

Pulmonary Nocardia Infection Diagnosed by Bronchopulmonary Lavage in Malwa Region of Punjab

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Received October 19, 2019; Accepted November 25, 2019; Published January 08, 2020

ABSTRACT

Nocardiosis is a disease caused by a type of bacteria that is found in the environment, typically in standing water, decaying plants and soil. These bacterial species belong to the genus *Nocardia* and considered to be opportunistic pathogens. Nocardiosis is a common opportunistic infection found in Patients both immunocompromised and immunocompetent, cancer or on certain medications. Pulmonary Nocardiosis shows clinical symptoms similar to Pulmonary Tuberculosis. Bronchopulmonary lavage has also provided fresh dimension for the investigation of pulmonary nocardia and other disorders.

Keywords: Nocardia, Pulmonary Nocardiosis, Bronchopulmonary lavage

INTRODUCTION

Nocardia is aerobic actinomycetes group of bacteria which are gram-positive bacilli showing branching filamentous forms, are non-spore forming and mildly acid-fast bacteria [1]. These bacteria are saprophytic and are found in soil and water [2].

Pulmonary infection with *Nocardia* spp. show clinical symptoms similar to those suspected with pulmonary tuberculosis (fever, cough, chest pain, night sweats, weight loss and pneumonia) [3,4]. Infections with *Nocardia* spp. usually occur in individuals with weakened immune system and can include patients suffering from diabetes, malignancies, HIV/AIDS, lung disorders like pulmonary alveolar proteinosis (plugged lung air sacs), individuals with connective tissue disorders, chronic alcoholism, transplant patients and patients on corticosteroid therapy. It has been noted that more than 60% of human nocardiosis occurs in immunocompromised individuals and that males are more prone to infection than females (3:1) [4-7] and immunocompetent [8-11] individual was reported recently in the literature. Previous study has also elaborated on the types of radiological findings in pulmonary nocardiosis that include consolidation of the lungs, presence of nodules and masses, pleural effusion and extension of lung infection towards the chest wall resulting in abscess [12-15].

Bronchopulmonary lavage (BAL) has provided a fresh dimension for the investigation of pulmonary disorders.

BAL fluid may be analysed for cells and chemical mediators in the diagnosis and also serially for the management of several granulomatous Disorders including sarcoidosis, extrinsic allergic alveolitis, chronic beryllium disease, talc granulomatosis, tuberculosis, Langerhans' histiocytosis-x and Crohn's disease [16]. It may also provide information in fibrosing alveolitis, collagen vascular disease, occupational and drug-induced lung disease, acquired immune deficiency syndrome, bronchial asthma, neoplasia, transplantation, pulmonary alveolar proteinosis and eosinophilic lung disease. This study is planned to analyses the value of BAL in Nocardia infection.

MATERIALS AND METHODS

The medical records of patients with a diagnosis of nocardiosis maintained by Unique Hospital identification

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Citation: Kumar R, Kaur G, Singh S, Bansal R, Singh N, et al. (2020) Pulmonary Nocardia Infection Diagnosed by Bronchopulmonary Lavage in Malwa Region of Punjab. Int J Radiography Imaging Radiat Ther, 2(1): 60-63.

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number at Delhi Heart Institute and Multispeciality Hospital, Bathinda (Punjab), India from 2018-2019 were retrospectively reviewed. Bronchopulmonary lavage (BAL collected by Bronchoscope) is used for this study which showed positive modified acid-fast stained filamentous

bead-branching organisms (**Figure 1**) [17] or a positive culture or both. Epidemiologic data, clinical, chest X-ray, data were collected. The specimens from the patients were usually inoculated in routine non-selective media for Bacteria, fungi and mycobacteria.

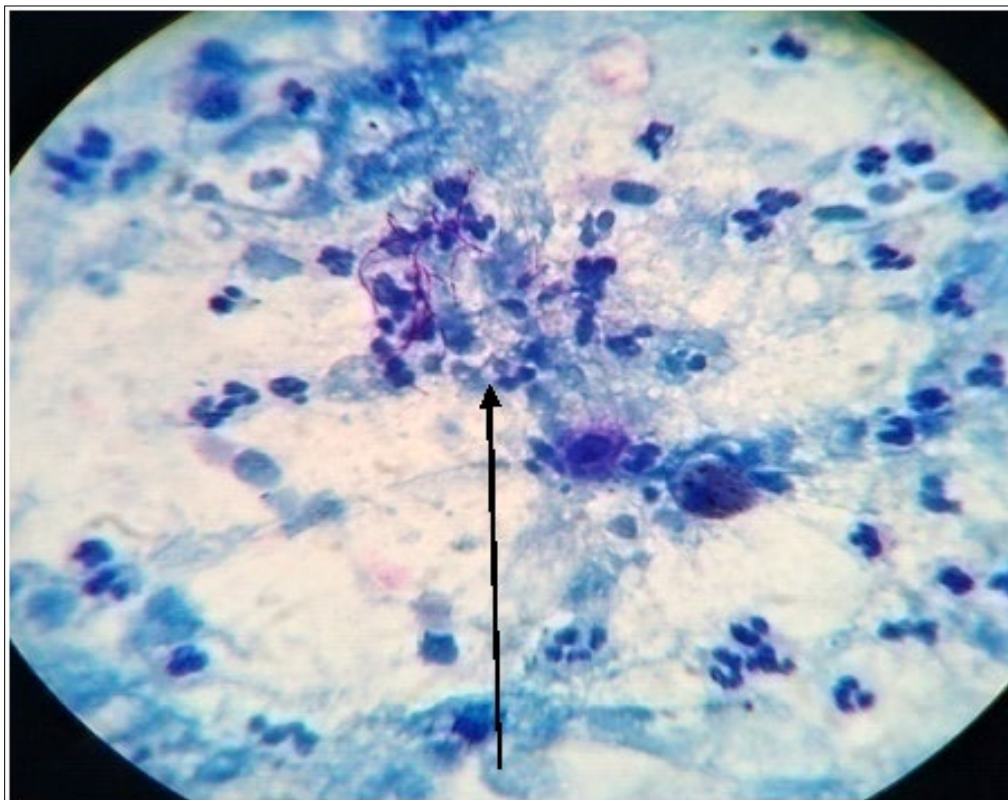


Figure 1. Modified Zn-stain showing nocardia.

RESULTS

Over the study period, there were 13 cases of nocardiosis at Delhi Heart Institute and Multispeciality Hospital, Bathinda (Punjab), India. Data of 13 cases were collected. The age, sex distribution (male/female 3:1) and underlying diseases

(found in 80% of cases) are shown in **Table 1**. Immunosuppressive agents (either corticosteroids or methotrexate treatment) having connective tissue disease used in 61.5% of cases followed by chronic lung disease (15.3%) and diabetes mellitus (15.3%) and Grave's disease was also found in one case.

Table 1. Epidemiologic data of 13 patients with nocardia.

Sex distribution (male:female)	3:1
Underlying diseases	Nil
HIV infection	Nil
Malignancy	Nil
Connective tissue diseases/Methotrexate treatment	8 (61.5)
Diabetes mellitus	2 (15.3)
Graves' disease	1 (7.6)
Chronic lung diseases	2 (15.3)
Mitral stenosis	Nil

The common clinical findings were fever, cough and hemoptysis (**Table 2**). Only 15.3% of patients had fever less than one week before presentation. Septic shock was documented at initial presentation in three cases.

Table 2. Clinical presentation of 13 patients.

Clinical presentation	Number of patients (%) N = 13
Fever	4 (30.7%)
Cough	3 (23%)
Hemoptysis	1 (7.6%)
Chest Pain	4 (30.7%)
Dyspnea	2 (15.3%)
Expectorate	3 (23%)
Headache	3 (23%)

Chest radiographs of all 13 cases were reviewed with a radiologist. The abnormal findings are summarized in **Table 3**. The common abnormalities were alveolar infiltrates (39.1), patchy opacities (36.9%), cavity lesion (21.7%) reticulo-nodular infiltration (17.4%) were found either alone or concurrently with infiltration.

Table 3. Chest X-ray findings.

Findings	Number of patients (%) N = 13
Alveolar infiltrates	3 (39.1)
Patchy opacities	2 (36.9)
Reticulonodular infiltration	1 (17.4)
Pulmonary nodules	2 (10.7)
Pulmonary mass	2 (8.7)
Cavitary lesion	3 (21.7)
Pleural effusion	2 (15.2)
Hilar lymphadenopathy	1 (2.2)
Pneumothorax	1 (2.2)
Bronchiectasis	1 (2.2)

DISCUSSION

Nocardiosis is a common opportunistic infection in immune compromised hosts that can cause serious or disseminated disease. More than 60% of all reported cases of nocardiosis are associated with pre-existing immune compromise ranging from alcoholism and diabetes to organ transplantation and AIDS. Persons requiring long-term corticosteroid or methotrexate treatment are also at risk with underlying diseases.

Pulmonary disease is the predominant clinical finding followed by connective tissue disease (61.5%), which is similar to other reports [18].

Whereas chest pain is (30.7%) cough, expectorate and headache has shown (23%) followed by dyspnea (15.3%). No difference between alveolar and reticulonodular or interstitial pattern of pulmonary infiltration was found. Although cavitation was common in pulmonary nocardiosis (21.7%) found in this study.

CONCLUSION

Nocardiosis is still a major problem in immune compromised hosts. Pulmonary infection was the predominant manifestation. Positive smears of Nocardia were seen in only 60% of cases, which may have resulted in missed or Delayed diagnosis in the remainder. Therefore, nocardiosis should be suspected in immune compromised and Methotrexate-treatment patients, whereas

bronchopulmonary lavage has also provided a fresh dimension for the investigation of pulmonary disorders.

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