Clinical profile and short-term outcomes of optic neuritis patients in India

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Purpose: To evaluate the clinical profile and short-term visual outcome of optic neuritis (ON) patients in India. **Materials and Methods:** In this prospective study carried out over a period of 3 years, 99 eyes of 83 ON patients were examined and followed up for 10.8 ± 8.2 months for type of presentation, recurrence rate, and visual outcome. **Results:** Mean age was 27.6 ± 8.8 years. Female preponderance was seen (70% of cases). Papillitis (53.5% of eyes) was more common than retrobulbar neuritis (46.5% of eyes). Bilateral presentation was seen in 19.3% cases. Baseline median logMAR visual acuity (VA) was 1.6 ± 0.8 , which improved to 0.2 ± 0.6 , with approximately 64% of eyes retaining VA of 20/40 or more. Two patients had previous diagnosis of multiple sclerosis (MS). MS was newly diagnosed in two patients. Recurrence was seen in 16% of eyes and was more common in cases of retrobulbar neuritis. **Conclusion:** The clinical profile of ON in Indian patients is different from that in the Western population. Unlike reported in the Western literature, papillitis is frequent in the Indian setup, with lower recurrence rates but poorer outcomes.

Key words: Clinical profile, Indian population, optic neuritis treatment trial, optic neuritis

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Optic neuritis (ON) is an acute inflammatory disorder of the optic nerve. The disease is characterized by unilateral or bilateral sudden loss of vision, often accompanied by peri-ocular pain. The majority of cases are idiopathic in origin. However, de-myelination, specifically multiple sclerosis (MS), is reported to be the most common etiology in the Western literature.^[1,2] In India and other Asian countries the incidence of MS is reported to be low.^[3-5] Moreover, various studies from South East Asia have documented difference in etiology, clinical presentation, and prognosis of ON when compared with the Western population.^[6-9] The aim of the present study was to analyze the clinical profile and visual outcome of ON patients in India in relation to their Western counterparts.

Materials and Methods

This prospective observational study was conducted at a neuro-ophthalmology clinic of a tertiary care center for which approval was obtained from the ethical committee of the institution. Patients of ON were included in the study after obtaining informed consent. ON was diagnosed on the basis of history and clinical examination, which included sudden unilateral or bilateral visual loss of less than 4 weeks duration, presence of relative afferent pupillary defect, dyschromatopsia, and normal or swollen optic disc on fundus examination. Other optic neuropathies, such as ischemic, infective, traumatic, toxic, hereditary, and compressive, were excluded from the study. Patients under the age of 15 were excluded from the study.

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Detailed history was obtained, which documented onset of visual loss, duration, association with pain, any previous attack, and history of any other neurological symptoms. Clinical examination included Snellen's visual acuity (VA), evaluation of pupils, slit-lamp biomicroscopy, and fundus examination. Cases thought to have other neurological deficits were referred to neurologist for evaluation. Investigations included Goldman visual field (GVF) wherever possible, visual evoked response, contrast sensitivity on Pelli-Robson chart, and color vision with Ishihara pseudo-isochromatic plates. A contrast sensitivity of less than 1.5 and inability to read any one of the Ishihara test plates was considered abnormal. Magnetic resonance imaging (MRI) of the brain and orbit with contrast, although advised in all patients, could only be performed in 32 cases due to financial constraints. Hemogram, total and differential white blood count; erythrocyte sedimentation rate, chest X-ray, Mantoux test, and serology for syphilis, toxoplasmosis, and toxocarasis were obtained in all cases.

All patients received treatment in the form of 200mg of dexamethasone in 150 ml of 5% dextrose solution given intravenously over 30 min for three consecutive days.^[10,11] The patients were followed up at 1 week, 1 month, and 3 months after the last day of treatment, and thereafter at 3 monthly intervals. At all follow-up visits examination included Snellen's VA, evaluation of pupil, slit-lamp biomicroscopy, fundus, GVF wherever possible, visual evoked response, contrast sensitivity, and color vision. Analysis included descriptive data of demographic profile, clinical presentation, and visual outcome.

Results

Ninety nine eyes of 83 patients were included in this study, which was conducted over duration of 3 years. The mean follow-up period was 10.8 ± 8.2 months. The mean age of presentation was 27.6 ± 8.8 years (15-58 years). Female preponderance was seen in a ratio of 2.2:1 (58 versus 25).

Results of the hemogram; total and differential white blood count; erythrocyte sedimentation rate; chest X-ray;

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Mantoux test; and serology for syphilis, toxoplasmosis, and toxocarasis were normal in all cases.

Bilateral presentation was seen in 16 cases (19.3%), 5 of whom presented as retrobulbar ON (RBN) and 11 had papillitis.

All patients presented with sudden loss of vision, where as pain was an accompanying feature only in 61 cases (73.4%). Of the remaining 22 patients (26.6%) without pain, 8 had RBN and 14 had papillitis.

Fifty-three eyes (53.5% of eyes) had papillitis whereas RBN was seen in 46 (46.5% of eyes) eyes. Other fundus findings were peri-papillary splinter hemorrhages in five eyes, circumferential retinal folds on the temporal side of the disc in another 6 eyes, and vascular sheathing in the mid periphery in the infero-temporal quadrant in 1 eye.

Mean logMAR VA at presentation was 1.57 ± 0.82 (median 1.6), with 92 out of 99 eyes (93%) presenting with VA <20/40. At the final follow-up, mean logMAR VA was 0.47 ± 0.62 (median 0.2). At presentation 37 eyes (37.3% of eyes) had VA <20/200 and this level persisted in only 15 eyes (15%) at the last follow-up visit. At the final follow-up 95 eyes (96% of eyes) showed improvement by at least two lines from their baseline VA. Four remained the same and none showed worsening. Table 1 summarizes the visual outcome in all patients.

All patients had defective color vision and contrast sensitivity at the time of presentation. Ninety-three percent of the eyes were unable to read even the first plate on the Ishihara pseudo-isochromatic plate. Similarly, 93.7% of the eyes could not identify even a single letter with the highest contrast sensitivity on Pelli–Robson chart. However, improvement in vision was accompanied by improvement in both color vision and contrast sensitivity. At the final follow-up 60.6% of the eyes could read all the color plates and 30.5% of the eyes had normal contrast sensitivity. Mean contrast sensitivity in the affected eye at the final follow-up was 1.07 ± 0.55 .

A total 46 eyes (46.4%) with presenting vision of $\leq 20/400$ were unable to undergo GVF examination. Central and centrocecal scotoma were seen in 35 eyes (35.3%), followed by enlarged blind spot in 11, generalized constriction in 5, supero-nasal quadrantic defect in 1 eye, and inferior altitudinal defect in 1 eye. However, with improvement in VA, 64 eyes (64.6%) had normal field at the end of the final follow-up.

Thirteen of 67 patients with unilateral involvement showed decreased contrast sensitivity in the contralateral eye suggesting possible involvement of the fellow eye. Mean contrast sensitivity in the contralateral eyes at presentation was 1.2 ± 0.2 , which eventually improved to 1.6 ± 0.1 . None of these eyes showed any defect in either color vision or on GVF.

| Table 1: Visual outcome of patients (<i>n</i> = 99 eyes) | | | | | | |
|---|-----------------|-------------------|--|--|--|--|
| Vision | Baseline | On last follow-up | | | | |
| Mean (median) | 1.57±0.82 (1.6) | 0.47±0.62 (0.2) | | | | |
| ≥20/20 | 0 | 37 (37.3%) | | | | |
| \geq 20/40 to <20/20 | 6 (6%) | 26 (64%) | | | | |
| ≥20/200 to <20/40 | 32 (94%) | 21 (36%) | | | | |
| <20/200 | 61 (61.6%) | 15 (15.1%) | | | | |

MRI was not possible in all cases due to financial constraints and was performed in 32 cases. Of these 32 cases, no lesion was seen in 12 cases and 8 had shown enhancement of the optic nerve in the affected eye only. Demyelinating lesions in the brain were present in 12 patients and in four patients some of the periventricular lesions enhanced with contrast. One of these 12 patients was subsequently diagnosed with transverse myelitis on spinal MRI after she developed lower limb weakness. Two known cases of MS were included in the study when they were referred for ON. Two cases in the study developed other neurological symptoms during follow-up and were subsequently diagnosed with MS.

A total 13 eyes with RBN and 3 eyes with papillitis (16/99 eyes [16.2%]) showed recurrence during follow-up. Recurrent ON was seen in 3 patients with MS, 3 patients with demyelinating lesions on MRI, and 2 patients with normal MRI.

Discussion

The Optic Neuritis Treatment Trial (ONTT) initially undertaken to evaluate the role of corticosteroids in the management of ON was a pioneering study that shaped our understanding of ON. Since then many research studies have been conducted to understand the disease and its association with MS. Western data suggest that at least 50% of patients with ON will eventually develop MS,^[12,13] but studies from Asia and Africa^[6-9,14] present a contrasting scenario. An Indian study conducted before the commencement of the ONTT had indicated that the clinical profile of ON in our country may be different from that presented in the Western literature.^[15] Apart from the above study conducted before the ONTT no other study is available that clarifies the status of ON in the country. The present study has been conducted with the aim of understanding the clinical picture of ON in India.

The age of presentation and female preponderance noted in the present study was similar to that reported by the ONTT and other studies.^[6,9] Bilateral presentation was seen in 20% of the patients in the present study and compares to 16%-35% reported in other studies from this region,^[5,7,9] whereas an African study^[14] has reported it to be as high as 80%.

A significant deviation from the ONTT report is the increased frequency of papillitis, which was 53.5% in the present study as compared with 35.3% in the former. The above figures suggest that papillitis is as common as RBN, if not more frequent, in the Asian population.

Another remarkable difference is absence of pain in 25% of our cases compared with7.8% in the ONTT^[2] and this is consistent with other studies from Asia.^[5-9]

Idiopathic ON and ON associated with MS are considered to have good visual prognosis. As per a report of the ONTT around 93.3% of patients recovered VA of 20/40 or better.^[16] However, in the present study only 64% of the patients could recover VA to this level. The amount of visual recovery was similar in unilateral and bilateral cases (58% versus 57.6% gaining VA of 20/40 or more). This result is comparable to an Indian study done earlier.^[15] The other Asian studies have also suggested an overall poorer visual outcome when compared with the ONTT population.^[7,9]A study from Africa reported extremely poor visual outcome of ON in the African population, with only 27% of eyes gaining VA of 20/40 or more.^[14]

| Table 2: Comparison of demographic and cli | ical profile of ON in Asian region with ONTT |
|--|--|
|--|--|

| | ONTT | Present study | Singapore (Lim <i>et al</i> .) | Taiwan (Lin <i>et al</i> .) | Singapore (Wang <i>et al</i> .) | Japan (Wakakura <i>et al</i> .) |
|--------------------------|---------------------------|---------------------------|-----------------------------------|---|------------------------------------|------------------------------------|
| Age range in years | 18-46 | 15-58 | 12-70 | 7-80 | 11-67 | 14-55 |
| Female:Male ratio | 3:1 | 2.2:1 | 3:1 | 1:1 | 0.6:1 | 3:1 |
| Papillitis (<i>n</i> %) | 35% | 53.5% | 60% | 53% | 65.4% | 50% |
| Pain (<i>n</i> %) | 92% | 73% | 71% | 59% | 50% | 56% |
| Bilateral (n%) | Nil | 19% | 16.4% | 34.9% | 19% | Nil |
| MS (<i>n</i> %) | 30.1% | 5% | 25.5% | 14.7% | 6.5% | 5.6% |
| Recurrence (<i>n</i> %) | 28%: More common with RBN | 16%: More common with RBN | 29%: More common with RBN | 33.95 (at 5 years): More common with RBN | Not reported | Not reported |

ON: Optic neuritis, ONTT: Optic Neuritis Treatment Trial

Involvement of the fellow eyes was suspected in 19.4% of unilateral cases in the form of decreased contrast sensitivity, although no defect in color vision or visual field was noted. Since we used GVF, the subtle changes that could have been picked up on Humphrey visual fields may have been missed in this study and so it is possible that we have documented lower rates of fellow eye involvement.^[2,6]

Recurrence was seen in 16% and was more common with RBN. The ONTT has reported an overall risk of recurrence to be 28% at 5 years follow-up and was more frequent in their MS group and in patients without MS who were in the oral prednisolone treatment group.^[17]

Although it was not possible to do MRI in all patients, intracranial de-myelination changes consistent with MS were seen in 37.5% of patients (8 out of 32) in whom it was done in contrast to 48.7% (203 out of 417) reported by the ONTT.^[2] Four cases in our study had MS. We acknowledge that there is a possibility of underestimation of MS in our study given the fact that MRI was not performed in all cases; however, other reports from the south eastern region also show low incidence of MS in the population from this part of the world.^[5-9]

The limitations of our study include not doing automated perimetry and not obtaining MRI in all cases. Despite that we found that ON in the Asian region is different from that reported in the Western population. Papillitis was more frequent than retrobulbar neuritis, bilateral presentation was common, association with MS was low, and visual outcome seemed moderate. Table 2 compares the demographic and clinical profile of ON in the present study with that in other studies. Whether environmental factors, ethnicity, and genetic composition could play a role in the discrepancy in clinical profile in this region remains to be studied.

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