

Case Report

# Pulmonary nocardiosis: Under-diagnosed respiratory opportunistic infection – A case report

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## Abstract

Nocardia infection is a rare disorder caused by bacterium, which tends to affect the lung, brain, and skin. Pulmonary nocardiosis is a subacute or chronic pneumonia caused by a species of the family Nocardiaceae. Nocardia particularly affects immunocompromised patients, and only a few reports have described high resolution computed tomography (HRCT) manifestations in a case series of pulmonary infection. Here we describe a case report in which 70 year old patient with history of bronchial asthma on treatment with inhaled corticosteroid presented to emergency with complaints of cough with scanty expectoration and increase in breathlessness. Initially we suspected it to be a case of pulmonary tuberculosis or acute exacerbation of bronchial asthma but later investigations proved it to be a case of opportunistic pulmonary Nocardiosis. He responded well to anti-nocardia therapy and recovered from the symptoms. We conclude that pulmonary Nocardiosis must be suspected and screened in all patients with immunocompromised state and not responding to preliminary diagnosis of chronic obstructive airway disease, asthma or pulmonary tuberculosis.

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**Keywords:** Nocardia; Pulmonary nocardiosis; HRCT; Corticosteroid therapy; CT

## 1. Introduction

Nocardia infection is a rare disorder caused by bacteria, which tends to affect the lung, brain, and skin. Pulmonary nocardiosis is a subacute or chronic pneumonia caused by a species of the family Nocardiaceae. Seven species have been associated with human disease. *Nocardia asteroides* is responsible for about 70% of infection caused by these organisms and debilitated patients have a 45% mortality rate even with appropriate therapy. The typical lesions of nocardiosis are abscesses extensively infiltrated with neutrophils [1]. Nocardia particularly affects immunocompromised patients, and only a few reports have described high resolution computed tomography (HRCT) manifestations [2–5].

Although HRCT plays an important role in the diagnosis of pulmonary nocardiosis, variations in HRCT findings have not correlated with clinical diagnosis. Here, we describe the radiological features of pulmonary nocardiosis with respect to pulmonary nodules. Impaired cell-mediated immunity would increase the prevalence of infection [6], however, there was no study to examine the status of cumulative and/or daily dose of steroid treatment in patients with pulmonary nocardiosis.

Case report: 70 year old patient with history of bronchial asthma presently on treatment with inhaled corticosteroid presented to emergency with complaints of cough with scanty expectoration and increase in breathlessness of 10 days duration. On examination he was tachypneic, tachycardic, had type 1 respiratory failure. Chest auscultation revealed harsh vesicular breath sound with bilateral expiratory wheeze and diminished breath sound in left infra axillary area. Chest x-ray and ultra sound revealed left mid and lower zone consolidation with minimal pleural effusion (Fig. 1). Laboratory evaluation revealed hemoglobin level of 10 g/dL. His WBC count was

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$15.9 \times 10^3/\text{mm}^3$  (neutrophils 74%, eosinophils 1%, lymphocytes 26%, monocytes 5%). Serum creatinine was 1.6 g/dl.

He was initiated on ceftriaxone, azithromycin and non invasive ventilation for mild ARDS (Acute Respiratory Distress Syndrome). On day 4 of hospital stay, his breathing mechanics worsened and he was initiated on mechanical ventilation in view of worsening ARDS and pneumonia. Endotracheal aspirate culture initially revealed *Staphylococcus aureus* which was subsequently turned out to be contaminant. To rule out pulmonary tuberculosis two samples were sent for AFB smear (Acid Fast Bacillus) examination and were found to be negative. Mycobacterial culture was sent. CT thorax on day 8 showed bilateral extensive areas of consolidation (Figs. 2–4) with multiple small cavitating nodules (Fig. 5). Special stain for *Nocardia* was done on the broncho-alveolar lavage – Kinyoun stain was done which revealed weakly acid fast branching bacilli (Fig. 6). Culture of the BAL was done on 5% Sheep blood agar and chocolate agar which revealed chalky white colonies after 3 days of incubation. These were identified *Nocardia* spp on staining morphology on Grams stain and Kinyoun stain. He was initiated on trimethoprim and sulphamethoxazole. Subsequently he had VAP (Ventilator Associated Pneumonia) with gram negative bacteria, and was treated as per sensitivity. Tracheostomy was performed and weaned off ventilator.

## 2. Discussion

*Nocardia* is a rare opportunistic pathogen that particularly affects immunocompromised patients. Inhaled or systemic

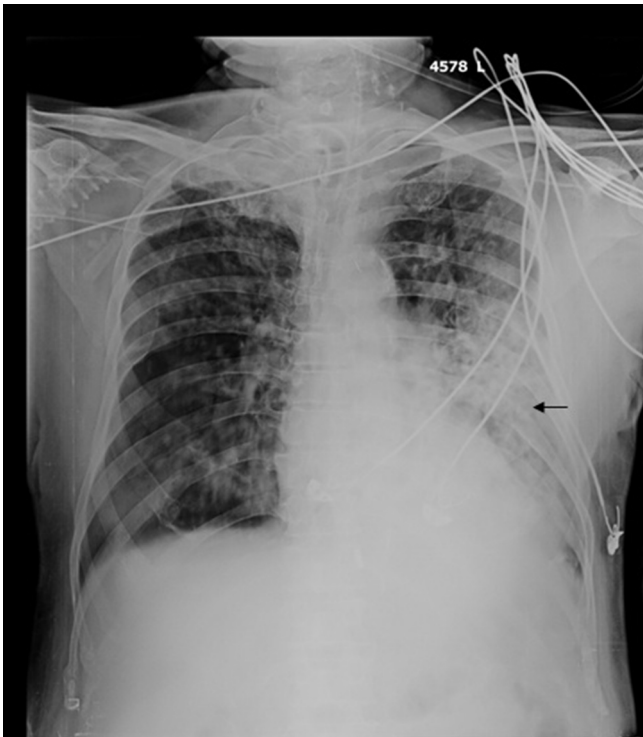


Fig. 1. Bilateral nodular radio opacities with large coalescent region in left lower zone (arrow).



Fig. 2. CT transverse section shows large area of consolidation (arrow) in superior segment of left lower lobe.

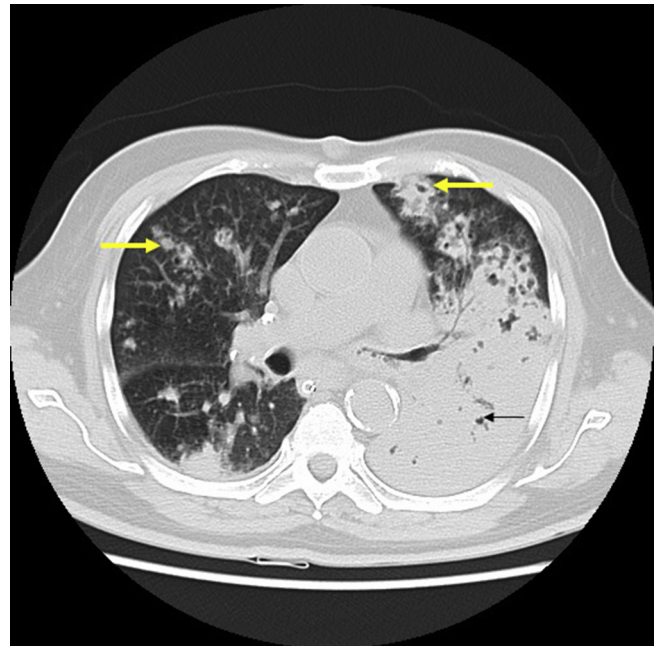


Fig. 3. CT transverse section (lung window) shows bilateral nodular lesions (yellow arrows) and subtle air bronchogram in large area of consolidation (thin arrow) on left.

corticosteroids can predispose to pulmonary nocardiosis [7]. Stuck et al. [6] found 12.7% and 8.0% overall rates of infectious complications in steroid-treated and control patients, respectively (relative risk: 1.6), and the rate of infection did not increase in patients administered with <10 mg/day or a cumulative dose of <700 mg of prednisone [8].

Suppression of cellular immunity appears to play a key role in the establishment of *Nocardia* infection [9]. Inhaled

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