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A case Report on the Usefulness of Diffuse Tensor Imaging in Dysphagia with Traumatic Brain Injury.

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INTRODUCTION

Traumatic brain injury(TBI) is one of the common causes of disability in adults and is associated with long-term or lifelong physical, cognitive, behavior and emotional consequences. Dysphagia or swallowing difficulty is common after serious TBI and is associated with increasing risk of malnutrition and pneumonia. Neural injury to the white matter can cause neurological disorder after TBI. Diffusion tensor imaging(DTI) allows access to injury mechanisms of traumatic axonal injury (TAI) following TBI, useful for detecting axonal injury lesions. We report on the case of confirming the damage of the neural tube in the DTI that was carried out due to the difficulty of swallowing for patients with traumatic brain damage.

CASE REPORT

A 15-year-old male patient was hit by a car while riding an electric kickboard and hit his head and left knee on the ground, and was diagnosed with subarachnoid hemorrhage, intraventricular hemorrhage, and traumatic right subdural hemorrhage. (Fig. 1) When the patient arrived at the hospital after the accident, he was in a state of stupor, which lasted for about 30 days, and even after he gradually regained consciousness, cognitive function defect appeared. He was hospitalized in neurosurgery, received conservative treatment, and underwent several surgeries with an orthopedic consultation for a left femoral fracture and posterior cruciate ligament dislocation.

After regaining consciousness, he tried to walk in a wheelchair, tried to eat orally, and there was no reflex coughing while eating. However, The patient was referred to the Department of Rehabilitation Medicine for consultation to confirm dysphagia and conduct a video fluoroscopic swallowing study(VFSS) test. As a result of the VFSS test, a Functional dysphagia scale score (FDSS) of 29 points and a PAS score of 8 were confirmed, and L-tube feeding was started.

After that, he was transferred to our Department of Rehabilitation Medicine for intensive rehabilitation treatment. Through rehabilitation and muscle strengthening for hemiplegia, motor function quickly recovered and min assist gait became possible. The VFSS test was repeated 4 times, there was no significant change and aspiration was still confirmed (Fig. 2) when aspiration was confirmed in a repetitive VFSS test in a patient with a relatively small amount of cerebral hemorrhage, a diffuse tensor imaging(DTI) test was performed to determine the cause of dysphagia. On the DTI image, The right cortical spinal tract (CST) was reduced at the pons level and cortical level compared to the left CST. (Fig. 3)

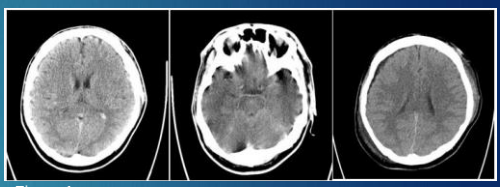

Figure 1.
Brain CT images shows Acute IVH in the left lateral ventricle, Small amount of SAH in the internal peduncular cistern, left ambient cistern, superior cerebellar cistern, right parietal sulci and Rt. SDH

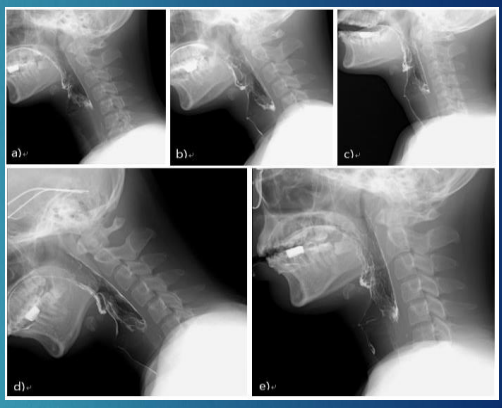

Figure 2.
(a), A small amount of aspiration was confirmed on the first video fluoroscopic swallowing study(VFSS). and study shows the remaining contrast residue in the valleculae and pyriform sinus. (b)~(e), Afterwards, while undergoing professional swallowing rehabilitation, a total of 4 VFSS follow-up tests were performed at intervals of 1 to 2 weeks, and a large amount of aspiration was still confirmed, and residues still remained

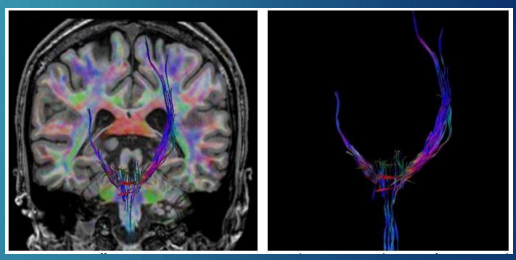

Figure 3.
MRI Diffusion Tensor Imaging(DTI) images shows Decreased extent of corticospinal tract fibers in right hemisphere and pons level.

DISCUSSION

In this case study, we confirmed that the CST was reduced in the DTI of a patient with dysphagia after traumatic brain injury. Decreased CST in DTI indicates nerve damage, which may have contributed to the patient's dysphagia.

Therefore, DTI can help to identify Diffuse Axonal injury(DAI) and neural Injury to know the cause of the difficulty of swallowing in TBI and cerebral hemorrhage patients.