

## Case Report

# Severe Headache Initiated by Flash Stimulation During Visual Evoked Potential Recording in a Patient with Monocular Optic Neuritis and History of Migraine Headache

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### Abstract

Headache is a common sign during optic neuritis. These headaches are usually one sided and worsen when the affected eye moves. The aim of the present manuscript is to report severe headache in a patient with optic neuritis and history of migraine headache initiated by flash stimulation of affected eye during visual evoked potential (VEP) recording. Based on our findings we suggest that patients with a history of migraine headache should be informed about possible headache before VEP recording using flash stimulus.

### Keywords:

Headache

Optic neuritis

Visual evoked potential

Flash stimulation

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## Introduction

Visual evoked potential (VEP) is used primarily to measure the functional integrity of the visual pathways from retina to the brain visual cortex<sup>1</sup>. For recording purposes in VEP a suitable visual stimulator is necessary<sup>2</sup>. Proper visual stimulator for recording VEP in photophobic patients with normal visual acuity is pattern reversal stimuli but only flash VEP can be used for photophobic patients with severely reduced visual acuity, which might lead to headache<sup>2</sup>. Here we present a case of severe headache in a patient with optic neuritis and history of migraine headache caused by flash stimulation of affected eye during visual evoked potential (VEP) recording. This report was approved by the ethics committee of Basir Eye Health Research Center, Tehran, Iran, and written consent was obtained from the patient before reporting the case.

## Case Report

A female patient suspected of multiple sclerosis was referred to Basir Eye Clinic, Tehran, Iran, for visual evoked potential (VEP) testing. She was 31 years old with only light perception ability in the right eye due to optic neuritis and normal vision in the left eye. Magnetic Resonance Imaging (MRI) of the patient was normal without any sign of plaques. The patient file indicated one week of pulse therapy with one gram of prednisolone per day, but no improvement in the affected eye. Conventional VEP method was performed for the recording. Three electrodes were used to connect the patient to a Mangoni machine capable of recording different types of VEP including pattern reversal and flash types. Active, reference and ground electrodes were attached to occipital, earlobe and forehead respectively. The left eye was examined using pattern reversal VEP. The latency of VEP, P<sub>100</sub> peak was 97 msec and the

amplitude of the peak was 5  $\mu$ V. For the right eye (the affected eye with light perception vision) flash type of stimulator was used for VEP recording. The latency and amplitude of VEP, P<sub>100</sub> peak were 117 msec and 3  $\mu$ V respectively. During the right eye examination, the patient complained of headache but she insisted to finish the examination. After recording the headache continued for a period of one hour and the patient remained in clinic until her condition became stable. The patient was asked for the possible reason of the headache and she explained that she is suffering from migraine and further investigation showed a history of aura migraine in the patient, in which flashes of light might initiate headache. For our patient this episode of headache was unavoidable since the only possible stimulator in eyes with much reduced eye sight is the flash stimulus.

## Discussion

The affected eye in our patient suffering from optic neuritis only had light perception vision therefore it was stimulated with flash stimulus when performing VEP. During the VEP recording the patient complained from headache and the headache continued after VEP exam with pain getting more severe. It is a well-known fact that certain stimuli can provoke the patients and thereby produce headache; flickering or flashing light are among these stimuli<sup>3</sup>. Martin et al.,<sup>4</sup> used very bright, stroboscopic light in patients with a history of regular headaches. The result was more headaches in response to stimulus compared to controls with no history of headache<sup>4</sup>. It seems that flashes of light in flash VEP might initiate headache in patients with a history of previous headaches and this should be considered when using this type of stimulus.



**Conclusion**

The use of flash stimulus during visual evoked potential recording in patients with severely decreased visual acuity is unavoidable. Patients

with a history of migraine headache and limited visual acuity should be informed about possible headache before VEP recording using flash stimulus.



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## Footnotes and Financial Disclosures

### Conflict of Interest:

The Authors have no conflict of interest with the subject matter of the present manuscript.

