Dyslipidemia And Dysglycemia In Patients With HIV Infection and In Patients On Antiretroviral Therapy

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Abstracts: Objective: Use of ART in HIV infected individuals' results in reduced mortality and morbidity associated with AIDS. Long term complications of HIV & ART including dyslipidemia & dysglycemia have raise concern regarding accelerated cardiovascular risk in these patients. Aim of study is to determine prevalence of dyslipidemia & dysglycemia in HIV infected patients and its relation to CD 4 count. Material and Methods: A cross sectional two arm comparison study carried out at Shree Sayajirao General Hospital and Medical College Baroda. The treatment arm, ON ART arm, constituted 30 patients already on ART defined as a combination of at least three classes of antiretroviral drugs, namely PIs, NNRTIs and NRTIs, one of which was a PI or an NNRTI ,or a triple combination of NRTIs. Comparator arm, ART naïve arm constituted 30 HIV-positive patients, eligible for, but not yet receiving ART. Dyslipidemia & dysglycemia were defined as high total or LDL cholesterol, high triglycerides, or low HDL cholesterol according to the adult treatment panel III (ATP III) guidelines and as the presence of diabetes , impaired fasting blood sugar(FBS) , impaired post prandial blood sugar(PP2BS) or impaired glucose tolerance according to ADA (American diabetes association)criteria ,respectively. Discussion: Dysglycemia was present in 30% of study population and dyslipidemia was present in 73.33% of study population. Difference in elevation of serum Cholesterol level and serum LDL level in patients on ART arm was statistically significant. Dysglycemia and dyslipidemia was associated with low CD 4 count compare to patients with normal blood glucose level and normal lipid profile level. [Patel H et al NJIRM 2012; 3(5) : 53-57]

Key Words: ART-anti retroviral therapy, acquired Immuno deficiency syndrome –AIDS, human immunodeficiency virus -HIV.

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Introduction: Starting with Keith Henry's letter to **The Lancet** in 1998, reporting two cases of myocardial infarction in young HIV POSITIVE men, multiple studies, have reported an increased risk of myocardial infarction And endothelial dysfunction in patients living with HIV-AIDS and in patients who are on highly active antiretroviral therapy (HAART) . [1]

For those who have access to highly active antiretroviral therapy (ART), the overall incidence of acquired Immuno deficiency syndrome (AIDS) or death related to infection by human immunodeficiency virus (HIV) has decreased dramatically . Prior to 1996, the annual mortality rate among individuals with HIV-1 infection exceeded 20 percent; after a decade of effective treatment, annual mortality has declined to less than 2 percent.[2]

As patients are living longer with HIV, new concerns have arisen among individuals taking ART including increased prevalence of fat redistribution, including lipoatrophy, lipodeposition, or a mixed picture of both.[3,4] Metabolic features of this fat redistribution syndrome include dyslipidemia (approximately 70 percent of patients), diabetes mellitus (8 percent), insulin resistance , and hepatic steatosis.[5]

It is not clear if this syndrome is the consequence of increased longevity or a direct adverse effect from medications. One mechanism links HIV inhibition of cholesterol efflux from human macrophages. ART , most commonly protease inhibitors are associated with dyslipidemia and dysglycemia. However, NNRTI,NRTI,CCR5 agonists also shown lipid abnormalities .HIV lipodystrophy is now the most common form of lipodystrophy and may directly promote metabolic syndrome. Expert panels have convened to identify research priorities to decrease cardiovascular risk.[6,7]

Many studies have shown dyslipidemia and dysglycemia in HIV patients and in patients who are on HAART as risk factors for atherosclerosis,

cardiovascular diseases, including , coronary heart disease , stroke , congestive cardiac failure and hypertensive disease, myocardial infarction, ischemic dilated cardiomyopathy .We have studied these metabolic abnormalities in Indian population.

Aims and objectives: To study dyslipidemia & dyglycemia in HIV/AIDS patients and in patients on Anti Retroviral treatment. To study correlation between these metabolic abnormalities and CD4 cell count.

Material and Methods: Study sample includes sixty indoor patients with HIV/AIDS , admitted in Shree Sayajirao General Hospital (SSGH), Vadodara, from Jan 2009 to Dec 2010. This is a cross sectional two arm comparative study of HIV-infected patients. The treatment arm, ON ART arm, constituted 30 patients already on ART defined as a combination of at least three classes of antiretroviral drugs, namely protease inhibitors (PIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), and nucleoside reverse transcriptase inhibitors (NRTIs), one of which was a PI or an NNRTI ,or a triple combination of NRTIs.

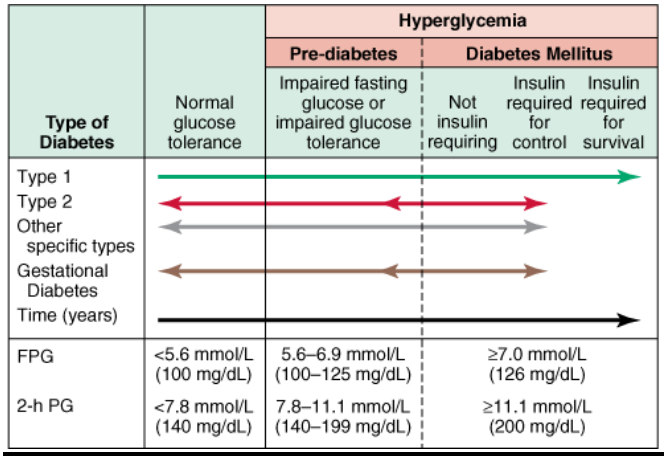
Comparator arm, ART naïve arm constituted 30 HIV-positive patients, eligible for, but not yet receiving ART. Outcome of interest was dyslipidemia, defined as the presence of any of the following: high total or LDL cholesterol, high triglycerides, or low HDL cholesterol according to the national cholesterol education program (NCEP) and the adult treatment panel III (ATP III) guidelines.(Table I)

Table I: NCEP Guidline

LDL Cholesterol	
< 100	Optimal
100–129	Near or above optimal
130–159	Borderline high
160–189	High
190	Very high
Total Cholesterol	
< 200	Desirable
200–239	Borderline high
240	High
HDL Cholesterol	
< 40	Low
60	High

Dysglycemia was defined as the presence of diabetes , impaired fasting blood sugar(FBS) , impaired post prandial blood sugar(PP2BS) or impaired glucose tolerance according to ADA (American diabetes association)criteria. (Table II)

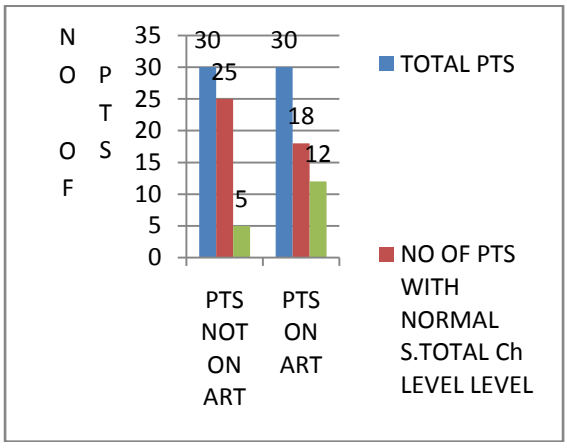
Table II : ADA Criteria



Pregnant female patients, critically ill patients, patients on drugs like Anti hypertensive drugs, Antidiabetic drugs, Lipid lowering agents were excluded from the study.

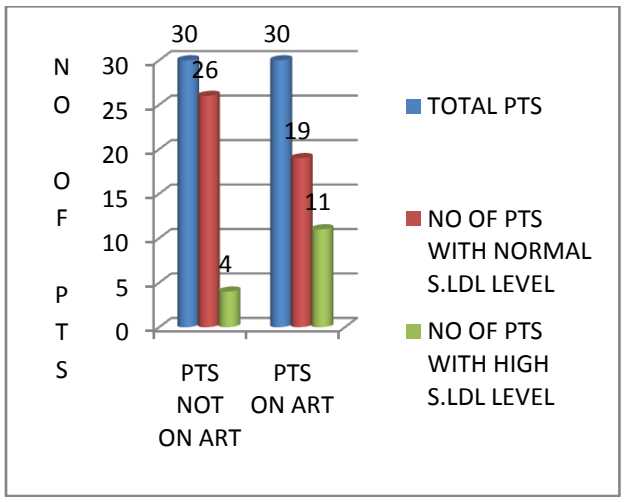
Result: Result are describe in Graph below

Graph I : Comparison Of S. Total Cholesterol Level Abnormalities In Two Arm



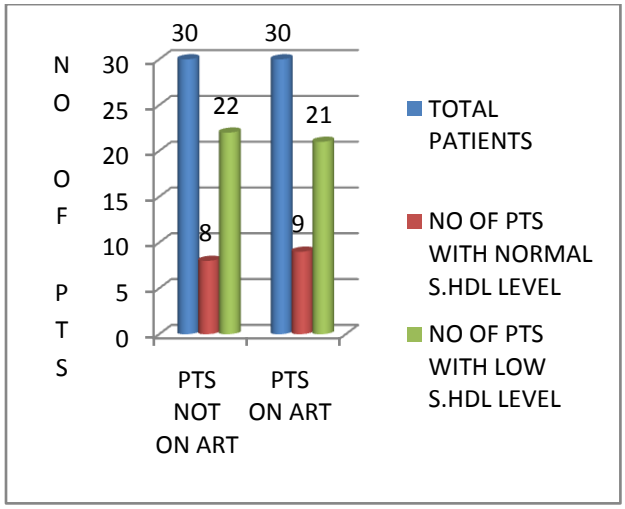
Elevated S. Total cholesterol level was found in 5(16.67%) patients in ART naïve arm and in 12(40%) patients who were on ART. p value0.044<0.05,Odds ratio 0 .3, 95% Confidence interval(CI): 0.07-1.15.Thus, observed difference is statistically significant.

Graph II : Comparison Of S. LDL Cholesterol Level Abnormalities In Two Arm



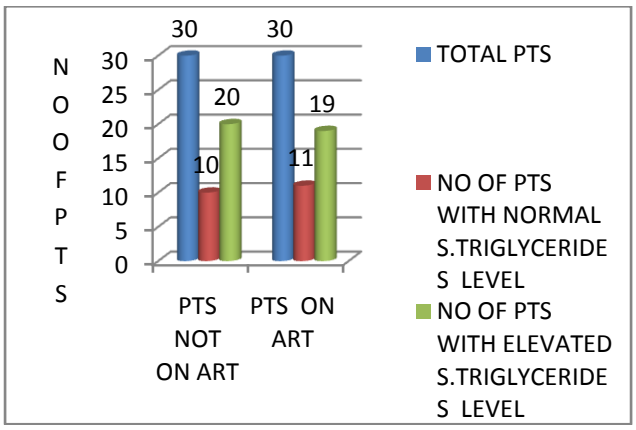
Elevated serum LDL level was found in 4(13.33%) patients in ART naïve arm and in 11(36.67%) patients who were on ART. p value0.037<0.05,Odds ratio 0 .31, 95% CI: 0.07-1.3.Thus, observed difference is statistically significant.

Graph III: Comparison Of S. HDL Cholesterol Level Abnormalities In Two Arm



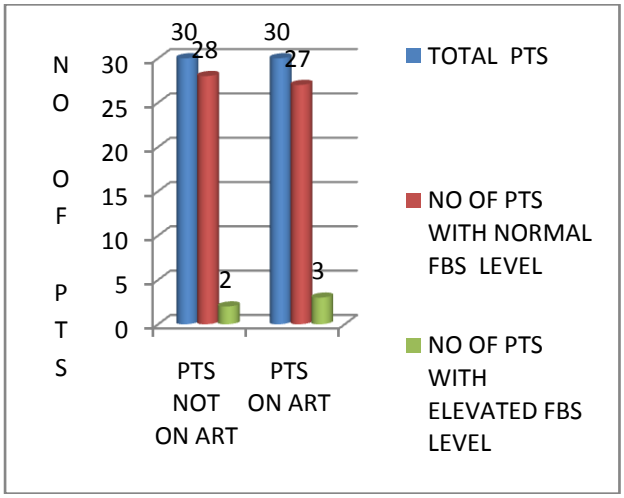
Low serum HDL level was found in 22(73.33%) patients in ART naïve arm and in 21(70%) patients who were on ART. p value 0.77>0.05,Odds ratio 1.18, 95% CI: 0.33-4.19. observed difference is statistically not significant.

Graph IV : Comparison Of S.Triglycerides Level Abnormalities In Two Arm



Elevated serum Triglyceride level was found in 20(66.67%) patients in ART naïve arm and in 19(63.33%) patients who were on ART. p value 0.78>0.05,Odds ratio 1.16, 95% CI: 0.35-3.83). Thus, observed difference is statistically not significant.

Graph V : Comparison Of FBS Level Abnormalities In Two Arm

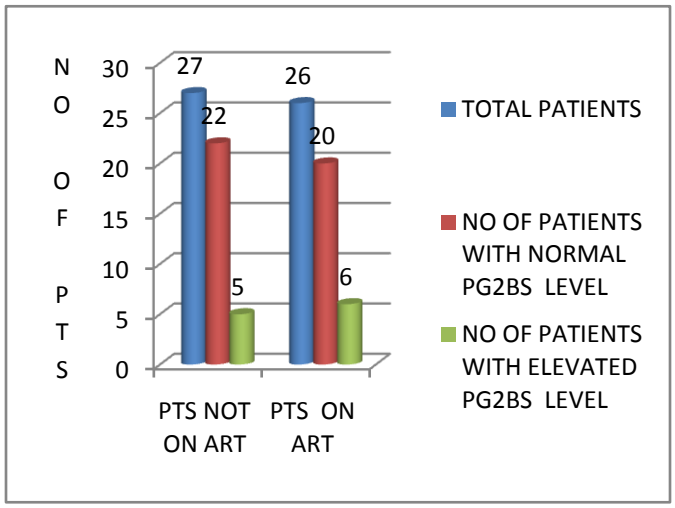


Impaired FBS was found in 2(6.67%) patients in ART naïve arm and in 3(10%) patients who

were on ART. p value 0.5>0.05, observed difference is statistically not significant.

High PP2BS was found in 1(3.33%). patients in ART naïve arm and in 1 (3.33%) patients who were on ART. No difference observed.

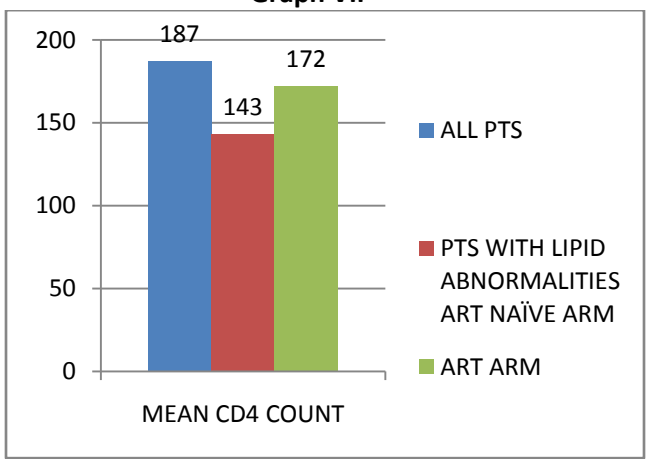
Graph VI : Comparison Of PG2BS Level Abnormalities In Two Arm



High post glucose blood sugar level was found in 5(18.51%) patients in ART naïve arm and in 6(23.0%) patients who were on ART. p value0.73> 0.05 Thus, observed difference is statistically not significant.

Mean CD4 count was 187/mm^3 . Mean CD4 count in patients with lipid abnormalities in ART naïve arm was 143 /mm^3 and in on ART arm was 172/mm^3 .

Graph VII



And Mean CD4 count in patients with sugar abnormalities in ART naïve arm was 109 /mm^3 and in on ART arm was 175/mm^3.

Graph iX

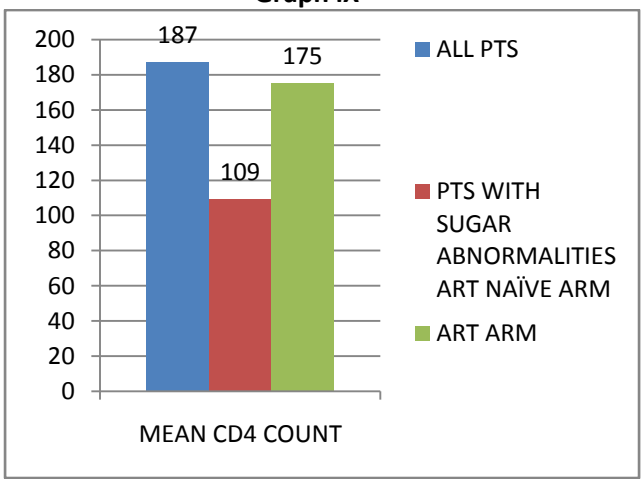


Table:1 Comparison of Serum Lipid abnormalities between ART naive and on ART Arm

	ART NAIVE ARM		ON ART ARM	
	NO of PTS	%	NO of PTS	%
S.Cholesterol	**5**	**16.67**	**12**	**40**
S.LDL	**4**	**13.33**	**11**	**36.67**
S.HDL	**22**	**73.33**	**21**	**70**
S.TGs	**20**	**66.67**	**19**	**63.33**

Table:2 Comparison of Blood glucose Abnormalities between ART naive and on ART Arm

	GROUP OF PATIENTS NOT ON ART		GROUP OF PATIENTS ON ART	
	NO of PTS	%	NO of PTS	%
FBS	**2**	**6.67**	**3**	**10**
PP2BS	**1**	**3.33**	**1**	**3.33**
PG2BS	**5**	**18.51**	**6**	**23**

Discussion: Dysglycemia and dyslipidemia was present in both groups. Dysglycemia was present in 30% of study population and dyslipidemia was present in 73.33% of study population.

Elevated triglycerides , low HDL were commoner lipid abnormalities than elevated LDL and total cholesterol. LDL and total cholesterol level were more elevated in patients on ART group. High post glucose blood glucose level was most common dysglycemia. Dysglycemia was more in ART group then ART naïve group.

Difference in elevation of serum Cholesterol level and serum LDL level in patients on ART arm was statistically significant. Difference in elevation of serum Triglyceride level, low serum HDL level and elevation of glucose level in patients on ART arm was not statistically significant. Dysglycemia and dyslipidemia was associated with low CD 4 count compare to patients with normal blood glucose level and normal lipid profile level .

Conclusion: Dyslipidemia and dysglycemia in HIV patients can be due to both HIV lipodystrophy and ART ,and it is associated with low CD4 count. Dyslipidemia is more with ART.

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