

IJBHS 2010128/6408

Evaluation of haematological variations among HIV infected patients attending antiretroviral Clinic at Barau Dikko Specialist Hospital Kaduna State Northwest Nigeria

A. Dangana^{*1}, A. Nuhu² and K. Thomas³

¹Haematology Department, Federal Medical Centre, Bida, Nigeria

²Haematology Department, National Hospital Abuja, Nigeria

³Laboratory Department Barau Dikko Specialist Hospital Kaduna State, Nigeria.

(Received August 18, 2010; Accepted October 10, 2010)

ABSTRACT: The epidemic prevalence rate of HIV/AIDS in Nigeria is very high. one hundred and eighty eight (188) persons were employed for this work. These comprised of 106 HIV seropositive patients attending ART clinic in Baraudikkospecialist Hospital Kaduna, and 82 apparently control individuals that are HIV seronegative. The parameters investigated were haematocrit volume (pcv) determined by Hawksley micro-capillary centrifugation, haemoglobin (Hb) value by cyanmethaemoglobin method, total leucocytes and platelets count were done by standard methods. A differential leucocytes count was also done by the thin blood film method, stained with leishman stain and examined microscopically. The erythrocytes sedimentation rate (ESR) was carried out using the westergreen method. There was a reduction in haematocrit, Hb, and total leucocyte levels, though not significant, while there was a significant increase ($p > 0.001$) in ESR and platelets count as compared to the normal controls respectively.

Key Word; HIV, antiretroviral therapy.

Introduction

Infection with HIV/AIDS is an urgent problem with several implications. It causes a devastating disease in the world and so far there is no known proven cure. The epidemic in Nigeria is on the increase with a prevalence rate of 3.8% in 1993, which had increased to 5.8% in 2001, a level of epidemic proportion (1). HIV has become a common complication among people in most developing countries. The Human Immunodeficiency Virus (HIV) epidemic in Africa has endured over time and may have reached a peak to Acquired Immunodeficiency Syndrome (AIDS) is life threatening (2) after infection has occurred, factors other than the AIDS virus itself appear to influence progression to disease (2). This conclusion is based on the variation in time from infection to the development of symptoms and AIDS among different individuals even those receiving the same contaminated blood. One possible co-factor in HIV pathogenesis is infection by opportunistic bacteria among others.

^{*}To whom correspondence should be addressed.

E-mail: isalemit@yahoo.co.uk. Tel: +234(0)8032103952

Infection with HIV is associated with a range of haematological abnormalities (3). The mechanisms for these changes are reported to be multiple including in part, effects of opportunistic infections myriads of drugs against infections or HIV itself. The haematological abnormalities known to be associated with HIV infection include anaemia which occurs in 10 – 20% at initial presentation but could increase to involve approximately 70 – 80% of patients during the course of the disease. This may be due to decreased in production of red blood cells (RBC), increased red cell destruction and ineffective erythropoiesis. Neutropenia, as in the other peripheral blood cytopenias in the setting of HIV infection has multiple aetiologies, which may be present either singly or in combination. Thus, decreased colony growth of the progenitor cells leads to decreased production of both granulocyte and monocytes produced by the infected cells known to suppress neutrophils production (5).

Severe thrombocytopenia occurs in 7% of women, while in over 75% of cases, it is mild and of unknown cause, a condition referred to as incidental thrombocytopenia (6). Thrombocytopenia could result from increased platelets destruction; decreased platelet production by the HIV infected Megakaryocytic cells.

There are also physiological and haematological changes that occur in HIV infected patients which are the basis of this study. Hence, the aim of the study is to evaluate and determine the haematological variations in HIV infected patients attending the clinic at Baraudikko Specialist Hospital.

Materials and Methods

This comprised 188 individuals attending Baraudikko Specialist Hospital in Kaduna town. This number consisted of 106 HIV infected seropositive patients attending ART clinic at the institution and 82 apparently healthy control individuals.

Their blood samples were analyzed for various haematological counts according to Lewis and Decie (7). Haemoglobin, haematocrit, total WBC and differential WBC, platelets count and ESR. Information on sociodemographic factors such as age and marital status were obtained.

Sample Collection

Whole blood sample was drawn with minimum stasis into 5ml bottle via the antecubital vein using a disposable plastic syringe and needle. Each sample was then mixed gently and thoroughly to ensure anticoagulation and prevent cell lysis. Aliquots were used to determine the haematological parameters within two hours of collection.

The data were processed and analyzed using the epi-info 6.04 statistical software. The results were summarized as mean \pm SD and means compared using Mann Whitney U test for non-normally distributed data. The level of significance in the differences between the mean was inferred at $P < 0.05$.

Results

From the data obtained, both test and controls subjects had a mean age of 30 years. Of those individuals, 56.4% were single, while 43.6% were married. The haematological values obtained from the test and control subjects on ART as shown in table 2. The values of Hb, HCT, total WBC and basophils of HIV subjects and controls were comparable ($P > 0.05$), while ESR, monocytes, and eosinophils values of HIV seropositive subjects were significantly higher than those of controls ($P < 0.001$). In contrast, the values of platelets count were significantly lower ($P < 0.001$) among HIV seropositive subjects compared with values of control.

Table1: Age and Marital Status of HIV Seropositive Subjects and Controls.

Characteristic Age Bracket	Subjects on ART	Controls	Total
16 – 25	50	40	90
26 – 35	34	33	67
36 – 45	22	9	31
Marital Status			
Married	44	42	86
Single	56	50	106

Table 2: mean and Standard Deviation for HIV Seropositive on ART and Controls.

Parameters	Subject on ART	Control	P – Value
Age	30.0	30.0	P > 0.05
Haemoglobin	12.3±3.0	80±20	P > 0.05
Packed Cell Volume	0.37±4.0	0.24±5.0	P > 0.05
Total wbc	7.78±5.8	5.65±5.9	P > 0.05
Neutrophils	568±6.0	34±6.0	P > 0.05
Lymphocyte	43±4.0	66±5.0	P > 0.01
Mon	3.12±2.59	1.28±206	P > 0.01
Eos	1.32±2.42	0.34±1.06	P > 0.05
Bas	0.04±0.19	0.02±0.14	P > 0.05
ESR	13±4.0	74±12.0	P > 0.01
Platelets count	254.98±60.9	90.64±32.5	P > 0.01

*P > 0.005 = Not significant

*P < 0.005 = significant

Discussion

The HIV pandemic is a worldwide problem and the scale of infected number of people is vast (8). The socioeconomic impact of HIV/AIDS is becoming an issue of great concern as it has continued to spread. The mean haematocrit (HCT) and Hb levels were found to be reduced in HIV seropositive patient regardless of their therapy status when compared to values in control individuals. This reduction which was observed is similar to that reported by Chesley (9). Although the HCT and Hb values were reduced in individuals not on ART as compared with those on ART this may be due to the fact that these therapy includes two nucleoside reverse transcriptase inhibitors with a protease inhibitor which could normally slow down the action of the enzyme reverse transcriptase possessed by the HIV virus. Hence ART may provide the opportunity for haemopoiesis rejuvenation.

Total leucocyte counts of HIV seropositive patient were lower as compared with the control, although they fall into the normal range of a normal healthy population. This observation is in contrast to the work of Efranti (10) who

proposed an increase due to increase in neutrophils counts. Neutropenia was observed in patient on ART. This in agreement with Leiderman *et al* (5) who related the decrease in neutrophils count to soluble inhibitory substances produced by HIV infected cells and noted to suppress neutrophils production in vitro.

The platelet count of all test subject in this study were found to be significantly reduced ($P < 0.001$), when compared with the controls. This agrees with the findings of Gerbasi *et al* (11) and may be due to an increase in plasma volume observed during gestation. According to Sullivan (12), it may be as a result of increased platelets destruction or decreased platelet production in subjects not on ART. This may tend to affect the normal haemostasis such that the individual become predisposed to bleeding tendency.

The finding that ESR of HIV/AIDS subjects was increased significantly when compared to values of control subjects due to decreased erythrocyte count (anaemia) agrees with the work of Barbara (13).

In conclusion, relatively low values of haemoglobin, haematocrit, and platelets count in HIV Seropositive patient could be an indication of low toxicity in patients on high active antiretroviral therapy (HAART). Also, these patients may be prone to bleeding disorders or excessive bleeding due to a much more reduced platelets count.

References

1. Federal Ministry of Health (2004): HIV/Syphilis Seropositive Science in Nigeria. Technical report. AIDS/STDs Control Programme.
2. Lery, J.A. (1998): HIV and the pathogenesis of AIDS: ASM Press Washington DC. 311 – 321.
3. Doweiko, J.P. (1993): Management of the Haematological Manifestations of HIV disease. Blood Review. 7:121-126.
4. Zon LI, Arkin C. Groopman E. (1988): Haematologic Manifestations of the HIV J. Haem. 25:208.
5. Leiderman I, Greenberg M. Adelsberge B. (1987): Glycoprotein's inhibitor of Protein granulopoiesis associated with AIDS blood; 70:1267.
6. Hoffbrand A.V. Petit I.E, Moss P.A. (2001). Essential Haematological 4th ed. Blackwell Science (Oxford) 349.
7. Dacie J.U; Lewis S.M. (1994). Practical Haematology 8th Ed. Churchill Livingstone. Edingburgh.
8. Lightman S. HIV/AIDS. (1995): The differing ocular manifestations in developed and developing countries. Community eye health; 8:17-19.
9. Chesley, L.C. (1972): Plasma and red cell volume during pregnancy. A.M. J. Obstet Gynae. 112:440-441.
10. Efrati P. Presentey B, Margabath M. (1964) leucocyte of normal pregnant women obstet Gynae. 23: 19-30.
11. Gerbasi F.R. J. Bottoma S. Faraq A (1990). Increased intravascular coagulation associated with pregnancy J. Obstet gynaecol 75:385-9.
12. Sullivan P.S, Hanson D.L, Chu S.T. (1992): Surveillance for thrombocytopenia in persons infected with HIV results from the multistate adult and adolescent spectrum of disease project J. Acquir. Immuno Deficiency Syndrome 28:769-10
13. Barbara G.P, Zauli. G. Gloranhimi M. (1990): Early loss of circulatory haematopoietic progenitors in HIV – 1 infected subjects. J. Haematol 18:426 -27