

B-CELL SUBPOPULATIONS AND CORRELATION WITH HUMORAL IMMUNE RESPONSE IN PATIENTS WITH COVID-19

Spaska Lesichkova^{1,2}, Yana Krasteva¹, Valentina Atanasova¹, Nevena Gesheva¹, Yulia Proevska³, Evelina Shikova³, Maria Atanasova⁴, Anastasiya Mihaylova¹, Elisaveta Naumova^{1,2}

¹ *Clinic of Clinical Immunology and Stem Cell Bank, University Hospital "Alexandrovska", Sofia, Bulgaria*

² *Department of Clinical Immunology, Faculty of Medicine, Medical University, Sofia, Bulgaria*

³ *Central Laboratory of Microbiology, University Hospital "Alexandrovska", Sofia, Bulgaria*

⁴ *Clinic of Anesthesiology and Intensive Care, University Hospital "St. Anna", Sofia, Bulgaria*

COVID-19 pandemic raised a number of questions related to cell-mediated and humoral responses against SARS-Cov-2. Studies on B cells and their subpopulations in patients with COVID-19 are limited and controversial.

Aim: To investigate the relationship between B-cell subpopulations, and the nonspecific and specific humoral immune response in patients with COVID-19.

Materials and methods: B lymphocytes and their subsets were analyzed by flow cytometry in 23 patients with PCR-confirmed SARS-CoV-2 infection hospitalized in University Hospital "Alexandrovska" or University Hospital "St. Anna". Serum immunoglobulins (IgG, IgA, IgM) and C3 and C4 fractions of complement were measured by turbidimetry. Specific IgG and IgA antibodies against SARS-CoV-2 spike protein were determined using commercial ELISA kits.

Results: Seventeen (73.9%) patients were positive for IgA and IgG SARS-Cov-2 specific antibodies. During the follow-up seroconversion was observed in 4 patients. High levels of both IgA (Ratio-7.56±3.0 vs. >1.1) and IgG (Ratio: 9.52±4.47 vs. >1.1) SARS-Cov-2 specific antibodies predominate (75,7%). In 65,4%% of samples the values of IgG antibodies are higher than those of IgA. Elevated IgA serum levels were observed in 42.5% of patients. B cell percentage was increased in 11 (47.8%) patients, and in 8 of them the absolute number was also elevated. Increased plasmablasts were observed in 12 (52.2%) and exhausted B cells in 7 (30.4%) patients, while in 9 patients class-nonswitched B cells were reduced. High antibody values correlated with increased percentages of total B cells (p = 0.049).

Conclusion: The results of this pilot study show activation of the B-cell immune response in hospitalized patients with COVID-19. A correlation with the humoral immune response against SARS-CoV-2 was also found.