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WHITE MATTER ANATOMY RELEVANT FOR GLIOMA SURGERY IN ELOQUENT BRAIN REGIONS

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Abstract

Background. The primary aim of the glioma surgery is to achieve a balance between maximal tumor removal and minimal functional morbidity. The knowledge of morphology of the sulci, fissures, gyri and the white matter with its connecting fibers are crucial for successful resection.

Material and methods. Fourteen patients had tumor lesions in close proximity to eloquent cortex, including primary motor and sensory cortex in either hemisphere and the language cortex in the dominant hemisphere. Patients underwent a thorough neuropsychological evaluation prior to surgery. Patients were kept fully awake during the whole surgical procedure. Brain mapping was performed by direct cortical stimulation using the Ojemann stimulator to identify a safe corridor for surgical approach to the tumor. Intraoperative physiological monitoring was carried out by the assessment of speech, motor and sensory functions during the process of surgical resection. All resections were evaluated and verified by postoperative imaging. Postoperative complications and neurological deficits, as well as the extent of tumor resection, were evaluated.

Results. Fourteen patients were operated due to tumor lesions in the primary motor cortex of the left hemisphere (glioma, metastatic tumor). Patients were fully collaborative during the cortical mapping. There were no perioperative complications. There was no deterioration of the neurological finding after the surgery.

Conclusion. Subcortical stimulations remain the 'gold standard' when attempting to perform a complete resection together with a safe functional outcome.

Key words: Glioma – complications, diagnosis, surgery; White Matter – anatomy & histology; Neurosurgery