

Original Research

An USG assessment of fatty liver disease and cardiovascular diseases in type 2 diabetic patients

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ABSTRACT:

Background: Non-alcoholic fatty liver disease (NAFLD) is the most common form of chronic liver damage and is on the rise worldwide, especially in communities with high rates of obesity and diabetes. The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG. **Materials & Methods:** 92 patients of type 2 diabetes and fatty liver disease of both genders were selected and subjected to ECG. **Results:** Out of 92 patients, 62 were males and 30 were females. The age group <40 years had 23 fatty liver and 3 non- fatty liver patients. Age group 40-50 years had 30 fatty liver and 5 non- fatty liver patients and >50 years had 24 fatty liver and 7 non- fatty liver disease patients. The difference was significant ($P < 0.05$). Ischemia was present in 4 and absent in 7 in patients with <5 years of diabetes, present in 8 in patients and absent in 15 with 5-10 years of diabetes and present in 12 patients and absent in 46 patients with >10 years of diabetes. The difference was significant ($P < 0.05$). LVDD was absent in 28 and present in 66 patients. Grade 1 was seen in 30, grade 2 in 20 and grade 3 in 16 patients. The difference was non- significant ($P > 0.05$). **Conclusion:** Non-alcoholic fatty liver disease (NAFLD) and cardiovascular risk factors were found to be correlated in patients with type 2 diabetes mellitus. Therefore, a thorough evaluation of these patients is required.

Key words: Non-alcoholic fatty liver disease, diabetes mellitus, Ischemia

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INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) is the most common form of chronic liver damage and is on the rise worldwide, especially in communities with high rates of obesity and diabetes. Reports indicate that NAFLD is linked to a better prognosis for liver cirrhosis and cardiometabolic disorders, particularly type 2 diabetes.¹ NAFLD may be diagnosed if the liver's fat content exceeds 5% to 10% of its weight after secondary causes of hepatic steatosis have been ruled out and the patient consumes fewer than 10 g of ethanol daily.² Compared to those without diabetes, people with type 2 diabetes mellitus (T2DM) appear to be at a higher risk of developing non-alcoholic fatty liver disease (NAFLD) and are undoubtedly at a higher risk of developing cirrhosis and fibrosis. NAFLD's presence in T2DM may also contribute to increased cardiovascular disease risk. T2DM surges

the risk of liver-associated death by up to 22-fold in patients with NAFLD.³

When diabetes is present, the prevalence of cirrhosis in patients with non-alcoholic fatty liver disease (NAFLD) more than doubles, from 10% to 25%.⁴ 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. Liver imaging may be a more precise method of diagnosing NAFLD.⁵ The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG.

MATERIALS & METHODS

The present study comprised 92 patients of type 2 diabetes and fatty liver disease of both genders. All patients gave their written consent for participation in the study.

Data such as name, age, gender etc. was recorded. Diabetes's history and longevity were noted. Everybody had an ECG, and ischemia alterations were noted. One radiologist conducted the ultrasonographic evaluation, which included

measurements of liver echogenicity, portal vein doppler study, mesenteric fat pad thickness, and carotid artery doppler research. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 92		
Gender	Males	Females
Number	62	30

Table I shows that out of 92 patients, 62 were males and 30 were females.

Table II Distribution of patients according to age group & fatty liver

Age group (years)	Fatty liver	Non- fatty liver	P value
<40	23	3	0.01
40-50	30	5	0.05
>50	24	7	0.03

Table II shows that the age group <40 years had 23 fatty liver and 3 non- fatty liver patients. Age group 40-50 years had 30 fatty liver and 5 non- fatty liver patients and >50 years had 24 fatty liver and 7 non- fatty liver disease patients. The difference was significant (P< 0.05).

Table III Ischemic changes in ECG

Duration	Ischemia present	Ischemia absent	P value
<5 years	4	7	0.05
5-10 years	8	15	0.03
>10 years	12	46	0.02
Total	24	68	

Table III show that ischemia was present in 4 and absent in 7 in patients with <5 years of diabetes, present in 8 in patients and absent in 15 with 5-10 years of diabetes and present in 12 patients and absent in 46 patients with >10 years of diabetes. The difference was significant (P< 0.05).

Table IV Assessment of left ventricular diastolic dysfunction with duration of diabetes

Duration	LVDD				P value
	No	Grade 1	Grade 2	Grade 3	
<5 years	4	2	4	1	0.24
5-10 years	6	7	5	5	
>10 years	18	21	11	10	
Total	28	30	20	16	

Table IV shows that LVDD was absent in 28 and present in 66 patients. Grade 1 was seen in 30, grade 2 in 20 and grade 3 in 16 patients. The difference was non- significant (P> 0.05).

DISCUSSION

Non-alcoholic fatty liver disease (NAFLD) is currently the leading cause of chronic liver disease in the United States and is also on the rise worldwide. Simple steatosis and non-alcoholic steatohepatitis (NASH), a progressive form of liver disease, are among the range of liver illnesses.⁶ 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.⁷ A build-up of fat in the liver that, when excessive alcohol drinking is avoided, proceeds from simple steatosis to cirrhosis, hepatocellular carcinoma (HCC), and steatohepatitis is known as non-alcoholic fatty liver disease (NAFLD). In NAFLD, over 5% of hepatocytes have macrovascular steatosis, which is

distinguished by the lack of inflammation.⁸The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG.

We found that out of 92 patients, 62 were males and 30 were females. Lu et al⁹ investigated the prevalence of NAFLD in T2DM population and compared the prevalence of coronary heart disease (CHD) and its risk factors between diabetic patients with and without NAFLD. The prevalence of NAFLD was 75.18% (421 cases) among all participants, and 285 cases (67.70%) had normal liver function and no symptoms. NAFLD group had higher body mass index (BMI), waist/hip circumference ratio (WHR), alanine aminotransferase (ALT), triglycerides (TG) and low-density lipoprotein cholesterol (LDL-C) levels than those without NAFLD. Moreover, the prevalence of CHD was also

higher in the NAFLD group, especially in those male patients with elevated plasma ALT.

We observed that the age group <40 years had 23 fatty liver and 3 non- fatty liver patients. Age group 40-50 years had 30 fatty liver and 5 non- fatty liver patients and >50 years had 24 fatty liver and 7 non-fatty liver disease patients. Targher et al¹⁰ assessed the prevalence of cardiovascular disease (CVD) and its risk variables in individuals with and without non-alcoholic fatty liver disease (NAFLD) in the population with type 2 diabetes. NAFLD was the most frequent etiology (81.5%) of hepatic steatosis on ultrasonography examination, and its uncorrected prevalence among participants was 69.5%. The age-adjusted prevalence of NAFLD was 71.1% in males and 68% in women, and the prevalence rose with age (65.4% among those aged 40-59 and 74.6% among those aged > or = 60; P < 0.001). Compared to those without NAFLD, patients with NAFLD had significantly (P < 0.001) higher age and sex-adjusted prevalences of peripheral (15.4 vs. 10.0%), cerebrovascular (20.0 vs. 13.3%), and coronary (26.6 vs. 18.3%) vascular disease. Compared to those without NAFLD, patients with NAFLD had significantly (P < 0.001) higher age and sex-adjusted prevalences of peripheral (15.4 vs. 10.0%), cerebrovascular (20.0 vs. 13.3%), and coronary (26.6 vs. 18.3%) vascular disease. NAFLD was linked to common CVD in logistic regression analysis, regardless of traditional risk variables, glycemic management, drugs, and metabolic syndrome characteristics.

We found that ischemia was present in 4 and absent in 7 in patients with <5 years of diabetes, present in 8 in patients and absent in 15 with 5-10 years of diabetes and present in 12 patients and absent in 46 patients with >10 years of diabetes. LVDD was absent in 28 and present in 66 patients. Grade 1 was seen in 30, grade 2 in 20 and grade 3 in 16 patients. Banerjee S et al¹¹ in their study showed fatty change in 43%, non-alcoholic steatohepatitis (NASH) could be identified in 40% with more advanced disease in 23% of the study population. According to Bleumke DA et al¹², abnormal left ventricular mass and geometry stands out to be potential marker of myocardial remodelling and cardiovascular disease.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that non-alcoholic fatty liver disease (NAFLD) and cardiovascular risk factors were found to be correlated in patients with type 2 diabetes mellitus. Therefore, a thorough evaluation of these patients is required.

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