Content available at: https://www.ipinnovative.com/open-access-journals

IP International Journal of Ocular Oncology and Oculoplasty

Journal homepage: https://ijooo.org/

Original Research Article

Clinical profile and visual outcome of optic neuritis patients in tertiary care hospital

Vijay Prakash Kinikar[1,*], Yashaswi Pendyala[1], K. Vijay Kumar[1]

[1]*Dept. of Ophthalmology, Mamata Medical College, Khammam, Telangana, India*

ARTICLE INFO

Article history:
Received 28-05-2021
Accepted 26-06-2021
Available online 24-07-2021

Keywords:
ON
ONTT
MS
Papilitis
Retrobulbar neuritis

ABSTRACT

Aim & Objective: To study the clinical profile and visual outcome of optic neuritis
Materials and Methods: Study population included patients who were clinically diagnosed as Optic neuritis at Department of Ophthalmology, Mamata medical college. A total of 30 cases were taken up for the study. Patients were examined in detail at presentation and treated with ONTT regimen and follow up done at 1 week, 1 month and 3 months.
Results: Most common age group affected was 20- 50 years with mean of 39.36yrs. Highest incidence was seen in age group of 41-50yrs which was found to be 36.7%. Higher incidence was seen in females. Females constituted 63.33%. Female to Male ratio was 1.72:1. Higher incidence of Papilitis was seen among males and RBN was more commonly seen among females. Incidence of retrobubar neuritis was slightly higher than papilitis. All presented with DOV. Pain was present in 56.66%. Loss of vision persisted more than 1 month in case of papilitis. BCVA after ONTT had very good improvement. After treatment majority had vision between 6/18-6/6 (46.38%) and was statistically significant. Also after 1month and 3 months majority had vision between 6/18-6/6 [60.52% and 64.56% respectively]. Only 3.23% had VA less than 6/60 after 3months. There was improvement in both colour vision and contrast sensitivity but was not statistically significant. Central and centrocaecal scotoma was most common visual field defect. MRI brain was done in only 11 patients due to financial constraints which revealed two MS and 3 cases of increased signal intensity in short segment of Optic nerve. The recurrence rate in our study was 6.66%.
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 as frequent as Retrobulbar neuritis in the Indian setup, with poorer visual outcome.

1. Introduction

Optic neuritis is the inflammation of the optic nerve. It can occur secondary to autoimmune, infectious, or inflammatory disorders and is strongly associated with Multiple sclerosis (MS). It is the presenting symptom in 15-20% of cases of MS, but frequently occurs in the absence of MS. In addition, 65% of patients with multiple sclerosis will suffer from optic neuritis at some point during the course of the disease.

Optic neuritis causes substantial visual impairment and potential long-term visual defects in addition to serving as an important prognostic indicator for future development of demyelinating diseases such as multiple sclerosis. So ophthalmologist has a very significant role to aid in prevention of full blown MS. Fortunately, in most cases, optic neuritis recovers either spontaneously or with treatment. Recovery can be partial or absolute, depending largely upon severity and co-existing conditions.

It typically affects younger individuals with a median age at onset in the early thirties, but has been reported in patients as young as four. It has an estimated annual occurrence rate of 5.1/100,00 in the United States, and is

* *Corresponding author*.
E-mail address: vijaykinikar@gmail.com (V. P. Kinikar).

https://doi.org/10.18231/j.ijooo.2021.032

more commonly seen in women than in men. Much of the information regarding the natural history of optic neuritis, its treatment, and its relationship with multiple sclerosis has been acquired from the Optic Neuritis Treatment Trial (ONTT). This was a large clinical trial that followed optic neuritis patients over time which allowed for evaluation of the natural history of the disease and response to corticosteroid treatment.

In developing countries like India the clinical profile of optic neuritis is somewhat different. Not many studies have been done on optic neuritis. A few studies clarify that the scenario in Indian subcontinent is different as infectious diseases play a important role in causation of optic neuritis and prognosis is not so good. Hence this study will focus on likely causative factor, risk and visual outcome of optic neuritis in Indian set up.

2. Objectives of the study

1. This is a prospective study done to evaluate the clinical profile and visual outcome in optic neuritis.
2. To evaluate the effect of risk factors and treatment given on the visual outcome of Optic neuritis.

3. Materials and Methods

3.1. Subject selection

All patients clinically diagnosed as optic neuritis in Mamata Medical College and Hospital during February 2018 to February 2021 were included in the study.

3.2. Inclusion criteria

All patients clinically diagnosed of optic neuritis.

3.3. Exclusion criteria

1. Parainfectious Optic Neuritis.
2. Post Vaccination Optic Neuritis.

3.4. Methods of data collection

Sample size: Sample size was be detected based on a pilot study for the following parameters level of significance, absolute error d=10%. Sample median proportion s related parametric and non parametric tests done. On an average 2.5 patients were diagnosed with optic neuritis per month, hence 30 cases were taken for the study.

3.5. Method of study

Patients admitted with optic neuritis after taking valid consent detailed history was taken, with documention of onset of visual loss, duration of visual loss, pain and history of any other ophthalmic and neurological symptoms.

Clinical examination included Snellen's visual acuity testing, evaluation of pupils, slit lamp biomicroscopy with 78D, color vision by pseudo-isochromatic test plates, visual field by automated perimetry, contrast sensitivity by pelli robson chart. Parainfectious and postvaccinated optic neuritis were excluded from the study. Other causes of disc edema like ischemic optic neuropathy, traumatic neuropathy were thoroughly ruled out. Cases thought to have other neurological deficits were referred to neurologist for evaluation.

Haemogram, total and differential white blood count, erythrocyte sedimentation rate, chest X ray, mantoux test, and serology for syphilis, toxoplasmosis, HIV were obtained in all cases. Magnetic resonance imaging (MRI) of the brain and orbit with contrast were done in patients who were affordable and suspected to have demyelinating disease and retroorbital mass . Patients with contraindications to systemic steroids like active systemic infection, uncontrolled diabetes etc were excluded from study. All patients were treated as per treatment guidelines i.e ONTT regimen which consisted of Injection Methyprednisolone 1g for 3days followed by oral prednisolone 1g/kg/body wt for 11 days and then tapered. Patients suspected of infectious cause of optic neuritis were supplemented with systemic antibiotics.

Follow ups were done at 1 week, 1 month and 3 month. At all follow up visits, examination included Snellens visual acuity testing, evaluation of pupils, slit lamp biomicroscopy with 78D, colour vision, contrast sensitivity and visual field. Data was recorded in a specially designed proforma which was transferred to master sheet. The data will be subjected to statistical analysis by the biostatistician of our institution.

3.6. Statistical method employed

Descriptive statistics used

1. CRAMERS V
2. Chi square test
3. Student T test

Cramers V was used for Association Chi square for difference 't' test for individual samples SPSS software version 16.0 used

4. Observation and Results

Sixty eyes of 30 patients were included in this study, which was conducted over duration of 1 year. The mean follow-up period was 3+/-0.2 months.

Out of total 30 patients 1 was under age group <20yrs[3.3%], Seven [23.3%] patients belong to age group of 21-30yrs, Seven [23.3%] were in the age group of 31-40yrs, four [13.3%] were under fifty yrs and majority of the patients come under 41-50yrs i.e eleven [36.7%]. Less number of patients in extremes of age group i.e <20yrs and >50yrs. Both Retrobulbar neuritis and Papillitis were common in age group of 41- 50yrs.

Table 1: Showing age distribution

	No of patients	% of total
<20 years	1	3.3%
21- 30 years	7	23.3%
31- 40years	7	23.3%
41-50years	11	36.7%
>50 years	4	13.3%

The mean age of presentation was 39.3667 ± 14.03563[16-75].

Table 2: Showing occurrence of type of toptic Neuritis.

Type	Number
RBN	17[56.7%]
Papilitis	13[43.3%]

Out of 30 patients Retrobulbar neuritis was diagnosed in 17[56.7%] whereas Papilitis was diagnosed in 13[43.3%].

Table 3: Showing involvement of type of Optic Neuritis among Males and Females.

	Male	Female	Total
RBN	3[27.3%]	14[73.7%]	17[56.7%]
PAPILITIS	8[73.7%]	5[26.3%]	13[43.3%]
Total	11[36.66%]	19[63.33%]	30[100%]

Out of thirty patients 19[63.33%] were females and 11[36.66%] were males i.e the female preponderance was seen in a ratio of 1.72:1. Among males, Papilitis was more commonly seen [73.7%] but RBN was noted more commonly in females [73.7%].

Table 4: Showing eye involvement in the study

Type	RBN	Papillitis	Total
RE	4	5	9[30.00%]
LE	7	7	14[46.66%]
BE	1	6	7[23.33%]

Bilateral presentation was seen in 7 cases [23.33%], 6 of whom had papilitis and 1 had retrobulbar neuritis. Left eye was more commonly involved than right eye i.e 1.55:1.

Table 5: Showing risk factors association in causing optic neuritis

Associations	Number	P value
Previous similar episode	2	1.55
Alcohol	1	2.1
Smoking	3	1.59
Tobacco	4	1.35
Diabetes	3	1.59
Pregnancy/lactation	1	2.1

All values of P > 0.05 are insignificant.

Out of thirty patients 2 patients had similar history in past, 1 was a diagnosed case of MS and other was Retrobulbar neuritis. Recurrence rate was 6.66%.

Table 6: Showing complaints by patients

Complaints	RBN	Papilitis
DOV	17	13
Pain	11	6
Loss of field	0	0
Photopsia	0	0
Uthoffs phenomenon	1	0

DOV was seen in all patients with optic neuritis, out of 17 RBN cases 11[36.66%] patients complained of pain with eye movements and 6 [20%] patients complained of non specific pain in an around the eye.1 patient had uthoffs phenomenon.

Table 7: Showing pupillary reaction comparison before and after treatment.

	Presentation	One week	One month	3 months
Normal	0%	63.33%	76.66%	80%
RAPD	76.66%	20%	10%	6.66%
Sluggish	23.33%	16.66%	13.33%	13.33%

All patients with optic neuritis had pupil abnormality at presentation. 76.66% had RAPD and 23.33% had sluggishly reacting pupil. After treatment i.e at one week RAPD was detected in only 20% of cases, and at end of one month RAPD was noted in 10% of cases and at the end of 3 months it was 6.66% of cases. In case of bilateral disease after treatment pupil was sluggishly reacting in 16.66% cases and later after 3 months it was reduced to 13.33%. At end of 3 months 80% had normal pupillary reflex.

Table 8: Visual acuity comparison before and after treatment

VA	AT Presentation	After ONTT [one week]
PL+	4.35	-
CF TO 6/60	40.57	3.23
6/60 – 6/36	48.56	19.95
6/36 – 6/18	6.52	30.44
6/18- 6/6	-	46.38
P VALUE	-	0.030**

All patients at presentation had vision worse than 6/18 with majority of the patients had vision between 6/60 to 6/36 and 4.35% had PL+. After treatment majority had vision between 6/18-6/6 [46.38%] and was statistically significant. Also after 1month and 3 months majority had vision between 6/18-6/6 [60.52% and 64.56% respectively]. Only 3.23% had VA less than 6/60 after 3months.

In case of RBN 90.1% of patients had DOV for less than one month i.e they improved to 6/6 after ONTT regimen within 1month whereas the scenario was reversed in case of Papillitis where in 84.2% complained of persistence of

Table 9: Above showing visual outcome after 1month and 3month of ONTT regimen.

	On follow up	
	1 Month	**3 Month**
PL+	-	-
CF – 6/60	3.23	3.23
6/60 – 6/36	11.62	4.72
6/36- 6/18	28.65	27.91
6/18 – 6/6	60.52	64.16
P VALUE	0.006***	0.002***

Table 10: Showing time duration of visual loss from onset to recovery.

DOV	**RBN**	**PAPILITIS**	**Total**
<4 Weeks	10 [90.1%]	1 [9.1%]	11[36.66%]
>4 Weeks	3 [15.8%]	16 [84.2%]	19[63.33%]

vision loss even after 4 months i.e Vision didn't improve to 6/6 at 1 month duration. Papillitis patients took longer time to recover.

Table 11: SHow color vision comparison before and after treatment.

Colour vision	**Presentation**	**One week**	**One month**	**3 month**
Normal	8.69	26.09	36.23	39.86
Defective	77.97	70.68	60.54	56.91
Not possible	13.44	3.23	3.23	3.23
P value*		0.232	0.112	0.105

Table 11 Showing Color Vision loss among optic neuritis patients. Most of them had defective color vision at presentation [77.97%]. About 13.44% of patients Color Vision was not able to record due to poor vision. After 3 months color vision improved. Residual Color Vision defect persisted in 56.91% of patients. There was no statistically correlation but grossly Color Vision improved with treatment and time.

Table 12: Shows contrast sensitivity comparison before and after treatment

Contrast sensitivity	**Presentation**	**One week**	**One month**	**3 month**
Normal	3.23	6.66	6.66	9.86
Reduced	83.33	90.11	90.11	86.91
Not possible	13.44	3.23	3.23	3.23
P value*		0.252	0.122	0.115

Table 12 Showing Contrast Sensitivity loss among optic neuritis patients. Most of them had reduced Contrast Sensitivity at presentation [83.33%]. About 13.44% of patients Contrast Sensitivity was not able to record due to poor vision. Some patients showed improvement in Contrast Sensitivity whereas majority didn't after ONTT regimen. At end of 3months reduced Contrast Sensitivity was noted in 86.91%. There was no statistically correlation.

Table 13: Showing visual field changes in optic neuritis

Type of field defect	**Number**
Central and centrocecal scotoma	45.31
Arcuate	34.43
Altitudinal	6.46
Others	13.8

Table 13 A total 28 eyes were unable to undergo Visual Field examination due to poor vision and lack of learning curve. Among patients who had visual field done, majority had Central and Centrocecal scotoma were seen in 45.31%, followed by Arcuate scotoma in 34.3%, Inferior altitudinal defect in 6.64%.

Table 14: Showing fundus findings at presentation

Findings	**Number**
Disc edema	13 [43.33%]
Peripapillary haze	11[36.66%]
Macular exudates	4[13.33%]
Temporal pallor	2 [6.66%]
Haemorrhages	2[6.66%]
Sheathing	3[10%]
Retinochoroiditis patch	1[3.23%]

Table 14 Most common Fundus Findings were disc edema and Peripapillary haze suggestive of papilitis. Apart from these there were temporal pallor in two patients, Haemorrhages in two patients, macular exudates in four patients, sheathing in three patients and Retinochoroiditis in one patient.

Results of the hemogram; total and differential white blood count; erythrocyte sedimentation rate were abnormal in 5 cases of papilitis. 3 had lymphocytosis, 1 raised ESR and another tested positive for Toxo IgM antibodies.

Chest x ray and Mantoux were normal in all cases.

MRI was not possible in all cases due to financial constraints and was performed in 11 cases. Of these 11 cases, no lesion was seen in 6 cases and 3 had shown signal enhancement of the optic nerve in the affected eye only. Demyelinating lesions in the brain were present in 2 patients, one of which was already diagnosed as MS. ONE case in the study developed other neurological symptoms during follow-up and were subsequently diagnosed with MS. This patient also had Internuclear ophthalmoplegia with convergence involved. She also tested positive for oligoclonal bands in CSF. The recurrence rate in our study was 6.66%.

5. 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.[1] Western data suggest that at least 50% of patients with ON will eventually develop MS, but studies from Asia and Africa[2–6] present a contrasting scenario. An Indian study conducted by Rohit Saxena et al 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.[7,8] Apart from the above studies no other study is available that clarifies the status of ON in India. 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 conducted by Wakakura M et al and Wang JC.[2,3] Bilateral presentation was seen in 23.33% of the patients in the present study and compares to 16%-35% reported in other studies from this region conducted by Woung LC et al and Lim SA et al,[4,5] whereas an African study conducted by Pokroy R et al[6] has reported it to be as high as 80%.

A significant deviation from the former Indian studies conducted by Rohit Saxena et al[7] and Jain et al[8] is the slightly increased frequency of retrobulbar neuritis, which was 56.7% in the present study. But our study showed that the incidence of RBN was similar to ONTT study. The above figures suggest that RBN is as common as papillitis, if not more frequent, in the Asian population.

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 6/12 or better. However, in the present study only 64.16% 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 6/12 or more). This result is comparable to an Indian study done earlier by Jain IS et al.[8]

Although it was not possible to do MRI in all patients, intracranial de-myelination changes consistent with MS were seen in two patients. Two 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 of India also show low incidence of MS in the population from this part of the world.[2–6]

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 equal in incidence as retrobulbar neuritis, bilateral presentation was common, association with MS was low, and visual outcome seemed moderate. Whether environmental factors, ethnicity, and genetic composition could play a role in the discrepancy in clinical profile in this region remains to be studied.

6. Conclusion

Females were predominantly affected than males.

Most common affected persons were in the age group of 41-50years with mean age group 39.3667.

No specific associations with any etiological factor noted.

Almost all patients had diminution of vision. Apart from DOV next common complain was pain.

Bilateral cases were 23.33% and more of papillitis.

Papillitis was more commonly seen among males and RBN in females.

Visual acuity at time of presentation was 6/60-6/36 which improved to 6/18-6/6 in 64.16% of patients.

In all patients pupillary reaction was abnormal. Color vision and contrast sensitivity were lost in patients.

Field defect was noted in all patients most common was central/centrocaecal scotoma.

Retrobulbar neuritis was noted in 56.7% patients. Others had papillitis. Most commonly disc edema was noted. Rarely haemorrhages were noted.

After ONTT all patients showed improvement in vision. This improvement in vision is statistically significant.

Color vision recovery was noted in 39.86%. Fields showed persistent defects after 3months. RBN had rapid visual recovery than Papillitis. Recurence Rate was 6.66%.

Institution of ONTT has definite role in speeding up of recovery.

7. Acknowledgment

The author is thankful to Department of Ophthalmology for providing all the facilities to carry out this work.

8. Conflict of Interest

The authors declare that there is no conflict of interests

9. Source of Funding

None.

References

1. Rodriguez M, Siva A, Cross SA, O'Brien PC, Kurland LT. Optic neuritis: A population-based study in Olrnsted County, Minnesota. *Neurology*. 1995;45(2):244–50. doi:10.1212/wnl.45.2.244.
2. Wakakura M. Baseline Features of Idiopathic Optic Neuritis as Determined by a Multicenter Treatment Trial in Japan. *Japanese J Ophthalmol*. 1999;43(2):127–32. doi:10.1016/s0021-5155(98)00072-0.
3. Wang JC, Tow S, Aung T, Lim SA, Cullen JF. The presentation, aetiology, management and outcome of optic neuritis in an Asian population. *Clin Experiment Ophthalmol*. 2001;29(5):312–5. doi:10.1046/j.1442-9071.2001.00442.x.
4. Woung LC, Lin CH, Tsai CY, Tsai MT, Jou JR, Chou P, et al. Optic neuritis among national health insurance enrollees in Taiwan. *Neuroepidemilogy*. 2000;29:250–4.

5. Lim SA, Goh KY, Tow S, Fu E, Wong TY, Seah A, et al. Optic neuritis in Singapore. *Singapore Med J*. 2008;49:667–71.
6. Pokroy R, Modi G, Saffer D. Optic neuritis in an urban black African community. *Eye*. 2001;15(4):469–73. doi:10.1038/eye.2001.157.
7. Saxena R, Phuljhele S, Menon V, Sharma P, Sinha A, Gadaginamath S, et al. Clinical profile and short-term outcomes of optic neuritis patients in India. *Indian J Ophthalmol*. 2014;62(3):265–7. doi:10.4103/0301-4738.121131.
8. Jain IS, Munjal VP, Dhir SP, Gangwar DN. Profile of optic neuritis in Chandigarh and surrounding areas. *Indian J Ophthalmol*. 1980;28:195–200.

Author biography

Vijay Prakash Kinikar, Assistant Professor

Yashaswi Pendyala, 3rd Year Post Graduate Resident

K. Vijay Kumar, Professor

Cite this article: Kinikar VP, Pendyala Y, Kumar KV. Clinical profile and visual outcome of optic neuritis patients in tertiary care hospital. *IP Int J Ocul Oncol Oculoplasty* 2021;7(2):163-168.