

Comparison of mfERG with VEP in NAION Patients and Healthy People

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ABSTRACT

Purpose: Comparison of mfERG (multifocal electroretinography) with VEP (visual evoked potential) in NAION (Nonarteritic ischemic optic neuropathy) patients and healthy people

Materials and methods: 44 NAION patients were included in the study. The patients were 23 women, 21 male. The average age was 60-83 in NAION group. The patients underwent mfERG and VEP. 35 healthy people formed the control group. In the control group was 19 women, 17 male. The average age was 57-89 in control group.

Results: Mean VEP amplitude 1.89 ± 0.95 mV and latency 123.6 ± 18.70 msec in NAION group. In healthy group VEP amplitude was 4.92 ± 1.02 mV and latency was 103.01 ± 7.02 msec. There was no obvious pathology in mfERG in patients with NAION and in the control group.

Conclusion: In NAION patients, significant changes can be seen in VEP amplitude and VEP latency. This was also found in our work. Ganglion cell and optic disc damage does not change in the mfERG, so abnormal mfERG is probably a reporter of an external retinal lesion.

Keywords: mfERG, VEP, NAION

INTRODUCTION

Multifocal ERG (mfERG) and multifocal VEP (mfVEP) have been used widely in the investigation of pathological changes or functional variations in the visual system. Altitudinal hemifield loss is a visual field defect that is usually found in patients with ischaemic optic neuropathy (ION)(1,2).

Electrophysiology was effective in differentiating between retinopathy, post-retinal pathology and normality in 91 % of subjects. Pre-testing provisional diagnoses of retinopathy and post-retinal pathology were revised in 30 and 42 %, respectively, after electrophysiology. Appreciation of characteristics of each test, correlation with the clinical picture and interpretation of results in totality are required to localize the site of pathology(3,4).

Multifocal VEP and mfERG techniques show promise for routine clinical use in neuro-ophthalmology. OCT is now used in many subspecialty areas of ophthalmology, especially in studies of the retina and glaucoma. Although neuro-ophthalmologists must still rely on time-consuming history taking and careful clinical examination, the three modalities described herein can provide objective proof regarding clinical diagnoses in selected cases, saving time and avoiding costly neurologic investigations(5).

The aim of this study was to comparison of mfERG (multifocal electro retinography) with VEP (vizual evoked potential) in NAION(Nonarteritic ischemic optic neuropathy) patients and healthy people.

MATERIAL-METHODS:

In the Ankara Training and Research Hospital between January 2013 and May 2016, 44 NAION cases were included in the study. The NAION cases were identified as Group I and were identified as follows:

- ESR and CRP values were normal in laboratory values
- Those without clinical findings of the temporal artery

Exclusion Criteria for Facts of NAION

- The presence of a glaucomatous story or IOP above 21 mmHg
- To find a trauma or surgical story
- Finding diabetic retinopathy by ophthalmoscopy
- Finding neurological disease

Visual acuity of 10/10 (complete), IOP of 21 mmHg and below, and ophthalmologic examination of normal 38 cases were defined as control group and Group II.

Differential diagnosis of NAION cases was made as clinical and laboratory diagnosis. Demographic data, initial ophthalmologic examination findings, VEP and mfERG findings were recorded.

Complete ophthalmologic examination was performed on NAION cases and control group. Refractive errors were measured with autorefractometer. The best corrected visual acuity was determined separately for each eye with a Snellen. Anterior segment was evaluated by biomicroscopic examination. IOPs were measured. After mydriasis indirect ophthalmoscopic examination was performed with a non-contact fundus lens (Super Field Volk Lens).

The χ^2 test was used to compare the demographic characteristics of the cases in Group I and Group II.

RESULTS:

Between January 2013 and May 2015, 44 patients (Group-I) with NAION diagnosis were included in the study. 35 normal adult were formed control groups (Group-II). The mean age of group-I was $71,89 \pm 8,09$ years, the age range was 60-83 years, the mean age of Group-II was $70,12 \pm 6,12$ years and it was 57-89 years. There was no statistically significant difference between the groups in the mean age (χ^2 test $p = 0,27$). When sex differences are compared; Twenty-three of the 44 patients in Group-I were male (56.24%), 21 were female (43.76%) and in Group-II ;19 were male (59.18%) and 17 were female (40.82%). According to this, it was observed that there was no statistically significant difference in the sexes (χ^2 test, $p = 0.46$) ($p < 0.001$ was considered statistically significant).

CONCLUSION:

Electrophysiology is an objective functional test of the visual pathway and allows the location of visual dysfunctions to be detected. The visual evoked potential (VEP) is a cortical response and serves as a functional test of the entire visual pathway from the eye to the visual system of the brain. After presenting each of these methods individually, the article gives assistance in situations where the appropriate electrophysiological method for a given clinical hypothesis is to be selected and explains how the methods can be combined in a reasonable way(6,7).

The combined evaluation of VEP and mfERG is useful both to establish the area of dysfunction and the normality of the visual system. Electrophysiological testing prior to neuroimaging is recommended for patients where clear clinical signs of cerebral disorders are not evident. This reduces the frequency of unnecessary neuroimaging and associated radiation exposure(8-12).

In our study ; there was a statistically significant difference between NAION and the control group in both VEP amplitude and VEP latency (respectively $p = 0,00032$, $p = 0,00045$) (table-1).

None of the patients had both NAION and in the control group, there was no obvious pathology in mfERG.

In conclusion ; NAION patients, significant changes can be seen in VEP amplitude and VEP latency. This was also found in our work. Therefore we recommend that electrophysiological tests be performed in NAION patients.

TABLES

Table-1:

	VEP AMPLITUDE AVERAGE (mV)	VEP LATENCY AVERAGE (msec)
NAION	1,89*0,95mV	123,6*18,70 msec
CONTROL GROUP	4,92*1,02mV	103,01*7,02 msec
p value	0,00032	0,00045

student – t test (p <0.001 was considered statistically significant)

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