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Original Research Paper

Biochemistry

LIVER ENZYMES AND LIPID PROFILE: MARKERS FOR DISEASE MANAGEMENT IN HIV/AIDS PATIENTS ON ART AND ART- NAIVE.

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ABSTRACT

Introduction: AIDS is a fatal illness caused by HIV. Antiretroviral therapy can cause dyslipidemia and liver disease.
Aim: To evaluate liver enzymes and lipid profile in 200 HIV/AIDS patients and compare these in HIV /AIDS patients on ART and ART- naive.
Results: The mean AST, ALT and ALP in the ART group were 58.93±89.19, 66.08±121.34 and 113.81±51.63 respectively as compared to 34.64± 24.69, 33.18 ± 23.40 and 120.22 ±125.41 respectively in the ART-naive group. The mean Cholesterol, TG, VLDL, LDL and HDL in the ART-group were 161.55 ±77.33, 209.92 ±93.29, 38.82 ±13.93, 63.97 ±28.54 and 48.52 ±16.31 respectively compared to 138.65 ± 41.87,178.02 ±81.32 ,34.17 ± 14.35, 58.50 ± 33.02 and 46.53 ± 16.25 respectively in the ART-naive group.
Conclusion: Timely assessment of liver enzymes and lipid profile will help in better subsequent management of the HIV/AIDS patients.

KEYWORDS : HIV/AIDS, Liver enzymes, lipid profile

INTRODUCTION

The Acquired Immunodeficiency Syndrome (AIDS) is a fatal illness caused by a retrovirus known as the Human Immunodeficiency Virus (HIV) that breaks down the body's immune system, progressively leads to AIDS. [1] The transmission route is still predominantly sexual (87.4%); other routes of transmission by order of proportion include prenatal (4.7%), unsafe blood and blood products (1.7%), infected needles and syringes (1.8%) and unspecified routes of transmission (4.1%).[2]

HAART (Highly Active Antiretroviral Therapy) can cause severe dyslipidemia especially regimen including protease inhibitors.[3] Antiretroviral therapy can induce raised levels of total cholesterol (TC), low density lipoprotein-cholesterol (LDL-c) and triglycerides (TG), and variable effects on high density lipoprotein-cholesterol (HDL-c) levels.[4] Hypertriglyceridaemia was the first dyslipidaemia to be reported in HIV infected patients, but other lipid abnormalities such as hypercholesterolemia or hypo HDL cholesterolaemia have also been reported. Although immunological dysfunction is common to all AIDS patients, the clinical spectrum of HIV infection is diverse and multiple organ involvement is frequently evident.[5]

Liver disease has been linked to HIV infection and may manifest as fever of unknown origin, hepatomegaly or sub-clinical abnormalities in liver function tests.[6,7]

In view of the increasing incidence of HIV infection, the present study was undertaken to evaluate the liver enzymes and lipid profile in HIV/AIDS patients and to compare these in HIV /AIDS patients on ART and in those who were ART- naive (freshly diagnosed HIV positive patients who were yet to be started on ART).

AIMS AND OBJECTIVES

1. To evaluate lipid profile (Cholesterol, Triglycerides, HDL, LDL and VLDL) in 200 HIV/AIDS patients.
2. To compare liver enzymes in 100 HIV/AIDS patients on antiretroviral therapy with 100 HIV/AIDS patients who are antiretroviral therapy-naive.
3. To compare lipid profile in 100 HIV/AIDS patients on antiretroviral therapy with 100 HIV/AIDS patients who are antiretroviral therapy-naive.

MATERIAL AND METHODS

The present study was conducted in the Department of Biochemistry on 200 HIV/AIDS patients ≥ 15 years of age visiting the ART Clinic, Rajindra Hospital, Patiala. These patients were diagnosed HIV positive as per NACO guidelines (2003).[8]

Patients were further divided into two groups –
Group I: Those on ART therapy (n=100)
Group II: Those ART- naive (n=100)

Exclusion criteria: HIV/AIDS patients with known history of cardiovascular disease, liver disease and other chronic illnesses; and < 15 years of age.

SAMPLE COLLECTION:

5 ml of fasting blood sample was collected in plain vacutainers from these patients and centrifuged. The serum separated was used for analysis of lipid profile and liver enzymes in the laboratory.

Lipid profile and liver enzymes were evaluated on fully automated Biochemistry analyzer EM 360.

Statistical analysis was done using Statistical package for the Social sciences (SPSS Cary, NC, USA) version 10.0. p value < 0.05 was considered as significant.

RESULTS

Of the total 200 HIV/AIDS patients, there were 128 males (64%) and 72 females (36%). The mean age (in years) of the HIV/AIDS patients on ART was 38.50 ± 5.60 which was comparable to the mean age of 37.42 ± 6.62 of HIV/AIDS patients who were ART naive. Analysis of the liver enzymes in the above 200 HIV/AIDS patients revealed that AST levels were raised above normal range in 109 patients (54.5%); ALT levels were raised in 94 patients (47%) and 49 patients (24.5%) had raised levels of ALP.

Analysis of lipid profile in these 200 HIV/AIDS patients revealed that 23 patients (11.5%) had hypercholesterolemia; 124 patients (62%) had hypertriglyceridemia; 37 patients (18.7%) had HDL levels below the normal range; LDL and VLDL levels were calculation based using Friedwald's formula.

When the two groups i.e. patients on ART (n=100) were compared with patients who were ART-naive (n=100), it was observed that the mean AST levels (IU/L) in the ART group were 58.93 ± 89.19 as compared to 34.64 ± 24.69 in the ART-naive group and the difference was statistically significant (p=0.009). The mean ALT levels (IU/L) in the ART group were 66.08 ± 121.34 as compared to 33.18 ± 23.40 in the ART-naive group and the difference was statistically significant (p= 0.008). The mean ALP levels (IU/L) in the ART group were 113.81 ± 51.63 compared to 120.22 ± 125.41 in the ART- naive group and the difference was statistically non-significant (p=0.637).

The mean Serum Cholesterol levels (mg/ dl) in the ART-group were

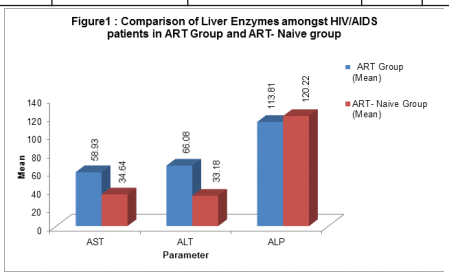
161.55 ± 77.33 compared to 138.65 ± 41.87 in the ART-naive group and the difference was statistically significant (p=0.010). The mean Serum Triglycerides (mg/dl) in the ART group were 209.92 ± 93.29 as compared to 178.02 ± 81.32 in the ART- naive group and the difference was statistically significant (p= 0.011). The mean VLDL levels (mg/dl) in the ART group were 38.82 ± 13.93 compared to 34.17 ± 14.35 in the ART – naive group and the difference was statistically significant (p=0.025). The mean LDL levels (mg/dl) in the ART group were 63.97 ± 28.54 compared to 58.50 ± 33.02 in the ART-naive group but the difference did not attain statistical significance (p= 0.223). The mean HDL levels (mg/dl) in the ART group were 48.52 ± 16.31 compared to 46.53± 16.25 in the ART-naive patients but the difference was statistically non-significant (p= 0.39).

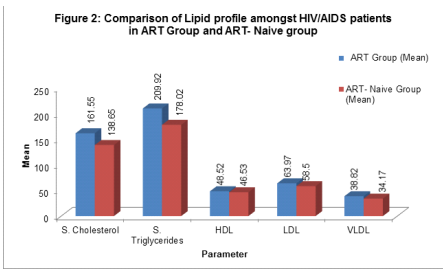
Table 1: Comparison of Liver Enzymes amongst HIV/AIDS patients in ART Group and ART- Naive group

Parameter	ART Group (n=100) Mean ± SD	ART- naive Group (n=100) Mean± SD	p value	Significance
AST	58.93 ± 89.19	34.64 ± 24.69	0.009	S
ALT	66.08 ± 121.34	33.18 ± 23.40	0.008	S
ALP	113.81 ± 51.63	120.22 ± 125.4	0.637	NS

Table 2: Comparison of Lipid profile amongst HIV/AIDS patients in ART Group and ART- Naive group

Parameter	ART Group (n=100) Mean ± SD	ART- naive Group (n=100) Mean± SD	p v alue	Significan ce
S. Cholesterol	161.55 ± 77.33	138.65 ± 41.87	0.010	S
S. Triglycerides	209.92 ± 93.29	178.02 ± 81.32	0.011	S
HDL	48.52 ± 16.31	46.53 ± 16.25	0.39	NS
LDL	63.97 ± 28.54	58.50 ± 33.02	0.223	NS
VLDL	38.82 ± 13.93	34.17 ± 14.35	0.025	S





DISCUSSION

The present study showed a rise in the AST and ALT levels in patients of HIV/AIDS and the rise was more in patients who were on ART than those who were ART-naive. The increase in the liver enzymes in HIV/AIDS patients is attributed to HIV which directly activates hepatic stellate cells via the gp 120 receptor, activating metabolic pathways resulting in Reactive oxygen species (ROS).[9] The levels are more increased in HIV/AIDS patients on ART as various HIV medications can cause mitochondrial toxicity and oxidative stress.[10] Our findings are consistent with the findings of study by Pakhale MR et al who also observed a rise in liver enzymes in HIV/AIDS patients.[11]

There is dyslipidemia in HIV/AIDS patients which is more in patients on ART than those who are ART-naive. There is increase in the levels of S. Cholesterol, Triglycerides, LDL and VLDL. Many studies such as those by Grunfeld et al (1991),[11] Pakhale MR et al (2015)[12] have shown similar findings of hypertriglyceridemia as in our study.

The increased levels of triglycerides in AIDS can be attributed primarily to an increase in VLDL and also to subsequent increase in IFN which decrease the clearance of triglycerides. Hypertriglyceridemia was more in patients on ART as ART medications increase the hepatic triglyceride synthesis by increased expression of key enzymes involved in its synthesis. There is impaired uptake of triglycerides in the adipocytes which leads to increase in their levels.[13]

CONCLUSION

The present study shows that HIV infection itself and the antiretroviral therapy for AIDS affects the liver function as well as alters the lipid profile leading to dyslipidemia which is more in patients on ART than those who are ART- naive. Therefore, it is recommended to assess liver enzymes as well as lipid profile at the time of diagnosis of HIV/AIDS and also at the start of ART therapy and then to be followed at 3-6 months after ART initiation or when ART regimen is changed. Wherever possible, the antiretroviral therapy which is least likely to affect the liver function as well as lipid profile should be chosen. This will help reduce incidence of liver related diseases and cardiovascular complications that may happen with HIV/AIDS and ART and help in better subsequent management of the HIV infection and AIDS patients.

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