
CASE REPORT**A case report of pulmonary nocardiosis caused by *Nocardia otitidiscaviarum***

Neetu Gupta^{1*}, Kalpana Angadi¹, Urvi Shukla², Ketaki Pathak¹, Uday Zende³, Meenakshi Bhakare⁴

¹Department of Microbiology, ²Department of Intensive Care Unit, ³Department of Radiology,

⁴Department of Respiratory Medicine, Symbiosis Medical College for Women (SMCW) and Symbiosis University Hospital and Research Centre (SUHRC), Symbiosis International (Deemed University), Lavale, Pune-412115 (Maharashtra), India

Abstract

Nocardiosis is a rare infection of the lung, brain and skin and can be a localized or disseminated infection. Here, we report a case of a 56-year-old male patient who presented with a right testicular torsion for which right orchiectomy was done in the hospital. In the post-operative period, patient developed increased respiratory insufficiency and was intubated. Chest X-ray revealed bilateral fluffy opacities most likely due to infective etiology. Endotracheal tube aspirate sample was sent for Gram staining and culture, organism present showed characteristics like Nocardia. MALDI-TOF identified organism as *Nocardia otitidiscaviarum*. The patient was treated with cotrimoxazole and ceftriaxone. His clinical condition improved. We report this case because *Nocardia otitidiscaviarum* is a rare cause of pulmonary nocardiosis and although there is high mortality reported in nocardiosis, early diagnosis because of the availability of advanced diagnostic technology and prompt treatment can help save the patient.

Keywords: Nocardia, *Nocardia otitidiscaviarum*, Pulmonary Nocardiosis, MALDI-TOF

Introduction

Edmond Nocard, a French veterinarian, and microbiologist first described the nocardial infection [1]. Nocardia is a gram-positive and weak acid-fast, branching, filamentous organism. They are aerobic slow-growing, saprophytic bacteria belonging to the family Nocardiaceae [1-2]. Although Nocardia has been described as an opportunistic pathogen, reports say that infection can happen in both immunocompromised and immunocompetent individuals [3]. Pulmonary nocardiosis may present as pneumonia, lung abscess, empyema, endobronchial inflammatory mass, or contiguous extension of cavitary disease into surface or deep structures [1]. *Nocardia caviae* was the previous name of *N. otitidiscaviarum* and was isolated from a middle ear infection of a guinea pig by Snijders in 1924 [4-

5]. *N. otitidiscaviarum* is a less commonly isolated species and is considered less pathogenic [3, 6]. But many cases have been reported with this organism eventually causing death. Therefore, we present here a case of *N. otitidiscaviarum* pulmonary infection.

Case Report

A 56-year-old patient presented to the surgery ward with tenderness and swelling over the right scrotal region. The patient was diagnosed as a case of right testicular torsion. He was operated and right orchiectomy performed under spinal anaesthesia as an emergency procedure after admission. The patient had a history of chronic and heavy alcohol use and was a smoker. He also had a history of tubercular infection two years ago for

which, according to relatives, had taken irregular treatment for 6 months.

On first postoperative day, the patient developed respiratory distress, was transferred to the intensive care unit and intubated on third day due to respiratory insufficiency. During this period, patient had intermittent fever with thick endotracheal secretions. Chest X-ray of the patient showed multiple inhomogeneous alveolar and interstitial opacities with areas of consolidation bilaterally. Laboratory investigations revealed an increasing trend of leukocytosis, respiratory acidosis with CO₂ retention and a raised alkaline phosphatase. The patient was suspected with pneumonia and started on meropenem as empirical treatment.

An endotracheal aspirate was sent to the microbiology laboratory for Gram staining, culture sensitivity and GeneXpert for tuberculosis. GeneXpert for tuberculosis showed negative result. Gram staining showed the presence of many pus cells and many gram-positive beaded branching filamentous bacilli (Figure 1). Blood agar culture plate, after 48 hours of incubation, showed significant growth of an organism with dry, wrinkled, yellow pigmented colonies (Figure 2). Gram stain smear of colonies also showed gram-positive branching filaments, as in direct smear. Modified acid-fast stain showed acid-fast fragments of branching filaments (Figure 3). Sample was also cultured on selective media like Lowenstein Jensen Media and Sabouraud Dextrose Agar. Smear of growth from selective media stained with modified acid-fast stain showed the acid fast branching filaments (Figure 4).

MALDI-TOF identified this organism as *Nocardia otitidiscaviarum*. The patient was put on cotrimoxazole and ceftriaxone and his condition improved. He was extubated and made a complete

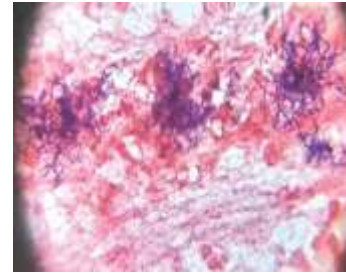


Figure 1: Gram staining showing Gram-positive branching filamentous bacilli



Figure 2: Blood agar with yellow dry wrinkled colonies



Figure 3: Modified acid fast stain from endotracheal aspirate sample showing acid fast fragments in filamentous bacilli

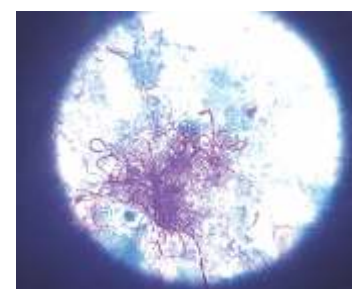


Figure 4: Modified acid fast stain from LJ culture growth

recovery over the next 3 weeks. He was sent home and advised to abstain from alcohol and smoking and to continue cotrimoxazole for 6 months. He was advised a follow up after 15 days in medicine out-patient department.

Discussion

Indian investigators found the presence of *N. otitidiscaviarum* in the soil [4]. Individuals with weak immune systems such as HIV infection, after solid organ transplantation, malignancy, receiving long-term corticosteroid therapy, alcohol use, chronic obstructive lung disease and autoimmune diseases are at risk of developing Nocardia infection [3, 7]. This patient was a farmer by occupation and lived near the agricultural area which may be the source of inhalation and colonization of the organism in respiratory tract. The patient was a chronic alcoholic which is a risk factor. Surgery mostly further lowered the immunity and acted as a triggering factor for the disease for which the symptoms appeared on the next postoperative day. In countries like India where tuberculosis is very common, nocardiosis should always be a differential diagnosis not only in immunocompromised but also in immunocompetent individuals. The symptoms of pulmonary nocardiosis might resemble empyema, coexist with extra-pulmonary and pulmonary tuberculosis, or resemble a tuberculosis relapse following anti-tubercular medication [8]. Co-infection suspicion should be ruled out particularly when the patient fails to respond to standard therapy. Tuberculosis-induced structural alterations in the lungs promote co-infection or late infection of pulmonary nocardiosis and increase exacerbation. In this case, patient's relative gave a history of pulmonary tuberculosis of patient two years back

and told that he had taken irregular treatment. Therefore, GeneXpert test for *M. tuberculosis* was also performed on the endotracheal aspirate sample which gave negative result. *N. otitidiscaviarum* organism was grown and identified from patient sample, and the response of patient to the given treatment helped to establish the diagnosis of pulmonary nocardiosis. In pulmonary nocardiosis, the chest radiographic findings are pleomorphic and often nonspecific. Areas of consolidation and presence of large irregular nodules, often cavitory, are most common; nodules, masses, interstitial patterns can also be seen [9]. About 14–40% of people die from pulmonary nocardiosis, and this number rises sharply if the condition spreads to the central nervous system [8]. Good communication with your own laboratory in case of clinical suspicion is essential, as it requires the culture sample to incubate for a longer period than routine and if required other necessary tests need to be performed. Newer methods like MALDI-TOF, 16S ribosomal DNA sequencing and PCR can rapidly detect clinically important Nocardia species [8, 10]. Use of these methods can help in the final diagnosis of nocardiosis as was in this case.

Conclusion

Awareness of various clinical presentations of nocardiosis and a high index of clinical suspicion is required for the diagnosis of this rare and fatal disease. Furthermore, good quality clinical samples, microbiological investigations including gram stain microscopy, prolonged incubation of culture, and use of new rapid methods of diagnosis are the way to make a correct and early diagnosis that can help improve survival of patients as evidenced in this case.

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***Author for Correspondence:**

Dr. Neetu Gupta, Department of Microbiology, Symbiosis Medical College for Women (SMCW) & Symbiosis University Hospital and Research Centre (SUHRC), Symbiosis International (Deemed University), Lavale, Pune-412115 Email: neetu.gupta@smcw.siu.edu.in Cell: 9921871497

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