# COVID-19-associated Retrobulbar Neuritis In A Child

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ICNC 2022
17th INTERNATIONAL CHILD NEUROLOGY CONGRESS
ANTALYA, TURKEY | OCTOBER 3-7, 2022

## Abstract

Objectives: Herein, we report the clinical findings of a rare case of COVID-19 Delta variant infection with the sole manifestation of retrobulbar optic neuritis. Methods: A 13-year-old previously healthy boy was admitted to Pediatric Neurology Outpatient clinic with a history of progressive painful eye movements and bilateral, dark spots in the visual field lasting for two days. He had no preceding history of upper respiratory infection. He had no respiratory symptoms and fever, or loss of taste except for a nonspecific headache. No neurologic deficits or cranial nerve dysfunction were noted, when evaluating pupillary reflexes a relative afferent pupillary defect was observed in the eye, and visual field examination showed a scotoma in the upper quadrant of the visual field. Magnetic resonance images with the contrast of the brain and orbita were unremarkable. The visual evoked potential (VEP) revealed showed slightly prolonged latencies. Since lumbar puncture will be performed under operating room conditions, a COVID-19 polymerase chain reaction swab test was taken from the nasopharynx under hospital rules. His COVID-19 PCR screen was positive. Results: The patient was diagnosed with retrobulbar neuritis associated covid and treated with intravenous pulse methylprednisolone Conclusions: Ocular manifestations associated with COVID-19 are rare but should not be ignored. Physicians should consider a detailed evaluation of patients when necessary, even if no preceding history of COVİD 19 infection. Steroids are the mainstay of treatment, but additional studies are recommended to explore the disease and successful treatments.

## Objectives

Herein, we report the clinical findings of a rare case of COVID-19 Delta variant infection with the sole manifestation of retrobulbar optic neuritis

## Methods

A 13 $^{8/12}$ year-old previously healthy boy with no relevant medical history was admitted to Baskent University Faculty of Medicine, Dr Turgut Noyan Teaching and Medical Research Center, Pediatric Neurology Outpatient clinic with a history of nonspesific headache, progressive painful eye movements and bilateral, dark spot in the visual field lasting for two days. He had no preceding history of upper respiratory infection. He had no respiratory symptoms, fever, or loss of taste and there was no history of drug intake. Furthermore, his family medical history was also unremarkable.

The vital signs and physical examination were normal. No neurologic deficits or cranial nevre dysfunction were noted Extraocular eye movements were intact although eye pain worsened when moving the eyes The pupils were equal and fully reactive to light. The funduscopic examination and visual field examination revealed normal.

On examination by ophthalmologist, he was noted his history of blurred vision in both eyes, mostly in the left eye and pain in the gaze directions in both eyes. In the ophthalmological examination of the patient, visual acuity was complete in both eyes (logMAR 0.00). Bilateral relative afferent pupillary defect was detected. Intraocular pressure values measured by Goldman applanation tonometry were 14 mm Hg in the right eye and 12 mm Hg in the left eye. No pathology was detected in anterior and posterior segment examination. The visual evoked potential (VEP) revealed showed normal latency (OU). The brain magnetic resonance image with contrast (MRI) of the brain and orbita were unremarkable and chest X-ray was normal.

Laboratory analyses revealed normal blood count, serum C-reactive protein (3 mg/L), and erythrocyte sedimentation rate (20 mm/h). The liver, kidney, and thyroid function tests, vitamin B12, folic acid, and serum electrolyte levels and serum creatine kinase were normal. Since lumbar puncture will be performed under operating room conditions, a COVID-19 polymerase chain reaction (PCR) swab test was taken from the nasopharynx in accordance with hospital rules. His COVID-19 PCR screen was positive for COVID-19 Delta variant. Based on the clinic profile the patient was diagnosed with retrobulber neuritis associated Covid and treated with intravenous pulse methylprednisolone (20 mg/kg/ day for 3 days) and followed by oral prednisolone (1mg/ kg/day for 14 days).

His eye pain resolved after one day of hospital stay, and he was discharged on a tapering dose of prednisolone with home isolation for 14 days per the national guidelines. Two weeks after the beginning of the symptoms, he was submitted to a lumbar puncture no pleocytosis and normal protein and glucose concentrations were noted on cerebro spinal fluid (CSF) analysis. Culture and viral serologies in the CSF were negative, did not show oligoclonal banding and the immunoglobulin (Ig) G index was normal. He was screened for autoimmune optic neuritis, (antinuclear antibodies, anti-dsDNA antibodies, autoantibodies against aquaporin 4 (anti-NMO), anti-myelin oligodendrocyte glycoprotein antibodies (MOG-IgG) but the results from all investigations were unremarkable, viral and Lyme serology were all negative. The angiotensin- converting enzyme level was normal in the serum and CSF.

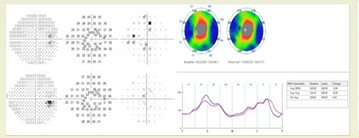

Figure1: Right eye

A: Upper quadrant scotoma in the pre-treatment visual field and mean RNFL thickness 109 µm (top left visual field-RNFL value, first of right color pictures)

B: Reducing scotoma and mean RNFL thickness 108 µm after treatment initiation (visual field-RNFL value at lower left, second of color pictures on right)

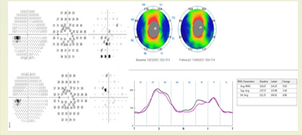

Figure 2: Left eye

A: Paracentral and lower quadrant scotoma in the visual field before treatment, and mean RNFL thickness 119 µm (visual field-RNFL value in the upper left, first of the colored pictures on the right)

B: Reducing scotoma and mean RNFL thickness 114□m (lower left visual field-RNFL value, second of right color images) after treatment initiation

## Results

The patient was diagnosed with retrobulbar neuritis associated covid and treated with intravenous pulse methylprednisolone

## Conclusions

Optic neuritis, inflammation of the optic nerve head, manifests as papillitis, retrobulbar neuritis or neuroretinitis. It is a clinical diagnosis based primarily on the history and examination findings. Funduscopic features help distinguish typical cases from atypical cases SARS-CoV-2 virus is speculated to be capable of causing relative hypoxia leading to neuroinvasion of the virus progressing to optic neuropathy.

However, only one case has been reported, to the best of our knowledge, describing bilateral retrobulbar neuritis post-COVID-19 without any triggering factors and with rapid recovery at the beginning of steroids. We present this case because of its rarity. Ocular manifestations associated with COVID-19 are rare but should not be ignored. Physicians should consider a detailed evaluation of patients when necessary, even if no preceding history of COVİD 19 infection. Steroids are the mainstay of treatment, but additional studies are recommended to explore the disease and successful treatments

1. Alnahdi, M. A., & Alkharashi, M. (2022). Ocular manifestations of COVID-19 in the pediatric age group. European Journal of Ophthalmology, 11206721221116210.