Original Article

A Comparison between the Efficiency of Vonavir (Tenofovir-Emtricitabine-Efavirenz) and Cobavir (Lamivudine-Zidovudine) with Efavirenz used for HIV Patients in Fasa, Iran

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Abstract

Background & Objective: Many different combination regimens have been used for the treatment of patients infected with human immunodeficiency viruses (HIV). This study aimed to compare the efficacy of two antiviral drugs for the treatment of HIV-infected patients.

Materials & Methods: This cross-sectional study was performed on HIV-positive patients in Fasa, Southwest Iran. Eighty patients were enrolled in the investigation who were then randomly divided into two groups and treated plus vonavir (tenofovir-emtricitabine-efavirenz) and cobavir (lamivudine-zidovudine) with efavirenz for six months. Blood samples collected from all patients were examined for viral load every six months using Real-time PCR and CD_4 changes by flow cytometry.

Result: During the six months of treatment, the CD_4 response was not significantly increased in group one, treated with vonavir. In contrast, the CD_4 value showed a significant increasing trend during the treatment course in group two treated with cobavir-efavirenz (P=0.003). However, overall, there was no statistically significant difference between the CD_4 responses of the two groups (P=0.361). In addition, the plasma viral load was significantly suppressed in both regimens (P< 0.05).

Conclusion: Hence, the two regimens (cobavir-efavirenz, and vobavir) showed the same efficacy on HIV patients according to the same suppression of viral load, and CD_4 response in this region. However, inclusion of more samples is needed and more studies are suggested in order to confirm our results as well.

Keywords: Tenofovir-Emtricitabine-Efavirenz, Lamivudine-Zidovudine, HIV, CD_4, Viral load, Iran

Introduction

Human immunodeficiency viruses (HIV) are categorized as two species groups of Lentivirus (a subgroup of retrovirus) that suppress the human's immune system (1). The loss of CD_4+ T cells causes immunodeficiency syndrome (AIDS) leading to HIV-associated complications and death (2-5). According to the high morbidity and mortality rates of HIV patients, antiretroviral therapy (ART) is prevalently used (1). It is shown that the prescription of the ART properly at an appropriate time has increased the life expectancy of HIV-infected patients (3, 6). Using three or more antiretroviral drugs is nominated as highly active antiretroviral therapy (HAART) that has at least one protease inhibitor or non-nucleoside reverse transcriptase inhibitor. HAART acts as a preventive approach to inhibiting the progression of the disease, improving the quality of life. However, the success of the treatment depends on the patient's

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amount of collaboration in antiretroviral regimens (7, 8). There are many different combination regimens for the treatment of HIV-infected patients aiming to create a synergy between them as well as to reduce drug resistance (9). Numerous researches have investigated the efficacy and safety of tenofovir disoproxil fumarate (TDF)-Emtricitabine as an antiretroviral compound (10-13). Although the antiretroviral compounds are effective in HIV-infected patients, drug resistance is considered as a threatening event (14). Because of the high prevalence of HIV patients in Iran, the purpose of this study was to compare the efficacy of two antiviral regimens including vonavir (tenofovir-emtricitabine-efavirenz), and cobavir (lamivudine-zidovudine) plus efavirenz in HIV-infected individuals.

Materials and Methods

This cross-sectional study was performed on HIV-positive patients in Fasa, Southwest Iran. Eighty patients enrolled in the investigation and were randomly divided into two groups, 40 persons in each group, based on the type of antiviral treatment. They were subsequently followed up for six months. The patients` information of demographic characteristics were recorded. Group one received vonavir (tenofovir-emtricitabine-efavirenz), and group two received cobavir (lamivudine-zidovudine) plus efavirenz. All patients gave informed written consent to participate in this study.

Ten mL of venous blood sample was collected into EDTA blood tubes from each patient and was investigated for CD_4 measurement (done every three months) using flow cytometry, viral load (done every three months) using Real time-qPCR, and periodic examinations (done each month). The flow cytometry and Real time-qPCR assays were performed according to Nasri et al., 2018 and Noorbazargan et al., 2018 (15, 16). The CD_4 responses were finally compared between two groups.

Data Analysis

The data were eventually analyzed using repeated measurement analysis of variance (ANOVA) test. The comparison between the both groups was conducted using Chi-Square test considering a p value of <0.05 as a significance level.

Result

Table-1 shows the information of the patients taking part in the study including sex, age, education, the rout of the disease transmission, drug abusing and regular medical treatment. The total number of patients was 80 persons (60 men and 20 women) divided in two groups. Also, the mean age values of group one and two were 41.82 ± 7.86, and 40.65 ± 9.89 years, respectively. The patients were also classified into three educational degrees including elementary, middle, and diploma and higher levels. Accordingly, most of the patients were educated lower than diploma. Furthermore, the routes of HIV transmission in the patients were investigated. The most common route of transmission was recorded as drug injection.

Table1. Demographic data of the HIV-infected patients

Variable	Groups	
	One N (%)	Two N (%)
Sex		
Male	31 (51.67)	29 (48.33)
Female	9 (45)	11 (55)
Education		
Elementary	22 (47)	24 (54.17)
Middle	16 (55.17)	13 (44.83)
Diploma and higher degree	2 (40)	3 (60)

Drug Abuser		
No	6 (40)	9 (60)
Yes	34 (52.31)	31(47.69)
Routs of HIV transmission		
Drug injection	30 (53.57)	26 (46.43)
Sexual	10 (50)	10 (50)
Transplacental	0	4 (100)
Regular use of medicine		
No	5 (35.71)	9 (64.29)
Yes	33(51.56)	31 (48.44)
Age	41.82± 7.86	40.65± 9.89

Also, during the six months of treatment, the CD_4 average trend was not significantly altered in group one, treated with vonavir (Table 2). In contrast, the CD_4 response showed a significant increasing trend within group two, treated with cobavir (P =0.003).

However, there was no significant difference between the CD_4 values of the two groups (p=0.361). Besides, according to the linear mix effect model analysis, the HIV RNA level was significantly recorded lower than 52 copies/mL in both experimental groups at the end of the study. Accordingly, there was no significant difference between the viral loads of the two medications (p=0.346).

Table2. The results of CD_4 analysis over time

Variable	Month	Mean±SD	F	P-value*
Group one	1	414.28± 265.07	1.504	0.199
	2	378.10± 207.382		
	3	423.50± 227.42		
	4	370.08± 207.42		
	5	397.55± 227.21		
	6	426.03± 228.52		

Group two	1	369.05± 202.83	4.676	0.003
	2	398.40± 207.01		
	3	391.90± 278.10		
	4	471.65± 274.56		
	5	511.10± 348.68		
	6	518.88± 305.58		

*Repeated measure :P –value for Greenhouse-Geisser

Discussion

HAART for the treatment of HIV disease reduces morbidity and mortality of the HIV-infected patients (17). Observational studies have suggested that using ART for a short time in the primary stage of HIV infection may preserve immune function (18), decrease the viral evolution (19), and limit the viral reservoir (20, 21). In the present study, the efficacy of two types of anti-HIV drugs (cobavir-efavirenz, and vonavir) were evaluated for two forty-member groups of HIV patients in six months. According to our results, although the CD_4 values increased during the treatment period in the patients of the second group, using cobavir- efavirenz, no significant difference was observed between the CD_4 responses of the two groups at the end of the study. In other words, both drugs (cobavir-efavirenz, and vonavir) represented the same effects on the CD_4 value of the two groups. Sadeghi et al., (2018) also showed a rapid CD_4 increase after antiretroviral therapy including Vonavir or combination of Zidovudine, Lamivudine and Efavirenz, which was the same as our study (22). In addition, the plasma viral level was not detectable at the end of the study for the two groups. Previous studies have also evaluated the efficacy of various regimens of ART on the patients. For instance, a randomized multicenter study was conducted to compare tenofovir disoproxil fumarate (TDF) emtrcitabine (Truvada) in combination with efavirenz versus zidovudine-lamiodine (cobavir) in combination with efavirenz. The result showed a reduction in RNAs of HIV in 84%, and 73% of the patients in groups one and two, respectively (23). However, in our study, the viral load suppression was shown in all (100%) of the patients of the two groups. In another investigation, TDF-emtricitabine drug combined with efavirenz, and zidovudine-lamiodine with efavirenz were compared to each other. Regarding to the results, in week 48, the Truvada treatment regimen with efavirenz showed significant superiority in viral suppression and CD_4 response (24);

although the viral suppression was revealed the same result for both vonavir and cobacir-efavirenz in the current study. Another study showed that through week 48, the combination of tenofovir-DF and emtricitabine plus efavirenz fulfilled the criteria for noninferiority to a fixed dose of zidovudine and lamivudine plus efavirenz and proved superior in terms of viral suppression, CD_4 response, and adverse events resulting in discontinuation of these drugs (24). In contrast, our study illustrated the same effect on plasma viral level suppression, and CD_4 response in both regimens. The limitation of the study is the statistical population in which more patients could be considered. Due to insufficient cooperation from other cities of Fars province, the studied population was limited to Fasa.

Ethical approval

The human participants included in this study were in accordance with the ethical standards of Fasa University Medical Science (IR.FUMS.REC.1398.067) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conclusion

Hence, both efavirenz-based antiretroviral therapy (cobavir-efavirenz, and vonavir) resulted in successful outcomes in the patients among which no superiority was found with respect to the same viral load suppression, and CD_4 response in patients living in Fasa. However, more samples need to be included, and more studies are suggested in order to confirm our result as well.

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The human participants included in this study were in accordance with the ethical standards of Fasa University Medical Science (IR.FUMS.REC.1398.067) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interests

The authors declare no conflict of interest.

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