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Medicine

A STUDY OF LIPID PROFILE IN DIABETES MELLITUS

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ABSTRACT

BACKGROUND: Diabetes is the most common non-communicable disease globally. . It is estimated that nearly 380 million adults worldwide will have diabetes by 2025.India has 41 million diabetics and this number is expected to increase to 70 million by 2025. Diabetes is characterized by chronic hyperglycemia and disturbances of carbohydrate, lipid and protein metabolism. We aimed to research association between serum lipid profile and blood glucose, hypothesizing that early detection and treatment of lipid abnormalities can minimize the risk for atherogenic cardiovascular disorder and cerebrovascular accident in patients with type 2 diabetes mellitus. **AIM & OBJECTIVES:** 1. To determine the association between lipid profile with type 2 Diabetes mellitus in relation to age, sex and duration of diabetes. 2. To study the occurrences of vascular complications in type 2 Diabetes mellitus. **STUDY DESIGN**: Cross sectional observational study. **MATERIALS AND METHODS:** The present study was undertaken between the years 2013-2015 at CAIMS (Chadalawada Anandarao Institute of Medical Sciences).Total sample size 100 of which the study group consists of Fifty type-2 diabetic patients and not on Lipid lowering agent. The remaining fifty formed healthy control group. Their cholesterol levels and vascular complications were measured and compared. **RESULTS:** Results indicate a significance increase in serum VLDL - C, TG and LDL along with a significant decrease in serum HDL-C among diabetics as compared to non diabetics. Total cholesterol, TG and LDL was increased among 34%, 64% and 60% of the study group when cutoff values were taken as TC > 200 mg/dl, TG > 150 rng/dl and LDL> 100 mg/dl. HDL was reduced among 72% of the study subjects when HDL < 40 mg/dl was taken as cutoff values. **CONCLUSIONS:** The alteration of lipid metabolism of type-2 diabetics has raised a serious medical concern with respect to vascular complications like coronary artery disease, cerebra vascular diseases and the recommendation of greater routine evaluation of serum lipid profile and its treatment among both treatment naïve and treatment initiated type-2 diabetes mellitus strongly suggested

KEYWORDS : diabetes mellitus, TC-total cholesterol, TG -triglycerides, LDL-low density lipoproteins, HDL-high density lipoproteins.

INTRODUCTION: Diabetes is the most common non-communicable disease globally1. The estimated number of adults with diabetes in 2007 was 246 million; of these, 80% live in developing countries, the largest numbers on the Indian subcontinent and in China. Approximately 85–95% of all cases of diabetes are type 2 diabetes and the worldwide explosion of this disorder is a major health care burden. It is estimated that nearly 380 million adults worldwide will have diabetes by 2025.

India has 41 million diabetics and this number is expected to increase to 70 million by 2025.The increased number of diabetics in India is likely to be due to a significant increase in the incidence of type 2 diabetes, caused by unprecedented rates of urbanization, which results in environmental and lifestyle changes.

Chronic diseases, such as diabetes and cardiovascular disease (CVD), pose a primary challenge for the health care system. India is the second most populous country, with considerable diversity in caste, religion, habitat, socioeconomic status, lifestyle, and food habits. Although several infectious and parasitic diseases have been controlled successfully in India, non-communicable diseases are becoming increasingly common, resulting in an enormous burden on the health care system.

It is clear from the population based studies that type - 2 diabetes generally is associated with a 50% to 100% elevation in the plasma levels of total and VLDL triglycerides.The most common alteration of lipoprotein in type-2 diabetes mellitus is hyper tryglyceridemia caused by an elevation in VLDL concentration2,3,4. In type - 2 diabetes mellitus with severe hyperglycemia, the clearance rate for LDL apo-B is reduced. Mildly hyperglycemic individuals with

type-2 diabetes mellitus may have increased LDL production as well. So LDL levels in type -2 diabetes mellitus can be either increased or decreased depending upon hyperglycemia. HDL in type-2 diabetes mellitus is usually decreased due to increased rate of HDL clearance as measured by apo-A and apo-A2' . kinetics5. The above mentioned lipid abnormalities will lead to microvascular6,7 and macrovascular diseases in diabetic patients. Lipoprotein abnormalities correlated with large vessel disease are seen in diabetes and non diabetes populations, however atherogenesis is accelerated in diabetes8,9,10,11

Among the risk factors hypertension is twice as frequent in patients with diabetes as in those without diabetes and accounts for up to 85% of the cardiovascular disease risk12,13. Patients with hypertension are more prone to diabetes than are normotensive persons.

AIM & OBJECTIVES:

1. To determine the association between lipid profile with type 2 Diabetes mellitus in relation to age, sex and duration of diabetes.
2. To study the occurrences of vascular complications in type 2 Diabetes mellitus.

MATERIALS AND METHODS:

The present study was undertaken at chalmeda medical college between the years 2013-2015. Total sample size 100 of which the study group consists of Fifty type-2 diabetic patients and not on Lipid lowering agent. The remaining fifty formed healthy control group
INCLUSION CRITERIA: patients age >18y with diagnosis of diabeteics .

EXLUSION CRITERIA:

1) Renal disorders,
2. Thyroid disorders, jaundice,
3.Chronic liver disease, diabetes mellitus on statins
4.Familial hyperlipidemia,
5.patients under therapy with lipid lowering drugs, protease inhibitors or other drugs known to alter lipid profile were excluded from our study.

Serum total cholesterol (TC), serum low-density lipoprotein cholesterol (LDL-C), serum very low-density lipoprotein cholesterol (VLDL-C), serum high-density lipoprotein cholesterol (HDL-C) and serum triglycerides (TG) were assayed using enzymatic estimation kit (ERBA-Diagnostics Manheim,GmbHGermany).

Determination of vascular complications of diabetes.1. All diabetic patients were subjected to detailed Fundoscopic examination for retinopathy.

2 Hypertension is detected by standard sphygmomanometer (mercury) method

3. Ischemic heart disease was evaluated by history, ECG, TMT and echo study.

4. Nephropathy was confirmed by microalbuminuria study among suspected diabetics.

5. Suspected cases of peripheral vascular diseases were confirmed by peripheral vascular Doppler study

6. Cerebra vascular diseases cases were confirmed by CT scan brain.7. Neuropathy was detected by history and CNS examination like, sensory testing and deep tendon reflex testing.

RESULTS & DISCUSSION:

A total of 50 patients suffering from type-2 diabetes were studied. The results of the various clinical and biochemical parameter and their inter-relationship are as follows. Among these fifty study patients, thirty seven were males(Age: mean± SEM, 49.21 ± 8.77 years and thirteen were females (Age : mean ± SEM, 50.76 ± 7.36 years) and their mean age of study group was 49.62 ± 8.38 years and for the healthy group (Age : mean ± SEM of age, 50.84 ± 9.07 yrs)[TABLE-1]

Total cholesterol (TC) among 30-39 years males and females were within the desirable levels of National Cholesterol Education Programme (NCEP) ATP-III guide lines hence not significant.

While the total cholesterol of 40-49 age group male was within the desirable value but in the females of the same age group it was in the borderline i.e.230.50 ± 32.22 mg/dl P = 0.007 while the control had only 159 ± 29.9 mg/dl. The total cholesterol values of both males and females were statistically significant when compared to control.

In 50-59 age group males the TC was 208.44 ± 38.80 mg/dl, p= 0.0008 as compared to control of 178.3 ± 5.208 which was in the borderline, even the females was the same age group the TC level 231.8 ± 48.53 mg/dl, p=0.0345 (control = 178 ± 2.82) was also in the border line. The total cholesterol values of both males and females were statistically significant when compared to control.

Among the 60-69 age group the TC in the diabetic males were borderline with 204.67 ± 66.424, p = 1873 (control = 161.11 ± 7.49) and females has TC at 286.5 ± 135.06 mg/dl, p = 0.2212 and was under the high level category of more than 240 mg/dl according NCEP guidelines but was not statistically significant when compared to control.

In the 30-39 year age group males had triglyceride level of 246.21 ± 40.81 mg/dl as compared to 99.5 ± 17 of control and comes under high level as per NCEP guidelines and is statistically significant, while females of same age group had only borderline triglyceride levels of 193± 60.81mg/dl, p = 0.128 and was higher than control values of 113 ± 47.1 but statistically not significant

Among 40-49 age group males the TG level was 255 ± 171.42 mg/dl (control= 99.3 ± 18.9mg/dl) which is high level as per NCEP guide lines, while among females it was 192 ± 89.83, p = 0.752(control = 105 ± 10.6 mg/dl) taken as borderline to high.

Among 50-59 age group males had mean TG levels of 215.56 ± 100.1 mg/dl, p=0.0002 (control 101 ± 7.616) which is high level and females had 197 ± 90.763 mg/dl, p = 0.0461 (control = 99.5 ± 33.23) is considered borderline high as per NCEP guidelines and was statistically significant for both males and females of this age group.

In the 60-69 age group males had TG levels of 184.33 ± 101.16 mg/dl, p = 0.0142 (control 99.33 ± 15.13) taken as borderline high and female of this age group had 272.5 ± 234 shows high level of TG as per NCEP guideline but statistically not significant for both males and females.

In the age group of 30-39 males had mean HDL value of 30.2 ± 8.643 mg/dl, p=0.101 (control 46.83 ± 3.68), and females HDL level was 34.5 ± 0.707 mg/dl, p =0.156 (control 46.66 ± 2.68) mg/dl, both males and females low level as per NCEP guideline and statistically not significant.

In the age group of 40-49 Males had HDL values of 33.615 ± 8.53 mg/dl, p=0.00007 (control 43.7 ± 4.91),low level as per NCEP, hence statisticallysignificant. Wherein Females had HDL level 41± 13.11mg/dl, p =0.2241 (control 43.8 ± 2.68) again low levels but statistically not significant. The age group in50-59 age group males had 33.25 ± 7.75 mg/dl HDL level with p =0.0005 which is low level, and females 44.2 ± 11.34 mg/dl, p = 0.3085 (control 47 ± 1.414) which is borderline high as per NCEP guideline.

In the age of 60-69 males have HDL level was 33.33 ± 5.77 mg/dl, p = 0.0469 (Control 44.77 ± 4.37) and females 39 ± 1.4142 mg/dl, p = 0.0149 (control 47±1.4142) both are low levels as per NCEP guidelines. the HDL level is substantially decreased as compared to control hence statistically significant for both males and females.

The males of 30-39 age group had LDL levels of 117.6 ± 21.43 mg/dl, p=0.088 (control 102 ± 4.9) and females of this age group had 104.5 ± 10.61 mg/dl, p=0.299 (control 98.7 ± 4.62) both of which were near optimal as between 100 - 129 mg/dl as per NCEP guidelines and statistically not significant.

In 40-49 age group males LDL was 97.846 ± 42.7 mg/dl, p = 0.434 (control 99.9 ± 4.94 mg/dl) which was optimal i.e.< 100 mg/dl, females of the same age group shows LDL levels of 151.5 ± 35.25 mg/dl, p=0.029 (control 98.6 ± 5.27) which is borderline high and statistically significant.

In 50-59 year age males, LDL was 130.75 ± 38.49 mg/dl, p=0.0021 (control 98.2 ± 5.116 mg/dl) which is borderline high as per NCEP guideline and statistically significant when compared to control. Females of the same age group had LDL levels of 139.2 ± 63.04 mg/dl, p=0.158 (control 106 ± 14.14 mg/dl) which was borderline high but statistically not significant.

Among 60-69 years old males LDL was 84 ± 27.05 mg/dl, p=0.3055 (control 94.44 ± 32.19 mg/dl) which was optimum as per NCEP and females of the same age group had LDL levels of 193.5 ± 91.217 mg/dl, p=0.1107 (control 63 ± 52.32 mg/dl) which was very i.e.> 190 mg/dl as per NCEP both the values were statistically not significant.

The most common (46%) vascular complication[TABLE-2] observed is (IHD) ischemic heart disease having 53.84% in Females and 43.24% in Males. next vascular complications are neuropathy(24%)and retinopathy(24%). Neuropathy observed in females (30.16%) more than males(16.21%) similarly retinopathy also observed in females(30.16%) more than males(16.21%).

CONCLUSIONS:

The percentage elevation of total cholesterol among diabetics was 34% (Total Cholesterol more than 200 mg/dl) and Triglyceride was 64% (more than 150 mg/dl) HDL was 72% (HDL

less than 40 mg/dl) and LDL was 60% (LDL more than 100 mg/dl), 92% of the 50 diabetics had dyslipidemia.

TABLE-1 MEAN AND STANDARD DEVIATION OF CHOLESTROL

parameter	TOTAL(DM)	MALE(DM)	FEMALE(DM)	CONTROL
AGE	49.62+/-8.38	49.21+/-8.77	50.76+/-7.36	50.84+/-9.04
Duration	6.69+/-5.30	6.71+/-5.39	6.61+/-5.26	
FBS	183.4+/-53.37	180.05+/-52.80	192.92+/-55.97	108.62+/-10.80
TC(mg/dl)	207.62+/-49.79	199.29+/-43.52	231.30+/-60.15	163.66+/-18.21
TG(mg/dl)	224.64+/-117.87	231.02+/-123.49	206.46+/-102.47	100.78+/-17.78
LDL(mg/dl)	122.04+/-46.18	113.62+/-7.79	146+/-55.05	97.3+/-17.39
HDL(mg/dl)	35.64+/-9.00	32.97+/-7.79	470.92+/-9.90	50.82+/-25.14

TABLE-2 VASCULAR COMPLICATIONS

COMPLICATIONS	MALES	FEMALES	TOTAL
RETINOPATHY	9(24.32%)	2(15.38%)	11(22%)
HYPERTENSION	25(67.56%)	8(61.5%)	33(66%)
IHD	16(43.24%)	7(53.84%)	23(46%)
NEPHROPATHY	2(5.40)	0	2(4%)
PVD	3(8.10)	2(15.38%)	5(10%)
CVA	6(16.21%)	2(15.38%)	8(16%)
NEUROPATHY	6(16.21%	4(30.16%)	12(24%)

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