

## Original Research

### Evaluation of cardiovascular diseases and fatty liver disease in type II diabetic patients with ultrasonography

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#### ABSTRACT:

**Background:** Non-alcoholic fatty liver disease (NAFLD) is the upcoming leading cause of chronic liver disease in the United States and its prevalence is increasing worldwide. The present study was conducted to assess cardiovascular diseases and fatty liver disease in type 2 diabetic patients with ultrasonography (USG). **Materials & Methods:** 120 patients with type II diabetes mellitus and fatty liver disease of both genders were subjected to ECG. Ultrasonography was done with Toshiba machine. Parameters such as liver echogenicity, portal vein doppler study, mesenteric fat pad thickness and carotid artery doppler study was recorded. **Results:** Out of 120 patients, males were 80 and females were 40. Age group <40 years had 26 fatty liver and 6 non- fatty liver patients. Age group 40-50 years had 40 fatty liver and 5 non- fatty liver patients and >50 years had 31 fatty liver patients and 12 non- fatty liver disease patients. The difference was significant ( $P < 0.05$ ). Ischemia was absent in 22 and present in 13 in patients with <5 years of diabetes, absent in 26 and present in 15 in patients with 5-10 years of diabetes and absent in 24 and present in 20 in patients with >10 years of diabetes. The difference was significant ( $P < 0.05$ ). LVDD was absent in 40 and present in 80 patients. Grade 1 was seen in 22, grade 2 in 20 and grade 3 in 38 patients. The difference was non- significant ( $P > 0.05$ ). **Conclusion:** There was an association between cardiovascular risk factors and non- alcoholic fatty liver disease in patients with type II diabetes mellitus.

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

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#### INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) is the upcoming leading cause of chronic liver disease in the United States and its prevalence is increasing worldwide. It is a spectrum of liver diseases that ranges from simple steatosis to a progressive form of liver disease called non-alcoholic steatohepatitis (NASH). The prevalence of NAFLD is remarkably high in populations of both industrialized and developing countries, although there is variation depending on the criteria used and the population studied.<sup>1</sup>

The coexistence of diabetes in NAFLD patients more than doubles the prevalence of cirrhosis from 10-25%.<sup>2</sup> Among patients with hyperlipidaemia, at least two-thirds with hypertriglyceridemia and one-third with hypercholesterolemia have fatty liver by

ultrasonography. Existence of NAFLD in T2DM may also contribute to increased cardiovascular disease risk.<sup>3</sup> T2DM surges the risk of liver associated death by up to 22-fold in patients with NAFLD. It has been reported that NAFLD has a prognostic value for liver cirrhosis and cardiometabolic diseases, in particular, in type 2 diabetes.<sup>4</sup> NAFLD may be diagnosed when the fat content in the liver exceeds 5% to 10% of the weight of the organ in patients in whom secondary causes of hepatic steatosis are excluded and who consume less than 10 g of ethanol per day. Liver imaging may be a more reliable method for diagnosing NAFLD.<sup>5</sup> The present study was conducted to assess cardiovascular diseases and fatty liver disease in type 2 diabetic patients with ultrasonography (USG).

**MATERIALS & METHODS**

The present study comprised of 120 patients with type II diabetes mellitus and fatty liver disease of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. In all patients, duration of diabetes was recorded. All were subjected to ECG. Ultrasonography was done

with Toshiba machine. USG 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 recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I: Distribution of patients**

Total- 120		
Gender	Males	Females
Number	80	40

Table I shows that out of 120 patients, males were 80 and females were 40.

**Table II: Distribution according to age group**

Age group (years)	Fatty liver	Non- fatty liver	P value
<40	26	6	0.01
40-50	40	5	0.02
>50	31	12	0.04

Table II shows that age group <40 years had 26 fatty liver and 6 non- fatty liver patients. Age group 40-50 years had 40 fatty liver and 5 non- fatty liver patients

and >50 years had 31 fatty liver patients and 12 non-fatty liver disease patients. The difference was significant (P< 0.05).

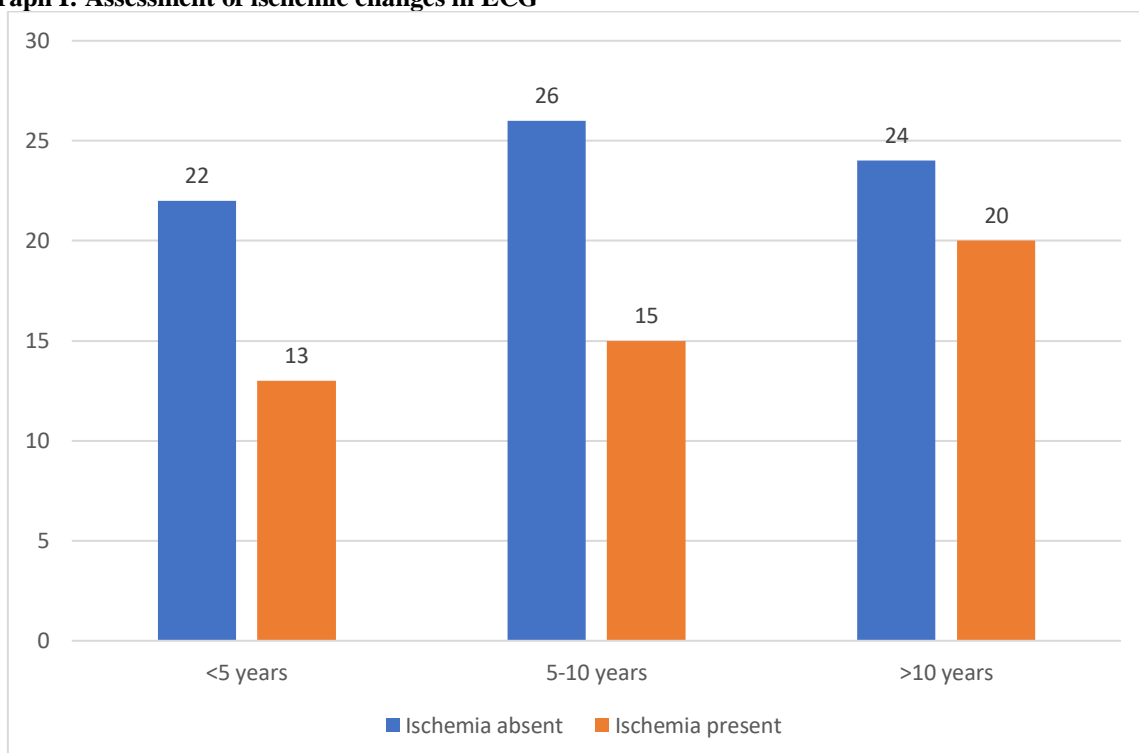
**Table III: Assessment of ischemic changes in ECG**

Duration	Ischemia absent	Ischemia present	P value
<5 years	22	13	0.05
5-10 years	26	15	0.04
>10 years	24	20	0.95

Table III, graph I shows that ischemia was absent in 22 and present in 13 in patients with <5 years of diabetes, absent in 26 and present in 15 in patients

with 5-10 years of diabetes and absent in 24 and present in 20 in patients with >10 years of diabetes. The difference was significant (P< 0.05).

**Graph I: Assessment of ischemic changes in ECG**



**Table IV: Assessment of left ventricular diastolic dysfunction**

Duration	LVDD				P value
	No	Grade 1	Grade 2	Grade 3	
<5 years	8	4	6	17	0.17
5-10 years	10	8	8	15	
>10 years	22	10	6	6	
Total	40	22	20	38	

Table IV shows that LVDD was absent in 40 and present in 80 patients. Grade 1 was seen in 22, grade 2 in 20 and grade 3 in 38 patients. The difference was non-significant ( $P > 0.05$ ).

## DISCUSSION

The non-alcoholic fatty liver disease (NAFLD) is categorized by accumulation of fat in liver which changes from simple steatosis to steatohepatitis, cirrhosis and hepatocellular carcinoma (HCC) in lack of excessive alcohol intake. NAFLD is distinct by macrovascular steatosis of more than 5% hepatocytes in the absence of inflammation.<sup>6</sup> Non-alcoholic fatty liver disease (NAFLD) is the most common form of chronic liver damage and its prevalence has increased worldwide, especially in obese and diabetic populations.<sup>7</sup> Type 2 Diabetes Mellitus (T2DM) patients seem to have an increased risk of developing NAFLD than non-diabetic subjects and certainly have higher risk of increasing fibrosis and cirrhosis.<sup>8</sup> The present study was conducted to assess cardiovascular diseases and fatty liver disease in type 2 diabetic patients with ultrasonography (USG).

We found that out of 120 patients, males were 80 and females were 40. Banerjee Set al<sup>9</sup> 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.

We observed that age group <40 years had 26 fatty liver and 6 non-fatty liver patients. Age group 40-50 years had 40 fatty liver and 5 non-fatty liver patients and >50 years had 31 fatty liver patients and 12 non-fatty liver disease patients. According to Bleumke DA et al<sup>10</sup>, abnormal left ventricular mass and geometry stands out to be potential marker of myocardial remodelling and cardiovascular disease.

We found that ischemia was absent in 22 and present in 13 in patients with <5 years of diabetes, absent in 26 and present in 15 in patients with 5-10 years of diabetes and absent in 24 and present in 20 in patients with >10 years of diabetes. We found that LVDD was absent in 40 and present in 80 patients. Grade 1 was seen in 22, grade 2 in 20 and grade 3 in 38 patients. Tarhgher et al<sup>11</sup> estimated the prevalence of cardiovascular disease (CVD) in Type 2 diabetic patients with and without non-alcoholic fatty liver disease (NAFLD), and to assess whether NAFLD is independently related to prevalent CVD. They studied 400 Type 2 diabetic patients with NAFLD and 400 diabetic patients without NAFLD who were matched for age and sex. Main outcome measures were prevalent CVD (as ascertained by medical history,

physical examination, electrocardiogram and echo-Doppler scanning of carotid and lower limb arteries), NAFLD (by ultrasonography) and presence of the metabolic syndrome (MetS) as defined by the World Health Organization or Adult Treatment Panel III criteria. The prevalences of coronary (23.0 vs. 15.5%), cerebrovascular (17.2 vs. 10.2%) and peripheral (12.8 vs. 7.0%) vascular disease were significantly increased in those with NAFLD as compared with those without NAFLD ( $P < 0.001$ ), with no differences between sexes. The MetS (by any criteria) and all its individual components were more frequent in NAFLD patients ( $P < 0.001$ ). In logistic regression analysis, male sex, age, smoking history and MetS were independently related to prevalent CVD, whereas NAFLD was not.

The limitation the study is small sample size.

## CONCLUSION

Authors found that there was an association between cardiovascular risk factors and non-alcoholic fatty liver disease in patients with type II diabetes mellitus.

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