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Original Research Paper

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STUDY OF LIPID PROFILE AND RENAL PROFILE IN HIV PATIENTS ON ANTIRETEROVIRAL THERAPY

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ABSTRACT

OBJECTIVE: TO STUDY LIPID PROFILE AND RENAL PROFILE IN HIV PATIENTS ON ANTIRETEROVIRAL THERAPY.

METHODOLOGY: THIS IS A CROSS SECTIONAL OBSERVATIONAL STUDY CONDUCTED ON HIV PATIENTS,OVER A DURATION OF ONE YEAR FROM NOVEMBER 2014 TO NOVEMBER 2015 IN GMC BHOPAL.

RESULTS: SIGNIFICANT LIPID ABNORMALITIES ARE FOUND IN HIV PATIENTS ON ANTIRETROVIRAL THERAPY ,WHILE THERE WAS NO SIGNIFICANT RENAL ABNORMALITIES DETECTED IN OUR STUDY ON THE SAME SET OF PATIENTS.

CONCLUSION: BASELINE LIPID PROFILE NEED TO BE DONE BEFORE STARTING ANTIRETEROVIRAL THERAPY IN HIV PATIENTS.DIRECT CORELATION WAS FOUND BETWEEN PROTEASE INHIBITORS AND DYSLIPIDEMIA.

KEYWORDS :

INTRODUCTION

Human immunodeficiency Virus (HIV) infection is pandemic world wide.[1] worldwide around 33.3 million people are living with HIV, 30.8 million are adults. In 2009, an estimated 2.6 million new HIV cases occurred. The estimated number of AIDS related deaths in 2009 was estimated to be 1.8 million with adults being 1.6 million.[2] Human immunodeficiency virus patients are often associated with aberration of biochemical parameters like renal profile, liver profile, thyroid profile, thrombocytopenia and severe anemia. Patients with HIV infection were reported to have hypocholesterolaemia with or without hypertriglyceridemia however the mechanism of decrease in cholesterol levels is not known.[4]

In developed countries, the life expectancy of HIV-infected individuals has increased substantially through the implementation of highly active antiretroviral therapy (HAART) in the management of HIV infection.[5-7] The effectiveness of HAART lies in the co administration of different classes of antiretroviral drugs. These therapies target specific mechanisms within the HIV life cycle and providing tighter control of HIV replication than could be achieved with single therapy.[5] The three major classes of HIV drugs currently employed in HAART are the non-nucleoside reverse transcriptase inhibitors (NNRTIs), nucleoside/nucleotide analogue reverse transcriptase inhibitors (NRTI and NtRTI) and HIV protease inhibitors (PIs).[8]

It is estimated that the scale up of free AntiRetroviral Treatment (ART) since 2004 has saved over 1.5 lakh lives till 2011 by averting deaths due to AIDS-related causes in India. Wider access to ART has led to 29% reduction in estimated annual AIDS-related deaths from 2.07 lakh in 2007 to 1.48 lakh in 2011 highlighting the impact of scale up of free ART services in india.[9]

Studies have been observed when HIV patients are treated with protease inhibitors they tend to exhibit hyperlipidaemia with increase in total cholesterol, triglycerides, low-density lipoproteins and concomitant decrease in high-density cholesterol.[10] Infections can increase serum triglycerides levels by decreasing clearance of circulating lipoprotein levels as process seems to inhibit the lipoprotein lipase activity or stimulating hepatic lipid synthesis through increase in either hepatic fatty acid synthesis or reesterification of fatty acids derived from lipolysis.

Keeping in view of the various biochemical abnormalities associated with lipid metabolism, our research was inclined to assess the lipid profile in HIV positive cases, with an attempt to further elucidate more features of HIV disease which erupts as acquired immunodeficiency syndrome (AIDS) linking any possible involvement of lipid profile in disease progression of AIDS.

The current study is an attempt to examine whether any changes in lipid profile do take in HIV positive patients and those who are taking ART, and whether those changes which are involved could be linked to the development of clinical AIDS with HIV infection. Thus the current study was undertaken to address whether HIV infection and HAART can affect lipid profile status in patients and other biochemical abnormalities.

MATERIALS AND METHODS

Study design

This was a hospital based descriptive cross - sectional study. The study was designed to ascertain the association of dyslipidemia and other biochemical abnormakities among HIV patients. and observe the effect of HAART on status of lipid profile,renal profile of HIV/AIDS patients.

This study was done at ART centre, Department of Medicine, Hamidia Hospital, Gandhi Medical College, Bhopal.

Study duration

The study was conducted between November 2014to November 2015.

Study participants

Study participants were newly diagnosed cases of HIV/AIDS in whom decision about ART was yet to be taken and patients on HAART whose initial lipid profile is available in records.

Inclusion criteria

Those who signed a written informed consent to participate in the study were recruited in the study. All recently diagnosed HIV patients attending HIV clinic at the time of study between age group 20 to 50 years were eligible for inclusion to the study. Both patients on HAART and HAART naive were included in the study.

Exclusion Criterion

- Those who did not gave consent
- Patients who were on HAART less than six months but no baseline lipid profile record available for them.
- HIV patients who were on lipid lowering drugs.
- Patients with long standing history of Diabetes.
- Those who were morbidly obese and,
- Pregnant women.

METHODOLOGY

Study subjects were selected by consecutive enrolment from the patients attending ART centre. Patients were recruited on each clinic day if they met the inclusion criteria and signed a written consent to participate into the study. Those who consented were requested to

come next day in a fasting state for laboratory investigations.

Laboratory investigations

In a fasting state, 5mls of blood samlpes was drawn for determination of lipid profile, Blood Glucose levels and liver function tests, Hb, CD4 count.

Sample were taken at two occasions for lipid profile, First at the time of registration for Baseline values and other one as Follow up at six month.

Dyslipidemia was defined as the presence of any of the following lipid abnomalities: hypercholestrolemia, hypretriglyceridermia, decreasesd HDL, increased LDL, or increased VLDL.

OBSERVATIONS AND RESULTS

Table 1: Number of Male and Female patient

	Male	Female
Sex	162	38

Total 200 patients included in study out of with number of males were 162(81%) while rest 38(19%) patients were female.

Table 2: Showing Age wise distribution of no of patients among different age group.

Age Group	Number of Patients (%)
20-25	37
26-30	31
31-35	**39**
36-40	30
41-45	37
46-50	26

Age of patients ranges from 20 to 50 years with mean age being (±SEM) 34.85±2.46 years.

Highest number of patients (39) belonged to 31-35 years of age group followed by 20-25 and 41-45 years age group, 26-30(31 patients) and 46-50 (26 patients.

Table 3: Showing Distribution of patient in HAART Naïve Group and HAART treated group along with different regimes of ART.

	HAART NAÏVE (%)	PATIENTS ON HAART(%)			
		Category I	Category Ia	Category II	Category III
REGIME	51(25.5%)	21(10.5%)	10(5%)	114(57%)	4(2%)

Out of all 200 patients 51 registered patient were HAART naïve and never started ART during study.

While total 149 patients were kept on different categories of HAART with highest number of patients in Category II (114 patients), followed by Category I (21 patients), Category Ia (with 10 patients) and Category III with smallest 4 number of patients.

Evaluation of Lipid profile for Baseline (0 month) and Follow up values (6 month) in HAART Naïve patients(n=51)

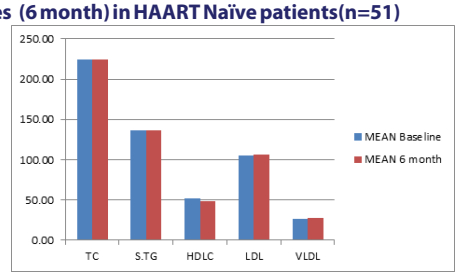

Figure: Depicting status of lipid profile parameters TC, S.TG, HDLC, LDLC, VLDL at Baseline and follow up evaluations.

Association between Parameters of lipid profile and CD4 count

Table 4: Results of Multiple regression analysis CD4 count as independent variable taking TC, S.TG, HDL, LDL and VLDL being dependent variable.

Lipid Parameters	Standard Error	R Square	p Value
TC	0.9155	0.2382	**p<0.0001**
S.TG	0.9833	0.1057	p>0.05
HDL	1.5056	0.0969	**p<0.0005**
LDL	1.2936	0.0382	**p<0.001**
VLDL	1.443	0.1601	p>0.05

Multivariate Regression Analysis where n=200 in each variable group, and CD4 count as independent variable taking TC, S.TG, HDL, LDL and VLDL being dependent variable.

On multivariate analysis correlation between CD4 count and Total Cholesterol, HDL and LDL was established with R^2 being 0.2382(p<0.0001), 0.0969(p<0.0005) and 0.0382 (p<0.001).

DISCUSSION

This study was conducted among HIV patients at ART Centre, Department of Medicine, Gandhi Medical College & Hamidia Hospital, Bhopal with the aim of assessing the changes in lipid profile in this population. Both patients on HAART and HAART naïve were studied.

On top of the effect of HAART and the HIV virus itself; the dyslipidaemia could also be explained in part by wrong eating habits among HIV affected patients. A common practice in the local population is to encourage HIV patients to 'over-feed' on rich foods so that they mantain their weight and improve immunity In the past 'Thin subjects' were social stigma and still is. Thus HIV patients strive to get nutritional support and use food supplements. This may lead to overweight and dyslipidaemia.,

The prevalence of hypercholesterolaemia of 42% in this study is higher than that reported by ***Swai et al***(1993) in a general multiregional survey 5%-19%.[164] However the current study is from a specified group of HIV affected patients. It is possible that a factor related to HIV disease and its treatment is responsible for increased hypercholesterolemia.

The prevalence of hypercholesterolemia in the current study is much higher than the one reported by ***Amstong et al*** in Dar es salaam among HIV patients who were not on HAART 14%[149] The difference with the current study which constituted the patients who were on HAART\and HAART naive perhaps suggest an additional effect of HAART in causation of hypercholesterolemia.

Prevalence of hypertriglyceridemia in this study was (36%) with malesand females almost equally affected. The pattern is similar to that which was reported in South Africa HIV patients in which more HIV males had hypertiglyceridemia than females.[163] The prevalence in the current study was higher than that reported by ***Armstrong et al*** among HIV patients HAART naive 28%.[149] However the prevalence is lower than that was reported by ***Anastos et al*** in which he reported the prevalence to be 48%.[166] The difference in prevalence from the current study could be due smaller sample size in the current study as compared to **Anastos et al**. High triglyerides levels in HIV patients has been postulated to be due to inflammation with subsequent cytokines release and decreased hepatic clearance related to a role of apolipoprotein E.

Elevated LDL occurred in 53% of the study subjects being significantly higher in females than in males. The prevalence is lower than that which was reported by **Armstrong *et al.* (2011)** in urban

Dar es salaam among HIV patients who are not on HAART (67%)[149] The results are lower than that which was reported in Latin American study in which it was found to be 25%.[161] The results from all these studies call for a need for intervention to prevent premature CVD among HIV patients.

Dyslipidemia and HAART status

The prevalence hypercholesterolemia, hypertriglyceridemia, and high LDL were found to be more prevalent among HIV patients on HAART than HAART naïve patients. Even after adjusting for age and sex HAART use remained to be an independent predictor for hypercholesterolemia and hypetriglyceridermia. The similar pattern has been observed among HIV patients in Kenya[145] and in Cameroon.[167] The difference observed among HAART users and HAART naive patients indicate that HAART use has an additive effect to that attributed by the HIV virus itself in causation of hypercholesterolemia, hypertriglyceridemia, and high LDL.

In this study gradual decrease in CD4 count in patient shows negative correlation with increase in lipid profile parameters while positive correlation with decrement in HDL. This correlation was significant for Total cholesterol, HDL and LDL. Although a similar study by **Njoroge** does not showed any correlation. Reason for such deference may be because, analysis was analyzed for CD4 counts below and above 350 cell/microL not by using multivariate analysis method.[168]

SUMMARY AND CONCLUSION

Total number of 200 patient recruited from ART centre from with 51 was not given any ART while in rest 149 patient there was indication for ART and HAART was started. Patients parameters for lipid profile and otheeatr demographic data was analysed against baseline values of follow up values at six month. It was found that:

- Percentage of male and female included in study was 81% and 19% respectively.
- In Age wise distribution for age groups 20-25, 26-30, 31-35, 36-40, 41-45 and 46-50 was 18.5%, 15.5%, 19.5%, 15%, 18.5% and 13%
- In lipid profile significant increase was seen for TC in HAART naïve group($p<0.05$), for TC, S.TG ($p<0.05$) in Regimen I treated patients, same for the Regimen II treated patients, TC ($p<0.005$), S.TG ($p<0.0001$), HDLC ($p<0.05$) in Regimen II treated Patients and for TC, S.TG, HDLc, LDL and VLDL ($p<0.005$, $p<0.005$, $p<0.05$, $p<0.005$, $p<0.05$,) in Regiment III treated patients.
- On Correlation multivariate analysis CD4 count was found to have significant correlation with changes in TC ($p<0.0001$), HDLc (0.0005) and LDL (0.001) respectively.

Thus it can be concluded that HIV infection and ART both derange Lipid profile and increase risk for cardiovascular disease and CD4 count can be use to as parameter for possible Dyslipidemic changes. Patients living with HIV and taking ART should be evaluated and monitored.

Further well structure study in more number of patients is need to consolidate results of this study.

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