

'Visual snow'—a disorder distinct from persistent migraine aura

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Patients frequently describe the phenomenon of visual snow – a persistent visual disturbance like the static or snow of an analogue television encompassing the entire visual field. Previously, these symptoms were often assumed to be related to a migraine aura, drug use, or psychological. This study aimed to clinically characterize the features of visual snow, in order to better understand the disorder and potential treatment options.

Methods and Statistics: This was a three-step study, as detailed below.

1. **Retrospective chart review:** Outpatient clinic letters from 2001-2011 including patients with visual snow with the keywords: “visual snow” or “primary persistent visual disturbance”. The diagnosis was then confirmed based on current literature.
2. **Retrospective Identification of additional visual symptoms:** Authors analyzed an internet-based survey between June to September 2010. This survey asked questions regarding patient experiences with visual snow as well as other visual symptoms. Complete data sets were randomly split into two groups (Group A and Group B) to control for outliers. These groups were then compared. The authors arbitrarily used a cutoff frequency of 33% to define meaningful visual symptoms.
3. **Prospective clinical characterization:** Telephone interviews were conducted between Nov 2011-March 2012 with people who responded to social media ads regarding visual snow. Interviewers assessed visual symptoms, non-visual symptoms, onset and progression, headache history, past medical history, and results of neuro/ophthalmology exams. Patients were excluded from analysis if any abnormalities were found on fundoscopic exam.

Results: In the retrospective chart review, 22 patients were identified with 15 patients having additional visual symptoms (photophobia, palinopsia) with a mean age of onset of 23. The most common comorbidity was migraine. All patients had a normal neurological exam and often a normal ophthalmologic exam. In the retrospective data sets, 235 subjects were evaluated. The mean age was 26 years. In both groups, additional visual symptoms were present in at least 1/3rd of patients, including floaters, prolonged after-images, and nyctalopia. Finally, in the prospective clinical characterization, the mean age was 30 years of age, with the most common additional visual symptoms being palinopsia, photophobia, nyctalopia, floaters, blue field entopic phenomenon. A total of 97% of patients had at least one additional visual symptoms with 92% of patients having at least 3 additional visual symptoms. Of note, only 7 patients had a typical visual aura and 5 patients had consumed cannabis. 46 patients (59%) met criteria for migraine, with 21 patients (27%) having typical migraine aura. In 92% of patients, symptoms were constant from symptom onset. No patient reported complete resolution of symptoms or consistently showed any improvement in visual symptoms with treatments.

Conclusion: Between all three steps of the study, a similar type/demographic of patient was noted, with normal neurological and ophthalmologic evaluations, normal visual acuity, minimal drug use, and the presence of symptoms during childhood/adolescence. Minimal psychiatric co-morbidity and poor response to conventional treatments were suggestive of the fact that visual snow is a unique phenomenon. It was also notable that many patients described additional visual symptoms, most commonly palinopsia (trailing of images), blue field entoptic phenomena (looking at the sky or bright field through blue glass leading to corpuscles accelerating in any direction), photophobia, and nyctalopia

(impaired night vision). Of note, bilateral tinnitus was also a common symptom of patients. Importantly, while there was an association seen between migraine and visual snow, acute headache attacks were not directly seen with visual snow. Additionally, these visual symptoms were not consistent with typical migraine aura, suggesting that these two are likely different entities. Overall, with this data, the authors proposed the following diagnostic criteria for visual snow:

1. Visual snow for at least 3 months
2. Presence of at least 2 out of the 4 visual symptoms: palinopsia, enhanced entopic phenomena, photophobia, nyctalopia
3. Symptoms are not consistent with migraine visual aura
4. Symptoms are not better explained by another disorder

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