A Rare Infection in Disguise - A Case of Pulmonary Actinomycosis

Author's Details:
Dushantha Madegedara[1], S A Luckmy[2], B M L S Basnayake[3], Prasanna Wijerathna[5], I M Nawarathne[4]
[1]Senior Consultant Respiratory Physician, [2,3,4]Senior Registrars in Respiratory Medicine, [5]Resident Respiratory Physician, National Hospital - Kandy, Sri Lanka. Corresponding author- Dushantha Madegedara (dmadegedara@yahoo.com)

Abstract
Actinomycosis is an unusual infection caused by Actinomyces species, which are anaerobic, filamentous gram-positive bacilli. It is responsible for chronic infections in the human body, particularly in the form of facial and abdominal sepsis with suppuration. Actinomycosis of respiratory tract involves larynx, bronchi as well as pulmonary parenchyma and the clinical presentation differs depending on the site of involvement. Due to non-specific nature of clinical and radiological presentations, the diagnosis of pulmonary actinomycosis can often be challenging. Here, we report a case of a female who presented with chronic cough and progressive shortness of breath for four months duration. The computer tomography of chest revealed an intrabronchial lesion mimicking lung malignancy. Subsequent fiberoptic bronchoscopy and histological examination confirmed the diagnosis of endobronchial foreign body associated with actinomycosis. The patient was commenced on intravenous penicillin following which complete resolution of symptoms and radiological clearance was observed. This case highlights the importance of considering uncommon infections like actinomycosis when patients present with non-resolving respiratory symptoms.

Keywords: *Actinomyces, pulmonary actinomycosis, foreign body*

Introduction

Actinomycosis is a rare indolent infection caused by bacteriae of the family Actinomycetacea which is a filamentous, gram positive, nonacid-fast anaerobic or facultative bacillus.(1) It causes suppurative infection more commonly in the oral cavity, cervicofacial region and gastrointestinal tract (1, 2) Pulmonary actinomycosis is relatively rare and accounts for nearly 15% of total cases
(3) and may affect the larynx, bronchi and pulmonary parenchyma. A number of risk factors have been associated with the development of actinomycosis including smoking, alcoholism, poor oral hygiene, various medical conditions causing immunosuppressive state (diabetes mellitus,

malignancies) and preexisting lung disease. (2) Most infections follow aspiration of oral or gastrointestinal secretions, hence are of particular importance. Patients may present with an array of manifestations, including consolidations, cavitation, mass lesions and mediastinal adenopathy often mimicking other common respiratory diseases, particularly tuberculosis given the high background prevalence in Sri Lanka as well as lung malignancy. (4) Therefore, a high degree of suspicion is essential not only to achieve early diagnosis, but also to prevent unnecessary treatments and psychological stress which accompany erroneous diagnoses.

We report a case of endobronchial actinomycosis who presented with a long history of respiratory symptoms. The macroscopic examination of the bronchial tree, as well as the contrast enhanced computer tomography (CECT) findings were more in favor of malignancy. However, the histological examination of the endobronchial lesion provided the definitive diagnosis of actinomycosis. Our aim is to stimulate clinicians to include atypical presentations of rare pulmonary infections in the differential diagnosis of common respiratory presentations.

Case presentation

A 62-year-old female presented with nonproductive cough and progressive exertional dyspnea (modified medical research council scale 3) for four-month duration which was associated with low grade intermittent fever and significant loss of weight. The patient had diabetes mellitus for 20 years with several macro and micro-vascular complications.

Clinical examination revealed pallor. She was afebrile at presentation and there was no clubbing or lymphadenopathy. Auscultation revealed coarse crepitations over the mid and lower zones of the right hemi thorax. Examination of other systems were normal except for preexisting peripheral neuropathy and pre-proliferative retinopathy. The basic investigations revealed neutrophilic leukocytosis (WBC 12000 x 10^9/l, neutrophil 64%, lymphocytes 24%, eosinophil 2%), C reactive protein (CRP) 226mg/dl and erythrocyte sedimentation rate (ESR) 56 millimeter/ first hour. Chest radiography illustrated a large ill-defined mass in the right hilar region with right lower zone consolidation (figure 1). Three samples of sputum for acid fast bacilli (AFB), AFB culture and Gene Xpert were negative. All other basic investigations revealed normal results. The possibility of lung malignancy with post obstructive pneumonia was considered based on the clinical evidence and further work up arranged after commencing on appropriate antibiotics. Contrast enhanced computer tomography (CECT) was performed which demonstrated a homogenously high (calcified) density solitary, endobronchial lesion measuring 8-millimeter widest dimension at the orifice of the right lower lobe bronchus. An extensive obstructive consolidation with air bronchogram was noted in the apical and posterior segments of the right lower lobe (figure 2 A, B). Fiber optic bronchoscopy was carried out and revealed a large mass at the right lower lobe bronchus which was surrounded by mucosal infiltration. The remaining segments of the right bronchial tree and contralateral bronchial tree were macroscopically normal (figure 3)

Multiple biopsies were obtained from the mass and the histological examination revealed multiple colonies of filamentous and cocco-bacillary forms of organisms, which resembled actinomycosis in the presence foreign vegetable matter, suggestive of food particle aspiration. There were extensive neutrophilic infiltrations, which surrounded the bacterial colonies (figure 4), with no evidence of neoplastic involvement. A definitive diagnosis of pulmonary actinomycosis was made and the patient was commenced on intravenous penicillin 4 million units six hourly after sensitivity test. There was significant response to treatment as observed by the improvement in clinical, biochemical and radiological improvement. (figure 5).

Three weeks later, a large foreign body was extracted from the right bronchial tree under general anesthesia. (figure 6). The patient was completely asymptomatic after 6 weeks of treatment, and a repeat bronchoscopic examination was performs which revealed near total resolution of the endobranchial mass lesion (Figure 7). The repeat CECT chest only demonstrated, residual bronchiectatic changes. The patient received a total of six weeks intravenous antibiotics and thereafter continued on oral penicillin 500 milligrams twice a day, for further 18 weeks. She is currently asymptomatic and is being followed up at the respiratory clinic.

Discussion

Pulmonary actinomycosis is a rare form of pulmonary bacterial infection (2) first described in early 1870s (3). Patients usually present with common respiratory symptoms, predominantly cough and chest pain. (5,6) Constitutional symptoms such as weight loss and fever occur more commonly in disseminated disease. (7,8) Although the disease is associated with a low mortality rate, (9) it can be associated with significant complications, including massive hemoptysis, abscess formation and formation of bronchopleural fistula. (3) Therefore, early diagnosis is essential, but unfortunately, remains a challenge due to its non-specific presentation. Consequently, the disease is often misdiagnosed as lung malignancy, tuberculosis, or other bacterial and fungal pneumonias. According to one study, actinomycosis was suspected initially in less than 7% of patients who actually had the disease (10). According to Mabeza et al, up to 25% of patients with pulmonary actinomycosis were at first suspected to have malignancy. (3) Furthermore, in countries with a high burden of tuberculosis, it is not uncommon for the treating physicians to misdiagnose and treat as clinically diagnosed pulmonary tuberculosis.

The diagnostic confirmation of pulmonary actinomycosis is based on the histopathology (11). However, these organisms are difficult to be cultured due to various reasons making the microbiological confirmation difficult. The fact that they exist as commensals in the oropharynx, gastrointestinal tract and female urogenital tract, previous antibiotic therapy, constraints of obtaining an optimal tissue sample and poor culture techniques all contribute to inadequate growth of the organism. The presence of sulfur granules enhances the accuracy of the diagnosis, but is not diagnostic as they could be also seen rarely in other infections such as nocardiosis, and chromomycosis. (12) The current standard of care for the management of Actinomycosis includes prolonged treatment with an appropriate antibiotic. The antibiotic of choice is penicillin, given intravenously in the initial stage followed by the oral form (13). Tetracycline and erythromycin are alternative antibiotics which can be instituted in the presence of contraindications such as penicillin allergy. (14) Surgical interventions are indicated when complications are present, for instance fistula formation, massive hemoptysis, abscess formation or empyema (15, 16).

In this case, it is likely that the presence of diabetes mellitus and previous foreign body aspiration may have contributed to pulmonary actinomycosis. Although the patient was unable to recall any prior history of aspiration, she agreed to the fact that she was engaged in habitual betel chewing with arecanut, (a nut widely used for chewing with betel) which was removed from the affected bronchus.

Conclusion

Pulmonary actinomycosis is an uncommon chronic bacterial infection which largely mimics pulmonary tuberculosis and pulmonary malignancy. Hence, increased awareness of this infection as well as a high degree of clinical suspicion is paramount for early diagnosis and appropriate treatment.

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None

Contribution:

DM, SAL, IMN and BMLSB contributed to the manuscript preparation. DM supervised the all the aspects and was the supervising care physician. PW was involved in management.

Ethical statement:

Informed written consent was obtained from the patient for the publication of the case report and all the accompanying images.

Conflicts of interest:

All the authors have declared that they have no conflicts of interest.

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Figures

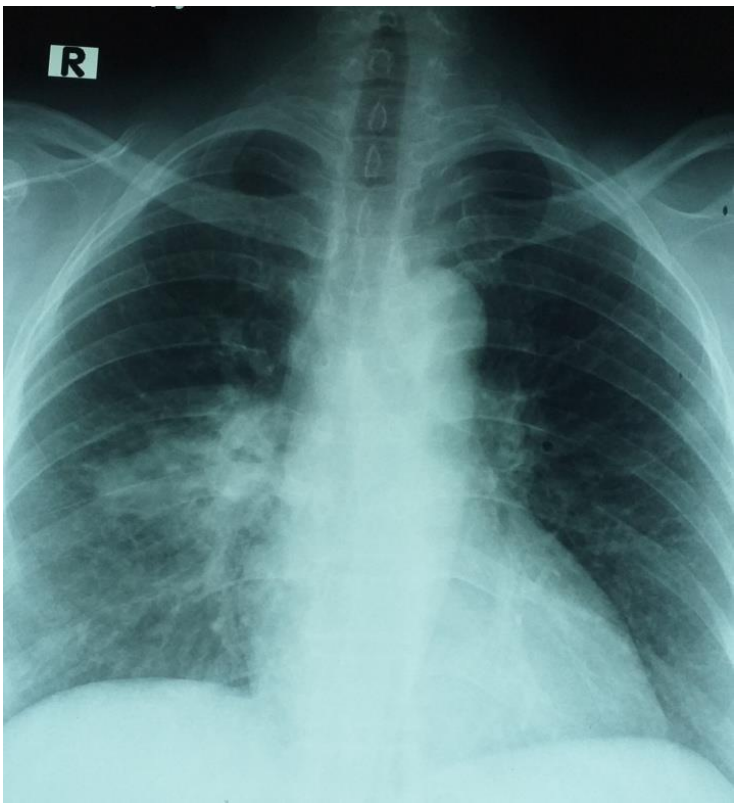

Figure 1- chest radiograph demonstrating a large irregular mass in the right hilar region with air space consolidations in the right lower zone

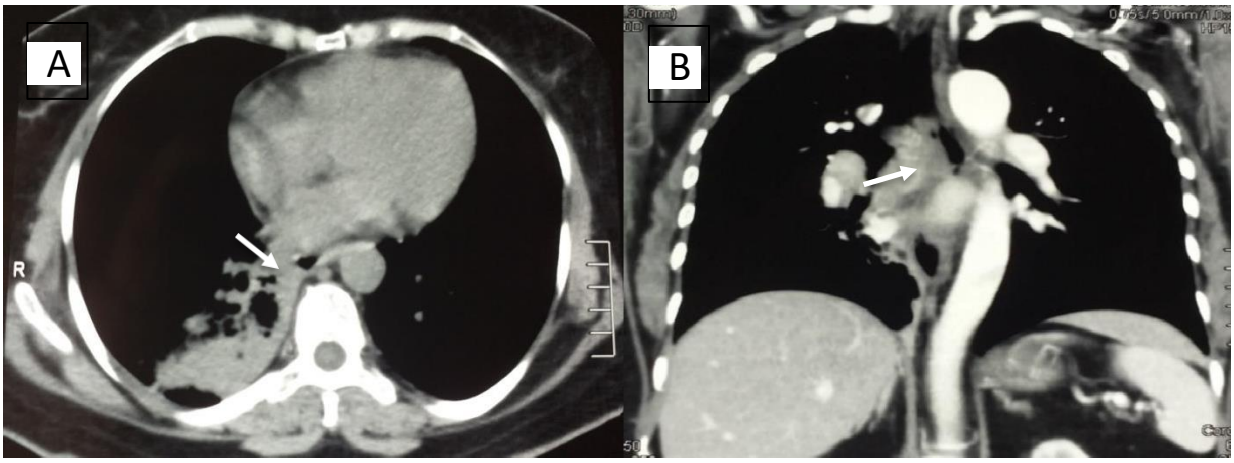

Figure 2 (A) Computed tomography mediastinum window showing an irregular mass in the right lower lobe bronchus with consolidation. (arrow) (B) Coronal view illustrating an endobronchial mass. (arrow)

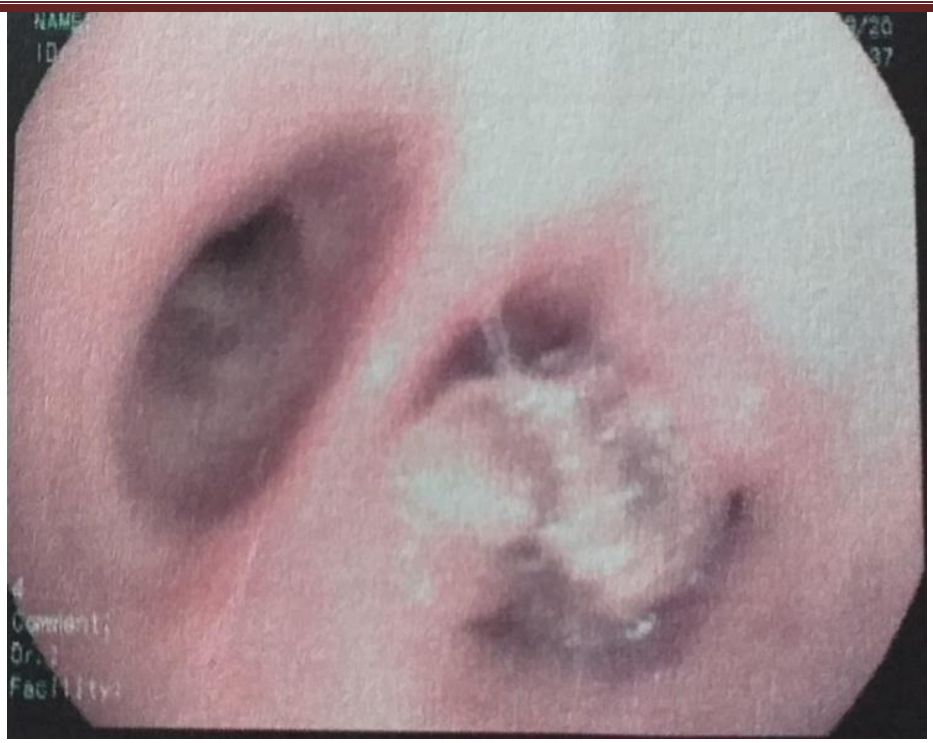

Figure 3- Bronchoscopic appearance of endobronchial mass seen at the orifice of the right lower lobe bronchus

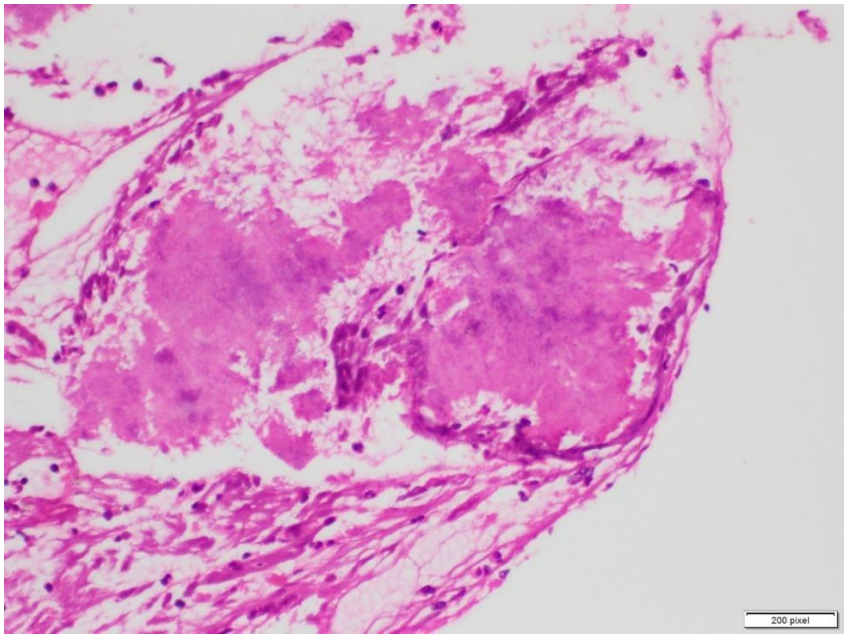

Figure 4- Histology slide stained with haemotoxylin and eosin showing actinomyces.

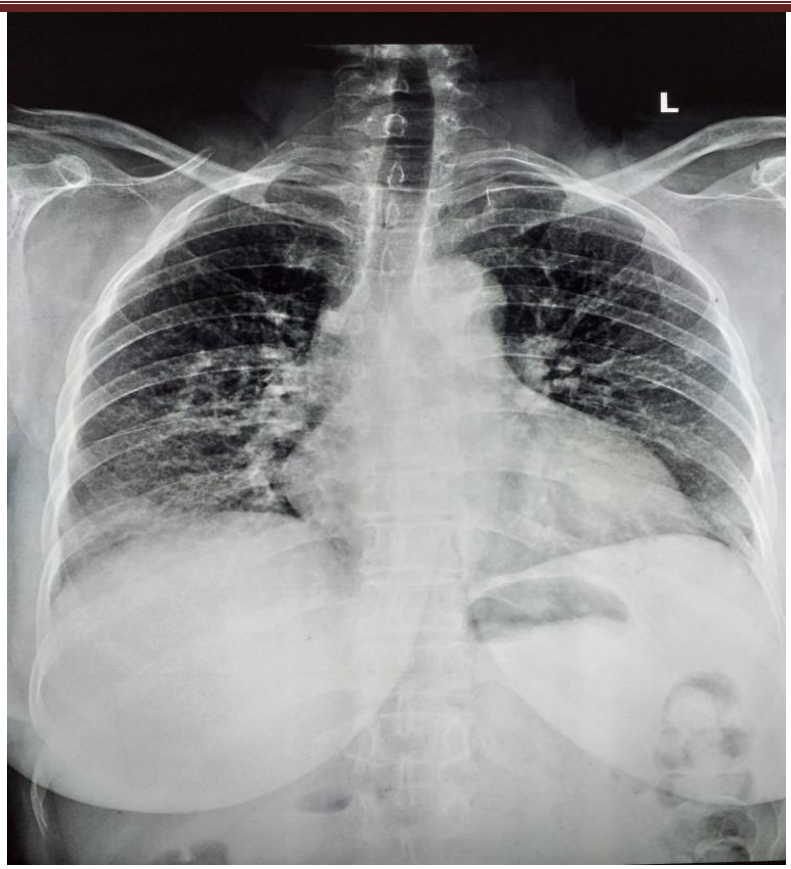

Figure 5 - Chest radiograph taken after three weeks showing resolving consolidation.

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Figure 6 - Specimen of a part of an areca-nut removed from the right bronchial tree.

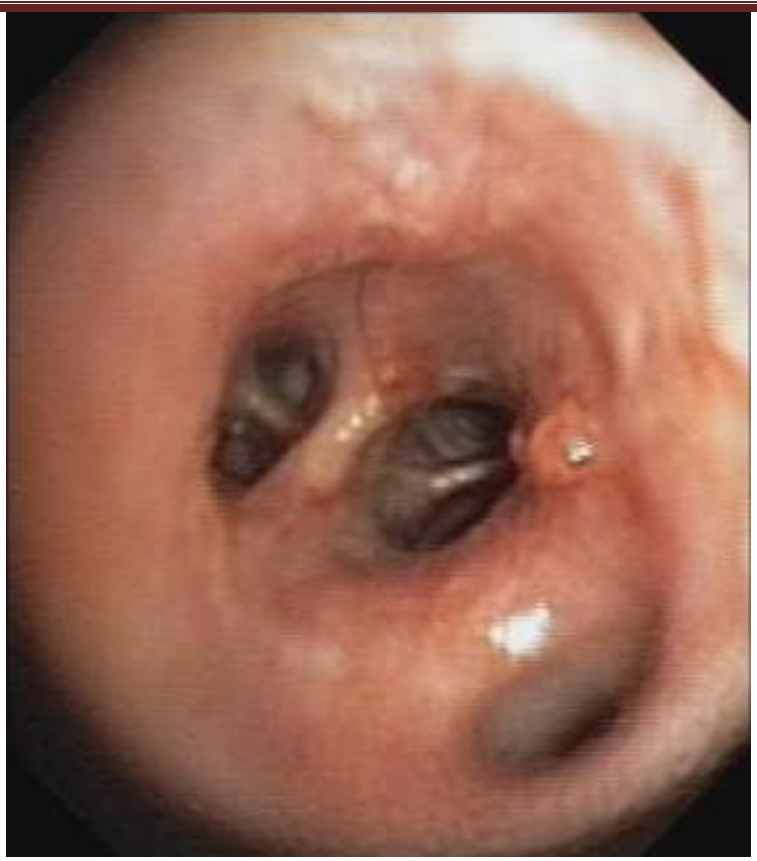

Figure 7 – Bronchoscopic appearance after six weeks of treatment showing near total resolution of the endobronchial lesion.