

## **Impact of Chronicity on Lipid Profile of Type 2 Diabetics**

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### **Abstract**

**Aim:** To study the impact of chronicity of type 2 diabetes on lipid profile in type 2 diabetics.

**Material & Methods:** This study was conducted on 120 Punjabi male type 2 diabetics. Their age ranged from 30 to 70 years. The subjects were categorized into three groups, on the basis of the duration of detection of type 2 diabetes- group 1(below 4 years), group 2 (between 4 to 8 years) and group 3(above 8 years).**Results:** There was sharp and definite increase in the percentage of patients having >200mg/dl total cholesterol after four years of diabetes mellitus from 16% to 25% and then to 55% after 8 years of duration. The percentage of patients having >150mg/dl of low density lipoproteins (LDL) after 8 years of diabetes mellitus was much high (67%) as compared to group 1 (29%) and group 2 (49%) . There was also an increase in the percentage of patients having <160mg/dl of triglycerides after four years of diabetes mellitus from 14% to 37% of diabetes and then to 56% after 8 years. **Conclusion:** The chronicity of Type 2 Diabetes mellitus disturb the normal levels of lipid profile that is dyslipidemia if unchecked this may lead to atherosclerosis and ultimately Cardio-Vascular Disease (CVD) and it is the commonest cause of death in type 2 diabetics.

**Key words: Type 2 Diabetes Mellitus, Lipid profile, Dyslipidemia.**

### **Introduction**

Dyslipidemia is one of the major cardiovascular disease (CVD) risk factors and plays an important role in the progress of atherosclerosis, the underlying pathology of CVD. The prevalence of dyslipidemia in type 2 diabetes is double with respect to the general population (Haffner, 1998). In patients with type 2 diabetes, which is equivalent to CHD (Juutilainen et al. 2005); it is most commonly characterized by elevated TG and reduced HDL-C (Goldberg, 2001). These abnormalities can be present alone or in combination with other metabolic disorders. The prevalence of dyslipidemia varies depending on the population studied, geographic location,

socioeconomic development and the definition used (Wood et al, 1972; Berrios et al, 1997). Triglyceridemia has been associated with increased risk of coronary heart disease both in non-diabetic and type 2 diabetic subjects (Frank et al., 2002, Sridhar, 2002). Remnants of triglyceride rich lipoproteins seem to be extremely atherogenic (Car et al., 2004). LDL cholesterol is related to life style factors such as diet and exercise (Khatit et al., 2008). It has been associated with metabolic syndrome (Analava et al., 2007). The Pro-atherogenic properties of small LDL particles may relate to their ability to penetrate the arterial wall and thereby making them more susceptible to

oxidation, indirectly linked with coronary artery disease (*Goldfine and Beckman, 2008*). Coronary artery disease represents a wide spectrum from angina pectoris, myocardial infarction and sudden death to silent myocardial ischemia (*Mozaffarian et al., 2006*). Silent myocardial ischemia has a reported prevalence of 10-20% in diabetic population as compared to 1-4% in non-diabetic population (*Ronald et al., 2004*). The present study was planned to identify the impact of Chronicity on lipid profile among type 2 diabetic Punjabi population.

### Material and Methods

This prospective study was conducted on 120 type 2 diabetic patients. The age limit was taken from 30 to 70 years. Only male patients were selected on random base as subjects. The study protocol was reviewed and approved by the Ethics Committee of Punjabi University, Patiala. Following exclusion criteria was used- patients with type 1 diabetes mellitus, any liver, kidney or cardiac failure, neoplasm and patients who were on any type of anti-lipidemic therapy. The objectives of the present study were thoroughly explained to the subjects. Participants of the study were divided into three groups according to the duration of detection of diabetes mellitus. In the first group patients with history of type 2 diabetes mellitus below 4 years were included; second group included 4-8 years and third group included above 8 years duration of type 2 diabetes mellitus. The patient underwent a clinical assessment, which included history (a questionnaire) and clinical examination. The variables of questionnaire were age, sex, marital status, personal history

(occupation, education, socio-economic status) exercise status, smoking status and family history (including family history of diabetes). The serum was separated immediately after obtaining the blood sample (overnight fasting) using centrifugation for 10 minutes. Lipid Profile [Total Cholesterol (TC), HDL & Triglycerides (TG)] were measured using Blood Analyzer by the qualified laboratory technician. The appropriate chemical testing kits were used. LDL was calculated by using Friedewald formula:  $LDL = TC - (TG/5) - HDL$ .

### Results & Discussion

Among 120 patients with diabetes below 4 years of onset, 21(**48%**) had total cholesterol levels <150mg/dl while 16(36%) had total cholesterol levels 150–200mg/dl and 7(16%) had >200mg/dl. Among those with diabetes for 4-8 years, 15(30%) had total cholesterol <150 mg/dl while 12(25%) had 150-200mg/dl and 22(**45%**) had levels >200mg/dl. Among those with diabetes for above 8 years, 5(19%) had total cholesterol levels < 150mg/dl while 7(26%) had 150-200mg/dl and 15(**55%**) had >200mg/dl.

Among 120 patients with diabetes below 4 years of onset, 10(23%) had HDL - cholesterol levels <40mg/dl while 34(**77%**) had >40mg/dl. Among those with diabetes for 4-8 years, 19(39%) had HDL cholesterol <40mg/dl while 30(**61%**) had >40mg/dl. Among those with diabetes for above 8 years, 17(**63%**) had HDL cholesterol <40mg/dl while 10(37%) had >40mg/dl.

Among 120 patients with diabetes below 4 years of onset, 31(**71%**) had LDL-cholesterol levels <150mg/dl while

13(29%) had >150mg/dl. Among those with diabetes for 4-8 years, 25(51%) had LDL cholesterol levels <150mg/dl and 14(49%) had LDL cholesterol >150mg/dl. Among those with diabetes for above 8 years, 9(33%) had LDL cholesterol <150 mg/dl while 18(67%) had LDL cholesterol levels >150mg/dl. Among 120 patients with diabetes below 4 years of onset,

38(86%) had triglyceride levels from 40-160 mg/dl while 6(14%) had >160mg/dl. Among those with diabetes for 4-8 years, 31(63%) had triglycerides from 40-160 mg/dl while 18(37%) had >160mg/dl. Among those with diabetes for above 8 years, 12(44%) had triglycerides 40-160 mg/dl while 15(56%) had >160mg/dl.

**Table: Duration of Type 2 diabetes and lipid profile of different groups.**

Group	Group 1, (below 4 years)	Group 2, (4-8 years)	Group 3, (above 8 years)			
<b>TC (mg/dl)</b>						
<150	21(48%)	135±5.9	15(30%)	141±2.2	5(19%)	148±4.1
150-200	16(36%)	168±8.2	22(45%)	177±6.9	7(26%)	181±3.3
>200	7(16%)	202±2.0	12(25%)	214±3.7	15(55%)	222±5.2
<b>HDL (mg/dl)</b>						
<40	10(23%)	39±3.5	19(39%)	35±3.0	17(63%)	31±4.2
>40	34(77%)	52±5.4	30(61%)	47±2.8	10(37%)	44±3.6
<b>LDL (mg/dl)</b>						
<150	31(71%)	121±4.1	25(51%)	134±5.4	9(33%)	140±2.0
>150	13(29%)	145±7.2	24(49%)	157±3.9	18(67%)	169±4.7
<b>TG (mg/dl)</b>						
40-160	38(86%)	120±7.2	31(63%)	143±3.7	12(44%)	147±5.3
>160	6(14%)	160±2.9	18(37%)	171±4.7	15(56%)	183± 2.0

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

The Patients with diabetes have a higher degree of atherosclerosis burden due to dyslipidemia than the people without diabetes (Mohsin et al., 2007). New National Cholesterol Education Programme (NCEP) guidelines raise the risk factors of patients with diabetes without known CHD to CHD equivalent, a guideline substantiated by the results of numerous studies (Alexander et al., 2003). For example in Finnish East West Study, patients with diabetes, without known heart disease had 20% chance of having a cardiac event over a 7 years time period

(Haffner et al., 2000). In Canadian patients with type 2 diabetes a Chart audit study revealed that 55% of patients with a diagnosis of <2 years had dyslipidemia. This population rose to 16% in patients with diabetes for >15 years (Harris et al., 2005). The United Kingdom Prospective Study (UKPDS) calculated risk score for CVD, which indicates both the duration and the degree of glycemic control (Guzder et al., 2005). Talat et al, (2003) found that duration of diabetes was associated with higher incidence of dyslipidemia. In that study they found elevated total cholesterol, low density

lipoprotein and triglycerides. Our study is consistent with that.

**Conclusion:** The chronicity of Type 2 Diabetes mellitus can disturb the normal levels of lipid profile which can lead to dyslipidemia. The advanced dyslipidemia can progress the atherosclerosis and ultimately Cardio-Vascular Disease (CVD), commonest cause of death in type 2 diabetics.

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