



ORIGINAL RESEARCH PAPER

Ophthalmology

CLINICAL PROFILE AND TREATMENT OF CASES OF OPTIC NEURITIS IN DOON VALLEY: A CASE SERIES

KEY WORDS: Optic Neuritis, Methylprednisolone, RAPD, COVID 19

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ABSTRACT

Purpose of the study: The purpose of this study was to report clinical features, neuroimaging, and visual outcome in optic neuritis in population of Doon valley in the year 2020 during Coronavirus (COVID 19) pandemic.

Materials and Methods: This is a retrospective study of patients diagnosed with Optic Neuritis, that presented at this hospital between Mar 2020 to May 2020.

Results and conclusions: Amidst COVID 19 pandemic when the entire country is under COVID 19 infection threat and lockdown, the patients reported late to the OPD, but still had satisfactory visual outcome after started on pulse steroids. 2 cases of optic neuritis were treated at this centre with successful visual outcomes.

BACKGROUND

Inflammation of optic nerve is known as optic neuritis which can affect any part of the nerve in its course. Typically, optic neuritis first manifests itself with pain on movement of the eyes, followed by a worsening of vision. Only 0.4% of patients develop symptoms in both eyes simultaneously¹. The pain and worsening of vision are so disturbing that patient seeks early visit to an ophthalmologist. It commonly affects young and healthy individuals between 18 to 50 years of age^{2,3}. 70% of the patients are females.^{2,3}

Visual acuity in Optic Neuritis range from 0, i.e., no light perception to 1.5 decimal equivalent; in two-third of the patients it is below 0.5 decimal equivalent². In unilateral cases, the direct pupillary reaction to light and consensual reaction of the opposite eye are weaker in affected eye. This is known as relative afferent papillary light defect (RAPD). The optic disc usually appears normal but is mildly edematous in one third of the cases². Impaired colour perception in the form of desaturation of coloured objects especially red colour is observed in affected eye. Usually, the visual acuity improves and patients regain near normal acuity within 2 months. Visual contrast, visual fields and colour perception also improves gradually.

The aetiology of the disease is composite and difficult to deduce. Majority of cases are idiopathic, though demyelination disorders especially Multiple Sclerosis (MS) has been found to be the commonest association. In Asian population MS has traditionally been thought to be a different entity from that seen in the western population, characterized by high incidence of visual involvement at onset, prevalence of recurrent acute transverse myelitis [considered as an opticospinal MS (OSMS)] and a high degree of overlap with neuron myelitis optica (NMO)^{4,5}. In a prospective study done in Chandigarh by Jain *et al.*⁶, 42 patients of optic neuritis were followed up for a period up to 6 months. In 20 (29.4%) eyes, the appearance of the optic disc was normal, indicating retrobulbar neuritis; whereas 38 (56%) eyes showed blurring of the disc margins with or without edema of the disc, suggestive of papillitis or anterior retrobulbar neuritis. Sixty-two percent had bilateral involvement of the discs. Only 3 (7.1%) patients had some neurological deficit, and a provisional diagnosis of MS was made. Region wise estimation of the incidence of demyelinating Optic Neuritis are not available. Optic Neuritis is reported to have an incidence of 1-5 cases per 100,000/year; higher the latitude, higher the incidence^{7,8,9}.

Viral infections have also been implicated in causation of Optic Neuritis. This includes Chikungunya virus, HSV-1 and 2, EBV, Hepatitis B, Measles, Mumps, Rubella and Coxsackie^{10,11,12,13}. Post vaccination Optic Neuritis has also been reported in children¹⁴.

In view of the ongoing novel Coronavirus (CoV) pandemic caused by the severe acute respiratory syndrome coronavirus - 2 (SARS-CoV-2), also commonly known as COVID 19, we tried to find association of Optic Neuritis with the Coronavirus infection, which could help us to unearth new etiology of the disease and also the effects of virus on other organs of the body.

CASE REPORT(S):

Case 1: a 47 years old lady presented with acute painless loss of vision in the right eye followed by diminution of vision in left eye after 2 days of onset in the right eye. This gradually increased over a period of 10 days to an extent that when she reported to us, she was 20/500 i.e +1.4 logMAR in right eye and 20/200 i.e +1.0 logMAR in left eye and patient complained of having washed out colour vision in the form of inability to read any of the Ishihara Colour vision plates.

The visual fields of the patient were suggestive of generalized depression. Pupillary reaction was ill sustained in both the eyes. Cranial nerves and neurological evaluation was normal with no features suggestive of demyelination disorder. Funduscopy revealed mildly edematous optic nerve heads (ONH) with no other abnormality. On clinical evaluation patient was diagnosed to have papillitis both eyes. The patient had laboratory investigations included haemogram, electrolyte and liver chemistries, angiotensin converting enzyme, antinuclear antibodies, Fluorescent Treponemal antibody absorption test (FTA-ABS), or microhaematoagglutination Treponemal test (MHA-TP), Venereal Disease Research Laboratory Test (VDRL), purified protein derivative, Chest X Ray and all viral markers including Human Immunodeficiency Virus, Hepatitis B and C and Reverse Transcriptase Polymerase chain reaction (RT-PCR) for COVID 19. All investigations were normal. Fat suppressed T2 weighted MRI images showed no significant abnormality of brain or orbits. Neuromyelitis Optica (NMO); Anti-Aquaporin-4, IgG was negative. Visual Evoked Potential (VEP) revealed bilateral prolonged p100 latencies [fig 1]. Cerebrospinal fluid analysis was also done for oligoclonal band and found to have normal pattern. The diagnosis of Bilateral Optic Neuritis was made. Patient was hospitalized and Intravenous Methylprednisolone 1000 mg was administered for three consecutive days followed by oral prednisolone in the dose of 1mg/kg body weight for 11 days. Patient started showing good visual recovery in three days and on follow up after 1 week had vision of 20/120 i.e +0.8 logMAR in right eye and 20/50 i.e +0.4 logMAR in left eye with slight improvement in colour vision. At 4 weeks follow up patient had vision of 20/30 i.e +0.2 logMAR in both eyes with normal pupillary reaction. Colour vision improved minimally, as patient was able to read few Ishihara Colour vision plates.

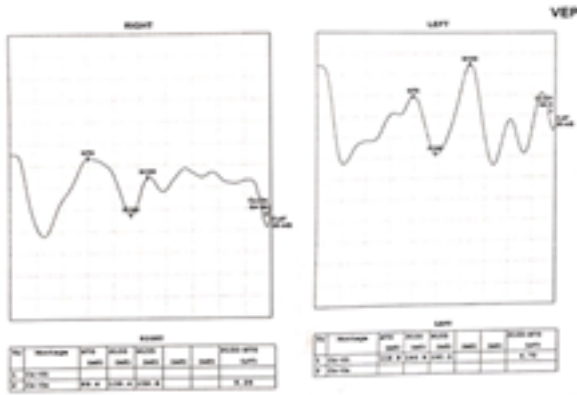


Fig1 VEP

Case 2: 31 years old lady presented with complaints of vision loss in left eye 12 days back which was preceded by pain in superior eye movements and had gradually deteriorated to 20/200 i.e +1.0 logMAR at the time of presentation. Patient gave complaints of dyschromatopsia as she was unable to read any of the Ishihara Colour Vision Plates. On evaluation patient had RAPD in left eye with painful superior ocular movements. Funduscopy revealed grossly edematous optic nerve head with rest of the fundus being normal [fig 2]. Patient was diagnosed as papillitis left eye. All blood investigations to rule out underlying inflammatory or infective etiology were done including viral markers and were found to be normal. VEP showed delayed p100 latency in left eye with grossly suppressed visual fields in left eye. Fat suppressed T2 weighted MRI images were suggestive of thickening of intraocular and perichiasmatal segment of left optic nerve [fig 3]. COVID-19 RT PCR test was found to be negative. Patient was diagnosed as Optic Neuritis left eye. Patient was hospitalized and treated with intravenous Methylprednisolone 1000 mg for three consecutive days followed by oral prednisolone in the dose of 1mg/Kg body weight for 11 days. Patient showed significant visual recovery to 20/50 i.e +0.4 logMAR on third day and 20/20 i.e +0.0 logMAR after 1 week. The pupillary reaction became normal though the colour desaturation did not improve much.

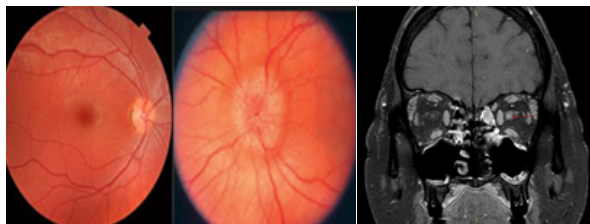


fig-2 swollen left optic nerve head

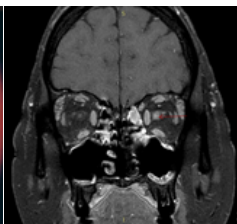


fig-3 left optic nerve hyperintensity

DISCUSSION

Recovery of visual functions in Optic Neuritis is observed spontaneously within 2-3 weeks in more than 80% of patients without treatment. Vision stabilizes over months or continues to improve up to 1 year, although long-term defects in visual functions is possible. The long-term visual prognosis of idiopathic optic neuritis remains good. More than 90% of the patients recover a visual acuity of 20/40 or better by 6 months, as seen in the ONTT²⁰

These two cases, highlight that Idiopathic optic neuritis have good visual prognosis even if the treatment is started late in the course of illness with satisfactory visual outcomes. Both the patients, seen at this centre were females and within the high risk age group. Typical Optic neuritis has a monocular presentation, but as one of the cases had bilateral presentation, we investigated her for any systemic illness. Bilateral optic

neuritis is usually thought to affect children, often follows a viral syndrome, and is not typically associated with subsequent multiple sclerosis²¹. Neuromyelitis optica (NMO; also known as Devic's syndrome or Devic's disease) is an autoimmune disorder that affects both optic nerves and the spinal cord²² and is found to be one of the causes of Atypical Optic Neuritis affecting both the eyes²³.

Amidst the pandemic and the lockdown situation, both our patients reported late to the hospital but a thorough clinical examination helped us to diagnose the condition and timely treatment was started with satisfactory visual outcomes. Optic Neuritis has a known viral etiology in children and as we noticed a higher than normal incidence of optic neuritis during this period, this triggered us to study its association with novel Coronavirus. Both our cases had no symptoms suggestive of the infection or any contact and travel history but due to already reporting asymptomatic carriers in society it was decided to test the patients for COVID 19, however both the cases were tested negative for it.

On the 30th of January, the World Health Organization (WHO) declared a public health emergency of international concern. As the infection caused by coronavirus is still not well understood, the evidence of ocular transmission is being studied worldwide. However, CoV ocular infection has been well established in various animals. In some cases, such as CoVs which affect the murine and feline orders, they can cause sight-threatening ocular complications. Such evidence suggests that CoVs can shed and even infect ocular issues. Apart from the respiratory tract, CoV have been found to affect the gastrointestinal tract and ocular tissue.^{24,25} In 2005, a retrospective study that analyzed the nasal swabs of children with respiratory illnesses from 2000 to 2003 for 6HCoV-NL63 was conducted in France. In this study, they found that 17% (n = 3) of HCoV-NL63 patients (n = 18) had developed conjunctivitis²⁶. As the literature on human ocular CoV infection is still sparse, there is value in studying ocular manifestations of CoVs in various animals. The feline CoV (FCoV) is an Alphacoronavirus that affects both domestic and wild cats and can cause conjunctivitis, pyogranulomatous anterior uveitis, Choroiditis with retinal detachment and retinal vasculitis²⁷. The A-59 strain of the murine CoV mouse hepatitis virus (MHV) has been found to cause viral-induced Optic Neuritis due to viral-induced inflammation²⁸. As CoVs can cause ocular infection across different animals, the possibility of SARS-CoV-2, having ocular implications cannot be ignored. Patients with conjunctivitis are being treated with greater caution, as it can be the presenting symptom of COVID-19 or there can be probable risk of transmission from tears of these patients.^{29,30}

As the current pandemic continues, a better understanding of the virus will emerge, hopefully with more emphasis on research into the relationship between human CoVs and the ocular tissue. More research and studies in this direction will not only open up new avenues to understand the pathogenic mechanism of the virus but will also help us understand its role in the alteration of the disease course of optic neuritis. This can also give us an opportunity to study the neurological implications of corona virus infection in human beings. Till that time ophthalmologists and other health care workers should continue to use all possible precautions to prevent the spread of infection through body fluids and ocular tissue.

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