficiencies revealed no genetic abnormalities. Regarding acquired factors, conditions such as immobility, surgery, trauma and medications such as oral contraceptives, malignancies, smoking, pregnancy, hyperlipidaemia, essential thrombocythaemia, myeloproliferative disorders including polycythaemia vera and paroxysmal nocturnal haemoglobinuria were considered[4]. Blood sampling, contrast-enhanced CT scans and positron emission tomography scans were conducted in this case; however, none raised suspicions. Pulmonary infarction can be linked with venous thrombosis. Islam et al. reported a higher incidence of pulmonary embolism in younger patients without identifiable thrombotic risk factors; nevertheless, the precise mechanisms remain unclear[2]. It is crucial to maintain vigilance for pulmonary embolism even in the absence of thrombotic risk factors or in younger patients.

In this case, infection may have occurred following pulmonary infarction. Pulmonary aspergillosis typically results from underlying conditions such as acidosis, chronic obstructive pulmonary disease, pneumothorax or previously treated lung cancer[5]. There are several case reports where chronic pulmonary aspergillosis developed following pulmonary infarction[3,6]. Chronic cavitary pulmonary aspergillosis is defined by the Infectious Diseases Society of America. The criteria include progressive pulmonary cavities with Aspergillus IgG antibody positivity or microbiological evidence of Aspergillus, along with clinical symptoms such as cough, fever or weight loss[7]. However, obtaining microbiological evidence in chronic pulmonary aspergillosis would be quite challenging because of its low culture positivity. In contrast, the anti-Aspergillus IgG antibody test has been reported to be positive in approximately 85% of cases, making it diagnostically valuable[8]. In this

case, organising pneumonia was observed around cavities. Organising pneumonia is a non-specific response to various pulmonary injuries, and it can manifest around cavities in chronic pulmonary aspergillosis[9,10]. Therefore, we need to be cautious while interpreting organising pneumonia. If the clinical course is not compatible with usual organising pneumonia, reconsidering the diagnosis may be necessary.

There is a concern that steroid therapy for organising pneumonia may have led to Aspergillus infection in this case. However, at the initial visit the patient already presented with a cavitary formation exhibiting a scab-like shadow in the left lung, so it is reasonable to assume that the Aspergillus infection occurred prior to the initial visit. Aspergillus infection usually requires underlying diseases[5]; pulmonary infarction was considered to be the underlying disease in this case.

We present a case of chronic pulmonary aspergillosis resulting from pulmonary infarction, which mimicked cryptogenic organising pneumonia. When confronted with treatment-resistant pulmonary lesions, it is crucial to consider the potential for pulmonary perfusion disorders, even in the absence of a history of thrombotic factors.

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