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Optimization of the Results of Surgical Treatment of Parasagittal Meningiomas of the Brain

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Abstract: According to literature data, meningiomas account for 18-34% of primary brain tumors, second in frequency only to tumors of the neuroectodermal series. According to various authors, brain tumors develop annually in 2-25 per 100,000 population. Despite the great successes and achievements in neurosurgery of parasagittal meningiomas, the problem of their surgical treatment is still relevant all over the world due to the development of both frequent intra- and postoperative complications, the high frequency of their recurrence, which in turn leads to the need for re-operations. All this affects the quality of life of patients. This article presents an analysis of the results of surgical treatment of this category of patients using radiation therapy for complex treatment.

Keywords: parasagittal meningiomas, symptoms, tractography, radical surgery, radiation therapy.

Introduction

Meningiomas of the cerebral hemispheres account for approximately 47% of all supratentorial meningiomas. Among meningiomas, the frequency of occurrence of the parasagittal type ranges from 21-40%, which makes up a significant part of neuro-oncological patients [1, 2, 3].

Despite the development of modern diagnostics, the diagnosis of brain meningioma remains difficult and unsystematic. Currently, new medical equipment and various methods of laboratory diagnostics have appeared in Uzbekistan. These equipment can improve the diagnosis and, in turn, the results of treatment, but still early diagnosis of meningioma remains problematic [4, 5]. Thus, to further improve the diagnosis and comprehensive treatment of parasagittal meningiomas of the brain, new scientific research and new medical equipment such as MR tractography, Fiber tractography, MR spectroscopy, MR angiography are required [6, 7].

It is extremely important to determine the tactics of meningioma treatment is timely recognition and obtaining the most complete information about its localization and size, sources of blood supply.

The purpose of the research: determination of the effectiveness of various surgical methods of treatment of parasagittal meningiomas of the brain.

Materials and methods of the research: We observed 72 patients with meningiomas of the cerebral hemispheres who were treated in the neurosurgical department of the clinic of the Samarkand State Medical University in the period from 2016 to 2021, of which 38 patients were under their own supervision and 34 - an analysis of materials on archival medical histories was carried out. 80% of patients were subjected to surgical intervention.

When distributing patients with brain tumors of the large hemispheres by age, we used the generally accepted WHO classification [8]. The age of patients ranges from 20 years to 66 years, the average was 35.7 ± 13.9 years. By age, all patients with meningiomas of the cerebral hemispheres are divided into 3 groups.

Parasagittal meningiomas of the brain were more often detected in patients aged 19 to 45 years, which accounted for 61.3%. It was followed by patients aged 46 to 64 years – 24%, and patients aged 4 to 18 years made up 14.7%.

Patients by gender were distributed as follows: men were 50.7%, and women–49.3%, i.e. there is an equal frequency of occurrence of parasagittal meningiomas of the brain in both sexes. The presence of parasagittal meningioma of various localization was also determined (Table 1)

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Table 1
Distribution of patients by localization of meningiomas

Localization of meningiomas	**n**
Anterior third of the sagittal sinus and olfactory fossa	24 (33,3%)
The middle third of the sagittal sinus	27 (37,5%)
Posterior third of the sagittal sinus	18 (25,0%)
Wing of the main bone	3 (4,1%)

Results and their discussion: We analyzed the results of surgical interventions based on the protocols of operations, before operative observations, the dynamics of the neurological status of patients after surgery.

Depending on the radicality of tumor removal, four groups are distinguished (n-68):

1. Total removal – 79,3%.
2. Subtotal removal – 5,7%.
3. Partial removal – 7,3%.
4. Taking a biopsy – 1,8%.

5.9% of patients did not undergo surgical treatment (1 patient was directed to a Gamma knife, the rest did not agree to surgical treatment).

The radicality of the surgical intervention depended on the predominant spread of the tumor into functionally significant areas of the brain.

The operations were performed under endotracheal anesthesia. The removal of the tumor was carried out by conventional methods using mono- and bipolar coagulation, vacuum aspirator, most of the operations were performed in the traditional open way and microsurgical technique was used according to indications.

Table 2
Distribution of patients by type of surgical intervention (n– 68).

Type of operation	**n**
Bone-plastic trepanation of the skull	54 (79,5%)
Resection trepanation of the skull	10 (14,7%)
Recovery and repeated trepanation of the skull in case of relapses	4 (5,8%)
Total	**68 (100%)**

As shown in Table 2, in most cases – 79.5% of patients underwent bone-plastic trepanation, resection trepanation was performed in 14.7% of cases, and only in 5.8% of cases, re-operation and repeated trepanation of the skull was performed with relapses of meningiomas of the brain.

With cerebral edema and a defect of the dura mater, autoplasty of the dura mater with a graft from the wide fascia of the thigh was performed at the end of the surgical intervention. When severe cerebral edema occurred in patients, a bone flap was eliminated at the end of the operation. The process of taking an autograft was carried out in parallel with the general operation.

64 patients were fitted with an adjustable outflow drainage system using a sterile one-time system. The lateral end of the system was connected to a sterile vial filled with 20% furacilin solution. The level of the vial depends on the frequency of drops of bloody tissue fluid from the wound, individually. This system is installed through a small incision of the skin into the wound and promotes good drainage of accumulated tissue fluid from the epidural and subdural space and thus it is possible to control the volume of tissue fluid released with the prevention of possible compression of the brain by bloody or liquid volumetric formation. Postoperative complications were observed in 3 (4.1%) patients, of which 2 (2.9%) had cerebral edema. Liquorrhea from the postoperative wound was observed in 2 more patients after surgery. The correlation analysis showed a relative relationship between the degree of radical removal of tumors and the dynamics of the condition of patients after surgery. Significant correlation coefficients for total removal (r=0.30) and

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subtotal removal (r=0.28) of tumors indicate the presence of a correlation between the radicality of removal and neurological symptoms in this category of patients.

Among the operated 63 patients with the use of such a system, no postoperative complications were noted in any case. And there were also no postoperative complications, such as cerebral edema or liquorrhea, in those patients who underwent autoplasty of a defect of the dura mater with subsequent installation of an adjustable outflow drainage system.

After surgery, patients received a course of radiation therapy at the Republican Scientific Center of Oncology – 24 (35.2%) (Table 3).

Table 3

Distribution of patients who received a different combination of complex treatment after surgical treatment.

Type of complex treatment	n	%
chemotherapy + radiation therapy	21	30,8
Biopsy + radiation therapy	2	2,9
Biopsy + radiation therapy + chemotherapy	1	1,4

It should be noted that out of 28 patients with meningiomas, 1 patient had a relapse of the tumor on comparative MRI. Repeated operation was performed. Histological diagnosis: Anaplastic meningioma. In the early postoperative period, she had right-sided hemiparesis and central paresis of the facial nerve. After the course of radiation therapy (56 Gy), 19 months passed. She is registered in our clinic, she comes to us every 6 months. Of the neurological symptoms, mild hemiparesis persists on the right.

The fatal outcome was observed in 3 (4.1%) patients, 2 of them died in the early postoperative period due to respiratory and cardiovascular insufficiency. 1 patient died in the late postoperative period after 12.8 ±1.47 months.

Conclusions: Thus, it can be concluded that the complex treatment of patients with parasagittal meningiomas of the brain with surgical intervention and radiation therapy contributes to improving treatment results, preventing various complications and disability, thereby lengthening the median life expectancy of patients and improving their quality of life.

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