

Nocardia endophthalmitis in a child: Distinct clinical and imaging features on orbital CT scan

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Abstract:

Nocardia is a rare cause of endophthalmitis in immunocompetent individuals with poor visual outcomes. We, herein report a 15 month otherwise healthy child, who presented with hyphema, vitreous hemorrhage and secondary glaucoma following a vague history of trauma in the left eye 2 months before presentation. He presented a week later with features of panophthalmitis which were confirmed on B-scan and orbital CT scan. CT scan with contrast revealed the presence of multiple ring enhancing abscesses in the vitreous cavity and also in the intraconal space. Evisceration was done and smear and cultures revealed *Nocardia*. Rare presentation in a healthy pediatric patient and typical CT scan findings are discussed.

Keywords:

Nocardia endophthalmitis, orbital abscess, orbital imaging, pediatric

INTRODUCTION

Trauma is the most common cause of endophthalmitis in children with incidence reported between 2% and 70%^[1,2] most commonly due to Streptococci and Staphylococcal species.^[3,4]

The diagnosis of post-traumatic endophthalmitis in children is often delayed due to the inability of the child to vocalize their complaints and delay on the part of the parents especially if the injury was trivial. Primary *Nocardia* endophthalmitis in immunocompetent individual is most likely post-traumatic.^[5,6] *Nocardia*, itself, is a very rare cause of endophthalmitis in children with only one case reported in literature till the submission of this case report.^[7] We describe a rare case of *Nocardia* endophthalmitis in a toddler with very unique orbital CT scan findings.

CASE REPORT

A 15-month-old boy presented with complains of pain, redness and photophobia in the left eye since 2 months. There was a vague history of trauma, following which the parents noticed

the symptoms. The child was healthy with normal developmental milestones and was well immunized for age. Visual acuity could not be assessed due to extreme photophobia. The left eye had diffuse corneal haze with blood staining. There was circumciliary congestion and anterior chamber showed hyphema obstructing the fundus view. The intraocular pressure was 26 mmHg. The other eye was normal. Ultrasound B-scan showed few low reflective dot echoes with an attached retina with no evidence of any intraocular foreign body, mass lesion or calcification. With a working diagnosis of post-traumatic hyphema with secondary glaucoma, the child was started on topical antiglaucoma and cycloplegics. But the condition of the child acutely worsened within a week. The left eye progressed to proptosis, lid edema and restriction of movement. Anterior chamber was filled with blood tinged fibrinous exudates and a scleral abscess was noted at the infero-temporal limbus [Figure 1]. Repeat B-scan revealed plenty of medium reflective membranous echoes with collection of sub-Tenons fluid (positive T sign).

CT-scan orbit revealed proptosis with increased preseptal soft tissue edema. Multiple hyperdense membranes/septae were seen in the mid and posterior vitreous suggestive of multiple

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Figure 1: Left eye showing lid edema, diffuse conjunctival congestion and a scleral abscess at the temporal limbus. Cornea appears hazy and anterior chamber is full of blood stained fibrinous exudates

abscess in the vitreous. Increased thickening of the sclera and choroid was noted. There was no evidence of an intraocular mass lesion or calcification. On IV contrast, there was a ring enhancing lesion in the intracanal space just behind the globe suggestive of an intracanal abscess [Figure 3a and b]. A diagnosis of panophthalmitis was made and a pediatrician consult was sought to rule out any systemic foci of infection for endogenous etiology. Systemic examination and investigations were negative.

As there was no improvement in the eye condition after 24 h of systemic broad spectrum antibiotics, evisceration was planned. Intraocular contents were sent for microbiology and histopathologic evaluation.

On Gram stains, mildly Gram-positive beaded filaments more prominent in the modified Ziehl-Neelsen stain with 1% sulphuric acid were noted [Figure 2a and b]. Chalky white colonies grew on the Chocolate agar 3 days after inoculation [Figure 2c]. Smear from culture confirmed the presence of *Nocardia*. Based on the sensitivity pattern the patient was started on oral combination of Sulphamethoxazole (8 mg/kg/day) + Trimethoprim (50 mg/kg/day) along with topical Moxifloxacin. The child had a healthy socket with no evidence of local recurrence at 1 week and 1 month follow-up. The antibiotics were continued for 10 weeks. He showed no signs of systemic or local recurrence till his last follow-up at 1 year.

DISCUSSION

Nocardia is a gram positive, branching filamentous aerobic, saprophytic in nature and is ubiquitously found in soil and air. Primary nocardial endophthalmitis in immunocompetent individual is mostly post-traumatic.^[7] Endogenous *Nocardia* endophthalmitis is usually secondary to disseminated nocardiosis.^[5,6] *Nocardia* endophthalmitis (endogenous or post-traumatic) is associated with severe morbidity and mortality.

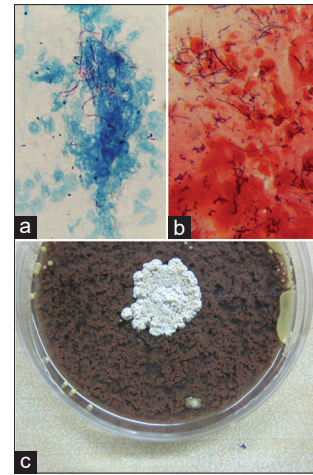


Figure 2: (a-c): On modified Ziehl-Neelsen stain (a), *Nocardia* appears as partially acid fast beaded branching filamentous bacilli. Gram stain showing mildly Gram positive beaded filaments indicating *Nocardia*. On Chocolate Agar (b), colonies of *Nocardia* appear as white powdery growth which was seen after a period of 3 days

To the best of our knowledge, there is only a single case report of a 5 year old immunocompetent child with post-traumatic *Nocardia* endophthalmitis in literature. The child was misdiagnosed as a case of recurrent uveitis with traumatic cataract and later presented with features of endophthalmitis secondary to *Nocardia*.^[7] This may be due to the slow growing nature of the organism. Our patient too was initially misdiagnosed as traumatic hyphema and vitreous hemorrhage, as features of active infection were absent at presentation.

Identification of *Nocardia* species is based on the typical staining and growth characteristics. *Nocardia* is a Gram-positive branching, beaded filamentous bacilli and is faintly AFB positive with modified 0.5–1% Ziehl-Neelsen stain. Chalky white growth on conventional media like Sheep blood/Chocolate agar helps in confirming the diagnosis. Growth is often delayed with an average of 2–7 days on routine media.^[8] We could not perform the biochemical and genotyping tests for species identification due to lack of facilities. Systemic evaluation is of utmost importance as ocular manifestation in *Nocardia* infection are known to precede systemic disease in almost half of the cases.^[8-11] In our patient, the site of primary inoculation was most likely the eye due to trauma, hence we could not find any evidence of systemic involvement even at presentation and follow-up.

Exogenous *Nocardia* endophthalmitis following surgery is known to cause localised inflammation in the anterior chamber with relative sparing of the posterior segment.^[5,7,8] However in our patient, both the anterior and posterior segments were involved with predominant vitreous involvement which is rarely seen in *Nocardia* endophthalmitis probably pointing towards a deep penetrating trauma.

Nocardia infection is characterized by abscess formation in the involved organ.^[8,9] Yu *et al.* were the first to demonstrate the evolving CT and MRI features of a patient with *Nocardia*

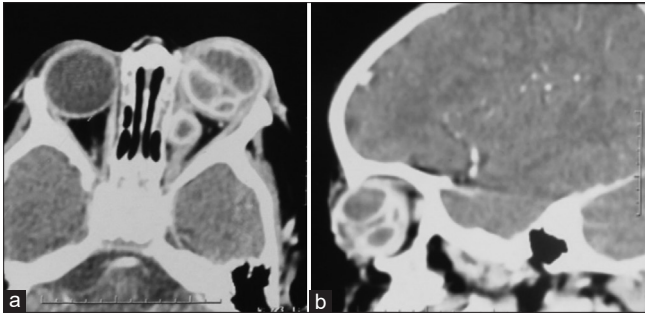


Figure 3: (a and b): CT scan orbit, Axial view (a) depicting gross proptosis with preseptal soft tissue edema along with thickening of the sclera and the choroid in the left globe. Multiple membrane-like hyperdense septae are seen in the posterior vitreous cavity suggestive of multiple abscess formation along with a ring enhancing lesion on contrast enhancement is seen in the intraconal space just posterior to the globe. Sagittal section (b) passing through the left globe demonstrates the hyperdense membrane like septae in the mid and the posterior vitreous

endophthalmitis progressing to panophthalmitis.^[10] The features of proptosis with preseptal soft tissue edema, presence of multiple abscesses in the vitreous cavity on orbital CT scan, although similar, were more advanced in our patient. However, the ring enhancing intraconal abscess noted in our patient has not been described previously. [Figure 3a and b]. Systemic Co-trimoxazole remains the first line of therapy. Our patient responded very well and did not show any sign of local or systemic recurrence during the follow-up period of 1 year.

To conclude, *Nocardia* endophthalmitis is a rare but serious infection of the eye leading to severe mortality and morbidity. Delay in presentation after trauma may lead to disruption of tissue anatomy making the diagnosis and management more complicated. Post-traumatic endophthalmitis in children must be managed aggressively by imaging and early intervention.

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Conflicts of interest

There are no conflicts of interest.

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