

Literature Review

EVALUATION ON THE NUMBER OF CD4 T CELLS AND ANTIRETROVIRAL SIDE EFFECTS IN PATIENTS WITH AIDS

Siti Qamariyah Khairunisa¹, Irine Normalina¹, Nasronudin¹
Institute of Tropical Disease, Universitas Airlangga

ABSTRACT

Antiretroviral drug discovery has encouraged a revolution in the care of people living with HIV, although it has not been able to cure diseases and to increase the challenge in terms of drug side effects. Side effects of antiretroviral drugs are fairly common occurrences in HIV patients and generally occur within the first three months after initiation of antiretroviral therapy, although long-term side effects are also often found afterwards. This study aims to evaluate the number of CD4 T-cells in patients with AIDS before and after getting on ARV therapy and side effects arising during the taking of ARVs. Samples were collected from 10 patients infected by HIV/AIDS in a clinic in Surabaya. This study is an analytical survey. Data collection was conducted using secondary data obtained from the medical record card status on HIV patients in a clinic in Surabaya. Data results showed that the side effects that often occur in people with AIDS are appetite loss (90%), headache (80%), insomnia (80%) and nausea (70%). While many combinations of antiretroviral drugs have side effects such as a combination of AZT +3 TC + EFV, d4T +3 TC + followed by EFV and AZT +3 TC + NVP. The present study shows that combination antiretroviral therapy gives good results to the increased number of CD4 T-cells in patients living with HIV, as shown by the tendency of an increase in the number of CD4 T-cells in 8 out of 10 AIDS patients who received a antiretroviral therapy.

Keywords: antiretroviral drug side effects, CD4 T-cell

ABSTRAK

Latar Belakang: Penemuan obat antiretroviral mendorong suatu revolusi dalam perawatan ODHA, meskipun hal tersebut belum mampu menyembuhkan penyakit dan menambah tantangan dalam hal efek samping obat. Efek samping obat antiretroviral merupakan kejadian yang cukup sering terjadi pada pasien HIV dan umumnya terjadi dalam tiga bulan pertama setelah inisiasi ARV, walaupun efek samping jangka panjang juga kerap didapati sesudahnya. **Tujuan:** Untuk mengevaluasi jumlah sel T-CD4 pada penderita AIDS sebelum dan sesudah mendapatkan terapi ARV serta efek samping yang timbul selama mengkonsumsi ARV. **Metode:** Subyek penelitian adalah sebesar 25 kemudian dipersempit menjadi 10 karena tidak semua data penderita dapat dianalisis (tidak terdapat data CD4 yang lengkap). **Hasil:** Data hasil penelitian menunjukkan bahwa efek samping yang sering terjadi pada penderita AIDS adalah keluhan nafsu makan yang menurun (90%), sakit kepala (80%), sulit tidur (80%) dan mual (70%). Sedangkan kombinasi ARV yang banyak menimbulkan efek samping adalah kombinasi AZT+3TC+EFV, disusul D4T+3TC+EFV dan AZT+3TC+NVP. Dalam penelitian ini terlihat bahwa kombinasi terapi ARV memberikan hasil yang cukup baik terhadap peningkatan jumlah sel T-CD4 pada pasien ODHA, hal ini ditunjukkan dengan adanya kecenderungan peningkatan jumlah sel T-CD4 pada 8 dari 10 penderita AIDS yang mendapatkan terapi ARV.

Kata kunci: antiretroviral, efek samping obat, sel T-CD4

INTRODUCTION

HIV (Human Immunodeficiency Virus) is a virus that attacks human immune system. If a person is infected by

this virus, their immune system decreases, and they become susceptible to diseases. This virus will ultimately lead to a disease called AIDS (Acquired Immune Deficiency Syndrome). Progress from year to year of a person who

is infected by this virus keeps increasing that this case has become a very serious concern for the health sector. Several data indicated that in the end of 2010, nearly 34 million people (31.6 million–35.2 million) people lived with HIV in this world. The increase reached 17% in the year 2001.¹ The results of the development situation of HIV/AIDS in Indonesia in 2009 were as many as 3,863 cases, in 2010 was as many as 4,158 cases, and up to June 2011 the cumulative total was 26,483 cases.² The HIV virus transmitted into human body through contact with infected body fluids, will bind to the T cell surface receptor CD4 and replicate in them to produce a new virus and infect other CD4 T cells. The result is a decrease in the number of CD4 T cells that eventually reaches a point that it will significantly decrease the body's immune system, and the body becomes susceptible to opportunistic infections.

Antiretroviral drug discovery has encouraged a revolution in the care of people living with HIV, although it has not been able to cure diseases and to increase the challenge in terms of drug side effects. Many studies have shown that antiretroviral drugs give very good results in various countries. The purpose is to determine the antiretroviral suppresses viral replication rate and the maximum continuity which will result directly or indirectly on the recovery, or maintenance of immune function, improved quality of life of people with HIV, decreased morbidity and mortality associated with HIV, and reduced rate of HIV transmission in the community.³ Based on the recommendations of WHO and the World Health Organization first-line antiretroviral medicines, what are recommended are two NRTIs (2 types of nucleoside reverse transcriptase inhibitor) and 1 NNRTI (a type of non-nucleoside reverse transcriptase inhibitor).⁴ Antiretroviral combination is the basis for the management of the provision of antiretroviral to AIDS patients. Antiretroviral combination can reduce the resistance, effectively suppress HIV replication so that opportunistic infections and other complications can be avoided, and improve the quality and life expectancy of AIDS patients. Side effects of antiretroviral drugs commonly occur in AIDS patients and generally occur in the first three months after initiation of antiretroviral, although long-term side effects are also

often found afterwards. This study aims to evaluate the number of CD4 T-cells in patients with AIDS before and after getting an ARV therapy and the side effects arising during the taking of ARVs.

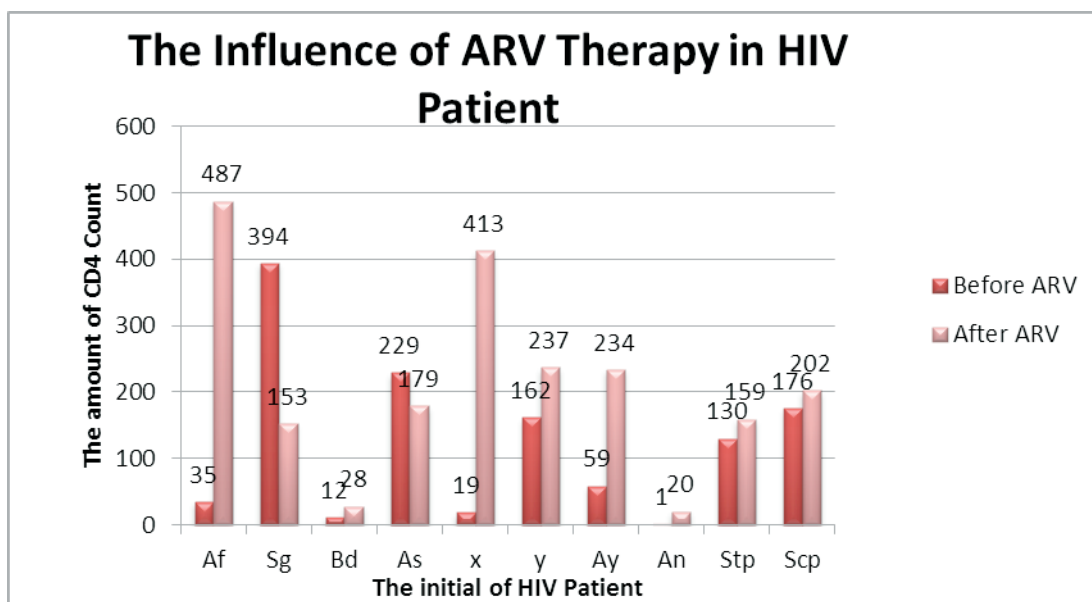
This study is an analytical survey. The data were obtained from medical records in a private clinic in Surabaya. Samples were collected from 10 patients infected by HIV/AIDS in Surabaya.

RESULTS

From the medical records of patients with HIV/AIDS, the data acquired from the disease history of the patients prior to ARV (presence or absence of opportunistic infection) were CD4 cell (counted before and after antiretroviral therapy), patient weight, types of drugs given, and complaints/adverse events after the administration of drugs. Provision of antiretroviral drugs also causes side effects in patients with HIV/AIDS, because each has a toxicity of certain drugs. Side effects of antiretroviral drugs are fairly common occurrences in HIV patients and usually occur within the first three months after initiation of antiretroviral therapy, although long-term side effects are also found often afterwards. According to the indications for changing the ARV regimen due to toxicity of antiretroviral, the side effects of drugs are divided into four degrees, namely (1) degree 1: mild reaction, no need to change on ARV therapy, (2) degree 2: the reaction is thus necessary to continue to give consideration antiretroviral drugs as long as possible, symptomatic treatment may also be given, but if it does not work, replace one kind of anti-HIV drugs that cause side effects, (3) grade 3: severe reaction that requires substitution of ARVs which causes side effects, without stopping antiretroviral, and (4) degree 4 : severe, life-threatening reaction that should be stopped by providing antiretroviral, in which the ARVs were restarted after severe reactions were handled. A research by Kosasih, et al, conducted in Jakarta, found that convenience and drug side effects are major determining factors in people living with HIV antiretroviral adherence. First-line antiretroviral used in Indonesia is the combination with 3TC and NVP

Table 2. ARV Side effects and type of ARV

No	Side Effect	AZT+3TC+NVP	AZT+3TC+EFV	D4T+3TC+EFV
1	Nausea	1	4	2
2	Fatigue	1	1	2
3	Sleeping problem	1	5	2
4	Lose appetite	2	4	3
5	Muscle pain	0	2	0
6	Diarrhea	1	4	2
7	Skin rashes	2	4	2
8	Breathless	0	2	2
9	Fever	0	5	1
10	Headache	1	5	2
	TOTAL	9	36	18



Picture 1. Diagram of the amount of CD4 before and after ARV therapy.

AZT/d4T / EFV. Side effects have been studied including NVP hypersensitivity (27.6%), increased transaminase enzymes (20.8%), and d4T neuropathy (22%).⁵ The results showed that the average HIV/AIDS patients have complaints/side effects after receiving ARV therapy. Here are the numbers and the percentages of the side effects complained by the patients of AIDS who underwent antiretroviral therapy for 1 to 3 years.

Table 1. Frequency of the ARV side effects

No	Side Effects	N	Percentage (%)
1	Nausea	7	70
2	Fatigue	5	50
3	Sleeping problem	8	80
4	Lose appetite	9	90
5	Muscle pain	2	20
6	Diarrhea	6	60
7	Skin rashes	6	60
8	Breathless	4	40
9	Fever	6	60
10	Headache	8	80

Side effects had been suffered by HIV patients after receiving ARV therapy according to the result of the medical records of patients. These side effects are shown in Table 1.

According to table 1, it is known that side effects are common in patients with AIDS. The complaints were appetite loss (90%), headache (80%), insomnia (80%) and nausea (70%). Loss of appetite in AIDS patients may be caused by the influence of drugs. Some of these effects such as nausea or difficulty in swallowing food emerge due to mouth sores caused by fungal infections. Side effects such as headaches that often occur in people with HIV/AIDS

is caused by the influence of drugs such as AZT. Some interesting findings are that most of ARV drugs cause some types of sleep disorders. Many AIDS patients experience sleep disturbances (difficulty of sleep). Complaints of sleep disorders are also associated with depression and pain, whether it is difficult to fall asleep leading to staying up all night. Nausea often occurs because the path where the ARV drugs are put orally is irritated. It also increases stomach acid. Table 2 is the table of side effects and types of drugs consumed by people with AIDS.

Drugs are given to HIV patients in the form of three drug combinations: Highly Active Anti Retroviral Therapy (HAART). The recommended combination of two drugs is the group of NRTIs plus one group of NNRTI, such as the combination of AZT +3 TC + EFV, d4T +3 TC + EFV and AZT +3 TC + NVP. There are three (3) combinations of drugs that are usually given to the HIV patients. It depends on the condition of the patients such as changes in weight, CD4 cell count etc. When HIV patients are getting ARV therapy, they should be carried out to clinical or laboratory monitoring which is aimed to find out the ARV toxicity symptoms, to figure out the opportunistic infections/other diseases, to figure out the adherens of the patients, and to see the response of the therapy.³

According Table 2, it is noted that the combination of drugs that causes many side effects is a combination of AZT +3 TC + EFV, d4T +3 TC + EFV followed by EFV and AZT +3 TC + NVP. This suggests that any patients get antiretroviral therapy. Failures can vary and depend on the patients condition (opportunistic infection) and the level of the patients compliance, that they need clinical and laboratory monitorings. Therefore, as shown in Table 2, there are various side effects caused by antiretroviral therapy. None of the patients getting ARV therapy got more than one side effect for the combination of the ARV given.

Thus, in Table 2, the total of side effects for one combination of ARV does not always amount to 10. If the antiretroviral therapy given to the patients fails, the combination of ARV will be changed with the next combination of ARV. The present study shows that combination of antiretroviral therapy gives good results to the increased number of CD4 T-cells in patients with AIDS, as seen in picture 1.

The diagram above shows a trend increase in the number of CD4 T-cells in AIDS patients receiving ARV therapy. Some data indicate a decrease in CD4 cell counts. This may be due to secondary infections that affect the success of the therapy and the patients with low levels of compliance to drug therapy. Although the ARV therapy generated a lot of complaints or side effects in people, it could increase the number of CD4 T-cells significantly. It is certainly not independent on the adherence factor which is a dynamic process, but it can change with the subjectivity of individuals who consume drugs. In addition, environmental

factors such as support of the family and friends, will also greatly affect the process of clinical improvement (increase in CD4 cell count, weight gain and reduction in viral load) of the AIDS patients.

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