P17.75. UTILITY OF 3D SURGICAL PLANNING FOR RESECTION OF HIGH-GRADE GLIOMAS

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OBJECTIVES: Surgical resection of gliomas involving eloquent brain areas carries a high risk of postoperative neurological deterioration. METHODS: Total of 129 patients (75 males, 54 females, mean age 45.5 years, range 20-70 years) underwent preoperative MRI with Gd-enhancement (3D-T1W, T2W, FLAIR, DTI-FT, fMRI). Brain tumors located in eloquent areas (Sawaya grade III) in 93 (72.1%) patients and close to eloquent areas (Sawaya grade II) in 36 (27.9%) patients. The surgical planning and tumor microsurgery resection were carried out using StealthStation navigation system (Medtronic Inc., USA). The surgical planning was performed with a 3D volumetric reconstruction of cerebral hemispheres’ surface, tumor, corticospinal tracts, motor areas, ventricles, cerebral arteries, dural sinuses and cortical surface veins. The surgical trajectory and volume of safe tumor resection were defined and calculated preoperative. RESULTS: A gross total tumor resection was achieved in 54 (41.9%) patients, subtotal resection in 61 (47.3%), partial resection in 14 (10.8%). Glioblastomas (WHO Grade IV) were found in 61 (47.3%) cases, anaplastic gliomas (WHO Grade III) in 68 (52.7%). Median KPS score increased from 68.4 to 84.8 after surgery (p < 0.05). The neuronavigation system supports the ability of multimodal data sets integration and preoperative planning with using of 3D models presenting anatomical and functional structures. The 3D modeling reveals anatomical relations of tumor with the surrounding eloquent areas and vessels that creates conditions for determination of the optimal surgical tactics. The use of multimodal neuronavigation provided intraoperative orientation by comparing position of virtual structures from preoperative planning data with the anatomical structures in the operative field. CONCLUSION: The 3D surgical planning allows evaluating the risk of injury of eloquent structures, facilitates the orientation in operative field, and reduces the level of neurological disorders in operated patients.