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ORIGINAL RESEARCH

Occurrence of non- alcoholic fatty liver disease and its correlation with coronary risk factors in patients with diabetes mellitus

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ABSTRACT

Background: People who do not consume alcohol in amounts that are generally considered harmful to the liver are affected by a collection of illnesses known as nonalcoholic fatty liver disease The present study was conducted to assess prevalence of non- alcoholic fatty liver disease and its correlation with coronary risk factors in patients with type 2 DM. **Materials & Methods:** 100 patients of type 2 diabetes of both genderswere divided into 2 groups of 50 each. Patients with NAFLD who had USG evidence of fatty liver changes were in group I, whereas patients without NAFLD who had no USG evidence of fatty liver changes were in group II. Diabetes's history and longevity were noted. Everybody had an ECG, and ischemia alterations were noted. One radiologist conducted the ultrasonographic assessment. **Results:** In group I, 28 were males and 22 were females and in group II, 26 were males and 24 were females. In group I and group II, BMI >25 kg/m² in 32 and 9, hypertension was seen in 37 and 25, smoking in 42 and 23, HbA1c (>7%) in 41 and 19, metabolic syndrome in 45 and 28, LDL cholesterol >160 mg/dl in 25 and 37, HDL (<50 mg/dl in females and <40 mg/dl in males) in 37 and 46, total cholesterol >200 mg/dl in 33 and 32, triglyceride >150 mg/dl in 40 and 24, ALT (> 50 IU/l in males and >35 IU/l in females) in 36 and 18 and AST (>40 IU/l) in 41 and 19 patients in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** The prevalence of non-alcoholic fatty liver disease (NAFLD) increases dramatically in people with type 2 diabetes. Obesity, hypertension, and dyslipidemia were significantly more prevalent in NAFLD patients than in those without the disease.

Keywords: Diabetes, Non-alcoholic fatty liver disease, macrovesicular hepatic steatosis

INTRODUCTION

People who do not consume alcohol in amounts that are generally considered harmful to the liver are affected by a collection of illnesses known as nonalcoholic fatty liver disease (NAFLD), which is histologically characterized by macrovesicular hepatic steatosis.[1] According to reports, the general population's prevalence of NAFLD is between 15% and 30% in several nations, and it is most likely increasing.[2] When diabetes is present, the prevalence of cirrhosis in patients with non-alcoholic fatty liver disease (NAFLD) more than doubles, from 10% to 25%.[3] According to ultrasonography, fatty livers are present in at least two-thirds of patients with hypertriglyceridemia and one-third of patients with hypercholesterolemia who also have hyperlipidemia.[4] Liver imaging may be a more precise method of diagnosing NAFLD.

Patients with type 2 diabetes appear to have a higher risk of developing NAFLD and, most obviously, a higher risk of cirrhosis and fibrosis than patients without the disease.[5] Additionally, new studies suggest that the presence of NAFLD in type 2 diabetes may be associated with a higher risk of cardiovascular disease (CVD), regardless of the metabolic syndrome's components. By detecting NAFLD in those with type 2 diabetes, these findings could have important therapeutic ramifications and aid in predicting the risk of CVD.[6,7]The present study was conducted to assess prevalence of non- alcoholic fatty liver disease and its correlation with coronary risk factors in patients with type 2 DM.

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MATERIALS & METHODS

The present study comprised 100 patients of type 2 diabetes of both genders. All patients gave their written consent for participation in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 50 each. Patients with NAFLD who had USG evidence of fatty liver changes were in group I, whereas patients without NAFLD who had no USG evidence of fatty liver changes were in group II. Diabetes's history and longevity were noted. Everybody had an ECG, and ischemia alterations were noted. One radiologist conducted the ultrasonographic assessment. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Status	NAFLD	Non- NAFLD
M:F	28:22	26:24

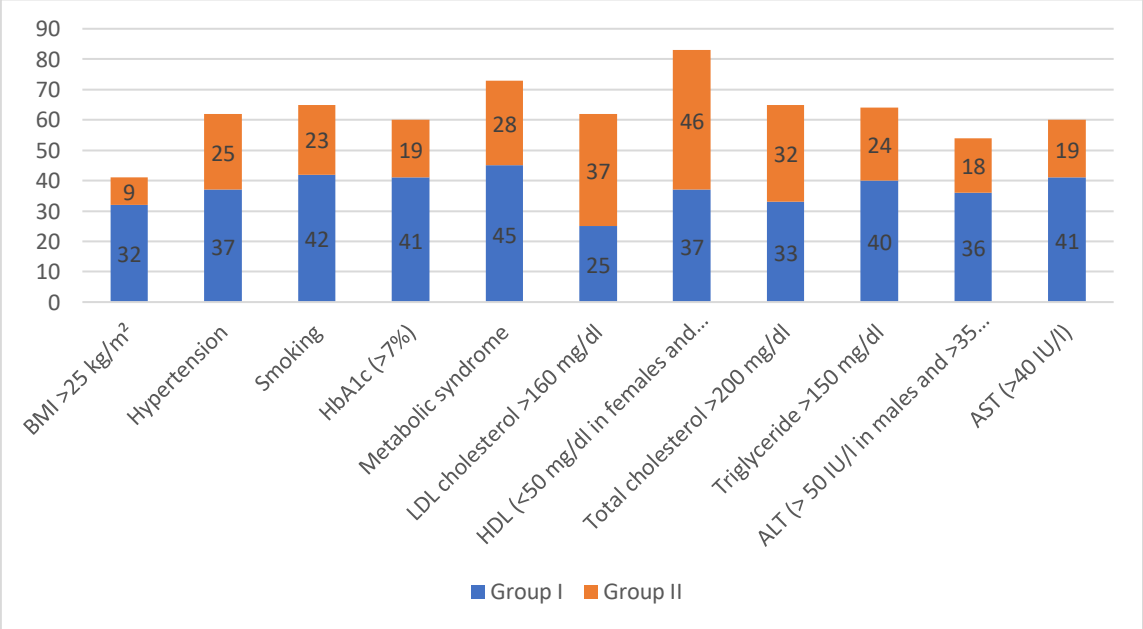
Table I shows that in group I, 28 were males and 22 were females and in group II, 26 were males and 24 were females.

Table II Assessment of parameters

Parameters	Group I	Group II	P value
BMI >25 kg/m²	32	9	0.01
Hypertension	37	25	0.04
Smoking	42	23	0.01
HbA1c (>7%)	41	19	0.01
Metabolic syndrome	45	28	0.02
LDL cholesterol >160 mg/dl	25	37	0.05
HDL (<50 mg/dl in females and <40 mg/dl in males)	37	46	0.05
Total cholesterol >200 mg/dl	33	32	0.94
Triglyceride >150 mg/dl	40	24	0.01
ALT (> 50 IU/l in males and >35 IU/l in females)	36	18	0.05
AST (>40 IU/l)	41	19	0.01

Table II shows that in group I and group II, BMI >25 kg/m²in 32 and 9, hypertension was seen in 37 and 25, smoking in 42 and 23, HbA1c (>7%) in 41 and 19, metabolic syndrome in 45 and 28, LDL cholesterol >160 mg/dl in 25 and 37, HDL (<50 mg/dl in females and <40 mg/dl in males) in 37 and 46, total cholesterol >200 mg/dl in 33 and 32, triglyceride >150 mg/dl in 40 and 24, ALT (> 50 IU/l in males and >35 IU/l in females) in 36 and 18 and AST (>40 IU/l) in 41 and 19 patients in group I and II respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters



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DISCUSSION

The most common form of chronic liver damage, non-alcoholic fatty liver disease (NAFLD), is becoming more commonplace globally, particularly in areas with high obesity and diabetes rates.[8] According to reports, NAFLD is associated with a poorer prognosis for cardiometabolic diseases, especially type 2 diabetes, and liver cirrhosis. NAFLD may be diagnosed if a patient consumes less than 10 g of ethanol per day and their liver fat level surpasses 5–10% of the weight of the organ after secondary causes of hepatic steatosis have been ruled out.[9] Individuals with type 2 diabetes mellitus (T2DM) are clearly at a higher risk of developing deteriorating cirrhosis and fibrosis, and they also seem to have a higher risk of developing non-alcoholic fatty liver disease (NAFLD) than those without the condition.[10]The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG.

We found that in group I, 28 were males and 22 were females and in group II, 26 were males and 24 were females. Kim et al[11]investigated the risk of non-alcoholic fatty liver disease (NAFLD) for cardiovascular disease and all cause death in patients with type 2 diabetes mellitus (T2DM).Of 7 796 763 participants, 6.49% (n=505 763) had T2DM. More patients with T2DM had grade 1 NAFLD (34.06%) and grade 2 NAFLD (26.73%) than those without T2DM (grade 1 NAFLD: 21.20%; grade 2 NAFLD: 10.02%). The incidence rate (per 1000 person years) of cardiovascular disease and all cause death increased in the order of no NAFLD, grade 1 NAFLD, and grade 2 NAFLD, and the incidence rates in patients with T2DM were higher than those in patients without T2DM. The five year absolute risk for cardiovascular disease and all cause death increased in the order of no NAFLD, grade 1 NAFLD, and grade 2 NAFLD in patients without and with T2DM (no NAFLD, without T2DM: 1.03, 95% confidence interval 1.02 to 1.04, and 1.25, 1.24 to 1.26, respectively; grade 1 NAFLD, without T2DM: 1.23, 1.22 to 1.25, and 1.50, 1.48 to 1.51, respectively; grade 2 NAFLD, without T2DM: 1.42, 1.40 to 1.45, and 2.09, 2.06 to 2.12, respectively; no NAFLD, with T2DM: 3.34, 3.27 to 3.41, and 3.68, 3.61 to 3.74, respectively; grade 1 NAFLD, with T2DM: 3.94, 3.87 to 4.02, and 4.25, 4.18 to 4.33, respectively; grade 2 NAFLD, with T2DM: 4.66, 4.54 to 4.78, and 5.91, 5.78 to 6.05, respectively). Patients with T2DM and without NAFLD had a higher five years absolute risk for cardiovascular disease and all cause death than those without T2DM and with grade 2 NAFLD. Risk differences for cardiovascular disease and all cause death between no NAFLD and grade 1 or grade 2 NAFLD were higher in patients with T2DM than in those without T2DM.

We observed that in group I and group II, BMI >25 kg/m² in 32 and 9, hypertension was seen in 37 and 25, smoking in 42 and 23, HbA1c (>7%) in 41 and 19, metabolic syndrome in 45 and 28, LDL cholesterol >160 mg/dl in 25 and 37, HDL (<50 mg/dl in females and <40 mg/dl in males) in 37 and 46, total cholesterol >200 mg/dl in 33 and 32, triglyceride >150 mg/dl in 40 and 24, ALT (> 50 IU/l in males and >35 IU/l in females) in 36 and 18 and AST (>40 IU/l) in 41 and 19 patients in group I and II respectively. Suryawanshi et al[12] investigated the USG prevalence of non-alcoholic fatty liver disease (NAFLD) in individuals with type 2 diabetes mellitus and established a correlation between NAFLD and coronary artery disease and coronary risk factors. Of the 120 patients who participated in the trial, 51 were non-NAFLD and 69 had NAFLD. The mean duration of diabetes was substantially longer in those with NAFLD. Obesity, visceral obesity, metabolic syndrome, and hypertension were more common in the NAFLD group. Glycemic control was significantly worse in the NAFLD group. The NAFLD group had higher levels of Sr. HDL and Sr. Triglycerides, whereas the non-NAFLD group had higher levels of Sr. LDL. The two groups' total cholesterol levels were essentially equal.ALT and AST values were higher in NAFLD patients than in non-NAFLD patients.

In a cohort of Indian type 2 diabetics, Agrawal et al[13] used ultrasonography to determine the prevalence of non-alcoholic fatty liver disease (NAFLD) and to connect NAFLD with coronary artery disease (CAD) and coronary risk factors. Patients with type 2 diabetes were enlisted consecutively. Both the physical examination and the history were documented. Blood glucose, blood urea, serum creatinine, liver function tests, lipid profile, glycated hemoglobin, microalbuminuria, and ultrasonographic measurement of carotid intimal-medial thickness (CIMT) were among the laboratory tests conducted while fasting and two hours after meals. Based on an ultrasound evaluation of the liver, NAFLD was identified. A NAFLD group (n=71) and a non-NAFLD group (n=53) were created from the study group (n=124). The percentage of people with NAFLD was 57.2%. The NAFLD subgroup had a higher prevalence of CAD (60.5%) than the non-NAFLD segment.

NAFLD in individuals with type 2 diabetes may also raise their risk of cardiovascular disease. T2DM raises the risk of liver-associated death in people with NAFLD by up to 22 times. Simple steatosis and non-alcoholic steatohepatitis (NASH), a progressive form of liver disease, are among the range of liver illnesses. Although it varies depending on the population being examined and the criteria used, the prevalence of non-alcoholic fatty liver disease (NAFLD) is remarkably high in both industrialized and developing countries. In NAFLD, macrovascular steatosis, which is distinguished by the absence of inflammation, is present in over 5% of hepatocytes.[14]The limitation of the study is the small sample size.

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CONCLUSION

Authors found that the prevalence of non-alcoholic fatty liver disease (NAFLD) increases dramatically in people with type 2 diabetes. Obesity, hypertension, and dyslipidemia were significantly more prevalent in NAFLD patients than in those without the disease.

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