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Research Article

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Association between dyslipidemia and diabetes mellitus in patients of nonalcoholic fatty liver disease

Dr. Mohammad Amzarul, Dr Sara Sidddiqui
Department of Medicine, Government Medical College, Kannauj.
Corresponding author: **Dr. Mohammad Amzarul,** Government Medical College, Kannauj.
Email: *drmamzarulkgmc@gmail.com*

Keywords

non-alcoholic fatty liver disease, dyslipidemia, diabetes mellitus.

Abstract

Background: NAFLD is a clinicopathologic syndrome that is closely correlated to visceral obesity, dyslipidemia, insulin resistance, and type 2 diabetes, thus suggesting that NAFLD is another feature of the metabolic syndrome. The pathophysiology of non-alcoholic fatty liver disease involves insulin resistance, which causes hepatic steatosis, a process enhanced in patients with type 2 diabetes mellitus and/or obesity.
Materials and Methods: This study was conducted in Department of Medicine and Department of Radiology, GMC, Kannauj. This was a Cross-sectional study done over a period of 18 months. The study include admitted patients having fatty liver finding on ultrasound and patients having any history of alcohol abuse and viral hepatitis were excluded. Sample size was 65.
Results: Prevalence of dyslipidemia was 63.4% among diabetics as compared to 16.7%among non-diabetics. Statistically, this difference was significant ($p<0.001$).Similarly, mean FBS and PP BS levels were also significantly higher among patients with dyslipidemia as compared to those not having dyslipidemia ($p<0.05$).
Conclusion: In present study prevalence of dyslipidemia with NAFLD-diabetes mellitus in cohort was found to statistically significant ($p<0.001$), which emphasizes that dyslipidemia is added disadvantage to precipitate non alcoholic fatty liver disease.

Introduction

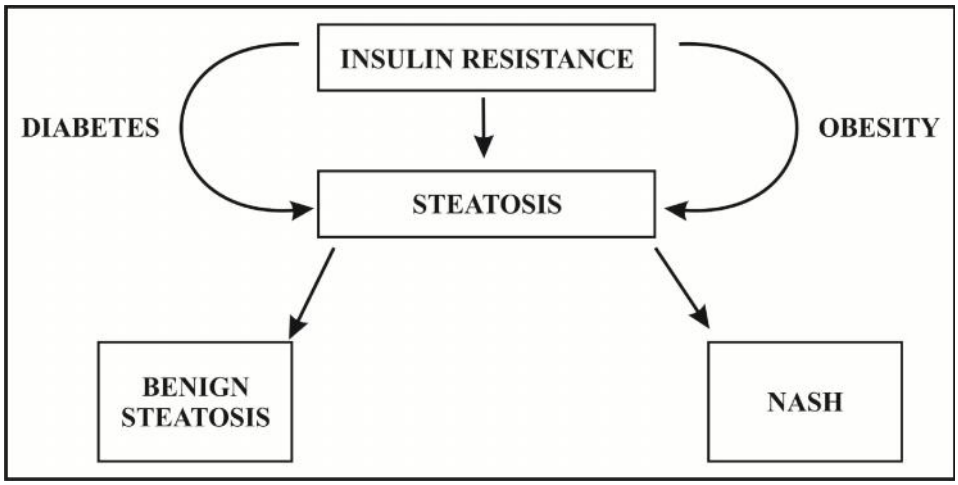
NAFLD is a clinicopathologic syndrome that is closely correlated to visceral obesity, dyslipidemia, insulin resistance, and type 2 diabetes, thus suggesting that NAFLD is another feature of the metabolic syndrome (1–4).

Hepatic steatosis has a benign clinical course. In contrast, Non-Alcoholic Steatohepatitis (NASH) may progress to cirrhosis and liver-related death in 25% and 10% of patients, respectively. Cases occur most commonly in obese, middle-aged women with diabetes. However, NASH may also occur in children and normal weight men with normal glucose and lipid metabolism.[5] Radiological modalities such as ultrasonography (USG) and magnetic resonance imaging (MRI) can show increased fat accumulation (steatosis) in the hepatic parenchyma.[6]

Nonalcoholic fatty liver disease (NAFLD) is emerging as an important cause of liver disease in India. Epidemiological studies suggest prevalence of NAFLD in around 9% to 32% of general population in India

with higher prevalence in those with overweight or obesity and those with diabetes or prediabetes.[7]

In fact, hepatic steatosis has now been proposed as a feature of the insulin resistance syndrome along with type 2 diabetes mellitus, central (visceral) obesity, hyperlipidemia, and hypertension.



The pathophysiology of non-alcoholic fatty liver disease involves insulin resistance, which causes hepatic steatosis, a process enhanced in patients with type 2 diabetes mellitus and/or obesity.

Materials and Methods

Study Center: This study was conducted inDepartment of Medicine and Department of Radiology,GMC, Kannauj.

Type of study: Cross-sectional study.

Study period=18 months

Inclusion criteria: Admitted patients having fatty liver finding on ultrasound.

Exclusion criteria: Any history of alcohol abuse and viral hepatitis.

Sample size:n=65

After enrollment following details were noted and relevant investigations were performed:

- **Height** was measured using stadiometerin cms.
- **Weight** in kg.
- **Body mass index**= weight in kg/ height in m^2.
- **Blood sugar**: Blood sugar was done by GOD-POD method[8].

Diagnosis of type 2 diabetes mellitus according to ADA criteria[9] which is:

- Symptoms of diabetes plus random blood glucose concentration more than equal to 11.1mmol/L (200mg/dl)
- Fasting pasma glucose more than 7.0mmol/L(126mg/dl)
- Two hour plasma glucose more than equal to 11.1mmol/L(200mg/dl) during an oral glucose tolerance test.

Fasting lipid profile[10]: Triglyceride was quantified by GPO method of XL system packs. HDL will be quantified by standard kit method.

- LDL Cholesterol= Total cholesterol-HDL Cholesterol-Triglyceride/5[11]

Normal values:

- Cholesterol<200mg/dl
- HDL cholesterol in males> 40mg/dl
- LDL cholesterol <100mg/dl
- Triglycerides< 150mg/dl

Ultrasonography: (3.5 MHz machine from GE Voluson P8) was done to screen fatty liver.

Results

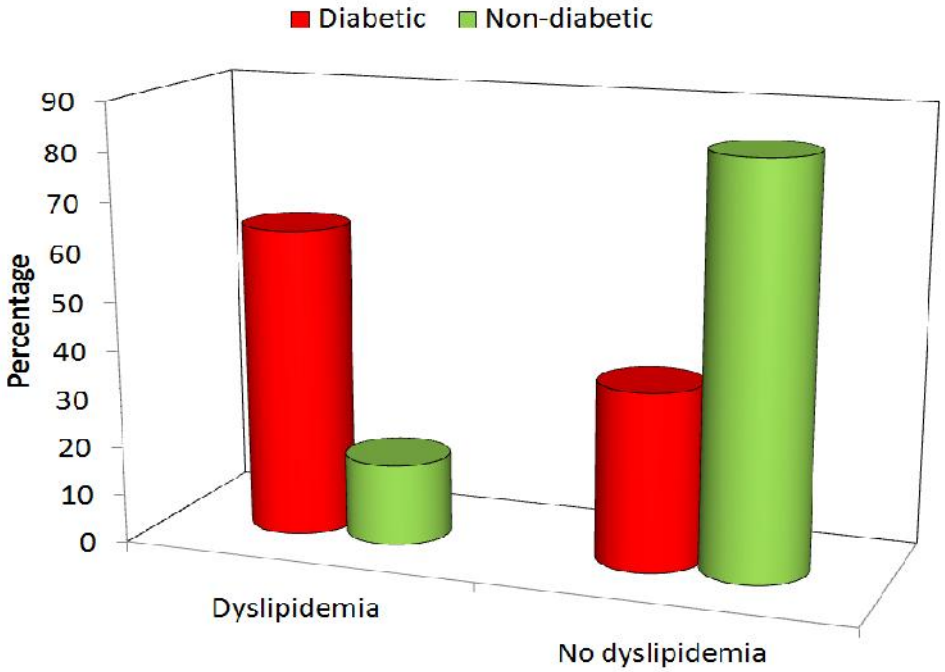
Table 3a: Distribution of anthropometric parameters of Non-alcoholic fatty liver diseases patients

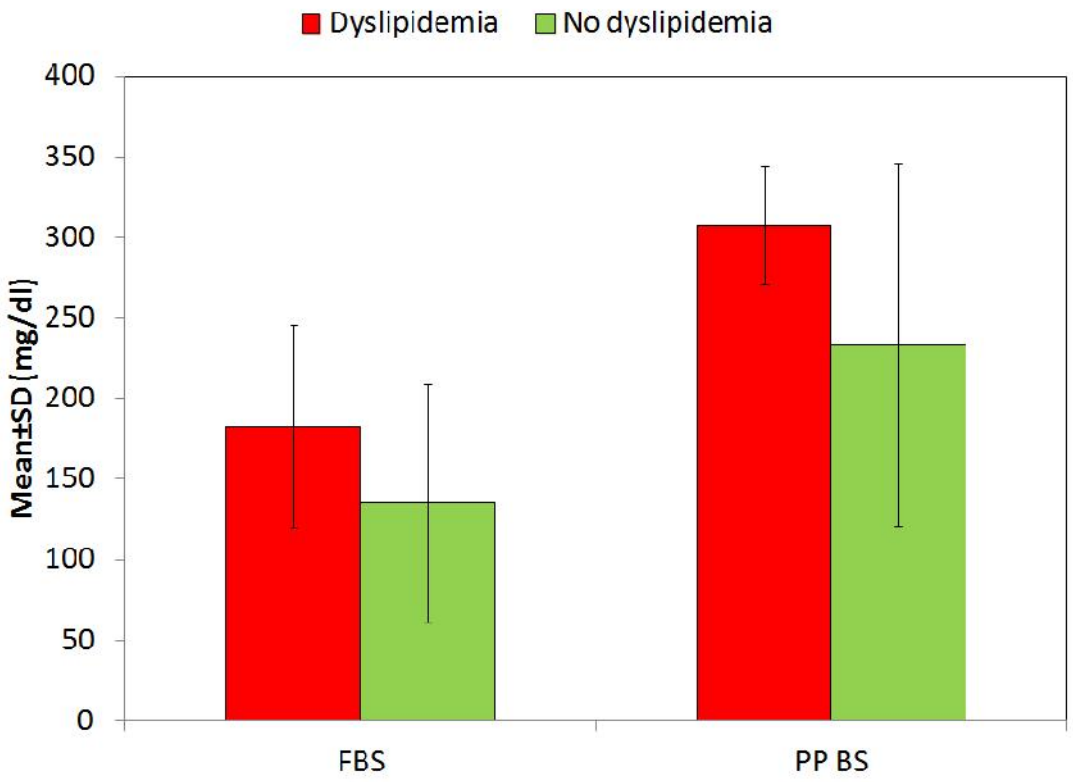
Anthropometric parameters	Mean ± SD	Minimum	Maximum
Height in cms	160.92 ± 6.12	150	178
Weight in kg	73.72 ± 9.29	53	92
BMI in kg/m^2	28.96 ± 3.77	22.0	36.0

Table 6a & Fig. 6b shows distribution of anthropometric parameters of male patients of non alcoholic fatty liver disease, the mean height, weight and BMI was 162.36 ± 6.32, 72.85 ± 9.6 and 27.99 ± 3.72 kg/m^2 respectively.

Association between Diabetes and Dyslipidemia

SN	Dyslipidemia	Diabetic status							
		Diabetic Table 17a: Association between Diabetes and Dyslipidemia (n=41)		Non-diabetic (n=24)		Mean FBS		Mean DBP	
		No.	%	No.	%	Mean	SD	Mean	SD
1.	Dyslipidemia (n=30)	26	63.4	4	16.7	182.90	64.97	307.73	98.29
2.	No dyslipidemia (n=35)	15	36.6	20	83.3	135.57	73.69	233.26	112.82
Statistical significance		χ^2=13.312; p<0.001 (Chi-square test)				't'=2.728; p=0.008		't'=2.814; p=0.007	





Prevalence of dyslipidemia was 63.4% among diabetics as compared to 16.7%among non-diabetics. Statistically, this difference was significant ($p<0.001$).

Similarly, mean FBS and PP BS levels were also significantly higher among patientswith dyslipidemia as compared to those not having dyslipidemia ($p<0.05$).

Discussion

In the present study, the prevalence of NAFLD patients suffering from diabetes mellitus found to be 63%(Table no 8a). In the study done by**RushadPatel et al. (2014)** showed prevalence of diabetes amongst NAFLD patients to be 52%. However study of **Mohan V et al. (2009)**the prevalence of diabetes mellitus came out to be 33%.

In present study, prevalence of dyslipidemia among NAFLD patients found to be 46.2%(table no 8a) which was lower than the prevalence rate of 52% as found in the study done by **M. V. Jali et al.(2015)**.

In present study, prevalence of dyslipidemia with diabetes mellitus in NAFLD cohort was found to statistically significant($p<0.001$)(Table 17a) and similar correlation was found in a study done by **Shivram Prasad Singh et al.(2014).**

Conclusion

In present study prevalence of dyslipidemia with NAFLD-diabetes mellitus in cohort was found to statistically significant ($p<0.001$), which emphasizes that dyslipidemia is added disadvantage to precipitate non alcoholic fatty liver disease.

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