

## **Metastases in the Brain of Tumors of the Female Reproductive System: A Review of the Literature**

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### **Abstract**

The article presents a modern view on the treatment problem of patients with intracranial metastases of malignant tumors of the female reproductive system. The author presents their own experience in patients' treatment with ovarian cancer (OC), cervical cancer (CC) and endometrial cancer (EC) with brain metastases.

Tumors of the female reproductive system metastasis to the brain is rare and studied pathology. Problems of their diagnosis and treatment remain to be solved. The paper details the clinical picture, X-ray, morphological diagnosis and treatment of patients with intracranial metastases tumors of the female reproductive system.

**Keywords:** *Metastases; Tumors; Brain; Cancer; Uterus; Central Nervous System; Reproductive System; Survival Rate; Oncology*

### **Introduction**

Tumors of the female reproductive system are a serious medical and social problem: on the one hand, there is an increase in the population, their malignant transformation frequency is increasing [1-3]. At the same time, tumor dissemination of the female reproductive system in the brain is a rare pathology [4,5].

Current achievements in the treatment of the female reproductive system primary tumors lead to an increase in life expectancy of patients with an increase in the number of patients with tumor metastases from these localizations in the brain [6]. The life prognosis of this group is poorly understood due to the low frequency of pathology, but it has been shown that complex treatment offers not only life prolongation, but also a long relapse without patient survival in some cases [7].

### Literature Review

According to literature data, tumor meningitis and focal brain metastases can occur in the practice of a palliative care physician. The term neoplastic meningitis refers to tumor involvement metastases of cerebral meninges.

Synonyms for neoplastic meningitis are such terms as leptomeningeal metastasis and cerebral meninges carcinomatosis [8,9]. Membrane metastases to membranes are observed in 5-8% of all malignant tumors [10,11].

Often the clinical picture of tumor meningitis is the first clinical manifestation of cancer generalization. In palliative patients with oncological diseases progression, it is also possible to develop focal lesions of the meningeal foci with the formation of focal lesions and metastases. The development of neoplastic meningitis and focal brain metastases are complications that significantly reduce the life quality of palliative care patients and often portend a very short life prognosis.

The review comprises the data from foreign and Russian academic articles found in PubMed on the subject published over the past 30 years. The paper addresses the strategy of management of patients with such disease based on a specific clinical case [12,13].

### Discussion

Malignant tumors metastasis of the female reproductive system of the central nervous system is a rare clinical event, the frequency of which is 0.5 - 3% [14-16]. More often, metastases occur in neighboring organs, lymph nodes, while hematogenous spread is very rare and is the mechanism responsible for the occurrence of distant metastases. Intracranial metastases are rare.

As for the mechanisms of tumors metastasis of the female reproductive system to the central nervous system, according to Batson's theory [17], the vertebral venous system is the main route of metastasis in the brain.

However, there are reports of an increase in metastases frequency to the central nervous system of the female reproductive system tumors due to improved methods of treating primary tumors and, therefore, increased expectations for the lives of patients [18,19].

The oncologist should have a high degree of awareness of possible metastases of female reproductive system tumors to the central nervous system, when patients develop adequate neurological symptoms, followed by the necessary diagnostic measures.

With regard to therapies, it should be noted that a combination of therapies such as chemoradiotherapy is preferred in the treatment of metastatic ovarian cancer, which is a tumor that is highly sensitive to chemoradiation therapy. A complex technique, including a surgical stage, is most widely used in the treatment of metastases of body and cervix tumors [20,21].

An approach that combines surgery, a combination of chemotherapy and radiation therapy can provide long-term survival with a high quality of life for patients.

Metastases of female reproductive system tumors in the brain account for more than 5% of all metastases. The most aggressive course of all tumors of the reproductive tract is OC. Among patients, intracranial metastases occur only in 0.24 - 1.01% of cases, however, the frequency of secondary brain lesions has increased 6.5 times over the past 20 years. Epidemiological data on the detection and treatment of ovarian cancer metastases in the brain are summarized in a single major review by A. Gadducci, *et al.* (2007) [22].

Ovarian cancer metastases are characterized by a good fluorescent change in tumor/norm, equivalent to 12/1 on average, which allows the areas detection of greatest accumulation of protoporphyrin IX, giving a bright violet glow in the 620 - 640 wavelength range. Photodynamic therapy (PDT) session was performed intraoperatively in 33.3% of patients. With complex treatment, a high median overall survival was achieved - 14.0. The median disease-free survival rate was 9.4.

The average age of EC patients was 56.6 years. All patients had metastases in cerebral hemispheres. They were unique in 2 patients [2,3]. The average time since primary lesion detection was 14 months. After brain surgery, 3 patients underwent complex treatment, including HBRT and polychemotherapy, 2 patients - only HBRT. Despite the treatment, the average tumor-specific survival rate against the background of the treatment complex was 5.4 months in this group of patients.

For 7 years of observation, the department treated only 4 patients with metastases of cervical cancer in the brain. The median age was 46.5 years. The median survival was 6.4 months. It is now known that when local control of a brain tumor is achieved, the survival and life quality of individual patients can be improved [23].

Reports from several authors have shown that surgical resection in combination with radiation therapy and chemotherapy has a much better effect on individual performance, treatment methods using one method (for example, using only radiation therapy or neurosurgical treatment) as palliative care [24-26]. According to our observations, patients with life expectancy of more than 3 and 5 years underwent complex and combined treatment.

### Conclusion

Therefore, analyzing the data of the world literature presented in the article on the treatment of patients with metastases in the central nervous system of female reproductive system tumors, it should be noted that metastasis in the central nervous system of female reproductive system tumors is paradoxical, but possible. The reason for this rare observation is the high nervous tissue resistance to various tumors types.

Metastases to the central nervous system are usually found in the late stages of the malignant process and have a poor prognosis. However, the possibility of metastasis in the central nervous system of female reproductive system tumors indicates the need for further study of this pathology. Treatment strategies must be tailored to relieve symptoms and improve patients' life quality.

Tumors of the female genital organs are ineffective for metastases in the brain. However, this often leads to the termination of specific treatment and, as a consequence, to progression acceleration. At the same time, data from foreign colleagues in literature and from our own observations indicate the need for neurosurgical intervention to eliminate neurological and continue antitumor treatment.

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