A Pilot Study of Diffusion Tensor Imaging for Corticospinal Tract Assessment and Correlation to Neurologic Examination after Endoscopic Intracerebral Hemorrhage Evacuation

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Introduction

Diffusion tensor imaging (DTI) is currently used to guide neurosurgical operations and predict motor recovery after lesional surgery. A mean fractional anisotropy (FA) ratio of 0.8 is commonly used as a corticospinal tract (CST) threshold determining return of function 3 months after surgery1,2. Higher FA values correlate with better function. DTI may also predict motor recovery in endoscopic minimally invasive intracerebral hemorrhage (ICH) evacuation.

Methods

Diffusion tensor imaging and tractography were performed in 4 patients with ICH 6-8 days after endoscopic ICH evacuation. FA values along the CST were measured, drawing two regions of interest (ROI) as seeds on the cerebral peduncle and posterior limb of the internal capsule. FA ratios were determined (hematoma side vs. contralateral side) and correlated with NIHSS at the time of the MRI scan.

Results

All patients improved after surgery. Approximately 1 week after surgery, mFA ratios were 0.93, 0.86, 0.79, 0.77. NIHSS score at the time of MRI were respectively 2 (from admission NIHSS of 6), 9 (from 18), 13 (from 20), and 20 (from 30).

Conclusions

Mean FA ratio of the corticospinal tracts, measured 1 week after endoscopic ICH evacuation is inversely correlated with NIHSS at the time of the MRI scan. Further investigation is necessary to determine the ability of FA to predict long term outcome in this patient population.

References
