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Case Report

A CASE OF POLYMICROBIAL PNEUMONIA WITH NOCARDIA IN AN IMMUNOCOMPETENT FEMALE

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ABSTRACT
Polymicrobial pneumonia is rare in an immunocompetent host. Pulmonary nocardiosis is a rare opportunistic infection more commonly seen in immunocompromised individuals. We report the case of 47 year old female who presented with fever, cough with expectoration and weight loss. She was evaluated and found to have bilateral pneumonia, her sputum was positive for *Nocardia, Pseudomonas* and *Acinetobacter*. No profound causes of immunodeficiency like Human immunodeficiency virus infection, diabetes mellitus, chemotherapy or previous corticosteroid intake were identified. When a patient responds poorly to empirical therapy for community acquired pneumonia, pulmonary nocardiosis should be suspected and evaluated even in immunocompetent individuals**.**

Keywords: *Polymicrobial Pneumonia, Nocardia Pneumonia Immmunocompetent Host*

INTRODUCTION
Pneumonia is an acute inflammation of the lower respiratory tract. Lower respiratory tract infection is a major cause of mortality worldwide. *Actinomycetes* are somewhat loose group of aerobic and anaerobic gram positive organism that tend to grow slowly with branching filaments. Only few are pathogenic to man. Pulmonary nocardiosis (PN) is an infrequent but severe infection that commonly presents as a subacute or chronic suppurative disease. *Nocardia spp.* are branching, beaded, filamentous aerobic gram-positive bacteria belonging to *Actinomycetes* and are weakly acid fast (Anil *et al.*, 2013). Soil is a natural habitat of *Nocardia*. Man acquires infection by inhalation of the bacteria from contaminated soil. Person-to-person transmission is rare (Tilak *et al.*, 2008). They are responsible for localized or disseminated infection in animals or humans. Nocardiosis is a rare opportunistic infection with greater incidence in immunocompromised individuals with predominance in males. *Nocardia* infections are common in chronic obstructive pulmonary disease patients. Here we report a rare case of polymicrobial pneumonia including *Nocardia, Acinetobacter and Pseudomonas* in an immunocompetent female with no structural lung disease or any history suggestive of immunocompromised state.

CASES
A 45 year old female with no known co-morbidities had complaints of cough with scanty expectoration for three weeks. During the first week of illness, she presented to a peripheral hospital, where she was treated symptomatically and was discharged after three days. Then she developed high grade intermittent fever with worsening of cough and significant muco-purulent, foul smelling expectoration. She was evaluated at another centre for her symptoms. Routine investigation showed neutrophilic leukocytosis with normal ESR. Sputum tested three days prior to admission to our hospital, was found to be sterile and negative for AFB. Radiological studies done outside, revealed bilateral multiple opacities with consolidation of right base. She was treated with empirical antibiotics for two days. Due to persistence of symptoms, she was referred to our hospital for further management.

On admission, she presented with additional history of weight loss and loss of appetite. She was mildly tachypnoeic with a room air oxygen saturation of 92%. On systemic examination, bilateral basal crackles and decreased air entry over left base were observed.

Routine investigations showed relative neutrophilia with raised erythrocyte sedimentation rate and elevated procalcitonin. Liver function tests showed conjugated hyperbilirubinemia with hypoalbuminemia

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and Albumin: Globulin ratio reversal. Chest X-Ray showed bilateral air space opacities (Figure 3). Sputum tested positive for *Nocardia* by modified Ziehl-Neelson stain (Figure 1). Sputum for acid fast bacilli was negative and culture was sterile. Human immunodeficiency virus (HIV) was negative. Ultrasound chest showed left minimal pleural effusion with underlying consolidation. High resolution computed tomogram of lung showed bilateral air space consolidation with a few areas of pleural based opacities. She was first started on empirical antibiotics with addition of trimethoprim-sulphamethazole for *Nocardia*. Due to recurrence of fever spikes, repeat chest X-Ray was done which showed blunting of left costophrenic angle in addition to the existing changes. Ultrasound guided diagnostic thoracocentesis was done which was found to be sterile with leukocytosis. Pleural fluid for *Nocardia* was negative. Repeat sputum culture grew *Pseudomonas and Acinetobacter* (Figure 2) which was treated according to sensitivity pattern. Repeat sputum for *nocardia* was negative. Additional antibiotic was added to cover multidrug resistant gram negative super infection.

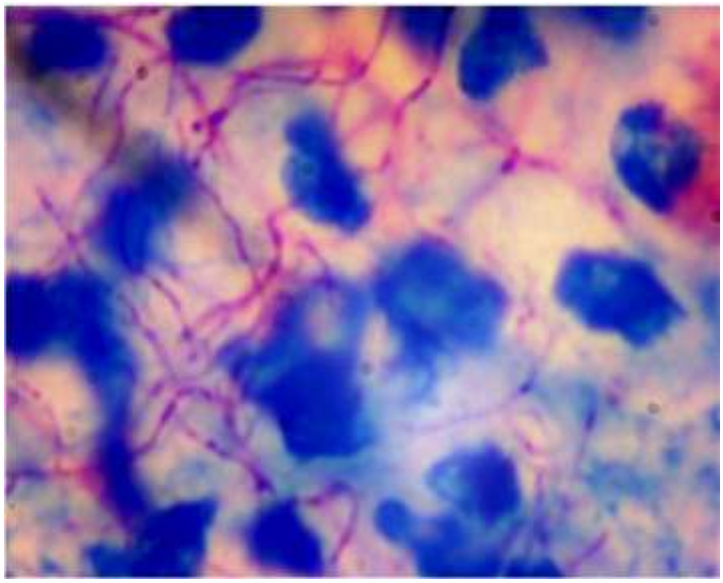

Figure 1: Sputum for nocardia showing positive for nocardia –modified zeihl neelson staining

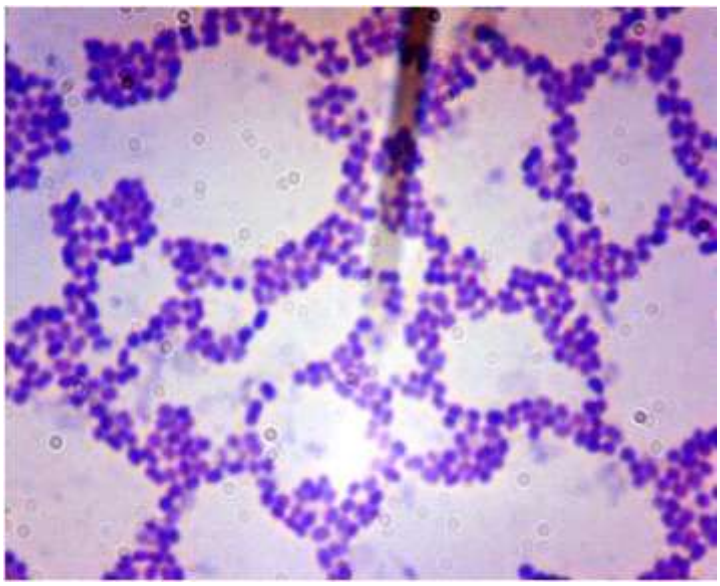

Figure 2: Sputum showing gram negative rods gram staining

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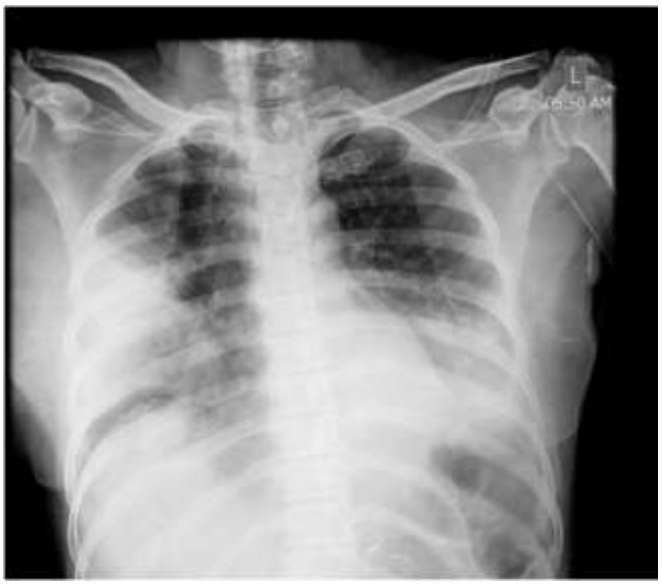

Figure 3: Chest X-ray at the time of admission

She improved clinically in response to therapy. At discharge she was advised to continue trimethoprim-sulphamethaxazole for 6 months. On review she showed clinical improvement with decreased lung signs and clearing Chest X-ray shadows (Figure 4)

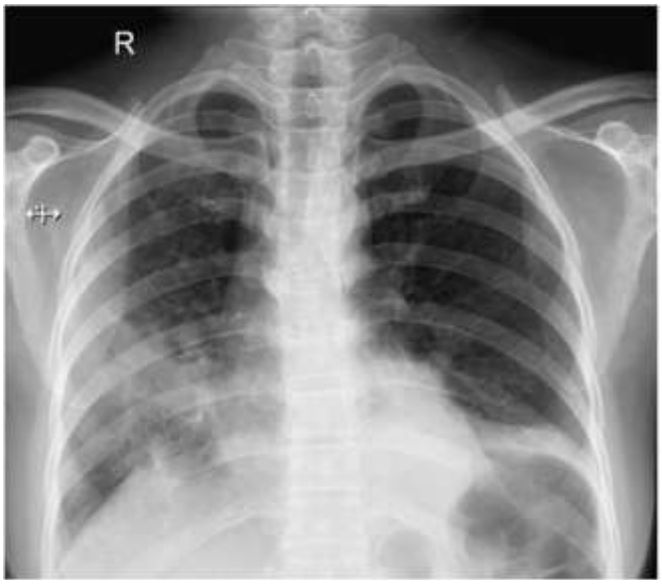

Figure 4: Chest X-ray at discharge

DISCUSSION

Pneumonia is infection of lung parenchyma. It is classified into community acquired, hospital acquired and ventilator associated pneumonia. Polymicrobial pneumonias are usually common in ventilator or hospital acquired pneumonias. Polymicrobial community acquired pneumonia can occur in immunosuppressed individuals but in immunocompetent individual as in our case is very rare. Our case is an interesting example of unexpected pulmonary nocardiosis complicated with *Acenitobacter* and *Pseudomonas* in an immunocompetent host with no history of any prior comorbidities or use of any steroids or underlying structural lung disease.

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Nocardia infections are rare among normal population, most of which occur in immunocompromised patients. Pulmonary nocardiosis is a sub-acute or chronic infection caused by *Nocardia spp.* which is aerobic, gram positive filamentous bacteria belonging to *Actinomycetes* and is responsible for localized or disseminated infection in animals or humans that has a worldwide distribution and can be cultured from the soil (Winn *et al.,* 2006, Menéndez *et al.,* 1997). *Nocardia* species are ubiquitous environmental saprophytes, living in soil, organic matter, or water (Menéndez *et al.,* 1997). Animal-to-human, human-to-human, and vertical transmission have not been reported (Bennett *et al.,* 2007). It grows mostly on nonselective media used routinely for cultures of bacteria, fungi, and mycobacteria (Tantracheewathorn *et al.,* 2004). Definitive diagnosis is obtained from a Gram's stain of the sputum, bronchoscopic washing or pleural fluid which reveal the typical Gram's positive branching filamentous bacteria, the acid-fast stain revealed variably acid-fast filamentous bacteria (Sorrell *et al.,* 2000). In the absence of corticosteroid therapy infection is very rare (Gilchrist *et al.,* 2011). It can affect immunocompetent host by impairing bronchial defenses by damaging ciliated epithelial cells especially in COPD and bronchiectasis patients(Martinez *et al.,* 2007).The lung is involved in about 75 % of patients with nocardiosis (Uttamchandani *et al.,* 1994), and as many as 50 % of patients with pulmonary nocardiosis have pleural effusion (Kramer and Uttamchandani.,1990). In immunocompetent subjects, the infection may run a chronic course and show granulomatous reactions (Apisarnthanarak *et al.,* 2002, Rolf *et al.,* 1992). In a series of 20 patients with positive sputum cultures for *Nocardia asteroides*, nine of the patients did not have radiographic abnormalities (Kime *et al.,* 1992). Chest radiographs of patients with pulmonary nocardiosis may demonstrate fluffy infiltrates, irregular densities, pleural empyema, single or scattered regular or irregular nodules or masses which may have cavities, single or multiple abscesses and interstitial, reticulonodular, alveolar or rarely military infiltrates (Bennett *et al.,* 2007).

The importance of infection caused by *Nocardia* is increasing because of the common predisposing factors for *Nocardia* infection were treatment for systemic lupus erythematosus, cancer, diabetes, and Acquired Immune Deficiency Syndrome (AIDS) (Kageyama *et al.,* 2004).

Sulfonamides have been the mainstay of therapy of nocardiosis since the 1940s; trimethoprim-sulfamethoxazole is currently preferred in a dose of 15 mg/kg/day of trimethoprim and 75 mg/kg/day of sulfamethoxazole, either parenterally or orally. Treatment of pulmonary nocardiosis should be continued for 6 to 12 months. For immunocompromised patients with nocardiosis, therapy should be continued for 12 months (Tunkel *et al.,* 1991).

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