

Pulmonary Nocardiosis: Unusual Presentation in Intensive Care Unit

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Abstract

Pulmonary nocardiosis is a rare disease, which mainly affects immunocompromised hosts such as uncontrolled diabetics; HIV patients; and patients on immunosuppressive therapies such as anticancer drugs, systemic steroids, and transplant recipients. The diagnosis is often missed and delayed, resulting in inappropriate treatment and thus higher mortality. We are reporting a case of pulmonary nocardiosis with acute presentation in an immune-competent host, who presented with community-acquired pneumonia to the Intensive Care Unit. Clinical expertise with multiple high-end and interventional investigations timely confirmed the case as pulmonary nocardiosis. Conservative management with medications led to her complete recovery.

Keywords: Immune-competent host, linezolid, pulmonary nocardiosis

INTRODUCTION

Pulmonary nocardiosis is a chronic disease occurring in immunocompromised patients mimicking tuberculosis, mycotic infection, or malignancy. It is caused by aerobic actinomycetes which usually originate from soil. Clinical and radiological manifestations are just like tuberculosis or malignancy, which include pneumonia, infiltrative, or nodular lesions which may be accompanied by cavitation, abscess formation, pleural effusions, or empyema and sometimes mass-like lesions. Acute presentation of nocardiosis is very rare, especially in immunocompetent host. Co-trimoxazole is the first-line antimicrobial therapy for nocardiosis, but carbapenems and linezolid may be second-line drugs if the patient is intolerant to sulfa drugs. If the disease is not diagnosed in early stage and it becomes disseminated to multiple organs such as brain, lymphoreticular system, and musculoskeletal system, then outcome is very poor with high mortality of about 70%–80%.

CASE REPORT

A 36-year-old female patient presented to the emergency department with a complaint of fever, hemoptysis, left-sided chest pain, and breathlessness for 7 days. She is not having any significant history of diabetes, malignancy, and drug intake. On

clinical examination, her vitals were as follows: temperature 102°F, respiratory rate 32/min, blood pressure 100/76 mm of Hg, heart rate 108/min, and SpO₂ of 92% in room air. On examination of the respiratory system, breath sound was decreased on the left side of the chest, significant crepitation was present on left infraclavicular, axillary and interscapular area, rest systems were within normal limits.

As the patient was having active hemoptysis and chest pain, she was transferred to Medical Intensive Care Unit for the purpose of monitoring and observations. After resuscitation of the patient, she was evaluated for coronary artery diseases by electrocardiography, two-dimensional echo, and cardiac markers, which were found to be normal. Tests for HIV, hepatitis B virus surface antigen, HCV, and autoimmune profile were negative. Chest X-ray revealed a mass lesion in the left upper and mid-zone of the lung, resembling neoplasia [Figure 1a].

Sputum examination did not reveal any pathogenic organism in Gram staining and culture reports. In this case, fiberoptic

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How to cite this article: Singh AK, Shukla A, Bajwa R, Agrawal R, Srivastwa N. Pulmonary nocardiosis: Unusual presentation in Intensive Care Unit. Indian J Crit Care Med 2018;22:125-7.

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10.4103/ijccm.IJCCM_472_17

bronchoscopy is the best option for tissue diagnosis, but it was avoided due to active hemoptysis and respiratory distress. Her computed tomography (CT) scan thorax with contrast study revealed a large mass lesion with contrast enhancement [Figure 1b], leading to high suspicion of malignancy. We planned a CT-guided fine-needle aspiration cytology (FNAC) from the lesion. The sample which was received by CT-guided FNAC was sent for cytological examination as well as for Gram staining and Ziehl–Neelsen staining and aerobic culture. It was found to be negative for malignant cells. Gram staining showed the presence of Gram-positive branching filaments with coccoid elements suggestive of *Nocardia* species [Figure 2a]. Conventional Ziehl–Neelsen staining for acid-fast bacilli was negative; however, modified Ziehl–Neelsen staining using 1% sulfuric acid showed partially acid-fast branching filaments [Figure 2b]. Blood agar plate after incubation of 48 h at 37°C revealed dry whitish-to-tan colonies, which on further incubation showed the typical raised, chalky white appearance with the characteristic earthy odor of *Nocardia* species [Figure 2c]. Staining of smears from culture also showed filamentous bacteria.

She was empirically put on the third-generation cephalosporin and azithromycin. After a confirm diagnosis of pulmonary nocardiosis, cotrimoxazole was started, but she had rashes all over the body. Antibiotic treatment was changed to imipenem for 10-day duration followed by oral linezolid. Chest X-ray revealed gradual resolution of pneumonia in the

form of cavitation [Figure 1c]. The patient responded well to this therapy and had complete resolution of the left upper lobe lesion in follow-up chest X-ray done after 6 months [Figure 1d].

DISCUSSION

Nocardiosis, caused by Gram-positive, aerobic actinomycetes, is a rare and serious infection mainly affecting immunocompromised patients, with approximately 65% of cases occurring in individuals with some compromise of host defense systems.^[1] Human disease is most commonly caused by *Nocardia asteroides*.^[2] The manifestations of nocardiosis can be solely pulmonary (75%–80%), cutaneous, or neurological (44%), but virtually any organ system may be involved.^[3] The risk of pulmonary and disseminated disease is greater among persons with deficient cell-mediated immunity especially that associated with lymphoma, transplantation, systemic steroid, or AIDS.

Clinical features are relatively nonspecific with a chronic course in 70% before diagnosis.^[4] Pulmonary nocardiosis tends to present typically as a subacute pneumonia, the symptoms appearing over the course of several days or weeks. Acute presentation such as dyspnea, pleuritic pain, and hemoptysis are less common.^[5] There is variable radiological presentation as consolidation, well-circumscribed nodules, large, multiloculated abscesses, or cavities.^[6] The major differentials in diagnosis are pneumonia, tuberculosis, bronchogenic carcinoma, or lung abscess. Pulmonary nodules with multiple cavitations can easily mimic actinomycosis, septic emboli, metastasis, sarcoidosis, Wegener's granulomatosis, or other fungal infections.^[7]

The diagnosis should always be based on isolation of organism in respiratory secretions which can be sputum or bronchial

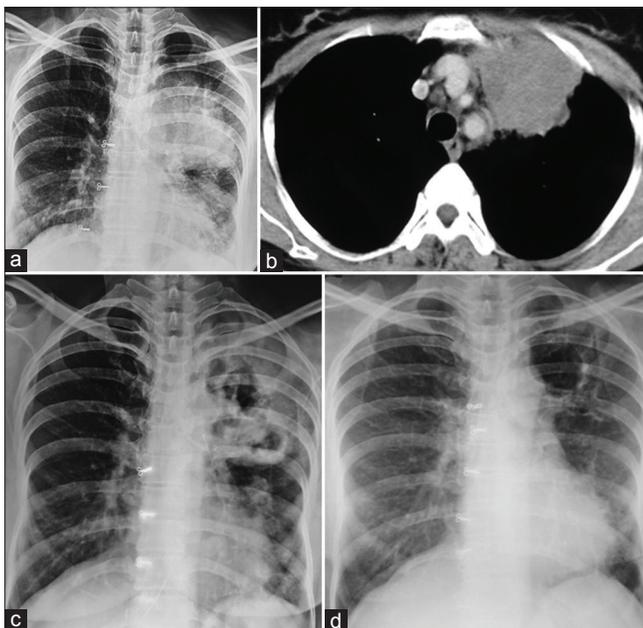


Figure 1: (a) Chest X-ray revealed a mass lesion in the left upper and mid-zone, resembling neoplastic in nature. (b) Computed tomography scan thorax with contrast study, which revealed large mass-like lesion with contrast enhancement. (c) Chest X-ray revealed a resolving mass lesion in the left upper and mid-zone, resembling cavitating pneumonia. (d) Patient responded well to this therapy and had complete resolution of the left upper lobe lesion in follow-up chest X-ray

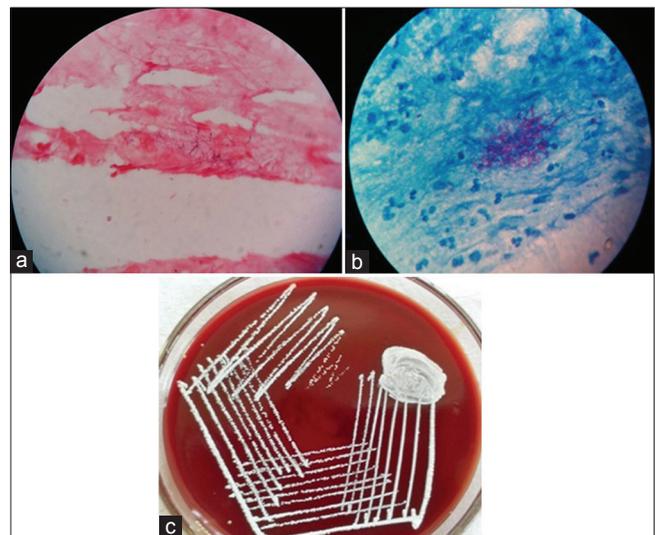


Figure 2: (a) Gram stain of a *Nocardia* species, demonstrating delicate, beaded, branching filaments. (b) *Nocardia* seen under high power after modified Ziehl–Neelsen staining. (c) *Nocardia* colonies on blood agar

washings. Management includes antimicrobial therapy in all cases with surgical drainage wherever needed. Cotrimoxazole is the drug of choice which can be given alone or in combination with other drugs such as imipenem, amikacin, third-generation cephalosporins, or minocycline in serious cases. Disseminated nocardiosis has a poor prognosis with a mortality rate of >85% in immunocompromised hosts, but in healthy patients this is about 15%–20%.^[8]

CONCLUSION

Pulmonary nocardiosis is a chronic disease affecting mainly a host who is having defective immune system. Acute presentation is very rare in clinical practice. We have presented this case because this was acute presentation in an immunocompetent host which was diagnosed timely and managed accordingly with a positive outcome. If a patient is not having significant toxemia and negative for malignancy, we must think about these uncommon organisms like *Nocardia*.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published

and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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