Relation between Erythrocyte Sedimentation Rate, Clinical And Immune Status In HIV-Infected Patients

Ndakotsu M A, FMCPath, Salawu L, FMCPath, FWACP, Durosinmi M A, FMCPath, FWACP

Department of Haematology and Blood Transfusion, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria

Abstract

Background: The objective of this study was to determine the clinical and immunologic implications of an elevated ESR in HIV-infected patients.

Method: One hundred and four consecutive HAART naïve human immunodeficiency virus (HIV)-infected adult patients and fifty one controls were studied. Detailed history was taken and full physical examination was conducted. Erythrocyte sedimentation rate (ESR), CD4+ T lymphocyte count, and complete blood count were performed.

Results: The mean (± SD) of ESR in the patients was 84.5 ± 36.8 mm/1st one hour and that for the controls was 20.4 ± 17.6 mm/1st one hour. The patients' ESR was significantly higher than those of the controls (p < 0.0001). There was a significant difference between the mean ESR of symptomatic (87.6 ± 37.0 mm/1st hr) and asymptomatic patients (61.0 ± 26.1 mm/1st hr) (p = 0.018), and between asymptomatic patients (mean ± SD = 61 ± 26.1 mm/1st one hour) and controls (mean ± SD = 20.4 ± 17.6 mm/1st one hour) (p = 0.000).The mean (± SD) CD4+ lymphocytes count of the patients and controls were 155.4 ± 90.6 cells/ µL, and 655.7 ± 17.6 cells/µL, respectively. The CD4+ cells count was significantly lower in the patients than in the controls (p < 0.0001).

Conclusion: ESR may be useful in monitoring HIV/AIDS disease.

Key words: HIV/AIDS, ESR, CD4+ T lymphocyte.

Introduction

The Erythrocyte Sedimentation rate (ESR) is a simple and inexpensive laboratory test for assessing the inflammatory or acute response. Although the role of acute phase reactants and cytokines in inflammatory responses is well-established,[1] the International Committee for Standardization in Hematology (ICSH) recommends the use of the Westergren's method [2,3] in assessing inflammatory response.[4] The ESR has also been found to be of clinical significance in the follow-up and prognosis of non-inflammatory conditions such as prostate cancer,[5] coronary artery disease,[6] and stroke.[7] However, ESR is not an appropriate screening test in asymptomatic patients . Elevation of ESR may be a reflection of advanced immune deficiency as found in Acquired Immunodeficiency Syndrome (AIDS).

The CD4+ lymphocytes count is central to the 1993 CDC classification system for HIV disease and to all of the staging systems proposed for developing countries. Counting subsets of lymphocytes, however, is often not possible in developing countries because the required technology may not be available or may be too expensive for routine use, if available.

The purpose of this study therefore, was to determine the clinical and immunologic implications of an elevated ESR in HIV-infected patients

Materials and Methods

We studied one hundred and four (104) consecutive HAART naïve human immunodeficiency virus (HIV)-infected patients, aged 15 years and above, with or without symptoms. The control group was composed of 51 apparently healthy age and sex comparable adults. Informed consent was obtained from each respondent. The study was approved by the Research Ethics Committee of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife.

Detailed history was taken, full physical examination was also conducted and the findings were documented in all patients. Blood was obtained by clean venipuncture and collected into dipotassium EDTA plastic bottle to determine ESR value and CD4^{+} lymphocyte count. The ESR was determined by Westergren's method [8], whiles the CD4+ lymphocytes count was carried out employing commercial kit [Dynal^{R} T4 Quarant Kit, Dynal Biotech, ASA, Oslo, Norway]. The manufacturer's procedures were strictly followed.

Statistical Analysis

Student t-test was used to test the significance of differences between mean values. Statistical Package

Correspondence to Dr. M.A. Ndakotsu, E-mail: mndakotsu@yahoo.com

for Social Sciences (SPSS) version 11.0 computer software (SPSS Release 11.0.1. 15 Non 2001, USA) was used for all statistical analyses. A probability (p) less than 0.05 were taken to indicate statistical significance.

Results
Clinical characteristics of the patients
A total of 105 patients aged 22 to 65 years (median = 36.5 years) participated in the study, out of which 65 were females and 39 males (female-to-male ratio was 1.7: I). Seventy five (72.1%) of the patients had clinical AIDS, 17 (16.3%) had non-AIDS symptoms and 12 (11.5%) were asymptomatic as at the time of investigations. Among those that had clinical AIDS, 49 had wasting syndrome, 22 had oro-oesophageal candidiasis, 3 had pulmonary tuberculosis, and 1 had Kaposi Sarcoma.

Laboratory parameters
The mean (± SD) of ESR in the patients was 84.5 ± 36.8 mm in the first one-hour and that for the control was 20.4 ± 17.6 mm in the first one-hour. The patients' ESR was significantly higher than those of the controls (p < 0.0001). Expectedly, there was a significant difference between the mean ESR of symptomatic (87.6 ± 37.0) and the asymptomatic patients (61.0 ± 26.1) (p = 0.018). The ESR of asymptomatic patients (mean ± SD = 61 ± 26.1) were higher than those of the controls (mean ± SD = 20.4 ± 17.6). The difference was statistically significant (p = 0.000). ESR values was found positively correlated (r = 0.631, p < 0.0001) with age among controls and inversely correlated to packed cell volume in both patients and the controls (P < 0.0001, respectively). The ESR for females among controls was significantly higher than that of males (p < 0.0001). There was a negative correlation between ESR and CD4 count, but this was not significant (P > 0.05). The mean (± SD) CD4 count of the patients and controls were 155.4 ± 90.6 and 655.7 ± 17.6, respectively. The CD4 count was significantly (p < 0.0001) lower in the patients. The CD4+ T-lymphocyte cell count was less than 200 cells/µL in 76% of the patients; and was between 200 and 500 cells/µL in the remaining 24%. The majority of the controls had CD4+ T-lymphocyte cell counts of 500 cells/µL and above (48/51); the remaining (3/51) had CD4+ T lymphocyte counts of between 400 cells/µL and 499 cells/µL. Table 1 shows the distribution of ESR and CD4 count among study groups

Discussion
The patients' ESR was significantly higher than those of the controls (p < 0.0001) in the present study. Similarly, there was a significant difference between the mean ESR of symptomatic (87.6±37.0) and the asymptomatic

patients (61.0±26.1) (p = 0.018) and between the asymptomatic patients and the controls (p = 0.000). However, the negative correlation observed between ESR and CD4 count in both patients and controls was not significant (P > 0.05). This finding is in accordance with those of some previous studies,[9-13] where ESR was found to be a specific predictor of HIV disease progression, but contrasts that of Vazque et al[14] who found ESR a poor marker for deterioration in clinical, immune or viral status.

A significant inverse relation (p < 0.0001) was found between ESR and haematocrit. Low haematocrit, a common finding in HIV infection has a negative influence on ESR and could have contributed to the elevated ESR level in our patients. Similarly, the hypergammaglobulinaemia and malnutrition, which are also common findings in HIV/AIDS patients, may contribute to elevated ESR levels[15]. ESR levels are typically higher in females than males, irrespective of infection or immune status. This pattern was confirmed in the present study. The ESR is also influenced by age and this was similarly observed in this study, in which there was a significant positive correlation between the two parameters in the controls, but not in the patients.

Conclusions: The results from this study show that ESR was significantly higher in both symptomatic and asymptomatic HIV/AIDS patients than in the controls; the difference was more marked between the symptomatic patients and controls. There was an insignificant negative correlation between ESR and CD4+ T lymphocyte count. We therefore, conclude that ESR may be useful in monitoring HIV/AIDS disease. However, our sample size was relatively small and a study with larger samples is required.

Table I. Distribution of ESR and CD4 count among study groups

Group		n	CD4 cells/ µL* (Mean ± SD)	ESR mm/ 1st one hr (Mean ± SD)
Controls:		51	655.7 ± 17.6	20.4 ± 17.6
	Males	29	637.3 ± 114.0	15.4 ± 14.4
	Females	22	669.7 ± 129.7	24.2 ± 18.1
Patients:		104	155.4 ± 90.6	84.5 ± 36.8
	Females	65	141.1 ± 67.9	88.5 ± 35.9
	Males	39	168.7 ± 118.3	77.9 ± 37.9
	Asymptomatic	12	266.7 ± 90.4	61.0 ± 26.1
	Symptomatic:	92	133.8 ± 74.6	87.6 ± 37.0
	With wasting syndrome	49	-	-
	with oral candidiasis	22	-	-
	With PTB	3	-	-
	With Kaposi sarcoma	1	-	-
	With non-specific symptoms	17	-	-

*Reference range = 500 1400 cells/L [16]
n = total number

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