

## Primary Pulmonary Nocardiosis: A Case Report

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### Abstract

A 28-year-old non smoker male who had undergone kidney transplantation and has been taking immunosuppressive drug for the last 15 months was presented to the Hospital of Special Surgery/Baghdad with low grade fever, productive cough, shortness of breath, purulent sputum and bilateral chest crepitation. Laboratory investigations showed low Hb percentage (11.9%) with normal blood urea and creatinine(42 mg/ dL and 0.9 mg/ dL respectively). Chest x-ray revealed homogenous shadow. Initial antibiotic and anti-tuberculosis therapy was not helpful. Laboratory examination of sputum indicated the causative agent was *Nocardia*.

**Key words** Pulmonary nocardiosis, kidney transplantation

### Introduction

*Nocardia* organism is filamentous gram positive rods. Thirteen species of this organism has been described, of which *Nocardiaastroides* being the most usual one found as a pathogen in man <sup>(1)</sup>. Infection takes place by inhalation of airborne bacilli <sup>(2)</sup> or through traumatic inoculation of organism into skin <sup>(3)</sup>.

*Nocardiaastroides* is responsible for about 80% of non-cutaneous invasive disease and for most systemic and central nervous system infections <sup>(4)</sup>. Recent reports have shown an increase in the incidence of nocardiosis in humans, probably due to the use of more aggressive diagnostic examinations, the increased use of immunosuppressive treatment such as those with transplanted organs, and those who receiving high doses of glucocosteroids and the appearance of the acquired immunodeficiency syndrome (AIDS)<sup>(5-7)</sup>. Suppression of cellular

immunity appears to play a key role in the establishment of *Nocardia* infection <sup>(8)</sup>.

Bronchopulmonary or disseminated nocardiosis usually occurs in adults, and male are affected twice as often as female <sup>(9)</sup>.

### Case presentation:

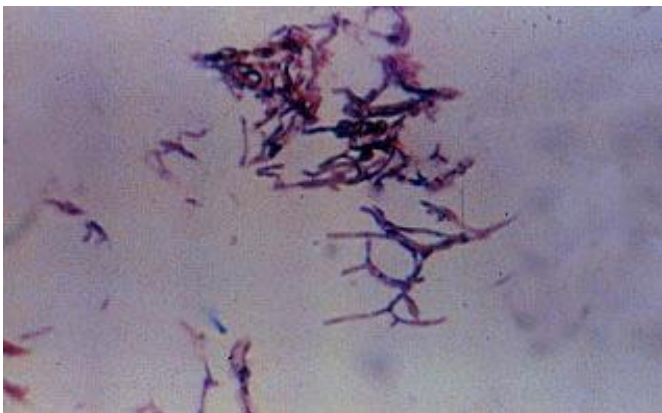
A 28-year-old kidney transplant patient non smoker white male was admitted to the Hospital of Special surgery/Baghdad on 2/10/1992 with shortness of breath, cough productive of purulent sputum, and bilateral chest crepitation. He was anxious with a temperature of 38°C, respirations were 22/min heart rate was 100/min, and blood pressure 130/80 mmHg. Hemoglobin concentration was 11.9%, total WBC count  $1.7 \times 10^3$  /mm<sup>3</sup> with polymorphonuclearleukocytosis, ESR was 64 mm / h.

A chest radiograph showed bilateral homogenous shadow. Relevant past history of renal transplantation for which he was on

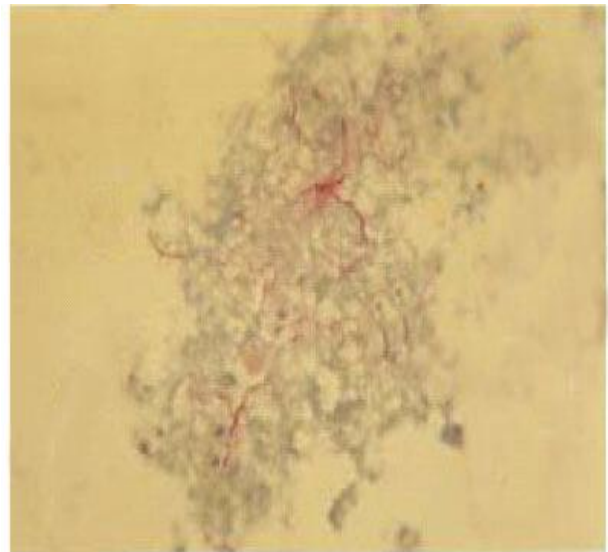
regular low dose of steroids. Initially, the patient was suspected to be infected with *Mycobacterium*. Therefore penicillin – streptomycin was tried but with no clinical improvement, as the patient still suffering from cough and breathlessness with high inflammatory markers.

Samples of sputum were taken for three consecutive days and gram stain and modified acid fast stain <sup>(10)</sup> were done. Furthermore, some samples were used for culturing using solid blood agar.

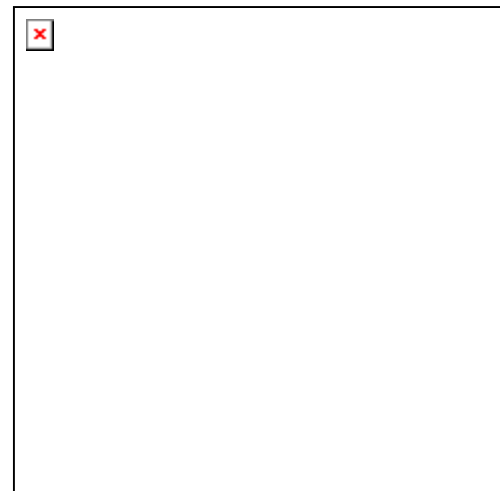
In gram stain, the organism appeared as beaded branching filaments gram positive (Figure1). Modified acid fast stain revealed acid fast branching filaments (Figure2). After incubation at 37°C for 72 hrs on solid blood agar, there were a small, white compact,dry, gritty colonies adhering to the agar without hemolysis (Figure3). A 200 ml of brain heart infusion broth was prepared with concentration of 37 gm/liter (OxoidCompany) in 500 ml flask. The broth was inoculated with *Nocardia* from solid blood agar under sterile conditions,and then was incubated at 37°C for 5 days with daily shaking. *Nocardia* – like organisms were noted after five days of inoculation.



**Figure 1.***Nocardia* stained with gram stain



**Figure 2.***Nocardia* stained with modified acid fast stain



**Figure 3.***Nocardia* colonies on solid blood agar

### Discussion

*Nocardia asteroides* are a saprophyte in nature, presents in soil and decaying organic matter. It is a weak aerobic gram positive acid fast filamentousbacterium. The various species of *Nocardia* are pathogens with low virulence, therefore clinically significant disease most

frequently occurs as opportunistic in elderly and immunocompromised persons affecting lung, brain, and skin<sup>(3)</sup> with no race predilection<sup>(11)</sup>.

Pulmonary nocardiosis is difficult to diagnose clinically, as the clinical characteristics are relatively non specific<sup>(12)</sup>. The radiographic findings are not helpful<sup>(13)</sup>, however, in early nocardiosis there is localized bronchopneumonia, and as the lesion progresses, complete lobular consolidation may appear<sup>(14, 15)</sup>. Sometimes, there is solitary or multiple nodules, abscess or pleural effusion<sup>(16)</sup>.

When pulmonary nocardiosis is suspected, the confirmatory diagnosis depends on sputum examination, although the organism doesn't appear easily in gram stain and modified acid fast stain and we have to do several smears for positive result. On the other hand, sputum culture is more positive more often, but growth may not appear until 3-21 days. So, culture should be kept for at least one month before the possibility of nocardiosis is excluded.

Our patient appears to have had primary nocardiosis, since there was no evidence of any underlying disease process and he responded well to the treatment with trimethoprim - sulfamethaxazol (cotrimoxazole) which are treatment of choice for nocardiosis<sup>(12,17,18)</sup>, as clinical improvement has been seen with almost normal inflammatory markers after 3 months of treatment.

Early diagnosis of pulmonary nocardiosis is extremely important, as the organism may spread to many parts of the body especially CNS where there will be poor prognosis<sup>(3)</sup>. Therefore, it is necessary to suspect *Nocardia* as the pathogen in obscure bronchopneumonic illness with apparently sterile sputum.

#### Acknowledgement:

With affection and pleasure we acknowledge our indebtedness to the patient Abdul-Hussein Toli Miftin, Dr. Monther Ahmed Zeki, senior of

kidney transplant fellow up for his supervision of the patient, and Dr. Abdul-Jalil Thwani for his confirmation of the organism.

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Received 9<sup>th</sup> Feb. 2010: Accepted 1<sup>st</sup> Feb. 2011