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Introduction: ^1H -magnetic resonance spectroscopy (^1H -MRS) is a non-invasive method for *in vivo* assessment of brain metabolites such as N-acetylaspartate, choline, creatine, myo-inositol and glutamate-glutamine. The advantage of this method is the possibility to provide information about metabolite alterations in the brain while MRI fails to reveal any morphological abnormalities. Lyme borreliosis (or Lyme disease) is a tick-transmitted multisystem inflammatory disease caused by the spirochete *Borrelia burgdorferi*, and is the most common arthropod-borne disease in temperate regions of the northern hemisphere. Lyme neuroborreliosis (LNB) is a disease of the nervous system, occurring in 10–15% of all Lyme borreliosis cases, and can occur at any stage of the disease. It is known that *B. burgdorferi* has a tropism for the nervous system, and therefore we hypothesized that since it causes systemic inflammation and infects the brain, leading to impaired CNS function, it may lead to alterations in brain metabolism, as measured by *in vivo* ^1H -MRS

Aim: To determine whether ^1H -MRS could detect brain metabolite alterations in patients with early LNB compared with healthy controls.

Methods: Twenty-six patients diagnosed with early LNB according to the European Federation of Neurological Societies (EFNS) guidelines and twenty-six healthy volunteers as a control group have been involved in the study. All of them underwent routine MRI protocol using 3.0 T MRI scanner. ^1H -MRS examinations were performed with repetition time (TR) = 2000 ms, and echo time (TE) = 135 ms. Single voxels were manually positioned in the anterior and posterior part of the right and left frontal lobe. The ratios of N-acetylaspartate (NAA) and choline-containing compounds (Cho) to creatine (Cr) were determined and analyzed. ^1H -MRS spectra were analyzed using the Linear Combination of Model spectra (LCModel). Statistical analysis was carried out with Stata 15.

Wyniki: NAA/Cr ratio was significantly decreased in the anterior part of the right and left frontal lobes ($p \leq 0.001$ and $p = 0.001$ respectively), and in the posterior part of the right and left frontal lobes ($p \leq 0.001$ and 0.031 respectively). There was no statistically significant change of Cho/Cr within all regions.

Conclusion: A significant decrease in NAA/Cr ratio in patients with early LNB suggests the presence of neuronal loss or dysfunction.