

Diffusion tensor tractographic findings in a patient with locked-in syndrome

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Objectives

We report on results of diffusion tensor tractography (DTT) of the corticospinal tract (CST) and the ascending reticular activating system (ARAS) in a patient with locked-in syndrome (LIS) following traumatic brain injury (TBI).

Case report

A 50-year-old female suffered head trauma resulting from a pedestrian–car accident and underwent conservative management for multiple contusional cerebral hemorrhages at the neurosurgery department of a university hospital. She was transferred to the rehabilitation department of the same university hospital five weeks after her initial injury. Complete weakness of all four extremities was detected on physical examination (Manual Muscle Test: right 0/0, left 0/0). She displayed alert consciousness during daytime and was able to move her eyeballs and, close and open her eyes. However, her cognition was not checkable due to severe quadriplegia and aphasia. DTT at 5 weeks after injury revealed that the CST was discontinued at the midbrain level in both hemispheres. However, the lower dorsal and upper ARAS showed intact configurations except for decreased neural connectivity to the prefrontal lobe of the upper ARAS in both hemispheres.

Conclusions

DTT was used to observe the CST and ARAS in a patient with LIS following TBI. We believe that DTT-based analysis of the CST and ARAS is helpful for precise diagnosis of LIS following brain injury.

Acknowledgment

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean Government(MSIP) (No. 2018R1A2B6000996).

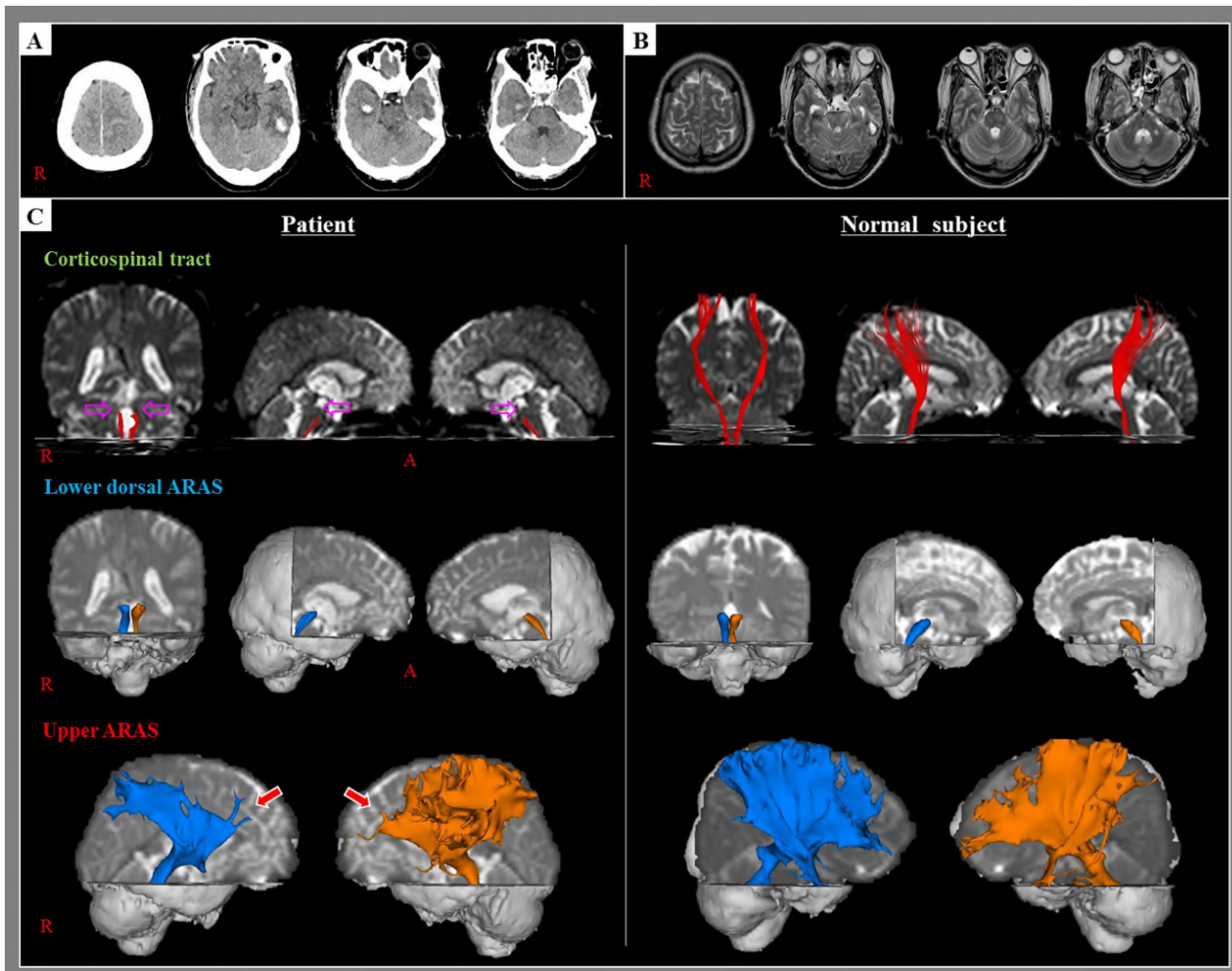


Fig. 1. (A) Brain computed tomography images taken at onset show multiple cerebral contusional hemorrhages. **(B)** Brain magnetic resonance images taken at 5 weeks after onset show multiple small leukomalactic lesions in the subcortical white matter including that in the left frontal area and the right thalamus. **(C)** Results of diffusion tensor tractography (DTT) for the corticospinal tract (CST) and ascending reticular activating system (ARAS). The CST is discontinued at the midbrain level (pink arrows) in both hemispheres compared to that in a normal subject (51-year-old female). However, the lower dorsal and upper ARAS showed intact configurations except for decreased neural connectivity to the prefrontal lobe of the upper ARAS (red arrows) in both hemispheres compared to a normal subject (48-year-old female).