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Endobronchial Actinomycosis Simulating Endobronchial Tuberculosis : A Case Report

We report a case of a 70-year-old woman who presented with mild exertional dyspnea and cough. Fiberoptic bronchoscopic findings revealed an endobronchial polypoid lesion with stenotic bronchus. The lesion was very similar to endobronchial tuberculosis. Histologic examination of the biopsy specimen demonstrated *Actinomyces* infection. There was a clinical response to intravenous penicillin therapy. Primary endobronchial actinomycosis must be considered in the differential diagnosis of an endobronchial lesion, especially endobronchial tuberculosis in Korea.

Key Words: *Lung diseases, obstructive; Bronchial diseases; Actinomycosis; Tuberculosis*

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INTRODUCTION

Clinical presentations of thoracic actinomycosis show as unresolved pneumonia or a pulmonary infiltrative mass evidenced on routine chest X-ray examination (1). The infection typically spreads without regard to anatomic barriers, but involvement of the major bronchi is exceptionally uncommon (2). However, we found a case of actinomycosis of the major bronchi. At first, it was considered as endobronchial tuberculosis because it had similiar appearances in symptoms as well as radiologic and fiberoptic bronchoscopic findings in the endobronchial tuberculosis. We diagnosed the case by fiberoptic bronchoscopic biopsy.

CASE REPORT

In June 1998, a 70-year-old woman was admitted to the Korea University Guro-Hospital with a four-week history of mild exertional dyspnea, and mild cough with a small amount of whitish sputum. She also suffered an episode of toothache and painful swelling of the periodontal region for about two years. She has never smoked. There was no history of recurrent infection or other evidence of immunodeficiency. She was a housewife, who lived in Seoul.

According to physical examination, she showed an alert and oriented mental status. However, she had exertional dyspnea including bouts of cough. Her oral temperature was 37.6℃ and she appeared ill. She had a blood pressure of 130/80 mmHg, a respiratory rate of 22 breaths per min, and a pulse rate of 76 beats per min. Oral examination by a dentist revealed odontitis with periapical abscess on the left lower second molar tooth. Chest examination revealed mild expiratory wheezing of right middle and lower lung fields. However, crackles and pleural friction rubs were not audible.

Initial laboratory findings revealed a leukocyte count of 9,600/μL, a hemoglobin value of 12.9 g/dL, and a platelet count of 293,000/μL. Differential cell count disclosed the following values: neutrophils 61%; lymphocytes 31%; monocytes 6%; eosinophils 0.8%. The admission roentgenogram showed a volume loss of right lower lobe and focal consolidation. Computed tomography of the chest demonstrated patchy air-space consolidation and atelectasis of right lower lobe (Fig. 1). Her sputum examination was as follows: Gram stain showed many Gram positive cocci, AFB smear of her sputum could not find any organism, and there was no fungal agent. The patient underwent flexible fiberoptic bronchoscopy. A reddish, polypoid, and slightly friable lesion was noted

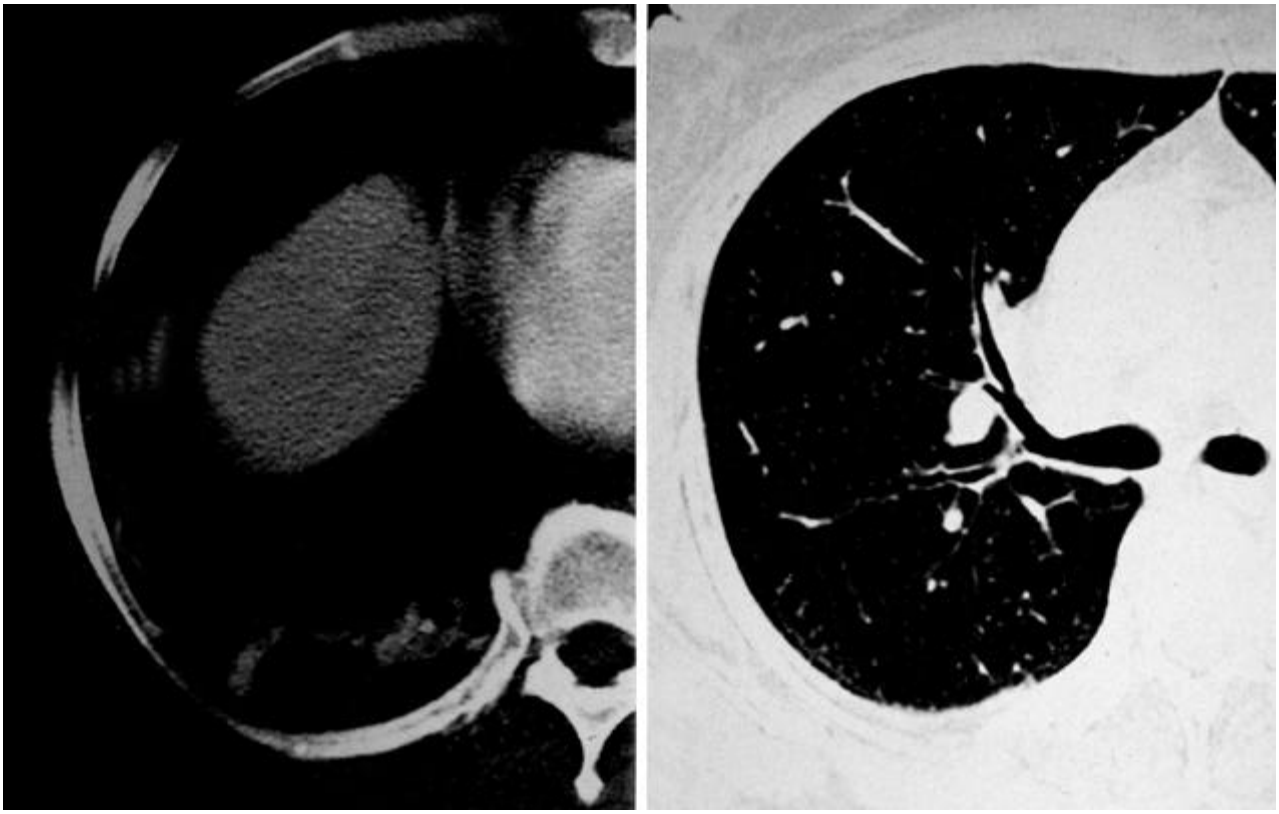

Fig. 1. Axial CT scans in mediastinal and lung window settings show focal bronchial narrowing in the distal part of intermediate bronchus, obliteration of right lower lobe bronchus, air-space consolidation and plate like atelectasis in right lower lobe.

in the proximal portion of the right lower lobe bronchus. The lesion obstructed 80% of the bronchial lumen (Fig. 2). We performed biopsy of the lesion. We performed a three-dimensional computed tomography of the affected lesion in order to get more precise information about the narrowed bronchus and endobronchial lesion. The film clearly demonstrated narrowing of the right lower lobe bronchus (Fig. 3). Histologically, the biopsy specimen revealed an acute inflammatory cellular infiltration and colonies which were formed of a felted network of filaments staining intensely with hematoxylin. At the edge of the colony, the individual hyphae may be surrounded with eosinophilic "clubbing" material. In some places "clubbing" material was absent. These findings were compatible with sulfur granule of *Actinomyces* infection. Other bacterial species were also noted around the sulfur granule (Fig. 4).

We thus confirmed the patient as an endobronchial actinomycosis.

The patient was initially treated with 1.5 million units of intravenous penicillin every six hr each day. After two weeks of therapy, her cough was resolved and exertional dyspnea improved. We then prescribed oral ampicillin. Duration of the antibiotic therapy will be about six to 12 months depending on her symptoms. We will also conduct a fiberoptic bronchoscopic examination.

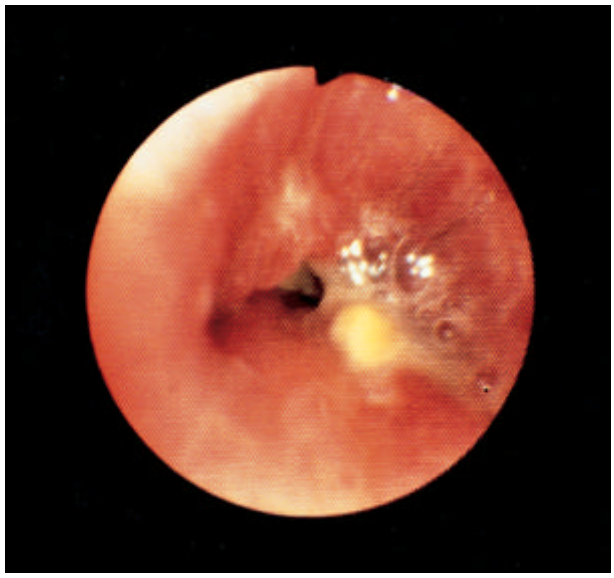

Fig. 2. Fiberoptic bronchoscopic finding shows subtotal occlusion of the right lower lobe bronchus with irregular, reddish, and polypoid mucosal lesion.

Fig. 3. Three-dimensional shaded-surface display of tracheobronchial tree clearly demonstrate the focal stenosis of the distal part of intermediate bronchus (arrow).

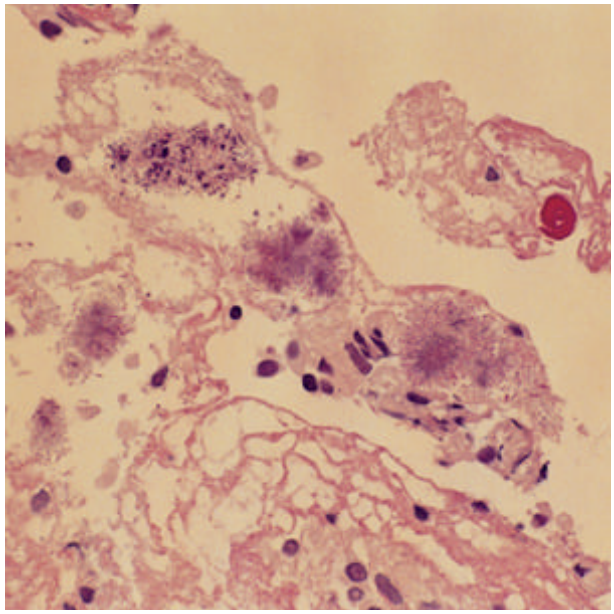

Fig. 4. Histologic slide stained with Hematoxylin and Eosin shows several sulfur granules containing eosinophilic clubbings on their peripheral portion (×600).

DISCUSSION

Actinomycosis is an infectious disease which is carried by the *Actinomyces*. The disease would affect any part of the human body. This organism is Gram positive and non-spore forming with strict or facultative anaerobic rods that normally inhabit anaerobic niches of the human oral cavity. The disease is classically divided into three types, depending on the anatomic sites involved: cervicofacial, abdominopelvic, and thoracic. The thoracic form constitutes 15 to 45% of cases (3). Aspiration of organisms from the oropharynx is the usual source of thoracic *Actinomyces* infection. Common primary lesion in the lung involves the peribronchial tissue, bronchioles, and alveoli. Direct extension may occur from disease in either the head and neck or abdominal cavity. However, secondary spread is very uncommon because of the advent of effective antibiotic therapy. Accordingly, primary lesion involving the major bronchi is exceedingly rare.

The organisms are not highly virulent and are found normally in the human oropharynx, particulary in persons with poor oral hygiene (4). In our case, she had an odontitis and periapical abscess in her tooth.

There are some case reports of endobronchial actinomycosis. In two of the cases, endobronchial lesions resulted from extension of intra-pulmonary diseases (5, 6). Another case, evaluating unresolved pneumonia, led to the diagnosis of endobronchial lipoma with superimposed actinomycosis (7).

Miracco et al. (8) reported a patient, who had required transient intubation six months earlier, presented with a large mass, containing microscopic foci, vegetable cells, and sulfur granules, occluding the right middle lobe bronchus without parenchymal involvement. In some reports, endobronchial actinomycosis was strongly associated with foreign body aspiration (4, 9, 10).

Even among immunocompromised hosts, such as HIV infected population, actinomycosis has not been shown to have an increased prevalence of infection. This is most likely due to partial susceptibility of the organism to antibiotics commonly used to treat persons with AIDS such as trimethoprim-sulfamethoxazole, isoniazid, rifampin, and cephalosporins. Cendan et al. (11) reported a case of endobronchial actinomycosis in a patient with AIDS. He proposed the possibility that endobronchial tissues may have been secondarily involved from a more distal infection as seen in tuberculosis. Another important point in endobronchial actinomycosis is the simulating condition of endobronchial involving lesion. Common causes of endobronchial obstruction are bronchogenic carcinomas, bronchial benign tumors, and endobronchial tuberculosis. Ariel et al. (12) reported five cases of endobronchial actinomycosis simulating bronchogenic carcinoma. Findings from Hashimoto (13) and Lau (14) also suggest the diagnosis of pulmonary neoplasm. Endobronchial tuberculosis, especially, is a common cause of endobronchial obstructive lesion in Korea. In endobronchial tuberculosis, fiberoptic bronchoscopy demonstrated that

exudative lesions were most common (43.3%) and ulcerative lesion, scarring and bronchoglandular appearance was also presented (15). In the fiberoptic bronchoscopic findings of our case, reddish, polypoid, and stenotic appearances of the endobronchial lesions were similar to that of endobronchial tuberculosis. So we thought the lesions were consistent with stenotic type of endobronchial tuberculosis. In addition, the patient's symptoms such as mild cough, low grade fever, mild exertional dyspnea, as well as airway obstructing findings such as localized wheezing on auscultation and volume loss on chest radiographs are also common findings of endobronchial tuberculosis. Reports seldom report primary endobronchial actinomycosis simulating endobronchial tuberculosis.

The hallmark of actinomycosis is the formation of sulfur granules. In a true sulfur granule, *Actinomyces* can be mixed with other microorganisms from the oral flora: Gram positive cocci, Gram positive bacilli, and fungi. Our case also has a histologic finding of mixed infection.

A difficulty in identifying *Actinomyces* organisms is their pleomorphism and tendency to fragment and stain unevenly by Grams methods. Moreover, *Actinomyces* organisms are anaerobic and will only grow in anaerobic conditions. This is why in our case the sputum and bronchial washings which were cultured under aerobic conditions were negative. Also *Actinomyces* findings by sputum cytology and/or culture, unless obtained directly from the bronchus, cannot be used as a definitive diagnosis due to its frequent presence as normal flora of the oral cavity (12). Even in the biopsy specimen, sulfur granules are very hard to find unless the specimen is resected by operation. Diagnosis of actinomycosis in a small, sometimes crushed bronchoscopic biopsy is difficult because the morphologic appearance of sulfur granules are not always the same as photos in a textbook. About ten cases diagnosed by bronchial biopsy have been reported in the literature as yet.

Primary endobronchial actinomycosis must be considered in the differential diagnosis of an endobronchial lesion, especially endobronchial tuberculosis in Korea.

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