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Short Communication

Leukopoietin Levels in Human Immunodeficiency Virus Infection in Umuahia, Nigeria

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Abstract

A total number of ninety (90) subjects within the age of 18-60 years were used for determining the comparative study of leukopoietin levels in human immunodeficiency virus infection in Umuahia, Nigeria. Among three groups with thirty (30) subjects each, group I comprised of control subjects, group II were HIV- subjects not on therapy, and group III were AIDS- subjects not on therapy. Blood samples were collected for both test and control subjects after informed consent. The results showed that the level of leukopoietin of group II was slightly higher than that of group I which is not statistically significant at $p<0.05$. The leukopoietin of group III was statistically higher when compared with those of groups I and II respectively.

Keywords

AIDS
Leukopoietin
Immunodeficiency

Introduction

Human immunodeficiency virus (HIV) is a lentivirus (slowly replicating retrovirus) that causes acquired immunodeficiency syndrome (AIDS) (Weiss, 1993; Douek et al., 2009) in humans, with progressive failure of the immune system allowing life- threatening opportunistic infections and cancers to attack the body. Infection occurs by body fluid contact like blood, semen, vaginal fluid, pre-ejaculate, and breast milk. Within these bodily fluid, HIV is present as both free virus particles and virus within infected immune cells. The four main routes of transmission are unsafe sex, contaminated needles, breast milk, and perinatal transmission. The primary means of HIV sexual transmission is through vaginal or anal intercourse, but it can also be transmitted through oral sex (Williams and Steven, 2007).

Leukopoietin on the other hand, is a hypothetical substance presumed to be humoral means of regulating leucopoiesis. The discovery of erythropoietin, a humoral substance regulating production of erythrocytes has raised the question whether humoral

factors for control of leucocytes exist. Probably, there are many leukopoietic stimulants specific for granulocytes, lymphocytes, monocytes etc, possibly even for neutrophilic, eosinophilic, or basophilic granulocytes. Almost certainly these stimulating substances are interrelated not only among themselves, but also with erythropoietins and thrombopoietins to maintain a well balanced hematopoietic population (Bierman, 2006).

According to Kakhetelidze and Dolgina (1972) these endogenous substances capable of inducing leucocytosis or of stimulating leucopoiesis have been given many names depending on the conditions and method used for their detection. Also options differ regarding the site of formation of these substances. These leukopoietins are glycoproteins and of a molecular size that can readily transverse capillary and cell membrane en route to the target site based on the prompt initiation and promotion of leucopoiesis in the marrow by circulating stimulant. Examples include Granulocyte Colony Stimulating Factor (G-CSF), Granulocyte Macrophage Colony Stimulating Factor (GM-CSF), Colony-Stimulating Factor-1 (CSF-1), CFU-preB, etc. Although it is plausible that these growth factors may play important roles in activation of granulocytes and non granulocytes as well as supporting final maturation stages at locations of inflammation. There is no evidence at present that production of granulocytes or non- granulocytes is regulated systemically through a mechanism that senses the mature cell numbers in the body and causes elaboration of a factor that works in the marrow. The aim of the present study was to comparatively study leukopoietin levels in HIV /AIDS subjects and apparently healthy subjects.

Materials and methods

The study was conducted at the HIV/AIDS clinic of Federal Medical Centre (F.M.C.) Umuahia which is located at the heart of Abia State capital territory. Umuahia covers a land mass of 245km^2, with Latitude of 5.5267 (decimal degree) North and Longitude 7.48959 (decimal degree) East with a population of 264,662 (Mongobay, 2012). With a well detailed research proposal and a letter of Introduction from the department, the head, Health Research and Ethics Committee of the Institution was met. After their meeting and thorough perusal of the protocols of the research, an ethical approval was given for the study. A total number of ninety subjects were used which was calculated based on the prevalence rate of HIV infected subjects with the age of 18-60 years, grouped into three (3) of thirty (30) each. Group I was made up of control subjects while groups II and III were made up of HIV subjects and AIDS subjects respectively. The HIV subjects were selected from donors that came to donate blood at the hospital and those that came for premarital counselling and testing after testing only positive to HIV screening. The AIDS patients were selected from ART clinic at F.M.C. Umuahia. The control subjects were selected from donors who were fit and from voluntary workers at the laboratory department F.M.C Umuahia. Both oral and written consent were obtained from the subject who also accented to the sample collection. The group I (controls) were selected on the basis that they were apparently healthy and showed no signs and symptoms of any viral (hepatitis B and C), systemic or cardiovascular diseases from the pre donating screening done on them such as clerking. HIV test, Hepatitis test, etc. The group II (HIV-patients) were selected having being confirmed of having HIV infection by the standard technique and not reactive to any other viral infections (hepatitis B and C), no other complications associated with the HIV infection and that are not sicklers or immunocompromised from their CD4 cell count. Group III (AIDS- Patients) were picked on the basis that they were confirmed of having AIDS and showed all AIDS indicator conditions (but no history of tuberculosis or reactive to any other viral infection.

The subjects showing any underlying signs and symptoms of diseases other than HIV and AIDS for the test subjects were excluded from the study. While the control groups reactive to any viral infections including HIV/AIDS or that are immunocompromised were excluded. About 6ml of venous blood was aseptically collected from the patients using a standard venipuncture technique. About 3ml was dispensed into a commercially prepared dipotassium EDTA Vacutainer (Beckon, Dickson and Company) while the remaining 3ml was dispensed into a dry plain plastic tube and allowed to clot. The samples were centrifuged at 3000 rpm for 10minutes to separate the plasma and the serum respectively. The plasma was used for leucopoietin analysis using ELISA method after the whole blood was used for analysis of CD8 while the serum was used for confirmation of HIV and other viral infections.

The results were expressed as mean and standard deviation (X±SD) the analysis was done using student's t-test and Pearson correlation analysis with the statistical package for social science (SPSS) version 13. The level of significance was at $p<0.05$.

Results and discussion

The results of the ninety subjects used for the study was as tabulated below and the results obtained have been summarized in Figs. 1 and 2. The results showed that the leukopoietin of the group II was slightly higher when compared with the control group I. However, it is not statistically significant. The mean value of group III was significantly higher than both group I and II.

Fig. 1: Leukopoietin contents in the study subjects in three groups. I = Control; II = HIV-infected patients not on therapy; III= AID-patients not on therapy.

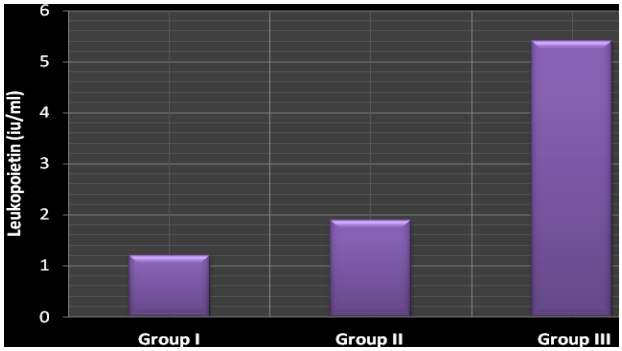
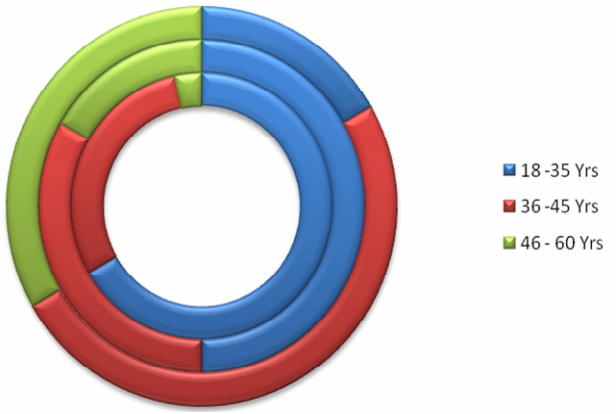


Fig. 2: Age-wise distribution of studied groups (I, II and III). I = Control; II = HIV-infected patients not on therapy; III= AID-patients not on therapy.



The mean value of leukopoietin was significantly higher in group III (AIDS patients) when compared with group I and II. Though there was a slight increase in the mean value of leukopoietin in group II (HIV patients) when compared with group I (control) but it was not statistically significant. The increased mean value of leukopoietin observed in group II could be as a result of continuous production of naïve T cells as a response to the immune cells depletion. The production of these immune cells continues to a point when there is a total breakdown of the body's immune system due to increased viral load with consequent opportunistic infections. At this stage, there is leucopoietic dysfunction possibly as a result of defects in leukopoietin production, and the cells gradually decline numerically and functionally. This study showed increase in proliferation of T lymphocytes measured by leukopoietin concentration in HIV infection; therefore it would be of immense health benefit to include leukopoietin level determination to serve as a prognostic guide in virologic treatment and management of HIV/AIDS patients. The leukopoietin levels of HIV positive patients, when compared with that of apparently healthy controls showed no statistical difference but when the leukopoietin levels of AIDS patients were compared with that of HIV positive asymptomatic patients and apparently healthy subjects, there was statistical difference in both.

References

Boasso Bierman, H. R., 2006. Characteristics of leukopoietin G in animal and man. Ann. New York Acad. Sci. 113, 753–765.

Douek, D.C., Roederer, M., Koup, R. A., 2009. Emerging concepts in the immunopathogenesis of AIDS. Annu. Rev. Med. 60, 471–84.

Kakhetelidze, M. G., Dolgina, Z. M., 1972. Site of formation of leukopoietins in dogs with aseptic inflammation. Options differ regarding the site of formation of these substances. Bull. Exp. Biol. Med. 73(3), 23-26.

Mongobay, 2012. Population of Umuahia, Nigeria Population. www.mongobay.com/../umuahia.

Weiss, R.A., 1993. How does HIV cause AIDS? Sci. 260(5112), 1273–1279.

William, N. R., Steven, B., 2007. Environmental and Occupational Medicine. 4th Edn. Wolter Kliwer/ Lippincott Williams & Wilkins, Philadelphia. 745p.