A STUDY OF LIPID PROFILE IN TYPE 2 DIABETIC SUBJECTS IN SELECTED AREA OF PUDUCHERRY STATE

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ABSTRACT

The reason for the study was to observe the lipid profile of type 2 diabetics in the subjects of selected area Puducherry state. Method(s): A total of 110 Type 2 diabetic men with an age range from 35 to 75 years eagerly participated in this study. The fasting blood sugar (FBS) & lipid profiles were maintained with analyzing procedure. Results: The mean age and FBS were 55..9 ± 12.6 years and 140.1±27.8 mg/dl respectively. There were 62% subjects with high total cholesterol (TC) levels and 96% were having increased LDL levels. 88% of the subjects were found with lower HDL level. Conclusion: It is concluded from the results of the present study that in type 2 diabetics dyslipidaemia was very common especially raised LDL levels. Results strongly suggest that further investigations should relate the effects of dyslipidaemia and abnormalities of insulin resistance in type 2 diabetics[1]. And ethnic specific patterns of lipid profile in type 2 diabetics regardless of their glucose levels, suggests that ethnic-specific strategies and guidelines on risk assessment and prevention of CVD due to dyslipidaemia are required.

Keywords: *CVD, FBS, Dyslipidaemia.*

Introduction

More cardiovascular disease occurs in patients with either type 1 or 2 diabetes. The link between diabetes and atherosclerosis is, however, not completely understood. Among the metabolic abnormalities that commonly accompany diabetes are disturbances in the production and clearance of plasma lipoproteins. Moreover, development of dyslipidaemia may be of future diabetes [1]. Patient with diabetes are relatively at an increased risk of CAD as compared to those without diabetes [2]. Lipoprotein (a) [Lp(a)], the smaller and denser fraction of LDL-C, because of its profound atherogenicity, is an emerging risk factor for coronary heart disease (CHD) (American Diabetes Association, 2004)[3, 4]. Dyslipidaemia is a disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency. Dyslipidaemia may be manifested by elevation of the total cholesterol, the "bad" low-density lipoprotein (LDL) cholesterol and the triglyceride concentrations, and a decrease in the "good" high-density lipoprotein (HDL) cholesterol concentration in the blood [5]. The important significant of the major cardiovascular disease (CVD) risk factors and plays an important role in the progress of atherosclerosis, relates to the pathology of CVD.These come under consideration in many situations including diabetes, A common cause of lipidemia. For adults with diabetes, it has been recommended that the levels of LDL, HDL, and total cholesterol, and triglyceride be measured every

yearThese are more complicated abnormalities that are results by the interrelation among the subjects with obesity, insulin resistance and hyperinsulinism. The elevated total cholesterol, LDL cholesterol, triglycerides and blood pressure as well as 11.9 time higher probability to have hyperinsulinemia. It is worth to emphasize that the fatty tissue is exclusively related to risk factors, such as the altered insulin and lipid profile, which can contribute to the development of the insulin resistance syndrome` It has long been known that lipid abnormalities are major risk factors for CVD [6.7]. In addition, chronic hyperglycemia promotes the glycation of LDL-C, and both glycation and oxidation are believed to increase the atherogenicity of LDL-C. Both of these processes may impair function and/or enhance atherogenicity even in those with type 1 diabetes with a normal lipid profile. [8, 9].These abnormalities can be present alone or in combination with other metabolic disorders` Very few cross-sectional studies have evaluated the relationship between lipid and blood glucose concentrations in type 2 diabetics in Punjabi subjects. The present study was planned to identify the prevalence of abnormalities in lipid profile among type 2 diabetic subjects of Puducherry.

Materials and Methods

One hundred and ten type 2 diabetic patients belonging to karaikal district of Puducherry were enrolled as subjects after obtained their informed written consent. The age ranged from 35-75 years. The aim of the study was thoroughly explained to subjects.

Clinical history was also documented and following exclusion criteria were used.

Inclusion criteria
1. Known case of type 2 Diabetes mellitus
2. Recently diagnosed case of type 2 Diabetes mellitus

Exclusion criteria
1. Insulin therapy
2. Lipid lowering drugs
3. Chronic renal failure
4. Nephrotic syndrome
5. Hypothyroidism
6. Drugs that cause dyslipidaemia
7. Obesity

Subjects should not taken any steroid therapy in past 3 months, any liver, kidney or cardiac failure, neoplasm and patients who were on any type of anti-lipidemic therapy. The study was reviewed and approved by the Ethics Committee of Pondicherry University Puducherry. The serum was separated immediately after obtaining the blood sample (overnight fasting) by using centrifugation for 10 minutes. Fasting blood glucose concentration and Lipid Profile [Total Cholesterol (TC), HDL, VLDL & Triglycerides (TG)] were measured using Blood Analyzer. The appropriate chemical testing kits were used. LDL was calculated by using Friedewald formula: LDL= TC – (TG/5) - HDL.[10] for the descriptive and inferential statistics SPSS version 16 was used.

Results & Discussion

Table 1 shows the mean values of age and fasting blood sugar were observed to be 55.9 ± 12.6 years and 140.1 ± 27.8 mg/dl respectively. Results of the BMI in the present study indicate that our subjects were not obese but their mean fasting blood sugar level was more than the normal value -table 1.

Table 1 Mean±SD of Age & FBS of Type 2 diabetics

Variables	Mean ± SD
Age (years)	55.9 ± 12.6
FBS(mg/dl)	140.1±27.8

Table 2 shows the quantitative analysis of lipid profile of Type 2 diabetics and found that the mean total cholesterol 205.6±14.7 mg/dl), triglycerides (149.9± 18.2 mg/dl), HDL (48.1±5.9mg/dl), LDL (125.2± 12.1 mg/dl), VLDL (32.5 ± 8.2 mg/dl) & LDL / HDL ratio (2.63 ± .37).

Table 2. Mean±SD of lipid profile of Type 2 diabetics

Variables	
Total Cholesterol, TC (mg/dl)	205.6±14.7
Triglycerides, TAG (mg/dl)	149.9± 18.2
HDL-C (mg/dl)	48.1±5.9
LDL-C (mg/dl)	125.2± 12.1
VLDL (mg/dl)	32.5 ± 8.2
Ratio of LDL / HDL	2.60±0.37

TC- total cholesterol, HDL- high density lipoproteins, LDL-low density lipoproteins, VLDL- very low density lipoproteins, TG- triglycerides

The study also includes the analyses of hyper- cholesterolemia, hypertriglyceridemia, low HDL and high low density lipoproteinaemia among type 2 diabetics. It was found that 62% Type 2 diabetics in this study had hypercholesterolemia, 56% Hypertriglyceridemia and 96% abnormal LDL levels. In 88% of Type 2 diabetics, the HDL was less than 40 mg/dl. Thus, the results of the present study shows that in Type 2 diabetics the dyslipidaemia is the most common abnormality and it was found in the level of LDL-C value.

Discussion

For the interpretation of serum lipid reference values, the guidelines of National Cholesterol Education Programme (NCEP) Adult Treatment Panel III (ATP III) were followed. According to NCEP-ATPIII guidelines, hypercholesterolemia is defined as TC > 200 mg/dl, high LDL-C when value > 100 mg/dl, hypertriglyceridemia as TAG > 150 mg/dl and low HDL-C when value is < 40 mg/dl. Dyslipidaemia was defined by presence of one or more than one abnormal serum lipid concentration [11]. Diabetes in most countries and hence the major burdens due to its rising prevalence [12]. Data from the Paris Prospective Study and the UKPDS shows that triglycerides in diabetic patients are higher than in the general population.[13,14]. The results of the present study were in agreement with the previous research reports that dyslipidaemia, overweight and obesity is a common association with type 2 diabetic patients *(Heffner, 1998 and American Diabetes Association, 1998).* In the study of Sehran *et al* in Pakistan, 54% diabetic individuals had elevated LDL-C, >50% individuals had increased TG In the present study 62% of the subjects had hypercholesterolemia and 96% abnormal LDL levels. Type of dyslipidaemia reported among diabetic subjects is numerous in different places in world indicating that dyslipidaemia can be influenced by the interaction of genetic and environmental factors *(Carlos et al, 2001).* The prevalence of the lipid abnormalities reported by Mexican nationwide survey done by *Carlos et al, (2001)* is similar to that observed in Turkish *(Mahley et al, 1995)* and other Asian subjects, including Bangladeshi and Pakistani subjects *(Bhopal et al, 1999).* Their study shows that 56% of the diabetic subjects had Hypertriglyceridemia. The present study is in agreement with the above report in relation to prevalence rates of hypertriglyceridemia among type 2 diabetic Puducherry subjects (56% in the present investigation and 54% in Mexican nationwide survey). It was also found that 96% of Type 2 diabetics had high LDL levels and 62% showed hypercholesterolemia. This observation further confirms that patients with Type 2 diabetes had co-incidence of several abnormal lipid profiles. It further confirms that dyslipidaemia could have impact on the development of insulin resistance in type 2 diabetes mellitus. *Menik et al (2005)* reported a significant genetic association between development of insulin resistance and dyslipidaemia among type 2 diabetic patients.

Conclusion

It is concluded from the results of the present study that type 2 diabetics were either overweight or type I obese and dyslipidaemia was very common. Results strongly suggest that further investigations should relate the effects of dyslipidaemia and abnormalities of insulin resistance in type 2 diabetics. And ethnic specific patterns of lipid profile in type 2 diabetics regardless of their glucose levels, suggesting that ethnic specific strategies and guidelines on risk assessment and prevention of CVD due to dyslipidaemia are required.

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