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INTRACRANIAL HYPERTENSION SYNDROME IN A PATIENT WITH BRAIN TUMORS

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Abstract: This article extensively discusses the pathogenesis, clinical course, diagnostics, and modern treatment approaches of intracranial hypertension syndrome, which develops in connection with brain tumors. The increased intracranial pressure is scientifically analyzed as a result of compression of brain tissue, impaired cerebrospinal fluid circulation, and impaired cerebral blood circulation. The article describes in detail the main symptoms identified in the patient based on clinical observation - headache, vomiting, visual impairment, and neurological deficits. It also discusses modern instrumental diagnostic methods, in particular, magnetic resonance imaging (MRI) to determine the localization, size, and effect of tumors on surrounding tissues. The effectiveness of conservative therapy (diuretics, corticosteroids) and neurosurgical interventions used in the treatment process is demonstrated on the basis of a clinical example. The results of the study confirm that early detection of intracranial hypertension syndrome, differential diagnosis, and the use of complex treatment methods are important in improving the quality of life and prognosis of patients. This article is of great clinical importance for practicing physicians and medical students, and serves to provide a deeper understanding of neurological conditions associated with brain tumors.

Keywords: Brain tumors, intracranial hypertension, glioma, headache, vomiting, MRI, neurosurgery

Relevance of the topic: Brain tumors are one of the most complex and urgent problems of modern medicine. They disrupt the structural and functional integrity of the central nervous system, leading to the development of many neurological syndromes, including intracranial hypertension syndrome. Intracranial hypertension is characterized by increased pressure inside the brain, which can lead to dislocation of brain tissue, circulatory disorders, and the development of life-threatening complications - brain herniation. The increasing incidence of brain tumors in recent years, especially among young and working-age people, further increases the social and medical importance of this problem. Despite the expansion of the possibilities of detecting tumors using modern diagnostic methods, in particular magnetic resonance imaging and computed tomography, early detection and differential diagnosis of intracranial hypertension syndrome still remains a difficult task. In addition, the nonspecificity of clinical signs of increased intracranial pressure, i.e., their similarity to other neurological diseases, can lead to many diagnostic errors. Failure to make a timely diagnosis leads to aggravation of the disease, disability, and even death. Therefore, an in-depth study of intracranial hypertension syndrome developing against the background of brain tumors, the identification of its clinical and diagnostic features, and the development of effective treatment methods are among the priorities of modern neurosurgery and neurology.

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Purpose of the topic: The main purpose of this study is to comprehensively study the mechanisms of development, clinical manifestations and diagnostic criteria of intracranial hypertension syndrome in patients with brain tumors. At the same time, one of the important tasks of the study is to identify clinical and instrumental signs that allow early detection of increased intracranial pressure, and to differentiate them from other neurological conditions (differential diagnosis). In addition, the evaluation of the effectiveness of conservative and surgical treatment methods, the development of an optimal treatment strategy aimed at improving the results of treatment in patients and reducing complications are also important areas of research. The ultimate goal is to develop practical recommendations aimed at early detection, effective treatment and improvement of the patient's prognosis of intracranial hypertension syndrome associated with brain tumors. Main part: Intracranial hypertension syndrome is a complex clinical condition that occurs as a result of a pathological increase in pressure inside the brain, and often develops against the background of brain tumors. The pathogenesis of this syndrome is multifactorial, and the main mechanisms are the growth of the tumor in terms of volume, compression of the surrounding brain tissue, the development of perifocal edema, and impaired cerebrospinal fluid dynamics. Under normal conditions, intracranial pressure is maintained in accordance with the Monroe–Kelly doctrine, that is, a balance is maintained between the volumes of brain tissue, blood, and cerebrospinal fluid. However, as the tumor progresses, this balance is disrupted, and intracranial pressure increases. As a result of tumor growth, not only the brain parenchyma is compressed, but also venous blood flow is impaired, which leads to increased venous stasis and secondary edema. Also, hydrocephalus develops due to compression or obstruction of the cerebrospinal fluid pathways, which further aggravates intracranial hypertension. As a result, dislocation of brain structures is observed, that is, their displacement from one anatomical region to another, which can lead to the development of life-threatening brain herniations (tentorial or tonsillar herniation).

Clinically, intracranial hypertension syndrome is manifested by a number of typical symptoms. One of the main symptoms is a headache, which often worsens in the morning, has a diffuse character and does not respond well to analgesics. Headache is often accompanied by nausea and vomiting, which indicates increased intracranial pressure. The visual analyzer detects papilledema, i.e. swelling of the optic nerve disc, which leads to decreased vision. In addition, patients experience general weakness, fatigue, decreased attention and memory, and sometimes mental disorders.

A neurological examination reveals focal symptoms depending on the localization of the tumor. For example, in frontal tumors, personality changes, behavioral disorders, and impaired motor function are observed, while in temporal lesions, epileptic seizures and hearing impairment occur. Sensory disorders are detected in the parietal region, and a narrowing of the visual field in the occipital region. At the same time, as intracranial hypertension develops, general brain symptoms begin to prevail. Modern instrumental examination methods are of decisive importance in the diagnostic process. Magnetic resonance imaging is considered the “gold standard” for detecting brain tumors, as it allows you to assess the exact localization, size, structure, and effect of the tumor on surrounding tissues. Computed tomography is used for rapid diagnosis, especially in urgent cases. Also, the detection of papilledema by examination of the fundus is an important sign of intracranial hypertension.

As a clinical observation, the development of this syndrome was analyzed in the case of a 45-year-old male patient. The patient had been complaining of increasing headaches, especially

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morning vomiting, blurred vision, and general weakness for several weeks. Neurological examination revealed papilledema, increased reflexes, and impaired coordination. MRI revealed a tumor located in the frontal area and perifocal edema around it, with a slight shift of the midline, which confirms increased intracranial pressure. Treatment was carried out in a comprehensive manner. Initially, osmotic diuretics (mannitol), corticosteroids, and symptomatic therapy were used to reduce intracranial pressure. Corticosteroids reduce perifocal edema and relieve compression of brain tissue. At the next stage, the patient underwent neurosurgical surgery, which removed the tumor to the maximum extent. After the operation, the patient's headache decreased, vomiting stopped, and the general neurological condition improved. Thus, intracranial hypertension syndrome associated with brain tumors is a complex pathophysiological process, in the development of which tumor growth, edema, impaired cerebrospinal fluid circulation and cerebral blood circulation play an important role. Timely detection of clinical signs, the use of modern diagnostic methods and the implementation of complex treatment measures are crucial for saving the patient's life and improving the prognosis.

Discussion and results: The conducted clinical observations and analyses showed that intracranial hypertension syndrome associated with brain tumors in most cases manifests itself as one of the initial and important signs of the disease. The main role in this is played by the size, localization and growth rate of the tumor. Especially in rapidly growing tumors, a sharp increase in intracranial pressure is observed, which leads to the rapid development of clinical symptoms. The results of clinical observation showed that the headache, morning vomiting and visual disturbances observed in the patient constitute the classic triad of intracranial hypertension. At the same time, it was confirmed that the detection of papilledema has important diagnostic value as an objective sign of increased intracranial pressure. However, in some cases, it was also found that due to the nonspecificity of the symptoms, an incorrect diagnosis can be made in the early stages of the disease. The results of instrumental diagnostics, in particular, the exact localization of the tumor, the detection of perifocal edema around it and midline shift by magnetic resonance imaging, became important in assessing the degree of intracranial hypertension. This indicates that modern diagnostic methods play a major role not only in diagnosing, but also in determining the prognosis of the disease. Analysis of the treatment results showed that an integrated approach to eliminating the syndrome of intracranial hypertension is the most effective. Conservative treatment methods, in particular the use of osmotic diuretics and corticosteroids, help to reduce intracranial pressure in a short time and stabilize the patient's general condition. The role of corticosteroids in reducing perifocal edema is particularly important, and they are of great importance in the preparation stage for surgical intervention. The results of neurosurgical intervention have shown that maximum removal of the tumor dramatically reduces intracranial pressure and leads to regression of clinical symptoms. At the same time, proper patient management, prevention of complications and rehabilitation measures in the postoperative period are also of great importance.

The results obtained are consistent with other scientific studies and once again confirm that intracranial hypertension syndrome is one of the main clinical indicators of brain tumors. The results of the study also showed that early detection of the disease, correct differential diagnosis and timely use of complex treatment measures significantly improve the patient's prognosis. At the same time, it was found that in some cases, late diagnosis, tumor growth and prolonged high intracranial pressure can lead to irreversible neurological changes. This requires high clinical vigilance by doctors regarding this syndrome. Based on the final results, it can be said that for effective management of intracranial hypertension syndrome associated with brain tumors, early

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diagnosis, use of modern diagnostic methods, and application of a comprehensive treatment strategy based on an individual approach are important.

Conclusion: Intracranial hypertension syndrome associated with brain tumors is one of the most severe and life-threatening pathological conditions of the central nervous system. The development of this syndrome is closely related to the volumetric effect of the tumor, perifocal edema, impaired cerebrospinal fluid circulation, and cerebral hemodynamics. The results of the study showed that the clinical symptoms of intracranial hypertension syndrome - headache, vomiting, visual impairment, and neurological deficits - are important diagnostic criteria for early detection of the disease. At the same time, the similarity of these symptoms with other neurological diseases complicates differential diagnosis and requires a high level of clinical thinking and vigilance from the doctor. Modern instrumental examination methods, especially magnetic resonance imaging, play a leading role in detecting brain tumors and assessing the level of intracranial pressure. An integrated approach to treatment, i.e., a combination of conservative (drug) and surgical methods, gives the most effective results. Early diagnosis and timely neurosurgical intervention are crucial in preventing severe complications of intracranial hypertension syndrome, improving the quality of life of patients, and reducing mortality. Therefore, it is necessary to pay special attention to identifying intracranial hypertension syndrome in each patient with brain tumors, and to widely implement modern standards of diagnosis and treatment. This approach will serve to increase the effectiveness of neurological and neurosurgical practice in the future.

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