Research Article

Prevalence and pattern of dyslipidemia among type 2 diabetes mellitus patients in a tertiary center hospital of Nepal

Abstract

Background: Diabetes Mellitus is one of the major endocrinological problem in Nepal and one of the major secondary causes of dyslipidemia, particularly in patients with Type 2 DM with poor glycemic control. This in turn is a major risk factor for atherosclerosis and coronary heart disease. A different pattern of dyslipidemia is present in the diabetic population.

Objective: To study the prevalence and pattern of dyslipidemia in type 2 diabetes.

Method: The study was conducted among 150 newly diagnosed patients with Type-2 Diabetes mellitus in dhulikhel hospital in between July 2014 to December 2014 who were not taking any lipid loweing drug. Patients were analysed on the basis of parameters like level of total cholesterol (TCHOL), triacylgycerol (TAG), low density lipoprotein (LDL), high density lipoprotein (HDL) and Glycosylated haemoglobin (HbA1c).

Result: Total of 150 Type-2 DM patients were studied of which 84 were male and 64 female. The prevalence of dyslipidemia among Type-2 DM patients in our study was 85.33%. Prevalence in male was 85.71% and in female was 84.85%. Among males with dyslipidemia, the proportion of patients with mixed dyslipidemia combined two parameter dyslipidemia and isolated single parameter dyslipidemia were 8.33%, 14.28%, 27.38% respectively while in female it was 19.70%, 24.24%, 30.30% respectively.

Conclusion: Majority of patients with Type-2 DM had dyslipidemia. The most common pattern of dyslipidemia among both males and females was isolated dyslipidemia with low HDL.

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Introduction

Type 2 Diabetes Mellitus is a heterogeneous condition characterized by the presence of both impaired insulin secretion and insulin resistance.[1] Diabetes care is complex and requires that many issues, beyond glycaemic control, be addressed.[2] They are prone to certain complications and evidence emerged in the 1990s supporting the benefits of glycaemic control as well as control of blood pressure and lipid levels in the prevention or delay in onset and severity of diabetes complications.[3,4] Glycemic control remains the major clinical objective in management of diabetes whereas long-term management targets in prevention of microvascular and macrovascular complications.

Diabetes mellitus is a common secondary cause of hyperlipidaemia, particularly, if glycaemic control is poor, which in-turn is an important risk factor for atherosclerosis and coronary heart disease.[5,6] The spectrum of dyslipidemia in diabetes mellitus can include all the various types of dyslipidemia identified in the general population; however, one phenotype is particularly common in diabetes mellitus, which is attributed mostly to insulin resistance and insulin deficiency. The characteristic features of this phenotype are a high plasma triglyceride concentration, low HDL cholesterol concentration and increased concentration of small dense LDL cholesterol particle.[7]

This study is conducted to see the prevalence and various patterns of dyslipidemia in type 2 DM.

Methods

This cross sectional study was conducted among 150 statin naïve newly diagnosed patients with Type-2 Diabetes mellitus in dhulikhel hospital in between July 2014 to December 2014. All the patients were interviewed with pre-designed and pre-tested Performa. Patients suffering from other causes of secondary dyslipidemia were excluded. Recent investigation reports were analysed for parameters- total cholesterol (TCHOL), triacylgycerol (TAG), low density lipoprotein (LDL), high density lipoprotein (HDL), Glycosylated Hb (HbA1c).

Patients having one or more parameters (TG, HDL cholesterol, or LDL cholesterol) outside the targets recommended by American Diabetes Association (ADA) were considered to have dyslipidemia.[8] Which include $TG \geq 150$ mg/dl, $LDL \geq 100$ mg/dl, $HDL \leq 40$ mg/dl in males and ≤ 50 mg/dl in females. Glycemic control was considered as good in patients with HbA1c<7% and poor in patients with HbA1c≥7%. Those with dyslipidemia were further classified into mixed dyslipidemia (all three parameters abnormal), combined two parameter dyslipidemia (any two parameters abnormal) and isolated single parameter dyslipidemia (TG, LDL and HDL). Comparison was also made of the lipid levels in patients with good control of diabetes (HbA1c<7%) with those having poor glycaemic control (HbA1c≥7%).[2] Data analysis is done using SPSS version 19.0. Graphs 1 & Graphs 2 and Tables (1-3) were generated using Microsoft word and excel.
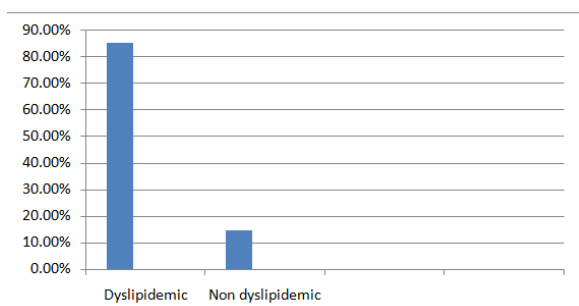
Graph 1 Prevalence of dyslipidemia in type 2 DM patients.

Prevalence of dyslipidemia among Type-2 DM patients in our study was 85.33%.
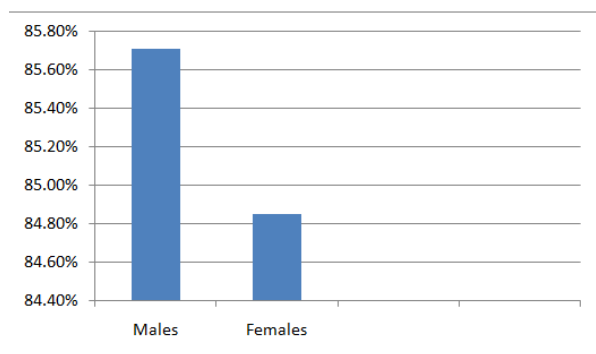
Graph 2 Prevalence of dyslipidemia in diabetic males and females.

Prevalence in male was 85.71% and in female was 84.85%.

Table 1 Clinical Parameters of Diabetic Patients

Parameter	Mean Value
Age	56.27 +/- 11.88 years
HbA1C	8.33 +/- 2.01 %
TAG	173.83 +/- 105.64 mg/dl
HDL	41.69 +/- 11.24 mg/dl
LDL	104.66 +/- 37.07 mg/dl

Table 2 Pattern of Dyslipidemia in Males and Females

Pattern of dyslipidemia	Males	Females
Mixed	8.33%	19.70%
Combined two parameter dyslipidemia	14.28%	24.24%
(LDL >= 100, TG>=150& HDL >40/50)	8.33%	4.54%
(LDL<100, TG>=150& HDL< 40/50)	4.76%	13.63%
(LDL>=100, TG <150 & HDL<40/50)	1.19%	6.06%
Isolated single parameter dyslipidemia	27.38%	30.30%
(LDL>=100, TG <150, HDL >40/50)	9.52%	4.54%
(LDL<100, TG>=150 , HDL>40/50)	3.57%	0%
(LDL<100, TG<150 & HDL<40/50)	14.28%	25.76%

Table 3 Type-2 DM Patients with Dyslipidemia and their Glycemic Status

Lipid level	HbA1C (<7) 38	HbA1C (>=7) 112	Total Pts 150
TAG >= 150	8	41	49 (32.67%)
LDL >= 100	16	67	83 (55.33%)
HDL <= 40 IN MALE <=50 IN FEMALE	15	59	74 (49.33%)

About 112 (74.67%) of the patients were poorly controlled (HbA1c >=7). Of these patients 83.67%, 80.72% and 79.73% had TG, LDL, and HDL outside recommended levels respectively.

Results

Among 150 Type-2 DM patients studied, 84 were male and 64 female. Among males with dyslipidemia, the proportion of patients with mixed dyslipidemia combined two parameter dyslipidemia and isolated single parameter dyslipidemia were 8.33%, 14.28%, 27.38% respectively. Among females with dyslipidemia, the proportion of patients with mixed dyslipidemia combined two parameter dyslipidemia and isolated single parameter dyslipidemia were 19.70%, 24.24%, 30.30% respectively.

The most common pattern of dyslipidemia in our study was isolated single parameter dyslipidemia in both males (27.38%) and females (30.30%). Isolated dyslipidemia with low HDL was common in both males (14.28%) and females (25.76%). Second most common pattern of dyslipidemia was combined two parameter dyslipidemia in both males (14.28%) and females (24.24%) in which high LDL with high TAG (8.33%) was common in males and high TAG with low HDL (13.63%) was common in females.

In our study 50% patient had cholesterol on desirable range (<200 mg/dl), 9.33 % had borderline cholesterol (200- 239 mg/dl), 6% had high cholesterol (>240 mg/dl) and in rest the status of cholesterol was not known.

Discussion

Patients with Diabetes Mellitus have a high prevalence of atherosclerosis and coronary artery disease (CAD). The major risk factors in DM are hyperglycemia, dyslipidemia and hypertension.[9] There is a twofold to fourfold excess risk of coronary artery disease in type 2 DM compared to non-diabetics.[10] Various patterns of lipid abnormalities are seen in patients with type 2 DM. Lipid abnormalities may be the result of the unbalanced metabolic state of diabetes (i.e. hyperglycaemia and insulin resistance) and improved control of hyperglycaemia does moderate diabetes-associated dyslipidaemia.[10] Lipid abnormalities in diabetic patients are likely to play an important role in the development of atherogenesis and so are called atherogenic dyslipidemia.[9] The mean age and HbA1c of study patients was 56.27 yrs and 8.33% which is comparable to the study done by Syed Shahid Habib,[9] i.e 53.12 years and 8.9 % respectively.

Dyslpidemia was present in 85.33% of diabetic patients in our study which is comparable to study done by Udawat et al.,[11] where it was 89%. In our study the prevalence of dyslipidemia in diabetics was 85.71% in males and 84.85% in females, where as in the study by Rakesh et al.,[12] the prevalence of dyslipidemia is 85.5% and 97.5% in males and female diabetics respectively.

In our study among males with dyslipidemia the proportion of patients with mixed dyslipidemia, combined two parameter dyslipidemia and isolated single parameter dyslipidemia were 8.33%, 14.28%, and 27.38% respectively. Figures for the same among female patients stood at 19.70%, 24.24% and 30.30% respectively. Whereas in study done by Jayarama N et al.,[13] Among males with dyslipidemia the proportion of patients with mixed dyslipidemia , Combined two parameter dyslipidemia and isolated single parameter dyslipidemia were 24.5%, 44.2%, and 31.2% respectively. Figures for the same among female patients stood at 27.3%, 42.97% and 29.7% respectively.

In our study isolated dyslipidemia with low HDL was common in both males (14.28%) and females (25.76%). Whereas in a study done by Rakesh et al.,[12] most common pattern was combined dyslipidemia with high LDL and low HDL in both males (22.7%) and females (33%). In our study Second most common pattern of dyslipidemia was combined two parameter dyslipidemia in which high LDL with high TAG was common in males (8.33%) and high TAG with low HDL was common in females (13.63%).

Whereas in a study done by Jayarama N et al.,[13] in south India in 2012 the second most common pattern of dyslipidemia among males and females was isolated low HDL affecting 17.09% and 12.85% respectively. In our study we found hypertriglyceridemia in 32.67%, LDL hyperlipoproteinemia in 55.33% and HDL dyslipidemia in 49.33% of type 2diabetic patients. Where as in a study by Jayarama N et al.,[13] it was 56.46%, 55.09% and 79.29% respectively.

Conclusion

Dyslipidemia was found in majority of patients with Type-2 DM. The most common pattern of dyslipidemia among both males and females was isolated dyslipidemia with low HDL. The most prevalent lipid abnormality in our study was high LDL followed by low HDL.

Acknowledgements

Conflicts of interest

The author declares there is no conflict of interest.

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