Tung Van Nguyen et al., Pediatr Ther 2018, Volume: 8
DOI: 10.4172/2161-0665-C1-049

Assessment of diffusion tensor MRI tractography of the pyramidal tracts injury correlates with gross motor function levels in children with spastic cerebral palsy

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Background: Cerebral palsy (CP) affects movement and posture is caused by brain damage before, during, or after birth. Accurate assessment of neurological damage and their relationship to motor dysfunction levels are important for the diagnosis, treatment and prognosis of cerebral palsy.

Objectives: The objective of this study was to evaluate the correlation between DTI parameters of each pyramidal tract with the GMFCS level in children with spastic cerebral palsy.

Materials & Methods: Descriptive study of 44 children with spastic cerebral palsy from two to 12 years was recruited at Rehabilitation Department from 10/2015 to 8/2017. We evaluated clinical characteristics and the distribution of Gross Motor Function Classification System (GMFCS) levels. All participants were studied with brain conventional MRI findings and the following three diffusion tensor imaging (DTI) parameters including tractography for each pyramidal tract: fibre number (FN), fractional anisotropy (FA) and Apparent diffusion coefficient (ADC).

Results: In 44 children with spastic CP mean age: 4.5±2.1y; mean gestational age: 35.34±4.6 wks. Clinically, 22 (50.0%) had quadriplegia, 15 (34.1%) had diplegia and 7 (15.9%) hemiplegia. The distribution of GMFCS levels: 25 (56.8%) level II, 13 (29.8%) level III and 6 (13.6%) level IV. Brain conventional MRI scans showed that 33 (75%) abnormal findings, within periventricular white-matter damage was the highest finding 27 (61.4%) and only 11 (25%) normal MRI findings the FA values of both tracts <0.05.

Conclusions: The DTI (FN, FA and ADC) parameters of each pyramidal tract were significantly correlated with GMFCS levels in children with spastic cerebral palsy ($p<0.001$).

Biography

Tung Van Nguyen is a Senior Consultant in the Pediatric Department at the 108 Military Central Hospitals in Hanoi, Vietnam. Since graduating, he has shown himself to be a very hard-working, reliable and enthusiastic member of staff. In the professional work, he indicates his very good background knowledge and skill of Clinical Doctor in Pediatric field. He has been studying the PhD course at Hanoi Medical University for three years. He has studied clinical features, brain MRI findings, treatment efficacy of Botulinum toxin type an injection and combination with rehabilitation in children with spastic cerebral palsy at Rehabilitation Department-National Hospital of Pediatrics. He has published more than five papers in national journals.

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