CASE REPORT

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# EXCELLENT RESOLUTION OF EARLY TREATMENT PEDIATRIC NEURORETINITIS

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## ABSTRACT

Neuroretinitis (NR) is an inflammatory condition characterized by optic disc edema and a formation of a *macular star* figure. Cat scratch is the most common cause of neuroretinitis affecting children around 10 years of age. Severe systemic manifestations may occur if the disease is not treated properly.

A 12-year-old girl came to outpatient clinic with chief complaint of sudden blurred vision on left eye since two weeks ago. Further history revealed that she used to play with a stray cat for the last 6 weeks. Right eye visual acuity was 5/5 while her left eye was 2/60. Anterior segment showed left eye relative afferent pupillary defect and from left eye posterior segment showed hyperemic and swollen optic disc, peripapillary haemorrhage, and *macular star*. Patient was treated with intravenous injection of 250mg methylprednisolone every 6 hours for five days during admission. Visual acuity was progressed to 5/10 and the optic disc showed great improvement. Six months follow up of the patient showed better left eye visual acuity of 5/7,5 and also excellent resolution of optic disc and macula.

The clinical ophthalmology features in this case are consistent with the diagnosis of neuroretinitis, especially one caused by cat scratch. Early treatment of intravenous steroid in attempt to reduce the inflammation showed an excellent outcome for the patient.

Early diagnosis and prompt treatment play a major role in sudden onset visual loss especially regarding infectious neuroretinitis to restore the patient's visual acuity**.**

**Keywords** Neuroretinitis, resolution, *macular star*

## BACKGROUND

Neuroretinitis (NR) is an inflammatory condition which is characterized by optic disc edema and a formation of a *macular star* figure. This disorder is possibly caused by an infectious process affecting the disc, a post-viral or autoimmune mechanism. In fact, some instances of NR have been reported to be accompanied by a wide spectrum of infectious pathogens[i]. The incidence and prevalence of neuroretinitis have not been determined. However, it is thought to be underdiagnosed because the swelling of the optic disc and the formation of a macular star typically happen at different times, usually 1 to 2 weeks apart[3]. In the United States, cat scratch disease incidence for people younger than 65 years old was 4.7 per 100.000 people[2]. Neuroretinitis affects young adults between the ages of 8 and 40, with a median age of 24. Females are more commonly affected than males, with a ratio of 1.8 to 1, although idiopathic and idiopathic-recurrent neuroretinitis does not appear to have a sex predilection[1].

Neuroretinitis may be seen in infections involving *Borrelia burgdorferi* (cat scratch disease), accounting of two-thirds of cases in one study[2]. However, there are other infectious etiologies of neuroretinitis, including cytomegalovirus, rubeola, toxoplasmosis, herpes simplex, syphilis, and multiple viral illnesses[3]. Intraocular inflammation itself may cause optic disc edema. The visual loss from damage to the optic nerve in demyelinating optic neuritis,

the visual acuity is limited by the degree of vitreous inflammation or by secondary changes in the macula, such as cystoid macular edema, associated with optic disc edema. Swelling of the peripapillary retina may be observed in patients with anterior optic neuritis. Lipid exudates in a star configuration may also develop in the macula of the affected eye[4,5].

Cat scratch disease is an illness caused by an intracellular gram-negative rod known as *Bartonella henselae*. It affects the lymph nodes draining the area where a cat scratch or bite occurs, causing regional lymphadenopathy. Primary Cytomegalovirus (CMV) infection can occur at any age; in children, primary CMV infection may cause few or no symptoms, whereas in adults, primary CMV infection usually causes a nonspecific febrile illness lasting 1–3 weeks associated with a transient lymphocytosis and abnormal liver function tests[ii]. CMV papillitis has been reported in 4%-14% patients with CMV retinitis. Several cases of CMV optic neuropathy in immune-compromised patients unrelated to CMV retinitis have also been described[iii].

Findings that are strongly suggestive of cat scratch disease include very young age, preceding systemic symptoms, and poor visual acuity but with a relative afferent pupil defect (RAPD). In contrast, the following are suggestive of idiopathic NR with a high risk of recurrence: absence of systemic symptoms, visual field defect outside the central field, preserved visual acuity with a large RAPD, and poor recovery of vision. Decisions regarding evaluation and treatment should be made with these features in mind[1,7,8].

## CASE PRESENTATION

A twelve years old girl came to outpatient clinic with chief complaint sudden blurred vision on left eye since two weeks ago. Blurred vision occurred right after 3 days of fever. There was no complaint of red eye, double vision, headache, vomiting or nausea. Further history revealed that she used to play with her neighbor's cat at home for over 6 weeks. Her neighbour's cat were never brought to the veterinarian since they kept the wild cats from the street. There was no history of other illness, past medication, and previous surgery.

From the general examination, patient revealed normal vital sign. There were no enlarged lymph nodes, myalgia, stiff neck, painful swallowing or abdominal pain. During her first visit examination revealed her visual acuity of right eye is 5/5, and left eye 2/60. Color vision examination with Ishihara was 36/38 on left eye. Intraocular pressure of the right eye was 14.6 mmHg, left eye 17,3 mmHg. Anterior segment (Fig.1) showed rounded pupils, isochoric 3 mm diameter, normal light reflex, and positive left eye relative afferent pupillary defect. Ocular motility on the both eye was normal with no pain within movement.

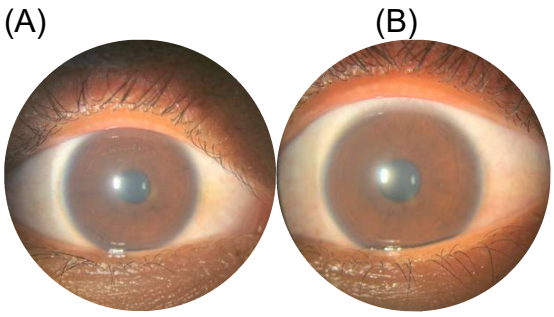



**Figure 1. Anterior segment of (A) right eye and (B) left eye was within normal limit. (courtesy of RSUD Dr. Soetomo)**

(A) (B)

**Figure 2. (A) Right eye retina photograph was within normal limit (B) Left eye showed hyperemic papil with blurred margin, peripapillary hemorage and *macular star.* (courtesy of RSUD Dr. Soetomo)**

Posterior segment of left eye showed swollen optic disc, hyperemic, blurred margin in all region, peripapillary hemorage, with *macular star* (Fig.2). Right eye posterior segment was within normal limit.

Confrontation test was within normal limit and Brain MRI (Fig. 3) showed no abnormalities. *Optical Coherence Tomography* (OCT) of optic nerve head showed increase thickness in all quadrants of the left eye (Fig. 4) and macula OCT also showed increase thickness in inferior and nasal quadrants (Fig. 5). There was no lymphadenopathy found in this patient. Blood investigation was done in the ward. Her investigations showed Leukocytosis, normal liver function test and normal renal function test. However, Immunoglobulin (Ig)G serology for Cytomegalovirus (CMV) was positive (4.329), and IgM CMV was negative (1.94), and VDRL was negative.

On the basis of clinical findings and laboratory result, patient was diagnosed as neuroretinitis with the suspicion of cat scratch infection. Patient was later treated with intravenous 250mg Methylprednisolone for every 6 hours and intravenous Mecobalamine 250 mcg for every 12 hours for five days.

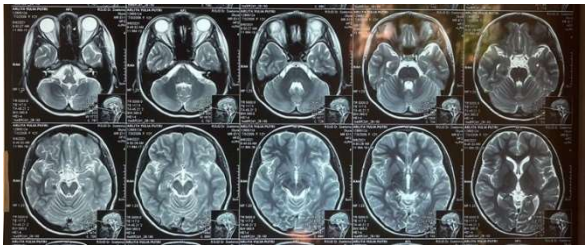


**Figure 3. Brain MRI showed no abnormalities. (courtesy of RSUD Dr. Soetomo)**

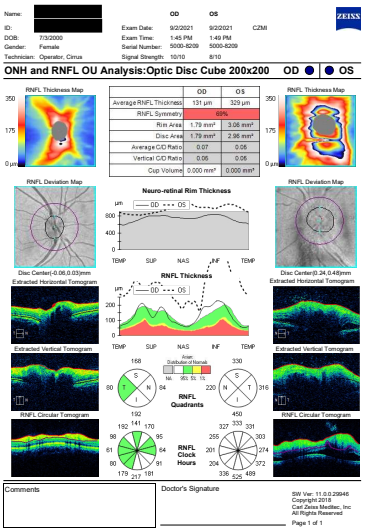
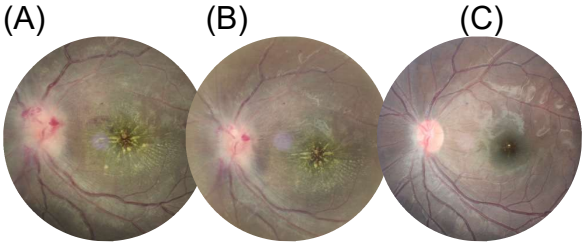



**Figure 4. Optic Disc OCT showed RNFL thickening of all quadrants in the left eye. (Courtesy of RSUD Dr. Soetomo)**



(A) (B) (C)

**Figure 6. Retinal photograph of (A) left eye during first visit, (B) five days after initial treatment and (C) left eye after six months of follow-up. (courtesy of RSUD Dr. Soetomo)**

Five days after treatment, patient showed progress in visual acuity of the left eye with 5/10. Ishihara also showed good progress with perfect score of 38/38 for left

eye. Anterior segment and ocular motility was unremarkable. Retinal photograph revealed left eye with minimum resolution of peripapillary haemorrhage although *macular star* still appeared (Fig. 6B) and the edge of the disc was not as elevated as the first visit (Fig. 6A). After six months of follow up, her left eye visual acuity was 5/7.5 with an excellent resolution of posterior segment (Fig. 6C).

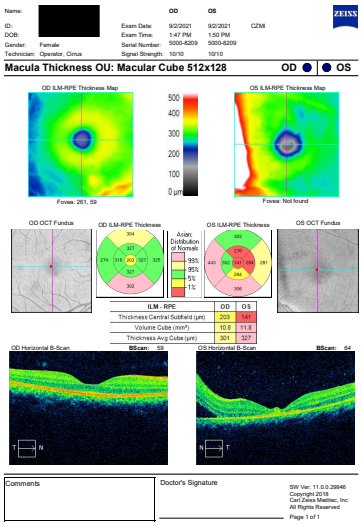



**Figure 5. Macular OCT showed thickening of the left eye inferior and nasal segment. (Courtesy of RSUD Dr. Soetomo)**

## DISCUSSION

The clinical features in this case align with the classic presentation of neuroretinitis, particularly one induced by cat scratch disease. The patient's young age, history of exposure to stray cats, and sudden onset of painless blurred vision strongly support the diagnosis. Notably, early intervention with intravenous methylprednisolone played a crucial role in the patient's recovery, leading to a rapid improvement in visual acuity and remarkable resolution of optic disc edema and macular star formation.

Neuroretinitis is typically self-limiting; however, untreated cases may result in prolonged visual impairment. The excellent outcome observed in this case underscores the importance of prompt diagnosis and early corticosteroid therapy. Intravenous methylprednisolone not only mitigates inflammation but also enhances neuroprotection, thereby accelerating visual recovery. The improvement from an initial visual acuity of 2/60 to 5/7.5 over six months highlights the significant impact of timely intervention.

Another crucial aspect of this case is the role of neuroprotective agents such as mecobalamin, which may contribute to optic nerve recovery. While the primary treatment was methylprednisolone, adjunctive therapy likely supported neural repair mechanisms. The absence of long-term visual deficits reinforces the potential benefits of a comprehensive treatment strategy.

This case also raises important considerations for clinical practice. A high index of suspicion for neuroretinitis should be maintained in pediatric patients presenting with sudden vision loss, particularly in those with a history of animal exposure. Given that serological testing for Bartonella henselae was unavailable, the decision to initiate empirical steroid therapy was based on strong clinical evidence. This approach proved to be highly effective, emphasizing that early treatment should not be delayed while awaiting confirmatory testing.

## CONCLUSION

This case highlights the importance of early diagnosis and timely intervention in pediatric neuroretinitis. The rapid and sustained improvement in visual acuity following methylprednisolone therapy demonstrates the critical role of corticosteroids in reducing inflammation and

promoting optic nerve recovery. The combination of steroid therapy with close monitoring over six months resulted in an excellent resolution of both optic disc edema and macular involvement, ultimately restoring the patient's vision to a near-normal level.

Physicians should remain vigilant in recognizing the clinical signs of neuroretinitis and initiate treatment without unnecessary delays, especially in cases where infectious etiology is suspected. Future advancements in diagnostic capabilities, including access to Bartonella serology and PCR testing, may further refine management strategies. Nonetheless, this case serves as a compelling example of how early and appropriate therapy can lead to outstanding visual outcomes in pediatric neuroretinitis.

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