

Endogenous Endophthalmitis in a Patient with Severe Underlying Nocardia Asteroides Infection

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ABSTRACT

An 85-year-old male presented 1 month after purchasing a house plant from Brazil with signs of sepsis. Cultures and remaining workup were initially unrevealing. He received broad-spectrum antibiotics with resolution of symptoms and was discharged. The patient returned to the hospital 1 month later with similar symptoms, at which time blood cultures grew *Nocardia asteroides*. Several days later, the patient developed decreased vision of the left eye and our service was consulted. Initial eye examination revealed light perception vision, hypotony, corneal edema, hypopyon, and choroidal detachment consistent with endogenous endophthalmitis of the left eye.

Key words: Chorioretinitis, endogenous endophthalmitis, endogenous ocular nocardiosis, *Nocardia asteroides*

INTRODUCTION

Endophthalmitis usually occurs as a complication of ophthalmic surgery or ocular trauma. However, endogenous cases can arise in the context of serious systemic bacterial or fungal infection. *Nocardia* is a rare cause of endogenous endophthalmitis that usually affects immunocompromised individuals. We present a case of endogenous *Nocardia* endophthalmitis in an immunocompetent 85-year old man who presented one month after purchasing a house plant from Brazil. This case highlights the need to consider *Nocardia* in the differential diagnosis of any patient presenting with endogenous endophthalmitis, regardless of immune status. It also demonstrates the importance of achieving prompt diagnosis and treatment of Nocardiosis to save vision or preserve the globe. Finally, we review current diagnostic and therapeutic strategies and draw recommendations based on a review of the literature.

CASE REPORT

An 85-year-old male presented in November to a tertiary care facility in the southern United States with chief complaint

of fever, chills, and night sweats. Symptoms began about 1 month after he purchased a houseplant from Brazil. Review of systems was otherwise unremarkable. Medical history was significant for chronic obstructive pulmonary disease. Surgical and family histories were noncontributory. The patient was subsequently admitted for sepsis of unknown origin. Cultures and remaining workup were unrevealing. He received broad-spectrum antibiotics with resolution of symptoms and was discharged. The patient returned to the hospital 1 month later with similar symptoms at which time blood cultures grew *Nocardia asteroides*. Several days later, the patient developed decreased vision of the left eye and our service was consulted.

Initial eye examination revealed visual acuity of hand motion only on the left (OS). Intraocular pressure (IOP) was 13 mmHg OD. Slit lamp examination revealed a 5 mm hypopyon, 3+ cell, and anterior synechiae of the anterior segment [Figure 1]. The posterior segment examination showed 2+ cell, vitreous debris, and choroidal effusion. B-scan ultrasound was consistent with choroidal effusion [Figure 2]. A diagnosis of endogenous endophthalmitis was made and the patient underwent intravitreal injection of amikacin and imipenem.

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At 1-week follow-up, visual acuity worsened to light perception. IOP decreased to 5 mmHg due to ciliary body shut down and hypotony. Slit lamp examination showed worsening of hypopyon to 8 mm. 3 weeks after initial treatment, the patient passed away from complications related to sepsis.

DISCUSSION

Endogenous endophthalmitis is an uncommon condition that results from hematogenous spread of bacteria or fungi to the inside of the eye, usually through the highly vascular choroid. Most bacterial cases in the United States and Europe are caused by highly virulent organisms such as *Streptococci*, *Staphylococcus aureus*, and Gram-negative *Bacilli*.^[1] Endogenous seeding by *Nocardia* species is exceedingly rare.

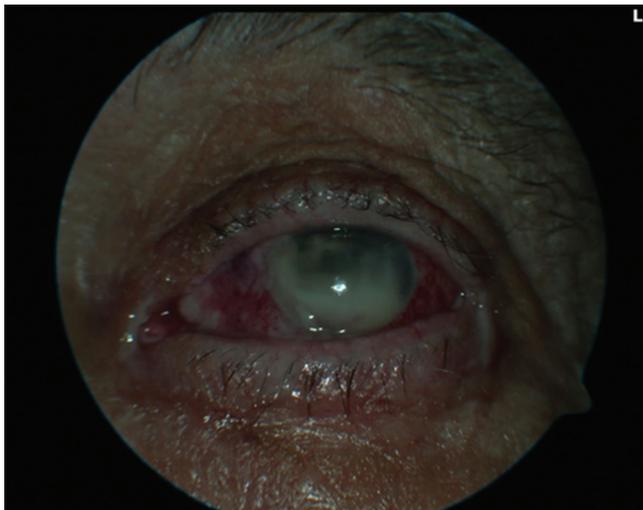


Figure 1: Anterior segment examination showing 5 mm hypopyon, 3+ cell, and anterior synechiae

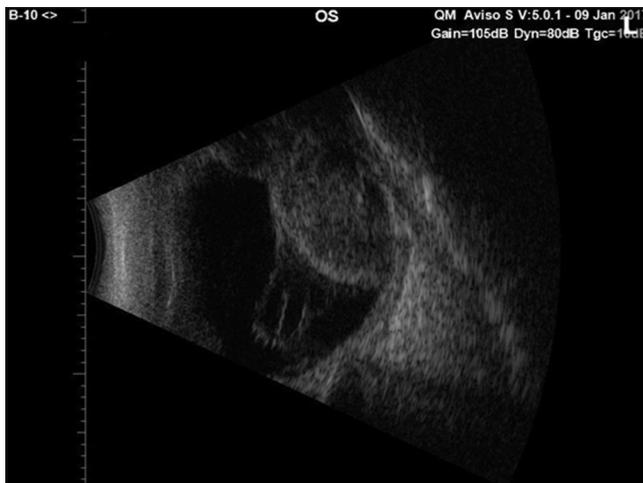


Figure 2: B-scan showing choroidal effusion

Nocardia is Gram-positive, weakly acid-fast aerobic actinomycetes that are found ubiquitously in soil and decaying plant matter. Typically regarded as an opportunistic infection, the lungs are the most common primary site of infection in the United States due to inhalation of organisms from environmental sources. Other common sites include the skin, subcutaneous tissue, and central nervous system.^[2] Only an estimated 0.6–1.0% of patients with systemic nocardiosis will develop endogenous endophthalmitis.^[3] Our patient was likely exposed through inhalation of *Nocardia* in the soil of a recently purchased houseplant from Brazil given his history of chronic lung disease and the absence of other localizing signs and symptoms.

The major risk factor for endogenous *Nocardia* endophthalmitis is immunosuppression, although a few cases have been reported in immunocompetent individuals.^[4-6] Eschle-Meniconi *et al.*^[3] reviewed 38 cases of *Nocardia* endogenous endophthalmitis reported from 1967 to 2007 and found that almost half (46%) of patients were organ transplant recipients. Other common predisposing conditions were autoimmune disease (24%), hematologic malignancy (19%), liver disease (19%), and recent history of surgery or trauma (13%). 73% of patients were on corticosteroids, either alone or in combination with other immunosuppressants. This case is among the few reported in which the patient was not chronically immunosuppressed.

Endogenous *Nocardia* endophthalmitis typically presents with unilateral loss of vision during the course of systemic infection. Additional presenting complaints include eye pain, flashes of light or floaters, and periorbital edema. Visual acuity is often severely impacted. Eye examination may reveal inflammation of both the anterior and posterior chambers as well as exudative choroidal effusion, retinal hemorrhage, or subretinal abscess. About half of patients will initially seek treatment for ocular symptoms^[3]. Isolated endophthalmitis is uncommon but has been reported.^[6-9]

In about half of reported cases, diagnosis of *Nocardia* endophthalmitis was made from ocular specimens.^[3] In other recent cases, *Nocardia* was successfully isolated from extraocular sites such as the skin,^[10-12] brain,^[13] and lungs.^[14,15] The average time to diagnosis is 3.5 weeks, reflecting both the non-specific signs of systemic infection and the slow growth of *Nocardia* in culture. Pars plana vitrectomy (PPV) and sampling of subretinal lesions are the most effective diagnostic modalities. B-scan ultrasound, fluorescein angiography, and ocular coherence tomography may aid in determining the extent of infection and diagnosing complications such as retinal detachment which occurs in about 40% of cases.^[3]

Speciation and antimicrobial susceptibility testing is an important step in management of *Nocardia* infections.^[16]

There are currently 33 species of *Nocardia* that are known to cause disease in humans.^[2] Gene sequence analysis of 16S rRNA has been used in many cases to successfully identify the specific *Nocardia* isolate^[6,8,12,15-17] from various samples. More data are needed to better define the epidemiology and antimicrobial susceptibility patterns among different *Nocardia* species.

For endogenous *Nocardia* endophthalmitis, intravitreal antibiotics and surgery, as well as hospital admission for intravenous antibiotics, are reasonable. The mainstay of treatment for Nocardiosis is trimethoprim-sulfamethoxazole. Amikacin and other aminoglycosides demonstrate excellent *in vitro* activity against numerous strains of *Nocardia* as well.^[16] However, Linezolid is the only drug aside from sulfonamides with activity against all clinically significant isolates. Other agents with variable activity between species include imipenem, ceftriaxone, minocycline, ciprofloxacin, clarithromycin, and amoxicillin-clavulanic acid. Therefore, *in vitro* testing for antimicrobial susceptibility at a qualified laboratory facility is recommended^[2]. For initial management of suspected *Nocardia* endophthalmitis, we recommend diagnostic PPV, with or without subretinal biopsy, and intravitreal amikacin (0.4 mg/0.1mL). Choice of systemic antibiotics should be guided by *in vitro* susceptibility testing as well as the extent of extraocular involvement, patient tolerance, and risk of toxicity.

For patients with endogenous *Nocardia* endophthalmitis, the prognosis is grim. Delayed diagnosis, inadequate therapy, and severe underlying conditions contribute to the high morbidity and mortality of this infection. In one series, about one-third of patients died from their infection. Among the surviving patients, about one-third of affected eyes had a final visual acuity of 20/200 or less, and about one-third required enucleation or evisceration.^[3] Thus, there should be a high index of suspicion for *Nocardia* in any patient presenting with endogenous endophthalmitis. Prompt diagnosis, initiation of appropriate medical and surgical therapy, and close monitoring for disease progression and complications are essential in the management of this potentially devastating infection.

CONCLUSION

Nocardia asteroides is a rare cause of endogenous endophthalmitis. While it typically occurs in the setting of chronic immunosuppression, it can affect immunocompetent individuals. There should be a high index of suspicion for *Nocardia* in any patient presenting with endogenous endophthalmitis as early diagnosis and appropriate management are vital to preventing potentially devastating outcomes. Effort should be made to identify the specific *Nocardia* species and its antimicrobial sensitivities.

Lessons learned

Nocardia endogenous endophthalmitis most commonly occurs in immunocompromised patients, although it affects immunocompetent patients as well. Early diagnosis and adequate treatment are critical in preventing associated morbidity and mortality. Management of *Nocardia* endophthalmitis consists of surgical intervention and intravitreal antibiotics in conjunction with systemic antibiotics.

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