Serum Enzymes Levels in HIV/AIDS Patients in Maiduguri, North-Eastern Nigeria

A.C. Ene, A.A. Gadjzama and E.O. Idigbe

The serum enzymes (i.e., Aspartate and Alanine amino transaminases and Alkaline phosphatase) levels in HIV-1 infected symptomatic/AIDS patients in Maiduguri, North-Eastern Nigeria was studied. The sample population used in this study comprised forty AIDS patients and forty healthy subjects as healthy controls. Five milliliter blood sample was collected by aseptic means after obtaining the consent of the patients and subjects. The two groups were screened for HIV. The 40 AIDS patients were confirmed HIV positive and the forty healthy controls were confirmed HIV negative. The serum enzyme levels in both the AIDS patients and the healthy subjects were assessed by serum assays of Aspartate and alanine amino transaminases and alkaline phosphatase. The results show that there is an elevation in serum enzyme levels in HIV/AIDS patients compared to the healthy subjects. This study is aimed at providing information which will help in managing HIV/AIDS patients.

Key words: AIDS patients, healthy subjects, serum enzyme levels

1Nigerian Institute of Medical Research, Maiduguri Outstation P.M.B. 1293, Maiduguri, Nigeria
2Department of Chemical Pathology, University of Maiduguri, P.M.B. 1069 Maiduguri, Nigeria
3Nigerian Institute of Medical Research, P.M.B 2013, Yaba Lagos, Nigeria
INTRODUCTION

The Acquired Immuno Deficiency Syndrome (AIDS) became a clearly defined clinical entity in the early 1980’s, with the number and distribution of cases rapidly achieving pandemic proportions. Yet, the cause of the clinical syndrome remained a mystery until the Human Immunodeficiency Virus (HIV), initially termed LAV (Lymphadenopathy-associated virus) or HTLV-111 was identified as the causative agent of AIDS in 1983 (Barre-Sinoussi et al., 1983).

This virus infects and destroys specialized cells of the immune system, leading to a profound depression of natural immunity. This break-through opened the door for an intense scientific effort to unravel the intricacies of the pathogenesis and dynamics of HIV infection.

The clinical course of HIV infection varies extensively between individuals, but there are, however, unifying characteristics. Primary infection defined as the period during which HIV infection is established in the host, is characterized in 30-70% of patients by a systemic illness including fever, headache, rash, pharyngitis, gastrointestinal disturbances and Lymphadenopathy (Cooper et al., 1985; Schacker et al., 1996). Subsequently, an asymptomatic phase follows, which varies in length, before the development of the final phase which is characterized by the protean effects of severe immunodeficiency, involving numerous opportunistic infections which target multiple organ systems resulting in morbidity and mortality. The pathogenesis of HIV infection is related to the virus’s destructive effects on the host’s immune system. With advances in the ability to measure virus activity in an HIV-infected host and applying these measurements to a range of clinical studies, the pathogenic relationship between the virus and the host immune system has become better defined (Ho et al., 1987).

Since the discovery of the HIV disease in the early 1980’s, many scientific researches have been going on in this area, to find a breakthrough in the treatment and control of this disease. In a study carried out by Viroj (2001), the level of alkaline phosphatase in some sick hospitalized Thai patients was determined. From this study, it was observed that there is high serum ALP levels in the patients that have obstructive biliary diseases, infiltrative liver diseases, sepsis and HIV virus.

To the best of our knowledge, no similar study has been carried out in this part of Nigeria. Therefore, this study aims at evaluating the serum enzyme levels in HIV/AIDS patients in Mauduguri-North Eastern Nigeria.

MATERIALS AND METHODS

The sample population comprised forty AIDS patients and 40 healthy subjects as healthy controls. The collection of blood samples lasted for about one month. Five milliliter venous blood acquired aseptically and serum was separated immediately after clot and stored at -20°C. The blood samples were collected from the patients and healthy subjects after obtaining their consent. The two groups were screened for HIV using Rapid capillus method (Des Jarlats, 1984). The HIV was confirmed by the Method of Determine (National Committee for Clinical Lab. Standards, 1993).

Biochemical determination of the serum activities of aspartate and alanine transaminases (AST and ALT) were by spectrophotometric method of Bergmeyer et al. (1986), while alkaline phosphatase was determined by spectrophotometric nitrophenol method of Tietz (1983).

The mean values of the results of the serum enzyme assay of the AIDS patients and healthy subjects were compared using independent t-test (SPSS ver. 11.0). The level of significance was set at p<0.05.

RESULTS AND DISCUSSION

The mean±serum enzymes i.e., aspartate amino transaminase (AST), alanine amino transaminase (ALT) and alkaline phosphatase (ALP) levels were significantly elevated (p<0.05) in the HIV/AIDS patients compared to the healthy control subjects (Table 1).

In a similar study carried out by Oguru et al. (2005), hepatic functions were assessed by serum activities of alanine amino transaminase (ALT), aspartate amino transaminase (AST), alkaline phosphatase (ALP) and some other biochemical parameters in 51 HIV-1 AIDS patients, 38 HIV-1 infected asymptomatic patients and 56 healthy HIV negative controls. From their results, it was observed that the serum enzyme levels were significantly elevated (p<0.001) in the AIDS patients and the HIV-1 infected patients compared to the healthy negative controls.

Table 1: Enzyme levels in AIDS patients and healthy subjects

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Level measured in healthy subjects (IU L⁻¹)</th>
<th>Level measured in AIDS patients (IU L⁻¹)</th>
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<tr>
<td>Aspartate amino transaminase (AST)</td>
<td>10.90±4.57&lt;sup&gt;a&lt;/sup&gt;</td>
<td>22.50±25.07&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>Alanine amino transaminase (AST)</td>
<td>2.05±2.06&lt;sup&gt;d&lt;/sup&gt;</td>
<td>5.20±4.46&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Alkaline phosphatase (ALP)</td>
<td>53.50±12.61&lt;sup&gt;d&lt;/sup&gt;</td>
<td>84.00±55.90&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
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Values are presented as mean±standard deviation (n = 40), All groups are compared to each other at p<0.05. Values with different superscripts along a horizontal column are statistically different.
After the infection with HIV virus, the people manifest many biochemical changes, which are very important to measure the condition of the patient. The parameters that are important in this context are the enzymes such as the alkaline phosphatase (ALP), alanine amino transaminase (ALT) and aspartate amino transaminase (AST). Upon infection with this HIV virus, the virus begins to propagate and destroys lots of CD4 cells. This gives way to opportunistic infections which causes the rise in the levels of the various enzymes (Sax et al., 1995).

With the development of AIDS, the enzyme level changes significantly. Among the above enzymes, the alkaline phosphatase is membrane bound enzyme located in the bile canalicular pole of the hepatocyte. It was described that there is an elevation in serum alkaline phosphatase levels in patients with hepatobiliary infection and HIV (Maldonado et al., 1998).

CONCLUSIONS

These results provide evidence to suggest that there is hepatic damage in AIDS patients. This information obtained from this study will help in managing AIDS patients.

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REFERENCES


