Research Article

Optic neuritis in indian children: a one year followup study

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Kumar P,Chiranjeevi P. Optic neuritis in indian children: a one year followup study . Opth Clin ther. 2017;1(1):3-5.

Objectives: Optic neuritis [ON] in children occurs usually secondary to viral infection or vaccination. A limited literature is available on pediatric ON in Indian children. Hence this study was done to describe the clinical characteristics of pediatric ON.

Methods: This was a retrospective study that included cases of pediatric ON treated over last 5 years. Retrospective review of the case records was done and details at presentation and each follow up were collected.

Results: A total of 27 eyes of 19 patients were included. Mean age of the patients was 12.39 years. 10 children (52.63%) were females and 9 (47.37%) were males. 8 (42.90) patients had bilateral disease whereas 11(57.10%) had unilateral disease. The presenting visual acuity in the affected eye ranged from no perception of light to 6/24. At presentation, 19 eyes (70.37%) had disc edema, 8 eyes (29.62%) had disc pallor. All patients received intravenous methylprednisolone followed by oral steroids. At one week follow up, visual acuity showed improvement in all the eyes. At one month follow up, 21 (91.30%) eyes showed improvement of visual acuity better than 6/12 except for two eyes (8.69%).

Conclusion: Initial visual loss due to optic neuritis is more profound in children than adults. The study showed the beneficial effects of corticosteroid in treatment of pediatric ON. It is better to treat the patients with the steroids, if autoimmune mechanism is considered as etiology. The study had a small sample size and limited follow up. Hence further studies are needed on a large sample size to analyze the clinical characteristics of pediatric ON.

Key words: Optic neuritis, Children, Optic disc edema

INTRODUCTION

Optic neuritis is usually more common in children than adults [1]. Usually optic neuritis in children is known to occure secondary to viral infection or vaccination [2-4]. There is a well-established relationship between optic neuritis and multiple sclerosis. Studies have shown low incidence of multiple sclerosis in children compared to adults with optic neuritis. Luchinetti et al. in their study have shown that 13% of the 79 patients with isolated optic neuritis progressed to definite multiple sclerosis by 10 years of follow up, 19% by 20 years, 22% by 30 years, and 26% by 40 years.

A limited literature is available on the clinical characteristics, treatment outcomes of pediatric optic neuritis in Indian children. Furthermore there are no studies comparable to optic neuritis treatment trial (ONTT), as for adult optic neuritis. Hence this study was done to describe the clinical characteristics, treatment instituted and outcomes of optic neuritis in individuals less than 18 years age.

METHODS

This was a retrospective study conducted in a tertiary care center. Institutional ethical committee clearance was obtained for the study. A written informed consent was obtained from the parents of all the children included in the study. All cases of pediatric optic neuritis diagnosed and treated over last 5 years were included in the study. Retrospective review of the case records of all these patients was done. Pediatric optic neuritis was diagnosed based on the clinical features of sudden onset diminution of vision, relative afferent pupillary defect, hyperemic optic disc, disc edema. Disc was carefully looked for the presence of telangiectatic vessels on the disc which were suggestive of Lebers hereditary optic neuropathy.

All the cases who presented with the above clinical features were included in the study. The details collected were age, gender, medical history, and duration of the diminution of vision, laterality, presenting visual acuity, visual acuity of the unaffected eye in unilateral cases, presence or absence of painful extra ocular movements, colour vision, disc appearance and fundus examination. Detailed ophthalmic evaluation including a dilated fundus examination was done in all the children. Cycloplegic refraction was also done in all these children.

Investigation details were also noted wherever available. The investigations done were Humphrey visual fields (HVF), Visual evoked potentials (VEP), Magnetic resonance imaging (MRI) of the brain and orbit. All these investigations were done only in cooperative children. Optical coherence tomography was done only in a few children as all the children were not cooperative and hence the findings were not included in the study. All the children with diagnosis of optic neuritis were administered intravenous methylprednisolone followed by oral steroids in tapering doses according to the weight of the child. Intravenous methylprednsiolone was given in dose of 1 mg/kg body weight in four divided doses a day and oral steroids in the dose of 1 mg/ kg body weight tapered over 2 weeks. The patients were followed up initially at one week, one month, six months and then every year. At each visit, all the above details were noted and VEP, neuroimaging were repeated if needed. All the details were tabulated and statistically analyzed using SPSS software.

RESULTS

A total of 27 eyes of 19 patients diagnosed with optic neuritis and treated were included in the study. Mean age of the patients in the study was 12.39 ± 4.07 years with a range of 4-18 years. Out of 19 patients in the study, 10 children (52.63%) were females and 9 (47.37%) were males. 8 (42.10) patients had bilateral disease whereas 11(57.90%) children had unilateral disease. Out of 19 patients, left eye was involved in 5 children (26.32%), 6 children (31.58%) had involvement of right eye and 8 children (42.10%) had involvement of both the eyes. Out of 8 children with bilateral disease, 7 children (83.33%) had simultaneous involvement of both the eyes whereas one child (16.66%) had sequential involvement. 2 patients (11.76%) had episode of fever prior to the diminution of vision. One child (5.88%) had lichen planus, one child (5.88%) had similar complaints in the other eye, one child (5.88%) had history of vaccination for hepatitis ten days prior to the visual complaints, and two children (11.76%) presented with a recurrent attack in the same eye (recurrent optic neuritis which presented to us). Children presented to us with in a period of 3-24 days after the onset of visual complaints. 11 children (57.89%) had associated pain on extra ocular movements whereas 8 children (42.11%) did not have any pain on extra ocular movements.

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Received: October 30, 2017, Accepted: January 16, 2018, Published: January 23, 2018

The presenting visual acuity in the affected eye ranged from no perception of light to 0.60 log units. The mean visual acuity at presentation was 1.75 ± 0.72 log units. Relative afferent pupillary defect was present in all the unilateral cases and pupillary reactions were sluggish in bilateral cases. Colour vision was affected in all the involved eyes. At presentation out of 27 eyes, 19 eyes (70.37%) had disc edema, 8 eyes (29.62%) had disc pallor (Table 1).

Out of 17 patients, HVF details were available only in 9 eyes of 8 patients (47.05%) and in 9 patients (52.94%) HVF was deferred. Out of 9 eyes with HVF results, 3 eyes (33.33%) had cecocentral defect, 2 eyes (22.22%) had central defect, 2 eyes (22.22%) had paracentral defects, 1 eye (11.l11%) had inferior defect, 1 eye (11.11%) had advanced loss,. Out of 27 eyes, VEP results were available only in 4 eyes (14.81%) and all these eyes had delayed latency. Out of 17 patients in the study, neuroimaging was done only in 6 patients (26.08%) out of which 4 patients (66.66%) had normal MRI, one patient (16.66%) had optic nerve signals, one patient (16.66%) had optic nerve thickening. Out of these 6 patients, one patient had acute sphenoid and ethmoid sinusitis on the same side of optic nerve involvement.

All patients received intravenous methylprednisolone followed by oral steroids in tapering doses in consultation with a pediatrician. The child with concurrent sinusitis received intravenous antibiotics and underwent functional endoscopic sinus surgery later. Following treatment at one week follow up, visual acuity showed improvement in all the eyes from the presenting visual acuity. At one month follow up, 21 (91.30%) eyes showed improvement of visual acuity better than 6/12 except for two eyes (8.69%) which had improvement only up to Counting Fingers at 1 meter from nil perception of light at presentation. This case had bilateral involvement at the initial presentation. The improved visual acuity maintained till one year follow up in all the eyes (Figure 1).

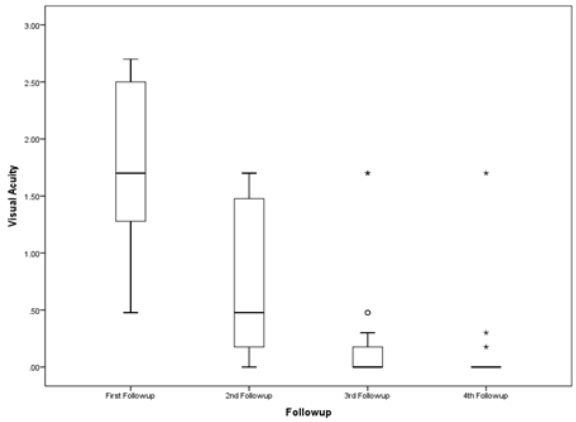

Figure 1: Box plot showing improvement in Log MAR visual acuity at each follow up till one year.

Table 1: Table showing comparison of various studies of pediatric optic neuritis with the present study.

Study	Number of patients	Mean age	Bilaterality	Visual acuity more than 6/12 following treatment
Hwang J M et al	23 pts	8.9 years	0.87	0.79
Morales D S et al	15 pts	9.8 years	0.66	0.583
Jo DH et al	20 pts	6.5 years	0.65	0.8
Brady K M et al	25 pts	Not available	0.56	0.76
Present study	19 pts	12.39 years	0.421	0.913

No case developed recurrence or evidence of multiple sclerosis till one year follow up after our treatment.

DISCUSSION

The present study described the epidemiology, aetiology, clinical characteristics, treatment outcomes and follow up in cases of pediatric optic neuritis in Indian children. Mean age at presentation in our study was 12.08 years. This was in contrast to other studies where the mean age ranged from 6.5 to 9.8 years. The high mean age must have been due to the variation in the inclusion criteria, where the present study included children up to 18 years of age where as the other studies included children less than 15 years age [4-5]. In our study, there was slight female preponderance (52.63%) compared to males (47.37%).

Controversy exists regarding female predominance in pediatric optic neuritis with few studies reporting female preponderance ranging from 60% to 85% [4-5] and some studies did not show any female dominance [6]. The exact cause of female predominance in childhood optic neuritis cannot be explained, but hormonal effect after puberty is considered to play a role [4]. In the study 11 patients (57.89%) had unilateral involvement whereas bilateral involvement was seen in 8 (42.11%) patients. The study had predominant unilateral involvement where as other studies had predominant bilateral involvement in about 42%-87% of patients [4-7].

Initial visual loss due to optic neuritis is reported to be more profound in children than adults. Kennedy et al in their study reported that all the affected children had presenting visual acuity of less than 6/60 at presentation [8]. In our study, 19 out of 27 eyes (70.37%) had a presenting visual acuity of less than 6/60. Despite the severe visual loss at presentation, all the eyes showed improvement in vision with treatment. 21 of 27 eyes (91.30%) in the study had a vision better than 6/12 at one month follow up except for 2 eyes where the visual acuity was CF at 1m. This is in accordance to other studies who reported an improvement in visual acuity to better than 6/12 in about 53-90% of treated patients [9-10].

The study also showed the beneficial effects of corticosteroid in treatment of pediatric optic neuritis. All the patients in the study received intravenous methyl prednisolone and showed improvement in visual acuity except for 2 eyes. However in the study by Brady et al all the children did not receive intravenous steroid treatment, yet showed improvement in the visual acuity [9]. These results in controversy regarding the use of steroids in the treatment of pediatric optic neuritis; however it is better to treat the patients with the steroids, if autoimmune mechanism is considered as etiology in the affected eyes.

CONCLUSION

All the patients in the study were of Indian origin and hence the racial differences might be responsible for the findings which were contrast from the other studies. The study has its own limitations. The study had a small sample size of 27 eyes of 19 patients and hence the treatment outcomes of this study cannot be used favorably to assess the prognosis of childhood optic neuritis patients. The follow up duration in the study was also of short duration. Hence further studies are needed on a large sample size to analyze the epidemiology, etiology, treatment, outcomes and prognosis in pediatric optic neuritis in Indian children.

ACKNOWLEDGEMENTS

NIL

CONFLICT OF INTEREST DISCLOSURE

NIL

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