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# Anthropometric and Immunological Effects of Antiretroviral Therapy in Albanian Adults

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**Abstract:** ***Background:*** ***Combinated antiretroviral therapy (ART)are known to gives rise CD4+ T-lymphocytecount and increased BMI (body mass index), in subjects treated for HIV/AIDS. Aim: Comparative evaluation of the CD4+ T-lymphocyte countand body mass index (BMI) at patients treated with PI (protease inhibitor) or non-PI(Nucleosid/non nucleoside transcriptase revers inhibitor). Methods. This prospective study was carry out at University Hospital Center "Mother TERESA", which included adults patients diagnosed with HIV / AIDS, who are treated with one of two following treatment: non nucleoside and nukleozid inhibitor (non-PI) and the other with PI, from 2011 till 2013. Were included only the patients who had data on CD4+ T-lymphocyte countsand BMI in Baseline and after, 6, 12, 24 months, in their file.The data were analized through the SPSS 17. Results: We had studied 89 patients, which were measured BMI and CD4.Patientswho wheretreated with PI have a significant increased of BMI compared with patients who treated with non-PI. (The technique of correlation Kendall's tau_b r = 0.123 p <0:05).Mean time the two groups of treatment provide a significantlyincrease CD4+ T-lymphocyte.***

**Keywords:** BMI, CD4+ T-lymphocyte, PI, ART, non-PI

## 1. Introduction

International guidelines recomend that measuring the number of CD4+ T-lymphocyte should be done within 6 months after initiations antiretroviral therapy (ART)(1, 2). BMI is widely measurable, contrary to viral load, CD4+ T-lymphocyteand WHO clinical staging, which is largely based on etiological diagnosis often requiring laboratory investigations. BMI has been repeatedly associated with the prognosis of HIV/AIDS patients who treated with, or without ART. (5–10). We assessed the change in BMI alone or in combination with change in CD4+ T-lymphocytebetween initiation of ART and every 6-month as a tool to predict virological success or virological failure in HIV-infected adult who receive ART therapy, in Albania.

## 2. Material and Methods

This study was carry out at University Hospital Center "Mother Teresa" , a prospective study, which included patients adult diagnosed with HIV / AIDS who are treated with combined antiretroviral therapy with first-line scheme along the axis containing double reverse transcriptase inhibitors nucleoside (NRTI) and protease inhibitors (PIs) or reverse transcriptase inhibitors non nucleoside (NNRTI), from 2011 till 2013.We're included only those patients who had data on the CD4+ T-lymphocyteand BMI ("Baseline") after a 6, 12, 24 months treatment with ART ( combined antiretroviral therapy).

## 3. Results

We have studied (that meet the above criteria) 89 patients, which was measured BMI(as a determinant of patient anthropometric status kg / m 2) and the level of CD4+ T-lymphocyte count, defined phases of the study, with an average age 39 years, 65% male. Viewed by type of therapy it seen those patients who wheretreated with PI (prothease inhibitors) have ansignificant increased BMI (the technique of correlation Kendall's tau_b r = 0.123 p <0:05compared with patients who treated with non-PI). Mean time the two groups of treatment provide a significantly increase in the number of CD4+ T-lymphocyte. Approximately 71% of those patients were in stage AIDS and 75% were treated with non-PIs,the rest of PIs. In the first year of study are included 42 patients and in the second year of study are included 58 patients. At the end of the study, five patients from the first year group and 6 patients have died from the second year the groups have died. In total 89 patients concluded the study **(see Figure 1)**

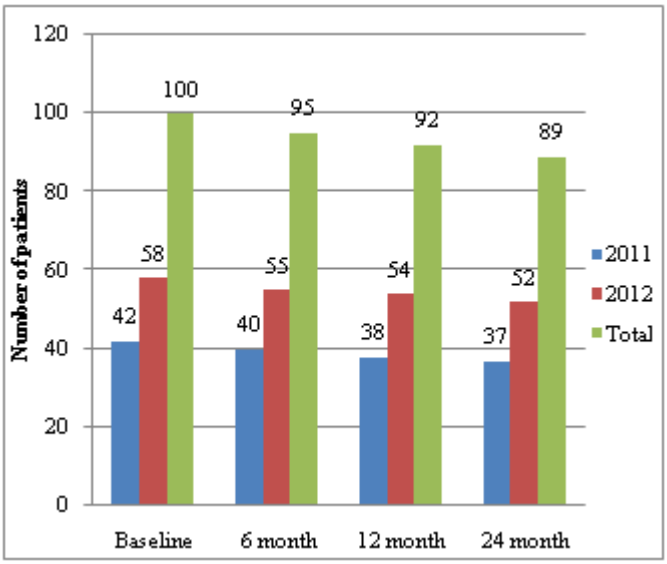


**Figure 1:** The number of patients who were included in this study

In figure 1, 19 of patients included in the study were treated with PI therapy and 81 patients with non-PI therapy, but at the end of the study principal has 17 patients with PI therapy and 72 patients with non-PI.

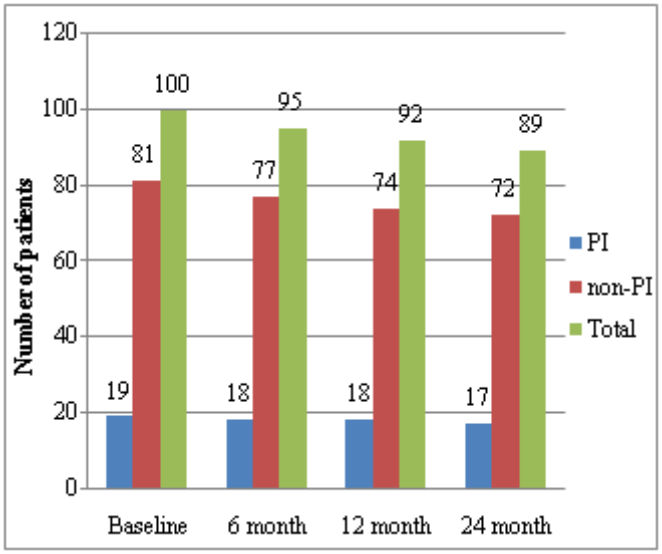


**Figure 2:** The number of patient's accordingphases of the study and therapy used

**Table 1:** Anthropometric and immunological variable according to the phases of therapy used

| Anthropometric and immunological variable | Therapy used | Baseline | 6 month | 12 month | 24 month |
|---|---|---|---|---|---|
| BMI (kg/m$^2$) variation | FP | 23.6±3.8 | 24.1±3.9 | 24.4±3.9 | 25.1±3.9 |
| | Non FP | 23.9±3.8 | 23.8±3.7 | 23.9±3.8 | 24±3.8 |
| CD4 number (average) | FP | 243.7±19.3 | n/a | 376±21.4 | 414±22.3 |
| | Non FP | 241.1±18.9 | n/a | 372±22.1 | 409±22.7 |

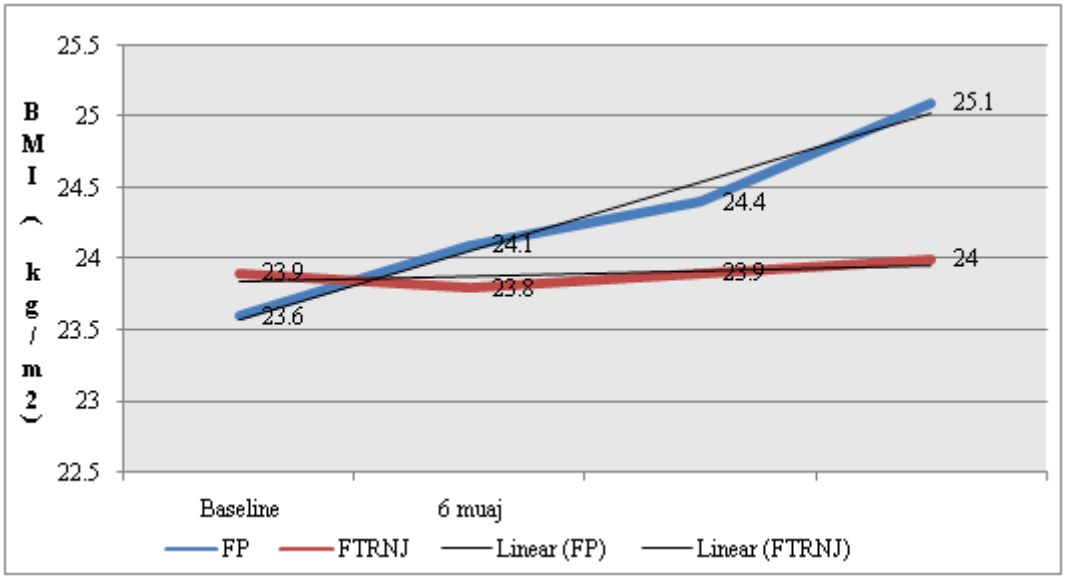


**Figure 3:** The average of BMI values at each stage of the study and according therapy

Accordingtherapy used, patients who have received treatment with PI have ansignificant increased BMI compared with patients who treated with non-PI. (In Kendall's correlation technique tau_b r = 0.123 p <0:05); **see figure 3 and table 2)**

**Table 2**.The values of the correlation between BMI and CD4+ T-lymphocyteduration therapy using

| Therapy used | Variable | Duration of therapy |
|---|---|---|
| FP | BMI | 0.123* |
| Non-FP | | 0.041 |
| FP | CD4 number | 0.223* |
| Non-FP | | 0.119* |

*Significant p< 0.05

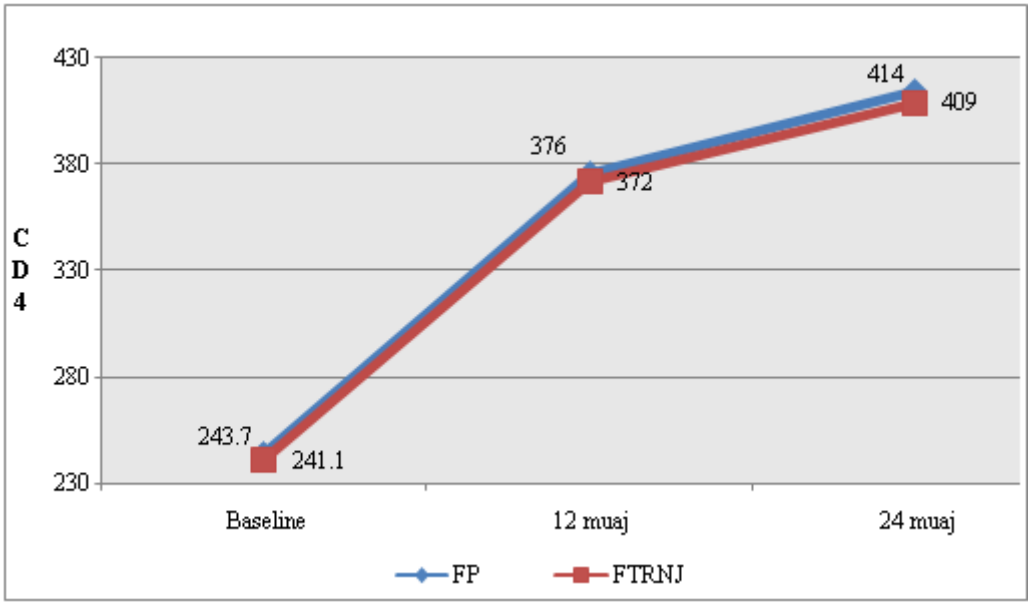


**Figure 4:** CD4+ T-lymphocytevalues at each stage of the study and according therapy used

In Figure 4 is presented the average of CD4+ T-lymphocyte at each stage of the study and therapy used. Seen by type of therapy observed that patients who received PI and non-PIs had significantly increase CD4 number (in Kendall's correlation technique tau_b, r = 0.223, p <0:05; **see Figure 4 and Table 2).**

## 4. Results

1) Patients who hadreceived PI and non-PI had an significant increased CD4+ T-lymphocyte (in Kendall's correlation technique tau_b r = 0.223, r=0.119, p <0:05).
2) So antiretroviral therapy increasesignificantly CD4+ T-lymphocytecount, independently type of therapy.
3) BMI tends to increase at patients who treated with PI, and these patients had more possibilities to affect by metabolic syndrome

## 5. Discussion and Conclusion

This is the first study in Albania that aims to evaluate the impact of antiretroviral therapy on CD4+ T-lymphocyteand BMI. The effect of antiretroviral treatment is significantly increased values of CD4+ lymphocite countin patients after one year of therapy. The findings of our study are consistent with other literature studies, which conclude on the fact that , the scheme of treatment with protease inhibitors (PIs) and the scheme of treatment with non-PI, significantly increase CD4 lymphocyte count (3, 4, 6).

Another important finding of our study is that patients who received PI are more likely to have changes in their BMI and need periodic controlling. The data of our study concur with those of contemporary literature (4, 5, 10, 12, 13).

The number of CD4+ T-lymphocyteserves as a great indicator of clinical immunocompetences in patients with HIV infection and is usually considered important in the decision to start ART (25)

Compliance with anti-retroviral medications should be monitored in these patients, as this is an important determinant of profitability with ART. (26) On the other hand, we should mention the limitations of our study, related to the methodology of the study, where they were studied only half of the patients who received ART, but who had laboratory data CD4+ T-lymphocytecount and BMI. Finally, data from this study show that after a year of treatment with antiretroviral therapy in "naive" diagnosed HIV/AIDS patients, treatment with PI had more atherogenic effects than non-PI.

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