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Case Report

Microbiology Section

Nocardia farcinica as a Cause of Complicated Chronic Suppurative Otitis Media: A Case Report

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ABSTRACT

Nocardia belongs to the order Actinomycetales suborder Corynebacteriaceae, family Nocardiaceae. It causes infections mostly in immunocompromised individuals. It primarily causes pulmonary infections, followed by central nervous system infections, cutaneous and disseminated infections. Cutaneous infections are reported in immunocompetent individuals also. Because of the growth characteristics, it is difficult to recover the organisms in culture. The recent advanced molecular technology has made identification of the organism to species level possible. Chronic Suppurative Otitis Media (CSOM) due to *Nocardia* spp is rarely reported. Here, authors report a case of CSOM caused by *Nocardia farcinica* in a 47-year-old female. The patient was on steroid therapy for bronchial asthma. Culture of ear discharge isolated *Nocardia* spp, identified as *Nocardia farcinica* by mass spectrometry. Appropriate antibiotic treatment was administered and good treatment response was obtained. Early diagnosis and appropriate antibiotic treatment is critical for nocardial infections. Difficulty in recovering and identifying the organism, with delay in initiating appropriate treatment can result in poor prognosis and treatment failure.

Keywords: Ear infection, Gram positive bacteria, Immunocompromised, Occupational infections, Underlying diseases

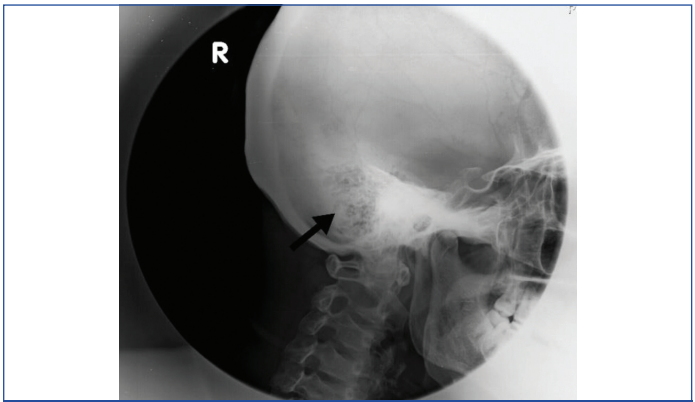
CASE REPORT

A 47-year-old female, agricultural worker presented with history of right ear pain for two days. She gave history of profuse, odourless, watery discharge from right ear, on and off for two years, for which she has taken three courses of oral antibiotics in two years. She also has partial hearing loss of right ear for two years. There was no associated fever, tinnitus or vertigo. She was a known case of bronchial asthma for four years, on regular treatment with inhalational steroids-formoterol and budesonide rotacaps 200 µg twice daily, azelastine and fluticasone nasal spray. She had undergone surgery for removal of nasal polyp five years back.

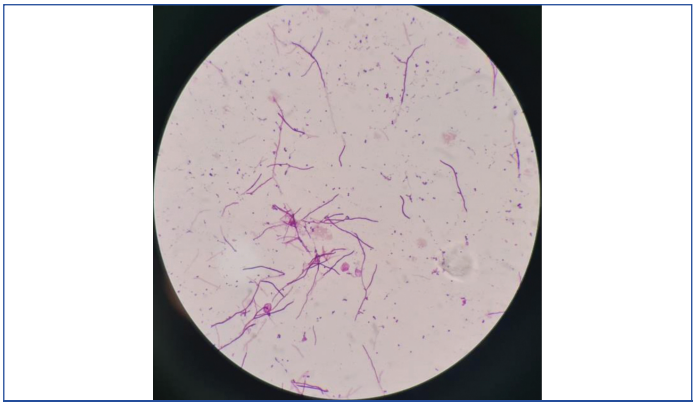
No significant findings on general physical examination was observed. Examination of right ear showed mycotic debris, discharge and oedema in the external auditory canal. There was a medium sized perforation in the tympanic membrane. Examination of nasal cavity showed right inferior turbinate hypertrophy, mild deviation of nasal septum to right-side and a spur on left-side. X-ray mastoid showed opacification of mastoid air cells on the right-side [Table/Fig-1]. X-ray chest showed increased bronchovascular markings bilaterally with hyperinflation. Pure tone audiometry showed right-sided conductive hearing loss. A preliminary diagnosis of CSOM (tubotympanic disease, active stage) with otitis externa and otomycosis was made. Patient was empirically started on neomycin, beclomethasone, clotrimazole and lignocaine ear drops and ciprofloxacin 500 mg twice daily orally.

Culture of the discharge from right ear was made on blood agar. It grew chalky white colonies after 48 hours of incubation [Table/Fig-2]. Gram stain from the colonies showed filamentous gram positive bacilli with branching [Table/Fig-3]. It was partially acid fast with Kinyoun's acid fast staining. The isolate was identified by Matrix-Assisted Laser Desorption Ionisation Time-Of-Flight Mass Spectrometry (MALDI-TOF MS) as *Nocardia farcinica*. The

[Table/Fig-2]: Blood agar showing chalky white colonies after 48 hours of incubation.



[Table/Fig-1]: X-ray mastoid showing opacification of mastoid air cells on the right-side.



[Table/Fig-3]: Gram stain from the chalky white colonies showing filamentous Gram-positive bacilli with branching (100x magnification).

isolate showed sensitivity to amikacin, ciprofloxacin, linezolid, meropenem, amoxicillin-clavulanate and was resistant to cefotaxime, cotrimoxazole, gentamicin and tetracycline by microbroth dilution test (CLSI document M24-A2, Volume 31, No. 5) [1].

The antimicrobial therapy for the patient was changed to linezolid 600 mg twice daily orally, which was administered for three months, based on the antimicrobial sensitivity pattern for the isolate. Monitoring for adverse effects was done. No adverse effects were observed. Aural toileting was given. Patient got symptomatically better. Linezolid was stopped when the mastoiditis resolved and there was no discharge from ear. Complete therapeutic response was achieved in three months.

DISCUSSION

Nocardia is an opportunistic pathogen belonging to the order Actinomycetales suborder Corynebacteriaceae, family Nocardiaceae. It is a filamentous aerobic gram positive bacteria which can cause diseases ranging from cutaneous infections to severe pulmonary or central nervous infections. The most common form is pulmonary nocardiosis, acquired by inhalation of mycelial fragments or spores which are airborne. Half of the patients with pulmonary disease also develop disease in extrapulmonary sites such as skin, subcutaneous and central nervous system. Primary cutaneous nocardiosis has been reported in immunocompetent people [2]. There are about 16 different species of *Nocardia* which can cause human infections [3]. Globally, infections caused by *Nocardia* is increasing [4]. *Nocardia farcinica* (formerly *N. asteroides* type V drug susceptibility pattern) accounts for nearly 24.5% of infections caused by *Nocardia* [5]. In 70% of cases, nocardiosis present as pulmonary disease. Other sites of involvement are CNS, skin, and in addition dissemination can occur to other organs such as kidneys, intestinal tract and joints [3]. There are few reports of CSOM caused by *Nocardia asteroides complex* from India. The patient was a known case of idiopathic thrombocytopenic purpura, undergone splenectomy and was on steroids. She presented with fever, ear discharge and ear pain, tinnitus and loss of hearing. Ear discharge grew *Nocardia asteroides complex* on culture. She was started on cotrimoxazole, but she developed cortical vein thrombosis as a complication of CSOM. Antibiotics was changed to amikacin and linezolid for 10 days. She got better and was discharged with cotrimoxazole for three months [6].

Nocardia is normally present in soil. Occupational exposure is seen with farmers, mine workers, construction site workers etc [7]. Long-term steroid therapy, solid organ transplantation, chronic obstructive pulmonary disease, underlying renal disease etc are risk factors for development of infection [8]. It is found that nearly 33% of patients having nocardiosis, especially cutaneous infections are immunocompetent [8]. In this case, steroid therapy for bronchial asthma may be considered as a risk factor. The patient was an agricultural worker, suggesting occupational exposure. Recovery of *Nocardia* spp on culture is challenging because of the slow growing nature of the organism [9]. On routine culture, *Nocardia* spp produce chalky white to yellow or brown pigmented colonies [3]. For speciation, the preferred methods are molecular methods such as 16s rRNA analysis, restriction fragment length polymorphism, multilocus sequence analysis and mass spectrometry [3].

Nocardiosis requires multiple drugs and prolonged period of treatment. First line antibiotic for *Nocardia* infections is trimethoprim-sulfamethoxazole. For CNS infections, cotrimoxazole, imipenem and amikacin can be administered in combination [10]. Observations from several cases showed good treatment response with use of cotrimoxazole for 1-3 months in cutaneous nocardiosis and 6-12 months in pulmonary and disseminated nocardiosis [11]. *Nocardia farcinica* is resistant to ampicillin, cephalosporins, aminoglycosides except amikacin and susceptible to ciprofloxacin, linezolid and imipenem. Linezolid and benzothiazinones can be considered as reserve drugs which can be used for resistant infections. Treatment failure and poor prognosis can result if there is delay in diagnosing and initiating treatment, especially in immunosuppressed individuals.

CONCLUSION(S)

Nocardia farcinica can cause infections in immunocompromised as well as immunocompetent people. Early diagnosis and targeted treatment resulted in successful resolution of disease in this case. Even though CSOM caused by *Nocardia farcinica* is rare, when encountered, it has to be considered, properly diagnosed and treated, in order to prevent development and worsening of complications.

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