

Original Research

Fatty liver disease and cardiovascular diseases in type 2 diabetic patients- An USG study

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ABSTRACT:

Background: The most prevalent type of chronic liver damage is non-alcoholic fatty liver disease (NAFLD), which is becoming more and more common globally. The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG. **Materials & Methods:** 110 patients of type 2 diabetes and fatty liver disease of both genders were enrolled and the history of duration of diabetes was recorded. All underwent ECG and ultrasonographic evaluation. **Results:** Out of 110 patients, males were 70 and females were 40. The age group <40 years had 24 fatty liver and 4 non- fatty liver patients. Age group 40-50 years had 32 fatty liver and 6 non- fatty liver patients and >50 years had 36 fatty liver and 8 non- fatty liver disease patients. The difference was significant ($P < 0.05$). Ischemia was present in 6 and absent in 12 in patients with <5 years of diabetes, present in 11 in patients and absent in 28 with 5-10 years of diabetes and present in 13 patients and absent in 40 patients with >10 years of diabetes. The difference was significant ($P < 0.05$). LVDD was absent in 12 and present in 98 patients. Grade 1 was seen in 34, grade 2 in 48 and grade 3 in 16 patients. The difference was non-significant ($P > 0.05$). **Conclusion:** Patients with type 2 diabetes mellitus showed a correlation between cardiovascular risk factors and non-alcoholic fatty liver disease (NAFLD). Hence, there is a need to assess these patients in carefully.

Key words: Cardiometabolic diseases, Diabetes, Non-alcoholic fatty liver disease

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INTRODUCTION

The most prevalent type of chronic liver damage is non-alcoholic fatty liver disease (NAFLD), which is becoming more and more common globally, particularly in populations with high obesity and diabetes.¹ According to reports, NAFLD is associated with a higher prognosis for cardiometabolic diseases, specifically type 2 diabetes, and liver cirrhosis.² When secondary causes of hepatic steatosis are ruled out and a patient consumes less than 10 g of ethanol per day, NAFLD may be diagnosed if the fat content of the liver surpasses 5% to 10% of the organ's weight.³ Type 2 Diabetes Mellitus (T2DM) patients seem to have an increased risk of developing NAFLD than non-diabetic subjects and certainly have a higher risk of increasing fibrosis and cirrhosis. Existence of NAFLD 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.⁴

The prevalence of cirrhosis in NAFLD patients more than doubles from 10–25% when diabetes is also present. At least two-thirds of patients with hypertriglyceridemia and one-third with hypercholesterolemia who have hyperlipidemia have fatty livers according to ultrasonography. There may be a more accurate way to diagnose NAFLD with liver imaging.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 110 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. The history of duration of diabetes was recorded. All underwent ECG and ischemic changes was recorded. Ultrasonographic evaluation was performed by a

single radiologist and parameters such as liver echogenicity, portal vein doppler study, mesenteric fat pad thickness and carotid artery doppler study was

performed. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 110		
Gender	Males	Females
Number	70	40

Table I shows that out of 110 patients, males were 70 and females were 40.

Table II Distribution based on age group & fatty liver

Age group (years)	Fatty liver	Non- fatty liver	P value
<40	24	4	0.04
40-50	32	6	0.01
>50	36	8	0.01

Table II shows that the age group <40 years had 24 fatty liver and 4 non- fatty liver patients. Age group 40-50 years had 32 fatty liver and 6 non- fatty liver patients and >50 years had 36 fatty liver and 8 non- fatty liver disease patients. The difference was significant (P< 0.05).

Table III Recording of ischemic changes in ECG

Duration	Ischemia present	Ischemia absent	P value
<5 years	6	12	0.05
5-10 years	11	28	0.03
>10 years	13	40	0.02
Total	30	80	

Table III, graph I show that ischemia was present in 6 and absent in 12 in patients with <5 years of diabetes, present in 11 in patients and absent in 28 with 5-10 years of diabetes and present in 13 patients and absent in 40 patients with >10 years of diabetes. The difference was significant (P< 0.05).

Graph I Recording of ischemic changes in ECG

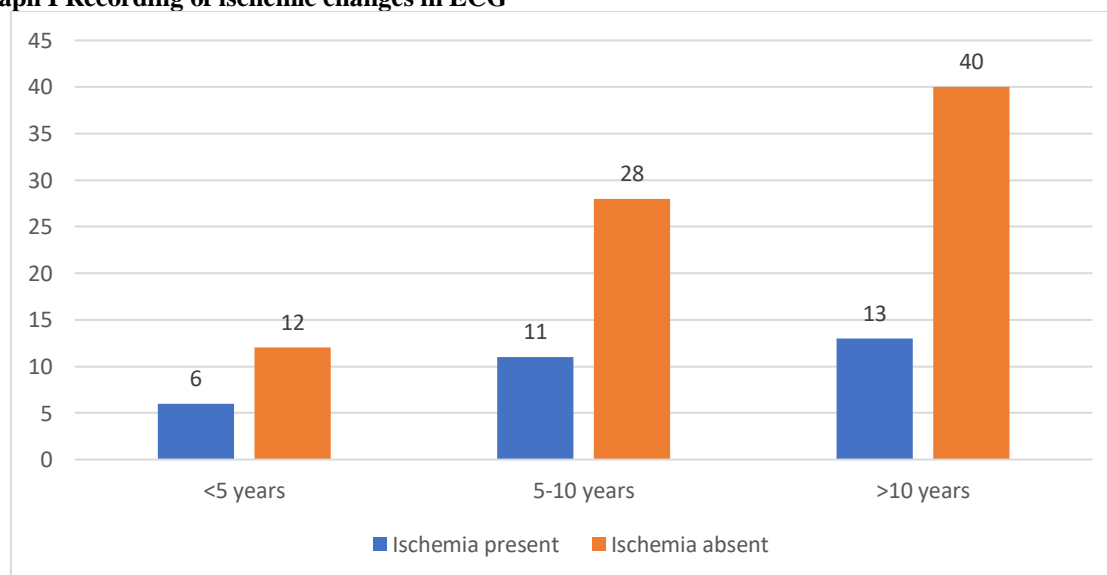


Table IV Assessment of left ventricular diastolic dysfunction with duration of diabetes

Duration	LVDD				P value
	No	Grade 1	Grade 2	Grade 3	
<5 years	3	7	11	5	0.18
5-10 years	2	13	17	6	
>10 years	7	14	20	5	
Total	12	34	48	16	

Table IV shows that LVDD was absent in 12 and present in 98 patients. Grade 1 was seen in 34, grade 2 in 48 and grade 3 in 16 patients. The difference was non- significant (P> 0.05).

DISCUSSION

The most common cause of chronic liver disease in the United States today is non-alcoholic fatty liver disease (NAFLD), which is also becoming more common globally. There is a spectrum of liver diseases that includes non-alcoholic steatohepatitis (NASH), a progressive type of liver disease, and simple steatosis. Both in industrialized and developing nations, the prevalence of non-alcoholic fatty liver disease (NAFLD) is strikingly high, though it varies based on the population being studied and the criteria applied.⁶ Non-alcoholic fatty liver disease (NAFLD) is defined as a build-up of fat in the liver that progresses from simple steatosis to cirrhosis, hepatocellular carcinoma (HCC), and steatohepatitis when excessive alcohol consumption is avoided. More than 5% of hepatocytes exhibit macrovascular steatosis in NAFLD, which is characterized by the lack of inflammation.^{7,8} The present study was conducted to assess fatty liver disease and cardiovascular diseases in type 2 diabetic patients using USG.

We found that out of 110 patients, males were 70 and females were 40. Banerjee S et al⁹ 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 al¹⁰, abnormal left ventricular mass and geometry stands out to be potential marker of myocardial remodelling and cardiovascular disease.

We observed that the age group <40 years had 24 fatty liver and 4 non-fatty liver patients. Age group 40-50 years had 32 fatty liver and 6 non-fatty liver patients and >50 years had 36 fatty liver and 8 non-fatty liver disease patients. Targher et al¹¹ evaluated the prevalence of non-alcoholic fatty liver disease (NAFLD) in type 2 diabetic population compared the prevalence of cardiovascular disease (CVD) and its risk factors between people with and without NAFLD. The unadjusted prevalence of NAFLD was 69.5% among participants, and NAFLD was the most common cause (81.5%) of hepatic steatosis on ultrasound examination. The prevalence of NAFLD increased with age (65.4% among participants aged 40-59 years and 74.6% among those aged > or = 60 years; $P < 0.001$) and the age-adjusted prevalence of NAFLD was 71.1% in men and 68% in women. NAFLD patients had remarkably ($P < 0.001$) higher age and sex-adjusted prevalences of coronary (26.6 vs. 18.3%), cerebrovascular (20.0 vs. 13.3%), and peripheral (15.4 vs. 10.0%) vascular disease than their counterparts without NAFLD. In logistic regression analysis, NAFLD was associated with prevalent CVD independent of classical risk factors, glycemic control, medications, and metabolic syndrome features.

We found that ischemia was present in 6 and absent in 12 in patients with <5 years of diabetes, present in 11 in patients and absent in 28 with 5-10 years of diabetes and present in 13 patients and absent in 40 patients with >10 years of diabetes. We observed that

LVDD was absent in 12 and present in 98 patients. Grade 1 was seen in 34, grade 2 in 48 and grade 3 in 16 patients. Lu et al¹² 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.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that patients with type 2 diabetes mellitus showed a correlation between cardiovascular risk factors and non-alcoholic fatty liver disease (NAFLD). Hence, there is a need to assess these patients in carefully.

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