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Research Article

Serum lipids assessment: a cardiovascular risk factor in asymptomatic type- II diabetics.

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Abstract

Introduction: Diabetes mellitus metabolic disorder, population in India faces higher risk for diabetes and its complications. It is associated with a high risk of cardiovascular disease. The blood sugar management, dyslipidemia and other modifiable risk factor is key in multifactorial approach to prevent complications of diabetes and decreasing the mortality and morbidity.

Methods: A total 100 subjects, fifty type II DM cases aged between 30-55 yrs and fifty controls age and sex matched. 8ml of fasting venous blood was drawn from ante cubital vein to determine glucose level, lipid profile. All parameters were estimated by using serum separated by centrifugation. Total cholesterol and HDL cholesterol is estimated by cholesterol oxidase / phenol amino antipyrine method, LDL by Friedewald formula. Total triglyceride by glycerol phosphate oxidase / phenol aminoantipyine method, VLDL by total triglyceride/5.

Results: significantly increase FBS level, weight, BMI, total cholesterol, total triglyceride, VLDL and LDL cholesterol levels, whereas decreased HDL cholesterol level in asymptomatic type II diabetics in comparison with controls.

Conclusion:The various changes in lipid profile were seen among asymptomatic diabetics and the prevalence of complication is quite high. Hence screening test like lipid profile is strongly recommended at the time of diagnosis for proper interventions which could prevent the complications at an earlier date.

Key words: lipid profile, type - II diabetics, cardiovascular risk factor.

INTRODUCTION

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycaemia resulting from variable interactions of hereditary and environmental factors due to defects in insulin secretion, insulin action or both.[1]

DM is associated with marked increased risk of cardiovascular diseases (CVD). Large epidemiological studies have shown that risk of coronary heart disease is increased 2-6 folds in patients with DM compared with non Diabetics. Patients with DM have high prevalence of subclinical CVD, which is a strong predictor of subsequent coronary heart disease and cardiovascular mortality.[2]

Dyslipidemia is a well recognized and modifiable risk factor that should be identified early to institute aggressive cardiovascular preventive management.[3] There has been a quantum increase in the incidence of coronary artery disease suggest the major impact of life style modification on lipid profiles and deleterious effect of latter in causing accelerated and more extensive coronary artery disease.[4]

Present study was to evaluate and compare the effect of serum lipids (Total Cholesterol, Triglyceride, LDL Cholesterol, HDL Cholesterol and VLDL Cholesterol) on cardiovascular system in type II diabetes mellitus cases and controls.

METHODOLOGY

This study was conducted in the Physiology department, J.J.M Medical College, Davangere in 2011-12. Asymptomatic fifty type II DM cases aged between 30-55 years and fifty controls (age and sex matched) were selected from the general population satisfying the inclusion criteria after obtaining written informed consent. Data acquisition was performed in the morning.

Inclusion criteria: asymptomatic; diagnosed type II diabetes mellitus cases of more than five years duration between 30-55 yrs of age with age and sex matched controls were selected.

Exclusion Criteria; Known diabetics of duration less than five years, Subjects with history of cardiac diseases, hypertension, smoking and alcoholism, Subjects on hypolipidemic drugs or contraceptive pills and Subjects below 30 yrs or above 55 yrs of age.

Estimation of Total Cholesterol and HDL – Cholesterol was done by Enzymatic cholesterol oxidase – Phenol amino antipyrine method. [5]

Estimation of Serum Triglycerides was done by Enzymatic glycerol phosphate oxidase – Phenol aminoantipyrine method.[5]

Estimation of Serum LDL and VLDL Cholesterol is done by using [5]

Friedewald formula:

LDL cholesterol = total cholesterol – HDL cholesterol – Triglyceride / 5

VLDL cholesterol = Triglyceride / 5

Statistical analysis; Results were expressed as Mean ± SD for continuous data and number and percentages for discrete data. Unpaired t test was used for statistical analysis. SPSS version 16 software was used for all the analysis.

RESULTS AND DISCUSSION

India leads the world today with the largest number of diabetics in any given country. Hyperlipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. In type II DM patients there is a global dysfunction of lipoprotein metabolism. The degree of dyslipidemia is more widespread, is not only due to over production but also due to poor peripheral clearance consequent to lesser expression of receptors on endothelial cell surface. This profile is likely to be the true reflection of the influence of nutritional status rather than a consequence of any specific biological alteration.[6]

In our study cases showed statistically significant increase in total cholesterol, triglycerides, LDL, VLDL cholesterol levels and decrease in HDL cholesterol levels when compared to their controls. In a case control study done by Bhatti JS et al it was found that there was significantly higher BMI in female diabetics when compared to controls. They also noticed that low levels of HDL cholesterol and high levels of TGs, VLDL cholesterol among type II diabetes mellitus cases. This indicates that adiposity is a strong risk factor for insulin resistance and subsequent metabolic complications.[7] A study done by Zargar AH et al showed statistically significant increase in serum total lipids, serum total cholesterol, triglycerides and LDL cholesterol levels in type II diabetics while serum HDL cholesterol level did not show any significant difference when compared to controls. These abnormalities in lipid profile was because of impaired activity of lipoprotein lipase activity.[6]

The increased weight and BMI in diabetics could be due to increase in adiposity associated with insulin resistance attributed to more of sedentary life style and less physical activity. Increase in body weight and BMI are important predictors of metabolic disturbances including dyslipidemia, hypertension and cardiovascular diseases .[8]

There was significant increase in blood sugar level in type II diabetics when compared to controls. This higher blood sugar values observed in diabetics were expected because, a person is said to be diabetic if fasting blood sugar is more. The increased FBS level in diabetics arises from the deficiency of insulin, the key hormone in the regulation of glucose metabolism.[9]

In a retrospective study on impact of diabetes management on lipid profile showed that total cholesterol, LDL cholesterol and triglyceride levels were significantly lower and HDL cholesterol was higher after one year follow up when compared to initial visit due to the effect of lipid directed medications in type II diabetes mellitus patients.[10]

HDL cholesterol was lower in diabetics when compared to controls, this can be explained as, it is due to inverse correlation of HDL cholesterol with adiposity and triglyceride levels.[6] In a study done by Nakhjavani M et al[11] they concluded that each of these dyslipidemic features were associated with increased risk of cardiovascular disease (CVD). Hyper triglyceridemia is a best predictor of CVD in diabetics independent of HDL cholesterol level and despite of glycemic control. Similar findings were also reported by Banerjee S et al,[12] Mohammadi H et al,[13] Ahmed N et al,[14] Onwuliri VA et al [9] and Ovno AF et al.[15]

CONCLUSION

There was significant increase in weight, BMI and fasting blood sugar level in type II diabetics when

compared to controls. There was a significant increase in serum total cholesterol, total triglyceride, LDL and VLDL cholesterol levels. Where as decreased HDL cholesterol level in type II diabetics when compared to controls.

The prevalence of complications is quite high even at the time of diagnosis, probably because of insidious onset of diabetes and long duration of asymptomatic disease before symptoms develop. Hence the conclusion of this study is that screening tests for complications are strongly recommended at the time of diagnosis not only for early detection but also to prevent the progression to end stage disease.

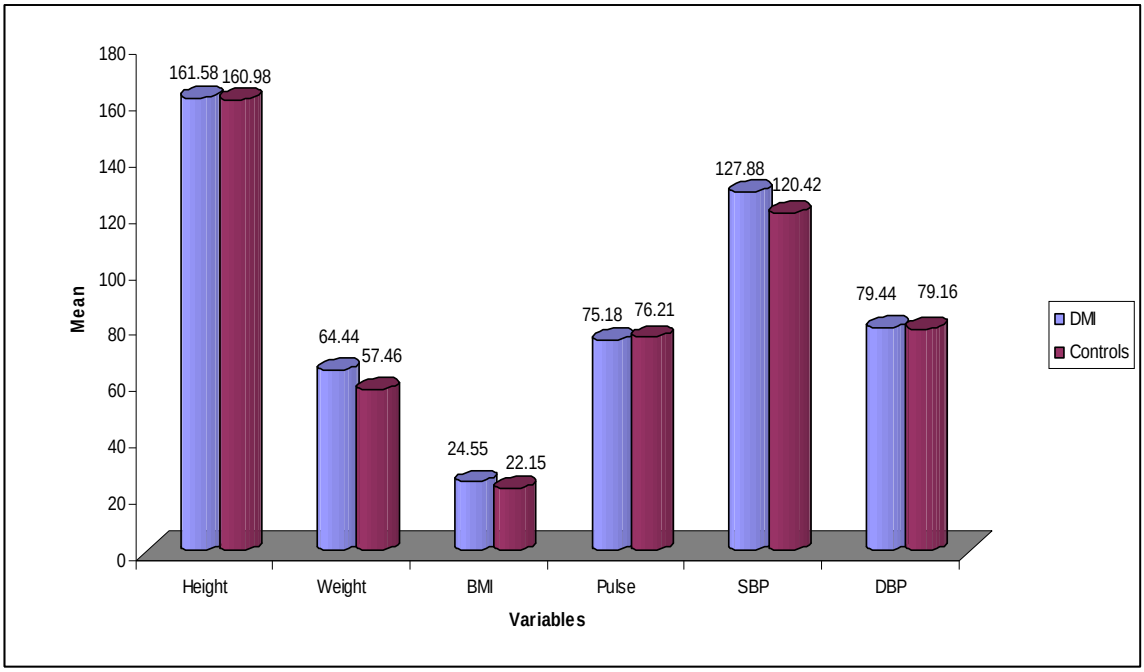
Table -1: Age and Sex Comparison of the Group's Studied

Variables		**DM- II**	**CONTROLS**
Subjects	**NO**	**50**	**50**
Gender	Male	20	20
	Female	30	30
Age (yrs)	Mean ±SD	45.8 ± 4.9	45.9± 5.0
	Range	35-54 Yrs	35-54 Yrs

Table -2: Comparison of variables Between Type- II DM cases and Controls

Type II DM					
Variable	Group	Mean	SD	t value	p value
HEIGHT(cms)	DM II	161.58	8.34	0.41	0.68
	Controls	160.98	6.02		
WEIGHT(kg)	DM II	64.44	7.78	5.13	0.000 **
	Controls	57.46	5.65		
BMI(kg/m^2)	DM II	24.55	2.19	6.57	0.000 **
	Controls	22.15	1.37		
PULSE(mmHg)	DM II	75.18	1.11	0.70	0.47
	Controls	76.21	10.2		
SBP(mmHg)	DM II	123.5	1.11	1.74	0.08
	Controls	120.42	12.4		
DBP(mmHg)	DM II	79.44	3.23	0.47	0.64
	Controls	79.16	2.65		

Unpaired t test , ** $p < 0.001$,
HS $p > 0.05$: not Sig.



Graph -1: Comparison of variables Between Type - II DM cases and Controls

Table - 3: Comparison of FBS, Electrolytes and Lipid Profile Parameters between Type II DM Cases and Controls

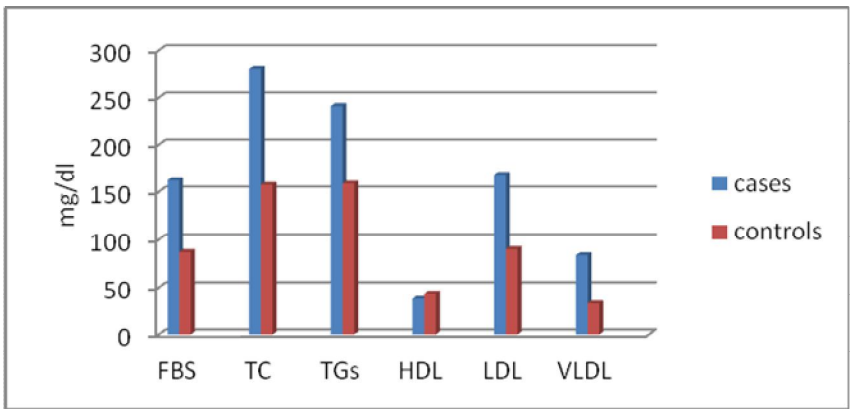
Variable	Group	Mean	SD	t value	p value
FBS(mg/dl)	DM II	162.32	57.09	9.20	0.000 **
	Controls	86.98	9.66		
T.C(mg%)	DM II	279.64	75.18	10.89	0.000 **
	Controls	157.28	25.71		
TGs(mg%)	DM II	241.35	118.58	4.09	0.000 **
	Controls	158.67	79.78		
HDL(mg%)	DM II	37.75	12.29	-2.29	0.024*
	Controls	43.57	13.12		
LDL(mg%)	DM II	168.11	77.00	6.75	0.000 **
	Controls	90.02	27.77		
VLDL(mg%)	DM II	83.67	18.25	14.47	0.000 **
	Controls	32.97	16.76		

Unpaired t test

* $p < 0.05$, Significant

** $p < 0.001$, HS

$p > 0.05$: not Sig.



Graph - 2: Comparison of FBS, Electrolytes and Lipid Profile Parameters between Type II DM Cases and Controls

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