

INTRAOPERATIVE NEUROPHYSIOLOGIC IDENTIFICATION OF NEURAL STRUCTURES INVOLVED IN MOTOR EXECUTION (INTRAOPERATIVE MAPPING)

Vedran Deletis*, Kathleen Seidel**

*Department of Neurosurgery, University Hospital Dubrava, Zagreb, Croatia

** Department of Neurosurgery, Inselspital, Bern University Hospital, Bern, Switzerland

vdeletis@chpnet.org

Kathleen.Seidel@insel.ch

Intraoperative mapping (IM) of the cerebral cortex, subcortical white matter tracts, motor cranial nuclei of the brainstem and long tracts of the spinal cord significantly improve neurologic outcome during supratentorial surgery, as well as surgery of the brainstem and the spinal cord. For IM of the motor cortex well established methods are “phase reversal somatosensory evoked potentials” and electric stimulation of the primary motor cortex either with high frequency stimulation (a short trains) or classical slow frequency stimulation (“Penfield technique”). The methodology for mapping of motor cranial nuclei of the exposed brainstem by hand held stimulating probe became routine armamentarium of brain stem surgery.

Recently a new technique of IM of the corticospinal tract (CT) within white matter of the brain in supratentorial surgery, using a suction probe as stimulating device, made very significant contribution to the safety of surgery close to the CT. Those method allows the surgeon to get on-line information about distance of the edge of surgical field and CT (Rule of thumb; “Each 1 mA of current needs to activate CT corresponds to 1 mm distance from CT”). Furthermore a couple of techniques for IM of the CT tract within spinal cord are in the process of development.

We will present our long lasting as well as recent experience with the above mentioned techniques, with a focus on subcortical white matter mapping and spinal cord CT mapping, as a recent achievement of intraoperative neurophysiology bringing a new sight to supratentorial and spinal cord surgeries.