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Original Research Article

An Investigation into some Biochemical Parameters (Alanine and Aspartate Aminotransaminase) of HIV Patients attending Clinic in ESUT Teaching Hospital Parklane, Enugu, Nigeria

P.Ikeyi Adachukwu*, O.Ogbonna Ann and Chioma Udenze Chinenyem

Department of Science Laboratory Technology, Institute of Management and Technology (IMT), Enugu, Nigeria
Corresponding author

A B S T R A C T

HIV is an extremely important issue that threatens human health. The purpose of this study was to investigate the levels of some biochemical parameters (alanine and aspartate aminotransaminase) among HIV Patients attending HIV clinic in ESUT Teaching Hospital Parklane, Enugu. The set objective was to assess alanine and aspartate aminotransaminase levels of HIV patients, using anti retroviral drugs and patients not using anti retorviral drugs, to examine the semographic factors affecting the aspartate and alanine aminotrasaminase levels of patients on anti retroviral drugs and to make recommendation for further studies. Related literatures were reviewed in line with set objectives. The research method was purely an experimental research with SPSS data analyses used. The sample size was 100 (50 patients on drug and 50 patients not on drugs) which were selected with non probability sampling technique. Ethical considerations were ensured which include authorization letter, principle of voluntary participation was observed and confidentiality of result obtained was ensured. The findings showed that aspartate aminotransaminase level of patients on drug mean value was 13.5 ±7.6 while 12% of them increased above normal range and that of those not on drug was 16.3 ± 8.5 while 10% of them increased above normal range value. Alanine level of patients on drug mean value was 6.9 ± 5.9 while 10% of them increased above normal range and those not on drugs were 7.4 ±4.2 while 8% of them increase above normal range. The researchers therefore suggest that HIV affects liver enzymes of both patients on anti retroviral drugs and those not on drugs. The effect of the virus is dependent on these factors; duration the person has been infected, the time the drugs was started and clinical compositions of some HIV drugs. Recommendations were made for effective publicity to encourage the masses on HIV screening in order to detect the Virus and start the drug on time, health workers should ensure proper liver function test before commencement of anti-retroviral drugs and follow them up. Finally, further studies should be carried out on this topic to fill the exposed gap.

Keywords

HIV;
Retroviral drugs;
Semographic factors;
ALT and AST.

Introduction

According to Kumer, (2010) Acquired Immuno Deficiency Syndrome (AIDS) is a disease caused by the retrovirus human immune deficiency virus (HIV) and

characterized by immune suppression that leads to opportunistic infections, secondary neoplasms and neoplasms and neurologic manifestations. At the end of 2006 more than a million case of AIDS had been reported in the United States, where AIDS is the secondary leading cause of death in men between 25 and 44 years and the third leading cause of death in women of the same age. It was reported that more than 190 countries around the world, and the pool of HIV infected persons in Africa and Asia is large and expanding. By the year 2006, HIV had infected 60 million people worldwide, and nearly 20 million adult and children have died of the disease there are about 33 million people living with HIV, of who 60% are in Africa and over 20% in Asia. The prevalence rate in adult is 8%. It is estimated that 2.5 million people were newly infected with HIV in 2006, and 2.1 million deaths were caused by AIDS in that year alone.

Acquired Immuno Deficiency Syndrome (AIDS) is caused by Human Immuno Deficiency Virus (HIV), a non-transforming human retrovirus belonging to the lentivirus family. Included in this group are two genetically different but related forms of HIV called HIV 1 and HIV2 isolated from patients. HIV 1 is the commonest type associated with AIDS in the United States, Europe, Central Africa, Whereas HIV 2 causes a similar disease principally in West Africa and India (Farrell 2002).

Materials and Methods

Material used

Cotton wool, Methylated spirit, Syringes and Needles, Hand Gloves, Authomatic Micropipette, 10ml pipette, Pipette Filter, Glass test tube, Metal rack, Gallenkamp Water bath, Gallenkamp Spectrophotometer, Distilled water, Chikpas Centrifuge, Thermocool Refrigerator and Sodium Hydroxide solution (0.4mol/l).

Collection and preparation of sample for alt and ast assay

Blood (2.5mls) was collected from each volunteer by venepuncture. The blood was allowed to clot and then centrifuged at 5000 rpm for 10 minutes. The top golden yellow serum was separated from the cell into a clean, dry and anti-coagulant free bottle. It was stored frozen at 20^{o}C till use.

Preparation of reagents

The reagents used were Commercial Analytical Kits from (Randox Laboratories United Kingdom and QCA). These commercial kits were purchased and used according to the manufacturer's direction for all parameters assayed.

Determination of alanine aminotransaminase (alt) and aspartate aminotransaminase (AST)

ALT and AST activities were assayed using (Reitman and Frankel 1957) and (Reitman and Schmidt 2006). Quimica Clinica Applicada and Randox test kits

Precautions

The reagent was used for diagnostic procedure only. Mouth was not used to pipette reagent or sample. The reagents and samples were preserved or stored in the refrigerator with accurate temperature (+2 to 18 ^{o}C).

Ingestion and contact of the body with sample or reagent was avoided. Instruments were checked both for setting and light source. All equipment used was well cleaned and the research work was assisted by Laboratory scientists.

Method of data analysis

Data was analyzed using SPSS statistical presentation in frequency and percentages.

Ethical consideration

The following issues were considered:

Authorization letter was collected from the head of Department of the Institution which introduced the researchers to the Hospital Ethical board for permission to carry out the research work.
The researcher used the principle of voluntary participation and confidentiality in the study.
The researcher respected the right of the patient by withholding the identity obtained from them and kept the information confidential.

Population

It comprises all the people living with HIV (PLWHIV) attending HIV clinic at ESUT Teaching Hospital, Enugu with the sample size of 100 (50 patients on drugs and 50 patient not on drugs).

Results and Discussion

The groups used for the study were people living with HIV (PLWHIV). The groups were both male and female subjects. The total number of the population was 100, first group were 50 patients on drug while the second were 50 patients not on drug. The subjects were in various infection stages. All the subjects aged between 6 months to 70 years and above.

Liver enzyme elevations are common in human immunodeficiency virus (HIV) infected patients. Their diagnosis or management may be difficult because of the intricacies of the pathogenic mechanisms involved. From this study it was observed that the mean value of aspartate aminotransferase for patients on drug was 13.5±7.6 with 12% of them above normal while for patients not on drugs was 16.3 ± 8.5 with 10% of them above normal range.

The mean value of alanine aminotransferase for patient on drugs was 6.9± 5.9 with 10% of them above normal while for patients not on drug was 7.4 ± 4.2 with 8% of them above normal range. The result showed that both parameters were increased in the serum of a good number of the patients, not withstanding if they were on drug or not. This result agrees with the study done by (Holme and Peck, 2007) who reported that HIV affects about 15% of aspartate aminotrasferase and 10% of alanine aminotransferase of an infected patient. In comparism of both parameters (alanine and aspartate aminotransaminase) on patients using antiretroviral drug and those not on drugs. The findings showed that the parameters were increased higher on the patients on anti-retroviral drugs than on those not on drugs. It was also observed that aspartate aminotransaminase was significantly higher in percentages both on persons on drug and those not on drugs than in alanine aminotransaminase. This also agrees with the study done by (Wyle's, 2008) who said that aspartate

Table.1 showing the age groups in frequency and percentages with their mean value N=50

Age group	Those on drug		Those not on drug	
	Frequency	Percentage %	Frequency	Percentage%
Under 5yrs	1	2.0	4	8.0
6 – 19yrs	1	2.0	3	6.0
20 – 29yrs	14	28.0	21	42.0
30 -39yrs	22	44.0	12	24.0
40 -49yrs	6	12.0	8	16.0
50 – 59yrs	5	10.0	2	4.0
70 & above	1	2.0	0	0.0
Total	50	100.0	50	100.0

Mean age of those on drug = 35.6± 12.2yrs
Mean age of those not on drug = 33.8 ± 12.7yrs

Table.2 Aspartate Aminotransaminase level of patients with their mean values. N=50

Range	Those on drug		Those not on drug	
	Frequency	Percentage %	Frequency	Percentage%
Normal (3 -18)iu/L	43	86.0	40	80
Below normal (0.3 – 2.9iu/L)	1	2.0	0	0
Above normal (19 – 38iu/L)	6	12.0	10	20
Total	50	100.0	50	100.0

AST mean of (those on drug) = 13.5± 7.6 yrs
ALT mean of (those not on drug) = 16.3 ± 8.5yrs

Table.3 Alanine Aminotransaminase level of Patients with their Mean Values. N=50

Range	Those on drug		Those not on drug	
	Frequency	Percentage %	Frequency	Percentage%
Normal (3 – 15iu/L) below normal	44	88.0	45	90.0
(0.3 -2.9iu/L)	1	2.0	1	2.0
Above normal	5	10.0	4	8.0
(15.30 iu/L)				
Total	50	100.0	50	100.0

ALT mean of patients on drug = 6.9 ± 5.9
ALT mean of those not on drug = 7.4 ±4.2

Table.4 Sex status of patients both on drugs and those on drugs

Range	Those on drug		Those not on drug	
	Frequency	Percentage %	Frequency	Percentage%
Male	19	38.0	15	30.0
Female	31	62.0	35	70.0
Total	50	100.0	50	100.0

Males on drug = 38%
Females on drug = 62%
Males not on drug = 30%
Females not on drug = 70%

aminotransaminase are mostly increased on HIV patients especially when they are taking anti retroviral drugs.

Moreso, in examining the demographic factors that affect these parameters (aspartate and alanine aminotransaminase) the result of this investigation showed that there was no significant difference in the mean value of both sex and age of the subjects studied but there was slight effect on children than adults. The finding agrees with the studies of (Murray *et al.*, 2005) which showed that children are vulnerable age groups in the biochemical changes of liver enzymes.

In summary, the serum levels of aspartate and alanine aminotransaminases have been implicated in this study as biochemical indices or biochemical makers of HIV patients. Based on these findings, it could be suggested that HIV affects biochemical parameters (aspartate and alanine aminotransaminase) of patient on antirrtroviral drugs and those not on drugs. The effect of HIV on aspartate and alanine aminotransaminase levels are dependent on the length of time the victim has been placed on antiretroviral drugs. Also, other undiagnosed diseases the person has may also lead to these biochemical changes on HIV patients. Sex of individuals has no effect on the aspartate and alanine aminotransaminase levels however, HIV was observed to be more in female than in males of the population studied. Age has little or no effect in aspartate and alanine aminotransaminase but an increase was observed in the children than in the adults of the population studied. Antiretroviral drug could also lead to tissue damage resulting to elevation of liver enzymes (Nelson *et al*., 2002). Early recognition and diagnosis of hepatic problems will facilitate safe and effective use of antiretroviral drugs and embrace survival of HIV patients.

Recommendation

It is therefore recommended that

Information should be provided to the public by the government to go for HIV screening in order to detect the virus on time.

Government should declare free HIV screening day and sponsor the service.

Health workers should carryout liver function test before starting antiretroviral drugs on patients and follow up those on drugs.

It is also recommended that further studies should be done on this topic which will involve a larger population to fill the gaps that were exposed.

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