LCModel

Automatic quantification of in vivo proton MR spectra.

Nagashima et al. assessed whether 3-T magnetic resonance spectroscopy (MRS) with LCModel software might be useful for discriminating glioma from other brain tumors, such as primary central nervous system lymphomas (PCNSLs) and metastatic tumors. A total of 104 cases of brain tumor (66 gliomas, 20 PCNSLs, 6 metastatic tumors, 12 other tumors) were preoperatively investigated with short echo time (35 ms) single-voxel 3-T MRS. LCModel software was used to evaluate differences in the absolute concentrations of choline, N-acetylaspartate, N-acetylaspartylglutamate, glutamate + glutamine, myo-inositol (mIns), and lipid. mIns levels were significantly increased in high-grade glioma (HGG) compared with PCNSL ($p < 0.001$). In multivariate logistic regression analysis, mIns was the best marker for differentiating HGG from PCNSL ($p < 0.0001$, odds ratio 1.9927, 95% confidence interval 1.3628-3.2637). Conventional MRS detection of mIns resulted in a high diagnostic accuracy (sensitivity, 64%; specificity, 90%; area under the receiver operator curve, 0.80) for HGG. The expression of inositol 3-phosphate synthase (ISYNA1) was significantly higher in gliomas than in PCNSLs ($p < 0.05$), suggesting that the increased level of mIns in glioma is due to high expression of ISYNA1, the rate-limiting enzyme in the mIns-producing pathway. In conclusion, noninvasive analysis of mIns using single-voxel MRS may be useful in distinguishing gliomas from other brain tumors, particularly PCNSLs [1)].

1)
Nagashima H, Sasayama T, Tanaka K, Kyotani K, Sato N, Maeyama M, Kohta M, Sakata J, Yamamoto Y, Hosoda K, Itoh T, Sasaki R, Kohmura E. Myo-inositol concentration in MR spectroscopy for differentiating high grade glioma from primary central nervous system lymphoma. J Neurooncol. 2017 Nov 15. doi: 10.1007/s11060-017-2655-x. [Epub ahead of print] PubMed PMID: 29143277.