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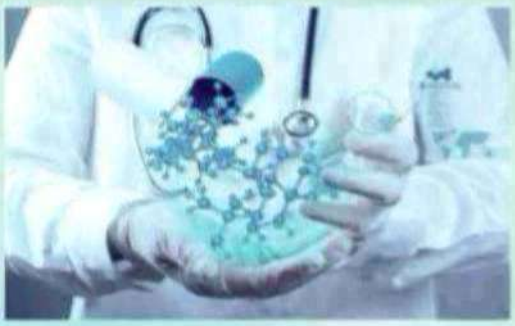

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DETERMINATION OF CHANGES IN BLOOD VESSELS OF BRAIN METASTASIS USING COMPUTER TOMOGRAPHY AND MAGNETIC RESONANCE TOMOGRAPHY

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✓ ***Resume***

In brain tumors and metastases, atypical cells disrupt the functioning of the brain and cause serious damage to blood vessels in it. As a result, the condition of patients worsens not only because of tumor or metastasis, but also because of its complications. Therefore, early diagnosis and accurate prognosis of vascular changes caused by brain metastases are very important to improve the quality of life and clinical outcomes of this category of patients. MRI and MSCT are leading in the diagnosis of brain tumors due to their high sensitivity, accuracy and availability. Complete information about cerebral blood vessels can be obtained by using methods of examination with the help of contrast material. Using this information, not only the current condition of patients is evaluated, but also their treatment tactics are planned. In turn, accurate diagnosis and the correct treatment tactics based on it lead to a decrease in the death rate in patients with brain tumors and metastases. This is one of the main tasks of modern medicine

Key words. Brain tumors, metastasis, MRI (Ge Signa 1.5T), MSCT (SIEMENS 64), contrast (MR - VISION. BIEMEXOL)

ОПРЕДЕЛЕНИЕ ИЗМЕНЕНИЙ В СОСУДАХ ПРИ МЕТАСТАЗА ГОЛОВНОГО МОЗГА С ПОМОЩЬЮ КОМПЬЮТЕРНОЙ ТОМОГРАФИИ И МАГНИТНО-РЕЗОНАНСНОЙ ТОМОГРАФИИ

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✓ ***Резюме***

При опухолях головного мозга и метастазах атипичные клетки нарушают функционирование головного мозга и вызывают серьёзные повреждения кровеносных сосудов в нем. В результате состояние пациентов ухудшается не только из-за опухоли или метастазирования, но и из-за её осложнений. Поэтому ранняя диагностика и точный прогноз сосудистых изменений, вызванных метастазами в головной мозг, очень важны для улучшения качества жизни и клинических исходов у этой категории пациентов. МРТ и МСКТ лидируют в диагностике опухолей головного мозга благодаря своей высокой чувствительности, точности и доступности. Полную информацию о кровеносных сосудах головного мозга можно получить, используя методы обследования с помощью контрастного вещества. Используя эту информацию, оценивается не только текущее состояние пациентов, но и планируется тактика их лечения. В свою очередь, точный диагноз и основанная на нем правильная тактика лечения приводят к снижению смертности у пациентов с опухолями головного мозга и метастазами. Это одна из главных задач современной медицины

Ключевые слова. Опухоли головного мозга, метастазы, МРТ (Ge Signa 1.5T), МСКТ (SIEMENS 64), контраст (MR - VISION. BIEMEXOL)

BOSH MIYA METASTAZLARIDA BOSH MIYA QON TOMIRLARIDA KECHADIGAN O`ZGARISHLARNI KOMPYUTER TOMOGRAFIYA VA MAGNIT REZONANS TOMOGRAFIYA YORDAMIDA ANIQLASH

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✓ ***Rezyume***

Bosh miya o`smalari va metastazlarda atipik hujayralar miyaning ishlashini buzadi va undagi qon tomirlariga jiddiy zarar etkazadi. Natijada, bemorlarning ahvoli nafaqat o'simta yoki metastaz tufayli, balki uning asoratlari tufayli ham yomonlashadi. Shu sababli, miya metastazlari natijasida kelib chiqadigan qon tomir o'zgarishlarini erta tashxislash va aniq prognoz qilish ushbu toifadagi bemorlarning hayot sifati va klinik natijalarini yaxshilash uchun juda muhimdir. MRT va MSKT yuqori sezuvchanlik, aniqlik va mavjudlik tufayli miya o`simtalari tashxisida yetakchilik qiladi. Miyaning qon tomirlari haqida to'liq ma'lumotni kontrast modda yuborib tekshirish usullari yordamida olish mumkin. Ushbu ma'lumotdan foydalanib, nafaqat bemorlarning hozirgi holati baholanadi, balki ularni davolash taktikasi ham rejalashtirilgan. O'z navbatida, aniq tashxis qo'yish va unga asoslangan to'g'ri davolash taktikasi miya shishi va metastazlari bo'lgan bemorlarda o'limning pasayishiga olib keladi. Bu zamonaviy tibbiyotning asosiy vazifalaridan biridir

Kalit so`zlar. Bosh miya o`simtalari, metastaz, MRT (Ge Signa 1.5T), MSKT (SIEMENS 64), contrast modda (MR - VISION. BIEMEXOL)

Relevance

Cancer arises when acquired or inherited mutations in the cells of the body result in uncontrolled cellular proliferation. In the case of solid tumors, the most lethal attribute of cancer is the ability of tumor cells to escape the primary tumor and metastasis via blood and lymphatic vessels to distant organs. Assessment of the number and location of metastatic lesions in a patient forms a critical part of disease staging and dictates both prognosis and treatment options. Metastatic lesions in the brain that arise from distant primary solid tumors, such as lung, breast and melanoma, result in a particularly poor prognosis. It has been speculated that the frequency of brain metastasis diagnoses has steadily risen over time due both to ongoing improvements in imaging and detection technologies that allow for greater detection rates of brain metastases in asymptomatic patients, and improvements in systematic disease treatments that prolong survival and allow more time for brain lesions to develop. A population-based study has shown that, cumulatively, 12% of patients with metastatic disease originating from over 27 different primary cancer types were found to have brain metastases upon primary cancer diagnosis, with a median survival of approximately five months. The study also showed elevated incidence of brain metastases in patients with melanoma (28%) and lung cancers (16–26%) relative to the other tumor types examined. The increasing incidence of brain metastases and the associated poor prognosis thus illustrates the importance of developing a more detailed understanding of their etiology and biology that may elucidate novel targets for therapy

Early tumor cell seeding as well as tumor-derived extracellular vesicles or circulating factors from distant primary tumors will often shape the microenvironment in secondary sites such as the brain before tumor cell colonization, creating a favorable environment for secondary tumor establishment termed the pre-metastatic niche. Cells of the NVU, together with immune cells of both myeloid and lymphoid lineages, can thus be hijacked by infiltrating tumor cells, leading to BBB breakdown and creating a metastatic niche that supports the tumor’s initial establishment and survival as well as its ongoing growth and proliferation. Notably, the unique vascular microarchitecture of the brain influences mechanisms and patterns of metastatic colonization. These processes play a key role in the metastatic cascade from a primary to an established secondary tumor yet remain poorly characterized

The brain is anatomically complex, containing several distinct compartments including the parenchyma, ventricles, brainstem, and meningeal layers at the cortical surface. Each of these compartments houses phenotypically unique vascular environments, and all depend on a continuous

supply of blood from a highly integrated network of penetrating blood vessels arising from the neck region. The anterior circulation of the brain is provided by the internal carotid arteries, whereas the posterior circulation is supplied by the vertebral arteries which join to form the basilar artery that also supplies the brainstem and cerebellum (vertebral–basilar circulation). The posterior and anterior circulation systems are connected via communicating arteries that form the circle of Willis, which exists as a compensatory mechanism in case blood flow is decreased in a particular system. The anterior and middle cerebral arteries which branch from the internal carotid arteries, together with the posterior cerebral artery (supplied by the posterior circulation) supply the deep regions of the brain through penetrating branches into the cortex.

After tumor cell arrest and successful extravasation, tumor cells attempting to colonize the brain require close physical contact to the abluminal surface of blood vessel walls in a pericyte-like position in the perivascular space. Melanoma cells, upon attaining their perivascular position, were found to form micro-metastases in close association with existing vasculature proliferating along micro vessels. These cells would only go on to induce extensive vascular changes and angiogenesis when a large macro metastasis had formed. Conversely, lung carcinoma cells arrested in brain capillaries showed marked early angiogenesis and vascular remodeling, resulting in rapid proliferation to generate a macro metastasis. These findings have similarly been reported in humans, with one study demonstrating that out of eight autopsy cases of melanoma brain metastases, all cases showed extensive evidence of co-optive growth along the abluminal surface of blood vessels, displaying features of pericyte mimicry. The study also found extensive vessel dilation and bleeding within the brain lesions, which was consistent with observations in animal models. Investigators postulated that small vessels were being destroyed due to the overgrowth of tumor cells along the vessel surface, which compromised the vessel integrity and lead to marked vascular damage, a phenomenon that is not often observed in extracerebral sites of metastasis.

Early and effective diagnosis of tumor metastases in the brain using Magnetic Resonance Tomography and Multi-Spiral Computer Tomography.

Materials and methods

The purpose of the study**.** – is to evaluate the effectiveness of CT and Magnetic resonance imaging diagnostics in determining the changes in the blood vessels of the brain in patients with brain tumors and metastases.27 patients with brain tumors and metastases were examined. Scientific research was carried out at the Bukhara branch of the republican specialized oncology and radiology scientific-practical research center together with the Department of Nuclear Medicine and Medical Radiology of the Bukhara State Medical Institute. Examination methods: MRI (Ge Signa 1.5T) and MSCT (SIEMENS 64) examination of cerebral blood vessels; MRI and MSCT examination of brain blood vessels with contrast agent (MR - VISION. BIEMEXOL); Clinical analyzes and laboratory results determining the condition of patients; Statistical methods.

Results and discussions

27 patients with brain tumors and metastases were examined, including 18 men and 9 women. In 12 male and 5female patients, brain metastasis grew into the brain and compressed the inferior cerebellar artery and anterior spinal artery from the outside, in 6 male and 4 female patients, it was found that it grew from the vascular endothelium. Blood circulation disorder was identified as the cause.

TOTAL PATIENTS **27**			
MALE **18**		FEMALE **9**	
brain metastasis grew into the brain and compressed the inferior cerebellar artery and anterior spinal artery from the outside **12**		brain metastasis grew into the brain and compressed the inferior cerebellar artery and anterior spinal artery from the outside **5**	
	brain metastasis grew from the vascular endothelium **6**		brain metastasis grew from the vascular endothelium **4**

Conclusion

With the help of MRI and MSCT, the changes in cerebral blood vessels in brain metastases were determined.

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