



White matter tracts alterations in the acute phase of herpes simplex virus encephalitis in a patient presenting major sequelae

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Introduction

Herpes Simplex Virus Encephalitis (HSVE) is one of the most common causes of sporadic necrotizing encephalitis, caused by the herpes simplex virus (HSV-1) which affects particularly the limbic and medio-temporal regions.

Aims

To investigate whether HSVE-1 causes also extensive white matter alteration in the acute phase of the viral brain infection.

Materials and Methods

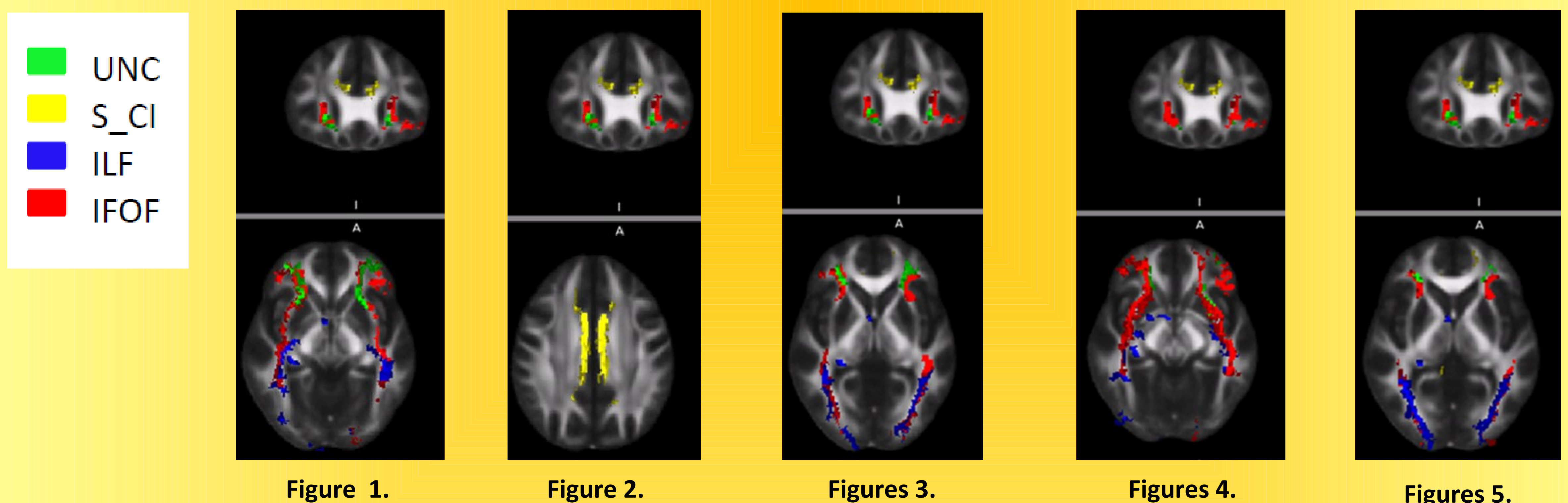
Participants: The patient (female, 70 years old, 5 years education) at onset had global amnesia, confabulation and anosognosia. After few days she showed severe global cognitive deterioration with persistent anterograde and retrograde episodic amnesia, spatio-temporal disorientation and daily-living functional loss. Conventional MRI showed selective bilateral atrophy in hippocampal and parahippocampal regions.

Procedure: The patient underwent ad-hoc second-level neuropsychological assessment and diffusion weighted imaging (DWI) acquired on a 3T GE MR scanner. Diffusion Tensor probabilistic tractography was used to reconstruct the white matter tracts. By using the Crawford and Garthwaite procedure (Crawford et al., 2010), t-test analysis comparing the mean Fractional Anisotropy (FA) between the patient and a group of healthy elderly controls (N=17) was carried out.

Results

Neuropsychological assessment: Extensive loss of memory functions, specifically affecting episodic and semantic memory (with a worse performance for living stimuli), autobiographical and visuo-spatial memory, and absence of priming. Visual naming was impaired, in particular for contextual scenes and famous landmarks. She showed spatial disorientation, way-finding and visual imagery deficits, some extent of executive deficits, whereas procedural and global frontal abilities (Frontal Assessment Battery) were preserved.

Neuroimaging data: After Bonferroni correction, neuroimaging analysis showed significant reduction of FA in bilateral inferior longitudinal fasciculus (ILF), left uncinated fasciculus (UNC), left inferior fronto-occipital fasciculus (IFOF) and right superior cingulum (S-CI), compared with the control group (See Figures 1-5; in radiological convention).



Conclusions

Diffusion Tensor tractography revealed that HSVE is characterised by reduced brain diffusivity in the acute phase of viral infection. The pattern of white matter damage seems to represent a plausible neural substrate of the cognitive deficits of this single case after HSVE, presenting not only extensive amnesia, but also severe deficits in visual recognition, spatial representation and navigation, and some extent of executive dysfunctions.

References

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