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PROGRESSIVE METHODS OF SURGICAL TREATMENT OF INTRACEREBRAL BRAIN TUMORS.

Khusanov Zafar Toshmurodovich, Aliev Mansur Abduhoikovich.

Assistant, Department of Neurosurgery, Samarkand State Medical University
Head of the Department of Neurosurgery, Samarkand State Medical University

Introduction. Brain tumors account for 1.8–2.3% of the structure of oncological diseases. The detection rate of primary breast tumors is 10.9–14.0 per 100 thousand population. Metastatic tumors of the brain are currently detected 5 times more often than primary tumors, and therefore metastatic tumor lesions of the brain are the most common among all tumor diseases of the central nervous system. In 50–60% of patients with brain tumors, involvement of functionally significant and vital brain structures in the pathological process is observed [1–3].

The use of an integrated approach in the treatment of GM tumors ensures an increase in survival rates and an improvement in the quality of life of patients. The results of randomized studies indicate the effectiveness of surgical treatment followed by
carrying out radiation therapy and chemotherapy taking into account the histobiological characteristics of tumors [4–7]. Moreover, in patients after total removal, a higher therapeutic effect of adjuvant therapy is observed than in patients after partial removal of the tumor [8, 9]. When planning an operation and resolving questions regarding the permissible extent of tumor resection, it is necessary to determine the anatomical and topographic relationship between the tumor and functionally important zones (PVZ) of GM, the degree of their damage, possibilities
restoration or compensation of impaired functions [10, 11].

A progressive method of surgical treatment of brain tumors is operations using neuronavigation, which makes it possible to sap intracranial and intracerebral orientation with determination of the relationship of the tumor with the GM FVZ. Intraoperative use modern navigation systems allow more effectively and safely remove the tumor, achieve high quality of life indicators for operated patients
patients [12–14].__

Purpose of the study:optimization of surgery
clinical treatment of patients with tumors of the brain with
using MN.

Materials and methods of research. The study included 43 patients operated on using multimodal neuronavigation (MN) for tumors of the hemispheres big brain. There were 46.6% women, men - 53.4%. The age of the patients ranged from 17 to 72 years, average 44.7 years. Functional status patients were assessed according to clinical monitoring over time before and after surgery using the Karnofsky scale. Surgical treatment tactics were planned taking into account the data of a comprehensive clinical and neurological examination and analysis of the results of multislice computed tomography (MSCT), magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), magnetic resonance tractography (MR tractography), neuroimaging data intended for navigation support of intracranial surgical intervention, distributed into basic and additional. Basic data MRI and MSCT were intended to calculate stereotactic coordinates and intraoperative orientation; data from SPECT, MR venography, fMRI, and MR tractography supplemented the main images information about the localization of the tumor, functional and structural features of the anatomical formations adjacent to the lesion. MRI images in T1 and T2 modes, MSCT, MR venography, fMRI, MR tractography, SPECT if necessary combined and displayed on the station monitor in the

form combined image in various combinations, depending on the information content of the received results and objectives of the study. For atraumatic and more complete removal
tumors spreading into the FVZ and median structures of the brain, we used a surgical technique
laser thermal destruction. Tumor areas were irradiated bordering the FVZ and conductive paths.
The extent of surgical tumor resection was determined intraoperatively by comparing MN data and information obtained in real time in the form of images from a video monitor, as well as based on the results of postoperative CT and MRI **Results and discussion.**With application
Using multimodal neuronavigation, 43 operations to remove tumors from the cerebral hemispheres were performed.
Comprehensive assessment of clinical examination data and neuroimaging results (MRI, MSCT,
MR angiography, fMRI, MR tractography, SPECT) at the preoperative stage allows you to clarify the topographic characteristics of the tumor process, determine the degree of damage to the FVZ and median brain structures, get an idea about the vascularization of the tumor and its histobiological features. Using software navigation station "Stealth Station Application"
Software Cranial 5" according to the main research MRI or MSCT performed spatial 3D modeling and performed stereotactic calculations. Sequential preoperative planning included segmentation and contouring of the tumor, 3D reconstruction of the tumor focus, determination of the area of perifocal spread edema, construction of volumetric topographic images of the surface relief of the cerebral hemispheres, convexitally located vessels, lateral ventricles, as well as the choice of the optimal trajectory and boundaries of surgical access. System The virtual image on the navigation station monitor was supplemented with video monitoring data in real time [18]. Subtotal tumor removal was performed in 252 (56.9%) patients, total - in 161 (36.3%), partial - in 30 (6.8%). According to the results of histological examination of intraoperative biopsy material, glioma grades I and II anaplasia (WHO) detected in 71 (16.0%) patients, anaplastic glioma grade III anaplasia - in 138 (31.2%), glioma IV degree of anaplasia - in 167 (37.7%), metastatic tumors - in 67 (15.1%). After surgical treatment, the assessment of the patients' functional status increased on average from 68.4 to 86.2 points on the Karnofsky scale. Depending on the location of the tumors according to in relation to the FVZ of the cerebral hemispheres, in according to topographic classification R. Sawaya [19], three groups of tumors were identified: with lesions of the FVZ (Sawaya Grade III) - in 55.5% patients adjacent to the FVZ (Sawaya Grade II) – in 35.2%, located remotely from the FVZ (SawayaGrade I) - 9.3%. Total removal of Sawaya Grade I tumors produced in 26.2% of patients, Sawaya Grade III - in
42.7%%; subtotal - in 67.3 and respectively 49.6%; partial - in 6.5 and 7.7%. After surgery
functional status of patients in both groups almost identical, in the Sawaya Grade II group
- 88.9 points, Sawaya Grade III - 85.6 points. Strategy for surgical treatment of patients with
regarding tumors of the cerebral hemispheres suggests optimizing the volume of tumor resection with ensuring high survival rates patients while maintaining high quality life. It is fundamentally important to strive for maximum tumor removal and reducing the risk of possible postoperative neurological deficit [4, 10, 20, 21].

Conclusions.1. Comprehensive analysis of MN data on stages of preoperative planning allows
determine anatomical and topographical features tumor spread, get information
about the nature and extent of damage to the FVZ and median structures of the GM, to identify changes in structures GM due to growth and volumetric action tumors. 2. Preoperative multimodal navigation planning using integrated neuroimaging data and modeling in virtual computer space of anatomical and functional formations allows you to select trajectory and safe limits of surgical
access, determine the optimal volume of resection tumor tissue, as well as assess the risk of possible intraoperative trauma to the cerebral hemorrhage. 3. Comparison of virtual preoperative navigation planning data with real topographic relationships of anatomical structures in the surgical field provides intraoperative orientation and controlled performing surgical procedures with simultaneous recording of the stages of the operation using video monitoring systems. 4. Intraoperative support using MN ensures high precision of surgical manipulations and functional preservation of the structures of the brain, which helps to reduce degree of risk of postoperative neurological deficit.

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