

Characterisation of the corticospinal tract using Diffusion Magnetic Resonance imaging in Unilateral and Bilateral Cerebral Palsy patients

Abstract

Neuroimaging is increasingly used to locate the lesion that causes cerebral palsy (CP) and its extent in the brains of CP patients. Conventional structural magnetic resonance imaging (MRI) does not indicate the connective pattern of white matter; however, with the help of diffusion MRI, fibre tracking of white matter can be done. **Methods:** We used diffusion MRI and probabilistic tractography to identify the putative white matter connectivity in the brains of 10 CP patients. We tracked the corticospinal tract (CST) of the patients' upper and lower limbs and calculated the white matter connectivity, as indexed by streamlines representing the probability of connection of the CST. **Results:** Our results show that diffusion MRI with probabilistic tractography, while having some relation with the clinical diagnosis of CP, reveals a high degree of individual variation in the streamlines representing the CST for upper and lower limbs. **Conclusion:** Diffusion MRI with probabilistic tractography provides the state of connectivity from lesioned areas to other parts of the brain and is potentially beneficial to be used as an adjunct to the clinical management of CP, providing a means to monitor intervention outcomes.