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Original research paper

Prevalence of Non-alcoholic fatty liver disease in patients with type 2 diabetes mellitus

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Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) which develops in the absence of alcohol abuse has been recognized as a major health burden. NAFLD is third leading indicator of liver transplantation. Insulin resistance is frequently seen in NAFLD. AIM: To determine the prevalence of NAFLD in type 2 Diabetic patients.
Material and Methods: A cross sectional observational study involving 100 type 2 Diabetic patients.
Results: NAFLD was seen in 53% Type 2 Diabetics. Increased BMI in the range of overweight was significant associated with NAFLD 28.2+/-3.1. Hypertriglyceridemia was associated with NAFLD.
Conclusion: High prevalence of NAFLD is Type 2 diabetes with increased BMI (over weight).

Keywords: Non-alcoholic fatty liver disease (NAFLD), type 2 diabetes, hypertriglyceridemia

Introduction

Non-Alcoholic fatty liver disease (NAFLD) which develops in the absence of alcoholic abuse (<30g/d in men and 20g/d in women) [1] has been recognized as a major health burden. NAFLD is the third leading indication for liver transplantation [2]. The clinical implications of NAFLD are derived mainly from its common occurrence in population and its potential to progress to cirrhosis and liver failure [3].
Estimates suggest that 20-30% of adults in developed countries of fatty liver [4]. 50% among diabetics and about 80% in obese [5].
High prevalence of NAFLD in western countries is due to obesity Type 2 diabetes and hyperlipidemia [6]. Insulin resistance is frequently seen in NAFLD [7].

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Aims

1. To determine the prevalence of Non-Alcoholic fatty liver disease in patients with Type 2 Diabetes
2. To find the association of various risk factors in Type 2 Diabetes with Non-Alcoholic fatty liver disease.

Material and Methods

Study design

1. A cross sectional Hospital based observational study.
2. 100 patients from Dr. B.R. Ambedkar medical college fulfilling the inclusion and exclusion criteria were recruited for the study after obtaining the informed consent.

Inclusion criteria

1. Patient with age above 18 years who were diagnosed with Type 2 Diabetes mellitus by standard ADA criteria.

Exclusion criteria

1. History of alcohol consumption Usage of hepatotoxic drugs like amiodarone, corticosteroids, tamoxifen, methotrexate, High dose oestrogen.
2. Positive serological viral markers like HBsAg, HCV, HIV
3. Clinical findings suggestive of metabolic liver diseases like Wilson's, hemochromatosis.

100 patients fulfilling inclusion, exclusion criteria were initially screened for BMI (Body mass index). Following blood tests were done.
FBS/PPBS (fasting and post prandial blood sugar), HbA1C, Fasting lipid profile, USG abdomen.

Statistical analysis

All data entered using Excel sheet and analysed using SPSS 21 trial version.

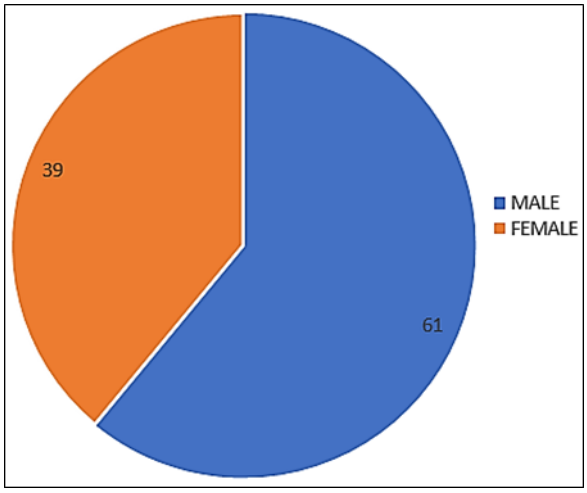
Results

In the present study the youngest age is 42 years and eldest is 75 years with mean age 58.1+/-8.3 years.

Table 1: Age distribution

Age in years	Number of patients
40-50	31
50-60	39
60-70	24
>70	06

Out of 100 patients 61 were male and 39 were female



Graph 1: Gender distribution

Ultra sound abdomen revealed 53 patients having Non-alcoholic fatty liver disease and 47 patients had normal liver.
Various parameters when compared between Non-alcoholic fatty liver diabetics with normal liver

Table 2: BMI

BMI (kg/m2)	NAFLD (n-53)	Normal liver (n-47)
<18.5	01 (1.8%)	03 (6.3%)
18.5-24.9	18 (33.9%)	23 (48.9%)
25-29.9	30 (56.6%)	19 (40.4%)
>30	04 (7.5%)	02 (4.2%)

P value <0.01 which is significant in the present study 47 patients had normal liver their Mean BMI was 24+/-2.1 whereas with NAFLD it was 28.2+/- 3.1.

Co-relation of duration of diabetes and NAFLD

In the present study the mean duration of diabetes with NAFLD was 10.6+/-3.5 years compared with patients without NAFLD 10.4+/- 2.9 years which is statistically not significant.
HbA1C when compared between NAFLD and Normal Liver group.

Table 3: HbA_1C

HbA1C	NAFLD(n-53)	Normal liver(n-47)
<7	13 (24.5%)	15 (31.9%)
>7	40 (75.6%)	32 (68%)

Statistically the difference between the groups was not significant.

Table 4: Lipid parameters

Lipid parameters	NAFLD (N-53)	Normal liver (N-47)	P value
1. Total cholesterol			
<200	37(69.4%)	28(60.7%)	0.080
>200	16(30.6%)	19(39.3%)	
2. Triglycerides			
<150	20(38.3%)	32(69%)	0.001

>150	33(61.7%)	15(31%)	
3. HDL			
<40	41(72%)	35(75%)	0.696
>40	12(23%)	12(25%)	
4. LDL			
<100	37(70%)	28(61%)	0.421
>100	16(30%)	19(39%)	

In the present study Hypertriglyceridemia were significantly higher among NAFLD group. Our study didn't show significant difference AST, ALT levels between the 2 groups.

Discussion

NAFLD is an asymptomatic disease which is being increasing in epidemic proportions. NAFLD is strongly associated with Type 2 Diabetes and cardiovascular disease within this spectrum, steatosis is apparently benign while non-alcoholic steatohepatitis may progress to cirrhosis and hepatocellular carcinoma [8].

Its pathogenesis is complex and involves insulin resistance and mitochondrial dysfunction with increased free fatty acid reflux from adipose tissue to the liver which play a key role in the chronic activation of inflammatory pathways and hepatocyte lipotoxicity with stimulation of chronic inflammation and necrosis [9].

The prevalence of NAFLD in the present study is 53% compared to other studies Bhatt *et al.* 45%, Williamson *et al.* 46.5%, Prashanth *et al.* 87%, M premnath *et al.* 55.68%, prevalence rate was high in those which had histological evidence (Prashanth *et al.* 87%) compared to serological evidence [10, 11].

In the present study the mean duration of diabetes for NAFLD 10.6+/-3.5 being compared to without NAFLD 10.4+/- 2.9 years. Statistically was not significant. Similar pattern was observed by Prashanth *et al.* whereas Vishwanathan *et al.* showed significant association of NAFLD with increase duration of diabetes.

Present study showed significant association of increased BMI 28.2+/- 3.1 falling into overweight with NAFLD.

Similar association was seen the studies by Vishwanathan *et al.* and Kalra S *et al.* [9, 10]

Present study showed significant association of hypertriglyceridemia with NAFLD group with p 0.001 where as other lipid parameters were not significantly raised. MV jalil *et al.* found hypercholesterolemia 52%, hypertriglyceridemia 67%, High LDL 59%, Low HDL 27% with NAFLD groups.

In a hospital-based study from north Indian Prashanth *et al.* found no significant association.

Present study, we found transaminase levels were not statistically significant between NAFLD and non NAFLD groups [11].

Jagaram N [12] *et al.* observed elevated levels of ALT significantly in NAFLD group. M Prashanth *et al.* observed similar pattern with no significant rise of ALT and AST levels [11].

Conclusion

The present study revealed high incidence of NAFLD in Type 2 Diabetes mellitus stressing the need for early screening.

Over weight and obese with type 2 diabetes are at risk for NAFLD. Hypertrophy is associated with NAFLD.

Hence diet, exercise, and weight reduction would help in probably decreasing the occurrence of NAFLD in Type 2 Diabetes.

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