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## CASE REPORT

### Spectrum of Nocardiosis –A report of three cases

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#### ABSTRACT

Nocardiosis is caused by soil borne aerobic actinomycetes in immunocompromised hosts as well as in persons without any predisposing factors. We report here, three cases of culture proven *Nocardia asteroides* infection. Two cases were reported from obviously immunocompetent individuals and the last one from an HIV patient.

**Key Words:** *Nocardia asteroides*, Immunocompetent, Immunocompromised

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#### Introduction

Nocardiosis is a localized or disseminated opportunistic infection caused by a soil borne aerobic actinomycete. The organism enters through the respiratory tract [1]. Members of this genus consist of delicately branching gram positive, partially acid fast, aerobic actinomycetes [2]. The organism grows readily on blood agar, Sabouraud's agar, or in other simple media in 2 to 5 days. Pathogenic species of *Nocardia* are found in house dust, beach sand, garden soil and swimming pools [3].

*N.asteroides* is the predominant human pathogen besides *N. brasiliensis*, *N.otitidiscaviarum* and *N.farcinica*[3]. A review of literature showed an increasing incidence and the changing spectrum of nocardiosis in recent years. Although nocardiosis is prevalent in immunosuppressed patients like organ transplant recipients and those infected with HIV, the recent years have witnessed its increased incidence in healthy immunocompetent patients[2],[4],[5],[6],[7],[8],[9],[10]. We report here, three culture proven cases of nocardiosis caused by *N.asteroides*, two in an immunocompetent and one in an immunocompromised individual.

#### Case 1

An 8 months old male baby was admitted to the paediatric ward with a history of fever, cough and breathlessness of 20 days duration. A diagnosis of pneumonia was made and he was treated with cefotaxime and amikacin. There was remarkable improvement with the treatment and he was discharged after 10 days of admission. About a month later, the child came back with similar complaints. The child was pale and febrile. Respiratory system examination revealed decreased breath sounds and crepitations. Other systems were normal. Chest roentgenogram and computerized tomography showed right lobe consolidation with multiple loculated empyema . Ultrasound of abdomen showed consolidation of the lung with encysted empyema. Haemoglobin was 8.1 gm% and total WBC count was 32,300 cells/cu mm with a differential count showing 67% polymorphs, 32% lymphocytes and 1% eosinophils. ESR was 90 mm at the end of the 1<sup>st</sup> hour. Peripheral smears showed the diagnosis of microcytic hypochromic anaemia. Malarial parasites were not found. Gastric aspiration was negative for AFB. Screening for HIV and HBsAg gave negative results.

Right mini thoracotomy was done and the pus sample was sent for microbiological investigation. Gram stain of the pus showed numerous polymorphonuclear lymphocytes and gram positive, branched, beaded filaments which were partially acid fast by the modified acid fast stain and hence, aroused the suspicion of

*Nocardia* species. Cultures on Brain heart infusion blood agar, Blood agar and Lowenstein Jensen media grew dry, irregular, adherent white colonies when incubated aerobically at 37° C for 48 hours. The isolate was identified as *N. asteroides*, based on biochemical characterization. It was catalase positive, produced urease, did not decompose casein and tyrosine, did not liquefy gelatin and did not grow in the presence of 0.4 % gelatin. The blood culture was negative for *Nocardia*. Histopathology of the pus showed an acute inflammatory infiltrate with no evidence of tuberculosis. Postoperatively, the patient was started on Amoxyclav I.V and was later put on cotrimoxazole following the culture reports. His condition improved dramatically. The child was discharged with the advice to continue cotrimoxazole for the next 3 months. The follow up of over one year revealed complete resolution of the infection without any signs of recurrence.



(Table/Fig 1) A-Chalky white colonies on SDA  
B-Orange colonies on L.J media

### Case 2

Pus collected from the wound of a 23 year old male with osteomyelitis of the thumb was subjected to microbiological investigation. General examination and routine laboratory tests were normal. HIV antibody and HbsAg tests were negative. Gram's stain of the pus from the wound showed gram positive, filamentous bacteria which were found to be acid fast by the modified acid fast stain. Blood agar and Sabouraud's dextrose agar grew dry, wrinkled, chalky white colonies which were identified as *N. asteroides* based on biochemical tests

[Table/Fig 1]. A course of cotrimoxazole was administered for 3 weeks. He improved dramatically.

### Case 3

An old man aged 65 years presented with a history of low grade fever, cough and expectoration since 15 days. Respiratory system examination revealed bilateral bronchial breath sounds. Other systems were normal. The WBC count was 16,500/cu mm with a differential neutrophil count of 92%. ESR was 100 mm at the end of the 1<sup>st</sup> hour. Chest X-ray showed bilateral opacity. The HIV antibody test was positive. Gram's stain of the sputum showed numerous polymorphonuclear lymphocytes with gram positive, branched filaments which were found to be acid fast by the modified acid fast staining method. *N. asteroides* was isolated in pure culture. Earlier, he was started on anti tubercular treatment based on X-ray findings, but based on the culture reports, the patient was started on cotrimoxazole. He showed remarkable improvement at the time of discharge. He was discharged with the advice to continue the same treatment for the next 3 months. The patient was lost to follow-up.

### Discussion

Nocardiosis was described for the first time in humans by Eppinger (1890) after Edmond Nocard (1888), a veterinarian noted an aerobic actinomycete in bovine farcy in cattle on the island of Guadeloupe [7]. Since then, the classification of the *Nocardia* species has undergone several changes. Based on their cell wall components, particularly cell envelope lipid, peptidoglycan compositions and DNA relatedness; they were reclassified as aerobic bacteria [3].

Nocardiosis is an acute, sub acute or chronic suppurative infection with a tendency to remissions and exacerbations, which initially may mimic pneumonia, tuberculosis, carcinoma or lung abscess[1]. Similar findings were observed in our patients; one patient mimicked pneumonia and the other tuberculosis. Infection occurs in all ages, even in neonates [1],[2],[3],[6] and the male to female ratio is 3:1 [1],[2],[3],[6].

Nocardiosis is chiefly an opportunistic infection, particularly found in patients with lymphoreticular neoplasms and chronic pulmonary disorders, in organ transplant recipients and in those who had a long term treatment with corticosteroids. Suppression of cellular immunity appears to play an important role in the establishment of *Nocardia* infections [1],[3]. However, Nocardial infection also occurs without concurrent diseases or therapies. In recent years, many cases have been reported in immunocompetent individuals [4],[7],[8],[9],[10]. In Curry's analysis of 455 cases, 39% of the patients did not have any preexisting illness, trauma or immunosuppressive therapy [2]. In India, Tendolkar et al [6] recorded similar findings. Their study showed no obvious predisposing factors in about 5 cases and male preponderance of infections.

Nocardiosis should be suspected in patients who present with pulmonary lesions or cerebral abscesses. Nocardial lesions in lungs or other organs in the body erode the blood vessels and disseminate to involve other sites [2],[3],[10]. Nocardiosis in the CNS usually follows pulmonary Nocardiosis. Nocardiosis is uncommonly reported in patients who are infected with HIV despite the profound T cell immunosuppression that occurs during infection, the frequency of infection being 1.8 % in adults with HIV [11]. The reason may be due to the under reporting of cases, as it is mistaken as pulmonary tuberculosis [1],[5],[12] or malignancy in CNS Nocardiosis [10]. This was noticed in one of our patients, where he was started on anti tubercular drugs based on radiological suspicion, though sputum for AFB was negative. It is important to consider Nocardiosis in the differential diagnosis of pulmonary diseases which do not respond to ATT and in which the sputum is negative for AFB.

A high index of suspicion, followed by aggressive laboratory diagnosis and effective treatment, is necessary to bring down the mortality rate in patients with Nocardiosis.

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