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Research Article

Neuro-Ophthalmological Evaluation of Cases with Multiple Sclerosis in a Referral Hospital in Ankara

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Abstract

Aim: To evaluate Multiple Sclerosis (MS) patients with neuro-ophthalmological findings in a referral hospital in Ankara

Methods: Fifty one MS cases diagnosed by neurology department of reference hospital in Ankara had been followed up by neuro-ophthalmology department. The data including sex, age, clinical presentation, Relative Afferent Pupillary Defect (RAPD), color vision, visual field tests, Visual Evoked Potential Test (VEP) results were recorded.

Results: In our study, 31 patients had history of blurred vision and pain with eye movement whereas 26 (50.9%) of them experienced double-vision. Optic neuritis were identified in 22 (60.7%) of them. P100 latency mean values was found as 138.9±18 ms for 41 eyes with optic neuritis whereas 121.2±13ms was found as mean value for 61 eyes without previous optic neuritis history. Difference between the values was found as statistically significant ($p<0.05$).

Conclusion: MS could affect the visual system in different ways and result in various visual complaints and findings. Periodic neuro-ophthalmological follow-up is essential to identify eye findings timely.

Keywords: Multiple sclerosis; Optic neuritis; Visual field; VEP

Introduction

MS is a neurodegenerative disorder affecting white matter of the Central Nervous System (CNS). MS could influence visual system via different patterns and causes a variety of pathologies [1-4]. Because of either optic neuritis or injury of nerves controlling muscles of eye movements, ocular pathology and vision are often encountered. Axonal loss is considered to be the basic mechanism resulting progressive nature of MS. Optic nerve damage brings about blurred vision and loss of color vision. Central scotoma or arcuate defects could possibly be observed in visual field examinations. Furthermore, some eye movement disorders like nystagmus or paralytic strabismus may show up with various forms and at different levels of severity due to involvement of several regions (especially, cerebellum and brainstem) in CNS which are responsible for eye movements [1,5].

Methods

Fifty one MS cases diagnosed by Neurology Department of reference hospital in Ankara had been followed up by neuro-ophthalmology department between January-2014 & May-2015 regardless of whether visual problem existed or not. Medical histories and findings of participants were recorded. Besides, information about age, gender, existence of previous blurred vision attack and double-vision history was inquired. Detailed eye & visual examination was applied. RAPD, color vision (with Ischiara color vision test) and visual field tests (with Humphrey Field Analyzer at 30-2 mode). And 15' pattern VEP test with Metro vision MonPack visual electrophysiological device was performed to all patients. Then, results were compared with the data of similar age group recorded by our electrophysiology unit. For statistical analysis, Student t test and Mann-Whitney U-test were used. Limit of statistical significance was accepted as P<0,005.

All of the patients were informed about the study. We complied with the Helsinki Declaration at all stages of the process.

Results

Fifty one MS patients were followed up by our neuro-ophthalmology clinic, regardless of whether visual complaints existed or not. Of those 51, 12 were male (23.5%) and 39 were female (76.5%). During follow-up none of the patients had acute eye involvement except one developing pars planitis. Most of the cases were women and the most common eye pathology we encountered was optic neuritis. There were 24 bilateral and 5 unilateral history of previous optic neuritis in the 31 cases with finding of optic neuritis. Difference between two sexes was found to be statistically significant ($p<0.05$). Mean age of cases was 37.5±9.5 years (exact values were in between 18-58) (Table 1). In addition, history of eye and visual problems were inquired. 31 patients (60.7%) mentioned blurred vision and pain with eye movement and 26 patients (50.9%) complained about double-vision. There was no eye problem in 13 cases (Table 2). Of 26 patients with history of double vision, 3 had paralytic abducens nerve. Previous optic neuritis was noted in 22 of 31 patients who had history of previous blurred vision attack. Optic disc involvement was present bilaterally in 16 and unilaterally in 6 cases. Non-pathological appearance was noted in 7 patients with previous optic neuritis. On the other hand, despite of the lack of blurred vision history, total 8 eyes of 7 different patients revealed optic disc pallor. Visual field defect was present in 2 of 7 cases having history of blurred vision but no paleness of optic disc. Furthermore, visual field defect was

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Table 1: Demographic characteristics of the patients.

Average age (years)	37,47 ± 9,52
Age (years)	18-58
Female	39 (%76,5)
Male	12 (%23,5)
Total	51

Table 2: Ocular symptoms of the patients.

Symptoms	N (eye)%
Eye pain	31 (% 60.7)
Decreased vision	31 (% 60.7)
Double vision	26 (% 50,9)

Table 3: The findings identified in the patients.

Findings	N (eye)%
Decreased vision	18 (%17.6)
Visual field defect	12 (%11.7)
RAPD	2 (%1.9)
Color vision defect	20 (%19.6)
Limitation of eye movements	4 (%3.9)
Optic disc pallor	38 (%37.2)
Additional fundus findings	2 (%1.9)

detected in 12 of 29 with history of optic neuritis. Of these 12 cases, arcuate scotoma in 6, central scotoma in 5 and non-specific visual field defect in 1 patient were noted.

Twenty six females and 3 males of 31 cases have had optic neuritis before. Both history of blurred vision and double-vision were present in 19 cases. Pars planitis was noted in 2 eyes of 1 patient with blurred vision without previous optic neuritis.

RAPD was present in 2 patients who had optic neuritis. Color vision test results were pathological in 20 cases. All those 20 patients had developed optic neuritis in the past (Table 3). Besides, we compared VEP latency values according to existence of optic neuritis history and we obtained that 41 eyes with optic neuritis history exhibited longer VEP latencies (138.9±18ms) than 61 eyes without optic neuritis history (121.2±13ms) ($p<0.05$) (Table 4). Moreover, longer p100 latencies were measured in 13 eyes with no optic neuritis history.

Discussion

MS is a demyelinating disease which is more common in adults and females. MS could affect the visual system via different ways and results in various visual pathologies. Problems about eye are prevalent due to optic neuritis or damage of neurons innervating muscles related. The most common eye involvement is optic neuritis. It is seen unilaterally most of the time but as disorder progresses the possibility of involvement in other eye increases [1-6]. Cases in our study were mostly young women and most frequent type of eye involvement was optic neuritis. Besides, most of the optic nerve involvement was observed bilaterally.

In this study, RAPD noted in 2 of cases who have history of previous optic neuritis. Defective color vision was present in 20 eyes

Table 4: VEP p100 latency of the patients with and without ON (optic neuritis) history.

	ON (+)	ON(-)	p
VEP p100 latency (ms)	138.9±17.6	111.2±13	0

that all of them have history of previous optic neuritis. However, it was reported that color vision tests have higher sensitivity but lower specificity [7-11].

Electrophysiological tests could evaluate the visual system from Retinal Pigment Epithelium (RPE) to the occipital cortex. Pattern VEP is used to measure response of cortical cells to pattern stimuli. This method is applied not only to evaluate optic nerve functions but also to assess the acute phase of optic neuritis and to follow up for long-term evaluation. In our study, we observed the expected prolongation of p100 latency in cases having history of optic neuritis. On the other hand, p100 latency prolongation was noted in 13 eyes without optic neuritis history and this finding shows that MS could bring about not only obvious damage to optic nerve like optic neuritis but also optic nerve involvement without apparent symptoms or findings. It might cause subclinical involvement and slower transmission due to demyelination of fibers. Abnormal VEP latency values without history of optic neuritis were mentioned in literature, which is consistent with our findings. In these cases, optic nerve is affected by high rates without revealing any symptom or finding [1-8]. Furthermore, VEP latency measurement is found valuable to detect previous optic neuritis for eyes with normal visual function because prolongation of VEP latency could be resolved mildly and after several years passed [11]. VEP is more reliable to determine demyelination than other psychosocial tests [1].

Studies mentioned that electrophysiological tests are used for follow-up and to find out the pathophysiology [1,8]. Evaluating MS cases with electrophysiological and structural tests was the major framework of follow-up in this study.

It was proved that visual field defects seen in MS patients could follow unexpected patterns considering affected optic nerve and areas in central nervous system. Typical visual field defects observed in optic neuritis cases are central or arcuate scotoma but different patterns might be seen with regard to the stage of the disease at the time of examination. Loss of central sensitivity could be encountered even if it is not an ordinary pattern. Visual field assessment was stated to have higher sensitivity but lower specificity [1,12]. Visual field defect was noted in 12 eyes with previous history of optic neuritis in our study. Vascular and inflammatory pathologies like Pars planitis, retinal vasculitis, vitritis and anterior Uveitis are more common in MS patients than general population [9-13]. In addition, retinal involvement emerges due to inflammatory and vascular alterations besides demyelination [13-15]. In our study, one of the follow-up patients developed pars planitis in both eyes sequentially. Although MS patients might develop vitreoretinal pathologies like vitritis or chorioretinitis in acute stage, patients in this study showed up none of them in our follow-up.

MS could affect visual system with various patterns and results in diverse visual symptoms and findings. In order to detect eye findings in early phases, full neuro-ophthalmological follow-up including tests like VEP, color vision, visual field in addition to ophthalmological

examination is required.

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