Pulmonary actinomycosis masquerading as aspergilloma

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SUMMARY

We report a case of a 34-year-old man who was initially treated as community acquired pneumonia following a three-month-history of productive cough, loss of weight and loss of appetite. However, three months after discharged from the hospital, he presented again with worsening respiratory symptoms and radiological evidence of a lung cavitation with intracavitary lesion resembling an aspergilloma associated with surrounding consolidation. Unfortunately, he remained symptomatic despite on antifungal therapy. The repeat computed-tomography demonstrated persistent cavitating lesion with development of necrotising pneumonia. He underwent lobectomy and the histopathological analysis of the resected specimen however revealed the diagnosis of actinomycosis.

KEY WORDS:
Actinomycosis, Aspergillosis

INTRODUCTION

Patients with pre-existing lung cavities and scarring are at risk of developing fungal colonisation. These intracavitary fungal masses are called aspergilloma since aspergillus species are the most commonly implicated fungi. On imaging, aspergilloma has a typical 'ball-in-hole' appearance associated with crescent sign. However, the appearance of 'ball-in- hole' may also be found in other condition including coccidioidomycosis, actinomycosis, nocardiosis, candidiasis, lung adenocarcinoma, and intra-cavitary haematoma.[1]

Actinomycosis is a chronic and slowly progressive suppuratives and granulomatous disease caused by filamentous gram positive anaerobic bacteria from the Actinomycetaceae family (genus Actinomyces). It is a rare disease, and due to lack of data, especially in developing countries, estimates of its incidence are not recent. In the 1960s and 1970s, the incidence in Germany and the Netherlands was estimated to be one per million, whilst Cleveland, USA was reported to be one per 300 000 respectively.[2] A higher incidence of pulmonary actinomycosis has been reported in patients with underlying respiratory disorders such as emphysema, chronic bronchitis, bronchiectasis and any infection leading to lung parenchyma destruction. Alcoholism, poor oral hygiene, dental disease, and facial or dental trauma are important risk factors for the thoracic form.[3]

The clinical presentations of actinomycosis are often non-specific and include chronic cough, fever, chest pain and haemoptysis. Some patients may also be asymptomatic at presentation.

Our case report highlights an interesting case of lung actinomycosis mimicking a fungal infection and the importance of recognising this rare and unusual manifestation lung Actinomycosis.

CASE REPORT

A 34-year-old man presented with three-month history of productive cough, loss of weight and loss of appetite. He had previous history of hydatid cyst in the dome of the liver 24 years ago following which he underwent antihelminthic therapy and surgery. He has been well since until the current admission. At presentation, he was haemodynamically stable and mildly pyrexic (37.8°C). There was reduced air entry on the right lower zone.

His chest radiograph showed an ill-defined opacity in the right lower zone. He was treated as community acquired pneumonia with intravenous antibiotics. He responded and discharged from the hospital. However, he redeveloped persistent cough with greenish sputum. A repeated chest radiograph showed marginal worsening of the opacity in the right lower zone. A CT scan was performed and revealed a thick- walled cavitation with intracavitary mass in the anterior segment of the right lower lobe (Figure 1). The intracavitary mass showed multiple internal tiny air pockets within, mimicking an aspergillosis. Note was also made of the presence of air crescent sign. The adjacent lung parenchyma showed consolidative changes. In addition, there was a cluster of calcifications at the dome of the liver likely represent dystrophic calcifications secondary to previous history of hydatid cyst disease and operation.

The sputum samples for acid fast bacilli (AFB) were negative. Bronchoscopy was performed and the bronchoalveolar lavage (BAL) specimens were also negative for AFB. No actinomycetes were identified. The culture of these BAL specimens did not grow any specific organism, tuberculosis or fungus. In addition, there were no malignant cells.

He further progressed with worsening appetite, weight loss and an episode of self-limiting haemoptysis. Despite on short course of antibiotics (Augmentin) and additional antifungal

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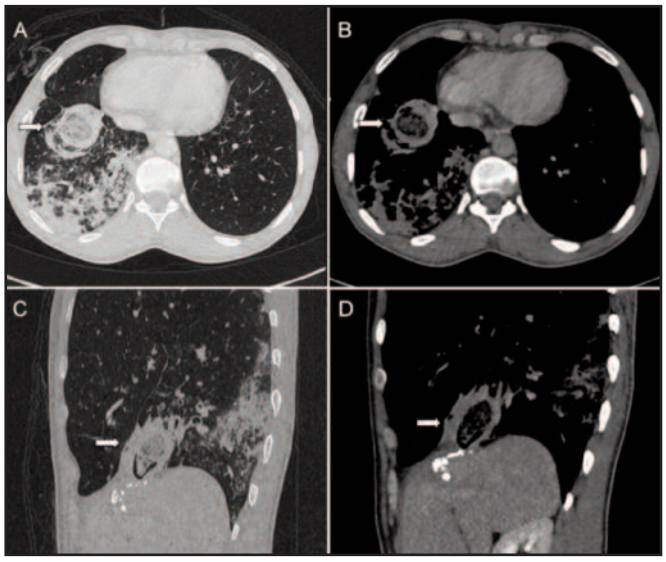

Fig. 1: Selected CT images in axial and sagittal views in both lung and soft tissue window settings.

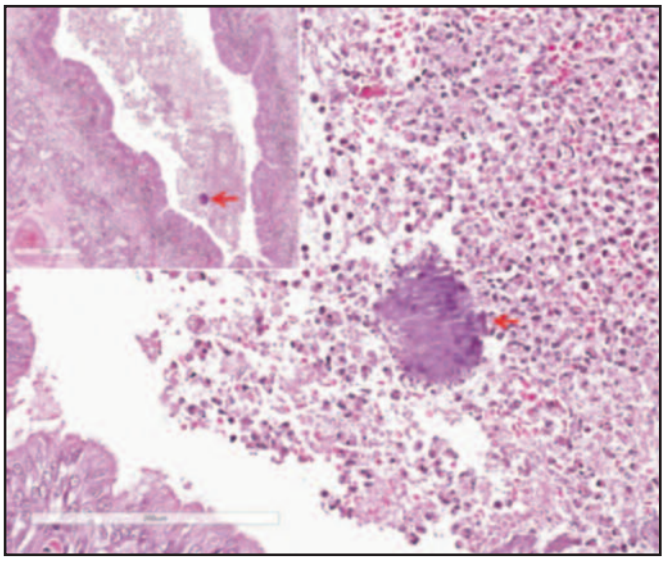

Fig. 2: HPE image of the resected lung tissue (Haematoxylin and eosin stain).

therapy (Itraconazole) for a total of three months, his condition continued to worsen. The antifungal agent was commenced following the discussion at the multidisciplinary team meeting. The team felt that the presence of multiple tiny air pockets within the intracavitary mass on CT was highly suspicious of a fungal ball and the surrounding consolidation could represent progression of the active component. A repeat computed-topography (CT) scan revealed worsening of the consolidation with newly developed bronchiectatic changes and areas of hypodensity suggestive of necrotising pneumonia. He was further discussed at the multidisciplinary team meeting and the decision for surgery was made given that the medical therapy has failed. A right posterolateral thoracotomy with lower lobe lobectomy was performed. Intra-operative findings revealed a cavitation with brownish intracavitary ball of necrotic materials measuring 5 x 7 cm in the consolidated right lower lobe. No pus collection was noted. The histopathological analysis of the resected lung revealed presence of actinomycete-like organism (Figure 2). The organisms comprised basophilic granules with peripheral radiating filaments surrounded by neutrophils. Special stain study illustrates that the organisms are gram positive bacilli and negative with Ziehl Neelsen stain. There were no fungal hyphae to suggest aspergillosis. His antifungal treatment was stopped as the final pathology findings demonstrate actinomycetes, which has been already treated with lobectomy and intravenous antibiotics post- operatively. He was well and has gained weight upon follow up at the chest clinic a few months later.

DISCUSSION

Actinomycetes are a group of aerobic and anaerobic bacteria in the order of Actinomycetales. These organisms are genetically varied but morphologically similar, exhibiting characteristic filamentous branching structures which then fragment into bacillary or coccoid forms. Some aerobic and anaerobic bacteria from this group particularly Actinomyces and Nocardia, respectively, can cause similar clinical syndromes involving the lung, bone and joint, soft tissue, and the central nervous system hence the diagnosis of these two often delayed. They are called "great masqueraders," and the hallmark of both infections is abscess formation and chronic progression of infection without regard to anatomic barriers.[4] Rarely, these bacteria may cause slow progressing infection known as Actinomycosis which is usually characterized by abscess formation, tissue fibrosis and draining sinuses.1 Actinomycosis commonly occurs in immunocompetent person but may also occur in immunocompromised patients.

Actinomycosis can occur at any age, but most cases are reported in young to middle-aged adults (20-50 years old). The prognosis of all forms of actinomycosis has greatly improved with the availability of antibiotics. The incidence of infection is two to four times higher in males compared with females.[5] This difference maybe attributable to poorer oral hygiene and higher incidence of facial trauma in males than female.

The radiologic finding of pulmonary actinomycosis include air space consolidation, multifocal mass like lesion, usually peripheral and not limited to pulmonary segments, cavitation with a thick regular wall, mild enlargement of mediastinal lymph nodes, small plural effusion or empyema, mild pleural thickening adjacent to airspace consolidation, and chest wall invasion.[1] Rarely, thoracic actinomycosis may lead to formation of intracavitary ball mass mimicking aspergilloma. Intracavitary lung colonisation within a cavity may give rise to 'ball-on-hole' appearance on CT scan. This form of actinomycosis is usually observed in patients with diabetes. The appearance of the 'ball-in-hole' may be due to actinomycete mycelia with or without co-existent fungal infection in the cavities.[1] It is also important to note that there are other causes of 'ball-in-hole' appearance including mycobacteria, neoplasia, and zoonoses that may mimic aspergilloma.

The presence of sulphur granules that was described in Actinomycosis may be misleading, because the granules do not contain sulphur but reflects the yellow colour of the granule in pus. Microscopically actinomycocete is evidenced by clumps of basophilic granules with peripheral radiating filaments surrounded by neutrophils. Gram staining reveals masses of gram-positive branching filaments. Another histologic feature of actinomycosis is an inflammatory pseudo tumour of the organising pneumonia type with marked fibroblastic proliferation and diffuse chronic inflammatory cells.[1]

The actual cause of the actinomycosis in the present case was unclear. We suspected that one possible contribution to the pulmonary actinomycosis was the fact that the underlying lung at the base of the right hemithorax may had been damaged with scarring following previous liver hydatid cyst infection and operation. Presence of underlying chronic lung changes was a known predisposing factor. However, we acknowledged that the time interval between the previous insult and the current presentation was too long. There were no other contributing risk factors identified in this case.

CONCLUSION

This case illustrates the importance of having a list of differential diagnoses, including rare diseases in treating cavitating lung lesion. Cardiothoracic intervention is essential in treating necrotizing pneumonia, which failed medical therapy. Multidisciplinary approach is crucial in deciding the best course for patient's management.

REFERENCES

1. Gazzoni FF, Severo LC, Marchiori E, Guimarães MD, Garcia TS, Irion KL, et al. Pulmonary diseases with imaging findings mimicking aspergilloma. Lung 2014; 192(3): 347-57
2. Wong VK, Turmezei TD, Weston VC. Actinomycosis. BMJ 2011; 343: d6099.
3. Han JY, Lee KN, Lee JK, Kim YH, Choi SJ, Jeong YJ, et al. An overview of thoracic actinomycosis: CT features. Insights into imaging 2013; 4(2): 245-52.
4. Sullivan DC, Chapman SW. Bacteria that masquerade as fungi: actinomycosis/nocardia. Proceedings of the American Thoracic Society 2010; 7(3): 216-21.
5. Pradeep J, Muthu T, Raave L. Actinomycosis. International Journal of Science and Research 2013; 5(2): 2153-5.