International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

A Study to Assess Dyslipidemia in Prediabetes

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Abstract: ***Lipid abnormalities are common in diabetes and play an important role in acceleration of atherosclerosis leading to cardiovascular diseases. Due to increasing burden of diabetes, it is becoming important to identify dyslipidemia in the high risk state for diabetes especially the prediabetes so that early intervention can reduce the cardiovascular risk. Aim of this study is to compare the lipid profile of prediabetes and healthy individuals. A total of 80 cases (40 prediabetes individuals and 40 healthy controls) from OPD and IPD of Rajindra Hospital Patiala were enrolled in this study after taking their written and informed consent. Lipid profile of both groups were measured and statistically analysed. Materials & Methods: This cross sectional case control study was conducted on 40 prediabetic subjects & 40 normal healthy controls from IPD and OPD of Department of Medicine, Rajindra Hospital Patiala. The Lipid Profile parameters of both the groups were measured and statistically analysed. Results: Total cholesterol, low density lipoprotein (LDL), triglyceride (TG), very low density lipoprotein, TG/HDL ratio and LDL/HDL ratio were significantly raised in prediabetic individuals as compared to normal healthy subjects, whereas high density lipoprotein (HDL) was significantly lower in prediabetic individuals as compared to normal healthy subjects. Conclusion: The prediabetic individuals, because of their dyslipidemia, are at higher risk for developing cardiovascular disease.***

Keywords: Dyslipidemia, Diabetes, Prediabetes

1. Introduction

The number of people with diabetes is steadily rising, with WHO estimating that there were 422 million adults with diabetes worldwide in 2014.The latest edition of the International Diabetes Federation (IDF) Diabetes Atlas 2019 shows that 463 million adults aged 20-79 years are currently living with diabetes. Cardiovascular Disease is one of the leading cause of death in patients with diabetes.

Type 2 diabetes is associated with a cluster of interrelated plasma lipid and lipoprotein abnormalities. These lipoprotein abnormalities play an important role in acceleration of atherosclerosis. The lipoprotein abnormalities commonly present in type 2 diabetes include an abnormally high level of triglycerides (TG), a high proportion of small dense low density lipoprotein cholesterol (LDL), low high density lipoprotein cholesterol (HDL), and postprandial lipemia. Insulin deficiency or resistance activates intracellular hormone-sensitive lipase which increases the release of non-esterified fatty acids (NEFA) from triglycerides stored in the more metabolically active centrally distributed adipose tissue. High circulating levels of NEFA increase hepatic triglycerides production. Increased hepatic triglyceride synthesis is associated with increased secretion of apolipoprotein B (apoB). Furthermore, the normal inhibitory effect of insulin on hepatic apoB production and triglyceride secretion in VLDL is lost, and the VLDL secreted is larger and more triglyceride-rich. The tendency to hypertriglyceridemia is further augmented by reduced VLDL catabolism. Lipoprotein lipase located on vascular endothelium largely determines the rate of removal of triglycerides from the circulation. In contrast to intracellular hormone-sensitive lipase this lipoprotein lipase may be down regulated in states of insulin resistance or deficiency. This reduction in lipoprotein lipase activity also contributes to postprandial lipemia.The small dense LDL particles found in Diabetes Mellitus are more atherogenic because they are more easily glycated and susceptible to oxidation..

The relationship between diabetes and cardiovascular disease begins earlier in the progression from normal glucose tolerance to impaired glucose tolerance and impaired fasting glucose to diabetes, and is associated with resistance to the activity of insulin. Apparently similar abnormalities in serum lipid profiles can be observed in the earlier stages before the diagnosis of Diabetes Mellitus i.e. in the prediabetes individuals. Keeping in view the increased risk of cardiovascular disease in diabetes, diagnosing the PREDIABETIC individuals and assessing their lipid profile can prevent them from developing overt diabetes and hence preventing their further morbidity and mortality.

2. Material & Methods

Study Design: Cross-sectional case control study**.**

Sample Size: 40 cases (prediabetic subjects) and 40 controls from OPD and IPD of Rajindra Hospital Patiala.

Inclusion Criteria: Normal Healthy controls.

Patients/Cases of prediabetes (diagnosed with ADA criteria) : Male or female patients > 18 years of age with:
Fasting blood glucose level is between 100 mg/dl and 125 mg/dl (IFG) and, or HbA1c 5.7%-6.4%

Exclusion Criteria

- Patients who did not give consent
- Patients diagnosed with Type 1/ Type 2 diabetes mellitus
- Patients with Thyroid Dysfunction
- Patients already on lipid lowering drugs
- Age<18 years
- Pregnant females and critically ill patients
- Renal failure patients
- Smokers and alcoholics.

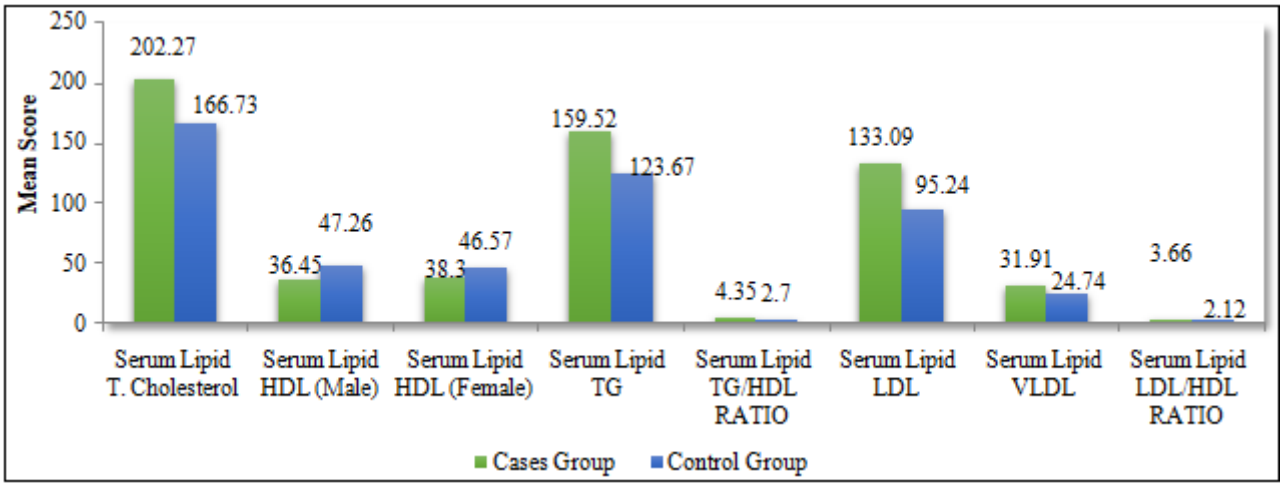
Lipid profile parameters Total Cholesterol, HDL, Triglycerides, VLDL, LDL, TG/HDL and LDL/HDL were measured in both the groups. Normal reference values used in Biochemistry laboratory of Rajindra Hospital Patiala were taken for the comparison of different parameters. The statstical analyses were performed with the IBM SPSS version 22.0 software programme. Percantage, Mean Values and Standard Deviations were calculated. Variables with

normal distribution were compared using unpaired student t-test and non-parametrical variables were compared using pearson's chi-square test.

3. Results

Comparison of lipid profile parameters of case group and control groups is given in table below:

	Cases	*Controls*	*T-Value*	*P-Value*
SERUM CHO	**LESTEROL**			
<200	15 (37.5 %)	36 (90%)	5.978	0.001
≥200	25 (62.5%)	4 (10%)		
Mean±SD	202.27±29.28	166.73±23.61		
SERUM HDL	**(MALES)**			
<35.3	9 (45%)	2 (10.53%)	5.486	0.001
≥35.3	11 (55%)	7 (89.47%)		
Mean±SD	36.45±5.70	47.26±6.60		
SERUM HDL	**(FEMALES)**			
<42	16 (80%)	4 (19.05%)	5.519	0.001
≥42	4 (20%)	17 (80.95%)		
Mean±SD	38.30±3.89	46.57±5.52		
SERUM LDL				
<153	22 (55%)	37 (92.50%)	5.962	0.001
≥153	18 (45%)	03 (7.50%)		
Mean±SD	133.09±30.23	95.24±26.43		
SERUM TGs				
<161	18 (45%)	36 (90%)	8.752	0.001
≥161	22 (55%)	04 (10%		
Mean±SD	159.52±17.51	123.67±19.09		
TG/HDL				
<3.5	07 (17.50%)	35 (87.50%)	9.985	0.001
≥3.5	33 (82.50%)	05 (12.50%)		
Mean±SD	4.35±0.81	2.70±0.66		
LDL/HDL				
<2.5	09 (22.50%)	29 (72.50%)	7.101	0.001
≥2.5	31 (77.50%)	11 (27.50%)		
Mean±SD	3.66±1.08	2.12±0.85		
SERUM VLDL				
<40	40 (100%)	40 (100%)	8.752	0.001
≥40	00 (0%)	00 (0%)		
Mean±SD	31.91±3.50	24.74±3.82		



4. Discussion

In present study, the mean serum the mean Serum lipid T. Cholestrol in prediabetics and controls were 202.27±29.28 and 166.73±23.61 respectively. The difference was statistically significant ($p<0.05$). In present study, the mean Serum HDL levels in prediabetic male cases was 36.45±5.70 which was significantly lower than the mean HDL levels in the control group males i.e. 47.26±6.60. The mean HDL levels in prediabetic female cases were 38.83±3.89 which was significantly lower than the mean HDL levels in control group females i.e. 46.57±5.52. In present study, the mean Serum lipid TG levels in prediabetics and controls were 159.52±17.51 and 123.67±19.09 respectively. The difference between case and control was significant as the p value is <0.05. In present study, the mean Serum Lipid

TG/HDL RATIO in prediabetes was 4.35±0.81 and this ratio of TG/HDL in control group was 2.70±0.66. The difference between case and control was significant as the p value is <0.05. In present study, the mean Serum Lipid LDL levels in prediabetics and controls were 133.09±30.23 and 95.24±26.43 respectively. The difference between case and control was significant as the p value is <0.05. In present study, the mean Serum Lipid VLDL in prediabetics and controls were 31.91±3.50 and 24.74±3.82 respectively. The difference between case and control was significant (p <0.05). In present study, the mean serum Lipid LDL/HDL RATIO in prediabetics and controls were 3.66±1.08 and 2.12±0.85 respectively. The difference between case and control was significant (p<0.05).

5. Conclusion

Total cholesterol, low density lipoprotein (LDL), triglyceride (TG), very low density lipoprotein, TG/HDL ratio and LDL/ HDL ratio were significantly raised in prediabetic individuals as compared to normal healthy subjects, whereas high density lipoprotein (HDL) was significantly lower in prediabetic individuals as compared to normal healthy subjects. Screening of prediabetic individuals for dyslipidemia, introduction of healthy lifestyle and pharmacotherapy to delay the onset of diabetes and cardiovascular disease can be considered.

References

[1] American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care 2014;*37(Suppl.1):S81-90
[2] International Diabetes Federation.2019. IDF Diabetes Atlas, 9th edition. Brussels: International Diabetes Federation, 2019
[3] Bhatnagar MK, Goel A, Jagdish RK, Sud R. Pattern of Dyslipidemia in Prediabetes and Diabetes- A Pilot Study. Asian Pacific Journal of Research. 2016 Aug;1(XLII):76-81.
[4] Kansal S, Kamble TK. Lipid Profile in Prediabetes. J Assoc Physicians India. 2016 Mar;64(3):18-21.
[5] Balgi V, Harshavardan L, Sahna E, Thomas SK. Pattern of Lipid Profile Abnormality in Subjects with Prediabetes. Int J Sci Stud. 2017 Feb;4(11):150-53.
[6] Mitra JK, Mitra R, Marandi S. Study of Lipid Profile in Prediabetes in Jharkhand. Int J Curr Res. 2017 May;9(5):51420-22
[7] Chakraborty M, Gouroju S, Singh P, Thatkar PV, Bagchi D, Tracking lipid profile and atherogenic indices in the prediabetics of Andaman Nicobar Islands: A retrospective hospital-based study. Journal of Family Medicine and Primary Care. 2019 Mar;8(3)1117-22
[8] Kumar M, Singh PS, Zafar KS, Kumar G. A Study of Lipid Profile in Prediabetes. J. Evid. Based Med. Healthc. 2016;3(44):2208-12