

Abstract

Epilepsy affects approximately 0,5-1% of children. Epileptic seizures originate in and propagate along certain neural pathways involved in physiological processes of cognition. Consequently, cognitive impairment frequently accompanies epilepsy in childhood and contributes to diminished quality of life of these patients. The main goal of this PhD thesis was to study multiple aspects of cognitive impairment in children suffering from intractable focal epilepsy.

In the **first and primary study**, we described for the first time the negative impact of quasi-periodic epileptiform discharges in sleep (termed “hurdles” in our work) on cognitive functions in children with focal structural epilepsy. We have also shown that epileptiform activity in sleep has a more prominent negative impact on cognitive functions than epileptiform activity in wake. Although “hurdles” are by definition generalized, they do not predict worse outcomes of epilepsy surgery, compared to controls. In the **second study**, we analyzed the relationship between the extent of epileptogenic zone, functional brain plasticity (evaluated by fMRI) and cognitive dysfunction in children with drug resistant temporal epilepsy. Comparing patients with isolated focal cortical dysplasia (FCD) and patients with combined pathology (FCD and hippocampal sclerosis - HS), we found the group of patients with combined pathology had a higher proportion of left-handedness and reduced face-recognition abilities than those with isolated FCD. We found a similar proportion of children with atypical cortical localization of speech centers in both groups, and they achieved lower scores of full-scale IQ/DQ and verbal IQ. The **third study** analysed post-surgical cognitive development in 203 children who underwent resective epilepsy surgery in the Centre for Epilepsy in Motol University Hospital between 2000 and 2017. Overall, the patients showed higher post-surgical scores of FSIQ/DQ, compared to pre-surgical values. Patients with FCD type I suffered from a more prominent cognitive impairment than those with other FCD types. Patients with low pre-surgical FSIQ/DQ scores tended to gain most. Patients with the lowest pre-surgical FSIQ/DQ scores showed the most prominent increment in (post-surgical) FSIQ/DQ scores.

Conclusion: The cognitive impairment is a multifactorially conditioned comorbidity of epilepsy, having a negative impact on quality of life, but partially preventable.

KEYWORDS: cognition, epilepsy surgery, epileptic encephalopathy, ESES