Anaplastic transformation of low-grade gliomas (WHO II) on magnetic resonance imaging.


Abstract

Malignant transformation among gliomas WHO II ranges between 35% and 89%. However, according to some reports, all gliomas WHO II undergo such transformation over time. The aim of the study was to analyse MRI parameters indicating anaplastic transformation of gliomas WHO II.

MATERIAL AND METHODS: Forty-six consecutive patients were enrolled in the study (20 females and 26 males; range of age 36 ± 9 years) with supratentorial glioma WHO II. Multiparametric MR examination included morphological imaging, perfusion-weighted imaging, diffusion-weighted imaging and proton magnetic resonance spectroscopy. Group division depended on the course of disease (ST - stable group, AT - anaplastic transformation group).

RESULTS: Subtotal tumour resection was achieved in the whole AT group, whereas in the ST group, total tumour resection was achieved in 10/29 (34%) patients. The size of the residual tumour after surgery was statistically significantly higher in the AT group compared to the ST group (AT: 51.5 cm³ ± 37.7 vs. ST: 29.0 cm³ ± 37.9; p = 0.011). Contrast enhancement in the AT group occurred in 5/11 (45%) of tumours and in none of the patients' areas of contrast enhancement were resected during surgery/biopsy. However, the initial MR showed contrast enhancement in 10/29 (34%) of patients in the ST group. The areas of contrast enhancement were totally resected in all patients. Compared to the ST group tumours that underwent anaplastic transformation had statistically significantly higher values of mean nrCBV and max nrCBV on the initial MR, the follow-up and final MR examinations. However, statistically significant differences between the groups in ADC values were observed on the follow-up and final MR whereas mean Cho/Cr and mean Cho/NAA were observed as late as on the final MR examination.

CONCLUSIONS: Multiparametric MR examination allows the detection of LGGs with high probability of rapid anaplastic transformation and the detection of transformation prior to the occurrence of contrast enhancement. The value of nrCBV is the most useful in the diagnosis of anaplastic transformation. The resection of contrast enhancement area of the tumour significantly increases time to anaplastic transformation of LGGs.

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