Original Article

Pattern of Dyslipidemia in Diabetes Mellitus in Tertiary Hospital of Nepal

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Abstract

Introduction: Dyslipidemia is a preventable major risk factor for coronary heart disease (CHD). Despite an increased risk of CHD in diabetes, little is known concerning awareness and adequacy of dyslipidemia treatment in this population. Patients with type I Diabetes Mellitus are at an increased risk for coronary heart disease. Hence, the study aimed to evaluate the pattern of dyslipidemia in patient with Diabetes Mellitus in tertiary care hospital.

Methods: This is a prospective, cross sectional, descriptive study of Diabetes Mellitus admitted in Medical units of TUTH. History was taken by preformed questionnaires and patients were clinically examined. A series of baseline investigations including fasting lipid profile were done. Patients were followed up till discharge.

Results: A total 120 diagnosed diabetes mellitus patient were enrolled in the study. Total serum cholesterol level was high in 33.3%, serum triglyceride was elevated in 18.3%, LDL cholesterol was raised in 21.7% and HDL cholesterol was low in 20%.

Majority of the study patients 69.2% were found to be in poor status of Glycemic control with HbA1c level more than 7 % and 30.8% were in good control with HbA1c level less than 7%. Among poor Glycemic control group, 84.4% had HbA1c level between 7-12% and 15.6% had HbA1c level >12%

Conclusion: Dyslipidemia, a major risk factor for CHD, remains largely undiagnosed and undertreated in high risk populations, especially in patients with Diabetes. Increased triglycerides and decreased HDL are the commonest pattern observed in diabetics. Treatment of dyslipidemia with various modalities early in the course of disease helps to prevent macrovascular complications.

Key words: Diabetes Mellitus, Dyslipidemia

Introduction

Diabetes mellitus comprises a group of metabolic diseases characterized by hyperglycemia resulting from defects in secretion and/or in the action of insulin.[1] It is a chronic disease which may develop microvascular and macrovascular complications later in the course of disease. The causes for increased risk of complications of diabetes are multifactorial.[2] The microvascular complications are related to glycemic control and duration of diabetes but risk factor for the development of macrovascular complications remains to be similar to those in non diabetic patients like dyslipidemia, hypertension and smoking.[3]

In both diabetes type 1 and type 2, hyperglycemia is frequently accompanied by hyperlipidemia. Hyperlipidemia usually manifests with increases in low density lipoprotein and triglyceride concentrations and free omega-6 fatty acids.[4]

Diabetes is associated with a marked increase in coronary heart disease (CHD) [5, 6]

Total mortality is almost double in type II diabetic patients than non diabetic patients and around 75 % of these deaths are due to cardiovascular events.[7, 8]

Dyslipidemia is a major risk and a common association with the macrovascular complications in both Type I and II Diabetes due to both qualitative and quantitative abnormality in the lipid level.

Absolute risk of coronary heart disease has been shown to increase with hypercholesterolemia in patient with diabetes than with non diabetic.

Each of the approaches to control dyslipidemia including good glycemic control, weight reduction and use of lipid lowering agents like statins, fibrates, nicotinic acid are found to have at least some favourable effect in decreasing the cardiovascular risk.

We tried to evaluate the pattern of dyslipidemia among patients with Diabetes Mellitus in a tertiary care centre in a developing nation in South East Asian context.

Methods

This is a prospective, cross sectional descriptive type of study done in diagnosed cases of diabetes mellitus. During the study period all the cases admitted in the Hospital with diagnosis of Diabetes Mellitus, irrespective of time when they were diagnosed as diabetes were consecutively enrolled in the study. Diabetes Mellitus was diagnosed by the guideline given by WHO in 2000 as fasting plasma glucose more than or equal to 126 mg/dl or random plasma glucose of 200mg/dl or more. Patients who meet the criteria of WHO for the diagnosis of Diabetes and the patients who already had history of Diabetes Mellitus were included in the study. The patients who had impaired glucose tolerance were not included in the study. History was taken by preformed questionnaires and patients were clinically examined. This study was conducted at the TUTH, Katmandu, Nepal, a tertiary care hospital in Nepal between 15th of June 2009 to 15th of January 2010.

A total of 120 patients admitted in the medical unit of TUTH through outpatients department or emergency room with a primary or additional diagnosis of DM were studied in the following steps. Patients were examined either in the emergency room or in the medical ward within first 24 hours of admission and the Performa prepared were filled up by the investigator. A set of baseline investigations needed for DM were done on the patients. The decision to go for more investigations rested on the judgement of the treating physician. All the patients underwent serum lipid profile analysis, Glycosylated Hemoglobin estimation, 12 lead ECG, One minute rhythm ECG, Blood sugar profile, renal function test, Urine for protein/microalbumin and ketone bodies and serum protein and albumin. Bedside clinical test of postural hypotension, Hand grip test and deep breath test were done to all the patients. The patients were followed up till discharge from the hospital. The data were tabulated in Microsoft Excel 2000, and the statistical analysis was done using SPSS.

Results

A total of 120 patients were enrolled in the study and followed up from the time of admission till discharge. Among 120 patients enrolled in the study, female were more commonly affected than male in the ratio of 1.35:1. The most common age group was older population with 50.8% above 60 years; 30% 50-60 years old, followed by 8.3% patients in 30-40 yrs age group and 3.3% in < 30 years . Brahmin and Chhetri were the commonest group affected (66, 55%) followed by Newar (38, 31.7%),Tamang 4, Gurung 3, Magar 3, Teraian 3, Rai 2, and 1 from Kami community. Among the study patients 55, 45.8% were smoker and among the smoker 37, 30.8% were currently smoking despite the disease.

Among the study patients' duration of diabetes varied from detection at the time of admission in hospital to more than 21 years.38.3% had detected diabetes for < 5 years 27.5% had diabetes for 6-10 years. 9.16% had diabetes for 10-15 years. 12.5% had diabetes for 15-20 years 6.7% had history of diabetes for more than 21 years. In about 5.8% patients, Diabetes was detected at the time of admission to hospital.

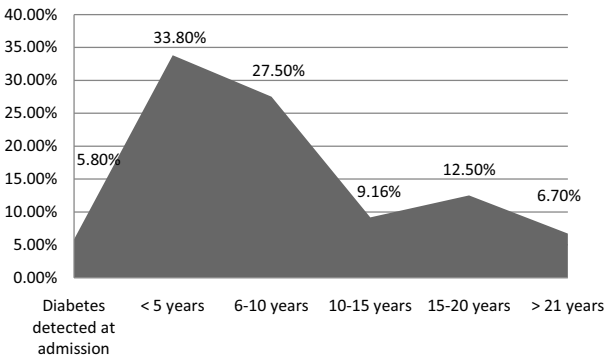

Figure1: Time to Detect Diabetes

66.7% were getting oral hypoglycemic agents prior to admission and 22.5% patients, were not taking any antidiabetic medications and 7.5% of the patients were on insulin. 3.3% were on both OHA and insulin combination therapy. Sulphonylurea (25, 20.8%) Metformin (20, 16.7%) were the two commonly used hypoglycemic agents. 30.8% were on combination therapy of OHA. Majority of diabetic patients were not on Aspirin (72.5%) and Lipid lowering therapy (68.3%). Among the study patients 56.7% had normal BMI, 27.5% were overweight and 9.2% were obese, 6.7% were under weight. All of the underweight patients were under 30 years of age. Evidence of coronary artery diseases were detected in 12-lead ECG in 17.5%. 12.5% patients had indeterminate ECG which signifies changes other than ischemia.

Total serum cholesterol level was high in 40 patients (33.3%), serum triglyceride level was elevated in 22 patients (18.3%), LDL cholesterol level was raised in 26 patients (21.7%) and HDL cholesterol was low in 24 patients (20%).

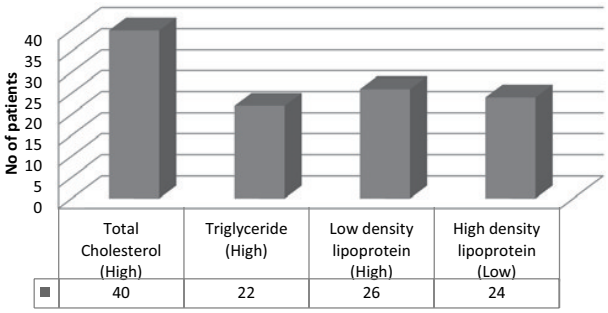

Figure 2: Pattern of Dyslipidemia in Diabetes Mellitus

Discussion

Dyslipidemia is a well-recognized and modifiable risk factor that should be identified early to institute aggressive cardiovascular preventive management. The prevalence and pattern of dyslipidemia in Diabetes mellitus varies in different population. The south Asians are found to have unusually high tendency of developing Diabetes Mellitus type 2 and coronary heart disease. [9, 10] Around 97% of adults with diabetes have one or more lipid abnormalities.[11,12] The form of dyslipidemia that is most characteristic of type 2 diabetes is increased triglyceride and decreased HDL cholesterol.[13-15] Framingham study showed that the prevalence of hypercholesterolemia was similar in diabetic and non diabetic subjects but hypertriglyceridemia was approximately doubled in the diabetic subjects, as was the prevalence of low HDL cholesterol.[7] We observed an increased level of cholesterol and triglyceride in our patients. Similar findings were seen in one study in Ghana[14] where Triglycerides were increased in 31% and cholesterol in 65%. The pathogenesis of dyslipidemia is not fully understood but most of the hypotheses attribute insulin resistance as the cause of dyslipidemia. Insulin inhibits hormone sensitive lipase in adipose tissue particularly peritoneal adipocytes and diabetes leads to the loss of inhibition. So there is lipolysis even in post prandial period in diabetic patients. The flow of non esterified fatty acids from adipose tissue to the liver sensitizes liver to produce triglyceride that are transported in Apo B containing very low density lipoproteins VLDL. [15, 17, 18]

Not only the amount of lipid and lipoproteins are increased in diabetic patients, the properties of various lipoproteins are also altered, and thus increasing their atherogenic properties[7, 19].

We have seen that the prevalence of dyslipidemia is quite high in diabetic patients and that the majority of the population were not under the lipid lowering agents and cardioprotective drugs. The patients diabetes need to be screened for dylipidemia and other risk factor for coronary heart diseases. Quite significant number of patients had coronary heart disease.

Tight glycemic control with various modalities like change in food habit, exercise, and antidiabetic agents is shown to be beneficial in correcting dyslipidemia [20,21] and reducing the risk of CVD in some patients. Others need lipid lowering agents like Statins or Fibrates to correct dyslipidemia and hence decrease the risk of coronary heart diseases[11].

Each of the approaches to control dyslipidemia including good glycemic control, weight reduction and use of lipid lowering agents like statins, fibrates, nicotinic acid are found to have at least some favourable effect in decreasing the cardiovascular risk.

Conclusion

The most consistent lipid abnormality in Diabetes is high triglyceride and low HDL. The study shows the increased prevalence of Triglyceride and Cholesterol and decreased level of HDL in Diabetic patients in our Set-ups. Most of the patients with dyslipidemia were not receiving the lipid lowering therapy and a significant proportion of the patient already developed coronary heart disease probably because the dyslipidemia was not considered seriously or not detected earlier. Early detection and prompt treatment of dyslipidemia in patients with diabetes is very important in order to reduce the macrovascular complications and coronary heart disease in particular. These types of population studies with large samples is recommended

in order to establish the relation of dyslipidemia and complications of diabetes and dyslipidemia has to be considered seriously in patients with diabetes and managed adequately.

Conflict of intrest: None declared

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