

ABSTRACT

Epilepsy, as the most common chronic neurological disease, affects a significant part of population (0.5–1%). Drug resistant epilepsy has a significant negative effect on the quality of life, psychiatric comorbidities, neurocognitive performance and the risk of SUDEP in children. Therefore, resective epilepsy surgery, the only curative treatment of this condition, can fundamentally reverse this unfavorable prognosis. An inevitable prerequisite for a good postoperative result is complete removal of the epileptogenic zone (EZ) and preservation of eloquent areas (EC). At present, even with improving and new preoperative non-invasive methods, we don't have an exclusive diagnostic method for their delineation.

The aim of this PhD study is to assess benefit of individual intraoperative electrophysiological (iEF) methods in pediatric patients with focal intractable epilepsy.

The first study evaluates the importance of intraoperative electrocorticography (iECoG) in the localization of EZ. The study proved that iECoG serves as a reliable tool to guide surgical resection and may predict results of epilepsy surgery. iECoG-based modification of surgical plan is not associated with increased risk of significant complications.

The second presented study analyzed the contribution of intraoperative electrical stimulation mapping (ESM) and motor evoked potential (MEP) monitoring in the localization and subsequent monitoring of motor eloquent cortex and pyramidal pathway. The study showed that new ESM protocol developed at our center represents a reliable method for preventing and predicting postoperative motor deficits in entire age and etiological spectrum of children undergoing resective epilepsy surgery proximal to eloquent motor regions.

In the third study, we assessed value of iEF techniques in the context of current trends of epilepsy surgery in children. The importance of these methods is growing. This is due to the changing spectrum of patients, as well as the optimization of iEF protocols. They represent an important factor that allow us to successfully cure more complex patients with stable long term results in terms of seizure control, postoperative complications and neurocognitive performance (4th study).

In conclusion, iEF monitoring methods represent effective and safe techniques leading to intraoperative identification and delineation of the epileptogenic zone and motor eloquent areas (cortex and pyramidal tract). This increases chance of achieving complete resection of the epileptogenic zone and significantly reduces the risk of postoperative neurological deficits. However, they are only a part of a complex diagnostic and treatment protocol of candidates of epilepsy surgery in childhood.