

CASE REPORT

Diagnostics and Clinical Care of *Nocardia* Keratitis

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ABSTRACT

Nocardia species are obligate aerobic, partially acid-fast, gram-positive bacilli, leading to ophthalmological complications. Because of infrequent presentation and variable clinical pictures of *Nocardia* corneal ulcers are easily misdiagnosed. We present here an ophthalmological and microbiological tied-in case of a 45-year-old male patient with *Nocardial* keratitis from Lahore, Punjab, Pakistan. A 45-year-old male patient presented with a corneal ulcer in the right eye, complaining of orbital pain, photophobia, and visual impairment. Based on microbiological findings suggesting *Nocardia* spp. growth, the patient was treated with Amikacin. Following this, the corneal ulcer was completely recovered. *J Microbiol Infect Dis* 2022; 12(1):31-34.

Keywords: *Nocardia*, corneal ulcer, diagnosis, care, treatment

INTRODUCTION

Nocardia species are obligate aerobic, partially acid-fast, gram-positive bacilli [1]. The genus *Nocardia* has numerous species (i.e., *N. asteroides*, *N. brasiliensis*) that may lead to various pulmonary, disseminated infection, skin, and ophthalmological complications [2]. Essentially, *Nocardia* thrives in standing water, soil, and decaying plants. Infection with *Nocardia* occurs in low and middle-income countries like Pakistan by inhaling dust-infected bacteria or direct inoculation to the skin when contaminated [1]. To the best of our knowledge, this 45-year-old male patient with ophthalmologic and microbiological findings is the first patient with *Nocardia* keratitis that is presented from Lahore, Pakistan.

CASE

A 45-year-old male, a farmworker, presented with a corneal ulcer in the right eye. There was a history of eye trauma with an unknown foreign body for two days. The patient complained of orbital pain, photophobia, and visual impairment at presentation. On ophthalmological examination, there was a remarkable papillary reaction of the

conjunctiva. The corneal ulcer was round and extended up to the mid periphery. The full-thickness infiltrated wreath patterns were seen with a persistent epithelial defect with white stromal opacities. Endothelium underneath was not be visualized due to stromal opacities. In addition, ++ cells, the anterior chamber reaction of ++ cells, and hypopyon of 1.5 mm were present. The corneal scrapings were taken by giving two proparacaine in the eye operation theater. These corneal scrapings were directly inoculated on Blood agar, chocolate agar, MacConkey Agar, and Sabouraud Dextrose Agar (SDA). The scrapings were also smeared on four glass slides for KOH wet mount, Gram staining, Giemsa staining, and Kinyoun staining. These agar plates and smeared slides were sent to the hospital's microbiology laboratory. The corneal ulcer findings are shown in Figure 1.

On stained slides examination, there was the presence of gram-positive, branching, beaded filaments. On Kinyoun staining, weak acid-fast branching filaments appeared red against the blue background. On inoculate culture examination, a chalky, white, round colony appeared on blood, chocolate, and SDA after

four days of inoculation suggestive of *Nocardia spp.* growth. The organism was further investigated on urease agar and Lowenstein-Jensen Medium (LJ). The *Nocardia spp.* growth was positive on the LJ medium, and it was urease positive organism. The sensitivity was tested for *Nocardia spp.* according to the Clinical and Laboratory Standards Institute; the strain was sensitive to Ciprofloxacin, Amikacin, linezolid, vancomycin, and sulphamethoxazole/trimethoprim. The patient was given medical treatment Amikacin (orally, 7.5 mg/kg every 12 h) for a total of 8 days, according to the sensitivity pattern of the isolated organism. After following up, the corneal ulcer was fully healed. The microbiological findings are showcased in Figure 2a-d.

DISCUSSION

Nocardial eye infections are rarely seen in eye infections, though they are present worldwide. They may occur due to contact with bacteria in the soil and water; our case was a farmworker and suggesting the possible transmission due to occupational exposure. They can cause keratitis, uveitis, choroiditis, retinal abscesses, and iritis [3]. The clinical examination of this case was a corneal ulcer that was round extended up to mid periphery. The full-thickness infiltrates wreath patterns with a persistent epithelial defect with white stromal opacities. The wreath pattern suggests a *Nocardial* infection of the corneal [4]. The diagnosis of corneal ulcer caused by *Nocardia spp.* is often misdiagnosed and delayed, resulting in inappropriate treatment and complications [5]. However, in the present case, we diagnosed the Gram staining and weak acid-fast bacilli on the first day of staining. The prompt diagnosis of branching filaments was helpful for the early diagnosis of *Nocardia spp.* keratitis in this case.

The *Nocardia* is a slow-growing bacterium and requires prolonged incubation, around 3-5 days [6]. In the present case, though the staining was helpful for early diagnosis, the inoculated culture was observed for up to the fourth day of inoculation. On the fourth day, the chalky white colonies were observed on blood agar and SDA. This finding was further confirming the diagnosis of *Nocardia spp.* The *Nocardia spp.* are urease positive, consistent with our case study [3]. On sensitivity pattern, the present *Nocardia spp.* was sensitive to

Amikacin and another group of antibiotics. The patient was given Amikacin, the medically best antibiotic for *Nocardial* corneal ulcers [7]. Traditional medication is the Sulfa group of antibiotics; alternatives are imipenem, meropenem, and 3rd generation cephalosporins.

Nocardia keratitis has an excellent prognosis results in ulcer healing if treated promptly. However, the delay in diagnosis and treatment can cause irreversible cornea scarring, and surgical management could be required. Keratoplasty and conjunctival flaps are the surgical options for the treatment of scarring the cornea [5].

Conclusion

The infrequent presentation and variable clinical picture of *Nocardia* corneal ulcers are easily misdiagnosed. This rare entity should be added to clinical differential diagnosis and accurate microbiological examination results in prompt and proper diagnosis. Culture and sensitivity should be the gold standard for diagnosing every corneal ulcer. The direct inoculation of corneal scraping and their direct staining help in early and prompt diagnosis of culprit micro-organisms responsible for the keratitis. Culture and sensitivity are also helpful for choosing proper antibiotics to which the organisms could be responsive to the medical treatment. Meanwhile, antimicrobial stewardship will be achieved by these microbiological analyses.

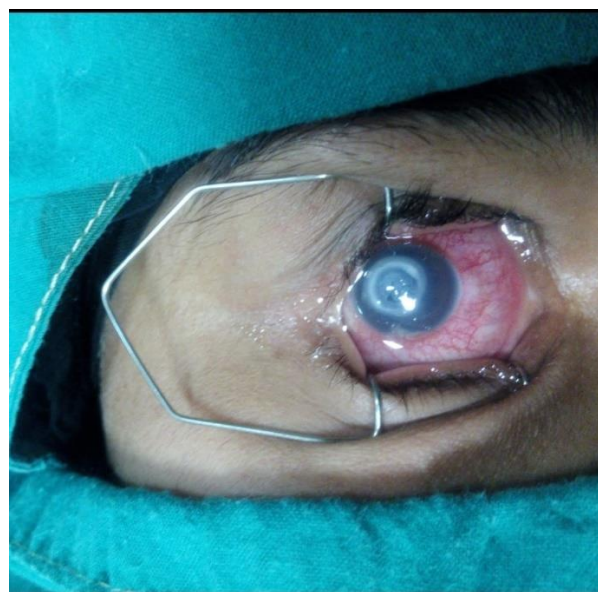


Figure 1. Corneal ulcer with wreath pattern



Figure 2a. Chalky white colonies on blood agar.



Figure 2b. Chalky white colonies on chocolate agar



Figure 2c. Gram staining of corneal scrapings showing Gram-positive beaded branching filaments suggestive of *Nocardia* spp.



2d. Chalky white colonies growth on LJ medium.

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