

## Research Article

---

# Recording of Visual Evoked Potential in Patients Suffering from Epilepsy following Valproate Sodium Treatment

Farabi Y\*, Adib Moghaddam S, Naser M

Department of Ophthalmology, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran

**\*Corresponding Author:** Farabi Y, Department of Ophthalmology, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran, E-mail: [dr.farabiyas2019@gmail.com](mailto:dr.farabiyas2019@gmail.com)

**Received:** 19 January 2019; **Accepted:** 30 January 2019; **Published:** 04 February 2019

### Abstract

**Aim:** Valproate Sodium is a drug which can be used in patients suffering from epilepsy. It is reported that in some cases it may have toxic effects on the visual system, mainly visual pathway. The aim of the present study is to examine the visual pathway of these patients using visual evoked potentials.

**Method:** 27 epilepsy patients under sodium valproate treatment were selected for the purpose of the present study. VEP, P<sub>100</sub> peak was measured in patients' groups, i.e. case group. The result obtained were compared with the control consist of 27 normal populations matched with case group.

**Results:** The two groups were matched demographically from age, sex and visual acuity point of view. The mean latency/ S.D of VEP, P<sub>100</sub> peak were 1.8/7.23 and 95/4.37 msec and that of mean amplitude were  $7 \pm 1.83$  and  $8 \pm 2.0$   $\mu$ v in case and control groups respectively. The difference between two groups was significant in case of latency of VEP, P<sub>100</sub> peak, whereas the difference between amplitude of VEP, P<sub>100</sub> peak was not significant.

**Conclusion:** From the results of the present work one can conclude that sodium valproate affects the visual pathway of epilepsy patients which can be proved by visual evoked potential.

**Keywords:** Epilepsy; Sodium valproate; Visual pathway; Visual evoked potentials

### 1. Introduction

Epilepsy is a chronic disorder the hallmark of which is recurrent unprovoked seizures. The seizures in epilepsy may be related to a brain injury or a family tendency. Although the symptoms of seizures may affect any part of the body,

the electrical events that produce the symptoms occur in the brain. The location of the event, how it spreads, how much of the brain is affected, and how long it lasts all have profound effects. These factors determine the character of a seizure and its impact on the individual. Valproate sodium is a medication used to treat epilepsy. This drug can be given intravenously or by mouth. valproate sodium has common side effects, including nausea, vomiting and dry mouth. Visual disturbances are a common side-effect of this drug. Color perception can be taken as side effect of sodium valproate on the visual system. Sodium valproate may affect the central nervous system. Segura-Bruna, N and his colleagues reported that valproate induces hyperammonemic encephalopathy [1]. Visual pathway is a part of central nervous system that can be accordingly affected due to this drug. There are different techniques to examine the visual pathway. One of the efficient techniques is the electrophysiology of vision. It comprises visual evoked potential (VEP), electroretinography (ERG) and electrooculography (EOG). These techniques may be used to examine the pathological conditions of the visual system. Tahmasebi on 2014 compared the electroretinographical patterns in retinitis pigmentosa and chloroquine consuming patients to look for different site of the retina which gets affected in these conditions [2]. Another work in this connection was done to examine the visual pathway disturbances of the migraines patients using proper stimulating technique, and they resulted that pattern reversal checker board VEP is an efficient technique for this purpose [3]. Shushtarian SM and his colleagues on 2014 worked on electroretinographical changes in multiple sclerosis (MS) patients with abnormal visual evoked potentials and they concluded that in MS patient's retina is also affected in addition to visual pathway disturbances [4]. Electrophysiological technique of vision can be used to examine the toxic effect of drugs on the visual system. Naser M and her research team worked on toxic effects of Depakine on retina of epileptic patients using electroretinogram, and they concluded that ERG was normal in depakine consuming patient, hence retina of these patients is intact [5]. Finally, a case study was reported to examine the visual disturbances in a patient with Amiodarone treatment following refractive surgery. The authors used VEP, ERG and EOG techniques in the patient and find out that these tests are abnormal in the patient. The patient complains from sensing a ring around the light. The symptom recovered after amiodarone termination [6]. Base on above literature survey a research was planned out to check the toxicity of valproate sodium on visual system using visual evoked potential.

## **2. Material and Method**

Twenty-seven patients suffering from epilepsy were selected for the purpose of the present study. The age range of patients were from 15-25 years. They were having both the sexes i.e. male and female. The patients were under sodium valproate treatment for at least 1 year. The visual acuity of the patients was 10/10 or otherwise could be corrected by suitable lenses. The patients under gone visual evoked potential (VEP) examination. Mangoni Machiue capable of recording VEP, ERG and EOG was used for this purpose. Three electrodes i.e. active, reference and earth were attached to occipital, vertex and forehead respectively. An electrophysiological gel was used for better contact and conduction between the electrodes and skin. Latency (msec) and amplitude ( $\mu\text{V}$ ) of VEP, P<sub>100</sub> peak were measured for each patient. Means and standard deviations were calculated for both latency and amplitudes obtained. The same procedure was repeated for 27 normal populations with no consumption of sodium valproate. The two groups i.e. patients and normal subject were matched demographically i.e. they were matched as for as sex, age and

visual acuity is concerned. The results obtained in both the groups were compared together to check the probable differences in two group. SPSS version 24 was used for this purpose.

### **3. Result**

Two groups of case and control were compared together, as for as VEP, P<sub>100</sub> peak parameters i.e. latency and amplitude were concerned. The mean latency/ S.D were 108/ 7.23 and 95/ 4.37 msec in case and control groups respectively. The difference between mean latencies of two groups was statistically significant (P<0.05). The mean amplitude ± S.D. were 7 ± 1.83 and 8 ± 2.01 (μv). The difference between two groups was not significant (P>0.05). Finally, the two groups did not have any difference as for as demographical conditions were concerned.

### **4. Discussion**

27 patients suffering from epilepsy and treated with sodium valproate (SV) for one year were examined by pattern reversal VEP (PRVEP). The result was compared with PRVEP obtained from 27 people with normal vision and no consumption of SV. Two groups were matched demographically as for as sex, age and visual acuity were concerned. The VEP obtained in two groups were significantly different in latency of VEP, P<sub>100</sub> latency (P<0.05) whereas the difference in amplitude of the peak does not show a statistical difference (P>0.05). It is a well-known fact that latency of VEP, P<sub>100</sub> is a reflection of visual pathway [7], so the increase in latency of VEP, P<sub>100</sub> peak is a reason for visual pathway disturbances in these patients. One of the later works in this connection was reported by Faught E and his colleague on 1984. They recorded PRVEP in epileptic patients treated with valproic acid. The result of their work was lengthening of VEP, P<sub>100</sub> peak and decrease of amplitude of the peak [8]. This finding is similar to the result of the present study. The only difference is the amplitude of VEP, P<sub>100</sub> peak, which in the present work we could not find a significant difference between case and control groups. Another research in this connection was done by Verroti A and his research team on 2000. They too examined 50 epileptic patients under SV treatment. The result was a significant increase in VEP, P<sub>100</sub> latencies [1]. Which once more support the result of the present work. Finally, there are two references which are in contradiction with the result of the present work. Yuksel A and his colleagues reported normal VEP in epileptic patient treated with sodium valproate [9] Which is not similar to the result of the present work. Another work was done in 2013. Tumay Y and his team reported smaller delay in VEP, P<sub>100</sub> peak of the epileptic patient consuming valporic acid in comparison to VEP, P<sub>100</sub> peak of the normal population [10].

### **5. Conclusion**

From the result of the present work one can conclude that the visual pathway of epileptic patients treated with sodium valproate gets affected after one year of sodium valproate treatment which can be proved by visual evoked potential examination.

## References

1. Segura-Bruna N, Rodriguez-Campello A, Puente V, et al. Valproate-induced hyperammonemic encephalopathy. *Acta Neurol Scand* 114 (2006): 1-7.
2. Tahmasebi S, Shushtarian SM. Comparison of Electroretinographical Patterns in Retinitis Pigmentosa and Chloroquine Consuming Patients. *Indian Journal of Applied Research* 4 (2014): 50-51.
3. Naser M, Shushtarian SM, Abdolhoseinpour H, et al. Selection of Suitable Visual Stimulator for Recording of Visual Evoked Potential in Photophobia Patients. *Indian Journal of Applied Research* 4 (2014): 413-415.
4. Shushtarian SM, Farhad Adhami-Moghadam, Maryam Naser. Electroretinographic Changes in Multiple Sclerosis Patients with Abnormal Visual Evoked Potentials. *Journal of Ophthalmic and Optometric Sciences* 3 (2017): 34-38.
5. Naser M, Shushtarian SM. Study the effect of depakine on retina of epileptic patients using electroretinogram. *International Journal of Scientific Research* 3 (2014): 392-393.
6. Naser M, Shushtarian SM, Shojaei A, et al. Visual Disturbance in a Patient with Amiodarone Treatment Following Refractive Surgery. *Journal of Ophthalmic and Optometric Sciences* 1 (2017): 39-42.
7. Doulah A, Shushtarian SM. Probable Toxic Effect of Methotrexate on visual pathway using visual Evoked potential. *Indian Journal of Applied Research* 6 (2016): 499-500.
8. Faught E, Lee SI. Pattern-reversal visual evoked potentials in photosensitive epilepsy. *Electroencephalogr Clin Neurophysiol* 59 (1984): 125-133.
9. Yuksel A, Sarıslan O, Devranoglu K, et al. Effect of valproate and carbamazepine on visual evoked potentials in epileptic children. *Pediatrics International* 37 (1995): 358-361.
10. Tumay Y, Altun Y, Ekmekci K, et al. The effects of levetiracetam, carbamazepine, and sodium valproate on P100 and P300 in epileptic patients. *Clin Neuropharmacol* 36 (2013): 55-58.

**Citation:** Farabi Y, Adib Moghaddam S, Naser M. Recording of Visual Evoked Potential in Patients Suffering from Epilepsy following Valproate Sodium Treatment. *Journal of Ophthalmology and Research* 2 (2019): 006-009.



This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC-BY\) license 4.0](https://creativecommons.org/licenses/by/4.0/)