

Self-induction seizures in sunflower epilepsy: a video-EEG report

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ABSTRACT – Seizures triggered by visual stimuli are the most common type of reflex seizure. Self-induced seizures produced by stimulation of natural light are rare and self-induction is a mode of seizure precipitation employed by either intellectually disabled or healthy photosensitive individuals. Absences and myoclonic jerks are the most common seizure types in self-induction. We report on a girl with normal intelligence who self-induced seizures by waving her outspread fingers in front of a bright light. This situation is called sunflower epilepsy. [Published with video sequences]

Key words: reflex seizures, self-induced seizures, sunflower epilepsy

Seizures triggered by visual stimuli are the most common type of reflex seizure (Kasteleijn-Nolste Tenitè, 1989; Striano *et al.*, 2012). Photosensitivity, an abnormal reflex of EEG paroxysmal activation by photic stimulation (PPR), is a genetically determined trait (Doose *et al.*, 1969; Panayiotopoulos, 2010; Verrotti *et al.*, 2012). Reflex photic EEG activation may be asymptomatic throughout life or manifest with clinical epileptic seizures (Panayiotopoulos, 2010). Of note, self-induction is a mode of seizure precipitation employed by either intellectually disabled or healthy photosensitive individuals (Kasteleijn-Nolste Tenitè, 2012). We report on a girl with normal intelligence who self-induced seizures by waving her outspread fingers in front of a bright light.

Case study

A 9-year-old girl was born from non-consanguineous parents after

full-term pregnancy. Her family history was remarkable for febrile seizures and autosomal dominant idiopathic generalised epilepsy, featuring absence seizures with variable age at onset. The neonatal period and growth were normal until the age of 7 years, when her parents noted stereotyped daily episodes of staring at a light source and moving her hands in front of her face. Psychiatric assessment and general and neurological examinations were normal. The video-EEG recorded an episode in which the girl started to wave her hands in front of her eyes while looking at sunlight, followed by short absence seizures accompanied by generalised 3-4-Hz spike-waves (video sequence 1). When we asked her to reproduce an attack in sunlight, the patient was always able to self-induce seizures (figure 1). The discovery of the self-induction technique by our patient was accidental.



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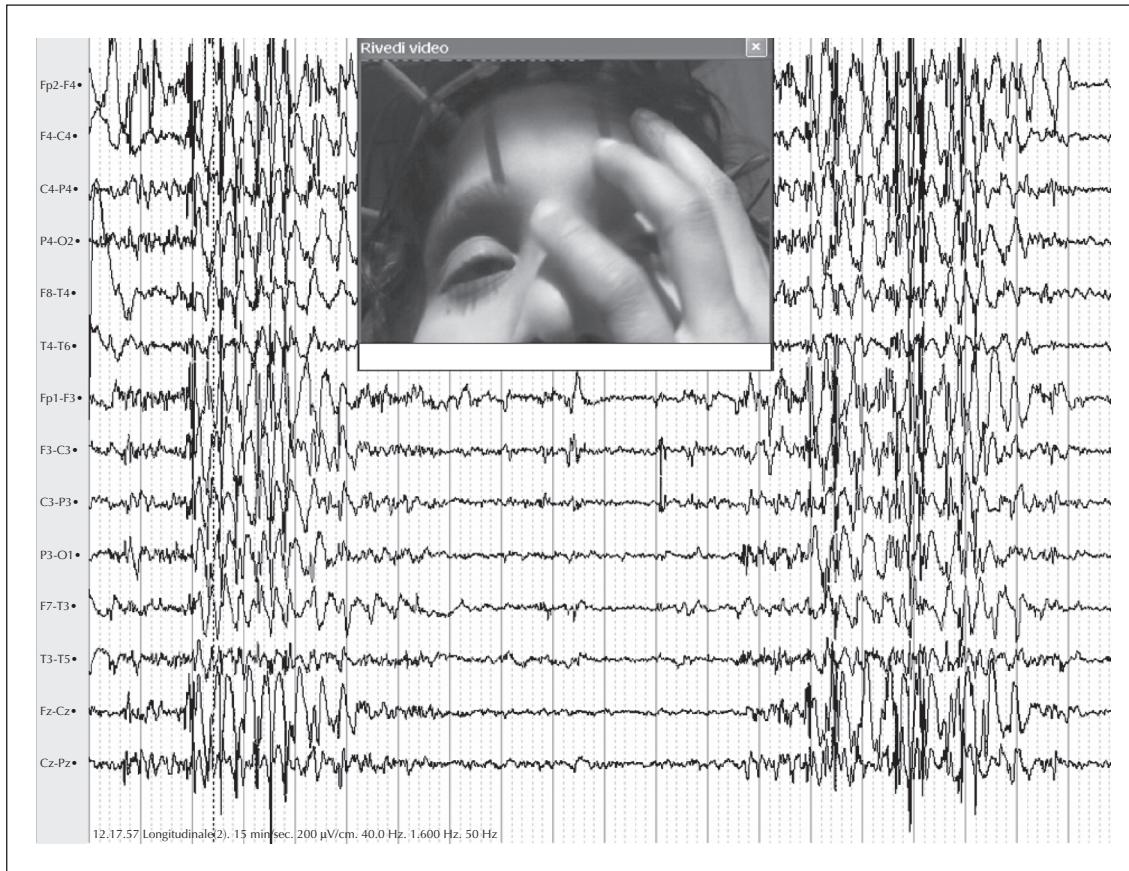


Figure 1. Generalised 3-4-Hz spike-waves evoked by waving a hand in front of the eyes, while looking at sunlight.

Moreover, the patient showed positive intermittent photic stimulation (IPS), accompanied by generalised 3-4-Hz spike-waves, at a flash rate of 10-20 Hz (*video sequence 2*). The interictal EEG recording while awake was normal. Valproate treatment at a dosage of 20 mg/kg body wt (75.5 µg/mL) was ineffective.

When the patient used a commercially available blue lens, namely Zeiss Clarlet F133 Z1 (Z1) (Capovilla et al., 2006), these episodes disappeared. However, the patient was still able to self-induce seizures without the use of the lens. The same Z1 lens also abolished the PPR (*video sequence 2*). At the last follow-up visit, neuropsychological assessment was normal and valproate was withdrawn. Generalised tonic-clonic seizures or myoclonic jerks never occurred.

Discussion

Self-induced seizures produced by stimulation of natural light are rare (Panayiotopoulos, 1979). Sometimes, the patient appears to be "magnetically"

attracted by the light. This condition is sometimes called *sunflower epilepsy* (Ames and Saffer, 1983). Such patients may seek out light in order to self-induce seizures in the way described. Our patient self-induced absence seizures by looking at a bright light and voluntarily waving her fingers in front of her eyes ("sunflower manoeuvre").

Self-induction or autoinduction occurs particularly in photosensitive patients; children and adolescents, in particular, start to use their reflex phenomenon to evoke pleasant, relaxing feelings as a result of the epileptiform discharges (Kasteleijn-Nolste, 1989). Absences and myoclonic jerks are the most common seizure types in self-induction (Panayiotopoulos, 2010).

The diagnosis of self-induction in photosensitive patients with normal intelligence requires careful history-taking; a video can be helpful in making the diagnosis. Long-term video-EEG monitoring is sometimes required because self-induction may occur after the technician leaves the room or after the EEG is discontinued (Kasteleijn-Nolste Tenitè, 2012). In our case,

use of the blue lens Z1 counteracted the episodes. However, the patient was still able to self-induce seizures without using the lens. Notably, the ictal EEG discharge appeared only when the patient started to wave her hands in front of her eyes while looking at sunlight, and the episodes were also reproduced when we asked her to show them to us. Thus, in our case, the excessive attraction to bright sunlight was mainly an attempt to self-induce seizures rather than a feature of the seizure itself. In contrast, Livingston and Torres (1964) suggested that their patient's hand waving was not an attempt to induce flickering, but rather a feature of the seizure itself, because it occurred concurrently with the onset of EEG abnormalities. Whether excessive attraction to bright sunlight is generally an attempt to self-induce seizures or a feature of a seizure is disputed, although both may be true (Panayiotopoulos, 2010).

In these patients, the use of dark glasses in sunlight has been encouraged since 1957 by Ames (Ames, 1971). In our patient, the Z1 blue lens suppressed both PPR and self-induced seizures. There has been considerable speculation on the motivation for self-induction. Theories include: wilful avoidance of unpleasant situations, seeking pleasure, relief of tension, addiction, and compulsion (Ames, 1971). The probability that the cingulate circuit may be involved in the pathogenesis of these patients' unusual response to sunlight has been proposed (Ames and Saffer, 1983).

Legends for videosequences

Video sequence 1

The girl started to wave her hand in front of her eyes while looking at sunlight. Generalised 3-4-Hz spike-waves appeared when the girl started to wave her hand in front of her eyes while looking at sunlight. The ictal video-EEG recording also showed short absence seizures.

Video sequence 2

The patient showed positive IPS, accompanied by generalized 3-4-Hz spike-waves at 20 Hz. Of note, the Z1 blue lenses were effective in suppressing the PPR.

Key words for video research on www.epilepticdisorders.com

Syndrome: idiopathic generalized not specified
Etiology: genetic predisposition

Phenomenology: absence (dialeptic) seizure

Localization: not applicable

Of note, some patients with reflex generalised epilepsies have regions of cortical hyperexcitability overlapping areas physiologically activated by specific sensory, motor, or cognitive stimuli (Ferlazzo et al., 2005). Whether, sunflower epilepsy falls into this category is yet to be confirmed. □

Disclosures.

The authors do not have any conflict of interest to disclose and did not receive any fund for this study.

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