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Research Paper

PATTERN OF TOTAL WHITE BLOOD CELL AND DIFFERENTIAL COUNT VALUES IN HIV POSITIVE PATIENTS RECEIVING TREATMENT IN FEDERAL TEACHING HOSPITAL ABAKALIKI, EBONYI STATE, NIGERIA

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The assessment of values of differential counts was carried out on one hundred (100) samples. Sixty (60) samples (test) were collected from HIV positive patients who came for routine medical check up and treatment at Federal Teaching Hospital Abakaliki and forty (40) samples (control) were from HIV negative individuals who were voluntary blood donors at the same hospital. The subjects were age matched from 16-65 years. 34% of the subjects were 16-25 years. 41% of the subjects were 26-35 years and 25% of the subjects were 36-45 years. The total white blood cell count result for HIV positive patients were $2.8 \times 10^9/l$ (16-25 years), $2.9 \times 10^9/l$ (26-35 years), $3.2 \times 10^9/l$ (36-45 years) which were lower than mean values of HIV negative subjects as follows $6.4 \times 10^9/l$ (16-25 years), $6.5 \times 10^9/l$ (26-35 years) and $7.0 \times 10^9/l$ (36-45 years). This showed significant difference in the mean values of total white blood cell of the HIV positive patients and HIV negative subjects ($p < 0.05$). Mean differential white blood cell count of HIV positive patients were 16-25 years (Neutrophil 58.1%, Lymphocyte 37.5%, Monocyte 1.9%, Eosinophil 2.7% and Basophil 0.3%), 26-35 years (Neutrophil 55.1%, Lymphocyte 39.5%, Monocyte 2.6%, Eosinophil 2.6% and Basophil 0.3%) and 36-45 years (Neutrophil 57.4%, Lymphocyte 38%, Monocyte 2.3%, Eosinophil 1.8% and Basophil 0.2%). The differential count of HIV negative subjects were 16-25 years (Neutrophil 58.8%, Lymphocyte 30.2%, Monocyte 2.1%, Eosinophil 1.5% and Basophil 0.4%), 26-35 years (Neutrophil 61.1%, Lymphocyte 35.4%, Monocyte 2.0%, Eosinophil 1.3% and Basophil 0.2%) and 36-45 years (Neutrophil 56.4%, Lymphocyte 36.4%, Monocyte 3.4%, Eosinophil 1.4% and Basophil 0%). This showed no significant difference in the differential count.

Keywords: HIV, Basophil, Neutrophil, Lymphocyte, Eosinophil, Monocyte, Positive and Negative and Patients

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INTRODUCTION

HIV positive patients are infected with Human Immunodeficiency Virus (HIV). According to the Centre of Disease Control (CDC) and prevention, HIV infection is diagnosed when the screening test for HIV is positive and CD₄⁺ cell count drops below 200 in a patient (Michael, 2001).

HIV is a retrovirus of lentivirus that lead to Acquired Immunodeficiency Syndrome (AIDS), a condition in human in which the immune system begin to fail leading to life threatening opportunistic infection and malignancies (Keele *et al.*, 2006 and Obi *et al.*, 2010). HIV infection occurs by transfer of blood, semen, vaginal fluid, breast milk, etc. Screening of blood, blood product for HIV has largely estimated transmission through blood transfusion or infected blood product in the developed world (Okoye, 2006 and Obi *et al.*, 2010). HIV infection leads to low levels of CD T-Cells (Clapham and Mcknight, 2001).

HIV primarily infects and attacks vital cells in the human immune system. The most important of these immune system (white blood cells) include lymphocytes (B Lymphocytes and T Lymphocytes) and other white cell series but attack more of T Lymphocytes which have CD4⁺ marker on their cell surface which the HIV bind with its gp 120 and gp 40. HIV infection leads to decrease in total white blood cell CD4⁺ cell count. Today HIV infection has become a world-wide epidemic with different prevalence rates.

In 1993, HIV affected an estimated 14 million people with over 3 million estimated cases of AIDS. By late 1993, an estimated 23 million people were also infected by HIV. By the year 2000. About 40 million people were also infected with HIV and the great increase is noticed in sub-Sahara Africa (Greener, 2002).

METHOD

Study Area

This research was done in Federal Teaching Hospital Abakaliki, Ebonyi State in the Hematology Laboratory.

Subjects and Sample

A total of 60 HIV positive patients who attended the Hospital for medical check up and treatment and 40 HIV negative blood donors in the hospital were used for the study. 3 ml of venous blood was collected from the subjects into dipotassium ethylene diamine tetra acetic acid container, mixed and the total white cell and differential cell determined.

RESULTS AND DISCUSSION

The result obtained from the study showed that the mean total white blood cell of all age matched groups (16-25 years, 26-35 years and 36-45 years) of HIV positive patients were lower than mean total white blood cell for HIV negative individuals.

The study revealed the mean total white blood cell of HIV positive patients among the age groups as $2.8 \times 10^9/l$, $2.9 \times 10^9/l$ and $3.2 \times 10^9/l$, respectively which is below $4.0 \times 10^9/l$ of the lower limit of the reference range of total white cell and mean total white blood cell of the HIV negative individuals as $6.4 \times 10^9/l$, $5.5 \times 10^9/l$ and $7.0 \times 10^9/l$ respectively which is within the normal range to $11.0 \times 10^9/l$. This supports Kumar (2004) and Cheesbrough (2002) that opined that in viral infections such as HIV infection there is reduction in total white cell count. There is significant difference in the total white blood cell ($p < 0.05$) but there was no significant difference in the differential white blood cell count ($p > 0.05$). This shows improvement through the treatment they have been receiving.

Table 1: Mean Values for Age Group 16-25 Years

| | WBC(*10 ⁹) | N(%) | L((%) | E(%) | B((%) | M(%) |
|-------------|------------------------|------|-------|------|-------|------|
| TEST(18) | 2.8 | 58.1 | 37.5 | 2.3 | 0.3 | |
| CONTROL(16) | 6.4 | 58.8 | 37.3 | 1.5 | | 1.9 |
| | | | | | | 2.1 |

Note: WBC(P<0.05); Differential Count(P>0.05).

Table 2: Mean Values for Age Group 26-35 Years

| | WBC(*10 ⁹) | N(%) | L((%) | M(%) | E((%) | B(%) |
|-------------|------------------------|------|-------|------|-------|------|
| TEST(25) | 2.9 | 55.0 | 39.5 | 2.6 | 2.6 | 0.3 |
| CONTROL(16) | 6.5 | 61.1 | 35.4 | 2.0 | 1.3 | 0.2 |

Note: WBC(P<0.05); Differential Count(P>0.05).

Table 3: Mean Values for Age Group 36-45 Years

| | WBC(*10 ⁹) | N(%) | L((%) | M(%) | E((%) | B(%) |
|------------|------------------------|------|-------|------|-------|------|
| TEST(17) | 3.2 | 57.4 | 38.0 | 2.6 | 1.8 | 0.2 |
| CONTROL(8) | 7.0 | 56.3 | 36.4 | 3.4 | 1.4 | 0.0 |

Note: WBC(P<0.05); Differential Count(P>0.05).
Keys: WBC=WHITE BLOOD CELL, N=NEUTROPHIL, L=LYMPHOCYTE; M=MONOCYTE, E=EOSINOPHIL AND B=BASOPHIL.

The effect on total white cell (Coovadial, 2004) leading to reduction below the control should be a concern.

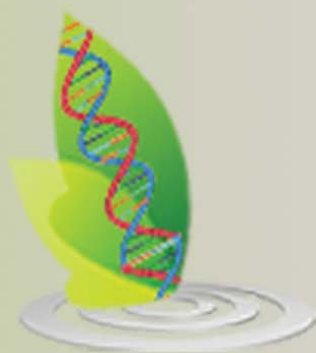
CONCLUSION

In this study, the decrease in the total white blood cell count may be associated with cytopathic effect of the immune cells in HIV positive patients. The differential white blood cell was expected to fall and this may be attributed to the improvement by the antiretroviral drugs.

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