**White matter tracts integrity in children with focal cortical dysplasia**

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**Introduction**: Studies of adults with epilepsy and focal cortical dysplasias (FCDs) show abnormalities of white matter tracts; however, the pattern of white matter tracts abnormalities in children with epilepsy and FCD remains unknown[1]. We aimed to evaluate the integrity of white matter tracts in children with pharmacoresistant epilepsy secondary to FCD. More specifically, we investigated alterations in tracts with different patterns of maturation across lifespan.

**Materials and Methods:** We analyzed diffusion tensor imaging (DTI) acquired in a 3 Tesla MRI of 14 patients (13 ± 4 years, 10 female) and 29 age and sex-matched controls (13 ± 4 years, 17 female). The cortical spinal tract (CST), as an important source of projection fibers, and the corpus callosum (CC), as the main commissural fiber tract, were selected for the present study Images were processed and analyzed using the software *ExploreDTI* with semiautomatic deterministic method to obtain average fractional anisotropy (FA), axial (AD), radial (RD) and mean (MD) diffusivity. Statistical analysis was performed with SPSS 24*.*

**Results:** Compared with controls, patients with FCD presented increase of MD and RD in the genu of the CC (Two sample T-test, MD: p<0.001; RD: p=0.03) and increase of FA (p=0.011) and MD (p=0.046) in the splenium of the CC. Differently, patients presented decrease of MD (p=0.009), AD (p<0.001) and RD (p=0.02) in the CST ipsilateral to the FCD.

**Discussion:** Children with epilepsy and FCD have abnormalities in white matter tracts. These abnormalities differ between CC and CST, with the first showing increase in FA and other diffusivities and the later showing decreased diffusivities. These tracts have similar patterns of maturation in normal children: FA showing progressive increase and, MD, progressive decrease1,2.

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| Table 1 – Comparison between the results of the present study with the literature 1,2 |
| **Anatomic region** | **Parameter**  | **Patients with FCD in comparison with healthy controls** | **Literature**  |
| Corpus Callosum | FA | - | Progressive increase with age |
| MD | Increased | \* |
| AD | - | \* |
| RD | Increased | Progressive decrease with age |
| Cortical Spinal Tract | FA | - | Progressive increase with age  |
| MD | decreased (ipsilateral to the FCD) | Progressive decrease with age |
| AD | decreased (ipsilateral to the FCD) | Progressive decrease with age |
| RD | decreased (ipsilateral to the FCD) | Progressive decrease with age |

**Conclusion:** Therefore, our findings suggest that abnormalities of white matter tracts observed in children with FCD can be secondary to impairment of normal maturational process.

**References:** [1] Evstigneev VV, et al. (2013). The effect of structural white matter abnormalities on the clinical course of epilepsy. *Advances in Clinical and Experimental Medicine*, 22, 529 – 537. [2} Eluvathingal TJ, et al. (2007). Quantitative diffusion tensor tractography of association and projection fibers in normally developing children and adolescents. *Cerebral Cortex*, *17*(12), 2760-2768; [2] Hasan KM, et al. (2009). Diffusion tensor tractography quantification of the human corpus callosum fiber pathways across the lifespan. *Brain research*, *1249*, 91-100.