IJHS

Original Article

Optic neuritis: Observation and experience at a tertiary care hospital in Qassim region, Saudi Arabia

Mohammad Jawad Alamgir[1], Syed Abrar Ali[2], Nermin Aly Hamdy[3], Moin Zafar Khan[4], Elgamri E Mohammad[2]

[1]Faculty of Neurology, Department of Medicine, College of Medicine, Qassim University (QU) Saudi Arabia, [2]Ophthalmology Department, King Fahad Specialist Hospital Buraidah Al Qassim, Saudi Arabia, [3]Currently, Faculty of Medicine, Minia University, Egypt, [4]Faculty of Medicine Department of Medicine, College of Medicine QU Saudi Arabia, [5]Neurology Unit Department of Medicine King Fahad Specialist Hospital Buraidah Al Qassim

Address for correspondence:
Mohammad Jawad Alamgir, Department of Medicine, Faculty of Neurology, College of Medicine, Qassim University (QU), Saudi Arabia.
E-mail: drmjalamgir@yahoo.com

WEBSITE: ijhs.org.sa
ISSN: 1658-3639
PUBLISHER: Qassim University

ABSTRACT

Objectives: Optic neuritis (ON) can occur in isolation or association with multiple sclerosis (MS) or neuromyelitis optica. ON, is seen more commonly in Caucasians and interaction is found to exist between ethnic origin and the latitude at which the patient grows up. At present limited information is available about the profile of ON in Saudi patients.We aimed to analyze the records of ON patients, in regard to their presentation, natural history, treatment outcome, and risk and association with MS. Whether, ON in Saudi patients behaves differently from the Western and Asian patients?

Methods: In this retrospective observational study; we retrieved the data from the medical records of the patients with ON, who attended the ophthalmology and neurology services of King Fahad Specialist Hospital Buraidah, Al Qassim, Saudi Arabia, from period 2006 to 2012.

Results: We recorded data of 60 patients of ON; 38 females (63.3%) and 22 males (36.7%). Color vision was affected in 66.7% of cases. Vision in the affected eye was 20/200 or worse in 74.97 % of our cases. Magnetic resonance imaging (MRI) brain revealed multiple lesions in 55% of cases; most of them developed MS on follow-up. Only 48.3% of patients had received systemic steroids. Vision improved in 85% of our cases.

Conclusion: Most of our patients had idiopathic ON, and almost 85% had good visual recovery, in this regard our study is comparable with such studies done in other Asian countries. On the other hand, 55% of our patients had multiple MRI brain lesions, a high risk and association of MS, almost similar to the Western Europe and North American ON patients.

Keywords: Optic neuritis, multiple sclerosis, Saudi Arabia

Introduction

Optic neuritis (ON) is an inflammation of the optic nerve and has various causes such as demyelinating, infective, vasculitis, sarcoidosis, toxic, metabolic, and hereditary neuropathy.

Most commonly it is a demyelinating inflammation of the optic nerve and typically, initially occurs in young adults. It may occur in isolation or association with multiple sclerosis (MS) or neuromyelitis optica.[1-4]

In cases associated with MS, ON is commonly the first manifestation of the chronic disease.[3] It has been observed in long-term follow-up studies that up to 75% of female and 35% of male patients initially presenting with ON may develop MS.[4-7]

Magnetic resonance imaging (MRI) of the brain at the initial presentation can demonstrate silent demyelinating lesions. Patients with isolated ON (without MRI brain lesions) have a 16%, 22% risk of progression to MS at 5, 10 years follow-up, respectively. This risk increases to 56% in patients with MRI brain lesions at 10 years follow-up.[8-12]

The demyelinating ON affects females more than males with 3:1 ratio.[13] Most of the patients are between 20 and 45 years of age.[8-10] It is unilateral in 70% of cases and is rare in children. Loss of vision, periocular pain and dyschromatopsia are considered to be the triad of inflammatory ON. For most patients with ON, visual function improves gradually over several weeks, in some cases can begin to improve after 1 week, even without any treatment. However, permanent residual deficits in color vision and contrast and brightness sensitivity can occur.

We aimed to analyze the records of ON patients, presented to King Fahad Specialist Hospital, Buraidah, KSA (KFSH), in regard to their presentation, natural history, treatment outcome and risk and association of MS. Moreover, whether ON in Saudi patients behaves differently from the Western and Asian ON patients?

Methods

After approval from the Ethical committee, in this retrospective study, we retrieved data from the medical records of patients who attended the ophthalmology and neurology services in KFSH Buraidah, from 2006 to 2012.

Inclusion and exclusion criteria

Patients older than 12 years presented with acute onset visual symptoms such as loss of visual acuity (VA) with or without eye pain and those with afferent pupillary defects. Patients below this age present to the children's hospital.

We excluded patients who showed any evidence of hereditary, vascular, toxic, metabolic, infiltrative, or compressive optic neuropathy.

The demographic variables and ON related variables including presenting symptoms, unilateral or bilateral involvement, relevant neurological symptoms, VA, color vision, pupil and fundoscopic findings, neuroimaging results, and any treatment offered and outcome were retrieved from the files of these patients and recorded on a structured pro forma.

Statistical analysis

Statistical software "Statistical Package for the Social Sciences (SPSS)-20.0" was used for data analysis. Descriptive analyses were done. Ratios for gender distribution and mean standard deviation (SD) were computed for age distribution.

Frequencies and percentages were computed to present the categorical variables such as age of onset of ON, unilateral or bilateral involvement, VA, visual fields, fundoscopic, and neuroimaging findings.

Results

We reported 60 patients of ON; 38 females and 22 males. Age ranged between 13 and 48 years (mean ± SD = 27.6 ± 8.8). Among these 98.3% were from Middle East origin including 91.67 Saudi patients. Only one case was from Indian origin. Demographic data of patients are shown in Table 1.

About 68.3% of our patients presented with ON in the right eye, while in 31.7% of cases the affected eye was left. In 33.3% patients, color vision was not affected, while decreased in rest of cases.

The vision in affected eye was 20/200 or worse in 78.3% of our cases and better than 20/200 in 21.7% of cases (Table 2).

Acute phase of ON was from 11 to 20 days in 75% of our cases. It lasted for <05 days in 3.4% of cases and took more than 21 days in 6.6% of cases (Table 3).

MRI scans of the brain were done for 52 patients, for the remaining 8 patients it was not requested, and they had not developed other neurological deficits. MRI brain was normal

Table 1: Demographic data of patients

Variables	*n* (%)
Sex	
Males	22 (36.7)
Females	38 (63.3)
Age groups	
13-20	15 (25)
21-30	25 (41.7)
31-40	15 (25)
41-48	5 (8.3)
Ethnic origin	
Middle East	59 (98.3)
Indian	1 (1.7)
Nationality	
Saudi	55 (91.1)
Non-Saudi	5 (8.3)

Table 2: Findings of ophthalmology examination

Variables	*n* (%)
Laterality	
Right eye	41 (68.3)
Left eye	19 (31.7)
Pupillary reaction	
Defective	44 (73.3)
Normal	16 (26.7)
Color vision	
Decreased	40 (66.7)
Normal	20 (33.3)
Painful eye movement	
Present	51 (85)
Absent	9 (15)
VA	
<20/200	36 (60)
20/200	11 (18.3)
>20/200	13 (21.7)
Optic disc	
Blurred	21 (35)
Pale	1 (1.7)
Normal	38 (63.3)

VA: Visual acuity

in 17 patients (28.33%) while, 33 patients (55%) had multiple lesions, and 2 (3.33%) patients had 2 or less lesions. 31 patients with multiple lesions developed definite MS on follow-up (Table 4).

Only 29 patients (48.3%) had received systemic steroid, and the rest of the cases (51.7%) had nonsteroidal anti-inflammatory drugs. Vision improved in 51 patients (85%) to better than 20/200. While it was 20/200 in 4 (6.7%) and <20/200 in 5 (8.3%).

Discussion

In this article, we analyzed various aspects of ON and described the profile of ON in Saudi (Middle East) patients. At present, minimal information is available on ON within Saudi population.

In this study, we selected all patients with ON, similar to the patient population of Zhang *et al*.,[14] Lim *et al*.[15] studies, though ON treatment trial (ONTT)[10] and other studies[16-20] had described patients with idiopathic ON only.

Young adults, aged 20-45 years, typically initially present with acute ON, although atypical cases of ON may be seen in elderly patients. Bilateral ON can occur in childhood and has less risk of progression to MS.[21] Mean age of our patients was from 13 to 48 years.

ON is seen more commonly in Caucasians and quite rarely in black populations.[22,23] Whites of Northern European descent develop ON 8 times more frequently than blacks and Asians. Most of our patients (98.3%) were from Middle East region including 91.67% Saudi patients and only one case was of Indian origin. An interaction is found to exist between ethnic origin and the latitude at which the patient grows up.[23,24]

Table 3: Duration of disease

Duration of disease days	*n* (%)
2-5	- (3.4)
6-10	9 (15)
11-15	15 (25)
16-20	30 (50)
21-25	2 (3.3)
>25	2 (3.3)

Table 4: MRI findings in patients

MRI brain finding	Males *n*=23 (%)	Females *n*=37 (%)
Normal	11 (18.33)	6 (10)
2 or less lesions	0	2 (3.33)
Multiple lesions	9 (15)	24 (40)
MRI not done	3	5

MRI: Magnetic resonance imaging

More recently, in a report from the United Kingdom about the incidence of ON within an ethnically diverse patient population, ethnicity bias has been observed.[25]

In our study, the numbers of females affected by ON (63.3%) were more than males (36.7%); a similar trend was noted in ONTT[26] and other studies[27-29] as well.

Causes of ON were not evident in most of our cases, similar to Asian studies done in China,[17,20] Singapore,[25] and India,[16] as most of their patients had unknown etiology.

Painful eye movements were present in 85% of our cases, which is in agreement with the ONTT that reported 92% of patients had painful ocular movements and was also one of presenting feature in some other studies.[12,27,29,30]

We could not retrieve much information related to visual fields defects from our records. However, any type of visual field defect is possible as suggested by the ONTT.[10] Studies from Taiwan[20] and Japan[18] have reported a diffuse depression as most common field defect in their patients.

Color vision was decreased in 66.7% or our patients. This is in agreement with ONTT[10] where patients showed mixed red-green and blue-yellow color defects, either one or the other type predominating.[31]

The incidence of MS associated with ON is found to be most common in populations of Western Europe and North America, located at higher latitudes and less common closer to the equator.[27] MRI showed changes consistent with demyelination of the brain in 48.7% of the patients in ONTT.[10] In comparison to Western Cohort, the risk of MS was found to be low in Asians with ON.[17,32] ON was associated with MS in 25.5% of patients of Lim *et al*.[15] and Tan.[32]

In our study, 55% patients had demyelinating lesions on MRI brain, and most of them developed MS in follow-up. This high risk and association of MS is almost similar to the Western Europe and North American populations.[10,23,24]

The treatment of acute ON is a symptomatic remedy of the acute symptoms of pain and decreased vision caused by demyelinating inflammation of the nerve. Various regimens of corticosteroids have been used for this purpose. Immunomodulating drugs are recommended for patients with ON whose brain lesions on MRI indicate a high risk of developing MS.[26-30]

We noticed, only 29 patients (48.3%) had received systemic steroid, and the rest of the cases (51.7%) had nonsteroidal anti-inflammatory drugs as initial treatment in the acute stage.

Vision improved in 85% of our cases, to better than 20/200, while in 15% of cases it remained 20/200 or less.

It has been reported that recovery is not as good with poor baseline VA, but even with ≤20/200 at baseline, recovery to ≥20/40 occurs in 85% recovery of visual loss occurs spontaneously starting within 2-3 weeks in 80%, stabilizing over months and continuing to improve for up to 1 year.[30]

Acute phase of ON lasted from 11 to 12 days in 75% of our cases. In the ONTT, 79% and 93% of patients started to show signs of improvement within 3 and 5 weeks of onset, respectively. The severity of initial visual loss does appear to affect final visual outcome, and in the ONTT the best predictor of visual recovery was the baseline acuity at enrolment.[30]

Limitations

This is a retrospective analysis of the patients who had presented with ON. In some cases, we could not exactly correlate the timing of the MRI scan and the onset or duration of the ON. Furthermore, could not retrieve detailed information related to visual fields defects from our records.

Conclusion

Most of our patients had idiopathic ON, and almost 85% had good visual recovery, in this regard our results are comparable with such studies done in other Asian countries.

Interestingly, our ON patient population is different from the other Asian countries in terms of high-risk and association of MS, as suggested by multiple demyelinating lesions on brain MRI in 55% of cases. This is almost similar to the Western Europe and North American populations.

History and examination are helpful to clinically identify typical cases. Only 29 patients (48.3%) had received systemic steroid as initial treatment in the acute stage, for management there should be multi-disciplinary approach including ophthalmology and neurology services. MRI brain is useful to identify cases having a high risk of developing MS. The association between ON and MS and possible use of immune modulating therapies should be discussed with such patients. We have single center retrospective observations; there should be multicenter prospective studies with a large number of patients.

References

1. Sørensen TL, Frederiksen JL, Brønnum-Hansen H, Petersen HC. Optic neuritis as onset manifestation of multiple sclerosis: A nationwide, long-term survey. Neurology 1999;53:473-8.
2. Lennon VA, Kryzer TJ, Pittock SJ, Verkman AS, Hinson SR. IgG marker of optic-spinal multiple sclerosis binds to the aquaporin-4 water channel. J Exp Med 2005;202:473-7.
3. Matsushita T, Isobe N, Matsuoka T, Shi N, Kawano Y, Wu XM, *et al.* Aquaporin-4 autoimmune syndrome and anti-aquaporin-4 antibody-negative opticospinal multiple sclerosis in Japanese. Mult Scler 2009;15:834-47.
4. Beck RW. Optic neuritis: Clinical considerations and the relationship to multiple sclerosis. Neuroophthalmol 1998;20:1-20.
5. Beck RW, Smith CH, Gal RL, Xing D, Bhatti MT, Brodsky MC, *et al.* Neurologic impairment 10 years after optic neuritis. Arch Neurol 2004;61:1386-9.
6. Levin LA, Lessell S. Risk of multiple sclerosis after optic neuritis. JAMA 2003;290:403-4.
7. Osborne BJ, Volpe NJ. Optic neuritis and risk of MS: Differential diagnosis and management. Cleve Clin J Med 2009;76:181-90.
8. Arnold AC. Evolving management of optic neuritis and multiple sclerosis. Am J Ophthalmol 2005;139:1101.
9. Beck RW, Trobe JD, Moke PS, Gal RL, Xing D, Bhatti MT, *et al.* High- and low-risk profiles for the development of multiple sclerosis within 10 years after optic neuritis: Experience of the optic neuritis treatment trial. Arch Ophthalmol 2003;121:944-9.
10. The clinical profile of optic neuritis. Experience of the optic neuritis treatment Trial. Optic Neuritis Study Group. Arch Ophthalmol 1991;109:1673-8.
11. Beck RW, Gal RL, Bhatti MT, Brodsky MC, Buckley EG, Chrousos GA, *et al.* Visual function more than 10 years after optic neuritis: Experience of the optic neuritis treatment trial. Am J Ophthalmol 2004;137:77-83.
12. Optic Neuritis Study Group. Long-term brain magnetic resonance imaging changes after optic neuritis in patients without clinically definite multiple sclerosis. Arch Neurol 2004;61:1538-41.
13. Balcer LJ. Clinical practice. Optic neuritis. N Engl J Med 2006;354:1273-80.
14. Zhang X, Wang W, Wei W, Wang Q, Wei Y, Kermode AG. Etiological profile of presumptive optic neuritis in China. J Clin Neurosci 2008;15:1346-9.
15. 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.
16. Jain IS, Munjal VP, Dhir SP, Gangwar DN. Profile of optic neuritis in Chandigarh and surrounding areas. Indian J Ophthalmol 1981;28:195-200.
17. Du Y, Yang J, Li JJ, Zhou RW, He JF. Unilateral optic neuritis in a Chinese population in three centers. J Clin Neurosci 2011;18:902-4.
18. Wakakura M, Minei-Higa R, Oono S, Matsui Y, Tabuchi A, Kani K, *et al.* Baseline features of idiopathic optic neuritis as determined by a multicenter treatment trial in Japan. Optic Neuritis Treatment Trial Multicenter Cooperative Research Group (ONMRG). Jpn J Ophthalmol 1999;43:127-32.
19. Bee YS, Lin MC, Wang CC, Sheu SJ. Optic neuritis: Clinical analysis of 27 cases. Kaohsiung J Med Sci 2003;19:105-12.
20. Chang YC, Wu WC, Tsai RK. Prognosis of Taiwanese patients with isolated optic neuritis after intravenous methylprednisolone pulse therapy. J Formos Med Assoc 2007;106:656-63.
21. Morales DS, Siatkowski RM, Howard CW, Warman R. Optic neuritis in children. J Pediatr Ophthalmol Strabismus 2000;37:254-9.
22. Phillips PH, Newman NJ, Lynn MJ. Optic neuritis in African Americans. Arch Neurol 1998;55:186-92.
23. McLeod JG, Hammond SR, Kurtzke JF. Migration and multiple sclerosis in immigrants to Australia from United Kingdom and Ireland: A reassessment. I. Risk of MS by age at immigration. J Neurol 2011;258:1140-9.
24. Berg-Hansen P, Moen SM, Sandvik L, Harbo HF, Bakken IJ, Stoltenberg C, *et al.* Prevalence of multiple sclerosis among immigrants in Norway. Mult Scler 2015;21:695-702.
25. Storoni M, Pittock SJ, Weinshenker BG, Plant GT. Opticneuritis in an ethnically diverse population: Higher risk of atypical cases in patients of African or African-Caribbean heritage. J Neurol Sci 2012;312:21-5.

26. Jacobs LD, Beck RW, Simon JH, Kinkel RP, Brownscheidle CM, Murray TJ, *et al.* Intramuscular interferon beta-1a therapy initiated during a first demyelinating event in multiple sclerosis. CHAMPS Study Group. N Engl J Med 2000;343:898-904.
27. Kurtzke JF. Optic neuritis or multiple sclerosis. Arch Neurol 1985;42:704-10.
28. Edan G, Kappos L, Montalbán X, Polman CH, Freedman MS, Hartung HP, *et al.* Long-term impact of interferon beta-1b in patients with CIS: 8-year follow-up of BENEFIT. J Neurol Neurosurg Psychiatry 2014;85:1183-9.
29. Wilhelm H, Schabet M. The diagnosis and treatment of optic neuritis. Dtsch Arztebl Int 2015;112:616-25.
30. Optic Neuritis Study Group. Visual function 15 years after optic neuritis: A final follow-up report from the optic neuritis treatment trial. Ophthalmology 2008;115:1079-82.
31. Schneck ME, Haegerstrom-Portnoy G. Color vision defect type and spatial vision in the optic neuritis treatment trial. Invest Ophthalmol Vis Sci 1997;38:2278-89.
32. Tan CT. Review multiple sclerosis in Malaysia. Neurol J Southeast Asia 1997;2:1-5.