Injury of the Papez circuit in a patient with herpes encephalitis: A diffusion tensor tractography study

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Objectives: We report on a patient with dementia following herpes encephalitis, showing injury of a part of the Papez circuit (thalamocingulate tract between the anterior thalamic nuclei and the cingulate gyrus) on diffusion tensor tractography (DTT).

Case report: A 45-year-old male had suffered from drowsy mentality, fever, and headache for three days. The patient was diagnosed as herpes encephalitis based on the clinical manifestations and the results of cerebrospinal fluid analysis, electroencephalography, and brain MRI. The patient's symptoms almost disappeared by administration of acyclovir for two weeks. However, the results of neuropsychological testing at three months after onset indicated dementia. On the Mini-Mental Status examination, the patient scored 21/30. Results of the neuropsychological test performed at three months after onset showed verbal memory impairment on the Memory Assessment Scale (68 [2%ile]). In addition, the patient's total score on the Memory Assessment Scale (84 [14%ile]) was relatively low compared with his total intelligence quotient on the Wechsler Adult Intelligence Scale (123 [94%ile]).

Results: On three-month DTT, the neural tracts of the Papez circuit (fornix, cingulum, mammillothalamic tract, and thalamocingulate tract) were reconstructed in both cerebral hemispheres; however, the right thalamocingulate tract between the anterior thalamic nuclei and cingulate gyrus was disrupted.

Conclusion: Our results indicate injury of the right thalamocingulate tract following viral encephalitis in this patient. We believe that the patient's memory impairment was attributed, at least in part, to injury of the right thalamocingulate tract. Our results suggest the necessity of evaluation of the Papez circuit using DTT in patients with symptoms of dementia following encephalitis.

Fig.1. (A) Brain MRI (T2 Fluid attenuated inversion recovery [FLAIR]) performed on the first admission day showed increased signal intensity in the left temporal lobe and insula, however, this increased signal intensity had been disappeared on the follow-up MRI performed at one week after admission. (B) Diffusion tensor tractography of the Papez circuit (thalamocingulate tract: yellow, cingulum: red, fornix: blue, mammillothalamic tract: green). The neural tracts of the Papez circuit were reconstructed in both cerebral hemispheres; however, the right thalamocingulate tract between the anterior thalamic nuclei and cingulate gyrus was disrupted.