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Relationship between injured cingulum and impaired consciousness in patients with HI-BI

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Objectives

We investigated the relationship between cingulum injury and impaired consciousness in patients with hypoxic-ischemic brain injury (HI-BI) by using diffusion tensor tractography (DTT).

Methods

We recruited 29 patients with HI-BI and 25 normal control subjects. The patients were classified as intact consciousness (group A, 13 patients) or impaired consciousness (group B, 16 patients). The DTT parameters of fractional anisotropy (FA) and tract volume (TV) were estimated for both cinguli. Glasgow Coma Scale (GCS) and Coma Recovery Scale-Revised (CRS-R) scores were also evaluated.

Results

The FA and TV values of the cinguli in groups A and B were lower than those of the control group ($p < 0.05$), and the FA and TV values of group B were lower than those of group A ($p < 0.05$). The FA and TV values of the cinguli in group A were not significantly correlated with GCS and CRS-R scores ($p > 0.05$); however, the FA correlations with GCS ($r = 0.457$, $p < 0.05$) and CRS-R ($r = 0.494$, $p < 0.05$) and those of TV with GCS ($r = 0.500$, $p < 0.05$) and CRS-R ($r = 0.491$, $p < 0.05$) were moderately positive.

Conclusions

We found a significant relationship between injury of the cingulum and impaired consciousness in patients with HI-BI. Our results suggest that an injured cingulum could be an appropriate target for neurointervention or neurorehabilitation in patients with impaired consciousness following HI-BI.

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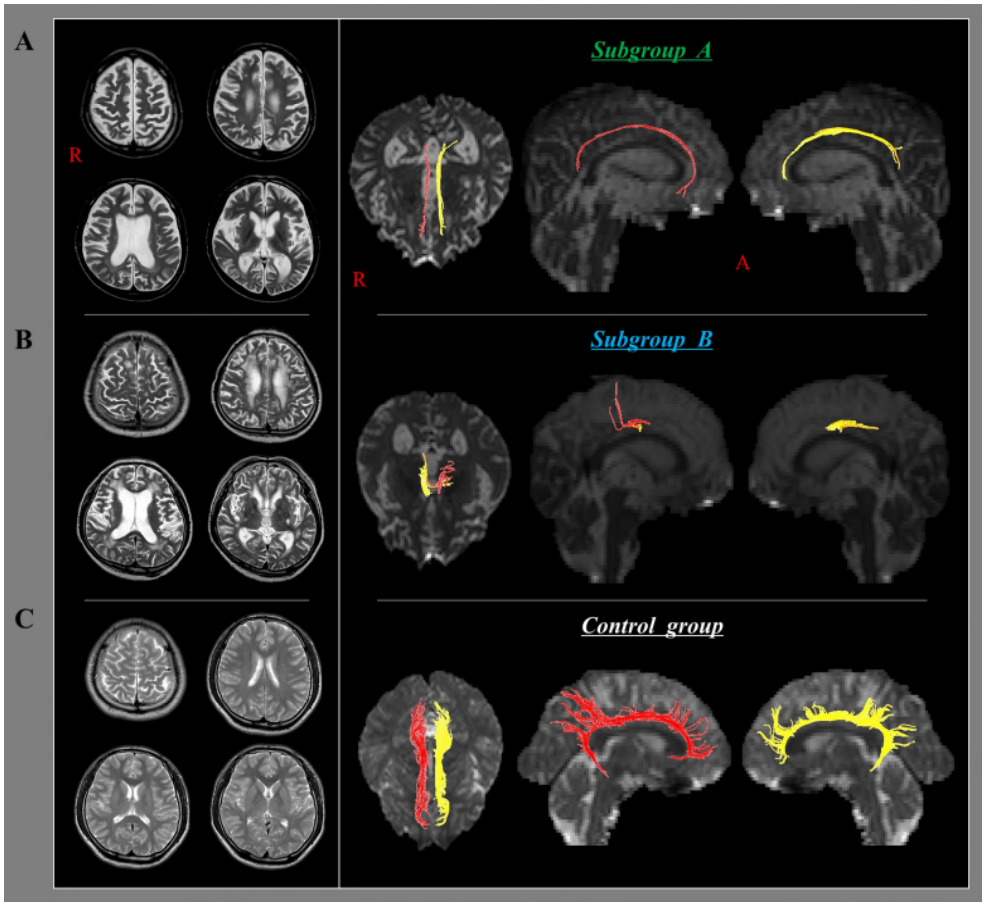

Fig. 1. Results from T2-weighted brain magnetic resonance images and diffusion tensor tractography (DTT) for the cingulum in representative patients from patient groups A and B and the control group. (A) Narrowing of both cinguli in a representative patient of group A (intact consciousness, 53-year-old male); however, the anterior and posterior portions of the cinguli are intact. (B) Non-reconstrucion of the anterior and posterior portions of the cinguli in a representative patient of group B (impaired consciousness, 47-year-old male). (C) Images showing the normal cinguli in a representative subject of the control group (46-year old male).