Photoparoxysmal response

Light flashes, patterns, or color changes can provoke seizures in up to 1 in 4000 persons. Prevalence may be higher because of selection bias. The Epilepsy Foundation reviewed light-induced seizures in 2005. Since then, images on social media, virtual reality, three-dimensional (3D) movies, and the Internet have proliferated. Hundreds of studies have explored the mechanisms and presentations of photosensitive epilepsy, justifying an updated review. This literature summary derives from a nonsystematic literature review via PubMed using the terms “photosensitive” and “epilepsy.” The photoparoxysmal response (PPR) is an electroencephalography (EEG) phenomenon, and photosensitive seizures (PS) are seizures provoked by visual stimulation. Photosensitivity is more common in the young and in specific forms of generalized epilepsy. PS can coexist with spontaneous seizures. PS is hereditable and linked to recently identified genes. Brain imaging usually is normal, but special studies imaging white matter tracts demonstrate abnormal connectivity. The occipital cortex and connected regions are hyperexcitable in subjects with light-provoked seizures. Mechanisms remain unclear. Video games, social media clips, occasional movies, and natural stimuli can provoke PS. Virtual reality and 3D images so far appear benign unless they contain specific provocative content, for example, flashes. Images with flashes brighter than 20 candelas/m2 at 3-60 (particularly 15-20) Hz occupying at least 10 to 25% of the visual field are a risk, as are red color flashes or oscillating stripes. Equipment to assay for these characteristics is probably underutilized. Prevention of seizures includes avoiding provocative stimuli, covering one eye, wearing dark glasses, sitting at least two meters from screens, reducing contrast, and taking certain antiepileptic drugs. Measurement of PPR suppression in a photosensitivity model can screen putative antiseizure drugs. Some countries regulate media to reduce risk. Visually-induced seizures remain significant public health hazards so they warrant ongoing scientific and regulatory efforts and public education [1)].

1)
Fisher RS, Acharya JN, Baumer FM, French JA, Parisi P, Solodar JH, Szaflarski JP, Thio LL, Tolchin B, Wilkins AJ, Kasteleijn-Nolst Trenité D. Visually sensitive seizures: An updated review by the Epilepsy Foundation. Epilepsia. 2022 Feb 7. doi: 10.1111/epi.17175. Epub ahead of print. PMID: 35132632.

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