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Case Report

EVALUATION ON THE EFFECT OF ANTIRETROVIRAL DRUGS ON CD4 T-CELL AND THE INCREMENT OF BODY WEIGHT AMONG HIV-AIDS PATIENTS IN SURABAYA

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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 occurr 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, the side effects arising during the taking of ARVs are related to the increment of body weight among the HIV-AIDS patients. Subjects were then narrowed down from 25 to 12 due to the incomplete data. The results showed that the top three most side effects which often occur in people with AIDS are appetite loss (20.0%), nausea (17.8%), and diarrhoea (15.6%). Meanwhile, about 58% of the subjects experienced increment of their body weight, and 42% were losing weight due to the side effects of the ARV therapy. Among those who lost their body weight, 50% were in the productive ages between 21–30 years old. 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 increment in the number of CD4 T-cells in patients who received antiretroviral therapy. However, around 42% of those patients were losing weight because of the side effects of the therapy. Therefore, the importance of giving specific nutrient to overcome with the weight loss is needed to be given to the patients HIV instead of only giving the ARV treatment.

Keywords: *antiretroviral drug side effects, CD4 T-cell, weight loss, weight gain, nutrition*

ABSTRAK

Latar Belakang: *Penemuan obat antiretroviral mendorong sebuah revolusi dalam perawatan orang yang hidup dengan HIV, meskipun belum mampu menyembuhkan penyakit dan meningkatkan tantangan dalam hal efek samping obat. Efek samping dari obat antiretroviral adalah kejadian yang cukup umum pada pasien HIV dan umumnya terjadi dalam tiga bulan pertama setelah memulai terapi antiretroviral, meskipun jangka panjang efek samping sering juga ditemukan setelah itu.* ***Tujuan:*** *Untuk mengevaluasi jumlah CD4 T-sel pada pasien dengan AIDS sebelum dan setelah mendapatkan terapi ARV, efek samping yang timbul selama ARV dikonsumsi dan dikaitkan dengan peningkatan berat badan di antara pasien HIV-AIDS tersebut. Subyek kemudian dipersempit dari 25 orang menjadi 12 orang karena data yang kurang lengkap.* ***Hasil:*** *penelitian menunjukkan bahwa terdapat 3 efek samping tertbanyak yang paling yang sering terjadi pada penderita AIDS antara lain kehilangan nafsu makan (20,0%), mual (17,8%), dan diare (15,6%). Sementara itu, sekitar 58% dari subyek memiliki peningkatan berat badan, dan 42% yang kehilangan berat badan karena efek samping dari terapi ARV. Di antara mereka yang kehilangan berat badan, 50% berada di usia produktif antara 21 - 30 tahun. Dalam penelitian ini menunjukkan bahwa kombinasi terapi antiretroviral memberikan hasil yang baik bagi peningkatan jumlah CD4 T-sel pada pasien yang hidup dengan HIV, seperti yang ditunjukkan oleh kecenderungan kenaikan dalam jumlah CD4 T-sel pada pasien yang menerima terapi antiretroviral. Namun, sekitar 42% dari pasien yang kehilangan berat badan karena efek samping dari terapi tersebut. Oleh karena itu, pentingnya memberikan nutrisi yang spesifik untuk mengatasi dengan penurunan berat badan yang perlu diberikan kepada pasien HIV bukan hanya memberikan pengobatan ARV saja.*

Kata kunci: *efek samping obat antiretroviral, CD4 T-sel, penurunan berat badan, berat badan, nutrisi*

INTRODUCTION

The Human Immunodeficiency virus (HIV) is one of the most serious, deadly diseases in human history. HIV causes a condition called Acquired Immunodeficiency Syndrome, commonly known as AIDS. HIV destroys type of defence cell in the body's immune system called CD4 helper lymphocyte.

A healthy body has CD4 helper lymphocytes cells ($CD4^-$ T cells) which helps the immune system to function normally and fight off certain kinds of infections by acting as a messenger to other types of immune system cells, telling them to become active and fight against an invading germ. When HIV destroys these lymphocytes, the immune system becomes weak and the people get more serious infection than that of normal people.

HIV attaches to these $CD4^-$ T cells. The virus then infects the cells and uses them as a place to multiply. While doing so, the virus destroys the ability of the infected cells to do their job in the immune system. The body therefore loses the ability to fight many infections. Once the number of $CD4^-$ T cells per microliter (μL) of blood drops below 200, the cellular immunity is lost. Acute HIV infection usually progress es overtime to clinical latent HIV infection and then early symptomatic HIV infection and later to AIDS which is identified on the basis of the amount of $CD4^-$ T cells remaining in the blood.[1]

Several symptoms of HIV infection and AIDS may not appear for as long as 10 years or more. People with HIV may not notice any signs that they have the virus. However, doctors nowadays can diagnose someone with AIDS when that person's blood lacks a number of $CD4^-$ T cells which are required to fight the infections. Doctors can also diagnose AIDS if the person has signs of specific illness or diseases that may occur to people with HIV infection, such as fatigue or extreme weakness, rapid weight loss, frequent fever, heavy sweating, swollen lymph glands, chronic diarrhoea, coughing, or even minor infections such as skin rashes.[2]

AIMS OF STUDY

The aim of this study is to evaluate the effect of antiretroviral (ARV) drugs that are given to the HIV-AIDS patients. The antiretroviral (ARV) drugs may give effect on the CD4 T-cells and also cause some specific symptoms which lead to neither increment nor deterioration of body weight among the patients.

MATERIALS AND METHOD

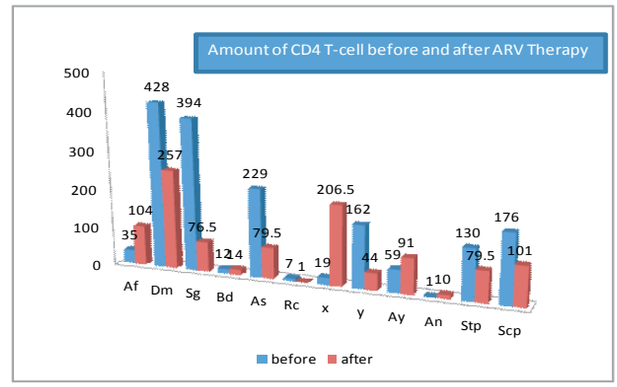
Twenty five patients with HIV positive from a private clinic in Surabaya were involved in the study. The treatment for HIV infection was given with high active antiretroviral (ARV) therapy which slowed down the progression of the diseases, including preventatives and active treatment of opportunistic infections.

Current antiretroviral (ARV) treatment options according to the WHO recommendations are combinations consisting of at least three medications belonging to at least two types of antiretroviral agents: an NNRTI (non-nucleoside reverse transcriptase inhibitor) and two NRTIs (nucleoside analogue reverse transcriptase inhibitors). The typical NRTIs include zidoyudine (AZT) or tenofovir (TDF) and lamiyudine (3TC) or emtricitabine (FTC). The ARV combination may reduce the resistance of HIV replication. Therefore the opportunistic infection could be avoided. However, the side effects of the drug therapy may occur within 3 months after the consumption of ARV. Some medication can upset the stomach which may lead to a weight loss. Nevertheless the ARV therapy is a way to increase the body weight which may be affected due to the infection.[3]

Each patient was given antiretroviral (ARV) drugs with different combinations namely AZT+3TC+NVP, AZT+3TC+EFV, and DAT+3TC+EFV. Conversely, due to the lack of the patient data, the sample of this study reduced to 12 people. Among these patients, we only evaluated the side effects of the drugs without differentiatin the types of drug combination associating with their body weight.

RESULTS AND DISCUSSION

This research shown the evaluation on the effect of ARV drug on CD4 T-cell before and after the therapy, and the increment of body weight of the HIV-AIDS patients, and also shows the side effects that occur during the ARV consumption. There were 25 samples in total; however it was reduced to 12 samples due to the incomplete data. Among 12 samples, the combination of ARV therapy gave a quite good result on the increasing amount of the CD4 T-cell as shown in the graphic below.



Graphic 1. The amount of CD4 T-cell before and after ARV therapy

Based on the graphic, some results show the reduction of the CD4 T-cells. These conditions were caused by the

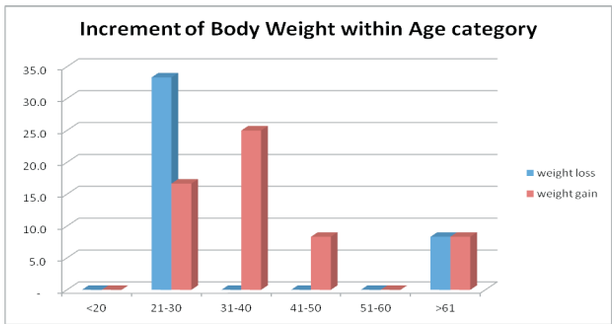
secondary infections which consequenced to the purpose of the therapy. Even though the ARV therapy may give some side effects however it has been proven to improve the amount of the CD4 T-cells continuously.

The 12 samples in this research were vandus age. Most of the patients were in productive ages, between 21 to 30 years old (in category). It can be seen in the table below.

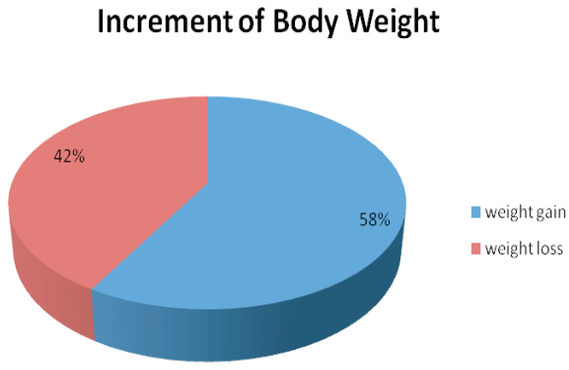
Table 1. Age Category

No	Age	N	Percentage (%)
1	< 20 years old	0	-
2	21 – 30 years old	6	50.0
3	31 – 40 years old	3	25.0
4	41 – 50 years old	1	8.3
5	51 – 60 years old	0	-
6	> 61 years old	2	16.7

Half of the samples were in the ages between 21–30 years old, which were consided productive ages. Comparisons with the increment the of body weight as a result of the ARV therapy are show in the graphic below.



Graphic 2. The increment of body weight within Age category



Graphic 3. Increment of Body Weight

The total samples, approximately 58.3% patients had gained weight. However, around 41.7% lost their weight. This increment of body weight might have associated with the ARV therapy, nevertheless there were still patients whose body weight were deteriorated. The side effects of the ARV therapy may have possibly caused the weight loss.

Based on the information acquired, 10 side effects occurred among the HIV-AIDS patients during the ARV therapy within 1 to 3 years. Each patient had the most frequent side effects that they experienced within the 10 side effects that occured. The side effects are shown in the table below:

Table 2. The most frequent side effect of ARV therapy

No	Side Effect	Freq.	Percentage (%)
1	Nausea	8	17.8
2	Fatigue	3	6.7
3	Sleeping problem	7	15.6
4	Lose appetite	9	20.0
5	Muscle pain	1	2.2
6	Diarrhoea	7	15.6
7	Skin rashes	4	8.9
8	Breathless	1	2.2
9	Fever	2	4.4
10	Headache	3	6.7

The top 3 most common side effects which occur among the HIV-AIDS patients are appetite loss (20.0%), nausea (17.8%), and diarrhoea (15.6%). The appetite loss side effect among the HIV-AIDS patients due to the ARV therapy, may have leaded to the reduction of their body weight, as well as the other side effects such nausea and diarrhoea. Some of ARV medications can upset stomach, this is why the side effects arise and the patients loose their weight.[4]

With respect to the dietary advice for HIV-AIDS patient, some evidence has shown a benefit of micronutrient supplements,[5] Dietary intake of macronutrients at RDA (Recommended Dietary Allowance) levels by HIV-infected adults is recommended by the World Health Organization.[6] Furthermore, WHO states that several studies indicate that supplementation of vitamin A, zinc, and iron can reduce adverse effects in HIV-positive adults to help improve body weight. There are some nutrition guidelines for HIV-AIDS patients. The basic thing is to eat more because extra muscle weight will help to fight HIV.

Balance diet containing macronutrients are essential.[7] Protein helps build and maintain muscle.[8] The good sources of protein came from meat, fish, beans, nuts, and seeds. Carbohydrates are the best macronutrient that give energy, which came from grains, cereals, vegetables, and fruits. Carbohydrates are also a good source of fibre. An other micronutrient is fat, which is needed in an appropriate amount. Monounsaturated fats are considered good fats if they are found in nuts, seeds, olive oil, and fish. To maintain a balance diet, a moderate exercise will help our body to transform the food into muscles. The easiest way is to include exercises into our daily activities (walking or cycling). Moreover, taking supplements can also help to maintain our body weight and get the vitamins and the minerals we need.[9] Last but not least, enough liquid is necessary. Extra water can reduce the side effects of

medications and also helps to concurrence the diarrhoea problem. However, such drinks as tea, coffee, carbonated drinks, chocolate or even alcohol should be avoided since these drinks may actually associate with body liquid loss.

CONCLUSION

Antiretroviral drugs (ARV) have been proven to increase the amount of CD4 T-cells which may help our immune system to function normally and fight off certain kinds of infections. These CD4 T-cells acted as the messenger to other types of immune system cells, telling them to become active and fight against an invading germ. However, the side effects of the ARV therapy among HIV patients are some symptoms related to the appetite which may cause deterioration to body weight. These symptoms are (1) appetite loss, (2) nausea, and (3) diarrhoea, which then lead to a weight loss.

To address the problem, supplementation of vitamin A, zinc, and iron can reduce adverse effects in HIV-positive adults to help them improve their body weight, maintain their body weight and get the vitamins and the minerals they need. Moreover, a balance diet must contain macronutrients that are essential such as high carbohydrates (to give energy), and protein (to help building muscles). Extra water can also help to reduce the side effects of medications and to overcome diarrhoea problems. Furthermore, to maintain a balance diet, it is recommended thats patients keep being active by doing some light exercise such as walking or cycling, in order to retain their body fitness, to gain appetite, as well as to preserve their body muscles.

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