Half a Century of Visual Pattern-Sensitive Epilepsy

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Precipitation of epileptic seizures by visual stimuli has been known since antiquity. Either simple visual precipitants, such as light or patterns, or complex visual excitations, such as television, video games, or reading, may trigger visually induced seizures. Photosensitive epilepsy, characterized by epileptic seizures provoked by intermittent light stimulation, is by far the most frequent and well-studied type of visually induced seizures. In ancient Greece, the rotation of a potter's wheel before the eyes of a slave was used as a provocative test to identify those with epilepsy. The first definite medical description of photosensitive epilepsy was provided by Gowers, who described 2 patients whose seizures were precipitated by bright light. This entity became widely recognized in the 1940s after the introduction by Walter et al of intermittent photic stimulation during electroencephalographic (EEG) recording. Nearly 5% of persons with epilepsy exhibit photosensitivity. In contrast, visual pattern-sensitive epilepsy is a rare condition first reported in 1953.

The first reported patient was a 6-year-old boy who was initially evaluated at the Mayo Clinic on November 29, 1950. His parents sought consultation because the boy had spells of blinking and unresponsiveness that occurred when he sought out and actively gazed at window screens or finely patterned fabrics, such as his father's necktie, corduroy jacket, or poplin storm coat. Because the symptoms were often caused by looking at his father, a psychological problem had been suspected. However, paroxysmal epileptiform EEG abnormalities and clinical seizures were induced in the EEG laboratory when the boy looked at finely patterned clothing, window screens, and pictures without parental association. He was also markedly sensitive to intermittent photic stimulation. Further studies demonstrated that one of the most effective triggering stimuli was a pattern of parallel black and white lines aligned vertically, but the same pattern was ineffective when the lines were aligned horizontally (Figure 1). When the boy was examined in 1959 (9 years after the initial evaluation), he would still seek out patterns such as window screens to induce his seizures. When placed in an environment without window screens, he would compulsively induce seizures by gazing at the pores of his skin. This behavior gradually abated and disappeared by the time the patient was 20 years old. When last contacted in July 2000, he had been relatively seizure-free for the past several years and was employed in a sheltered workshop facility.

Since the first description in 1953, several reports of individual patients and small series of patients with visual pattern sensitivity have been published. Most EEG laboratories do not routinely perform pattern-sensitivity testing and conduct it only in patients who exhibit an abnormal response to intermittent photic stimulation. Consequently, in most of the reported series, patients with visual pattern sensitivity were recruited from among those with photosensitivity, thereby introducing selection bias. On the basis of these studies, it is believed that the attributes of patients with visual pattern-induced seizures—occurrence in adolescence and early adult life, female preponderance, and association with generalized seizure types—do not differ from those of patients with photosensitive epilepsy. Little is known about the electroclinical characteristics and natural history of visual pattern-sensitive epilepsy.

Since 1950, when the first patient with visual pattern-sensitive epilepsy was seen, all patients undergoing EEG examination at the Mayo Clinic who are capable of cooperating are asked to scan a set of standard patterns. This practice has enabled us to identify patients on the basis of their principal attribute, namely, sensitivity to patterns. From 1950 up to the year 2000, a total of 73 patients have been identified. Long-term follow-up data ranging from 1 to 5 decades are available for more than half of these patients. These data are the focus of an ongoing research project, the analysis of which will soon be completed. This will be the first study of its kind involving a large number of well-characterized patients with visual pattern-induced seizures.

In conclusion, through the first description of a patient with visual pattern sensitivity, the Mayo Clinic has made a special contribution to the field of reflex epilepsies, the repercussions of which are still felt today. Several studies from the Mayo Clinic during the past half century, as

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well as ongoing research, have contributed to the understanding of visually induced seizures in general and visual pattern-sensitive epilepsy in particular.

REFERENCES


