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BRAIN

Proton MR Spectroscopy Improves Discrimination between Tumor and Pseudotumoral Lesion in Solid Brain Masses

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BACKGROUND AND PURPOSE: Differentiating between tumors and pseudotumoral lesions by conventional MR imaging may be a challenging question. This study aims to evaluate the potential usefulness and the added value that single-voxel proton MR spectroscopy could provide on this discrimination.

MATERIALS AND METHODS: A total of 84 solid brain lesions were retrospectively included in the study (68 glial tumors and 16 pseudotumoral lesions). Single-voxel spectra at TE 30 ms (short TE) and 136 ms (long TE) were available in all cases. Two groups were defined: "training-set" (56 cases) and "test-set" (28 cases). Tumors and pseudotumors were compared in the training-set with the Mann-Whitney *U* test. Ratios between resonances were defined as classifiers for new cases, and thresholds were selected with receiver operating characteristic (ROC) curves. The added value of spectroscopy was evaluated by 5 neuroradiologists and assessed with the Wilcoxon signed-rank test.

RESULTS: Differences between tumors and pseudotumors were found in myo-inositol (mlns); $P < .01$ at short TE, and *N*-acetylaspartate (NAA; $P < .001$), glutamine (Glx; $P < .01$), and choline (CHO; $P < .05$) at long TE. Classifiers suggested tumor when mlns/NAA ratio was more than 0.9 at short TE and also when CHO/NAA ratio was more than 1.9 at long TE. Classifier accuracy was tested in the test-set with the following results: short TE, 82% (23/28); long TE, 79% (22/28). The neuroradiologists' confidence rating of the test-cases on a 5-point scale (0–4) improved between 5% (from 2.86–3) and 27% (from 2.25–2.86) with spectroscopy (mean, 17%; $P < .01$).

CONCLUSIONS: The proposed ratios of mlns/NAA at short TE and CHO/NAA at long TE provide valuable information to discriminate between brain tumor and pseudotumor by improving neuroradiologists' accuracy and confidence.

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