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PROPORTION OF NON ALCOHOLIC FATTY LIVER DISEASE AND ITS CORRELATION WITH CORONARY ARTERY DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

KEY WORDS: .

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ABSTRACT

Background : The incidence of NAFLD (Non alcoholic fatty liver disease) in diabetic patients is high and it is also related to increase in the risk of coronary artery disease. Data supporting this in our population is limited. This study is to look for the proportion of NAFLD in patients with Type2 diabetes mellitus (T2 DM) and to find its association with coronary artery disease.

Aims : The aims of the study are to estimate proportion of non alcoholic liver disease as diagnosed by ultrasonographic examination of liver in patients with type 2 diabetes mellitus, to assess the association between and CAD (coronary artery disease) in type 2 diabetic patients, to compare risk factors of CAD between diabetics with and without NAFLD and to find correlation between NAFLD and metabolic parameters like glycemic status and lipid profile.

Methods : The first 100 patients with Type 2 Diabetes mellitus admitted in different General Medicine wards of Government Medical College, Kozhikode were selected as study population. Patients with Age >30 years with diagnosis of Type 2 DM were included in the study. Relevant history is taken from all subjects using a proforma. Anthropometric measurements and clinical examination is carried out in all subjects in fasting state. Relevant laboratory investigations were done and ultrasonogram of abdomen was also taken.

Conclusions : The proportion of NAFLD in diabetic patients is 58 %. Obesity was a risk factor for the development of NAFLD. Long term glycemic status (HbA1C) was significantly associated with NAFLD. It was a better predictor of NAFLD than single blood sugar value. Coronary artery disease was found to be significantly high among individuals with NAFLD compared to those diabetic patients without NAFLD.

INTRODUCTION

Metabolic syndrome consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease and diabetes[1]. Non alcoholic fatty liver disease is the hepatic manifestation of metabolic syndrome. Of the type 2 diabetic patients 70-75% may have some form of NAFLD[2,3]. Recent data suggest that NAFLD in Type 2 DM may also be linked to increased coronary artery disease risk (CAD), independent of risk conferred by components of metabolic syndrome[4]. In our study population, the incidence of NAFLD in diabetes patients is high and it is also link to increase the risk of coronary artery disease. Data supporting this in Indian population is limited. This study is look for the proportion of NAFLD in patients with Type2 diabetes mellitus and to find an association with risk of coronary artery disease.

The aims of the study are to estimate proportion of non alcoholic liver disease as diagnosed by ultrasonographic examination of liver in patients with type 2 diabetes mellitus, to assess the association between NAFLD and CAD in type 2 diabetic patients, to compare risk factors of CAD between diabetic patients with and without NAFLD and to find correlation between NAFLD and metabolic parameters like glycemic status and lipid profile.

METHODS

It was an observational study with case control design, conducted from January 2012 to December 2012.The first 100 patients with Type 2 Diabetes mellitus admitted in different General Medicine wards of Govt. Medical College, Kozhikode were selected as study population. Patients with Age >30 years with diagnosis of Type 2 DM were included in the study. Informed consent is taken from all study subjects .Relevant history is taken from all subjects using a proforma. Anthropometric measurements and clinical examination is carried out in all subjects in fasting state. Body weight measured after removing the heavy clothing and asking the subject to stand still on the platform. Weight was measured to the nearest of 0.1 kg. Height was measured using fixed stadiometer with head held in Frankfurt plane to the nearest of 0.1 cm. Body Mass Index (BMI) calculated using the formula weight (kg)/ height (m^2). Waist Circumference (WC) measured midway between iliac crest and lower most margin of ribs, in quiet breathing. Hip Circumference (HC) measured at the maximum protruding part of buttocks at the level of greater trochanter and Waist to Hip Ratio (WHR) was also calculated. Detailed clinical examination was carried out in all subjects. Pulse rate was determined after 5 minutes of rest in sitting position. Blood pressure was recorded using mercury sphygmomanometer in right upper limb in sitting position. Biochemical analysis- Laboratory investigations including fasting and postprandial blood sugar, fasting lipid profile ,liver function tests, Renal function test, urine routine, HBsAg, HCV were done. HbA1C was calculated by using high performance liquid chromatography. USG abdomen wise assessment of liver fat was also done. With the same kidney cortex and liver parenchyma echogenicity, it is evaluated as normal, ie No fatty liver (Grade 0). Fatty liver was further graded into three.ie Mild (Grade1), Medium (Grade 2) and Severe (Grade 3).

RESULTS

100 patients with Type 2 diabetes were selected as the study population. Out of which 53 were males and 47 were females. Minimum age was 32 and maximum age was 68. Seventy six patients had Type 2 diabetes mellitus of 1-10 year duration, 21 patients had newly detected diabetes and 3 had diabetes for more than 10 years. Out of 100, 19 patients were on insulin and 81 were on OHA. History of hypertension was present in 34 out of 100 patients but on examination 21 had abnormal blood pressure recordings, 13 had controlled BP on medication. Six out of 100 patients had dyslipidemia, 6 had history of coronary artery disease and 3 had history of jaundice. Among the 3 patients with history of jaundice none had evidence of chronic liver disease. Two out of 100 had history of alcohol consumption but none had consumed more than 20gms/day. Thirty nine out of 100 had history of smoking, 35 had more than 10 pack years. Out of 100 diabetic patients 46 had history of either over eating or history of fried food intake, 86 patients out of 100 used to take meat, fish or egg. Only 14 were vegetarians. Family history of diabetes was present in 38, 26 had family history of hypertension, 19 had history of coronary artery disease in the family and 6 patients had family history of liver disease. Most of the patients had sedentary life style. Only 9 had

regular exercise. Five patients had features of dyslipidemia like xanthoma and xanthelasma, 7 had hepatomegaly, none had splenomegaly and two had hirsutism. Twenty eight patients had acanthosis and most of them had NAFLD. Out of 100 diabetes patients 8 had diabetic foot, 30 had diabetic peripheral neuropathy, 12 had diabetic retinopathy and 13 had diabetic nephropathy. Sixty seven patients had BMI more than 23 and out of which 7 had BMI more than 30. Waist hip ratio was elevated in 33 patients. Out of 100 patients with diabetes only few had good glycemic status. More than 90 patients had uncontrolled blood sugar. Out of 100 patients 7 had elevated bilirubin, AST/ALT ratio >1 were seen in 35 patients, hypoalbuminemia (Albumin < 3.5 gm%) were seen in 47 patients, 13 patients had elevated uric acid and 15 had abnormal blood urea or serum creatinine. Fifty eight patients had evidence of NASH assessed by ultrasonogram of the abdomen. Out of which 44 patients had Grade 2 NASH and 4 had Grade 3 NASH. 33 patients out of 100 had abnormal ECG findings. Out of which 8 had ST segment elevation myocardial infarction (STEMI), 7 had Non ST segment elevation myocardial infarction (NSTEMI) and 18 had unstable angina. Out of the 8 patients with STEMI, 6 had thrombolysis with streptokinase. Out of 53 males 28(52.8%) had NAFLD, and out 47 females 25(63.8 %) had NAFLD, with a p value of 0.266 which was not significant. 19 out of 21 patients with duration of diabetes < 1 year had NAFLD. All the 3 patients with diabetes > 1 year had NAFLD with a significant p value. 45 out of 55 patients with dyslipidemia had NAFLD with a significant p value of 0.000. Among 9 patients with HbA1C >9 seven had NAFLD. HbA1C >7 was significantly associated with NAFLD. Patient with elevated AST and ALT were found to have positive correlation with NAFLD with significant p value < 0.05. Of 100 patients, 33 had high waist hip ratio (>0.9 for males and >0.85 for females) of which 28 had NAFLD (85%) with significant p value 0.000. Among 67 patients with normal waist hip ratio 30 had NAFLD. Out of 100, 67 patients had BMI more than 23.5 Out of which 7 had BMI >30. All the 7 had NAFLD with a significant p value 0.001. Only 9 patients in the study population had regular exercise. Of which 6 had NAFLD. Out of 28 patients with acanthosis nigricans 25 patients had NAFLD. Acanthosis is significantly related to NAFLD with a p value 0.000. Out of the 58 patients with NAFLD 24 had coronary artery disease (41%), 9 among 48 without NAFLD had CAD. NAFLD and CAD were significantly related with a p value of 0.036.

DISCUSSION

This study has brought out the prevalence of NAFLD in diabetic patients and the association between NAFLD and CAD[5]. Out of the 100 diabetic patients 58 patients had NAFLD by USG abdomen. Majority had Grade 2 NAFLD, (76%). Out of 53 males 28 had NAFLD (52.8%) and out of 47 females 30 had NAFLD (53%). No significant difference was observed among males and females. In another study of 124 patients (74 men and 50 women) with type 2 diabetes patients, the prevalence of NAFLD was 57.2% with men having a marginally higher prevalence (58.1%) as compared to women (56%)[6]. In our study most of the patients with NAFLD were in patients with diabetes duration 5-10 years with significant 'p' value of 0.000. NAFLD was more common in younger individuals with diabetes but the 'p' value was not significant. The prevalence of NAFLD in T2DM patients in India is reported to be in range of 12.5 - 87.5%[7].

Out of the 58 patients with NAFLD 45 (77.6%) had dyslipidemia with significant 'p' value of 0.000. Elevated ALT, elevated AST (60%), WHR >0.9, BM1 > 30 and acanthosis all were significantly associated with NAFLD. Several prospective, epidemiological studies have shown that elevation of liver enzymes and ultrasonographic appearance of hepatic steatosis are predictors of CAD independent of conventional risk factors[8,9]. Out of the 58 patients with NAFLD 24 had coronary artery disease (41%), 9 among 48 without NAFLD had CAD .NAFLD and CAD are significantly related with a 'p' value of 0.036. Prevalence of CAD was 60.5% in diabetics with NAFLD and 45.2% in diabetics without NAFLD. Binary logistic regression analysis revealed that NAFLD was a significant independent predictor of CAD (p=0.016). Targher et al found that NAFLD was associated with an increased risk of future CAD events among type 2 diabetics[10].

CONCLUSIONS

The proportion of NAFLD in diabetic patients was 58 %. Proportion of NAFLD is more in women than men. DLP was present in most of the patients with NAFLD. Elevated ALT, AST, elevated HbA1C, duration of diabetes all were significantly associated with NAFLD. Duration of diabetes was significantly associated with NAFLD. Elevated waist hip ratio, high body mass index were significantly associated with NAFLD. Obesity is a risk factor for the development of NAFLD. Long term glycemic status (HbA1C) is significantly associated with NAFLD. It was a better predictor of NAFLD than single blood sugar value. Coronary artery disease was found to be significantly high among individuals with NAFLD compared to those diabetic patients without NAFLD. Acanthosis nigricans can be taken as a marker of NAFLD.

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