

# Pulmonary And Extrapulmonary Tuberculosis along with Pulmonary Nocardiosis In a patient with Human Immuno deficiency Virus Infection

ANIL KUMAR, ASMITA MEHTA, GHANSHYAM KAVATHIA, MOLLY MADAN

## ABSTRACT

A 53 year old male presented with respiratory symptoms, low grade intermittent fever, anorexia, diarrhoea and weight loss of 5 months duration. Chest X-ray showed bilateral upper and mid-zone non-homogenous opacity and right lower zone homogenous opacity with hilar enlargement, while USG abdomen revealed

a peripancreatic mass. The serology of HIV-1 was positive by enzyme linked immunosorbent assay (ELISA) and western blot. The patient was diagnosed with pulmonary and extrapulmonary tuberculosis along with concomitant pulmonary nocardiosis.

**Key Words:** Tuberculosis, nocardia, human immunodeficiency virus

## INTRODUCTION

Nocardia most commonly affects patients with COPD or patients who are immuno suppressed[1].

In a reported series, 60% 90% of the patients had some underlying immunosuppressive condition such as chronic steroid use, solid-organ transplantation, lymphoreticular malignancy, chronic granulomatous disease (CGD), or human immunodeficiency virus (HIV) infection[2].

*Nocardia asteroides* is the predominant species and the one which is most commonly associated with disseminated disease. The typical sites of dissemination include the lungs, skin, brain, and the musculoskeletal system. The less-common sites include the pericardium, kidney, adrenal glands, eye, spleen, and the liver. There are occasional reports of nocardiosis in patients with HIV infection[3].

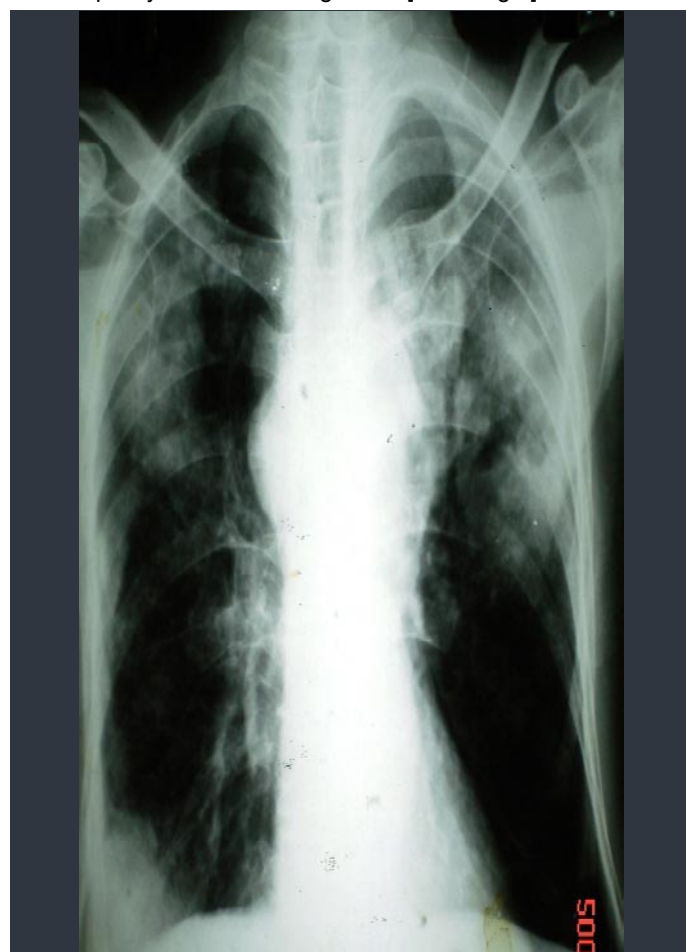
Tuberculosis also has more or less the same type of involvement, but with a higher prevalence in our population. Tuberculosis has reached epidemic proportions in HIV patients in India. Concomitant pulmonary tuberculosis and nocardiosis in an HIV patient have rarely been reported though autopsy studies nor have they shown the presence of coinfection in HIV patients dying of pulmonary tuberculosis[4].

We present here, a rare case of pulmonary and extrapulmonary tuberculosis with pulmonary nocardiosis in an HIV patient.

## CASE REPORT

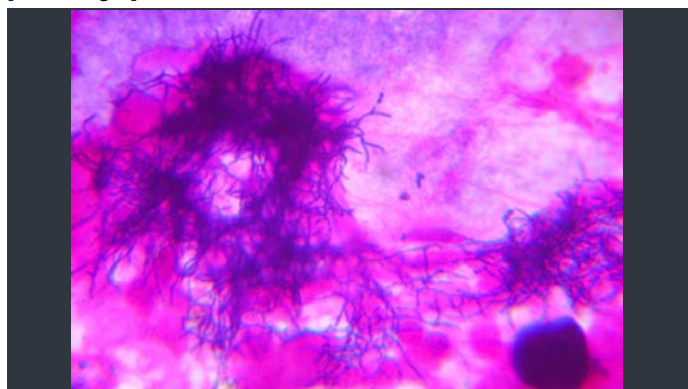
A 53 year old male presented with productive cough with moderate amount of mucopurulent expectoration, low grade intermittent fever, anorexia, diarrhoea and weight loss of 5 months duration. There was no history of sexual promiscuity or intravenous drug abuse. He gave a history of blood transfusion 7 years ago. The physical examination revealed a thin built individual with a pulse rate of 80/minute and a blood pressure of 120/80 mm of Hg. There was no pallor, icterus, cyanosis, finger clubbing or pedal oedema. The inguinal lymph nodes were palpable. The examination of the respiratory system revealed bilateral infra-clavicular, mammary and infra-axillary crackles. The examinations of other systems were not contributory. The haemoglobin concentration was 10 gm% and the total leucocyte count was 9500/mm<sup>3</sup>, with the differential count showing 70% polymorphs, 22% lymphocytes and

8% mixed population cells. The renal function was deranged with S. creatinine- 1.6mg/dl and S.urea -56mg/dl. The liver function test also showed significant hepatic damage with serum levels of bilirubin -1.3mg/dl, aspartate aminotransferase- 105 IU/L, alanine aminotransferase- 78 IU/L and alkaline- phosphatase 154IU/L. The frontal radiograph of the chest showed bilateral upper and mid-zone non-homogenous opacity and right lower zone homogenous opacity with hilar enlargement [Table/Fig 1]

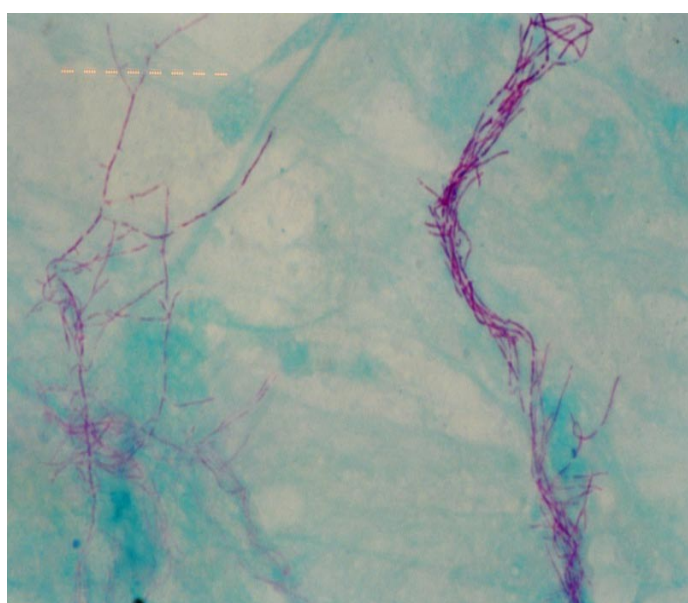


**[Table/Fig 1]:** Chest Radiograph showing bilateral upper and mid-zone non-homogenous opacity, right lower zone homogenous opacity with hilar enlargement

Three consecutive morning samples of sputum were positive for acid fast bacilli (AFB). The gram staining of the pus which was aspirated under ultrasonographic (USG) guidance from the lung nodule revealed a gram positive branching filamentous organism [Table/Fig 2] resembling nocardia, which was also 1% acid fast [Table/Fig 3]

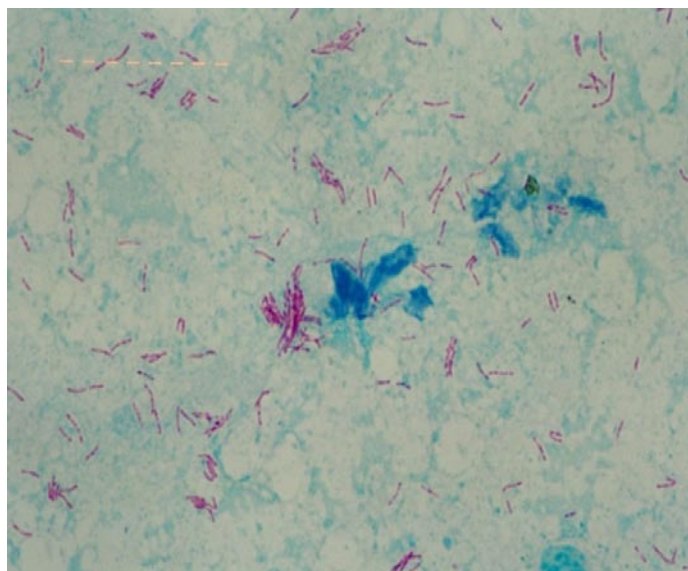


[Table/Fig 2]: Photomicrograph of pus aspirated from lung nodule showing Gram positive branching bacilli (Gram stain, X100).



[Table/Fig 3]: Photomicrograph of pus aspirated from lung nodule showing pink, 1% acid fast branching bacilli (Modified acid fast staining, X100).

USG of the abdomen showed a peripancreatic mass which on aspiration showed AFB [Table/Fig 4].



[Table/Fig 4]: Photomicrograph of pus aspirated from peripancreatic abscess showing pink, 20% acid fast bacilli (Acid fast staining, X100).

The HIV-1 antibody was positive by enzyme linked immunosorbent assay (ELISA) and western blot. All specimens were cultured on blood agar plates, brain-heart infusion agar, blood-chocolate plates and Lowenstein Jensen (LJ) slants. *Nocardia* grew from pus which was aspirated from the lung nodule, on blood agar, brain heart infusion and chocolate agar plates and was identified as *Nocardia asteroides* by using manual standard methods. Mycobacterial cultures of the pus which was aspirated from the peripancreatic mass and sputum were positive for *M. tuberculosis*. but those from the pus which was aspirated from the lung nodule were negative for *M. tuberculosis*. The patient was started on a therapy with co-trimoxazole and anti tubercular drugs. Blood cultures grew an extended spectrum beta lactamase producing *E. coli* on the fourth day, but unfortunately the patient's condition worsened in spite of starting on culture sensitive antibiotics. He expired on the fifth day due to hepatorenal failure, subsequent to uncontrolled Gram negative sepsis.

## DISCUSSION

India has a very high prevalence of tuberculosis and infections in both healthy and compromised hosts are very common, whereas nocardia infections are rare among the normal population, with most infections occurring in immuno-compromised patients, showing pulmonary involvement predominantly. *Nocardia* spp. are common natural inhabitants of the soil throughout the world. Pulmonary nocardiosis is usually community acquired due to the direct inhalation of *Nocardia* spp. from contaminated soil, while a person-to-person transmission is rare. Tuberculosis also has a similar presentation, but extrapulmonary involvement is very common and a person to person transmission is the only way in which the disease spreads. *N. asteroides* may be a saprophyte in the skin and in the upper respiratory tract. Respiratory colonization can occur in a compromised host and can progress to tissue invasion and dissemination [5],[6].

Rosett and Hodges isolated *Nocardia* spp. from respiratory secretions from 36 patients, 19 of whom were free of the disease [7].

Most of those patients who had colonized *Nocardia* had obstructive pulmonary disease. The host resistance to infection with *Nocardia* spp. is thought to depend on functioning phagocytic cells. Neutrophils limit the spread of infection in the early stage of tissue invasion [8].

Activated macrophages and T-lymphocytes prevent dissemination and kill the bacteria [9].

The crucial role of cell-mediated immunity has been proved in experimental in vitro studies; thus, it is not surprising that the *Nocardia* spp. behaves as an opportunistic microorganism in an immunocompromised host [9],[10].

Patients who are infected by HIV are predisposed to a variety of common and uncommon pulmonary infections. Of the various species of nocardia that are pathogenic to men, *N. asteroides* is the most common. Most cases of nocardiosis present with non specific respiratory symptoms such as chronic cough, chest pain, dyspnoea and haemoptysis at presentation, which mimic tuberculosis [11].

About 5% of the patients with proven pulmonary tuberculosis were shown to have co-infection with nocardia [12], [13].

Chronic nocardiosis carries a mortality rate of 33% and acute disease shows a rate of 66-72% [3],[13].

With the incidence of concomitant pulmonary tuberculosis, the mortality increases. The chest radiological findings of pulmonary nocardiosis in advanced HIV infections include alveolar infiltration, cavitation, pleural effusion and reticulonodular pattern [15].



Nocardiosis presents at an advanced state of HIV infection and can be fatal. In an autopsy study by Lucas et.al, on 247 patients who died of HIV related illnesses, 10 (4%) patients were found to have nocardiosis and among those with AIDS defining illnesses, 5% were found to have this disease. Of 10 patients who were diagnosed to have nocardiosis, 4 had initially been misdiagnosed as having pulmonary tuberculosis [4].

In our case, despite the initial suspicion that the patient's lung lesion represented the focus of tuberculous infection, a bacterial pathogen requiring different treatments was identified. More importantly, the search for acquired immune deficiency such as the HIV infection, should not be overlooked in patients with pulmonary and extra pulmonary tubercular infections. In India, the prevalence of nocardiosis as reported in 1973, was 4.6% among patients who were suspected to have tuberculosis [11].

Although nocardiosis resembles tuberculosis, the first line anti tubercular drugs have no roles to play in its treatment [4]. Therefore, it is important to establish a definitive diagnosis. It has been suggested that microscopic morphology can be suggestive enough to warrant empiric therapy for nocardiosis while awaiting the culture results, especially in seriously ill patients and in those with an impaired host defense system [14].

## CONCLUSION

In summary, two general conclusions can be made. Firstly, pulmonary nocardiosis is difficult to diagnose on the basis of clinical and radiological findings. Once pulmonary tuberculosis is diagnosed, co-infection with *Nocardia* is never suspected unless and until there is a high index of suspicion or when the patient does not recover after completing the course of anti tubercular chemotherapy. Microbiologists must be informed, in such cases, to include specific stains and cultures to investigate the presence of *Nocardia* spp. Secondly, cases with pulmonary and extrapulmonary tuberculosis along with pulmonary nocardiosis, with an HIV positive serology, are rare but not uncommon. So, any patient suffering from AIDS with pulmonary symptoms should be investigated for pulmonary tuberculosis and nocardiosis, while ruling out extrapulmonary tuberculosis.

## REFERENCES:

- [1] Begona Maria, Concepcion Monton Dolors Mariscal, Manel Lujan, Montserrat Salac Christian Domingo. Pulmonary Nocardiosis. Clinical Experience in Ten Cases *Respiration* 2001; 68:382-388.
- [2] Lerner PI. Nocardiosis. *Clin Infect Dis* 1996; 22:891-903.
- [3] Greenberg AE, Lucas S, Tossou O, Coulibaly IM, Coulibaly D, Kassim S, et al. Autopsy proven causes of death in HIV infected patients treated for tuberculosis in Abidjan, Cote d'Ivoire. *AIDS* 1995; 9:1251-4.
- [4] Lucas SB, Hounnou A, Peacock C, Beaumel A, Kadio A, De Cock KM. Nocardiosis in HIV positive patients: An autopsy study in West Africa. *Tuber Lung Dis* 1994; 75:301-7.
- [5] Kirch JA, Stinson EB, Remington JS. Nocardia infection in heart transplantation patients. *Ann Intern Med* 1975; 82: 18-26.
- [6] Goltz HA, Lavery DP, Kapila R. Actinomycetales infection in the acquired immunodeficiency syndrome. *Ann Intern Med* 1985; 102: 203-5.
- [7] Rosett W, Hodges GR. Recent experiences with nocardial infections. *Am J Med Sci* 1978; 276: 279-85.
- [8] Filice GA. Inhibition of *Nocardia asteroides* by neutrophils. *J Infect Dis* 1985; 151: 47-56.
- [9] Deem RL, Doughty FA, Beaman BL. Immunologically specific direct T-lymphocyte-mediated killing of *Nocardia asteroides*. *J Immunol* 1983; 130: 2401-6.
- [10] Black CM, Beaman BL, Donovan RM, Goldstein E. Effect of virulent and less virulent strains of *Nocardia asteroides* on acid-phosphatase activity in alveolar and peritoneal macrophages maintained in vitro. *J Infect Dis* 1983; 148: 117-124.
- [11] Powers CN. Diagnosis of infectious diseases: A Cytopathologist's perspective. *Clin Microbiol Rev* 1998; 11:341-65.
- [12] Gaudes GS, Hemashettar BM, Bagga AS, Chatterji R. Clinical profile of pulmonary nocardiosis. *Indian J Chest Dis Allied Sci* 1999; 41:153-7.
- [13] Verghese SL, Madhavan HN, Sekar B. Isolation and characterization of nocardia from clinical specimens. *J Indian Med Assoc* 1999; 94:58-59.
- [14] Curry WA. Human Nocardiosis. A clinical review with selected case reports. *Arch Intern Med* 1980; 140:818-26.
- [15] Uttamchandani RB, Daikos GL, Reyes RR, Fischl MA, Dickinson GM, Yamaguchi E, et al. Nocardiosis in 30 patients with advanced human immunodeficiency virus infection: Clinical feature and outcome. *Clin Infect Dis* 1994; 18:348-53.

### AUTHORS:

1. Dr. ANIL KUMAR
2. Dr. ASMITA MEHTA
3. Dr. GHANSHYAM KAVATHIA
4. Dr. MOLLY MADAN

### NAME OF DEPARTMENT(S) / INSTITUTION(S) TO WHICH THE WORK IS ATTRIBUTED:

Dept of Microbiology Amrita Institute of Medical Sciences  
Ponekara, Kochi, Kerala India: 682041  
Dept of Respiratory medicine, Amrita Institute of Medical Sciences, Ponekara, Kochi Kerala India: 682041  
Dept Of Microbiology, P.D.U. Medical College, Civil Hospital Campus, Rajkot, Gujarat, India  
Dept Of Microbiology, Subrati medical collage, Merut, Uttar Pradesh, India

### NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr.V.Anil Kumar MD (Microbiology) Clinical Assistant Professor  
Department of Microbiology Amrita Institute of Medical Sciences  
Ponekara, Kochi, Kerala India: 682041.  
Email: vanilkumar@aims.amrita.edu, Phone: 04842801234  
(Extn): 8010, 8015] Mob: 09037401413

### DECLARATION ON COMPETING INTERESTS: No competing Interests

Date of Submission: 11/11/2010  
Date of Acceptance: 10/12/2010  
Date of On Line First: 08/1/2011  
Date of Publication: 06/2/2011