뇌신경재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

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Recovery of injured optic radiations in a patient with hypoxic-ischemic brain injury

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Introduction of diffusion tensor imaging (DTI) has made three-dimensional reconstruction of optic radiation (OR) possible, and OR injury in patients with brain injury has been reported in many studies using DTT. However, only a few studies have demonstrated the recovery of injured OR. As a result, the recovery mechanisms of injured OR have yet to be elucidated.

A 19-year-old female patient underwent conservative management for HI-BI induced by hanging. At 4 months after onset, she was transferred to the rehabilitation department of our university hospital. Brain MRI at 4 and 5 months after onset showed leukomalactic lesions in the parieto-temporo-occipital lobes in both hemispheres. The patient was in a VS with a CRS-R score of 9. Although she could open her eyes spontaneously, she did not show blinking reflex with visual stimuli. She underwent comprehensive rehabilitation, which included medications, physical therapy, and occupational therapy. tDCS was applied to the upper occipital area (the anode) using saline-soaked surface sponge electrodes(cathode: the supraorbital region, stimulation intensity: 2mA, duration: 20 min/session, one session/day and seven sessions/week). rTMS was applied to the right upper occipital area at a frequency of 10 Hz with an 80% motor threshold intensity and 160 pulses for 8 minutes twice/day with seven sessions per week. After a month of rehabilitation, the patient had recovered to a MCS with a CRS-R score of 15. In addition, she showed blink reflex with visual stimuli and visual tracking according to visual stimuli. DTI was conducted twice. For OR, the seed ROI was placed on the lateral geniculate body(LGB), and the target ROI was placed on the bundle of the OR at the middle portion between the LGB and the occipital pole. On 4-month DTT, discontinuations of the OR were observed in both hemispheres. However, the OR was connected to the upper occipital lobe in both sides on 5-month DTT

In the current study, we followed up DTTs for the OR in a patient with impaired consciousness after HI-BI. We found the discontinued portions of both ORs were thickened and connected to the upper occipital lobes. These changes on DTTs indicate the recovery of injured ORs. At 5 months after onset she revealed blink reflex and visual tracking, which was not observed at 4 months after onset. These findings suggest that some of the visual function of this patient recovered during a month of rehabilitation.

Because recovery of the injured ORs occurred druing the chronic stage of HI-BI, this recovery appeared to be a result of brain plasticity

In conclusion, using follow up DTT, we demonstrated the recovery of injured ORs in a patient with HI-BI who showed partial recovery of visual function. We believe that the results of this study suggest one of the recovery mechanisms of injured OR in patients with brain injury. In addition, the recovery of injured ORs appeared to contribute to recovery of consciousness in this patient.

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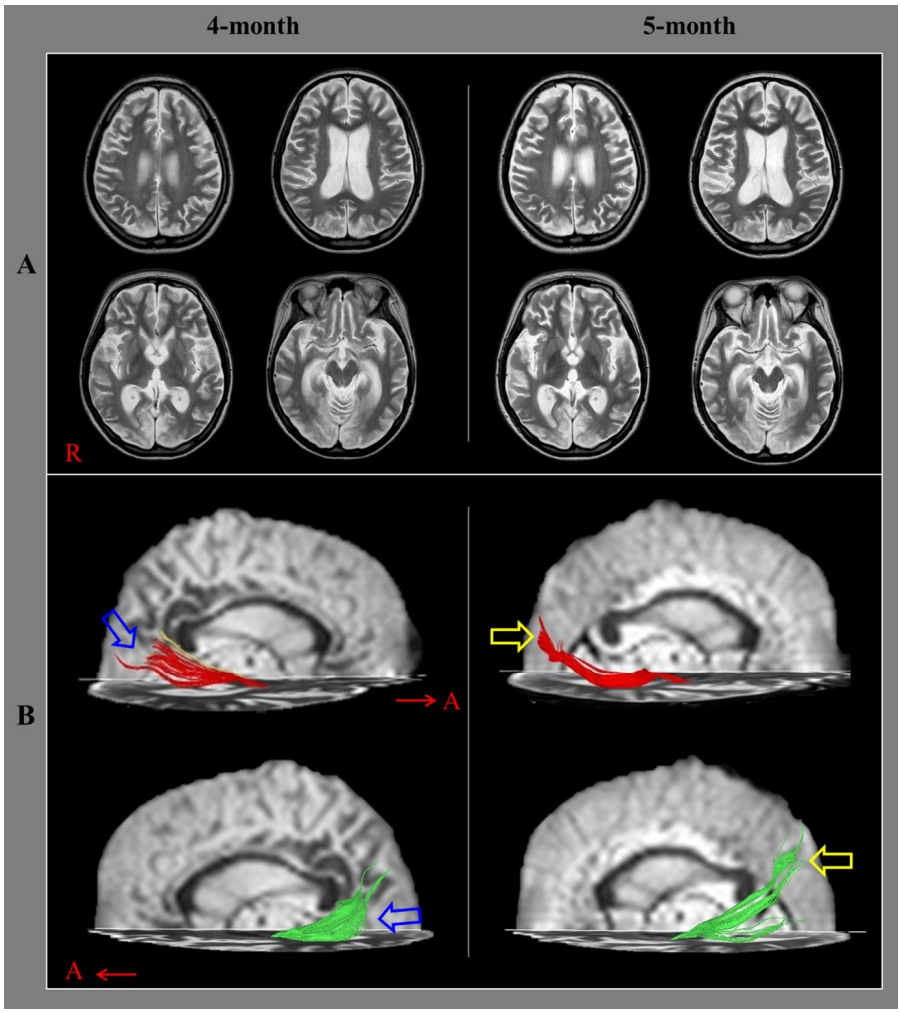

Fig. A: Brain magnetic resonance images at four and five months after onset showed leukomalactic lesions in the parieto-temporo-occipital lobes in both hemispheres. B: Results of diffusion tensor tractography (DTT) for optic radiation (OR). On 4-month DTT, discontinuations (blue arrows) except for tiny fibers in the posterior portions of the OR were observed in both hemispheres. However, the OR was connected to the upper occipital lobe on both sides (yellow arrows) on 5-month DTT.