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LONG-TERM RESULTS OF ANTIRETROVIRAL THERAPY IN HIV-INFECTED PATIENTS: A CASE STUDY OF ANDIJAN REGION

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Abstract:

This study is devoted to analyzing the application of antiretroviral therapy in HIV-infected patients and evaluating its effectiveness when initiated early and used continuously in Andijan. Materials and Methods**.** A retrospective analysis was conducted based on the registries of regional Centers for the Prevention and Control of AIDS and patients' medical records. Research Results. Continuous antiretroviral therapy resulted in virological suppression in 73% of patients, a 12.6% reduction in the proportion of patients with pronounced/severe immunodeficiency, and clinical stability in disease progression.

Keywords: HIV infection, antiretroviral therapy, virological suppression, HIV infection epidemiology

The epidemiological situation regarding HIV infection in the Republic of Uzbekistan remains critical at the current stage. The Andijan region is among the leading areas in the country in terms of HIV morbidity and prevalence.

The modern global strategy to combat the HIV epidemic is based on the "90-90-90" principle, which means that 90% of people living with HIV should be diagnosed, 90% of those diagnosed should receive treatment, and 90% of those treated should achieve successful therapeutic outcomes.

Currently, HIV infection, with the use of antiretroviral therapy (ART), is considered a manageable chronic condition. Timely administration of antiretroviral drugs significantly reduces the risk of disease progression and the development of severe opportunistic infections in the vast majority of patients. It also increases the lifespan and improves the quality of life of individuals living with HIV while curbing the spread of the epidemic [1]. According to current HIV treatment guidelines, ART should be initiated for all patients with chronic HIV infection, regardless of the presence or absence of secondary disease manifestations, the degree of immunodeficiency, or the viral load level [3]. Key challenges in HIV treatment include insufficient ART coverage among the HIV-infected population, low adherence to treatment and follow-up, inadequate monitoring of ART effectiveness, and the emergence of HIV resistance to antiretroviral drugs [2]. The current situation calls for further research into ART, with the systematization of data from various regions of the country to develop effective management solutions and therapeutic strategies [3].

OBJECTIVE: To analyze the use of antiretroviral therapy (ART) in the Russian population of HIV-infected patients and to evaluate its effectiveness with early initiation and continuous use in real-world clinical practice.

MATERIALS AND METHODS. The study, titled "Natural and Clinical Course of HIV Infection in the Republic of Uzbekistan," was conducted with the participation of research centers from regions of Uzbekistan with high HIV morbidity and prevalence rates. A protocol was developed as part of the study, which included a retrospective analysis of the registries from regional Centers for the Prevention and Control of AIDS and the medical records of patients.

Inclusion Criteria for the Study:

1. Male and female individuals of any age;
2. Verified and documented diagnosis of HIV infection, stages 2–4 according to the classification by V.I. Pokrovsky (2001);
3. Initiation/continuation of ART (for Group I) or absence of ART (for Group II);
4. Availability of medical records enabling the assessment of data from the time of study inclusion.

The primary method used in the project is a retrospective statistical approach, which involves compiling a database in accordance with the parameters of the studied population. This includes the analysis of demographic, anamnestic, and epidemiological data; clinical, virological, and immunological indicators; and other relevant information. The study utilized existing registries from regional Centers for the Prevention and Control of AIDS and patients' medical records.

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The statistical data processing was performed using the software package "Statistica for Windows 10.0." Qualitative data are presented as absolute and/or relative (%) indicators, while quantitative data are presented as X±x, where X is the arithmetic mean and x is the standard deviation. The null hypothesis (regarding the absence of differences between groups) was rejected when $p<0.05$. To assess the difference between means in unpaired samples, the Mann-Whitney U-test was used, and for paired samples, the Wilcoxon test was applied.

RESULT AND DISCUSSION

Statistical analysis at the initial stage revealed comparability between groups I and II in terms of age and sex, drug abuse history, epidemiological parameters, and the presence/absence of coexisting viral hepatitis. In the HIV-positive population (regardless of ART status), a clear predominance of the age group 30–39 years was observed, with almost equal gender distribution, identical drug abuse history, and similar patterns of sexual and parenteral (associated with intravenous drug use) transmission routes, as well as the prevalence and structure of coexisting viral hepatitis.

The ART regimen in the study population included standard three-component regimens — a combination of two nucleoside reverse transcriptase inhibitors (NRTIs) with protease inhibitors (PIs) (the most prevalent) or non-nucleoside reverse transcriptase inhibitors (NNRTIs), with rare use of regimens including integrase inhibitors (IIs) or other combinations. In the cohort of HIV-infected individuals without ART, 240 people (17.6%) had indications (according to the recommendations in effect at the time) for initiating antiretroviral drugs (presence of secondary disease manifestations and/or high viral load >100,000 copies of HIV RNA/ml blood and/or CD4+ lymphocyte count <350/μl blood). The lack of ART coverage in this group was likely due to their low adherence to treatment.

In the study population, a predominance of patients with undetectable viral load was found in Group I, and a low viral load in Group II. In the group of patients without ART, a higher percentage of cases with high viral load and a more significant average HIV RNA concentration in the blood were observed. Nearly half of the examined patients had no immunodeficiency, with CD4+ lymphocyte counts greater than 500 cells/μl blood, a quarter had moderate immunodeficiency (regardless of ART status), and the remainder had severe/advanced immunodeficiency, with a more significant frequency of severe immunosuppression in Group I.

Dynamics of ART Status in the HIV-Infected Population.

We conducted a comparative study of the dynamic changes in the virological, immunological, and clinical profiles of Groups I and II at the end of 2023 compared to the baseline stage in 2021. In Group I, under continuous ART, virological suppression was observed in more than 2/3 of patients, with a low percentage of samples with high viral load. In contrast, in Group II, there was a different trend, namely a decrease in the number of blood samples with undetectable viral load and an increase in the proportion of cases approaching a high level, nearly doubling. Statistically significant differences in the indicators between Groups I and II were registered at the final stage of the study.

At the end of 2023, statistical analysis revealed no significant differences in the distribution of patients between Groups I and II in terms of the severity of immunodeficiency. However, the dynamic decrease in the proportion of patients with severe/advanced immunodeficiency by 12.6% and the increase in the average CD4+ lymphocyte count to the category of no immunodeficiency in Group I on continuous ART stands out.

Impaired immune recovery, with persistent severe/advanced immunodeficiency despite ongoing ART in 1/4 of patients, may be due to various factors, including delayed initiation of ART against a background of significant immunosuppression, impaired regeneration of CD4+ lymphocytes in HIV infection, co-infection with hepatitis C virus, ART regimen specifics, drug-drug interactions between antiretrovirals and other pharmacological groups, and virological inefficacy in cases of HIV pharmacoresistance [4, 5].

When examining the dynamic HIV profile, clinical stability of the infection course was noted in both groups over the 3-year period, although there was a 10% increase in disease progression in Group II.

CONCLUSION.

The analysis of the data indicates a relatively low coverage of ART among the HIV-infected population in modern clinical practice, as well as a preference for regimens using the standard combination of two NRTIs with PIs. The dynamics of key indicators of HIV infection suggest the effectiveness of continuous ART. For example, in the group where ART was administered continuously, virological suppression was achieved in 73% of patients, with positive

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immunological dynamics and clinical stabilization in advanced stages of the disease over the observation period.

It was also shown that at the beginning of the observational period, the group receiving ART had lower CD4+ lymphocyte counts (higher immunodeficiency) and higher viral load compared to the group without ART. This may indicate that specialists in the Republic of Uzbekistan, in the regions of the study, still practice initiating ART only after a minimum threshold of immunodeficiency is reached. It is important to note that according to the "Clinical Guidelines for HIV Infection in Adults," approved by the Ministry of Health of Uzbekistan, ART is now recommended for all patients with HIV infection.

The findings of this study confirm the need for early and continuous ART use, both among healthcare professionals and within the HIV-infected population. Further research in this area should focus on identifying factors influencing adherence to treatment in this patient category.

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