

Occipital cortex and cerebellum gray matter changes in visual snow syndrome

Francesca Puledda, MD, Muriel Bruchhage, PhD, Owen O'Daly, PhD, et al.

Cite as: *Neurology*® 2020;95:e1792-e1799. doi:10.1212/WNL.000000000010530

Correspondence

Dr. Puledda

francesca.puledda@kcl.ac.uk

Study question

Do patients with visual snow syndrome (VSS) have regional gray matter (GM) and white matter (WM) differences, according to voxel based morphometry, compared to healthy volunteers?

What is known and what this paper adds

One prior functional imaging study found regional abnormalities in brain metabolism in patients with VSS. Neuroanatomic differences in VSS have not been previously studied. This study found subtle neuroanatomic abnormalities in key visual and lateral cerebellar areas in patients with VSS.

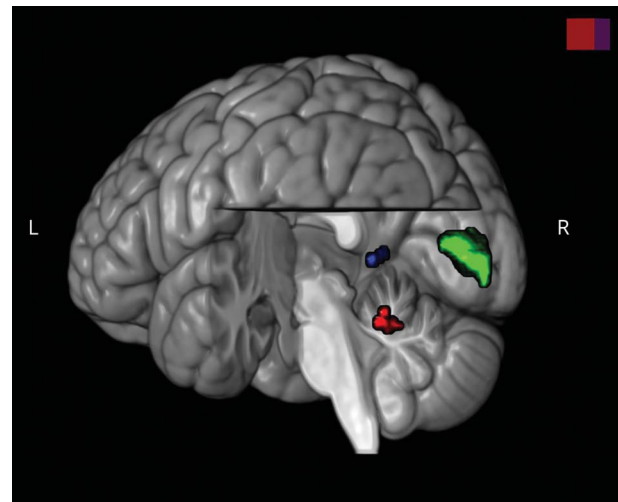
Methods

For this cross-sectional study, the investigators recruited 24 adults with VSS (50% male; mean age, 28 ± 6 years) from subjects who had previously contacted the study team asking to participate in research. They also recruited 24 age- and sex-matched healthy controls (HCs; 42% male; mean age, 28 ± 5 years) through internal advertisement at the study institution. Participants had no psychiatric comorbidities, were not using CNS active drugs, and had no history of recreational drug use. Participants underwent T1-weighted MRI scans with a 3T machine at the Clinical Research Facility, King's College Hospital in London. VBM analyses included whole-brain and parcellated cerebellar GM and WM analyses, as well as region-of-interest (ROI) gray matter analyses. Region of interest analyses were carried out in the bilateral primary visual cortex, visual motion processing area V5, and the pulvinar. The primary outcomes were comparisons of the VSS and HC groups in terms of neuroanatomic features.

Results and study limitations

The VSS and HC groups had similar mean total intracranial volumes ($1,465 \pm 113$ mL vs $1,450 \pm 146$ mL; $p = 0.6$) and comparable WM volumes. Compared with the HCs, the patients with VSS had increased GM volumes in the left primary and secondary visual cortices, the left visual motion area V5, and

Figure Map of 3 areas in which the VSS group had increased GM volumes: the left V1 cluster (green), the left V5 cluster (blue), and the left cerebellum cluster (red)



the left cerebellar crus I/lobule VI area. The investigators found no correlations between regional GM abnormalities and clinical variables for the VSS group. A limitation of the present study is the lack of an objective and reliable VSS severity metric. The investigators suspect that the present study's results will generalize well because VSS is a relatively homogeneous condition.

Study funding and competing interests

This study was funded by the UK National Institute for Health Research (NIHR) Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London, the Visual Snow Initiative, the Eye On Vision Foundation, and the Wellcome Trust. The authors report no competing interests. Go to [Neurology.org/N](https://www.neurology.org/N) for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The corresponding author(s) of the full-length article and the journal editors edited and approved the final version.

Neurology[®]

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Neurology 2020;95:e1792-e1799 Published Online before print August 5, 2020

DOI 10.1212/WNL.0000000000010530

This information is current as of August 5, 2020

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