DOI: 10.5455/msm.2014.246-2481
Received: 15 May 2014; Accepted: 25 June 2014

Published online: 26/08/2014
Published print: 08/2014

ORIGINAL PAPER Mater Sociomed. 2014 Aug; 26(4): 246-248

Optic Neuritis as First Clinical Manifestations the Multiple Sclerosis

Emina Alimanovic Halilovic[1], Ilda Alimanovic[1], Enra Suljic[2], Nabil Al Hassan[1]

Eye Clinic, Clinical University Center Sarajevo, Bosnia and Herzegovina[1]
Neurological Clinic, Clinical University Center Sarajevo, Bosnia and Herzegovina[2]

Corresponding author: prof. Emina Alimanovic-Halilovic, MD, PhD. Eye Clinic, Clinical University Center Sarajevo, Bosnia and Herzegovina.

ABSTRACT

Aim: To analyze the clinical signs of multiple sclerosis (MS) and show that optic neuritis is one of the first event, which indicates the development of disease. ***Patients and methods:*** The study involved 89 cases in which it confirmed MS at the time of the March 2009–2011. Since ophthalmological parameters were analyzed: visual acuity (VA), visual field (VF), and retinal nerve fibre layer (RNFL) thickness of peripapillary rim by optic coherent tomography (OCT). ***Results:*** Ten(10) patients had ON as the first clinical manifestation of the disease which was statistically significant (X^2 =9,7 p=0,01) compared to the manifestation of other clinical signs of disease. In VF, centrocecal scotomas were predominant in 50% of the subjects; the RNFL thinning of the neuroretinal rim was verified in all patients, most often in the upper quadrant. A month after pulse corticosteroid therapy, visual acuity in all patients with ON ranged from 0.6 to 1.0. ***Conclusion:*** ON is one of the first MS clinical manifestation. In VF, the most common disturbances are in the centrocecal area. The RNFL thinning was verified in all patients with OCT.

Key words: multiple sclerosis (MS), optic neuritis (ON), visual acuity (VA), visual field (VF), retinal nerve fibre layer (RNFL) thickness.

1. INTRODUCTION

Optic neuritis related to MS is an acute optic neuropathy occurring in young people, especially in women. The clinical picture shows a decline in visual acuity, a pain which increases with movements of the eye, a decline in contrast sensitivity, dyschromatopsia and changes in the visual field (1). It occurs more often unilaterally in young people, predominantly in women with an incidence of 1-5 per 100,000 annually (2). The main aim of this study was to determine the onset of optic neuritis as the first MS clinical presentation. We also wanted to analyze the role and significance of morphometric changes in the optic nerve and visual field by analyzing parameters of Optic Coherent Tomography (OCT) and computer perimetry in these patients. One of the aims was to determine the efficiency of pulse corticosteroid therapy in those patients.

2. PATIENTS AND METHODS

A clinical, retrospective study was conducted at the Eye Clinic and the Neurological Clinic, Sarajevo University Clinical Centre (SUCC) at the time of the March 2009–2011. After the first clinical signs follower is a detailed examination of patients by neurologists and ophthalmologists. Here we did not analyzed cases of MS relapses. In all analyzed patients we found a unilateral optic neuritis.

We approached MS verification according to Paty or Brakhof modern clinically defined multiple sclerosis (CDMS) criteria (3, 4).

- First criterion: at least two separate clinical episodes of the disease that occurred at different times and at least two fields of demyelination. Of radiological tests, MRI of the brain and spinal cord were analyzed.
- Second criterion: two MS clinical episodes, one MRI manifest lesion and paraclinical symptoms.
- Laboratory-supported MS diagnosis:
- Two episodes, one clinically and paraclinically confirmed lesion and immunoglobulin abnormalities of cerebrospinal fluid.
- One episode, two clinically separate lesions and cerebrospinal abnormalities.

Of neurological parameters we analyzed clinical manifestations of motor, sensory and sensitive disturbances, relevant to the confirmation of MS diagnosis. Of ophthalmological parameters, we analyzed: visual acuity (VA) by Snellen charts, visual field (VF) by Octopus 100, and thickness of the peripapillary rim nerve fibres by Stratus Zeiss Optic Coherent Tomography (OCT).

3. RESULTS

In the study included 89 cases with confirmed MS diagnosis. Ten (10) patients had optic neuritis as the first sign of the disease.

Structure of patient age	18-30		31-50		Total patients	
	n	%	n	%	n	%
	9	**90**	1	10	10	100
X^2=6,4 p=0,01						

Table 1. Age structure of MS patients with verified optic neuritis

	Male		Female		Total patients	
Gender of patients	n	%	n	%	n	%
	3	30	7	**70**	10	100
X^2=1,6 p=0,02						

Table 2. Gender structure of MS patients with verified optic neuritis

The age structure analysis of the sample shows that optic neuritis was most often present in the patients aged 18 to 30 years.

In the entire sample, onset of optic neuritis was more frequent in the female patients (70%) compared to the male patients.

Clinical manifestations	%	**Number**
Paresthesia	8.99	8
Monoparesis	5.62	5
Diplopia	2.25	2
Hemiparesis	7.87	7
Blurred vision	11.24	10
Impaired hearing	7.87	7
Burning and tingling	5.62	5
Ataxia (unsteadiness)	6.74	6
Lermitte sign	2.25	2
Iredness, fatigue quickly	7.87	7
Eating urinating	6.74	6
Speech difficulties	4.49	4
Nystagmus	4.49	4
Insomnia	6.74	6
The crisis of conscious	4.49	4
Dysarthria	6.74	6
In total	100.00	89
X^2=9,7 p=0,01		

Table 3. The first clinical manifestation of MS in our sample

Statistically significant tests (X^2=9,7 p=0,01) we have confirmed that the optic neuritis is one of the first clinical manifestation of MS, compared to the other motor, sensory and sensory events in our sample.

Ophthalmological parameters we followed after 7 and 15 days, after 1, 3, 6 and 12 months.

Analyzing disturbances in the computerised visual field: centrocecal and paracentral scotoma and diffuse sensitivity, we find most frequent disturbances in the centrocecal region in 50% of the cases.

Scotomas of visual field	Centrocecal scotoma		Paracentral scotoma		Diffuse depression of sensitivity		Total patients	
	n	%	n	%	n	%	n	%
	5	50	2	20	3	30	10	100

Table 4. Different kinds of scotoma in visual field in MS patients with optic neuritis

By analysis of OCT results in part of the nerve fibre thickness of papillary and parapapillary layers (of the neuroretinal rim), we had, after three months, results showing the thinning of the nerve fibres in the whole circumference, most often in the upper quadrant.

RNFL Average (microm) +/- SD	Superior	Inferior	Temporal	Nasal
	104+/-9.7	103+/-8.4	105+/-7.6	102 +/-12.2
No. of subjects	4	3	1	2

Table 5. Retinal Nerve Fibre layer (RNFL) by optic disc

	0.1-0.3		0.4-0.5		0.6-1.0	
Visual acuity on first examination	n	%				
	10	100				
Visual acuity after corticosteroid therapy			n	%	n	%
			3	30	7	70

Table 6. Visual acuity on first examination and one month after corticosteroid therapy

Visual acuity in all patients with optic neuritis at the first examination ranged from 0.1 to 0.3 with correction. After the administration of pulse corticosteroid therapy, all patients with optic neuritis had a significant improvement of VA, and a month upon administration it varied from 0.6 to 1.0.

4. DISCUSSION

In our sample of 89 patients with the verified MS diagnosis, 10 patients had a clinical picture of optic neuritis, as a first clinical sing of disease, it was statistically significant (X^2_ 9,7 p=0,01). The Optic Neuritis Study Group describes the changes of visual functions in MS patients, which usually present as a decline in vision, blurring, decline in contrast sensitivity, color vision disturbances, as well as disturbances in the visual field (1-5). In their studies, Allanore Y. and Deretzi G.confirm the genetic impact on MS development as an autoimmune disease in some families (6). Studies were performed to analyze the influence of stress, viral and bacterial infections of respiratory tract, urinary and gastrointestinal systems on the appearance and occurrence of MS exacerbations (7, 8). In our study, the disease appeared most often in the patients aged 18-30 years. Specified frequency was statistically significant (X^2=6,4 p=0,01). Women made up 70% of the group. Noonan CW and Kathman SJ in their study, which includes the U.S. population get results which show that the ratio of the incidence of occurrence of MS ranged from 1.9: 1 to 3.6:1 in favor of women (9). A large number of studies confirm the MS and ON occurrence at a younger age and more often in women (1, 2, 5, 10).

Balashov KE. finds a higher ON incidence in the spring months in the patients without verified demyelisating lesions, which has been observed in our past practice too, and which could be an aim of our future studies (11). Cigarette smoking is also a risk factor in the development of MS and ON (12).

In 50% of our subjects we had centrocecal scotoma in the visual field, and sensitivity depression in 30%. Disturbances in the central areas of the visual field were verified in other studies as well (1, 13).

Visual acuity in all patients with optic neuritis at the first examination ranged from 0.1 to 0.3 with correction. All patients with an ON and verified MS diagnosis monitored in this study were treated with pulse corticosteroid therapy in a dosage of 1,000mg for three days, followed by 8 days of 1mg/kg b.w. dosage. A month after pulse corticosteroid therapy, visual acuity in all patients with ON ranged from 0.6 to 1.0.

Corticosteroids administered intravenously by the pulse therapy scheme prevent ON relapse, but they have the same effect on definite VA as corticosteroids orally administered. ONTT finds that the ON patients treated with prednisolone orally administered in a dosage of 1mg/kg b.w. for 14 days have more frequent recurrent ON compared to those treated with pulse therapy. ONTT shows that intravenously administered corticosteroids inhibit MS development for a 2-year period, bur

after three years that effect disappears (14, 15).

Three months after the first ON presentations, the OCT analysis of retinal nerve fibre thickness and neuroretinal rim confirmed the nerve fibre thinning in all subjects. The most frequent thinning occurred in the upper quadrant.

ONTT shows that 50% of the patients with ON develop MS over a 15-year period. ONTT also finds that in ON patients without MRI changes, MS develops in 25% of the cases, and in the cases with one or more CNS lesions that is 75%. All patients had OCT-verified nerve fibre atrophy after ON (1, 14). According to other researchers, by OCT analysis it can discover in vivo atrophy of nerve fibres in patients with MS as structural damages of axons of afferent fibres of the visual pathway (15, 16).

Studies show, by morphometric analysis of the structure of nerve fibres by OCT, that there is fibre atrophy in the MS patients with and without ON. However, retinal nerve fibre atrophy is more significant in the patients with ON (16).

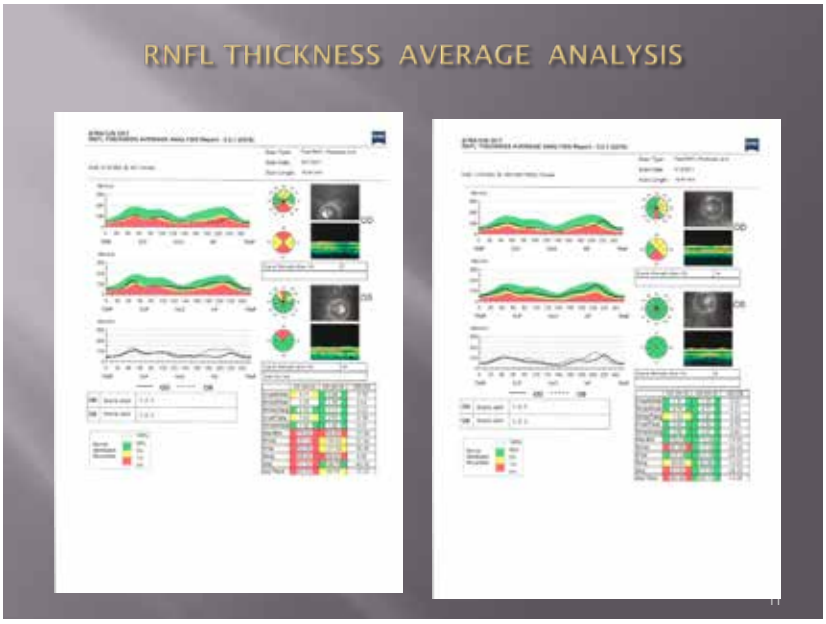

Figure 1. OCT RNFL Thickness average analysis

5. CONCLUSION

In our sample with the predominantly female gender ranging from 18 to 30 years of age, ON occurred as the first clinical presentation of MS. The analysis of the computerised visual field confirmed centrocecal disturbances as the most common, and optic coherent tomography registered the thinning of the nerve fibres of the neuroretinal rim in all subjects. A month after pulse corticosteroid therapy, VA was significantly improved in all patients.

CONFLICT OF INTEREST: NONE DECLARED.

REFERENCES

1. Optic Neuritis Study Group. Collaborators (28) Multiple sclerosis risk after optic neuritis: final optic neuritis treatment trial follow-up. Arch Neurol. 2008; 65(6): 727-732.
2. Rodriguez M, Siva A, Cross SA, O'Brien PC, Kurland LT. Optic neuritis: a population-based study in Olmsted County, Minnesota. Neurology. 1995; 45: 244-250.
3. Karen B. Shackelford. New Diagnostic Criteria Medically Reviewed by Multiple Sclerosis 2013.
4. Polman CH, Reingold SC, Banwell B, Clanet M, Cohen JA, Filippi M, Fujihara K, Havrdova E, Hutchinson M, Kappos L, Lublin FD, Montalban X, O'Connor P, Sandberg-Wollheim M, Thompson AJ, Waubant E, Weinshenker B, Wolinsky JS. Diagnostic criteria for multiple sclerosis: 2010 Revisions to the McDonald Ann Neurol. 2011; 69(2): 292-302.
5. Roodhooft JM. Ocular problems in early stages of multiple sclerosis. Bull Soc Belge Ophtalmol. 2009; 65-68.
6. Deretzi G, Kountouras J, Koutlas E, Zavos C, et al. Familial prevalence of autoimmune disorders in multiple sclerosis in Northern Greece. Mult Scler. 2010; 16(9): 1091-1101.
7. Ascherio A, Munger KL, .Environmental Risik Factors for Multiple Sclerosis. Part I: The Role of Infection. Ann Neurol. 2007; 61: 288-299.
8. Buljevac D. et al. Self reported stressful life events and exacerbations in multiple sclerosis: prospective study. BMJ. 2003; 327: 646.
9. Noonan CW, Kathman SJ, Withe MC. Prevalence estimates for MS in the United States and evidence of an Increasing trend for women. Neurology. 2002; 58: 136-138.
10. Allanore Y, Wipff J, Kahan A, Boileau C. Genetic basis for systemic sclerosis. Joint Bone Spine. 2007; 74(6): 577-583.
11. Balashov KE, Pal G, Rosenberg ML. Optic neuritis incidence is increased in spring months in patients with asymptomatic demyelinating lesions. Mult Scler. Feb 2010; 16(2): 252-254.
12. Jafari N, Hoppenbrouwers IA, Hop WC, Breteler MM, Hintzen RQ. Cigarette smoking and risk of MS in multiplex families. Mult Scler. 2009; 15(11): 1363-1367.
13. Voss E, Raab P, Trebst C, Stangel M. Clinical approach to optic neuritis: pitfalls, red flags and differential diagnosis. Ther Adv Neurol Disord. 2011; 4(2): 123-134.
14. The clinical profile of optic neuritis. Experience of the Optic Neuritis Treatment Trial. Optic Neuritis Study Group. Arch Ophthalmol. 1991; 109(12): 1673-1678.
15. Menon V, Saxena R, Misra R, Phuljhele S. Management of optic neuritis Indian J Ophthalmol. 2011; 59(2): 117-122.
16. Jindahra P, Hedges TR, Mendoza-Santiesteban CE, Plant GT. Optical coherence tomography of the retina: applications in neurology.Curr Opin Neurol. 2010 ; 23(1): 16-23.