

## Two Clinical Cases of Visual Snow

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### Abstract

Visual Snow is a symptom consisting of persistent and constant vision of white and black dots in the visual field. It is associated, in a large number of patients, with migraine with or without aura. However, many patients only present VS symptom and these cases make necessary to consider VS as an independent entity different from migraine. We describe two cases of young patients who came to our service because they had experienced VS. Further insight is needed into this debilitating condition to allow effective management in these often misunderstood patients.

**Keywords:** Visual Snow; Neuro-Ophthalmology; Aura; Migraine

**Abbreviations:** CWD: Cortical Wave Depression; IOP: Intraocular Pressure; MRI: Magnetic Resonance Imaging; OA: Both Eyes; RNFL: Retinal Nerve Fibre Layer; SD-OCT: Spectral Domain Optical Coherence Tomography; VS: Visual Snow

### Introduction

Visual Snow (VS) is a symptom consisting of persistent and constant vision of white and black dots in the visual field; this is described by the patient as if watching through a granular filter [1]. It is associated, in a large number of patients, with migraine with or without aura. This is why in many cases authors have described VS as a symptom related to migraine or even as a persistent migraine aura. However, many patients only present VS symptom without migraines. For this reason we should consider VS as an independent entity different from migraine.

### Cases report

We describe two cases of young patients who have experienced VS.

#### Case 1

A 20-year-old boy who referred "pixelated" vision affecting his whole visual field, this had started 7 months ago. The instauration had been progressive and he had noticed it in binocular and monocular vision.

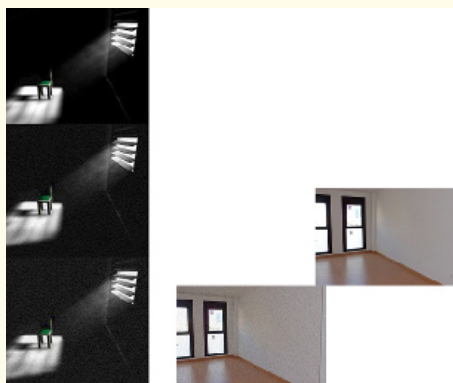
He did not relate the beginning of the symptoms with anything special and symptoms remained unchanged since then. Visual disturbances do not modify with illumination intensity but the patient notices them more at the end of the day. He also presents entopic phenomena such as floaters.

Even though it did not affect his daily life, he referred some discomfort especially when working with the computer. No colour discrimination problems were found. No remarkable personal or familiar medical history and no allergies were reported.

Ophthalmologic examination demonstrated normal visual fields and a visual acuity of 1,2 (Snellen) in both eyes (OA). Eye movements were normal with no signs of strabismus or nystagmus. Electro diagnostic assessments of visual evoked potentials were normal and symmetrical, and electroretinograms were not pathological. Slit lamp examination revealed healthy anterior and posterior segments OA with no evidence of optic neuropathy or retinal abnormality. Intraocular Pressure (IOP) was 14 mmHg OA and Amsler grid exploration was normal.

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Macular and Retinal Nerve Fibre Layer (RNFL) thickness images obtained by Spectral Domain Optical Coherence Tomography (SD-OCT) were completely normal. Physical, psychological, and neurological examination revealed no abnormal findings. Magnetic resonance imaging (MRI), including T1, T2, fluid attenuated inversion recovery, and diffusion-weighted images were informed as normal. The patient was asked to draw an image showing how he perceives VS (Figure 1).



**Figure 1:** The picture on the right shows three versions of the same image: the one on the top is how a normal person will perceive the image, and the one in the middle and the one in the bottom show how the patient perceives the image. The picture on the left shows the same phenomenon: the perception of a normal person on the top, and in the bottom how a patient with Visual Snow symptoms will perceive the same picture.

## Case 2

The second case is a 35-year-old man with a persistent visual disturbance. He described it as persistent, white, bright, jagged spots and black and white flashes with sparkles since the age of 32. He had gone to different specialists offices without obtaining a clear diagnose. He didn't suffer from either migraine or tinnitus but he complained about intense photophobia, nyctalopia, entopic phenomena and palinopsia. Family and personal medical history were normal and he had no allergies.

Ophthalmologic examination showed a visual acuity of 1,2 (Snellen) in OA. Slit lamp examination was unremarkable and no retinal abnormalities were described. His evoked visual potentials were normal and symmetrical, as the electroretinograms and Amsler grid exploration. Macular and RNFL thickness SDOCT results and MRI were unremarkable and IOP within normal limits in OA.

## Discussion

Visual Snow is a disabling symptom for the patients who suffer it. There are some cases reported in paediatric patients but it most commonly appears in young adults [2] and it usually doesn't change over time. Ophthalmologic and neurological examinations are normal most of the times and the problem is that at the moment there is little objective evidence to establish the diagnosis of VS. The lack of objectification helps to make wrong diagnosis and patients receive wrong remedies treating patients as having psychological, psychiatric or drug problems.

Most of the times it is diagnosed as migraine aura [3,4], however many patients do not suffer from migraine. In addition, the rare relation with drug abuse, the existence of paediatric [5] and teenager cases added to the minimal psychiatric co-morbidity, and the little response to conventional treatments suggest that VS is a unique and real syndrome.

The path physiology is still being studied, but recently Schankin., *et al.* [3] have demonstrated a hypermetabolism in right lingual gyrus and the anterior lobe of the left cerebellum in patients with VS when compared with healthy controls. Metabolic interictal migraine patterns differ from the ones obtained in VS cases. This results support the idea that VS, migraine and migraine aura are different syndromes that have similar pathophysiological mechanisms.

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Schankin, *et al.* [4] have proposed a series of clinical criteria for the diagnosis of VS syndrome. They define VS as the main symptom, which they describe as being continuous and dynamic. The patient must also refer at least one more additional symptom such as palipnosia, photophobia and impaired night vision or entopic phenomena. A good anamnesis is necessary to make sure that symptoms are not consistent with migraine with typical aura. If these criteria cannot be attributed to another eye disorder, to drug abuse or other circumstances, visual snow syndrome diagnosis can be made.

Patients suffering from VS also have high prevalence of bilateral tinnitus, 62% versus 7.9%, which is the prevalence in general population [6]. This supports the idea of it being a brain disorder and not an ophthalmologic one.

The pathophysiological mechanism of visual aura in migraine has been explained with the Cortical Wave Depression (CWD). It has been suggested that persistent visual aura and VS could be explained by repeated CWD in combination with a visual cortex hyper excitability [7]. Different drugs have been used to treat persistent visual aura, including verapamil, aspirin, selective serotonin reuptake inhibitors, tricyclic antidepressants, carbamazepine, nifedipine and beta-blockers, but with little success [8]. Published cases of VS recommend the use of some drugs, but none of them have proved effectiveness.

### Conclusion

The aim of this article is to highlight the importance of remember VS syndrome in order to avoid unnecessary referrals to different specialists. Although VS treatment is not usually effective, having a specific diagnosis can be beneficial for patients who become aware of their real problem.

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