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A Case Report on COVID-19 Causing Retrobulbar Neuritis: Neither the Doctor nor the Patient Saw

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Abstract

Vision problems with sudden in onset points towards the neurological deficit because of underlying acute attacks like stroke, or demyelinating disease. While these problems are common, the viral infection particularly, novel corona virus, SARS-CoV-2 infection in current situation, should also be kept in physician's mind and dealt accordingly.

Keywords: COVID-19; Retrobulbar Neuritis; Pandemic, Neurological Manifestation; Corona Virus; SARS-CoV-2

Key clinical message

COVID-19 infection can present with different kinds of symptoms including problems with vision. Consider COVID-19 as a differential diagnosis regardless of etiology in patients presenting with ophthalmic symptoms.

Introduction

Shortly after its eruption in Wuhan, China in December 2019, the novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) spread around the world and was declared pandemic by the World Health Organization (WHO) and has created a current health chaos. The neurotropism exhibited by other corona virus as well as SARS-CoV-2 (COVID-19) has led to several neurological sequelae in corona virus infected patients [1]. Case reports on different types of neurological problems¹ including visual problems have been reported [2]. In this article, we report the case of a COVID-19 infected patient with retrobulbar neuritis as a presenting complaint. The informed written consent was obtained from the patient and the ethical approval from the institutional review board was obtained as well.

Case Report

A 28-year-old male came to emergency department (ER) at our center with the complaint of a severely diminished vision in both of his eyes from last two weeks. According to him, he was apparently well 12 days back with no history of any comorbidities.

He noticed the change in his vision (which was very mild) while he was flying kite along with his neighbor on the neighbor's roof of the house. (In Nepal, houses are usually concrete building with flat roof). He was not able to identify and contrast the color of his and his friends' kites. This incident he had noticed suddenly and during the evening and he did not pay much attention to it. The following day he had noticed that he had difficulty in recognizing expression of face of people from far distance as well as he had difficulty in recognizing small letters of books. Then after, he came to visit our out-patient department (OPD). He had no eye pain or headache or other associated features. He had suffered road traffic accident 12 years back with fractured 4th rib (now healed). He was nondrinker and non-smoker, and he was vegetarian by diet since last 10 years. On examination, vitals were all normal except that he was febrile

(maximum temperature noted 100-degree Fahrenheit) and mild fluctuation in Oxygen saturation (93%-94%) with no signs of any respiratory distress. He showed no other neurological deficit except for the vision. He could perform finger counting only with both of his eyes. There was relative afferent pupillary defect (RAPD). The visual acuity on the Snellen's chart was 6/60 in both eyes.

Differential Diagnosis, Investigations and Treatment.

The sudden onset in diminished vision in young patient pointed towards the possibility of demyelinating disease like Multiple Sclerosis (MS), Optic Neuritis, Neuromyelitis Optica (NMO) and the remote possibility of cerebrovascular accident, ischemic stroke was thought. Investigations were run accordingly. The fundi of both eyes revealed no obvious papilledema, and slit examination performed by the ophthalmologist also revealed no significant abnormality. The vision field exam showed moderate to poor inferior temporal visual field in the left eye. (Figure 1a, b), the MRI of bilateral orbit and the Brain was performed and showed no significant abnormality in brain, but mild optic nerve swelling in both eye (left more than right) (Figure 1c, d). The blood work up was performed and did not show any remarkable result except that there was marginally lower level of vitamin B12 (146pg/ml). The lumbar puncture was performed, and the CSF exam showed normal leucocytes and protein level. The aquaporin-4 antibody (Aqp-4 Ab) test in CSF was negative from the cerebrospinal fluid (CSF). The other tests like myelin-oligodendrocyte glycoprotein antibody (MOG-Ab) could not be tested since it is not available in Nepal. The rt-PCR for COVID-19 showed positive.

Outcome

The same day of his arrival to the hospital, he was admitted and started with higher dosage of intravenous (i.v.) methylprednisolone (1gm once per day in slow infusion) for 3 days and oral prednisolone according to the Optic Neuritis Treatment Trial dosages (ONTT) [3] and on oral vitamin B12 supplementation. Following the second to the third day dosage, he showed a rapid improvement in vision. He was managed in the COVID ward and showed almost normal return of visual function (visual acuity 6/6) after day 5 of hospital stay. The ability to recognize color contrast had not fully recovered till writing of the report. The body temperature returned to 98-degree Fahrenheit, and the saturation had maintained and no deterioration of COVID 19 was noted.

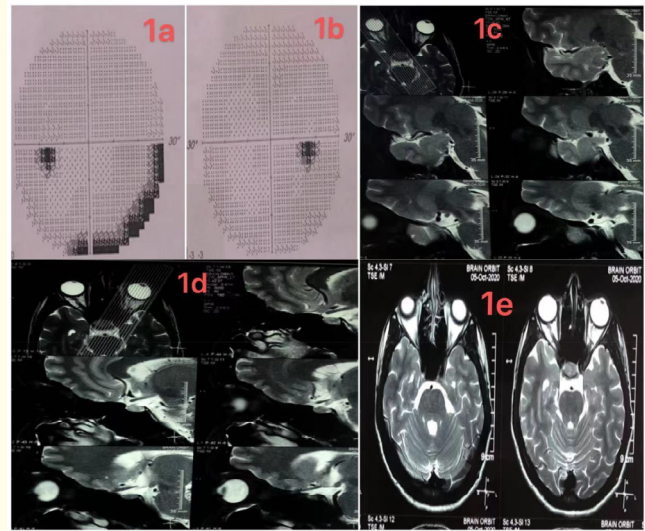


Figure 1a: Visual field exam of left eye.

Figure 1b: Visual Field exam of right eye.

Figure 1c: MRI of bilateral orbits: showing mild swelling in optic nerve.

Figure 1d: MRI of Brain: Axial, T2 MRI of brain showing no obvious abnormality.

Discussion

Conjunctivitis has been suggested as one of the pre-symptomatic signs for COVID-19 patients possibly by the exposure of the droplets received from other infected individual [4]. The virus has also been detected from tear as well as other conjunctival secretion by the rt-PCR [5]. Even the angiotensin-converting enzyme 2 (ACE2) and transmembrane serine protease 2 (TMPRSS2) receptor expression has been found in conjunctiva, pterygium cells, retina, pericytes and fibroblasts from the eye tissue [6-8]. ACE2 and TMPRSS2 act as the receptors for SARS-CoV-2 virus and thus infection propagates in human body [9,10]. Even though, the concentration of these receptors, ACE2 and TMPRSS2 are lower in eye than other organs, however, this easily explains the vulnerability of eye infection secondary to the COVID-19 infection. Subsequently, many cases of conjunctivitis have

been reported [2]. Comparatively lower incidence has been reported with optic nerve involvement in COVID-19 infected patients. A paper published recently conducted optic nerve analysis of COVID-19 infected patients. Out of 17 patients, 8 patients showed increased optic nerve swelling [11]. A case report described atypical bilateral optic neuritis with myelin oligodendrocyte glycoprotein antibody (MOG-Ab) associated in COVID-19 patient [12]. The hypothesis was that COVID-19 triggered autoimmunity and caused demyelination and subsequently optic neuritis. Our case also fits somewhere here with the probability of inflammation of optic nerves due to infiltration of virus particle or inflammation due to the immunity dysregulation secondary to the viral infection. The low level of vitamin B-12 (methyl cobalamin) occasionally causes optic neuritis [13] but the level in our case was not too low, and the level came to normal quickly with intramuscular supplementation and thus the chance of low vitamin B12 as the culprit in our case is not convincing. The CSF fluid exam was not remarkable, and the Aqp-4 antibody was negative which rules out the possibility of Neuromyelitis Optica. Hence, the possibility of COVID-19 infection causing the retrobulbar neuritis in our patient is high.

Conclusion

Our case highlights the fact that the neurotropism of SARS-CoV-2 virus and the availability of ACE2 and TMPRSS2 receptors should be kept in mind and the possibility of neurological deficit because of its infection to the patient should be included as differential diagnosis.

Acknowledgement

None.

Conflicts of Interest

None.

Author Contributions

AC was involved in conception and design of the study, drafting the article; AC involved in acquisition and analysis and interpretation of the data, revising the article; BP was involved in revision of the data and final approval of the version to be submitted.

Ethical Approval

Informed consent was obtained from the patient regarding the report of his clinical scenario data in an anonymous way.

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