THE EFFECT OF CHEMOKINE CXCL-13 ON THE CLINICAL AND FUNCTIONAL STATUS OF PATIENTS WITH MULTIPLE SCLEROSIS IN REMISSION

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Introduction. CXCL-13 can be involved in the development of MS, and its level in peripheral blood may have diagnostic and/or prognostic significance. The purpose of this study is to assess the level of CXCL-13 in serum and its relationship with the clinical and functional state of patients with remitting MS in remission.

Materials and methods. The study involved 67 patients (28 men and 39 women) with a relapsing MS in remission. All patients were examined by scales and questionnaires EDSS, Multiple Sclerosis Functional Composite, Multiple Sclerosis Impact Scale 29, Fatigue Severity Scale. On the day of the clinical examination venous blood samples were taken from patients and healthy donors, serum was isolated, and the level of CXCL-13 was assessed by enzyme immunoassay method.

Results and discussion. It was revealed that CXCL-13 in the serum in patients with MS was significantly lower than in healthy volunteers. A relationship was found between serum CXCL-13 and the severity of neurological deficit according to EDSS, with walking speed of 25 feet, with an assessment of the quality of life and fatigue.

Conclusions. Despite the association of CXCL-13 with the clinical and functional state of MS patients, at present time this chemokine cannot be considered to be a diagnostic or prognostic marker in MS patients.

Keywords: multiple sclerosis; CXCL-13; EDSS; MSIS 29; FSS.
Material and methods. The study involved 67 patients (28 men and 39 women) with a relapsing-remitting type of MS in remission. All patients had a reliably established MS diagnosis according to the Macdonald criteria (2010); the degree of disability on the Expanded Disability Status Scale (EDSS) was up to 6.0 points. The control group included 14 people without identified neurological disorders. Patients and healthy donors with signs of inflammatory diseases and pregnant women did not participate in the study. The average age of the patients was 33 ± 6.5 years, the disease duration was 6.5 ± 3.9 years, the frequency of exacerbations was 0.35 ± 0.56 times a year.

All patients were assessed for neurological status by EDSS scale, functional status by Multiple Sclerosis Functional Composite (MSFC, including 25 foot walk test, nine-well test and auditory test), quality of life of MS patients according to the Multiple Sclerosis Impact Scale 29 (MSIS 29), fatigue — by Fatigue Severity Scale (FSS). On the day of the clinical examination venous blood samples were taken from patients and healthy donors, serum was isolated, and the level of CXCL-13 was assessed by enzyme immunoassay (ELISA). Data processing was carried out using the program STATISTICA 10 using non-parametric methods (calculation of the correlation coefficient $R$ and $U$-criterion).

Results and discussion. The results of the examination of MS patients are presented in Table 1. Significant difference in the content of CXCL-13 in the serum of patients with MS and healthy volunteers was revealed. In healthy donors, the content of CXCL-13 was 52.08 (49.52; 76.15) pg/ml, and in patients with MS — 39.96 (23.53; 54.64) pg/ml ($U = 195$, $p = 0.0008$). The obtained results do not explain the available literature data on an increase of the chemokine level in the cerebrospinal fluid in patients with MS [4], however, they are consistent with the data from the pilot studies of K.R. Edwards and colleagues on the simultaneous assessment of the level of chemokines in serum and cerebrospinal fluid in patients with MS: the level of CXCL-13 in this work was increased in the cerebrospinal fluid in patients with MS compared to that in healthy donors, but decreased in serum [5]. Perhaps this effect is associated with the active capture of CXCL-13 by B-lymphocytes.

However, the correlation analysis revealed a relationship between serum CXCL-13 and severity of neurological deficit according to EDSS ($r = 0.36$, $p = 0.041$), with a walking speed of 25 feet ($r = 0.29$, $p = 0.047$), with the assessment of quality of life by MSIS 29 ($r = 0.34$, $p = 0.049$) and fatigue by FSS ($r = 0.31$, $p = 0.039$), which indicates the participation of this cytokine in the development of the disease. Similar information is described in literature — the level of CXCL-13 in organism is associated with the clinical and radiological activity of the disease [6]. Thus, despite the association of CXCL-13 with the clinical and functional status of patients with MS, its level in the serum of patients is lowered in comparison with healthy donors and does not reflect the concentration of CXCL-13 in the nervous tissue in MS, so, this chemokine can not be considered to be diagnostic or prognostic marker of MS.

References