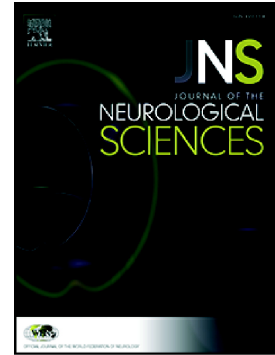


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The plasticity of the corticospinal tract in children with obstetric brachial plexus palsy after Botulinum Toxin A treatment

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Abstract

Botulinum neurotoxin A (BTX-A) intervention has long-term benefits for children with obstetric brachial plexus palsy (OBPP). Although cortical plasticity has been widely studied, plasticity in white matter has not received as much attention. Here, six children with OBPP underwent functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI) before and 6 months after BTX-A treatment. Surface electromyography (EMG) was recorded. The aim was to investigate changes in the corticospinal tract (CST) as an example longitudinal observation of white matter plasticity. Deterministic fiber tracking with a Fiber Assignment by Continuous Tracking algorithm was used to reconstruct the CST. Fiber tracts passing through a region of interest (ROI) in the posterior limb of the internal capsule and a target ROI in the upper-limb representation of M1 (defined by task-related fMRI) were selected as the CST. Motor performances were improved while EMG showed no significant difference 6 months after the treatment. We observed a significant increase in mean fractional anisotropy and a significant decrease in fiber number after treatment. We analyzed the correlations between DTI metrics and clinical motor assessments. Although the correlation results were not statistically

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