

Relationship between SLF injury and visual pursuit in patients with unconsciousness follow HI-BI

Han do Lee^{1,1†}, Sung Ho Jang^{1,1†}, Min Son Kim^{1,1*†}

Yeungnam University Medical Center, Department of Rehabilitation Medicine¹

Introduction

By using diffusion tensor tractography (DTT), we investigated the relationship between visual pursuit disturbance and injury of the superior longitudinal fasciculus (SLF) in patients with impaired consciousness following hypoxic-ischemic brain injury (HI-BI).

Methods

Twenty patients with impaired consciousness due to HI-BI and 11 control subjects were recruited to this study. We placed the patients into one of two groups according to whether they had visual pursuit ability, which was based on their visual function scale score on the Coma Recovery Scale-Revised (CRS-R): group A (visual fixation; CRS-R visual function scale score 0~2), 13 patients; group B (visual pursuit; CRS-R visual function scale score 3~5), 7 patients. The SLF of each participant was analyzed to obtain fractional anisotropy (FA), apparent diffusion coefficient (ADC), and fiber number (FN) values.

Results

Significant differences were observed in all three DTT parameters (FA, ADC, and FN) between patient groups A and B and the control group ($p < 0.05$). In the comparison of groups A and B, the FA, ADC, and FN values were different for the right, left, and both SLF except for the FN of the left SLF and the ADC of the right SLF ($p < 0.05$). A moderate positive correlation was observed between the CRS-R visual function scale and FA ($r = 0.619$, $p < 0.05$) and FN ($r = 0.522$, $p < 0.05$) values for both SLF. However, a moderate negative correlation was observed between the CRS-R visual function scale and ADC values for both SLF ($r = -0.451$, $p < 0.05$).

Conclusion

We observed a close relationship between visual pursuit disturbance and SLF injury in patients with impaired consciousness following HI-BI. We believe that SLF injury is a pathophysiological mechanism in visual pursuit disturbance of patients with impaired consciousness following HI-BI.

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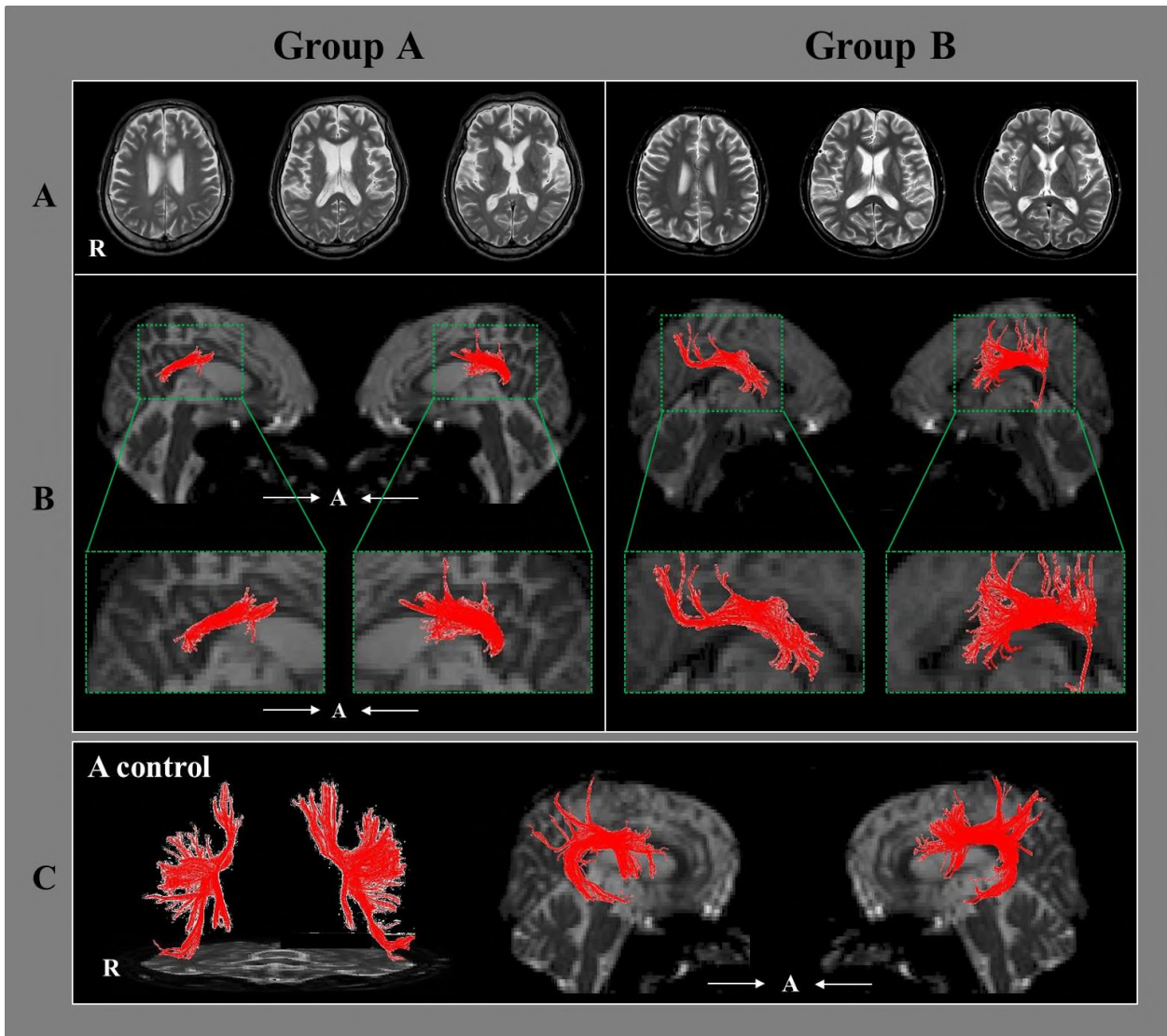


Fig. 1 (A) T2-weighted brain magnetic resonance images of representative patients in group A (46-year-old male) and group B (49-year-old male). **(B, C)** Results of diffusion tensor tractography for the superior longitudinal fasciculus (SLF) of **(B)** the same patients and **(C)** a control subject (50-year-old male). The SLF in both hemispheres of the patients show the presence of injuries when compared with those of the control subject. Moreover, the group A patient images indicate more severe injury than that in the group B patient.