Original Article

Visual Evoked Potential Findings in Patients Suffering from Optic Nerve Glioma

Nazanin Fatemian [1], PhD; Faezeh Sahbaei [2], PhD; Seyed Mohammad Masoud Shushtarian*[3], PhD; Ahmad Shojaei [4], MD; Farhad Adhami-Moghadam [5], MD

1. Department of Anatomical Sciences and Cognitive Neuroscience, TeMS.C., Islamic Azad University, Tehran, Iran.
2. Department of Nursing, TeMS.C., Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.
3. Department of Biophysics and Biochemistry, Faculty of Advanced Science and Technology, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.
4. Basir Eye Health Research Center, Iran University of Medical Sciences, Tehran, Iran.
5. Department of Ophthalmology, Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.

***Corresponding Author:** Seyed Mohammad Masoud Shushtarian
E-mail: mshushtarian@yahoo.com

Abstract

Purpose: The aim of present study was to measure visual evoked potential (VEP) among patients with glioma to study the possible change in VEP parameters including latency and amplitude, Peak in these patients.
Materials and Methods: Twenty-two eyes from 11 patients with optic nerve glioma (ONG) were selected for the purpose of present study. Flash type of VEP was recorded in these patients using a Mangoni machine. VEP, P100 latency (msec) and amplitude (μV) was measured. The results were compared with 11 sex and age matched patients.
Result: There was not a statistically significant difference in demographic findings between the case and control groups. Also, the difference between VEP, P100 parameters including latency and amplitude between the case and control groups were statistically significant.
Conclusion: From the results of the present study, we can conclude that visual pathway is affected among patients suffering from optic nerve glioma which can be measured using flash VEP recording.

Keywords: Optic Nerve Glioma; Visual Evoked Potential; Visual Pathway.

Article Notes: Received: Jul. 05, 2025, Received in revised form: Jul. 28, 2025; Accepted: Aug. 09, 2025; Available Online Dec.22, 2025.

How to cite this article: Fatemian N, Sahbaei F, Shushtarian SMM, Shojaei A, Adhami-Moghadam F. Visual Evoked Potential Findings in Patients Suffering from Optic Nerve Glioma. Journal of Ophthalmic and Optometric Sciences . 2026;10(1):

Introduction

Optic nerve gliomas (ONGs), also known as optic pathway gliomas (OPGs) are relatively rare lesions that comprise 1 % of all intracranial tumors and 3 – 5 % of all pediatric brain tumors and are believed to be the most common tumor of the optic nerve [1].

Optic nerve gliomas are equally seen among female and males and affects individuals younger than twenty years old [2]. There is no racial difference in the occurrence of ONGs between different races [2]. Ocular findings of ONGs include limited motility on a mechanical-restrictive basis and pupillary afferent defect, nystagmus and variable and non- specific visual field defects [3].

This disease affects the optic nerve and visual pathway in brain [4].

Visual Evoked Potential (VEP) is a suitable technique to screen the visual pathway.

Sarzaeim et al., [5] worked on twenty eyes with different stages of visual dysfunction due to head trauma. They used flash VEP for this purpose and reported pathological changes of VEP, P100 parameters including latency and amplitude. They concluded that head trauma can damage the visual pathway and can be measured by VEP.

Shushtarian et al., [6] described the case of a 25-year- old female who developed dimming of vision in the left eye twelve days after being exposed to Botulinum Toxin A (BTA). VEP revealed delayed P100 latency in affected eye [6]. In addition, magnetic resonance imaging (MRI) demonstrated inflammation of the left optic nerve [6].

In this study we recorded flash VEP in patients with (ONGs) to search for possible changes in VEP pattern.

Materials and Method

In this case-control study 22 eyes from 11 patients suffering from optic nerve glioma were evaluated as the case group and was compared with 22 eyes from eleven sex and age matched healthy controls. The patients were aged between 7 and 9 years. Flash VEP recording were conducted using a Mangoni device to assess their visual pathway. The selection of flash type of stimulation was due to some of patients not having proper visual acuity to distinguish the fixation point on monitor necessary to record pattern VEP.

The study protocol received approval from our institutional ethics committee, and written informed consent was obtained from all study participants. The latency and amplitude of VEP P100 Peak were measured in milliseconds and microvolts to evaluate the patients' visual pathway. The VEP recording were performed using three electrodes connected to Mangoni device. The active electrode was placed on occipital region. The reference electrode was placed on the vertex, and the ground electrode was placed on the forehead. This setup ensured accurate and reliable measurements during VEP Procedure.

Results

Table 1 compares the mean sex and age of the case and control groups. There was no statistically significant difference between the two groups in terms of age and sex. The difference between Best Corrected Visual Acuity (BCVA) was significant between the two groups ($P < 0.001$).

Table 2, presents the comparison of latency and amplitude measurements for VEP P100 peak between the case and control groups. As shown in table 2, the difference for both variables were significant ($P < 0.001$ and $P < 0.001$ respectively).

Discussion

In the present study, patients with optic

Table1: Comparison of age and sex between the age and control groups

Variable		Number of participants Control	groups (Mean ± SD) Case		P value
Age		22	8 ± 0.77	8.09 ± 0.83	0.78 *
Sex	Male	10	5 (45.45 %)	5 (45.45 %)	1**
	Female	12	6 (54.55 %)	6 (54.55 %)	

* Based on Mann-Whitney U Test
** Based on Chi-Square Tests

Table2: Comparison of BCVA and VEP findings between the case and control groups

Variable	Number of participants	groups (Mean ± SD) Control	Case	P value*
BCVA (LogMAR)	22	0 ± 0	0.26 ± 0.28	< 0.001
Amplitude (μv) Latency	22	6.45 ± 2.95	2.77 ± 1.37	< 0.001
(msec)	22	99.40 ± 1.96	106.81 ± 5.57	< 0.001

* Based on Mann-Whitney U Test

nerve glioma were tested using flash VEP examination to look for visual pathway disturbances. As it is seen in table 2, we found out significant difference in VEP, P100 peak latency and amplitude between the case and control groups; which is an indication of visual pathway involvement in patients with optic nerve glioma.

Wolsey et al., [7] made an extensive retrospective review including 297 patients with ONGs. Out of these patients 30 had VEP recording in their medical files. There was delay in VEP, P100 peak latency compared with control group, which supports the results of the present study [7].

In another research by Gros Wasser et al., [8] VEP was recorded in 25 young patients with ONGs. They found pathological changes in in VEP, P100 either in pattern or flash type of VEP; which also supports our findings.

Conclusion

Visual pathway may be affected in patients with optic nerve glioma which can be measured by visual evoked potentials.

Authors' ORCIDs

Nazanin Fatemian:
https://orcid.org/0000-0001-6214-8244
Seyed Mohammad Masoud Shushtarian:
https://orcid.org/0000-0002-6387-9046

Conflict of interest:

The authors have no conflict of interest with the subject matter of the present study.

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