

## Photosensitive Epilepsy

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### *Abstract*

Nine patients who had 'self induced photosensitive epilepsy' are described. The method of 'self induction' was rapid blinking and rolling up of the eye balls in 7 cases and hand waving and rubbing the eyes in sunlight in 2 cases. The clinical seizure type associated with induction was absence in 5 cases, complex partial seizures in 3 and myoclonus and tonic clonic seizures in 1 case. The EEG showed photo paroxysmal response to intermittent photic stimulation in 7 cases. The response to treatment with Sodium Valproate was dramatic in 3 cases and resulted in total control of the seizures as well as blinking and hand waving. The details of the clinical and EEG characteristics and the response to Sodium Valproate are discussed.

Key words -

**Photosensitive Epilepsy,  
Self induced epilepsy,  
Reflex epilepsy,  
Sodium Valproate**

Ever since the first account of photosensitive epilepsy by Gowers [1], there have been several reports of this clinical entity in the literature. Exposure to flickering light from natural as well as artificial sources such as television are known to precipitate these seizures [2]. A small group of patients with photosensitive epilepsy appear to be able to induce their own attacks. The methods reported to be employed by these patients for 'self induction' have been rapid hand waving in front of the eyes, blinking, head nodding and rubbing the eyes in sunlight to produce an effect of flickering light [3], [4], [5]. There has been much controversy regarding the origin of 'self induction'. The occurrence of a compulsive desire in some of these patients to wave their hands or blink in sunlight, associated with subjective experiences of pleasure during these activities, has been quoted as evidence for the existence of "self induction" [4], [6], [9]. On the other hand, many have produced data to indicate that the handwaving and blinking are ictal in origin. The evidence has been the failure of voluntary hand waving and blinking to reproduce the clinical attacks in some patients and the simultaneous occurrence of seizure discharges in the electroencephalogram at the onset of "Self induction" [10], [11], [12], [13], [14], [15], [16].

The present study reports the clinical and electroencephalographic characteristics in nine such patients. The observations support the evidence that what appears to be self induction of seizures may in fact be an ictal phenomenon.

### **Material and Methods**

The material consisted of 9 cases of photosensitive epilepsy seen amongst 15671 epileptics who

attended the Neurology services of the National Institute of Mental Health & Neuro Sciences (NIMHANS) over a period of 7 years from 1976-1982. These patients underwent a detailed neurological assessment following which, a resting EEG with hyperventilation and photic stimulation was done using a 16 channel Galileo machine. All the patients had been treated initially with various anticonvulsants with poor results. With the recent availability of Sodium Valproate, 3 patients were started on the same and the clinical and EEG response monitored. The detailed report of a representative case is given below.

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### Case Report

H. A. a 12 year old mentally retarded boy (case 8) was admitted with an 8 years history of repeated innumerable attacks of blinking the eyes and loss of touch with the surrounding. The attacks occurred only in the day time and in the presence of bright sunlight. The patient would repeatedly seek sunlight and rapidly blink his eyes. During these episodes he would be unresponsive. The attacks would last 5-10 seconds. Some times after blinking for a long time, he would fall down unconscious and have a few jerky movements of all the limbs lasting 20-30 seconds followed by recovery. He had no post ictal phenomena following these attacks. He had had 4-5 attacks of generalised tonic clonic convulsions between the ages of 2 to 3 years. On examination the patient was severely mentally retarded. He had no other neurological deficits. The attacks witnessed were as follows. On being taken out into bright sunlight he would gaze at the sun and rapidly blink his eyes at a rate of 3-4/second. Within a few seconds of blinking he would become unresponsive to commands and develop sudden jerks of the head from right to left. The attacks would last 5-10 seconds and were not associated with any post ictal phenomena. Any compulsive desire to blink was not elicitable since the patient was mentally retarded. The resting EEG showed generalised seizure discharges. Intermittent photic stimulation produced clinical attacks of blinking associated with generalised 3 Hz spike and wave activity. The patient was started on Sodium Valproate 600 mgs/day. In 3 days time his attacks had totally subsided. When taken into sunlight, he did not display the behaviour of gazing at the sun and blinking. Report EEG down showed marked reduction in the seizure discharges and photosensitivity. The patient continues to maintain this improvement over 16 months follow up.

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### Results

The age distribution of the patients ranged from 5-14 years (mean 9.5 years). The age of onset of photosensitive epilepsy ranged from 3-9 years (mean 5 years). Of the 9 patients, 8 were females and 1 was a male. A family history of epilepsy in sibilings was obtained in 4 such patients. In one such case, the sibling had similar photosensitive seizures. Mental retardation was seen in 4 patients and 6 of the 9 patients had associated non photosensitive seizures. The clinical details of the photosensitive seizures as given in Table I.

*Table I - Summary of the clinical profile in 9 patients with photosensitive epilepsy*

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In 7 patients the attacks were induced by rapid, blinking of the eye lids with rolling up of the eye balls. Rubbing of the eyes and hand waving in front of the eyes were the means of "induction" in the other two. In all of them the attacks were induced only in bright sunlight. Artificial light did not produce blinking or a clinical attack. The reasons for 'self induction' could not be elicited in 4 patients because of severe mental retardation; 2 patients gave a definite history of a compulsive desire to do so and one of them had a pleasurable sensation during the act; 3 patients could not explain why they did so. The EEG characteristics of the patients are shown in Table II. Most of them had paroxysmal abnormalities in the resting record and during intermittent photic stimulation at a flash frequency of 10-20 Hz. The response of the photosensitive seizures to the various anticonvulsants was poor as shown in Table I. In 3 patients, Sodium Valproate 600 mg/day given alone produced a dramatic and total control of the attacks including blinking within 3 days. The therapeutic effect was noticeable within 24 hours. Cases 8 and 9 used to get frequent attacks on exposure to sunlight. By the 4th day after starting treatment with Sodium Valproate, repeated exposure to sunlight produced neither blinking nor clinical attacks (Fig 1). Repeat EEGs done in these patients with photic stimulation also showed a definite reduction in seizure discharges (Fig 2). Sodium Valproate could not be tried in the other cases as they had not returned for follow up.

*Table II - Summary of the EEG features*

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*.Photograph showing the patient looking upto sunlight. - A. Before Sodium Valproate medication*

*.B. After 4 days of Sodium Valproate medication*

*.EEG showing response to photic stimulation. - A. Before Sodium Valproate medication - B. After 4 days of Sodium Valproate medication*

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## Discussion

Gestaut [3] first described the occurrence of self induced photosensitive seizures. There have been several reports of this entity in the literature. Most authors agree that the condition is rare and this fact has been borne out in the present study also where it formed .0005% of cases of epilepsy. An early age of onset and predominance of the illness in females have been stressed by different authors [2], [14]. The case is the same in the present study also. The high incidence of epilepsy in siblings (4 out of 9), mental retardation (4 out of 9) and associated non photosensitive seizures (6 out of 9) seen in the present study occur with similar observations in the literature [9], [14], [17], [18].

The commonest seizure type by 'self induction' has been variably reported to be tonic clonic seizures [4] and absence attacks in association with other seizure types [17], [18]. Maheswary [19] noted the occurrence of temporal lobe epilepsy as the clinical seizure type. In the present study absence attacks occurred in 5, complex partial seizures in 3 and myoclonus and tonic clonic seizures in 1.

Rapid blinking in sunlight was the 'inducing' factor in 7 of 9 patients. Evidence of compulsive desire to blink was not elicitable in these cases. Compulsive rubbing of eyes and hand waving in sunlight were seen in the remaining 2 patients. Hand waving and blinking have been cited as the common means of induction [4], [14], [17]. Blinking formed the precipitating factor in 7 of 9 cases in the present series and is comparable to the report of 9 cases by Green [18]. Eye closure and following up of the eye ball have

been shown to produce seizure discharges in the EEG [5], [16], [18]. Reduction of the photosensitive threshold by eye closure and triggering of seizure discharges by proprioceptive impulses from the orbicularis oculi have been two explanations offered for this phenomenon. Yet another possibility is that the blinks themselves are ictal in origin [14].

The EEG showed paroxysmal abnormalities in the resting record in 8 of 9 patients. In response to intermittent photic stimulation, 7 of 9 patients had a photo paroxysmal response and of these 4 had clinical attacks.

The initial poor response of the seizures to conventional anticonvulsants is in agreement with reports in the literature [2], [4]. With the advent of Sodium Valproate, its efficacy in reducing photo sensitivity has been well documented [2], [20], [21]. However the role of Sodium Valproate in 'self induced' photosensitive seizures has not been well documented. In the present study, in 3 patients Sodium Valproate controlled the seizures and stopped the occurrence of the inducing blinks and hand waving totally, within 3 days of starting treatment. This is yet another important evidence that the 'inducing' behaviour is ictal in origin. Sodium Valproate may hold much promise in the treatment of this clinical entity which is often difficult to manage.

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