

IMPACT OF DURATION OF TYPE 2 DIABETES MELLITUS ON LIPID PROFILE

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ABSTRACT

Background: In type 2 diabetes mellitus lipid abnormalities are almost the rule. This study was conducted to know the impact of duration on lipid profile in type 2 diabetic patients.

Material & Methods: This cross-sectional study was conducted at Khyber Medical College Peshawar from February 2009 to July 2009. The patients underwent a clinical assessment, which included history (a questionnaire) and clinical examination. 400 Diabetic Patients were categorized into four groups. The duration of diabetes in these patients was 1 to 8 years. The age limits was 40 to 60 years.

Results: There was sharp and definite increase in the percentage of patients having ≥ 200 mg/dl total cholesterol after four years of diabetes mellitus from (28-34%) to (41%). There was a sharp increase in the percentage of patients having > 150 mg/dl of low density lipoproteins after 6 years of diabetes mellitus from (8-9%) to (14.2%). There was also an increase in the percentage of patients having < 160 mg/dl of triglycerides after four years of diabetes mellitus from 53% to 61% of diabetes.

Conclusion: Increasing duration of diabetes is associated with higher incidence of dyslipidemia.

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

INTRODUCTION

In type 2 diabetes mellitus lipid abnormalities are almost the rule. Typical findings are elevation of total and VLDL cholesterol, triglyceride concentration, exaggerated postprandial lipaemia, lowering of HDL cholesterol and a predominance of small, dense LDL particles.¹ Insulin resistance is often involved in this process.²

Triglyceridemia has been associated with increased risk of coronary heart disease both in non-diabetic and type 2 diabetic subjects.^{3,4} Remnants of triglyceride rich lipoproteins seem to be extremely atherogenic.⁵ LDL cholesterol is related to life style factors such as diet and exercise.⁶ It has been associated with metabolic syndrome.⁷ 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.^{8,9}

Coronary artery disease represents a wide spectrum from angina pectoris, myocardial infarction and sudden death to silent myocardial ischemia.¹⁰ Silent myocardial ischemia has a reported prevalence of 10-20% in diabetic population as compared to 1-4% in non-diabetic population.¹¹

This study was conducted to know the impact of duration of illness on the lipid profile in type 2 diabetic patients.

MATERIAL AND METHODS

This study was conducted in Physiology Department of Khyber Medical College Peshawar. Four hundred type 2 diabetic patients were selected from three tertiary care hospitals of Peshawar i.e. Khyber Teaching Hospital, Lady Reading Hospital and Hayatabad Medical Complex. The age group selected was 40 to 60 years, irrespective of sex.

Patients with impaired glucose tolerance test, or known diabetics taking oral hypoglycaemic drugs, or managed with diet for the control of diabetes, were included in the study.

Patients using insulin, using cardiovascular and hypertension medication, having previous history of angina, severe vascular disease, nephropathy or other life threatening disease, and patients taking corticosteroids or any drug affecting lipid profile or diabetic status, were excluded from the study.

Participants of the study were divided into four groups according to the duration of diabetes mellitus. In the first group patients with 1-2 years,

second group 2-4 years, third group 4-6 years and in the fourth group 6-8 years duration were included.

For laboratory purpose the facility of Pakistan Medical Research Council, Khyber Medical College was availed.

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) eating pattern, nutritional status, exercise history, smoking status, menstrual history and family history (including family history of diabetes)

Determination of triglycerides was done by kit method (triglycerides escape), cholesterol determination by Elitech Cholesterol Pap, and LDL-cholesterol was determined by Friedewald formula.

RESULTS

Among 162 patients with diabetes for 1-2 years, 46 (28.3%) had total cholesterol levels <150mg/dl while 70 (43.3%) had total cholesterol levels 150-200mg/dl and 46 (28.3%) had >200mg/dl. Among those with diabetes for 2-4 years, 39 (24.0%) had total cholesterol <150 mg/dl while 70 (43.2%) had 150-200mg/dl and 53 (32.7%) had levels >200mg/dl. Among those with diabetes for 4-6 years, 9 (14.5%) had total cholesterol levels < 150mg/dl while 27 (43.5%) had 150-200mg/dl and 26 (41.9%) had >200mg/dl. Among 14 patients with history of diabetes for 6-8 years, 3 (21.4%) had total cholesterol levels <150mg/dl while 6 (42.8%) had 150-200mg/dl and 5 (35.7%) had >200mg/dl.

Among 162 patients with diabetes for the last 1-2 years, 56 (35.5%) had HDL cholesterol levels <40mg/dl while 106 (65.4%) had >40mg/dl. Among 162 patients with diabetes for 2-4 years, 55 (33.9%) had HDL cholesterol <40mg/dl while 107 (60.0%) had >40mg/dl. Among 62 patients with diabetes for 4-6 years, 20 (32.2%) had HDL cholesterol <40mg/dl while 42 (67.7%) had >40mg/dl. Among 14 patients with diabetes for 6-8 years, 4 (28.5%) had HDL cholesterol levels <40mg/dl while 10 (71.4%) had >40mg/dl.

Among 162 patients with diabetes for the last 1-2 years, 146 (90.1%) had LDL-cholesterol levels <150mg/dl while 16 (9.8%) had >150mg/dl. Among 162 patients with diabetes for 2-4 years, 148 (91.3%) had LDL cholesterol levels <150mg/dl and 14 (8.6%) had LDL cholesterol >150mg/dl. Among 62 patients with diabetes for 4-6 years, 56 (90.3%) had LDL cholesterol <150 mg/dl while 6 (9.6%) had LDL cholesterol levels >150mg/dl. Among 14 patients with diabetes for the last 6-8 years, 12 (85.7%) had LDL cholesterol levels <150mg/dl and 2 (14.2%) had LDL cholesterol levels >150mg/dl.

Among 162 patients with diabetes for 1-2 years, 75 (46.2%) had triglyceride levels from 40-160 mg/dl while 87 (53.7%) had >160mg/dl. In those with diabetes for 2-4 years, 76 (46.9%) had triglycerides from 40-160 mg/dl while 86 (53%) had >160mg/dl. In those with diabetes for 4-6 years, 24 (38.7%) had triglycerides 40-160 mg/dl while 38 (61.2%) had >160mg/dl. Among 14 patients with diabetes for 6-8 years, 7 (50%) had triglyceride 40-160 mg/dl while 7 (50%) had >160mg/dl.

Table: Duration of diabetes mellitus and lipid profile. (n=162).

Duration of diabetes	TC (mg/dl)	Number (Percentage)	HDL-C (mg/dl)	Number (Percentage)	LDL-C (mg/dl)	Number (Percentage)	TG (mg/dl)	Number (Percentage)
1-2 years	<150	46 (28.3)	<40	56 (35.5)	<150	146 (90.1)	40-160	75 (46.2)
	150-200	70 (43.3)	>40	106 (65.4)	>150	16 (9.8)	>160	87 (53.7)
	>200	46 (28.3)						
2-4 years	<150	39 (24.0)	<40	55 (33.9)	<150	148 (91.3)	40-160	76 (46.9)
	150-200	70(43.2)	>40	107 (60.0)	>150	14 (8.6)	>160	86 (53.0)
	>200	53 (32.7)						
4-6 years	<150	09 (14.5)	<40	20 (32.2)	<150	56 (90.3)	40-160	24 (38.7)
	150-200	27 (43.5)	>40	42 (67.7)	>150	6 (9.6)	>160	38 (61.2)
	>200	26 (41.9)						
6-8 years	<150	3 (21.4)	<40	4 (28.5)	<150	12 (85.7)	40-160	7 (50)
	150-200	6 (42.8)	>40	10 (71.4)	>150	2 (14.2)	>160	7 (50)
	>200	5 (35.7)						

DISCUSSION

The Patients with diabetes have a higher degree of atherosclerosis burden due to dyslipidemia than people without diabetes.¹² New National Cholesterol guidelines raise the risk factors of patients with diabetes without known CHD to CHD equivalent, a guideline substantiated by the results of numerous studies.¹³ 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.¹⁴ 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.¹⁵ The United Kingdom Prospective Study (UKPDS) calculated risk score for CVD, which indicates both the duration and the degree of glycaemic control.¹⁶

Talat N, et al found that duration of diabetes was associated with higher incidence of dyslipidemia.¹⁷ In that study they found elevated total cholesterol, low density lipoprotein and triglycerides but normal HDL. Our study is consistent with that. There was a sharp and definite increase in the percentage of patients having ≥ 200 mg/dl total cholesterol after 4 years of diabetes mellitus from 28-34% to 41%. There was a sharp increase in the percentage of patients having <160mg/dl of triglycerides after four years of diabetes mellitus from 53% to 61% of diabetes.

In our population diabetes and lipid control is usually poor due to various reasons like ignorance, poor socio-economic conditions and false beliefs of treatment.¹⁸

CONCLUSIONS

Increasing duration of diabetes is associated with higher incidence of dyslipidemia.

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