A Rare Case Of Solitary Pulmonary Nodule; Pulmonary Actinomycosis

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Abstract

Actinomycosis is a subacute to chronic bacterial infection caused by filamentous, gram-positive, anaerobic to microaerophilic bacteria that are not acid-fast. Pulmonary actinomycosis is rare, but its diagnosis is changing due to its variable presentation and the similarity in appearance to other intrapulmonary diseases. Here we report a 56-year-old woman with a solitary pulmonary nodule over the right upper lobe. Pulmonary neoplasm was highly suspected in this patient. Chest computerized tomography (CT) showed a nodule, 15*17 mm in size in the right lower lobe. Fluorodeoxyglucose-positron emission tomography (FDG-PET)/CT scanning revealed a positive reaction in the right lower lobe lesion. She was introduced to our department. CT-guided fine needle aspiration cytology (FNAC) was performed to establish diagnosis. Histopathological examination demonstrated this patient had an Actinomyces infection. Pulmonary actinomycosis should be kept in mind in differential diagnoses of solitary pulmonary nodule.

Keywords: Pulmonary actinomycosis, solitary pulmonary nodul, differential diagnoses.

Introduction

Actinomycosis is a subacute to chronic pulmonary infection caused by an Actinomyces species, with Actinomyces israelii being the most common pathogen (1-4). Actinomyces are gram-positive, filamentous branching rods that are considered normal flora of the human oropharynx, gastrointestinal tract and urogenital tract (3,5). Actinomycosis is considered to be a rare infection, and usually occurs in patients with compromised immune function or poor oral hygiene. Pulmonary infection due to Actinomyces is presumed to be caused by the aspiration of oropharyngeal secretions into the lungs (3) and pulmonary actinomycosis is estimated to account for approximately 15-20% of actinomycosis cases(6). Actinomycosis is confirmed by the isolation and culture of Actinomyces colonies and/or the histopathologic findings of sulfur granules (2,5). Despite clues suggestive of the disease, delayed diagnosis or misdiagnosis as tuberculosis, lung abscess, or lung carcinoma is common (6).

Solitary Pulmonary Nodule secondary to pulmonary actinomycosis is considered to be an extremely rare condition. We report here a case of pulmonary actinomycosis that was diagnosed by computerized tomography (CT)-guided FNAC as a rare cause of solitary pulmonary nodule.

Case

A 56-year-old woman was admitted with the complaints of intermittent cough with blood-tinged sputum for 2 years, fatigue and weight loss. The medicine she took from other clinics did not markedly improve the symptoms. She smoked cigarettes 1 pack a day for over 20 years. A physical examination showed that this patient was moderately developed and nourished and had clear consciousness. There was no evidence of digital clubbing, edema or cyanosis of the extremities. Upon presentation, the patient had a heart rate of 88 beats/min, respiratory rate of 24 breaths/min, blood pressure of 135/62 mmHg, and a SpO2 on room air of 96%. Respiratory examinations found no cervical lymphadenopathy, musculoskeletal disorder or other abnormalities. The remainder of her physical exam was unremarkable. Laboratory data revealed normal blood count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and renal and liver functions. Sputum examinations (three consecutive samples) were negative for acid-fast bacilli, malignant cells, or fungal elements. The contrast-enhanced computerized tomography (CT) showed a speculated mass, 14*17 mm in diameter, in the right lower lobe, which was highly suspected as a malignancy (Figure 1). Therefore he was referred to our clinic for a further examination and treatment.
In our clinic, the FDG PET (fluorodeoxyglucose positron emission tomography)/BT revealed a hypermetabolic lesion over the right lower lobe of the lung of the patient, with a maximum standardized uptake value (SUV) of 5.2 in the RLL nodule which favors a malignancy (Figure 1). Bronchoscopy revealed normal airways and mucosa and bronchoalveolar lavage was negative for malignant cells or fungal elements. CT-guided fine needle aspiration cytology (FNAC) was done from the right lung mass lesion. The smears were prepared and stained with haematoxylin and eosin, periodic acid Schiff (PAS), and Giemsa stains. The smears revealed radiating filamentous colonies of Actinomyces in a background of neutrophilic exudates; haematoxylin and eosin stain also showed Actinomyces colonies (Figure 2), resulting in the confirmation of the diagnosis of pulmonary actinomycosis. The patient was treated with intravenous penicillin for a month and then given oral penicillin for six months. The patient responded well to the above treatment; this was confirmed in the follow-up radiological examination at the end of six months (Figure 3).

**Figure 1 A and B.** Pulmonary actinomycosis in 56-year-old woman. A. Axial transverse CT scan shows a speculated mass, 14*17mm in diameter, in the right lower lobe. B. Increased 18F-FDG uptake is observed in lesion on PET image (peak standardized uptake value = 5.2).

**Figure 2.** Colonies of radiating filamentous Actinomyces surrounded by neutrophils (H-E, ×400).

**Figure 3.** Control axial transverse CT scan at the end of 6 month therapy.

**Discussion**

Pulmonary actinomycosis is a rare bacterial lung disease and causes lung cavities, lung nodules, and pleural effusion. Pulmonary actinomycosis might be related to poor oral hygiene or aspiration of gastrointestinal fluid, and as well the immunocompromised status (7). This is usually associated with chronic smoking and alcoholism. Our case had history of smoking. Baik et al. (8) reported 25 cases of pulmonary actinomycosis and hemoptysis was the most common clinical symptom occurring in 72% of the patients. Systemic symptoms such as fatigue and weight loss were also noted. The sign of subacute infection in this patient was prolonged, weight loss with recurrent, blood-streaked sputum for 2 years. Because of tuberculosis is the more common disease in our country, sputum examinations (three consecutive samples) were assessed and they were negative for acid-fast bacilli.

Radiographic and clinical features of pulmonary actinomycosis varied and could mimic a wide spectrum of benign and malignant diseases. In many cases, antituberculous medications have been administered without any improvement, and surgical resections have been frequently performed due to a suspicion of lung cancer. Radiologic findings of previous studies include consolidation with cavitation, lymphadenopathy, bronchiectasis within the consolidation, localized pleural thickening, and pleural effusion (9,10). Solitary pulmonary nodule secondary to pulmonary actinomycosis is extremely rare. Lin et al. reported pulmonary actinomycosis manifested as undetermined pulmonary nodule diagnosed by video-assisted thoracic surgery (VATS) (11). And also Mabeza et al. reported that up to 25% of cases with thoracic actinomycosis were initially misdiagnosed as malignancy (12) In general, high uptake on FDG PET suggests that the nodule contains active and proliferative lesions such as lung cancer, infiltration tumor, tuberculoma, and pulmonary mycosis. In our
case FDC PET/BT was performed to exclude malignancy and FDG is reported to accumulate in pulmonary nodule. This characteristic makes it quite difficult to distinguish pulmonary actinomycosis from lung cancer radiologically.

The diagnosis of pulmonary actinomycosis remains a clinical challenge. The culture of this bacterium from the sputum or bronchoalveolar secretions is technically difficult (13), and as well sometimes represents colonization. Thus, invasive procedures are necessary to confirm the diagnosis of pulmonary actinomycosis. Biopsy through fiberoptic bronchoscopy can be used in patients with endobronchial actinomycosis, and the ultrasound or CT guided biopsy used for the diagnosis of patients with peripheral lung lesions (14).

Previous studies reported that FNAC guided by CT or ultrasound has been proven to be a simple, safe, and effective diagnostic technique that reduces the number of unnecessary resections and also avoids difficulties in the management of the disease (15,16). Cytologically, the bacteria is identified by their growth pattern in colonies made up of dense masses of hematoxylin-stained, tangled filaments that radiate outward (17). Prolonged treatment with antibiotics (penicillin or amoxicillin) is indicated to ensure that the disease is cured.

In conclusion, we report a rare case of pulmonary actinomycosis presenting as a solitary nodule. Although pulmonary actinomycosis is rare, it should be considered in the differential diagnosis for a solitary nodule.

References