

ORIGINAL RESEARCH

Prevalence of dyslipidemia in HIV patients on HAART

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ABSTRACT:

Background: Metabolic effects of HIV infection such as hypertriglyceridemia are well recognized. The present study assessed the prevalence of dyslipidemia in HIV patients on HAART. **Materials & Methods:** This study done on 50 patients (male- 36, female- 14) who were diagnosed HIV seropositive, attending the outpatient department or admitted in the Medicine ward of Government Medical College and associated Guru Nanak Dev Hospital, Amritsar. Lipid profile estimation in the fasting state of fifty normotensive, non-diabetic, and non-obese HIV positive patients was done. **Results:** The mean CD 4 level in males was 356.13 ± 173.17 and in females was 395.35 ± 208.02 . The difference was non-significant ($P > 0.05$). The mean total cholesterol in males was 187.47 mg/dl and in females was 201.42 mg/dl, triglyceride in males was 221.41 mg/dl and in females was 235.5 mg/dl, LDL was 108.2 mg/dl and in females was 122.2 mg/dl, HDL was 33.9 mg/dl in males and 37.6 in females and VLDL was 44.2 mg/dl in males and 47.1 mg/dl in females. The difference was significant ($P < 0.05$). Dyslipidemia was seen in TC in 16 (32%) and HDL in 40 (80%). **Conclusion:** Lipid abnormalities are common in treatment-naïve HIV-infected patients, even in the absence of major host-related risk factors for dyslipidaemia. The combination of hyper-triglyceridemia and low HDL-C is the most consistent abnormality. HIV-infected patients should, therefore, be routinely screened for lipid disorders before commencement of ART, and those found to have dyslipidaemia, should be appropriately treated.

Key words: Dyslipidemia, Lipid, HAART

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INTRODUCTION

World Health Organization (WHO) estimated that 36.7 million people are living with HIV infection globally. WHO has identified HIV/AIDS (acquired immunodeficiency syndrome) as one of the world's first health emergency and an urgent threat to global public health. An estimated 0.8% adults aged 15-49 years worldwide is living with HIV. The advent of HAART has modified the natural history of HIV infection through reduction in risks of death associated with the condition and improvement of the quality of life of people living with the infection.¹

It is found that adult HIV prevalence in Punjab is 0.18%. Injection drug use (IDU) contributes significantly to the spread of HIV epidemic in India

which has been one of the leading cause for the rise in number of AIDS cases in Punjab in last few years.² Metabolic effects of HIV infection such as hypertriglyceridemia are well recognized⁵, and side effects of HAART such as dyslipidemia and insulin resistance were described very soon after its introduction. HAART causes increase in TC and low density lipoprotein (LDL).³ However, with protease inhibitors (PIs)-based therapies, HDL levels remain low and hypertriglyceridemia may be seen, giving rise to a distinctly atherogenic lipid profile.⁴ The prevalence of dyslipidemia on HAART individuals in resource-limited settings also has not been well characterized with increasing use of HAART in many countries especially in India, with differing baseline risk factors for cardiovascular disease, it is important to determine

the prevalence of HAART-associated complications, such as dyslipidemia.⁵ The present study assessed the prevalence of dyslipidemia in HIV patients on HAART.

MATERIALS & METHODS

This was a cross sectional study done on 50 patients (male- 36, female- 14) who were diagnosed HIV seropositive, attending the outpatient department or admitted in the Medicine ward of Government Medical College and associated Guru Nanak Dev Hospital, Amritsar. The study was conducted after approval from institutional thesis and ethical committee.

Patients were informed about the study procedure and written informed consent was taken according to the proforma attached. All patients included in the study were evaluated as per proforma given herewith. Lipid profile estimation in the fasting state of fifty normotensive, non-diabetic, and non-obese HIV positive patients was done. A standard questionnaire including a detailed history of present and past medical conditions, family history of medical diseases, previous history of medications, alcohol, drug addiction and

blood or blood product transfusion was taken. Physical examination including general physical examinations, per abdominal examination, cardiovascular examination, respiratory examinations and central nervous system examination was done. Random blood sugar and fasting blood sugar was checked for all study participants. Renal function tests for blood urea nitrogen, serum creatinine, and urine for albumin was also checked. All the cases were investigated for fasting lipid profile. The data was collected systematically and analyzed statistically according to the standard statistical methods.

DISCUSSION

Dyslipidemia is a common problem affecting HIV infected patients receiving antiretroviral therapy. Since publication of preliminary guidelines in 2000, numerous studies have addressed the risk of cardiovascular disease, the mechanisms of dyslipidemia, drug interactions, and the treatment of lipid disorders in HIV-infected patients.⁶

RESULTS

Table I CD 4 level in patients

CD 4	Mean	P value
Males	356.13 ± 173.17	0.50
Females	395.35 ± 208.02	

Table I shows that mean CD 4 level in males was 356.13 ± 173.17 and in females was 395.35 ± 208.02. The difference was non-significant (P > 0.05).

Table II Lipid Profile of patients

Parameters	Males	Females	P value
Cholesterol	187.47 ± 22.45	201.42 ± 18.76	0.04
Triglyceride	221.41 ± 17.96	235.50 ± 21.61	0.02
LDL	108.22 ± 19.05	122.21 ± 14.34	0.01
HDL	33.97 ± 4.19	37.64 ± 5.48	0.01
VLDL	44.28 ± 3.59	47.10 ± 4.32	0.02

Table II shows that mean total cholesterol in males was 187.47 mg/dl and in females was 201.42 mg/dl, triglyceride in males was 221.41 mg/dl and in females was 235.50 mg/dl, LDL was 108.22 mg/dl and in females was 122.21 mg/dl, HDL was 33.97 mg/dl in males and 37.64 in females and VLDL was 44.28 mg/dl in males and 47.10 mg/dl in females. The difference was significant (P < 0.05).

Table III Prevalence of dyslipidemia in patients

Parameters (Mean)	Number	Percentage
Total cholesterol (TC)	16	32%
HDL	40	80%

Table III shows that dyslipidemia was seen in TC in 16 (32%) and HDL in 40 (80%).

Infection with HIV-1 is known to increase plasma TG levels by decreasing the number of circulating lipoproteins, a process considered to be the result of reduced lipoprotein lipase or by stimulating hepatic lipid synthesis through an increase in hepatic fatty acid synthesis or an increase in re-esterification of fatty acid derived from lipolysis.⁷ However, highly active antiretroviral therapy (HAART) also leads to lipid changes with increases in both TGs and TC while increases in TC during therapy may represent a return to pre-infection levels to some degree. HAART is associated with an increased risk of CVD such as myocardial infarction. Few studies have studied lipid profiles of patients on HAART but they were either of short duration or based on a small number of patients (less than 100). Therefore, present study was designed for evaluating lipid profiles for antiretroviral-naïve patients on nucleotide reverse transcriptase inhibitor (NNRTI)-based HAART for medium term. The present study was conducted to assess the prevalence of dyslipidemia in HIV patients on HAART.

In present study, out of 50 patients, males were 36 and females were 14. Amberbir et al⁸ in their study 554 patients were enrolled, 50% at the rural HIV clinic, 72.7% were female. Malapati et al⁹ included 217 patients in their study. Gowdaiah et al¹⁰ had 80 cases and 80 controls who were age and sex matched.

We found that mean FBS level in males was 88.2 mg/dl and in females was 87.6 mg/dl. The mean RBS level in males was 127.1 mg/dl and in females was 126.2 mg/dl. In males mean blood urea level was 25.4 mg/dl and in females was 24.2 mg/dl. The mean serum creatinine level in males was 0.72 mg/dl and in females was 0.67 mg/dl. Malapati et al⁹ found that mean urea at baseline was 4.19 and after 12 weeks was 4.88.

We found that the mean CD 4 level in males was 356.1 and in females was 395.3. Muhammed et al¹¹ found the mean CD 4 cell counts was higher for subjects on HAART compared to HAART naïve 376.33±215.66 and 261.09 ±195.64, respectively (P< 0.001).

We found that mean total cholesterol in males was 187.47 mg/dl and in females was 201.42 mg/dl. The mean triglyceride level was 221.41 mg/dl in males and 235.50 mg/dl in females. The mean LDL level was 108.22 mg/dl in males and 122.21 mg/dl in females. The mean HDL level was 33.97 mg/dl in males and 37.64 mg/dl in females. The mean VLDL level was 44.28 mg/dl in males and 47.10 mg/dl in females. Armstrong et al¹² found that the mean triglyceride (TG) was significantly higher in the HIV-infected patients than in the controls, 176.125 mg/dL vs. 119.225 mg/dL. The HIV-infected patients also had significantly lower mean HDL-C 33.58 mg/dL vs. 48.38 mg/dL. On subgroup analysis in the HIV-infected patients, the mean serum triglyceride and VLDL levels were significantly higher in those with CD 4+ cell count

<200 cells/mm³ compared to those with CD 4+ cell count of 200 to ≥500 cells/mm³.

Nayyar et al¹³ found that a mean cholesterol level of 219.49 was observed in the control group with a mean of 219.29 in the HIV and 200.18 in the AIDS groups. The results were found to be statistically significant. In case of triglycerides also, the results came out to be statistically significant with a mean triglycerides level of 158.23 in the control group against a mean value of 140.88 in the HIV and 167.43 in the AIDS groups.

HIV virus itself, adverse effects of HAART and life style changes such as cigarette smoking post diagnosis predispose HIV patients to increased risk of atherosclerotic heart diseases.¹⁴ The prevalence of traditional cardiovascular disease risk factors such as dyslipidemia, hypertension, diabetes and cigarette smoking is generally higher compared with the general population. The cardiovascular risk factors attributed to HIV virus and/or HAART include hypercholesterolemia. Total cholesterol, LDL and VLDL cholesterol are elevated in HIV population and is attributed by both HIV virus and the use of HAART.

An increase in serum triglycerides levels is observed in HIV-infected patients as the disease progresses, particularly in the presence of opportunistic infections that might be possibly due to an increase in the levels of inflammatory cytokines (tumor necrosis factor alpha, interleukins, and interferon alpha) and steroid hormones. The lower the CD 4+ lymphocyte levels in peripheral blood are seen, the higher are the levels of triglycerides and the lower are the levels of total cholesterol and LDL cholesterol. In contrast, lower levels of LDL cholesterol are found in HIV-infected patients regardless of their CD 4+ T-lymphocyte counts.¹⁵

CONCLUSION

Lipid abnormalities are common in treatment-naïve HIV-infected patients, even in the absence of major host-related risk factors for dyslipidaemia. The combination of hyper-triglyceridemia and low HDL-C is the most consistent abnormality. HIV-infected patients should, therefore, be routinely screened for lipid disorders before commencement of ART, and those found to have dyslipidaemia, should be appropriately treated. Population-based prospective studies are needed to further explore the relationship between lipid profile changes and immunological status of HIV-infected patients.

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