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Assessment of Malignancy in Human Brain Tumors by *In vivo* 1H MR Spectroscopy at 3 Tesla

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Purpose : Three tesla high field MR has been important to those disciplines that are SNR limited, such as MR spectroscopy. Additionally, increased spectral dispersion is critical for minimizing spectral overlap and simplifying resonance structures. The purpose of this study was to assess clinical proton MR spectroscopy (MRS) as a noninvasive method for evaluating brain tumor malignancy at 3T high field system

Materials and Methods : Using 3T MRI/MRS system, localized water-suppressed single-voxel technique in patients with brain tumors was employed to evaluate spectra with peaks of N-acetyl aspartate (NAA), choline-containing compounds (Cho), creatine/phosphocreatine (Cr) and lactate. On the basis of Cr, these peak areas were quantificated as a relative ratio.

Results : The variation of metabolites measurements of the designated region in 10 normal volunteers was less than 10%. Normal ranges of NAA/Cr and Cho/Cr ratios were 1.67±018 and 1.16±0.15, respectively. NAA/Cr ratio of all tumor tissues was significantly lower than that of the normal tissues ($p=0.005$), but Cho/Cr ratio of all tumor tissue was significantly higher ($p=0.001$). Cho/Cr ratio of high-grade gliomas was significantly higher than that of low-grade gliomas ($P=0.001$). Except 4 menigiomas, lactate signal was observed in all tumor cases.

Conclusions : The present study demonstrated that the neuronal degradation or loss was observed in all tumor tissues. Higher grade of brain tumors was correlated with higher Cho/Cr ratio, indicating a significant dependence of Cho levels on malignancy of gliomas. Our results suggest that clinical proton MR spectroscopy could be useful to predict tumor malignancy.