Prevalence of Dyslipidemia, Metabolic Syndrome Among Hiv Infected Patients Using Haart

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Abstract
Introduction: To study about Prevalence Of Dyslipidemia, Metabolic Syndrome Among Hiv Infected Patients Using Haart.
Aims And Objective: To study the prevalence of metabolic syndrome, dyslipidemia in HIV infected population and the individual components of metabolic syndrome as well as characteristics of lipid profiles among these patients
Materials And Methods: The study conducted in Government Stanley medical college and hospital from March – July 2015.
Statistical analysis : The data was analyzed using SPSS version 16 and Microsoft Excel 2007
Summary: We can conclude that metabolic syndrome among HIV – infected patients using HAART are significantly associated with longer duration of treatment.The metabolic syndrome positive group among HIV infected patients using HAART have significantly lower CD4 cell counts which was statistically significant. Association between the metabolic syndrome positive group and hypertension, diabetes mellitus, abdominal circumference, triglyceride levels, altered HDL levels were considered to be statistically significant.
Keywords: HAART ,Metabolic syndrome ,dyslipidemia ,CD4 count .

I. Introduction

HIV is one of the leading causes for the burden of diseases worldwide.The advent of HAART (highly active anti retroviral therapy) has improved the quality of life of HIV patients and has prolonged the life of many. Despite these spectacular results, a lot of queries remain and a lot of issues are under debate. The treatment is with the risk of side effects. Metabolic complications of chronic use of highly active anti retroviral therapy include diabetes mellitus, insulin resistance and dyslipidemia. It leads to an increased risk for cardiovascular morbidity and mortality in HIV infected individuals[1]. HIV related lipodystrophy, is a condition with an elevation of plasma triglycerides, total cholesterol, sugar levels and it may develop in HIV infected patients on HAART[2].The characteristics of dyslipidemia in HIV-infected patients receiving HAART include elevated level of total cholesterol (TC), LDL-cholesterol (LDL-c), triglycerides (TG), decreased HDL-cholesterol (HDL-c) and increased triglyceride levels[3]. There is limited information on metabolic syndrome prevalence in HIV-infected patients receiving HAART worldwide, especially in our country. The prevalence of metabolic syndrome and dyslipidemia in resource-limited settings like India has not been well studied. Current World Health Organization (WHO) antiretroviral therapy (ART) guidelines do not recommend that lipid monitoring should be conducted in patients receiving first-line HAART[4-5]. The objective of the present study was to determine the prevalence of metabolic syndrome, dyslipidemia and characteristics of lipid profiles among people living with HIV infection receiving first-line HAART (Lamivudine, Zidovudine, Nevirapine) for more than one year.

II. Aims And Objective

1) To study the prevalence of metabolic syndrome, dyslipidemia in HIV infected population.
2) To study the individual components of metabolic syndrome as well as characteristics of lipid profiles among these patients.

III. Materials And Methods

Patients aged above 18 years, who were HIV seropositive and taking HAART more than one year were included. For all participant members, information regarding socio demography information, body mass index, medical history (including diabetes mellitus, hypertension, renal failure, use of drugs that alter lipid profiles, and

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current use of anti-TB drugs) were compiled. CD4^{+} lymphocyte values were collected. The components of metabolic syndrome were defined according to the modified NCEP-ATP III criteria considering abdominal obesity as per World Health Organization (WHO) guidelines for South Asians. Waist circumference was measured using a non-elastic measuring tape at the highest level of iliac crest with the patient standing with feet 1 foot apart. Systolic and diastolic blood pressure was measured by sphygmomanometer. In all the patients, a peripheral venous blood sample was to be drawn in the morning after 8 - 10 hours of fasting, to measure venous plasma glucose, serum total cholesterol, serum high density lipoprotein (HDL) cholesterol, and serum triglyceride levels. Serum glucose was to be measured by the glucose oxidase method; total cholesterol by cholestrol oxidase peroxidase method; HDL, LDL by PVS PEGME coupled precipitation method, triglycerides by glycerol phosphate oxidase method. The study period is from March – July 2015 conducted in government Stanley medical college.

Inclusion criteria
1) Age more than 18 years.
2) Good ART adherence. (adherence of $\geq$ 95% for the past 6 months)
3) Patients on first line HAART (Lamivudine, Zidovudine, Nevirapine) for one year.

Exclusion criteria
1) Receiving lipid altering therapy like statins and steroids.
2) Pregnant women.
3) Renal failure.
4) Hypothyroidism

IV. Statistical Methods

Data Analysis

The patients were divided into two groups by metabolic syndrome -ve and metabolic syndrome +ve groups. Descriptive statistics was done for all data and were reported in terms of mean values and percentages. Suitable statistical tests of comparison were done. Continuous variables were analyzed with the unpaired t test. Categorical variables were analyzed with chi squared test and Fisher Exact Test. Statistical significance was taken as $P < 0.05$. The data was analyzed using SPSS version 16 and Microsoft Excel 2007.

Case definition
1) Seropositive HIV patients registered in ART clinic, on first line HAART (Lamivudine, Zidovudine, Nevirapine) for one year.
2) Metabolic syndrome was defined as the presence of at least three of the following criteria:
- The cut-off point of waist circumference is $\geq$90 cm in males and $\geq$80 cm in females according to the recommendation by the World Health Organization (WHO) guidelines for South Asians
- Triglycerides $\geq$150 mg/dL or medications for hypertriglyceridemia.
- HDL-C < 40 mg/dL in males or <50 mg/dL in females or medications for low HDL-C.
- Blood pressure $\geq$130/85 mmHg or medications for hypertension
- Fasting blood glucose $\geq$100 mg/dL or medications for hyperglycemia
3) Dyslipidemia is defined as TC $\geq$ 200 mg/dl, HDL-c < 40 mg/dl, LDL-c $\geq$ 130 mg/dl, TG $\geq$ 150 mg/dl and TC/HDL-c ratio $\geq$ 5 by the United States National Cholesterol Education Program, Adult Treatment Panel (NCEP-ATP) III guidelines.

V. Discussion
Age And Gender Distribution

Age Distribution	Metabolic Syndrome –ve	%	Metabolic Syndrome +ve	%	All	%
$\leq$ 30 years	15	25.42	1	2.44	16	16.00
31-40 years	31	52.54	9	21.95	40	40.00
41-50 years	12	20.34	19	46.34	31	31.00
51-60 years	1	1.69	12	29.27	13	13.00
Total	59	100	41	100	100	100

The mean age was meaningfully less in metabolic syndrome -ve Group compared to metabolic syndrome +ve Group by 11.19 years. This significant difference of 1.32 times increase in age in metabolic syndrome +ve Group compared to metabolic syndrome -ve Group is true and has not occurred by chance.

Gender Distribution	Metabolic Syndrome –ve	%	Metabolic Syndrome +ve	%	All	%
Male	40	67.80	17	41.46	57	57.00

Female	19	32.20	24	58.54	43	43.00
Total	59	100	41	100	100	100
P value Chi Squared Test				0.8438		

Duration Of Art

Duration of ART	Metabolic Syndrome -ve	Metabolic Syndrome +ve
N	59	41
Mean	3.86	5.10
SD	0.88	0.74
P value Unpaired t Test		0.0000

In this study we can safely conclude that metabolic syndrome patients among HIV – infected patients using HAART are significantly associated with longer duration of treatment.

Cd 4 Count

CD4 Count	Metabolic Syndrome –ve	%	Metabolic Syndrome +ve	%	All	%
≤ 200 (cells/mm3)	1	1.69	4	9.76	5	5.00
201-400 (cells/mm3)	12	20.34	15	36.59	27	27.00
401-600 (cells/mm3)	20	33.90	9	21.95	29	29.00
601-800 (cells/mm3)	8	13.56	7	17.07	15	15.00
> 800 (cells/mm3)	18	30.51	6	14.63	0	0.00
Total	59	100	41	100	76	76

CD4 Count	Metabolic Syndrome -ve	Metabolic Syndrome +ve
N	59	41
Mean	653.37	501.10
SD	292.50	269.93
P value Unpaired t Test		0.0087

The mean CD4 count was meaningfully more in metabolic syndrome -ve group compared to metabolic syndrome +ve group by 152.28 (cells/mm3). This significant difference of 23% decrease in mean CD4 count in metabolic syndrome +ve group compared to metabolic syndrome -ve group is true and has not occurred by chance.

VI. Metabolic Syndrome

Depending upon WHO criteria metabolic syndrome include waist circumference , blood pressure , fasting blood sugar ,HDL and triglyceride .
On the basis of presence of 5 components of   metabolic syndrome ,the study population is analysed.

Metabolic syndrome (out of 5)	MetS –ve	%	MetS +ve	%	All	%
0 of 5	25	42.37	0	0.00	25	25.00
1 of 5	18	30.51	0	0.00	18	18.00
2 of 5	16	27.12	0	0.00	16	16.00
3 of 5	0	0.00	23	56.10	23	23.00
4 of 5	0	0.00	12	29.27	12	12.00
5 of 5	0	0.00	6	14.63	6	6.00
Total	59	100	41	100	100	100

* Association between the metabolic syndrome positive group and hypertension, diabetes mellitus, abdominal circumference, triglyceride levels, altered HDL levels were considered to be statistically significant.

VII. Conclusion

The association between the study groups and age distribution is considered to be statistically significant. Most of the metabolic syndrome -ve group patients had a mean age of 34.93 years. In the metabolic syndrome +ve Group patients, had a mean age of 46.12 years.
* The association between the study groups and gender distribution is considered to be not statistically significant.

- We can conclude that metabolic syndrome among HIV – infected patients using HAART are significantly associated with longer duration of treatment.
- The metabolic syndrome positive group among HIV – infected patients using HAART have significantly lower CD4 cell counts which was statistically significant.

- Association between the metabolic syndrome positive group and hypertension, diabetes mellitus, abdominal circumference, triglyceride levels, altered HDL levels were considered to be statistically significant.
- The mean TC levels was meaningfully less in metabolic syndrome -ve group compared to metabolic syndrome +ve group by 25.94 mg/dl, which infers that metabolic syndrome patients among HIV – infected patients using HAART have significantly higher TC levels.
- The mean LDL levels was meaningfully less in metabolic syndrome -ve group compared to metabolic syndrome +ve group by 13.09 mg/dl and the difference is significant.
- We can safely conclude that metabolic syndrome patients among HIV – infected patients using HAART have significantly higher TC/LDL ratio levels.
- The prevalence of metabolic syndrome in our study is 41%. Patients with no components of metabolic syndrome (0/5) was 25%, one component was (1/5) 18%, two components of metabolic syndrome (2/5) was 16% and 3/5, 4/5, 5/5 being 23%, 12%, 06% respectively. As I had already quoted, a range of studies across the globe has given a wide prevalence for metabolic syndrome in the HIV population which ranges from 11.2% up to 45.4%.
  Also we have to keep in mind that the HIV patients on HAART, included in our study were on drugs for more than 3 years, which might explain the high prevalence. The prevalence of metabolic syndrome in Indian population also varies, and a recent study done in Maharashtra puts the prevalence around 19.52%[6].
- The prevalence of dyslipidemia in our study was 71%, with abnormal HDL, high triglycerides, high total cholesterol, high LDL and high TC/LDL ratio being 65%, 39%, 30%, 25%, 35% respectively.
- The prevalence of dyslipidemia in HAART patients in a Brazilian study[7] was 66.7% with low HDL was the most frequent abnormality (53.5%), followed by high TG (36.1%). To look for the prevalence of dyslipidemia in Indian population, a fine study – ICMR INDIAB[8] which quotes abnormal HDL, high triglycerides, high total cholesterol and high LDL being 72.3%, 29.5%, 13.9%, 11.8% respectively with a prevalence of 79%.
- We conclude that HIV patients on HAART have high prevalence of metabolic syndrome and lipid abnormalities, and they should be regularly screened for the same and appropriately managed.

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