

The Role Of Immunological Factors In The Pathogenesis Of Hiv Infection In Women Of Reproductive Age With Genital Inflammatory Diseases

Nasiba Ismatilloeva Olimova

Assistant of the department of microbiology, immunology and virology of the Bukhara State Medical Institute Bukhara, Uzbekistan
DOI: 10.47750/pnr.2022.13.509.322

Abstract

Nowadays, there are a significant number of factors that determine the dynamics of the progression of the virus and the outcome of the disease. The main factor in the penetration of the virus into cells is cellular tropism, which is mediated by the determination of the viral phenotype and receptor interactions. But the mechanism of development of factors that contribute to the fact that the number of CD4+ T cells decreases and, at the same time, the number of X4-R5-tropic strains in AIDS increases, has not yet been fully understood.

A number of scientific studies are being carried out around the world to achieve high effectiveness of interventions aimed at the treatment and prevention of gynecological diseases in women living with HIV. In this regard, it is necessary to identify the main features of the development of diseases of the genital organs against the background of HIV infection and to substantiate the causes of the resulting negative changes.

KEYWORDS HIV infection, CD4+, T cells decreases, gynecological diseases.

INTRODUCTION

Nowadays, there are a significant number of factors that determine the dynamics of the progression of the virus and the outcome of the disease. The main factor in the penetration of the virus into cells is cellular tropism, which is mediated by the determination of the viral phenotype and receptor interactions. But the mechanism of development of factors that contribute to the fact that the number of CD4+ T cells decreases and, at the same time, the number of X4-R5-tropic strains in AIDS increases, has not yet been fully understood. The nature of the course of the disease and the time of its manifestation depends on the specificity of the immune response, this is due to the activity of T-cells and the level of organization of the immune system. Thus, these indicators are carefully studied and taken into account. In addition, special attention is paid to the study of cytokines. Cytokines play an important role in activating the immune response. In the course of the study, it was found that the spread of HIV infection throughout the body affects the formation of cytokines by changing the activity of T-cells. This is the reason for the decrease in immunity, creating favorable conditions for the reproduction of HIV [1,2,3].

Today, large-scale work is being carried out among various segments of the population, aimed at early diagnosis and reduction of complications of somatic diseases, especially among women, the creation of a healthy environment, the spread and prevention of HIV / AIDS. The Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 defines the following tasks: "...increasing the availability and quality of specialized medical care, further reforming emergency and emergency medical care, preventing disability ..." defined. In this regard, it is important to raise the level of medical services to a new level, to develop tactics for the early diagnosis and treatment of gynecological diseases in HIV-infected women, especially to reduce the number of complications.

This dissertation research, to a certain extent, serves to fulfill the tasks stipulated in the Decree of the President of the Republic of Uzbekistan dated January 25, 2018 No. PP-3493 "On measures to further improve the system for counteracting the spread of the disease caused by the human immunodeficiency virus in the Republic of Uzbekistan",

Decrees of the President of the Republic Uzbekistan No. PP-4887 dated November 10, 2020 "On additional measures to ensure healthy nutrition of the population" and No. PP-4891 dated November 12, 2020 "On additional measures to ensure public health by further improving the efficiency of medical prevention" as well as in other legal documents related to activities in this direction.(5)

This dissertation research was carried out in accordance with the priority direction of the development of science and technology of the Republic of Uzbekistan VI "Medicine and pharmacology".(9)

At the moment, there is an extensive number of articles exploring various indicators of the spread of HIV. In a general sense, they are classified into articles in a global context, considering all countries of the world, and articles focusing on countries - the focus of the disease. An analysis was made of the impact of social and economic determinants on the global spread of HIV and AIDS (2).

The analysis included 151 countries with 90 explanatory variables. In total, five major aspects were analyzed: the number of people infected with HIV/AIDS per 100,000 population; number and percentage of adults aged 15–49 living with HIV status; the estimated number of deaths from AIDS; percentage of patients with a sexually transmitted HIV diagnosis. The study by Moskaleva E. V., et al. (2017) emphasizes the importance of studying socio-economic factors in the spread of socially significant diseases. It is noted that the majority of those infected are women, so, in South Africa, women with AIDS make up 60% of all infected adults, and 75% of infected adolescents. (5).

In modern conditions, the clinical course of inflammation has changed: the frequency of erased forms of the disease with periods of exacerbation has increased, which undoubtedly creates significant difficulties in diagnosing the inflammatory process and contributes to the insufficiently high efficiency of routine methods of treatment. (6).

There are no studies in the literature evaluating markers of immunosuppression in inflammatory diseases of the genitals in HIV-infected women (3). In the Republic of Uzbekistan, the problem of IBD in women with HIV infection is not well covered. There are isolated reports concerning some issues of diagnosis and treatment (2). Particular attention is paid to the prevention of the spread of the disease in hospitals, especially in obstetrics. At the state level, the degree of coverage of patients with antiviral therapy and its pharmacoeconomic effect is being assessed (7). However, AIDS is still one of the leading causes of death in the world population.

MATERIALS AND METHODS

The work was carried out for 3 years (2018 - 2021) in cooperation with the advisory polyclinic of the AIDS Center, the Department of Gynecology of the Regional Perinatal Center, the Reproductive Center of Bukhara. A total of 315 patients aged 15 to 41 years were examined. Clinical and laboratory data of 200 patients were analyzed retrospectively for 2018-2019. (comparison group), 115 patients were under observation during 2020-2021. (main group).

In the course of the work, the surveyed took into account such criteria as:

Age of patients (18-40 years old)

Confirmed diagnosis of HIV-infection, which was based on examination data, anamnesis, antibodies to HIV infection, the presence of CD4+ leukocytes)

The ability of patients to undergo a full examination and examination during the study

Signs of the beginning of the development of inflammatory processes of the pelvic organs and external genital organs.

Patients with confirmed HIV-infected status were systematized and grouped on the basis of the classification by V. U. Pokrovsky according to the stage of the course of the disease, proposed in 2000.

RESULTS AND DISCUSSION

The average age of patients in the comparison group was 38.6 ± 0.67 years, in the main group 35.1 ± 0.65 , in the control group 34.93 ± 1.50 years, $p \leq 0.05$. The data obtained during the study confirmed the fact that the incidence of HIV infection among young people of active and reproductive age is the highest. The study also showed that the age group of patients with congenital HIV infection has increased, which indicates the effectiveness of ART therapy and leads to an increase in the average life expectancy of patients.

We also assessed the social status of the subjects from the two groups. A number of characteristic features were revealed when comparing the level of education of the surveyed individuals (Table 1).

The percentage of women with secondary and specialized secondary education was significantly higher in the surveyed women of both groups compared to women with higher education. In the course of assessing the profession of the subjects, we took into account the risks and possible impact on the development of the underlying pathology as a result of the influence of factors, as well as the conditions of professional activity. The vast majority of HIV-infected women are housewives or temporarily unemployed.

Table 1. Social history of retrospective and prospective surveyed women, abs/%

Index	Comparison group(n=200)	Main group(n=115)	Control(n=30)
Control			
Higher	32/16	16/13,9	10/33,3
Secondary special	127/63,5	62/53,9	11/36,7
Average	41/21,5	37/32,2	9/30
Social status			
Works	55/27	31/27	15/50
Temporarily not working	34/17	17/14,8	6/20
Student	0	0	0
A housewife	111/55,5	67/58,2	6/20
Other	0	0	3/10
Place of residence			
City	106/53	65/56,5	20/66,6
Village	94/47	50/43,5	10/33,3

A strong difference between groups in the evaluation was excluded. Information about marriage ties in the two groups did not differ, and most of the subjects, HIV-infected were not married (58.5% in the comparison group and the main group), and among healthy subjects, all were married. Among the women studied, I would like to emphasize that in the group of subjects who did not receive therapy, the number of unmarried women was significantly higher compared to patients who were under observation and receiving ART, -35 (41.1±5.3%) and 18 (24.0±5.0%), ($p<0.05$), it was also indicated that all relationships were completed after the diagnosis of HIV infection - among the subjects, their number was 10 people (13.3±3.9%) and 32 (37.6±5.2%) women in the comparison group. Women whose goals were the birth of a healthy child and the preservation of the integrity of the family, considered themselves capable of providing and nurturing children. In confirmation of their desires was the fact of social stability. Of the bad habits in the comparison group, 20% noted smoking and 20% - regular alcohol consumption, in the main group - 25.2 and 22.6%, respectively. When analyzing the incidence of the husband, the following was noted: in the comparison group, 64.5% of the examined husbands were not infected, in the main group - in 54.5%.

The route of infection in 40% of cases in the comparison group and in 43.5% - sexual, I would like to note the high percentage of the unknown route of infection in 46.5% and 40%, respectively (Table 3.2). 27 (13.5%) patients of the comparison group and 19 (16.5%) women of the main group were infected by the parenteral route.

According to the respondents, the cause of infection was the use of narcotic drugs, while each of the subjects does not consider himself a drug addict, referring to the fact that the infection occurred in adolescence with a single or accidental use of drugs.

Of the concomitant somatic pathology, arterial hypertension occurred with approximately the same frequency in both comparison groups (Figure 1). Iron deficiency anemia of mild to moderate severity was observed in every fourth patient. Diseases of the gastrointestinal tract occurred in every 6 patients, and the frequency was lower than in the control group, which may be due to the rare appeal of this category of patients to somatic hospitals, $p<0.05$. An ophthalmologist saw 5% of patients from the comparison group and 4.3% from the main group. Pathology of the thyroid gland, represented by diffuse goiter with/without dysfunction of the thyroid gland, occurred in 8.7% of cases in the main group and in 8.5% of cases in the comparison group. Surgical pathology - appendectomy - was noted in the anamnesis in 5% of patients in both observation groups. We noted a lower frequency of general somatic pathology in the examined patients, possibly due to the rare negotiability due to the presence of the underlying pathology.

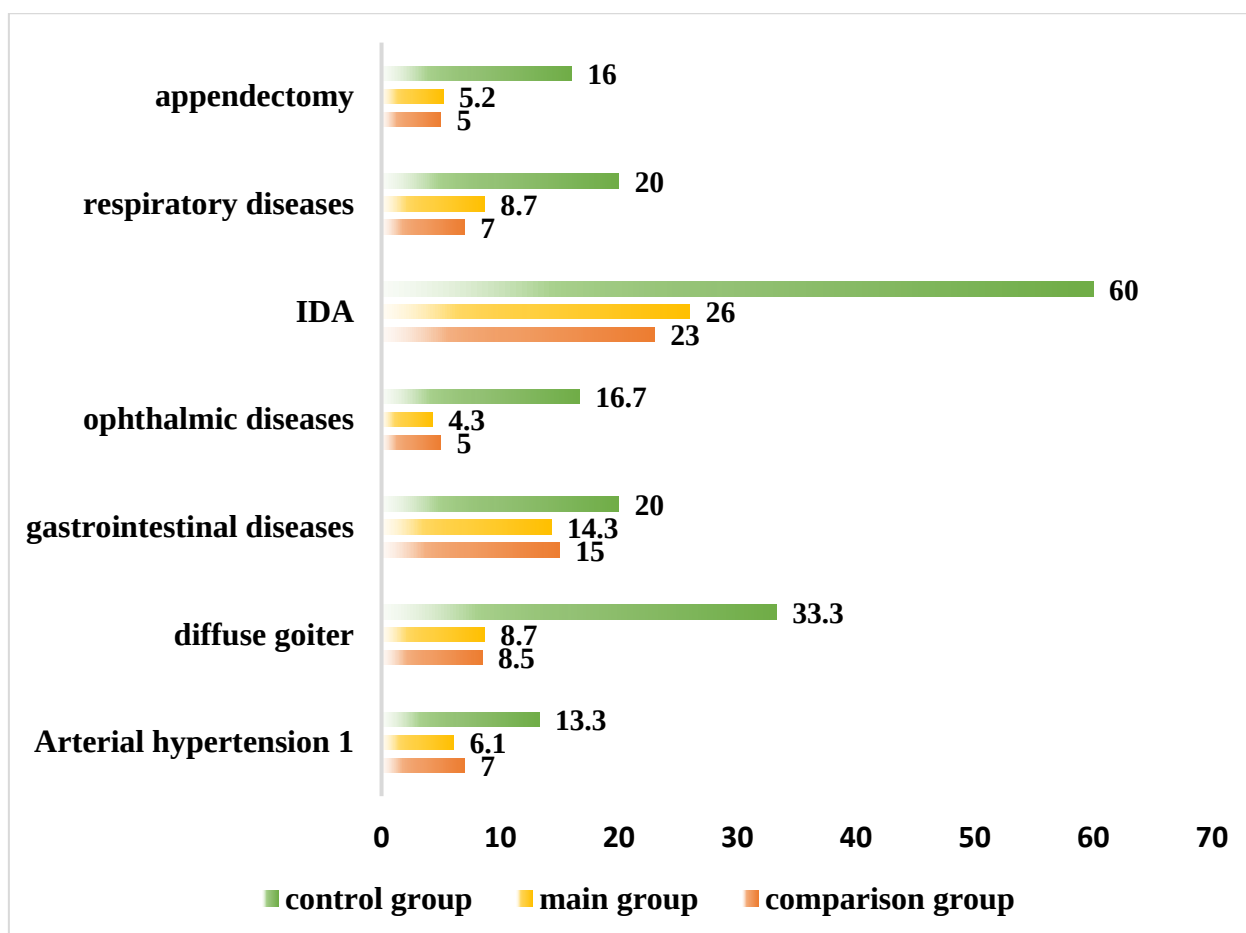


Figure 1. Somatic pathology in the examined (%)

When analyzing the reproductive function, the following results were obtained. There was one pregnancy in history in 9.5% of patients from the comparison group, in 9.6% of the main ones, two pregnancies in 63 and 63.5% of the examined, more than three pregnancies in 23% and 22% of women. On average, more than 66% of the surveyed both groups gave birth 2 or more times. During pregnancy, 29% of patients from the comparison group and 28% from the main group had ARVI, viral hepatitis (B, C) was noted in no more than 3% in both groups. In patients of the comparison group, 75% of iron deficiency anemia of 1-2 degrees was detected, while 64% of women from the main group in relation to the control group of the studied - 50%.

About 65% of the patients from the comparison group and 87% from the main group undergo ART. Antiretroviral therapy is received by 85.5% of patients from the comparison group and 86% from the main group. The duration of taking etiopathogenetic therapy in the comparison group is as follows: 1 year - 21% of patients, 2 years - 9%, 3 years - 20% and more than three years - 50%, in the main group - within 1-2 years received 10.5% patients, within 3 years - 16.6%, more than three years - 62.4%.

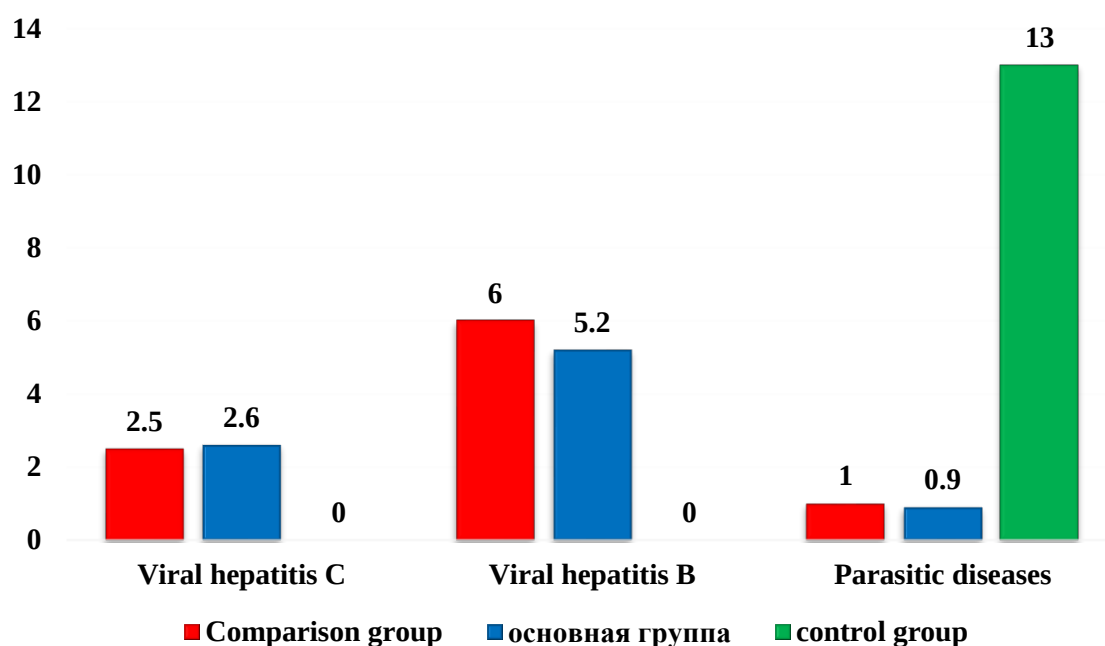


Figure 2. Infectious diseases in the examined (%)

I would like to note the presence of viral hepatitis B in 6% of cases in the comparison group and in 5% of cases in the main group (Figure 2), which had a significant difference compared to control values ($p < 0.05$). Viral hepatitis C was 2 times less common. Persons aware of their disease and not undergoing treatment referred to the high cost and duration of taking the drugs. Parasitic diseases are rare in comparison with the general occurrence and in relation to the control group.

As a complication of the underlying disease, our patients noted "chronic" diarrhea in 21% of cases ($n=42$) from the comparison group, 22.6% ($n=26$) from the main group, recurrences of upper respiratory tract infection were noted respectively by 23% ($n=46$) and 23.5% ($n=27$). Periodically occurring hyperthermia was noted by 6.5% of patients ($n=13$) from the comparison group and 8% ($n=9$).

The formation of menstrual function in the examined patients took place physiologically, which gives reason to conclude that the initial indicators of the start of the functioning of the reproductive system did not deviate from the norm.

By the nature of the menstrual function, the prevailing majority of the examined (83% of the comparison group and 82.6% of the main group) had a normal menstrual cycle.

CONCLUSION

1. In HIV-infected women, when studying innate (CD16+, FAN) and humoral immunity (IgA, IgM, IgG), the level of natural killer cells is accompanied by reduced activity, which corresponds to a chronic process. For most of the studied women, especially the 2nd group, it was characterized by insufficiency of phagocytosis activity as a result of a decrease in the activity of killer cells by 1.5 times. Humoral factors of innate immunity, an increase in the C3 component of the complement, as well as the level of IFN γ , have shown their failure in the long course of the disease. The level of CRP did not depend on the duration of the course of the disease and was significantly increased, both in women of the 1st group and in the 2nd group by more than 2 times.

2. The study of adaptive immunity showed a decrease in the level of CD4+ by 1.6 times in the 1st group and 2.3 times in the 2nd group, as well as a decrease in the immunoregulatory index by 1.16/1.07 times. Inhibition of markers of early activation of CD25+ was also found in group 1 - 18.5%, in group 2 - 14.9%, and the lymphocyte activation index was derived, which in women of the control group was 0.88 conventional units, and in women In the 1st group, this indicator was reduced to 0.7 conventional units, in the 2nd group - 0.5 conventional units, which indicates a decrease in adaptive immunity in women with chronic inflammatory diseases due to HIV infection.

REFERENCES

1. Pitpitan E.V., Kalichman S. C., Eaton L. A. Gender-based violence and HIV sexual risk behavior: Alcohol use and mental health problems as mediators among women in drinking venues, Cape Town // *SocSci Med.* - 2012. - Vol. 75(8). -P.1417-1425.
2. Quarraisha, A.K. Preventing HIV-infection in women - a global health imperative// *Clin Infect Dis.* - 2010. - Vol. 50 (Suppl. 3). - P.122-129.
3. Rugg D.L., Mac Gowan R.J., Stark K.A., Swanson N.M. Evaluating the CDC program for HIV counseling and testing// *Public Health Rep.* - 2017. -Vol.106., №6. -P.708-713.
4. Richardson E.T., Collins S.E., Kung T. Gender inequality and HIV transmission: a global analysis // *Journal of the International AIDS Society.* - 2014. -Vol.17.
5. Nyamhanga T.M. Gender context of sexual violence and HIV sexual risk behaviors among married women in Iringa Region, Tanzania // *Global Health Action.* - 2014. - №7. -P.76-87.
6. Olimova N.I., Ikhtiyarova G.A. Clinical and immunological features of Inflammatory diseases of the pelvis and genital Organs in HIV-infected women // *Psychology and education* (2021) 58(2): 4996-5001 issn: 00333077. – P. 4996-5001.
7. Onsomu E.O., Moore D., Abuya B.A. Importance of the media in scaling-up HIV testing in Kenya/ al.// *SAGE Open.* - 2013. -P.45-54.
8. Mmbaga E.J., Hussain A., Leyna G.H.. Prevalence and risk factors for HIV-1 infection in rural Kilimanjaro region of Tanzania: implications for prevention and treatment / . // *BMC Public Health.* - 2007. – P.7-58.
9. Morrison Ch., Fichorova R.N., Mauck Ch. Cervical inflammation and immunity associated with hormonal contraception, pregnancy, and HIV-1 seroconversion // *J Acquir Immune Defic Syndr.* - 2014. - Vol.66., №2. - P. 109-117.