

The effect of the hydrocephalus to the neural tracts : DTT study

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Introduction

We investigated the effect of hydrocephalus to the adjacent the neural tracts of the lateral ventricle in patients with hydrocephalus following spontaneous intracerebral hemorrhage (ICH), using diffusion tensor tractography (DTT).

Method

Fourteen consecutive patients with spontaneous ICH and hydrocephalus and 20 control subjects were recruited for this study. DTI studio software was used for evaluation of four neural tracts: corticospinal tract (CST), corticoreticulospinal tract (CRT), fornix, and cingulum. We measured the fiber number (FN) and fractional anisotropy (FA) of each neural tracts.

Results

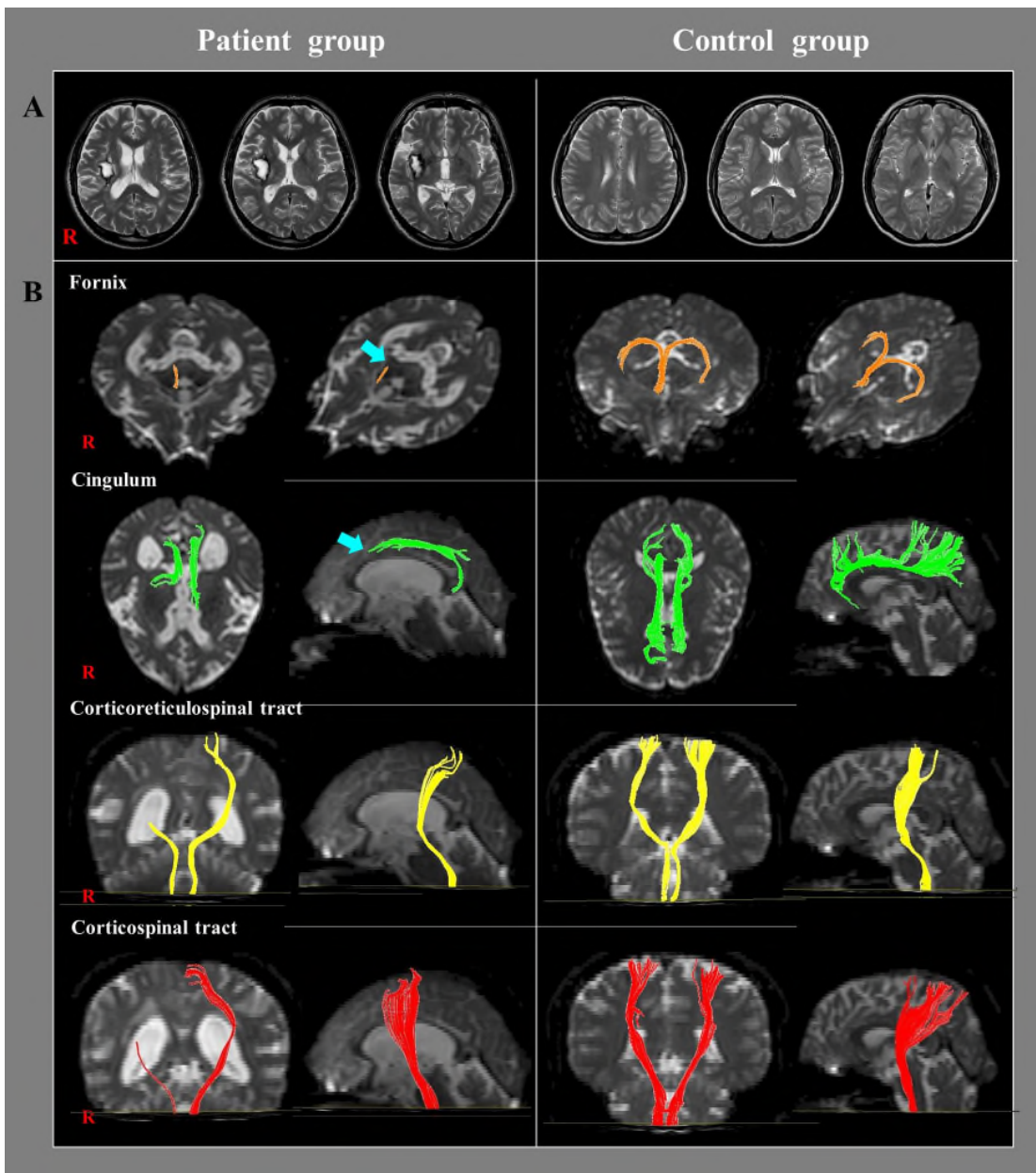
The values of FN and FA of the fornix, and FN of the cingulum showed significant differences between the patient and control groups ($p < 0.05$). However, no significant difference was not observed in the other DTT parameters of the rest neural tracts ($p > 0.05$). In terms of the FN, the effect size of the fornix showed the largest effect size (-554.761), followed by cingulum (-460.261), CRT (-216.471), and CST (-21.096). In addition, regarding the FN value, CST had statistically significant effect sizes compared to CRT, fornix, cingulum ($p < 0.05$), except for the comparison between fornix and cingulum ($p > 0.05$). However, as for the FA value, any pairwise comparisons of two effect sizes did not show significant difference ($p > 0.05$).

Conclusion

We found that the hydrocephalus affected to the fornix and cingulum without significant affection to the CRT and CST. Our results suggest that the neural tracts related to the cognition (fornix and cingulum) appeared to be more affected by hydrocephalus rather than motor function (the CRT and CST).

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(A) T2-weighted MR images shows a patient with hydrocephalus (59-year-old male) and control subject (56-year-old male). (B) Results of diffusion tensor tractography images of the fornix, cingulum, corticoreticulospinal tract and corticospinal tract in a patient and control subject. Blue arrow: injury of the neural tracts in unaffected hemisphere.