

Oncology of the chest

Humoral immune response against neural antigens and its effect on cognition in lung cancer patients

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Background. Cognitive impairment during the course of lung cancer develop as clinical manifestation of paraneoplastic neurological syndromes or may be induced by chemotherapy. Paraneoplastic neurological syndromes (PNS) are defined as the pathology of the nervous system observed in the course of neoplastic disease with the exclusion of a tumor infiltration, compression or metastasis. The PNS diagnosis is based on detailed criteria that consider both the clinical manifestation and the presence of onconeural antibodies. The pathomechanisms underlying PNS are immune-mediated leading to the pathology that causes cognitive impairment. The aim of the study was to evaluate the effect of humoral immune response against neural antigens on the cognition in lung cancer patients.

Material and methods. The prospective study included 51 consecutive lung cancer patients aged 62±8 years hospitalized in the Clinic of Oncology with The Sub-department of Diurnal Chemotherapy Wielkopolska Center of Pulmonology and Thoracosurgery of Eugenia and Janusz Zeyland and Chair and Clinic of Oncology. Neurological examination, MiniMental State Examination (MMSE), Trail Making Test (TMT) A and B, and Hamilton scale were performed at baseline (time of lung cancer diagnosis) and after 6 months. Moreover, Psychology Experiment Building Language software was used for the computer - based evaluation of cognitive functions, basing on digit span (Dspan), simple reaction time (SRT) and choice reaction time (CRT) tests. Patients sera were tested for the presence of onconeural antibodies and anti-neural antibodies with indirect immunofluorescence (EUROIMMUN, Germany) as a screening and Line blot as confirmation test (EUROIMMUN, Germany).

Results. Autoantibodies were found in 31% of lung cancer patients. Onconeural antibodies (anti-Hu, anti-Ma/Ta) were identified in 4%, and anti-neural antibodies (anti-neuroendothelium, anti-GFAP, anti-myelin) in 17.6% of study participants. MMSE was lower (26.7±2.7) in seropositive patients comparing with seronegative subjects (28.7±1.2; P = 0.013). The results of Trail Making Test B 6 months after lung cancer diagnosis were worse in patients with autoantibodies (184±74 ms) than in patients without antibodies (129±39 ms; P = 0.022). Humoral immune response in lung cancer patients affected also simple reaction time (SRT) and choice reaction time (CRT) tests. However, no effect on digit span was found. Moreover, we have observed than cognition impairment in lung cancer patients was not necessarily associated with onconeural or anti-neural antibodies. Immune reaction against nucleosome antigens may play a role as well.

Conclusion. Humoral immune response in lung cancer patients is associated with deterioration in cognitive functions. The specific reaction against onconeural or anti-neural antigens, but also non-organ specific reaction against nucleosome antigens is involved in cognitive impairment.