Abstract.

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B-cells play a pivotal role in the multiple sclerosis (MS) pathogenesis. Of particular interest is the involvement of B cells in the formation of ectopic lymphoid follicles (ELFs) within the subarachnoid space. These ELFs have been associated with cortical demyelination, neurodegeneration and disease progression. Recent studies have shown that ELFs may be recognized on magnetic resonance imaging (MRI) as foci of leptomeningeal contrast enhancement (LMCE). Thus, LMCE could be a noninvasive, in vivo biomarker of ELF formation.

The aim of our research was to study if LMCE formation is associated with disturbances in peripheral blood B-cells' subsets.

32 MS cases and 20 age-matched neurologically healthy controls were included into the study. LMCE was detected with a 3 Tesla 3D FLAIR post-contrast sequence in the subarachnoid space as areas of increased signal, that weren't detected on pre-contrast sequence. Patients with MS were divided on 2 groups based on the presence of LMCE: LMCE-positive (n=17) and LMCE-negative (n=15). Blood was taken within 3-6 months after the MRI. To analyze the distribution of B-lymphocytes subsets flow cytometry was performed according to Bm1-Bm5 classification (cell surface IgD, CD38 co-expression).

The presence of LMCE was associated with increased levels of immature Bm2, Bm2' subsets compared to controls (Bm2: LMCE-positive (mean±SD) – 129.57±58.67/μl, controls – 91.99±58.67/μl, p=0.0036; Bm2': LMCE-positive – 25.54±12.43/μl, controls – 11.85±12.43/μl, p=0.003). Bm3-Bm4 subset didn't differ from controls (Bm3-Bm4: LMCE-positive – 2.32±1.154/μl, controls – 1.59±1.154/μl, p=0.3337), but were significantly lower than in LMCE-negative peers (Bm3-Bm4: LMCE-negative – 4.47±1.154/μl, LMCE-positive – 2.32±1.154/μl, p=0.0434). The analysis revealed decreased mature eBm5, Bm5 subset in LMCE-positive subgroup compared to controls (eBm5: LMCE-positive – 15.03±11.88/μl, controls – 27.44±11.88/μl, p=0.0492; Bm5: LMCE-positive – 9.77±13.29/μl, controls – 19.49±13.29/μl, p = 0.0329) and LMCE-negative patients (only Bm5: LMCE-negative – 23.51±13.29/μl, p=0.0398).

LMCE-positive patients had significant disturbances in peripheral blood B-cell subsets, that may be related to B-cell redistribution between central nervous system and periphery.