AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 01, Issue 10, 2023 ISSN (E): 2993-2149

Diagnosis of Brain Tumors: Possibilities of Magnetic Resonance Imaging

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Abstract: Clinically manifest meningiomas account for 13-25% of all primary OGMS. Depending on the degree of malignancy, meningiomas proper (I degree), atypical meningiomas (II degree), anaplastic meningiomas (III degree) and meningiosarcomas (IV degree) are distinguished.

Research methods. All patients underwent MRI of the brain. When performing an MRI of the brain, a proprietary tomograph program was used.

Keywords: magnetic resonance imaging, brain tumors, diagnostics

Anaplastic astrocytomas (AN ACC) occupy an intermediate position between benign ACC and glioblastomas(GB), most often localized inthe left and temporal lobes. On MRI, ASCs were visualized as formations with a heterogeneous MR signal on T1 and T2 VI. In the central parts of the tumor, foci of cystic degeneration were detected in 4 cases. ПеритуморозныйPeritumor edema in the form of an increased MR signal of a characteristic shape in the form of divergent rays was diagnosed in 12 cases. AN ASC is characterized by an intense accumulation of contrast.

Glioblastoma (15 cases) is the most malignant of all glial OGMS. It is characterized by a rapid increase in clinical symptoms due to an increase in intracranial pressure and the appearance of symptoms of brain jamming. MRI reveals significant heterogeneity of the tumor: on T1 VI-formation with a mixed hypo-isointensive MR signal and central necrosis; on T2 VI-hypo-, iso-hyperintensive signals from the stroma of GB, necrosis, cysts and hemorrhages. Sheathedирный masseffect. GB often spreads to the other hemisphere. Benign diffuse ASCI on CT is most characterized by a low-density zone that does not have clear boundaries with the surrounding brain matter. CT with intravenous administration of ultravist does not lead toincreased tumor density.8 случаев) наблюдались Petrefacies in the form of small and larger foci were often observed (1 8 cases), which is consistent with the data. In озлокачествлении case of malignancy of astrocytomas inside a benign tumor (2 cases), zones of accumulation of contrast agent are determined. On CT scan, AN ASC was characterized by a nonhomogeneous tumor with a mixed density. After contrast administration, the heterogeneity of the tumor significantly increased. High-density areas often had the appearance of rings and half-rings, within which low-density areas (cysts) were identified, which is consistent with the data of other authors.

On CT, the density of GB is heterogeneous — the central zone is necrosis and has a low density, petrefacies were noted in 3 cases, and hemorrhages in the tumor-in 4. The tumor is usually surrounded by perifocal edema. On CT with CU, the contrast looks like a ring with an inhomogeneous internal contour. Gliosarcoma was detected in 2 cases. On CT, the tumor was similar to a meningiomasurrounded by perifocal edema. CT with CU revealed an

inhomogeneous ring-shaped increase in the tumor. Based on the MR characteristics, the HS cannot be differentiated from the GB. On CT, a pilocytic astrocytoma looks like a rounded or oval formation, well delimited and having hypo- or isodensive characteristics. Petrefacies are more clearly detected on CTпетрефикаты, and a solid tumor looks homogeneous. According to our data, the most characteristic MR diagnostic criteria for benign gliomas were: sharpness of contours, lack ofmass effect, absence перитуморозногоof peritumoral edema, presence of cysts, slow and polyfocal accumulation of contrast. The criteria for the absence of "mass effect" and perifocal edema are most sensitive (100%)-эффекта» и перифокального. Further, the ability of the tumor to slowly accumulate contrast (90%) is noted. Studies have shown that fibrillar and protoplasmicоплазматические astrocytomas on axial T2vi gave moderately hyperintensive signals and looked hypointensive on coronary T1vi. Pilocytic astrocytomas, as a rule, were localized in the white matter, close to the walls of the ventricles and did not spread to adjacent lobes of the brain. On axial T2vi and coronary T1VI, the tumor was isointensive in relation to the brain structure and was often accompanied by the presence of a cyst, hyperintensive in T2vi and isointensive in T1 VI. Calcifications were detected in 3 cases. Oligodendrogliomas were detected in 17 patients and were localized mainly in the frontal and temporal lobes. In 4 cases, large tumors caused displacement of the median structures and were accompanied перитуморознымby peritumoral edema. The structure of the tumors was heterogeneous due to the presence of calcifications. Dynamic MR contrasting of benign gliomas most often (90%) resulted in the absence or later and weak polyfocal accumulation of contrast. In 9 cases, there was a weak peripheral accumulation of contrast agent or its absence. As a rule, as gliomas become more malignant, the uniformity of their structure changes due to edema, necrosis, and hemorrhage; therefore, MR signals from these tumors were heterogeneous in our studies. A constant criterionfor MRDIAGNOSIS of ASC and HD is the heterogeneity of their structure, indistinct contours, and pronounced "masseffect" and perifocal edema. In most cases, the contrast was polyfocal, to a lesser extent peripheral, and passed faster than in benign gliomas. Ependymoma was diagnosed in 2 cases. The process was localized in the frontal lobe of pregnant women aged 27 years. On native CT, a large formation with perifocal edema, pronounced "mass effect", was detected. The tumor has a moderately increased density with areas of its decrease (due to cysts).

The most significant MRI signs of meningiomas: clear contours, uniform structure, pronounced "masseffect", presence or absence of perifocal edema, accumulation of contrast for up to 3-4 minutes, homogeneous contrast. As a rule, on MRI, meningiomas had clear contours and gave homogeneous-isointensive MR signals in T1 and T2 VI. Pronounced hyperintensive in T1-VI перитуморозныйperitumor edema, heterogeneity of signals from the tumor (with the exception of hypointensive calcifications) were found in large tumor sizes and malignancy (morphological confirmation in 4 cases). Significant displacement of the median structures was observed in large tumors. In 8 cases, the tumor was closely associated with the adjacent bones, and the dura mater was compacted, which is consistent with the data of other authors. MRI with CU васкуляризацией менингиомыshowed a rapid and homogeneous accumulation of contrast in the tumor during the first seconds due to the rich vascularization of the meningioma (signal intensity — 275±2.3%). CT scans with CU were highly specific (98%), sensitive (98%), and accurate.

МР-томограф The Siemens Magnetom MR tomograph (Germany)with a magnetic field strength of 0.4 Tl makes it possible to diagnose primary brain tumors in 90±3%, differentiate between benign and malignant neoplasms, study the features of tumor blood flow, establish the presence or absence перитуморозногоof peritumor edema, and the degree of displacement of the median structures of the brain.

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