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Differences in Cognitive Functioning over the Course of Chemotherapy in Patients Suffering from Multiple Myeloma and the Possibility to Predict Their Cognitive State on the Basis of Biological Factors

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Abstract : Introduction: The aim of the research was to determine the changes in cognitive functioning in patients with plasma cell myeloma by comparing patients' state before the treatment and during chemotherapy as well as to determine the biological factors that can be used to predict patients' cognitive state. Methods: The patients underwent the research procedure twice: before chemotherapy and after 4-6 treatment cycles. A psychological test and measurement of the following biological variables were carried out: TNF-α (tumor necrosis factor), IL-6 (interleukin 6), IL-10 (interleukin 10), BDNF (brain-derived neurotrophic factor). The following research methods were implemented: the Montreal Cognitive Assessment (MoCA), Battery of Tests for Assessing Cognitive Functions PU1, experimental and clinical trials based on the Choynowski's Memory Scale, Stroop Color-Word Interference Test (SCWT), depression measurement questionnaire. Results: The analysis of the research showed better cognitive functions of patients during chemotherapy in comparison to the phase before it. Moreover, neurotrophin BDNF allows to predict the level of selected cognitive functions (semantic fluency and execution control) already at the diagnosis stage. After 4-6 cycles, it is also possible to draw conclusions concerning the extent of working memory based on the level of BDNF. Cytokine TNF-α allows us to predict the level of letter fluency during anti-cancer treatment. Conclusions: It is possible to presume that BDNF has a protective influence on patients' cognitive functions and working memory and that cytokine TNF-α co-occurs with a diminished execution control and better material grouping in terms of phonological fluency.
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