

Case Report

Large Difference in Latency of Visual Evoked Potential P100 Peak in Case of Pattern and Flash Stimulation in a Multiple Sclerosis Patient

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Abstract

The visual evoked potential is one of the suitable techniques for the diagnosis of multiple sclerosis. There are two stimulation techniques, i.e., pattern reversal checkerboard and flash, to record visually evoked potential. Flash type of stimulation is used in patients with poor visual acuity.

Here we report the VEP recording of a multiple sclerosis patient with two types of stimulation and an extraordinarily significant P100 peak latency difference observed between the two types of stimulation.

Keywords: Visual Evoked Potentials; Pattern and Flash Stimulation; Multiple Sclerosis.

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Introduction

Visual evoked potential, or VEP, is a potential evoked in the visual cortex by light stimulation of the optical system. This diagnostic technique is used in different physiologic and pathologic conditions.

Shushtarian, SM et al., in 1999, worked on VEP changes during the monthly cycle in female subjects. They used two types of stimulation techniques, i.e., pattern reversal checkerboard and flash, and concluded that the flash type of stimulation produces more changes during this period than the pattern reversal type of stimulation ¹.

In another research in 2018, Shushtarian and his colleagues worked on pathological changes observed in the visual pathways of laborers exposed to occupational vibration in textile factories ².

Recently work was done on the utility of VEP in the early diagnosis of toxic effects of anti-seizure medication in patients suffering from seizures. The result was a delay in latency of VEP, P100 peak which indicates the visual pathway disturbance due to the drugs ³.

Finally, there are several research works on the utility of VEP for different pathological conditions. ⁴⁻⁸ Usually, pattern reversal checkerboard stimulation is used for this purpose; however, flash stimulation in patients with poor visual acuity is used for recording VEP.

In this study, we report VEP recording in the case of a patient who could see the fixation point on the monitor. We decided to record the flash type of stimulation along with checkerboard pattern reversal VEP.

Case Report

A 35-year-old male patient was referred to Basir clinic for VEP examination; his medical record favored demyelinating diseases, i.e.,

multiple sclerosis (MS). He was able to distinguish the fixation point on the monitor for recording checkerboard pattern reversal VEP. During recording VEP, he explained how he saw the monitor, i.e., he saw different colors on squares in the monitor despite the black and white squares on the monitor. The latency of VEP, P100 peak was 175 msec. He was tested for the flash type of VEP, and the latency VEP, P100 peak was reduced to 106 msec.

Discussion

A patient suspected of multiple sclerosis was referred to the Basir clinic for VEP recording. He was tested for VEP using a pattern type of stimulation. During the experiments, the operator used flash stimulation to record VEP. The result was a significant reduction of latency of VEP, P100 peak, i.e., from 175 msec to 106 msec. It is a fact that pattern reversal stimulation is an ideal technique to record VEP but in some instances, using the flash type of stimulation in recording VEP is inevitable. Visual acuity fall is a condition that makes using flash VEP necessary.

Sarzaeim and her research team in 2022 used flash VEP to evaluate the visual pathway of patients suffering from head trauma. The reason for the flash type of stimulation was minor visual acuity in these patients, which was hardly 2/10 BCVA ⁹.

Optic neuritis is a condition that recording of flash VEP is unavoidable. Shushtarian S M et al. in 2017 reported a case study regarding a female patient with monocular optic neuritis tested by flash VEP to survey the patient's visual pathway ¹⁰.

In another research done in 2020 regarding suitable stimulation techniques in recording VEP in migraine patients, 20 patients with a 20-30 years age range and 10/10 BCVA were

selected. The authors finally concluded that pattern reversal checkerboard is a suitable technique to record VEP unless the condition is so severe that the flash type of stimulation is inevitable to record VEP ¹¹.

Finally, Naser M et al. worked on selecting a suitable visual stimulator for recording VEP in photophobia patients in 2014. They performed extensive work on 75 patients suffering from migraine with aura. The result of the research was the superiority of the pattern reversal checkerboard to record VEP in migraine

with aura patients unless the flash type of stimulation is inevitable. ¹²

Conclusion

Pattern reversal checkerboard is an ideal technique to record VEP in MS patients unless the situation is so horrible to use the flash type of stimulation in recording VEP.

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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.