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## MODERN CLINICAL AND IMMUNOLOGICAL METHODS FOR THE STUDY OF UROLOGICAL DISEASES ACCOMPANIED BY TUBERCULOSIS

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✓ ***Resume***

***When pulmonary tuberculosis is combined with urological diseases, along with the general condition of the patient, changes in the body's immune system are noted, which are mainly characterized by a deep total secondary immunodeficiency of the T-link of the immune system. The fact that no significant changes were observed in the humoral or B-link of the immune system of patients indicates the absence of a negative effect of urological diseases on this link of the immune system. The true marker of T-link deficiency is the immunoregulatory index, which can be recommended to determine the development of secondary immunodeficiency of the T-link of the immune system.***

***Key words: Urological diseases, tuberculosis, immune system***

## СИЛ БИЛАН БИРГАЛИКДА КЕЛГАН УРОЛОГИК КАСАЛЛИКЛАР ЗАМОНАВИЙ КЛИНИК-ИММУНОЛОГИК ТАВСИФИ

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✓ ***Резюме***

***Ўпка сили билан касалланиш урологик касалликлар қўшилиб келганда, бемор умумий ҳолати билан бир қаторда организмнинг иммун тизимида ўзгаришлар кузатилиб, у асосан иммун тизими Т-бўғинининг чуқур тотал иккиламчи иммунодефицити билан тавсифланади. Беморлар иммун тизимининг гуморал ёки В-бўғинида эса айтарли ўзгаришлар кузатилмагани урологик касалликлар иммун тизимининг шу бўғинига салбий таъсир этмаганлиги исботлайди. Т-бўғиндаги дефицитни ҳаққоний баҳоловчи маркер бу иммунорегулятор индекс кўрсаткичи бўлиб, уни иммун тизимининг Т-бўғинидаги иккиламчи иммунодефицит ривожланганлигини аниқлаш учун тавсия этиш мумкин.***

***Калит сўзлар: урологик касалликлар, сил, иммун тизими***

## СОВРЕМЕННЫЕ КЛИНИКО-ИММУНОЛОГИЧЕСКЫЕ МЕТОДЫ ИССЛЕДОВАНИЕ УРОЛОГИЧЕСКИХ ЗАБОЛЕВАНИЙ, СОПРОВОЖДАЮЩИХСЯ С ТУБЕРКУЛЕЗОМ

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***При сочетании туберкулеза легких с урологическими заболеваниями наряду с общим состоянием больного отмечаются изменения в иммунной системе организма, которые в основном характеризуются глубоким тотальным вторичным иммунодефицитом Т-звена иммунной системы. Тот факт, что значимых изменений в гуморальном или В-звене иммунной системы больных не наблюдалось, свидетельствует об отсутствии отрицательного влияния урологических заболеваний на это звено иммунной системы. Истинным маркером недостаточности Т-звена является иммунорегуляторный индекс, который можно рекомендовать для определения развития вторичного иммунодефицита Т-звена иммунной системы.***

***Ключевые слова: урологические заболевания, туберкулез, иммунная система***

## Relevance

The proportion of people suffering from multimorbidity on our planet is increasing [1,2,4,7]. People suffering from chronic infectious diseases such as tuberculosis and HIV are characterized by the development of non-infectious diseases [3,5,6,9,10,11]. The most rapid increase in the number of non-communicable diseases is recorded in low- and middle-income countries. It is known that the course of urological diseases in patients with pulmonary tuberculosis has its own characteristics. These characteristics, together with the severity of the main disease, are also related to the body's immune system [7,8,12]. However, it has not been shown which part of the immune system is important in the pathological process.

**The purpose of the study:** to study quantitative changes in various parts of the body's immune system in urological diseases that occur together with pulmonary tuberculosis.

## Materials and methods

320 persons treated at the tuberculosis dispensary of Bukhara region were studied. They were divided into three groups: the main group - patients diagnosed with urological diseases together with pulmonary tuberculosis (n=117); comparison group - patients diagnosed with pulmonary tuberculosis, but without urological diseases (n=20); control group - healthy individuals without pulmonary tuberculosis and urological diseases (n=20).

The main group, in turn, was divided into three subgroups: 1a group - urolithiasis combined with pulmonary tuberculosis (STK) - n=18; Group 1b - urinary tract infection (STI) combined with pulmonary tuberculosis - n=54; 1st group - benign prostatic hyperplasia (BPH) in combination with pulmonary tuberculosis - n=45. Different urological diseases have different effects on their main disease - pulmonary tuberculosis. Also, there are various changes in quantitative indicators of the immune system. Therefore, the study and evaluation of the indicators of the immune system in these urological diseases was conducted in a comparative manner.

Evaluation of the immune system status of patients and healthy people was carried out based on the expression of CD-differentiated and activating antigens. The following markers of immunocompetent cells were identified: CD3+-, CD4+-, CD8+-, lymphocytes. Expression of CD receptors using LT series monoclonal antibodies of RF "Sorbent" LLC Garib F.Yu et al. (1995) by the method of socket formation reaction. The concentration of IgM, IgA and IgG in blood serum was determined by the method of radial immunodiffusion according to Mancini (1963). Cytokines in the blood serum of the subjects were determined by the IFA method using the "Cytokine" (RF) test kit.

All examinations were conducted at the Bukhara Regional Multidisciplinary Medical Center and the Institute of Immunology and Human Genomics of the Federal Republic of Uzbekistan.

## Results and analysis

Different urological diseases have different effects on their main disease - pulmonary tuberculosis. Also, there are various changes in quantitative indicators of the immune system.

For this reason, the study and evaluation of the indicators of the immune system in these urological diseases was conducted in a comparative manner.

The obtained results show that the number of leukocytes in all subgroups of the main group was significantly reduced compared to the control group (Table 1).

The analysis of the relative indicators of the total number of lymphocytes in these patients showed that there was no significant difference between the control and main groups ($R>0.09$), but there were significant differences in the absolute amounts of this parameter - 1.28 times in group 1a, 1.37 times in group 1b, respectively. times and 1.43 times decrease was observed in the 1st group ($R<0.05$).

This showed that there was a corresponding change in the amount of leukocytes. It is worth noting that the strongest immunodeficiency among the parameters of cellular immunity was observed in SD3+ cells - the decrease in relative amounts in the main group was 1.40, 1.45 and 1.37 times, respectively ($R<0.001$). A similar result was observed for the absolute amount of SD3+ cells - the decrease was 1.97, 2.01 and 2.00 times, respectively ($R<0.001$).

Both the relative and absolute amounts of SD3+-cells showed a equally convincing decrease ($R<0.05$-$R<0.001$). This immunocompetent cell shows a total deficiency in the main group of patients.

When SD3+ cell subpopulations (SD4+ and SD8+) were studied, it became clear that SD4+ cells were the cause of total T-immunodeficiency, as their relative and absolute amounts were reliably reduced in the main group compared to the control.

(Table 1)

**Indicators of immune status in patients with pulmonary tuberculosis combined with urological diseases**

| Indicators | Control group | Main group | | |
|---|---|---|---|---|
| | | U, n=18 | BPH, n=54 | UTI, n=45 |
| leukocytes, $10^9$/л | 6500±185 | 4648±253 | 47,38±234 | 4064±228* |
| Lymphocytes | 32,5±1,26 | 34,85±1,93 | 32,96±1,82 | 37,0±1,46 |
| Lymphocytes, 1 μl of blood | 2112±83 | 1649±99* | 1538±97* | 1482±76* |
| CD3+ cells % | 59,5±1,16 | 42,38±1,67* | 41,17±1,55* | 43,45±1,62* |
| CD3+ cells 1 μl of blood | 1257±38 | 638±47* | 626±46* | 629±34* |
| CD4+ cells % | 36,0±1,05 | 31,63±1,12* | 30,51±1,09* | 33,54±1,10* |
| CD4+ cells 1 μl of blood | 760±32 | 448±37* | 457±36* | 483±23* |
| CD8+ cells % | 23,5±0,82 | 27,0±1,27* | 24,0±1,03 | 24,36±0,63 |
| CD8+ cells 1 μl of blood | 496±29 | 339±30* | 376±29* | 360±24* |
| IRI, unity | 1,53±0,02 | 1,17±0,04* | 1,97±0,04* | 1,38±0,03* |

***Note:** * is a sign of reliable changes compared to the control group (P<0,05-0,001).*

Accordingly, there was no significant intergroup difference in the relative amounts of SD8+ cells.

IRI, a marker indicating the development of secondary immunodeficiency in the T-joint of the immune system, was 1.17±0.04, 1.27±0.04 and 1.38±0.05 units compared to the control group (1.53±0.02 units). a convincing deficit was evident.

A similar deficiency in the T-joint of the immune system was observed when a comparative analysis was performed with a comparison group.

Thus, in 9 out of 10 indicators describing the T-joint of the immune system, a convincing decrease in 9 (group 1a) and 8 (groups 1b and 1v) was observed in the main group compared to the control group, the depth of secondary immunodeficiency was especially in the relative and absolute amounts of SD3+ and SD4+ cells. was characterized by a decrease. The IRI indicator, which is a true assessment of T-joint deficiency, showed the development of secondary immunodeficiency, and IRI is characterized as an immunological marker that evaluates the development of secondary immunodeficiency in the T-joint of the immune system. When pulmonary tuberculosis is combined with urological diseases, along with the patient's general condition, there are changes in his immune system, which is mainly characterized by a deep total secondary immunodeficiency of the T-joint of the immune system.

When the humoral or V-joint of the immune system of the patients was studied, no convincing results similar to the above were observed.

Regarding the concentration of the main immunoglobulins (IgA, IgG, IgM) in the blood serum, a slight decrease in IgA and IgG was observed in the main group compared to the control group (R<0.05), but no difference was detected when compared with the comparison group (R>0.05).

Therefore, no significant changes were observed in the V-joint of the immune system (humoral immunity) when pulmonary tuberculosis was accompanied by urological diseases, and it was proved that urological diseases did not have a negative effect on this link of the immune system.

In contrast to these results, a dramatic, convincing increase in pro-inflammatory and anti-inflammatory cytokines (IL-10 and TNA) was noted. The indicators of the main group on these parameters were shown to be significantly higher than the control group, as well as the comparison groups (R<0.05 - R 0.01). Thus, it was proved that the detection of urological diseases in patients diagnosed with pulmonary tuberculosis, along with the deepening of the pathological process, also caused a convincing sharp increase in the concentration of pro-inflammatory and anti-inflammatory cytokines.

Thus, when pulmonary tuberculosis and urological diseases (STK, PBXG, STI) coexist, there were no significant changes in the V-joint of the immune system (humoral immunity).

The fact that there was no difference in the concentration of IgM, while there was a slight difference in IgA and IgG in the main group compared to the control, it practically did not differ from the parameters of the comparison group showed that there is practically no negative effect of urological diseases on the V-joint of the immune system, and it was proven that urological diseases are not an aggravating factor for pulmonary tuberculosis in terms of the effect on humoral immunity.

A sharp, reliable increase in the concentration of pro-inflammatory and anti-inflammatory (IL-10, TNA-x) cytokines in the blood serum of patients in the main group compared to the control and comparison groups has been proven to be an aggravating factor of the inflammatory process and the course of pulmonary tuberculosis.

**Conclusions:**

1. The depth of secondary immunodeficiency when tuberculosis and urological diseases were combined was characterized by a decrease in the relative and absolute amounts of SD3+ and SD4+ cells. The IRI indicator, which accurately evaluates the deficiency in the T-joint, showed the development of secondary immunodeficiency. Patients have changes in the immune system, which is mainly characterized by a deep total secondary immunodeficiency of the T-joint of the immune system.

2. When tuberculosis and urological diseases come together, no drastic changes were observed in the V-joint of the immune system (humoral immunity), which shows that there is practically no negative effect of urological diseases on the V-joint of the immune system. A reliable increase in the concentration of pro-inflammatory and anti-inflammatory (IL-10, TNA) cytokines in the blood serum of patients in the main group compared to the control and comparison groups has been proven to be a factor of the exacerbation of the inflammatory process and the course of pulmonary tuberculosis.

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