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Clinical-Immunological Description of Urological Diseases in Patients With Tuberculosis

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ABSTRACT

When tuberculosis and urological diseases coexist, significant acute changes in the B-cell branch of the immune system (humoral immunity) were not observed, indicating that urological diseases do not have a practical negative impact on the B-cell branch of the immune system and that they are not a complicating factor for pulmonary tuberculosis in terms of humoral immunity.

KEYWORDS: urological diseases, tuberculosis, immune system

Aim of the Study: To examine the quantitative changes in different branches of the immune system in patients with urological diseases coinciding with pulmonary tuberculosis.

Materials and Methods: A total of 157 individuals treated at the Bukhara regional tuberculosis dispensary were studied. They were divided into three groups: the main group - patients diagnosed with urological diseases alongside pulmonary tuberculosis (n=117); the comparison group - patients diagnosed with pulmonary tuberculosis but without urological diseases (n=20); and the control group - healthy individuals without pulmonary tuberculosis or urological diseases (n=20).

The condition of the immune system in patients and healthy individuals was assessed based on CD-differentiated and activation antigen expression. The following markers of immune competent cells were identified: CD3+, CD4+, CD8+, and lymphocytes. The expression of CD receptors was performed using LT series monoclonal antibodies from "Sorbent" LLC, according to the method established by Garib F. Yu. et al. (1995) through a rosette formation reaction. The concentrations of IgM, IgA, and IgG in serum were determined by the radial immunodiffusion method of Mancini (1963). Cytokines in serum were detected using the "Cytokine" (RF) test kit by the ELISA method.

All tests were conducted at the Bukhara Regional Multidisciplinary Medical Center and the Institute of Immunology and Human Genomics of the Academy of Sciences of Uzbekistan.

Results and Analysis: In these patients, the relative indicators of total lymphocyte counts showed no significant difference between the control and main groups ($p > 0.09$); however, significant differences were observed in the absolute counts of this parameter, with a reduction of 1.28 times in subgroup 1a, 1.37 times in subgroup 1b, and 1.43 times in subgroup 1c ($p < 0.05$). This indicates corresponding changes in leukocyte counts.

It is noteworthy that the most severe immunodeficiency among the cellular immunity parameters was observed in CD3+ cells, with a relative decrease in the main group of 1.40, 1.45, and 1.37 times, respectively ($p < 0.001$). A similar result was also noted in the absolute counts of CD3+ cells, with reductions of 1.97, 2.01, and 2.00 times, respectively ($p < 0.001$).

A significant decrease was uniformly observed in both the relative and absolute counts of CD3+ cells ($p < 0.05$ - $p < 0.001$). This indicates a total deficiency of this immune competent cell in patients of the main group. When evaluating the subpopulations of CD3+ cells (CD4+ and CD8+), it was determined that the total T-immunodeficiency was primarily due to the CD4+ cells, as their relative and absolute counts significantly decreased in the main group compared to the control.

In contrast, no clear differences were observed in the relative counts of CD8+ cells between groups.

The marker indicating the development of secondary immunodeficiency in the T-component of the immune system is the IRI, which was significantly reduced at values of 1.17 ± 0.04 , 1.27 ± 0.04 , and 1.38 ± 0.05 units compared to the control group (1.53 ± 0.02 units), clearly demonstrating a deficiency in this parameter. A similar deficiency in the T-component of the immune system was also noted in comparative analyses with the comparison group.

Conclusions: The profundity of secondary immunodeficiency when tuberculosis and urological diseases are present is characterized by a decrease in the relative and absolute counts of CD3+ and CD4+ cells. The IRI, which genuinely assesses the deficiency in the T-component, indicates the development of secondary immunodeficiency. Changes occur in the patients' immune systems, primarily characterized by profound total secondary immunodeficiency in the T-component. Significant changes were not observed in the B-component of the immune system (humoral immunity) when tuberculosis and urological diseases coexist, proving that urological diseases do not have a negative practical effect on the B-component of the immune system, and do not worsen the condition of patients with pulmonary tuberculosis. The significant increase in concentrations of pro-inflammatory and anti-inflammatory cytokines (IL-10, TNF) in the blood serum of patients in the main group indicates that the inflammatory process is intensifying and is a factor that exacerbates the progression of pulmonary tuberculosis.

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