ORIGINAL ARTICLE

Visual outcome following optic neuritis: A 5-year review

CN Pedro-Egbe, B Fiebai, CS Ejimadu

Ophthalmology Unit, Department of Surgery, College of Health Sciences, University of Port Harcourt, Nigeria

Abstract

Background: Optic neuritis is a demyelinating inflammatory disease of the optic nerve that typically affects young adults especially females, and is usually associated with multiple sclerosis especially in Caucasians. The prognosis for visual recovery is usually good but with poor quality.

Objective: The objective was to determine the level of improvement of vision after an attack of optic neuritis in Port Harcourt, Nigeria.

Design: A retrospective hospital-based study was performed.

Setting: Eye Clinic, University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt, Nigeria.

Data Extraction: Medical records of all cases of optic neuritis seen at the Eye Clinic of UPTH over a 5-year period (January 2006–December 2010) were retrieved and relevant data including age, sex, presenting symptom, and visual acuity (VA) were extracted. The VA at discharge 12 weeks later was noted. Our diagnosis of optic neuritis was based on the presence of low vision, dyschromatopsia, and peri-ocular pain.

Results: Over 24,000 patients were seen during this period, and 27 cases were optic neuritis (0.1%). Of the 27 cases of optic neuritis, 20 cases were retro-bulbar neuritis (74.1%), while seven (25.9%) were papillitis. There were 16 females and 11 males giving a female to male ratio of 3:2. Most cases (75%) at presentation had VAs<6/24. By the 12th week, most visual acuities (77.1%) had improved to 6/12 or better.

Conclusion: This study confirms widely documented evidence that there is improvement in visual acuity after an attack of optic neuritis. Even though the risk of developing multiple sclerosis following optic neuritis is said to be low in blacks, these patients should still be followed up for sometime especially as some may go on to develop other complications of demyelination.

Key words: Optic neuritis, Port Harcourt, visual outcome

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Introduction

Optic neuritis (ON) is a demyelinating inflammatory disease of the optic nerve that typically affects young adults especially females.[1] Many cases of optic neuritis are associated with multiple sclerosis or neuromyelitis optica or can occur in isolation.[2] The association between optic neuritis and multiple sclerosis is well established.[1] Bilateral optic neuritis has been reported in a Nigerian patient with neuromyelitis optica (Devic's disease).[3] Occasionally, ON can result from infectious processes involving the paranasal sinuses[2] or occur in the course of a systemic viral infection.[4,5]

A diagnosis of optic neuritis is most often based on accepted clinical criteria which include loss of vision, dyschromatopsia, and peri-ocular pain.[6] Other diagnostic criteria for optic neuritis may also include reduced perception of light intensity, Uhthoff's phenomenon (visual

Address for correspondence:
Dr. CN Pedro-Egbe,
Ophthalmology Unit, Department of Surgery, College of Health Sciences, University of Port Harcourt, Nigeria,
E-mail: cpegbe@weltekng.com

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deficit induced by exercise or increased body temperature),[7] and Pulfrich phenomenon (visual stereo-illusion observed when a swinging pendulum bob is viewed through a neutral density filter in front of one eye). The initial attack of optic neuritis is unilateral in 70% of adult patients and bilateral in 30%; and mean age of onset is in the third decade of life[8] with an annual incidence that ranges from 1.6 to 5.0 new cases per 100,000 population.[8,9]

The cause and treatment of optic neuritis are unclear, but prognosis for visual recovery is generally good[1] even though return of visual function is almost never complete.[1,10] After resolution of optic neuritis, almost all patients show some signs of optic nerve damage and even when a patient's acuity recovers to 20/20, abnormalities frequently remain in other measures such as contrast sensitivity, color vision, and visual field.[11-13] Visual loss may be subtle or profound and may occur over hours (rarely) to days (most commonly). The nadir is usually about 1 week after the onset.[14]

The magnitude of the risk of multiple sclerosis after optic neuritis is uncertain. Previous studies have reported very disparate results, with the risk being reported to be as low as 19% 5 years after MS[15] and others up to 50% 15 years later.[16]

Optic neuritis can sometimes result from an infectious process involving the orbit, paranasal sinuses or systemic viral disease.[17-20] It is second only to glaucoma as the most common acquired optic nerve disorder in persons younger than age 50.[1] Though the diagnosis of optic neuritis is usually made on clinical grounds, in atypical cases, magnetic resonance imaging (MRI) is used to further characterize and exclude other disease processes. Magnetic resonance imaging is well established as the single most important predictor of risk of developing optic neuritis (Optic Neuritis Treatment Trial).[1] The imaging of the brain in optic neuritis is said to be more important than that of the optic nerves as this is the most valuable predictor for the development of subsequent multiple sclerosis in the presence of white-matter abnormalities.[21]

In the Optic Neuritis Treatment Trial (ONTT), the 5-year risk of developing multiple sclerosis was 16% in patients with normal brain MRI findings, 37% with 1-2 lesions, and 51% with 3 or more lesions. At 10 years, the only statistically significant difference was between no lesions (22% risk) and one or more lesions (56% risk).[19] Prior to the Optic Neuritis Treatment Trial, there were no well-established guidelines for treating optic neuritis as some experts advocated treatment with oral prednisone while others recommended no treatment. Although corticosteroids had been used to treat this disease, various studies have not demonstrated their effectiveness.[18-20,22,23]

The objective of the study was to determine the level of improvement of vision after an attack of optic neuritis in Port Harcourt, Nigeria.

Materials and Methods

Medical records of all cases of optic neuritis seen at the Eye Clinic of the University of Port Harcourt Teaching Hospital over a 5-year period (January 2006 to December 2010) were retrieved and relevant data including age, sex, presenting symptom, presenting visual acuity (Snellen chart), and visual acuity at discharge 12 weeks later were extracted.

Our diagnosis of optic neuritis was based on accepted clinical criteria only and these included loss of vision, dyschromatopsia (Ishihara pseudoisochromatic plates), and peri-ocular pain in addition to a sluggish pupil or a relative afferent pupillary defect (RAPD). Contrast sensitivity was assessed with the Pelli-Robson chart. For retrobulbar neuritis a normal optic nerve head appearance was necessary for diagnosis while for papillits, the presence of disc swelling was needed for diagnosis. None of our patients had any systemic involvement suggestive of multiple sclerosis or neuromyelitis optica. All the patients received oral prednisolone (1 mg/kg body weight) for 2 weeks. Exclusion criteria included case files with incomplete records (two), those lost to follow-up (four) and other causes of optic neuropathy such as glaucoma or trauma. Diabetics were also excluded. Data were analyzed using Epi-info Version 6.02 and *P* values less than 0.05 were considered significant.

Results

A total of 27 cases of optic neuritis were seen over a 5-year period out of a total patient population of 24,363. (This gives the proportion of optic neuritis as 0.1%.) There were 11 males (40.7%) and 16 females (59.3%) giving a male to female ratio of 2:3. Over 60% of the subjects were aged between 20 and 49 years old [Table 1]. The mean age of those with optic neuritis was 26.7 ± 12.1. There were 20 cases of retro-bulbar neuritis (74.1%) and seven cases of papillitis (25.9%).

Table 2 shows the age and gender distribution of those with retro-bulbar neuritis. A total of 20 cases of retro-bulbar neuritis were seen. There were 8 males (40%) and 12 (60%) females giving a male to female ratio of 2:3. The mean age of those with retro-bulbar neuritis was 25.8 ± 11.1.

Table 1: Age and gender distribution of patients with optic neuritis

Age group (years)	Gender (%)		Total (%)
	Male	Female	
<10		1 (3.7)	1 (3.7)
10-19	4 (14.8)	3 (11.1)	7 (30)
20-29	6 (22.2)	5 (18.5)	11 (40.7)
30-39		3 (11.1)	3 (11.1)
40-49	1 (3.7)	2 (7.4)	3 (11.1)
50-59		2 (7.4)	2 (7.4)
Total	11 (40.7)	16 (59.3)	27 (100)

Table 3 shows the age and gender distribution of those with papillitis. A total of seven cases of papillitis were seen. There were three males (42.9%) and four females (57.1%) giving a male to female ratio of 3:4. The mean age of those with papillitis was 29.1 ± 15.3. There was a statistically significant difference between the mean age of those with retro-bulbar neuritis and papilltis (*Chi square*-12.52; *P* value - 0.00)

Nineteen patients had unilateral involvement (70.4%), while 8 (29.6%) subjects had bilateral involvement; making the total, 35 eyes of 27 patients [Table 4]. Over 75% of the cases at presentation had VAs<6/24; only 5 eyes (14.3%) had VAs better than 6/24 [Table 4]. Over 85% of those with bilateral disease were less than 25 years old and there was a slight female preponderance (M:F=1:1.3).

Table 5 shows that by the 12th week, most visual acuities (77.1%) had improved to 6/12 or better. In 18 eyes (52.4%) visual acuity was 6/6-6/9. There were no patients whose visual acuities remained at CF-NPL.

Discussion

In most parts of the world acute demyelinating optic neuritis (ON) is the most common cause of unilateral painful visual loss in young adults.[24] In this study, about 60% of those with optic neuritis were aged between 20 and 49 years, similar to other studies where young adults were found to be mainly affected by the disease.[24] Those with papillitis were however slightly older than those with retro-bulbar neuritis and this was statistically significant (*Chi square* 12.52; *P* value 0.00). Over 70% of our patients had unilateral ocular involvement similar to Shams *et al*.[24] In our study, even though females were found to be more affected than males by the disease, the figure is still slightly lower than reports by other researchers.[24-28] The reason for this may not be unconnected with the fact that, in our environment, females are less likely to present themselves for treatment than males because of cultural barriers and widespread illiteracy. This therefore gives a false impression that females are not that much affected compared to other studies. In our study, retro-bulbar neuritis was responsible for about 75% of all cases of optic neuritis similar to the result of the Optic Neuritis Treatment Trial Study.

In regions of the world where multiple sclerosis (MS) is common, most cases of ON are related to multiple sclerosis.[24] In our study, however, all the cases of optic neuritis occurred in isolation. This is not surprising as the incidence of multiple sclerosis associated optic neuritis (MSAON) is said to be very rare in blacks[29] and highest in Caucasians.[30]

At 12 weeks postpresentation, almost 80% of visual acuities had improved to 6/12 or better. This agrees with the widely documented evidence that visual acuity improves after an attack of optic neuritis.[6,31]

Table 2: Age and gender distribution of patients with retro-bulbar neuritis

Age group (years)	Gender (%)		Total (%)
	Male	Female	
<10		1 (5)	1 (5)
10-19	3 (15)	3 (15)	6 (30)
20-29	4 (20)	3 (15)	7 (35)
30-39		3 (15)	3 (15)
40-49	1 (5)	1 (5)	2 (10)
50-59		1 (5)	1 (5)
Total	8 (40)	12 (60)	20 (100)

Table 3: Age and gender distribution of patients with papillitis

Age group (years)	Gender (%)		Total (%)
	Male	Female	
10-19	1 (14.3)		1 (14.3)
20-29	2 (28.6)	2 (28.5)	4 (57.1)
30-39		1 (14.3)	1 (14.3)
40-49		1 (14.3)	1 (14.3)
Total	3 (42.9)	4 (57.1)	7 (100)

Table 4: Presenting visual acuity (VA) of patients with optic neuritis

Visual acuity	Right eye (%)	Left eye (%)	Total (%)
6/18	2 (5.7)	3 (8.6)	5 (14.3)
6/24	1 (2.9)	2 (5.7)	3 (8.6)
6/36	3 (8.6)	3 (8.5)	6 (17.1)
6/60	4 (11.4)	5 (14.3)	9 (25.7)
CF	1 (2.9)	1 (2.9)	2 (5.7)
HM	3 (8.5)	1 (2.9)	4 (11.4)
NPL	5 (14.3)	1 (2.9)	6 (17.2)
Total	19 (54.3)	16 (45.7)	35 (100)

CF = Counting fingers, HM = Hand movement, NPL = No perception of light

Table 5: Visual acuity 12 weeks following optic neuritis

Visual acuity	Right eye (%)	Left eye (%)	Total (%)
6/6	6 (17.1)	5 (14.3)	11 (31.4)
6/9	4 (11.4)	3 (8.6)	7 (20)
6/12	5 (14.3)	4 (11.4)	9 (25.7)
6/18	1 (2.9)	1 (2.9)	2 (5.7)
6/24	-	-	-
6/36	1 (2.9)	2 (5.7)	3 (8.6)
6/60	2 (5.7)	1 (2.9)	3 (8.6)
CF	-	-	-
HM	-	-	-
NPL	-	-	-
Total	19 (54.3)	16 (45.7)	35 (100)

About 50% of our patients however had some degree of reduction in quality of vision as assessed by color vision and contrast sensitivity. Since our patients were not followed up for a long time and none had magnetic resonance imaging (MRI), it is difficult to know if some were at risk of developing MS or if some could have gone on to develop multiple sclerosis. This relationship between optic neuritis and MS needs further elucidation in a homogenous black population such as ours.

Conclusion

This study has confirmed widely documented evidence that there is improvement in visual acuity after an attack of optic neuritis. It also lends credence to the known fact that optic neuritis is rare in blacks.[26] Even though the risk of developing MS following optic neuritis is said to be low in blacks, these patients should still be monitored for sometime especially as some may go on to develop other complications of demyelination. To fully substantiate some of these findings however, a prospective study on optic neuritis using the ONTT guideline and a larger sample size is proposed for future studies.

References

1. The Optic Neuritis Treatment Trial (ONTT). National Eye Institute. Available from: http://www.clinicaltrials.gov/ct2/show/NCT00000146. [Last accessed on 2006 June 2]
2. Beck RW. Optic neuritis: Clinical considerations and the relationship to multiple sclerosis. Neuroophthalmology 1998;20:1-20.3.
3. Komolafe MA, Komolafe EO, Sunmonu TA, Olateju SO, Asaleye CM, Adesina OA, *et al*. New onset neuromyelitis optica in a young Nigerian woman with possible antiphospholipid syndrome: A case report. J Med Case Reports 2008;2:348.
4. Siddiqui J, Rouleau J, Lee AG, Sato Y, Voigt MD. Bilateral optic neuritis in acute hepatitis C. J Neuroophthalmol 2009;29:128-33.
5. Lee HS, Choi KD, Lee JE, Park HK. Optic neuritis after Klebsiella pneumonitis and liver abscess. J Neuroophthalmol 2009;29:134-5.
6. ONTT G. The clinical profile of optic neuritis. Experience of the Optic Neuritis Treatment Trial. Arch Ophthalmol 1991;109:1673-8
7. Percy AK, Nobrega FT, Kurland LT. Optic neuritis and multiple sclerosis. Arch Ophthalmol 1972;87:135-9.
8. Bojić L, Ivanisević M, Sinićić A, Lesin M, Rogosić V, Mandić Z, *et al*. The incidence of optic neuritis in Split-Dalmatia county, Croatia. Coll Antropol 2004;28:343-7.
9. Rodriguez M, Siva A, Cross SA, O'Brien PC, Kurland LT. Optic neuritis. a population-based study in Olmsted County, Minnesota. Neurology 1995;45:244-50.
10. Omoti AE, Waziri-Erameh MJ. Management of optic neuritis in a developing African country. Niger Postgrad Med J 2006;13:358-60.
11. Sanders EA, Volkers AC, van der Poel JC, van Lith GH. Estimation of visual function after optic neuritis: A comparison of clinical tests. Br J Ophthalmol 1986;70:918-25.
12. Van Dalen JT, Greve EL. Visual field defects in multiple sclerosis. Neuroophthalmology 1981;2:93-103.
13. Hess RF, Plant GT. The psychophysical loss in optic neuritis: Spatial and temporal aspects. In Optic Neuritis. Cambridge: Cambridge University Press; 1986. p. 109.
14. Osborne BJ, Volpe NJ. Optic neuritis and risk of MS: Differential diagnosis and management. Cleve Clin J Med 2009;76:181-9.
15. Kinnunen E. The incidence of optic neuritis and its prognosis for multiple sclerosis. Acta Neurol Scand 1983;68:371-7.
16. Optic Neuritis Study Group. Multiple sclerosis risk after optic neuritis: Final optic neuritis treatment trial follow-up. Arch Neurol 2008;65:727-32.
17. Sanborn GE, Kivlin JD, Stevens M. Optic neuritis secondary to sinus disease. Arch Otolaryngol 1984;110:816-9.
18. Selbst RG, Selhorst JB, Harbison JW, Myer EC. Parainfectious optic neuritis. Report and review following varicella. Arch Neurol 1983;40:347-50.
19. Optic Neuritis Study Group. Visual function 5 years after optic neuritis: Experience of the Optic Neuritis Treatment Trial. The Optic Neuritis Study Group. Arch Ophthalmol 1997;115:1545-52.
20. 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.
21. Sanborn GE, Kivlin JD, Stevens M. Optic neuritis secondary to sinus disease. Arch Otolaryngol 1984;110:816-9.
22. Arnold AC. Evolving management of optic neuritis and multiple sclerosis. Am J Ophthalmol 2005;139:1101-8.
23. Vedula SS, Brodney-Folse S, Gal RL, Beck R. Corticosteroids for treating optic neuritis. Cochrane Database Syst Rev 2007;24: CD001430.
24. Shams PN, Plant GT. Optic neuritis: A review. Int MS J 2009;16:82-9.
25. Jin YP, de Pedro-Cuesta J, Söderström M, Stawiarz L, Link H. Incidence of optic neuritis in Stockholm, Sweden 1990-1995: I. Age, sex, birth and ethnic-group related patterns. J Neurol Sci 1998;159:107-14.
26. Loncarek K, Brajac I, Petricek I, Stalekar H, Cerovski B, Pokupe R. Epidemiology of monosymptomatic optic neuritis in Rijeka County, Croatia: Meteorological aspects. Coll Antropol 2005;29:309-13.
27. Koch-Henriksen N, Hyllested K. Epidemiology of multiple sclerosis: Incidence and prevalence rates in Denmark 1948-64 based on the Danish Multiple Sclerosis Registry. Acta Neurol Scand 1988;78:369-80.
28. Kurtzke JF. Optic neuritis or multiple sclerosis. Arch Neurol 1985;42:704-10.
29. Phillips PH, Newman NJ, Lynn MJ. Optic neuritis in African Americans. Arch Neurol 1998;55:186-92.
30. Balcer LJ. Clinical practice. Optic neuritis. N Engl J Med 2006;354:1273-80.
31. Beck RW, Cleary PA, Backlund JC. The course of visual recovery after optic neuritis: Experience of the Optic Neuritis Treatment Trial. Ophthalmology 1994;101:1771-8.

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