P 3-115

Change in the precuneus with recovery of impaired consciousness in a patient with HI-BI

Han Do Lee[1,1†], Sung Ho Jang[1,1†], Min Son Kim[1,1*†]

Yeungnam University Medical Center, Department of Rehabilitation Medicine[1]

Objectives

We report on the application of diffusion tensor tractography (DTT) to the ascending reticular activating system (ARAS) of a patient and observing a change in the precuneus with concomitant recovery of impaired consciousness in a patient with hypoxic-ischemic brain injury (HI-BI).

Case presentation

A 50-year-old male patient suffered cardiac arrest induced by an ST-segment elevation myocardial infarction. At eight months after onset, when he started rehabilitation at our hospital, the patient was a vegetative state (VS) with a Coma Recovery Scale-Revised (CRS-R) score of 5. He underwent comprehensive rehabilitation including transcranial direct current stimulation (anode at posterior parietal cortex). After two months of rehabilitation, his consciousness had recovered to a minimally conscious state (MCS) with a CRS-R score of 15. As a result, he was able to perform partial grasp-release of his left hand spontaneously and partial flexion-extension of his left great toe on verbal command. On 8-month DTT, decreased neural connectivity of the upper ARAS between the thalamic intralaminar nucleus and the cerebral cortex was observed in both prefrontal and parietal cortices. In contrast to the 8-month DTT, the 10-month DTT revealed increased neural connectivity of the upper ARAS in the left parietal lobe (especially in the precuneus) and the body of the corpus callosum.

Conclusions

Improvement in connectivity in the precuneus was demonstrated in a HI-BI patient who showed recovery from VS to MCS. It appears that the increased neural connectivity to the precuneus contributed to recovery from VS to MCS in this patient.

Acknowledgment

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

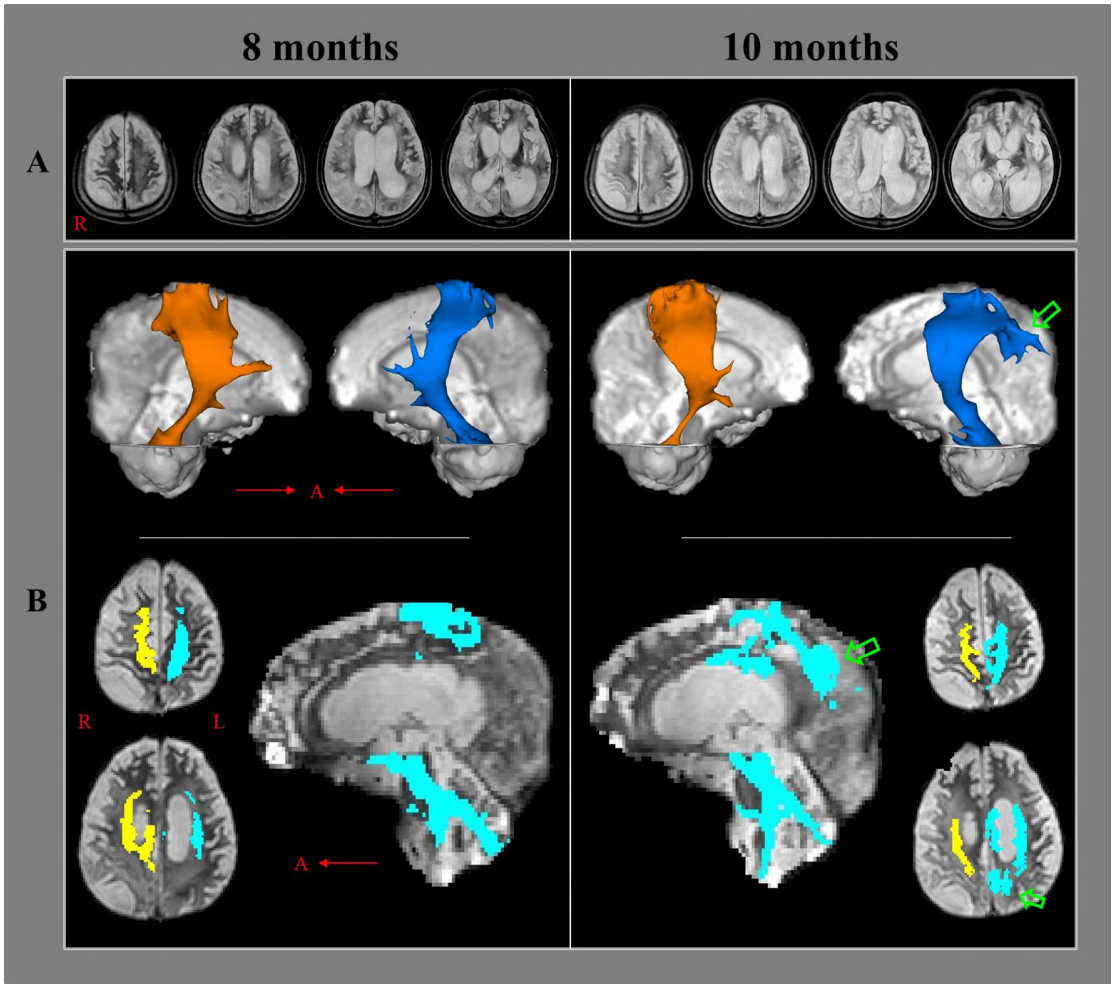

Fig. 1. (A) Brain magnetic resonance images at eight months after onset show leukomalactic lesions in the fronto-parieto-temporo-occipital lobes in both hemispheres. (B) Results of diffusion tensor tractography (DTT) of the upper ascending reticular activating system between the thalamic intralaminar nucleus and the cerebral cortex. On 8-month DTT, decreased neural connectivity of the upper ARAS is present in both the prefrontal and parietal cortices. Compared with the 8-month DTT results, the 10-month DTT revealed increased neural connectivity of the upper ARAS in the left parietal lobe (especially in the precuneus [arrows]) and the body of the corpus callosum.