

## **Cognitive Neuroscience 2020: Migraine visual aura: Heterogeneity and overlapping with other paroxysmal disorders**

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### **Abstract**

**Background:** There is a considerable variation in symptoms of Visual Aura (VA) that occur in individuals who fulfil the ICHD criteria of migraine VA. The precise mechanism of migraine VA is not well defined, although its symptoms are generated somewhere in the visual system rather than the eye. Vision is mapped on a variety of cortical areas and each is likely to be specialised for a different visual attribute. Serotonin and acetylcholine are concentrated in Visual Cortex (VC) and Visual Thalamic Neurons (TN), suggesting the role of cholinergic-serotonergic interaction in VA. Neurons of the Retino- Geniculo- Calcarine (RGC) pathway are excitatory to those in the primary VC, while interneurons in the LGN are inhibitory. The RGC visual pathway is also modulated by other factors. Cortical Spreading Depression (CSD) is thought to be the substrate of the migraine aura but could be associated with epileptic seizure. The distance, to which CSD spreads, rests on the steadiness between factors that predispose or inhibit the brain to CSD. The CSD markedly alters neuronal firing of ipsilateral third order thalamic nuclei. The thalamus processes signals from the retina to create images and plays key role in coordinating complex sensory and motor input to and from the cortex. **Purpose:** To examine the characteristics of migraine VA and to compare its symptoms with that caused by other paroxysmal disorders (e.g. syncope and epilepsy).

**Method:** A qualitative analysis of prospectively collected data, on characteristics of visual symptoms during attacks of migraine and syncope. Diagnosis of migraine VA was based on the ICHD-3 beta. We provide opportunity for patients to illustrate their visual aura symptoms to aid in diagnosis. **Results:** Visual symptoms were reported by 387/1079 (36%) of migraineurs. 172 (16%) patients fulfilled the ICHD Criteria A, B, C iv and D but missed one (43.5%) or two (56.5%) of the remaining items of criteria C as the visual symptoms were of non-gradual spread (20%), appeared in both visual fields (58%), or lasted less than 5 minutes or more than 60 minutes (75%).

**Conclusion:** Symptoms of migraine VA varied considerably in duration, pattern, mobility, location, mode of onset and colours. Our findings and literature review support the heterogeneity of migraine VA and its overlapping with that of other paroxysmal disorders.

This work is partly presented at Neurology 2020 & Cognitive Neuroscience 2020 on February 24-25, 2020 held in London, UK