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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Thalamocortical connection changes following shunt operation for Hydrocephalus in a patient with TBI

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Hydrocephalus is a dilatation of the ventricular system of the brain and is usually accompanied by an elevated intraventricular pressure. A few studies have demonstrated changes in the thalamocortical connections between the central thalamus and the cerebral cortex, which is a main neural structure for consciousness, following a shunt operation for hydrocephalus. In this study, we report on a patient who showed increased thalamocortical connectivity to the precuneus and the posterior cingulate cortex concomitant with recovery of impaired consciousness following TBI. A 78-year-old female patient underwent craniectomies on both frontal lobes for hematoma removal of traumatic ICH in both frontal lobes, as well as IVH and SAH. 1 month after onset, she was transferred to the rehabilitation department of the same university hospital. The patient exhibited impaired consciousness, with a GCS score of 9 and a CRS-R score of 6. Brain MRI taken at four months after onset showed hydrocephalus along with leukomalactic lesions in both fronto-temporal lobes and hydrocephalus. At that time, the patient exhibited a GCS score of 9 and a CRS-R score of 12. As a result, the patient underwent a V-P shunt operation via the right parietal approach. When the patient was transferred to the rehabilitation department at 8 days after the shunt operation, her consciousness had improved to a GCS score of 11 and a CRS-R score of 16. As a result, she was able to control her head for about 3 minutes while in a sitting position, and could track her eyes and execute hand movements according to verbal command. DTI data were obtained twice (1 day prior to shunt operation and 8 days post-op). For analysis of the neural connectivity of the intralaminar nucleus (ILN) of the thalamus to the cerebral cortex, the seed ROI was placed at the ILN of the thalamus at the level of he commissural plane. Out of 5000 samples generated from the seed voxel, contact results for neural connectivity of the ILN were visualized at a threshold of 10 contacts streamlined through each voxel for analysis. On DTT 8 days post-op, there was increased thalamocortical connection between the thalamic ILN and the cerebral cortex in the left precuneus and the posterior cingulate cortex compared to the connection level on DTT performed a day prior to the shunt operation. In this study, serial DTTs were used to demonstrate changes in the level of thalamocortical connections between the thalamic ILN and the cerebral cortex in a patient with TBI who showed partial recovery of impaired consciousness following a

shunt operation. The main changes were increased thalamocortical connections to the left precuneus and the posterior cingulate cortex.

In conclusion, increased thalamocortical connectivity to the precuneus and posterior cingulate cortex following a shunt operation for hydrocephalus was demonstrated in a patient with TBI who concurrent with the shunt operation showed partial recovery of impaired consciousness.

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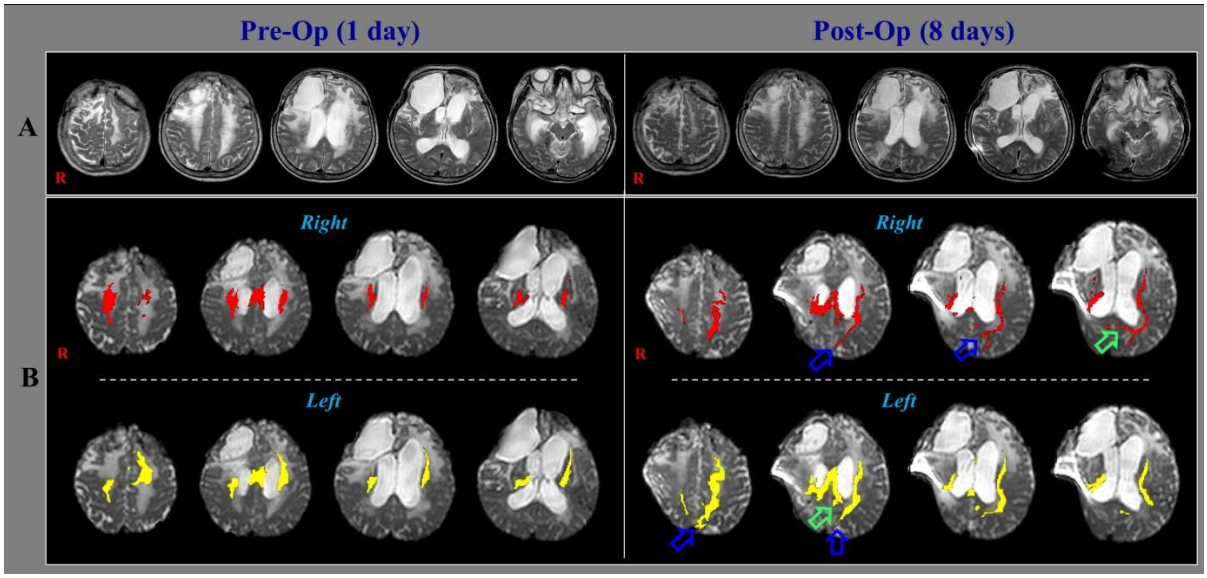

Fig 1. (A) Brain magnetic resonance images (MRI) at 1 day prior to shunt operation shows leukomalactic lesions in both fronto-temporal lobes and the presence of hydrocephalus. MRI at eight days post-operation show improvement of the dilatation of the ventricular system. (B) Results of diffusion tensor tractography (DTT). On DTT eight days post-operation the thalamocortical connections between the thalamic ILN and the cerebral cortex have increased in the left precuneus (blue arrows) and the posterior cingulate cortex (green arrows) from the connection level observed on the DTT performed one day prior to the operation.