ASSESSMENT OF SERUM PROTEINS IN HUMAN IMMUNODEFICIENCY VIRUS PATIENTS IN AUCHI, NIGERIA

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ABSTRACT
Aim: Human immunodeficiency virus infection has become pandemic in Nigeria and affects the immune system. Proteins are major components of the immune system and their evaluation gives diagnostic information. We sought to examine serum proteins of HIV seropositve patients in Auchi, Edo State.
Methods: Sixty patients comprising of 40 HIV seropositive and 20 HIV seronegative individuals attending Central Hospital, Auchi, Nigeria were randomly recruited. Serum total protein, albumin and globulin were estimated.
Results: Serum total proteins, albumin and globulin were significantly increased in HIV seropositive individuals while albumin: globulin ratio was significantly decreased when compared with HIV seronegative individuals. There was no significant difference observed in terms of gender.
Conclusion: Serum proteins increase with HIV progression and therefore can be used as a biomarker in the assessment of the progress of the infection.

Key words: Assessment, Serum proteins, HIV infection

INTRODUCTION

Human Immunodeficiency Virus (HIV) infection has reached epidemic proportions in Africa, where increasing numbers of people now die because of Acquired Immune Deficiency Syndrome (AIDS) and malnutrition remains a significant but intriguing consequence of HIV infection (Fenton and Silverman, 2008). Besides factors such as decreased food intake and malabsorption, Human Immunodeficiency Virus infection is typically associated with adverse metabolic events (Gasparis and Tassiopoulos, 2001).Abnormalities in protein, glucose and lipid metabolism have been evident in HIV infected patients since recognition of the AIDS epidemic (Salas-Salvado and Garcia-Lorda, 2001). Although there is consensus that major nutritional changes are rare in clinically stable HIV-infected populations (Faintuch et al., 2006), but opportunistic infections and the host's immune response to the disease can affect metabolic changes directly or indirectly (Sala-Salvado and Garcia – Lorda, 2001). Proteins are linear chains or polymers of amino acids, which are covalently linked by peptide bonds (Rawn, 1989). They are large molecules of varying molecular weight ranging from 1 to 1000kda. Protein functions mainly as transporter of substances within the blood circulation and the defense of the body against tissue damage. Proteins in the plasma or serum are readily accessible and can be analyzed directly to produce diagnostic information in disease state of the patients (Luzio and Thompson, 1990). Nutritional deficiencies influence various components of the immune system. Previous studies has shown the association between nutrition and immunity and focused on generalized protein – energy malnutrition. The extent of immunological impairment depends not only on the severity of malnutrition but also on the presence of infection, among other factors. Deficiencies of protein and its amino acids component, as well as vitamins are associated with reduced immune-incompetence. Dysproteinemic syndromes are found frequently in clinical practice and the determination of the different protein fractions found in the plasma may help in the diagnosis and management of disease. The aim of this study is to assess the serum protein of HIV patients attending the Central Hospital, Auchi, Edo State, Nigeria.

MATERIALS AND METHODS

Study Area
This study was carried out in the Central Hospital, Auchi, Edo State. It is a secondary health institution that serves as a referral centre for other primary health institution.

Sample Collection
A total of 40 HIV Positive patients and 20 apparently healthy controls were used for this study. 5mls of venous blood was collected aseptically into a plain container and allowed to clot. This was spun at 3000rpm for 10minutes to obtain a clear serum which is kept frozen until required for analysis. Ethical approval was obtained from the institution ethical committee.

Biochemical Analysis
Total serum protein and albumin was determined spectrophotometrically using Biuret and bromocresol green methods respectively (Doumas et al., 1981). Serum globulin was calculated by subtracting albumin from total protein. The Albumin Globulin ratio was also determined by dividing Albumin with Globulin. All reagents were products of Randox Laboratories UK. In all test, manufacturer instructions were strictly adhered to.

Statistical Analysis
The groups mean ± SD was calculated for each analyte and significant difference between means evaluated using the student t-test. Statistical Package for Social Science SPSS version 16.0 software (SPSS Inc., Chicago, IL USA) for windows was used, with $P < 0.05$ considered as statistically significant.

RESULTS
The results of our study shows significant increase in total protein, albumin and globulin ($p < 0.05$) but decreased Albumin: Globulin ratio ($p > 0.05$) in HIV seropositive individuals (Table 1). Table 2 and 3 shows the males and females HIV seropositive individuals when compared with the HIV seronegative individuals. There was no gender difference in the serum proteins of HIV individuals when they were compared (Fig 1).

Table 1: Mean ± SD Serum Protein of HIV patients and Control.

Parameters (g/dl)	HIV	Controls	P value
Total Protein	9.53±1.39	6.70±0.50	P =3.18 <0.05
Albumin	4.10±0.92	3.95±0.47	P =0.33< 0.05
Globulin	5.53±1.37	2.75±0.24	P =2.46 <0.05
A/G Ratio	0.74±0.67	1.44±2.0	P =0.53<0.05

Key: A/G = Albumin/Globulin ratio

Table 2: Mean ± SD Serum protein of Males HIV patients and Control.

Parameters (g/dl)	HIV	Controls	P value
Total Proteins	9.62±1.23	6.76±0.58	P =4.40<0.05
Albumin	4.08±1.07	3.96±0.57	P =0.24<0.05
Globulin	5.65±1.25	2.80±0.24	P =2.82<0.05
A/G	0.72±0.86	1.41±2.38	P =0.34<0.05

Table 3: Mean ± SD Serum Protein of Females HIV patients and controls.

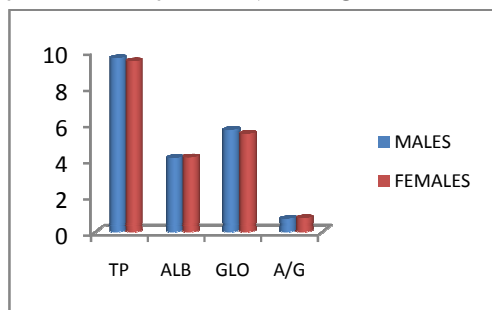| Parameters (g/dl)	HIV	Controls	P value
Total Protein	9.44±1.57	6.63±0.43	P =2.46<0.05
Albumin	4.12±0.77	3.93±0.36	P =0.46<0.05
Globulin	5.42±1.50	2.70±0.24	P =1.46<0.05
A/G	0.76±0.51	1.46±1.5	P =0.71<0.05

Fig 1: Mean ± SD Serum Proteins of Males and Females HIV patients compared.
KEY:
TP = Total Protein
ALB =A lbumin
GLO = Globulin
A/G = Albumin : Globulin

DISCUSSION

Our study showed a relative hyperproteinaemia in HIV seropositive individuals. This hyperproteinaemia was due to hyperglobulinaemia which occur in these individuals. This is in agreement with the findings of Ikekpeazu and his colleague (2012) and Akinpelu et al., (2012). But in contrast with the study of Okpa et al., (2015), who observe a decrease in total protein level in HIV patients. The increased total protein level obtained in our study may be due to increased immunoglobulins as stated by various authors (Lyamuya et al., 1994, Arinola and Igbi 1998, Lyamuya et al., 1999, Arinola et al., 2005). However,the increased immunoglobulins levels may be attributed to polyclonal B-cell activation with advancing disease as earlier reported by Arinola et al., (2005). The polyclonal B- cell activation is induce by viral envelope proteins especially glycoprotein 41 to produce excess abnormal immunoglobulins (Pascale et al., 1997, Arinola et al., 2005). The serum albumin of HIV seropositive patients in our study was observed to be significantly decreased when compared with the control subjects. This is in consonance with the study of Ikekpeazu et al., (2012), Okpa et al., (2015). Mehta et al., (2006) who in their studies associated a serum albumin level of less than 3.5g/dl (35g/l) as a pointer to faster progression of HIV to AIDS. The low albumin levels may be due to malnutrition or chronic inflammation associated with AIDS and HIV infection. This is because albumin is a negative acute phase reactive protein whose levels can possibly be depressed by elevated levels of Tumor Necrosis Factor (TNF) and Interleukin -1 (IL-1) during chronic inflammation (Mehta et al., 2006).

The globulin level of HIV patients in this study is significantly increased when compared with the control individuals. This is in accordance with the study of Serpa et al., (2010), which observed a high level of globulin in HIV patients and attributed this to hypergammaglobulinemia that is induce by HIV infection via polyclonal B-cell activation and spontaneous secretion of immunoglobulins by abnormally activated B- cells. There is a significantly decrease Albumin: Globulin ratio observed in the HIV patients when compared with the control subjects. This may be attributed to the low level of albumin observed in the HIV patients. There was no statistically significant difference observed when the male and female HIV patients were compared. Therefore our study has shown hyperproteinemia in HIV infection as a result of the hyperglobulinemia observed, which has been attributed to polyclonal B-cell activation in HIV seropositive patients.

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