

Abstract

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Proton MR Spectroscopy in the Evaluation of Cerebral Metabolism in Patients With Fibromyalgia: Comparison With Healthy Controls and Correlation With Symptom Severity.

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BACKGROUND AND PURPOSE: Widespread pain sensitivity in patients with fibromyalgia (FM) suggests a central nervous system (CNS)-processing problem. Therefore, it is conceivable that metabolic alterations exist in pain-processing brain regions of people with FM compared with healthy controls (HC) and that such metabolic data could correlate with clinical symptoms. The purpose of this study was to test these hypotheses using proton MR spectroscopy ((1)H-MR spectroscopy).

MATERIALS AND METHODS: There were 21 patients with FM and 27 HC who underwent conventional structural MR imaging and additional 2D-chemical shift imaging (CSI) MR-spectroscopy sequences. For the 2D-CSI spectroscopy, larger volumes of interest (VOIs) were centered at the level of the basal ganglia and the supraventricular white matter. Within these larger areas, 16 smaller voxels were placed in a number of regions previously implicated in pain processing. N-acetylaspartate (NAA)/creatine(Cr), choline (Cho)/Cr and NAA/Cho ratios were calculated for each voxel. Subjects underwent clinical and experimental pain assessment.

RESULTS: Mean metabolite ratios and ratio variability for each region were analyzed by using repeated-measures analysis of variance (ANOVA). Correlations between clinical symptoms and metabolite ratios were assessed. Cho/Cr variability in the right dorsolateral prefrontal cortex (DLPFC) was significantly different in the 2 groups; a significant correlation between Cho/Cr in this location and clinical pain was present in the FM group. Evoked pain threshold correlated significantly with NAA/Cho ratios in the left insula and left basal ganglia.

CONCLUSION: Our data suggest that there are baseline differences in the variability of brain metabolite relative concentrations between patients with FM and HC, especially in the right DLPFC. Furthermore, there are significant correlations between metabolite ratios and clinical and experimental pain parameters in patients with FM.

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