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Use of Immunotherapy for Treatment of HIV Infections

Z. I. Berdiyeva[1,3], P. E. Ignatov[2], I. Kh. Mamatkulov[3], M.P. Ignatov[2,*]

[1]Republican Center for Combating AIDS, Tashkent, Republic of Uzbekistan, 12 Farkhod Street, Chilanzar - 16, 100135, Tashkent, Republic of Uzbekistan
[2]IDEA Charity Foundation, Lake Elsinore, California, USA, PO BOX 804, 500 W Graham Ave, Lake Elsinore, CA, 92530
[3]Research Institute for Epidemiology, Microbiology and Infectious Diseases, Ministry of Health of the Republic of Uzbekistan, Tashkent, Republic of Uzbekistan, Zakovat Str #2, 100133, Tashkent, Republic of Uzbekistan Uzbekistan
*Corresponding author: mpignatov@gmail.com

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Abstract This paper describes the comparative use of antiretroviral therapy both with and without immunotherapy. A unique immunocorrector called IMMUN-5 was used in conjunction with standard ART. The results presented in the table that follows shows that during the 6 months of complex therapy, the viral load in patients in the experimental groups fell by several hundreds of thousands while simultaneously the number of CD4 cells increased during treatment. The authors suggest that it may be possible to achieve long-term remission in all patients. This will eliminate a link in the epidemic chain as the reservoir of infection, and this will create guidelines for the development of global programs to effectively combat the AIDS epidemic.

Keywords: *AIDS, immunotherapy, remission, cd4, lymphocytes, viral load, ART*

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1. Background

Currently, researchers have made significant progress in minimizing the replication of the human immunodeficiency virus (HIV) with antiretroviral therapy (ART) drugs, though the problem of improving the treatment of this disease remains. ART drugs do not cure, but only delay and slow the development of the virus, and this should prolong the life of the patient and make living with the disease much more bearable. However, the patient is forced to take ART the rest of their lives [1].

However, this causes its own set of problems, especially considering the high toxicity of ART drugs for the patient [2,3,4], as well as their steep financial cost. Worse yet, certain strains of the HIV virus have shown signs of resistance to ART [5]. Such resistance can often develop rather quickly, and this characteristic of pathogenic nosocomial infections should be taken into account when developing new treatment and prevention protocols. Our vision involves enhancing the effect of ART drugs by prescribing immunomodulating parapharmaceuticals in an effort to reduce toxicity that comes as a result of long-term ART use.

A phenomenal ideal would be activating the immune system against the virus itself. However, previous attempts to affect the immune system turned out to be, as a general rule, unsuccessful. Often they would lead to an overall worsening effect by accelerating the replication of the HIV virus, thereby increasing the viral load, and worsening the patient's overall health. This is due primarily to the fact that immunomodulators that activate the proliferation of the immune system cells simultaneously activate the factors of HIV replication. Therefore, the number of HIV virions increases and there are more target cells for the virus to multiply itself in. As a result, the viral load (VL) increases dramatically, but the number of CD4 lymphocytes, after a short, temporary burst upwards, ends up decreasing in the long run. However, some promising results about the effects of the immune system on the HIV virus can be found in modern scientific literature [6,7].

Since many doctors and scholars consider that the main pathogenetic element of immunodeficiency in HIV/AIDS is a chronic anergy of immunity cells, we used a natural immunocorrector, named "IMMUN-5", registered as a parapharmaceutical, for clinical purposes. This research highlights its' abilities as a unique detoxifier. This immunocorrector inhibited the cell anergy development and, conversely, turned on transcriptional signals, amplifying the killer abilities of macrophages and lymphocytes. As a result, these cells were able to effectively eliminate high quantities of the HIV virus. In order to not provoke viremia, treatment was designed so that CD4 cells would not proliferate quickly, but instead their quantities would be increased gradually. Simultaneously, we also inhibited HIV replication with the help of traditional ART drugs, and as a result, it inflicted a secondary blow to the virus. In addition to these already promising results, IMMUN-5 also effectively decreased the toxicity of ART drugs.

However, not all patients can tolerate ART therapy because of its toxicity and various side effects. In such cases, it may be possible to use immunocorrection

methods with the help of IMMUN-5 without ART therapy. Practically speaking, it would make more sense to use some sort of therapy rather than not using any at all.

2. Patients and Methods

The studies were conducted on the basis of the Clinical Trial Protocol, and were approved by the Ministry of Health, the work being called "The study of the prophylactic effectiveness of the 'IMMUN-5'. Test Design: Controlled open randomization with four parallel groups. The first experimental group (No. 1) included 30 men and women between the ages of 18-60, who were infected with HIV between stages 2-4. These patients have already been receiving antiretroviral and symptomatic therapy for 2–8 years, depending on the medical history.

Patients in the second group (No. 2) could not take ART drugs for various reasons. Therefore, they were prescribed only IMMUN-5 as immunotherapy. This group also included 30 people between the ages of 18 to 60, both male and female.

Two additional control groups were formed by a random sampling method. One of them (group No. 3) received only antiretroviral and symptomatic therapy, depending on their medical history. It also included 30 people, as with the previous two groups. The last group (group No.4) included 30 people as well and received no treatment.

Patients in group #1, in addition to ART, took IMMUN-5 for 6 months, which was designed to improve their immunity reactions and lower toxicity to ART drugs. Patients took two IMMUN-5 capsules daily after meals for 6 months. In the second group, IMMUN-5 was taken in exactly the same way and for the same duration, but without ART drugs.

The viral load (VL) was determined by the PCR method, using the Artus HI Virus-1 RG RT-PCR Kit, QIAGEN (Germany). The terms of determining VL corresponded to the Clinical Protocol "The study of the prophylactic effectiveness of the drug 'IMMUN-5' (capsules for oral administration, production Bibinor LLC, Uzbekistan)" approved by the Ministry of Health of the Republic of Uzbekistan on 02.02.2017. The number of CD4 cells was determined by the ELISA method on tests produced by Sysmex in Germany.

Due to the extreme ranges of measuring both CD4 and viral load levels, a Shapiro-Wilks Normality Test was performed and concluded that the data we received was not of a normal distribution pattern, therefore traditional statistical analysis methods like Student's T-test could not be used ($p < .05$). As a result, a Wilcoxon Signed Rank Test was utilized on all variables after the data was collected.

3. Results and Discussion

The main results of this experiment are presented in Figure 1 and Figure 2. Measuring Viral Load and the number of CD4 cells before and after treatment were the main criteria in evaluating the effectiveness of the course of therapy.

A Wilcoxon Signed Rank Test performed on groups 1 and 2 yielded statistically significant results on both the CD-4 and Viral Load variables ($p < .00001$). Group 3 (ART Only Variable) also yielded significant results on the CD-4 and VL variables ($p < .001$ and $p < .00016$, respectively). Group 4, as expected, showed no signs of improvement on these two variables ($p < .21$ and $p < .99$, respectively).

Analyzing the data presented in Figure 1 and Figure 2. for the first group, it is worth noticing that in all patients (100%) the viral load decreased significantly. If the VL was initially low (1,000-100,000 copies/ml), then during the six-month course of IMMUN-5 together with ART, their VL dropped to zero (HIV was not detectable). If the VL was initially high (100,000 - 1,000,000 copies/ml), then this course of treatment reduced VL to several thousand. It is probable that if the course of treatment was continued for an additional 1-2 months, then these patients would also have received a zero VL indicator. This therapeutic combination can theoretically allow for virtually all patients to reduce the VL index to zero (to an undetectable level). As a result of this treatment, this presents an opportunity for all patients to enter a state of remission. This also suggests the duration of the remission achieved can be quite long. However, these claims require additional research and testing.

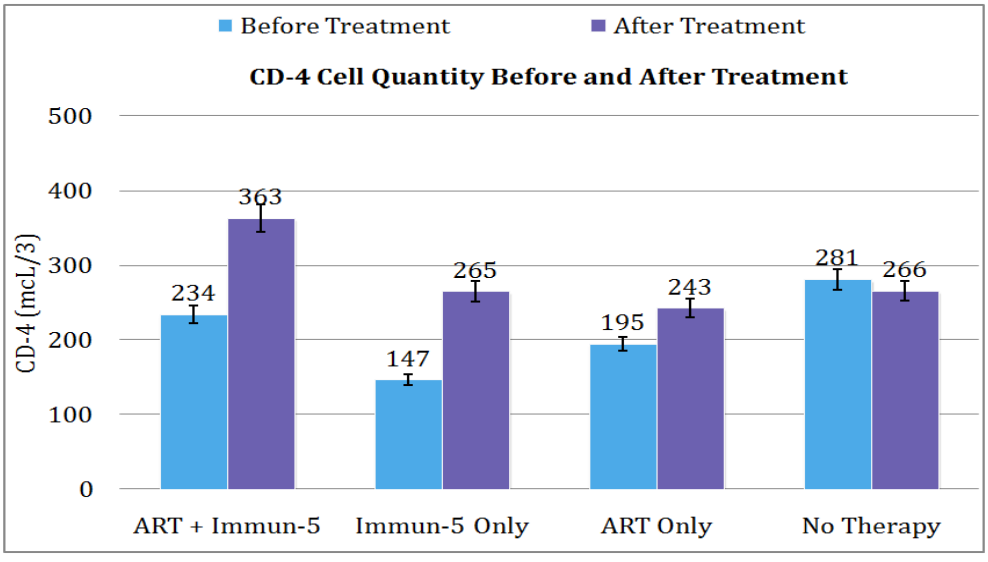

Figure 1. Quantity of CD-4 Cells of all treatment groups before and after treatment

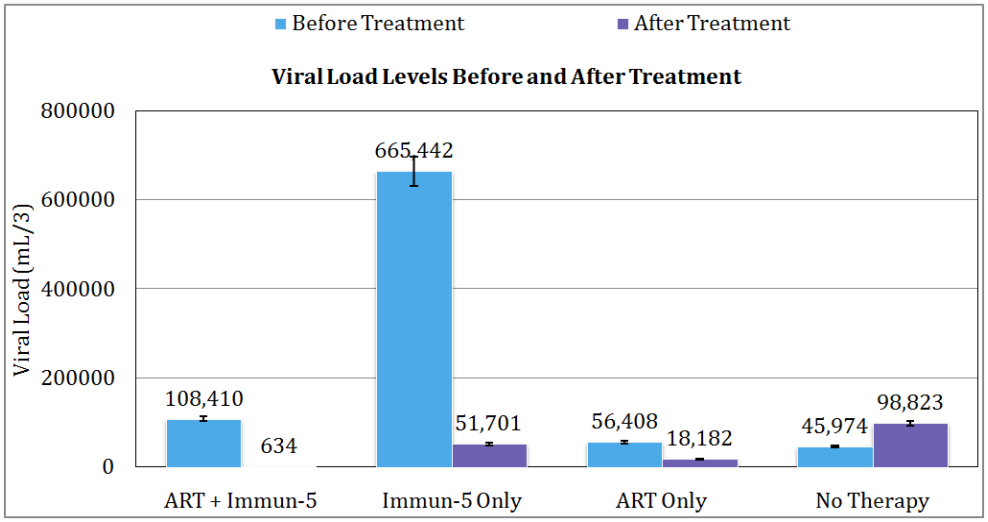

Figure 2. Viral Load Levels of all treatment groups before and after treatment

Continuing the analysis for group No. 2, it should be noted that, apparently the effect that was obtained in Group 1 was nevertheless mainly due to the use of the IMMUN-5, since Group 2 (without ART) had similar results. However, it is worth noticing that the VL in patients in group No. 2 did not fall as significantly as in the first group. This further supports the beneficial viral-suppressive properties of traditional ART therapy. At the same time, the restoration of the immune system (CD-4 cells) in the second group also happened much quicker, which highlights the negative aspect of ART therapy from the first group.

These results suggest it is possible to customize the treatment regimen for each patient, allowing not only rapid reduction of VL with the use of IMMUN-5 and ART, but also for faster recovery of the body using IMMUN-5 only. These regimens can also be changed depending on the presence of opportunistic infections and the various drugs prescribed for their treatment.

Considering that the patient in remission with zero VL is practically no longer a source of infection, this presents promising perspectives in the long-term fight against the AIDS epidemic. By eliminating the reservoir as a link in the epidemiological chain, we are able to destroy the entire epidemiological chain and thus eradicate this infectious disease.

The results of the control group (group No. 4) show that the VL and the number of CD4 cells in the group as a whole practically did not change over the 6 months. This further showcases the remarkable results obtained in the two experimental groups.

4. Conclusion

In conclusion, as a result of this experiment analyzing the dynamics of VL and CD-4 cells, it was demonstrated that the immunocorrector IMMUN-5 can increase the effectiveness of ART therapy while also inducing remission in most patients with the potential prospect of permanent remission in all patients. Of course, further research is needed about the duration of this remission (and the possibility of a permanent cure to HIV/AIDS). The tendencies manifested in this experiment indicate the likelihood of maintaining this remission, especially with the help of supplementary courses of IMMUN-5 (typically an additional 1-2 months). Prospective outlooks in the epidemiological area could also be very interesting. The extent of this work has exemplary prospects and should be further researched and examined.

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