LIPID PROFILE IN ART TREATED AND UNTREATED PATIENTS OF HIV POSITIVE CASES

Prathima Raj Dara[1], Rajendra Prasad Suram[2]

[1]Associate Professor, Department of Medicine, Government Medical College, Nizamabad.
[2]Associate Professor, Department of Medicine, Government Medical College, Nizamabad.

ABSTRACT

AIM

To study the lipid profile in ART treated and untreated patients of HIV positive cases.

MATERIALS AND METHODS

In this study, the patients were divided into HIV seropositive cases (n=74) and healthy non-HIV patients were selected as controls (n=45).

INCLUSION CRITERIA

HIV infected ART treated subjects who were a minimum of three months on medication (<350 cells/cu mm, n=37) and ART untreated patients (>350 cells/cu mm, n=37) were newly diagnosed. Control group was selected of healthy HIV seronegative, non-smokers.

EXCLUSION CRITERIA

Subjects who had hypertension, diabetes mellitus, obesity, alcohol abusers, smokers, and patients who were on multivitamin, antioxidant supplements, and hyperlipidaemic drugs were excluded.

RESULTS

This study consisted of 37 HIV positive ART treated patients, 37 HIV positive ART untreated patients, and 45 healthy seronegative non-HIV patients. The mean CD_4 count in HIV ART untreated subjects was 168.33±2.9 and after three months of treatment, the mean CD_4 count was 250.39±1.7. It was observed that in ART untreated patients, total cholesterol, HDL, and LDL cholesterol was less when compared to controls. In ART treated HIV patients, males were having more total cholesterol, triacylglycerols, and LDL cholesterol when compared to females. In ART untreated HIV patients, males were having more total cholesterol, triacylglycerols, and LDL cholesterol when compared to females.

CONCLUSION

When ART treated or untreated are carefully prescribe an anti-retroviral treatment regime, which will undeniably support in supervision of dyslipidaemia in HIV seropositive patients infected with HIV were constantly screened for lipid abnormalities.

KEYWORDS

HIV, Cholesterol, Serum, Triglycerides.

HOW TO CITE THIS ARTICLE: Dara PR, Suram RP. Lipid profile in art treated and untreated patients of HIV positive cases. J. Evid. Based Med. Healthc. 2016; 3(60), 3229-3232. DOI: 10.18410/jebmh/2016/699

INTRODUCTION: Lipid profile or lipid panel is a panel of blood tests that serves as an initial broad medical screening tool for abnormalities in lipids such as cholesterol and triglycerides. The results of this test can identify certain genetic diseases and can determine approximate risks for cardiovascular disease, certain forms of pancreatitis, and other diseases.[1] Lipid panels are commonly ordered as part of a physical exam along with other panels such as the Complete Blood Count (CBC) and Basic Metabolic Panel (BMP). The lipid profile typically includes Low-Density Lipoprotein (LDL), High-Density Lipoprotein (HDL), Triglycerides, and Total cholesterol. Using these values, a laboratory may also calculate very low-density lipoprotein (VLDL), Cholesterol:HDL ratio.[2] The lipid profile tests are of 7 types namely total lipids, serum total cholesterol, serum HDL cholesterol, total cholesterol/HDL cholesterol ratio, serum triglycerides, serum phospholipids, and electrophoretic fractionation to determination percentage of Chylomicrons, LDL-low density lipoprotein, VLDL-very low density lipoprotein, HDL-high density lipoprotein. Current recommendations for cholesterol testing come from the Adult Treatment Panel (ATP) III guidelines and are based on many large clinical studies such as the Framingham Heart Study. For healthy adults with no cardiovascular risk factors, the ATP III guidelines recommend screening once every five years.[3] A lipid profile may also be ordered at regular intervals to evaluate the success of lipid-lowering drugs such as statins. In the paediatric and adolescent population, lipid testing is not routinely performed. However, the American

Financial or Other, Competing Interest: None.
Submission 19-06-2016, Peer Review 29-06-2016,
Acceptance 15-07-2016, Published 26-07-2016.
Corresponding Author:
Dr. Rajendra Prasad Suram,
Flat No. 201, Vaadapalley Nivas, Rd No. 2,
Prashanthi Nagar, Uppar, Hyderabad-39.
E-mail: rpsuram@gmail.com
DOI: 10.18410/jebmh/2016/699

Academy of paediatrics and NHLBI now recommend that children aged 9-11 be screened once for severe cholesterol abnormalities.[4]

This screening can be valuable to detect genetic diseases such as familial hypercholesterolemia that can be lethal if not treated early. Traditionally, most laboratories have required patients to fast for 9-12 hours before screening. However, recent studies have questioned the utility of fasting before lipid panels and some diagnostic labs now routinely accept non-fasting samples. VLDL may be calculated using the Friedewald's equation: VLDL = Triglycerides/5, VLDL = Total cholesterol - (HDL + LDL). In India, the first case of HIV was diagnosed in 1986. It is a pandemic disease. As per Government of India, it is estimated that 2.4 million people are suffering from HIV infection. Children are estimated about 4.4% under age of 15 years, adults of age between 15-49 years are about 82.4%, and the remaining are 13.2% who are aged above 50 years are suffering from HIV infection. In Andhra Pradesh and Telangana, about 5 lakhs people are suffering from HIV infection.[5,6] In Andhra and Telangana, Guntur District (26.6%) is the highest and the least is Medak District (0.4%) in testing positive for HIV infection. The Antiretroviral Treatment (ART) regime, which consisted of a combination of Nucleoside Reverse Transcriptase Inhibitors (NRTI's), Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI's) and protease inhibitors delay the disease progression, but dyslipidemia is more obvious.[7] The aim of this study is to study the lipid profile pattern in ART treated HIV patients (1st line of treatment i.e. lamivudine, zidovudine, and nevirapine) and comparing them against untreated HIV patients.

MATERIALS AND METHODS: This study was conducted in Government General Hospital, Nizamabad. In this study, the patients were divided into HIV seropositive cases (n=74) and healthy non-HIV patients were selected as controls (n=45).

Inclusion Criteria: HIV infected ART treated subjects who were a minimum of three months on medication (<350 cells/cu mm, n=37) and ART untreated patients (>350 cells/cu mm, n=37) were newly diagnosed. Control group was selected of healthy HIV seronegative, non-smokers.

Exclusion Criteria: Subjects who had hypertension, diabetes mellitus, obesity, alcohol abusers, smokers, and patients who were on multivitamin, antioxidant supplements, and hyperlipidaemic drugs were excluded.

METHODOLOGY: After minimum 8 hours fast, blood was collected. Blood was taken into K2EDTA and fluoride containing test tubes about 5 mL. These blood samples were allowed to settle down for 1 hour and they were centrifuged for 10 minutes at 3000 rpm. Serum was analysed for lipid profile, plasma for CD_4 count, and FPG were done. Fasting plasma glucose was checked by the GOD/POD method.

RESULTS:

Variable	Controls (n=45)
Total Cholesterol (mg/dL)	127.6±3.0
Triacylglycerols (mg/dL)	119.1±12.3
HDL Cholesterol (mg/dL)	39±5.2
LDL Cholesterol (mg/dL)	70.9±1.8

Table 1: Shows the Lipid Profile of Controls

Variable	ART untreated HIV patients, >350 cells/cu mm (n=37)	ART treated HIV patients, <350 cells/cu mm (n=37)	ANNOVA
Total Cholesterol (mg/dL)	111.6±12.08	145.3±8.11	0.000
Triacylglycerols (mg/dL)	158.1±25.7	142.9±5.22	0.000
HDL Cholesterol (mg/dL)	34±4.7	40±1.1	0.000
LDL Cholesterol (mg/dL)	62.4±0.9	120.9±32.7	0.000

Table 2: Shows Lipid Profile in ART Treated Patients

Variable	Males (n=23)	Females (n=14)
Total Cholesterol (mg/dL)	116.2±15.9	110.0±17.6
Triacylglycerols (mg/dL)	167.5±11.1	150.2±18.4
HDL Cholesterol (mg/dL)	33±2.2	35.9±1.8
LDL Cholesterol (mg/dL)	45.4±1.7	35.8±8.3

Table 3: Shows Lipid Profile Between Sexes of HIV Infected ART Untreated

Variable	Males (n=22)	Females (n=15)
Total Cholesterol (mg/dL)	148.5±10.5	145.2±11.2
Triacylglycerols (mg/dL)	144.8±29.9	142.6±10.4
HDL Cholesterol (mg/dL)	39±5.9	40.8±1.5
LDL Cholesterol (mg/dL)	122.8±14.8	119.8±4.8

Table 4: Shows Lipid Profile Between Sexes in HIV Infected ART Treated

This study consisted of 37 HIV positive ART treated patients, 37 HIV positive ART untreated patients, and 45 healthy seronegative non-HIV patients. The mean CD_4 count in HIV ART untreated subjects was 168.33±2.9 and after three months of treatment, the mean CD_4 count was 250.39±1.7. It was observed that in ART untreated patients, total cholesterol, HDL and LDL cholesterol was less when compared to controls. In ART treated HIV patients, males were having more total cholesterol, triacylglycerols, and LDL cholesterol when compared to females. In ART untreated HIV patients, males were having more total cholesterol, triacylglycerols, and LDL cholesterol when compared to females.

DISCUSSION: Many studies have reported lipid profile in HIV patients. Doddigarla Zephy et al[8] from their study, they reported that HAART treated or untreated HIV seropositive cases have dyslipidaemia. In untreated HIV infection, most of the ATP is used in the reverse transcription process in attaining morphism of the host cell. The aim of the study was to find the lipid profile pattern in treated HIV patients after shorter period of time with ART (First line of treatment i.e. zidovudine, lamivudine, and nevirapine) and comparing them against HIV infected untreated individuals and controls within our locality. Subject field of HIV seropositive cases (n=84) and age and sex matched healthy non-HIV cases as controls (n=47). Comparison between the HIV infected (n=42), HIV infected ART treated (n=42), and controls were significant (p 0.000) for fasting cholesterol, triacylglycerols (p 0.000), and HDLc (p 0.000) and LDLc (p 0.000). Insignificant when TAG compared controls to HIV infected ART untreated subjects. Statistical significance in between sexes within untreated patients' lipid profile in HDLc (35±3.8 against 37.4±3.5) and LDLc (48.0±8.3 against 38.0±7.2). Patients infected with HIV, constantly screened for lipid abnormalities when ART treated or untreated and carefully prescribe an antiretroviral treatment regime, which will undeniably support in supervision of dyslipidaemia in HIV seropositive patients in future. Adewole OO et al,[9] conducted a study in which one hundred and thirty HIV positive patients seen in HIV Center in an urban area in Nigeria and 44 matched individuals were recruited. Data were collected on sociodemographic characters, baseline lipid profiles, and CD4 count. Values of lipid parameters were retrieved after 12 months on HAART. The results were the mean Low Density Lipoprotein (LDL) was 2.26+0.9 mmol/L among the test group compared with 0.96+0.39 mmol/L among the control p value = 0.000. The mean High Density Lipoprotein (HDL) was also significantly lower, 0.8+0.6 mmol/L reaching a dyslipidaemic level in the HIV positive group than the control, p value=0.00. Tuberculosis/HIV co-infected patients had a significantly elevated mean LDL, p=0.002. It concluded that abnormality of serum lipid is common among treatment naive HIV patients seen in Nigeria. The NNRTI regimen is associated with elevation of HDL and some stabilisation of TC and TG. T.S. Iffen et al[10] the present study assessed the lipid profile of HIV infected patients attending the University of Calabar Teaching Hospital. Fasting serum levels of Total Cholesterol (TC), High-Density Lipoprotein Cholesterol (HDL-C), Low-Density Lipoprotein Cholesterol (LDL-C), Very Low-Density Lipoprotein Cholesterol (VLDL-C) and Triglyceride (TG) were determined in 60 HIV-positive subjects and 60 age-matched HIV-negative controls. The CD4+ T-lymphocyte counts of the HIV-positive subjects were assessed and the HIV-positive subjects were grouped into three based on their CD4+ levels as follows: Group I (CD4+ count <200 cells/µL); group II (CD4+count 200-499 cells/µL); group III (CD4+count=500 cells/µL). The total cholesterol, HDL-C, LDL-C, VLDL-C, TG, and CD4+ T-lymphocyte for the HIV-positive subjects were 3.64±0.13 mmol/L, 1.02±0.07 mmol/L, 2.29±0.12 mmol/L, 0.34±0.02 mmol/L, 0.84±0.05 mmol/L, and 320.68±39.25 cells/µL, respectively while the TC, HDL-C, LDL-C, VLDL-C, and TG of HIV-negative controls were 3.80±0.10 mmol/L, 1.67±0.07 mmol/L, 1.85± 0.09 mmol/L, 0.29±0.01 mmol/L, and 0.71±0.03 mmol/L, respectively. A higher CD4+ count in the HIV-positive subjects was associated with higher HDL-C ($p<0.05$) while a lower CD4+ count was associated with higher TG and VLDL-C levels ($p<0.05$). Among the three groups classified based on the CD4+ T-lymphocyte count, higher ($p<0.05$) LDL-C, VLDL-C, and TG with lower ($p<0.05$) HDL-C were observed among the HIV positive subjects having CD4+ T-lymphocytes counts of <200 cells/µL compared to the HIV control. No difference ($p>0.05$) in total cholesterol was found between group I and the control group. The results revealed that lipid profile monitoring is as necessary as CD4+ T-lymphocyte count monitoring for the wellbeing of HIV patients in this locality. L Khiangte et al[11] this study has been carried out to find out any correlation between the changes in lipid profile and the progress of HIV infection. The study was conducted at the Regional Institute of Medical Sciences (RIMS), Imphal during period of January 2004 to December 2005 on 50 cases of HIV infected/AIDS patients of which 40 (80%) were males and 10 (20%) were females. Lipid profile, CD_4 lymphocyte count, and other routine investigations were also done for all the patients. The results were that in this study the decrease in mean cholesterol was first abnormality in the lipid profile, which occurred even in early stages of the disease (Stage II) when the CD_4 was >500/mm^3 and gradually decreased further as the CD_4 count decreased due to progression of disease ($p<0.05$). The HDL cholesterol was found to decrease as the disease progressed, which is signified by the decrease in CD_4 count ($p<0.00003$). The LDL level decreased and the mean VLDL level increased with the decrease in CD_4 count. The serum triglyceride level was the last to be affected and hypertriglyceridaemia was found in the late stages of the disease (Stage IV and V) when the CD_4 count was <200/mm, although it showed a tendency to increase as disease progressed and CD_4 count decreased ($p<0.02$). It concluded that lipid profile was altered in HIV infected patients. Indumati V et al[12] in their study they used hundred newly-diagnosed HIV positive patients who were yet to be started on ART were taken as controls (ART-Naive). Hundred randomly selected HIV+ patients who were already on first line ART regimen (stavudine/ zidovudine+ lamivudine+ nevirapine) for more than 12 months were taken as cases

(ART). This study was conducted for a period of 12 months at the VIMS ART Centre, Bellary, Karnataka, India. There was a significant increase ($p<0.001$) in serum total cholesterol, LDL-C, TG, VLDL, Non-HDL-C, and TC/HDL-C ratio in ART patients compared to ART-naive patients. Of the 100 ART patients, 23 had lipodystrophy syndrome (buffalo hump, abnormal fat deposition around neck and back, buccal fat resorption, increase in abdominal fat). To conclude, it is evident from our study that there is increase in lipid profile (except HDL) in ART patients compared to ART naive group and 23 ART patients showed lipodystrophy syndrome. Hence, it appears reasonable to measure fasting lipid levels before and 3-6 months after antiretroviral therapy is initiated or when ART regimen is changed.

CONCLUSION: When ART treated or untreated are carefully prescribe an antiretroviral treatment regime, which will undeniably support in supervision of dyslipidaemia in HIV seropositive patients infected with HIV were constantly screened for lipid abnormalities.

REFERENCES

1. Third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III) final report. Circulation 2002;106(25):3143-3421.
2. Paediatric cardiovascular risk reduction guidelines - NHLBI, NIH.
3. Sidhu D, Naugler C. Fasting time and lipid levels in a community-based population-a cross-sectional study. Archives of Internal Medicine 2012;172(22):1707-1710.
4. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol in plasma without use of the preparative ultracentrifuge. Clin Chem 1972;18(6):499-502.
5. Lakhashe S, Thakar M, Godbole S, et al. HIV infection in India: epidemiology, molecular epidemiology, and pathogenesis. J Biosci 2008;33(4):515-525.
6. http://www.indiafacts.in/health/hivaids-statistics/.
7. AP State AIDS Control Society. Facts, figures, and response to HIV/AIDS in Andhra Pradesh. New Delhi, India: Population Foundation of India 2005.
8. Zephy D, Lakshmi LJ, Ashraff R. Lipid profile among ART treated and untreated patients in HIV positive cases. Arch Med 2015;8:2.
9. Adewole OO, Eze S, Betiku Ye, et al. Lipid profile in HIV/AIDS patients in Nigeria. African Health Sciences 2010;10(2):144-149.
10. Iffen TS, Efobi H, Usoro CAO, et al. Lipid profile of HIV positive patients attending University of Calabar Teaching Hospital, Calabar - Nigeria. World Journal of Medical Sciences 2010;5(4):89-93.
11. Khiangte L, Vidyabati RK, Singh MK, et al. A study of serum lipid profile in Human Immunodeficiency Virus (HIV) infected patients. JIACM 2007;8(4):307-311.
12. Indumati V, Vijay V, Shekhanawar MS, et al. Comparison of serum lipid profile in HIV positive patients on ART with ART naive patients. Journal of Clinical and Diagnostic Research 2014;8(10):CC06-CC09.