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Evaluation of MR markers that predict survival in patients with newly diagnosed GBM prior to adjuvant therapy.

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Purpose Glioblastoma Multiforme (GBM) is the most common and lethal primary brain tumor in adults. The goal of this study was to test the predictive value of MR parameters in relation to the survival of patients with newly diagnosed GBM who were scanned prior to receiving adjuvant radiation and chemotherapy. Methods The study population comprised 68 patients who had surgical resection and were to be treated with fractionated external beam radiation therapy and chemotherapy. Imaging scans included anatomical MRI, diffusion and perfusion weighted imaging and (1)H MRSI. The MR data were acquired 3-5 weeks after surgery and approximately 1 week before treatment with radiation therapy. The diffusion, perfusion and spectroscopic parameter values were quantified and subjected to proportional hazards analysis that was adjusted for age and scanner field strength. Results The patients with larger lesion burden based upon volumes of anatomic lesions, volume of CNI2 (number of voxels within the T2 lesion having choline to NAA index >2), volume of CBV3 (number of pixels within the T2 lesion having relative cerebral blood volume >3), and volume of nADC1.5 (number of pixels within the T2 lesion having normalized apparent diffusion coefficient <1.5) had a higher risk for poor outcome. High intensities of combined measures of lactate and lipid in the T2 and CNI2 regions were also associated with poor survival. Conclusions Our study indicated that several pre-treatment anatomic, physiological and metabolic MR parameters are predictive of survival. This information may be important for stratifying patients to specific treatment protocols and for planning focal therapy.

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