



NON ALCOHOLIC FATTY LIVER DISEASE IN DIABETES MELLITUS IN EASTERN NEPAL: A HOSPITAL BASED STUDY

Bhupendra Shah^{*1}, Bickram Pradhan, Smriti Karki and Dharanidhar Baral

Department of Internal Medicine, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

***Corresponding Author: Dr. Bhupendra Shah**

Department of Internal Medicine, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

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ABSTRACT

Non alcoholic liver disease (NAFLD) represents the most frequent liver disease in the world. Its prevalence is increasing due to its relation to worldwide obesity and type 2 diabetes. With increasing prevalence of Type 2 Diabetes and obesity, chances of increasing prevalence of NAFLD is high so timely identification of predictors of NAFLD will help us to screen, identify and manage such patient. We aim to identify the predictors of the non alcoholic liver disease in type 2 diabetes mellitus by comparing diabetes mellitus with NAFLD and without NAFLD. We conducted hospital based comparative cross sectional study on 170 patients of diabetes mellitus. Patient of Diabetes mellitus were compared based on NAFLD and non NAFLD status. Risk factors of NAFLD were assessed based on medical history, physical examination, laboratory assessments and imaging. The mean age of the study population in NAFLD was 54±12.2 years and non NAFLD was 57±12.7 year. Hypertension was significantly more common in patients with non alcoholic fatty liver disease (P<0.001). Patient with NAFLD had high body mass index (P<0.001), hip circumference (P<0.001) and waist circumference (P<0.001) than patient without NAFLD. Patient with nonalcoholic fatty liver disease had significantly higher fasting blood sugar (P=0.002), post prandial sugar (P<0.001), glycated haemoglobin (P<0.001), total cholesterol (P=0.001), triglyceride (P<0.001) and low density lipoprotein (P=0.009) and significantly lower high density lipoprotein (P=0.009). Smoking, obesity, hypertension, elevated blood sugar profile and dyslipidemia are risk factors for NAFLD.

KEYWORD: Non alcoholic fatty liver disease, Diabetes mellitus, Risk factors.

INTRODUCTION

Non alcoholic fatty liver disease is a condition where there is excessive fat accumulation in the form of triglyceride in the liver (>5% of hepatocyte histologically).^[1] NAFLD was proposed by matteoni et al^[2] with the pupose of including the whole clinical spectrum of fatty liver disease, steatohepatitis and cirrhosis. Non alcoholic liver disease represents the most frequent liver disease in the world. Its prevalence is increasing due to its relation to worldwide obesity and type 2 diabetes.^[3] All India prevalence of NAFLD among type 2 diabetes was 56.5 %.^[4] Central obesity, type 2 diabetes, dyslipidemia and hypertension are the best risk factors related to NAFLD.^[5] In patient with non alcoholic fatty liver disease, type 2 diabetes is a independent predictor of the cirrhosis and all of its complication.^[6] The prevalence of diabetes in eastern Nepal was 6.3%,32% were overweight and 28% were obese.^[7] Study regarding the prevalence of non alcoholic liver disease is scarce in this part of world. With increasing prevalence of type 2 diabetes and obesity ,chances of increasing prevalence of NAFLD is high so timely identification of predictors of NAFLD will help us to screen, identify and manage such patient. We aim

to identify the predictors of the non alcoholic liver disease in type 2 diabetes mellitus by comparing diabetes mellitus with NAFLD and without NAFLD.

MATERIALS AND METHODS

This was hospital based cross sectional study carried out in the department of internal Medicine B.P. koirala institute of health sciences, a tertiary health care centre of Eastern Nepal after taking approval from the institutional review board of B.P. Koirala institute of health sciences. We enrolled 170 patients of Type 2 diabetes mellitus 85 each in NAFLD and NON NAFLD in this study after taking the written informed consent.

Study participants

Inclusion criteria

New or diagnosed case of Type 2 diabetes mellitus.

Exclusion criteria

Patient with significant alcohol intake (140 gm/wk for male, 70gm /wk- for female),who were on hepatotoxic drugs within six months of clinic presentation, chronic liver disease of known cause, patient with positive

Hepatitis B surface antigen and anti Hepatitis C antibody were excluded from the study.

Recruitment

Patients with type 2 diabetes mellitus new or already diagnosed were enrolled from medical outpatient and inpatient department for in this study after making necessary exclusion, ultrasonography by Phillips IU22 were performed to diagnose and categories the patient into NAFLD and non NAFLD group. Demographic and clinical presentation were filled in the proforma, height was measured in the centimeter, hip circumference was measured at the level of greater trochanter, waist circumference at midpoint between costal margin and iliac creast in midaxillary line, body weight in kilogram. Blood sugar measured by hexokinase method, glycated hemoglobin by turbidimetric method, fasting lipid profile and liver function test was assayed.

Statistical analysis

For descriptive study relative (%) and absolute (N) frequencies was employed for all classes of each qualitative variable. Mean, standard deviation, median, interquartile range was used to indicate the quantitative variables of the data in tabular form. For inferential statistics variables showing normal distribution were analysed by student t test. Results were considered statistically significant if P value was less than 0.05 with confidence interval of 95%.

To administer database, create and edit the graphs MS EXCEL 2008 was used and SPSS windows 11.5 version were used for the data analysis.

RESULT

We enrolled 170 population of diabetes mellitus for this study, 85 patient each in NAFLD and non NAFLD group. The mean age of the study population in NAFLD was 54±12.2 years and non NAFLD was 57±12.7 years, there was no significant difference in age between two groups. There was no difference in gender distribution. Table 1 depicts the hypertension was significantly more common in patients with non alcoholic fatty liver disease (P value<0.001). Smoking was more common in NAFLD group. Patient with Non alcoholic fatty liver disease had high body mass index (p<0.001), hip circumference (P value<0.001) and waist circumference (P value- <0.001) than patient without non alcoholic liver disease whereas there was no significant difference in waist hip ratio in two groups (P value-0.023). As showed in Table 3 patient with nonalcoholic fatty liver disease had significantly higher fasting blood sugar (p-0.002), post prandial (P value-<0.001), glycated haemoglobin (P value-<0.001), total cholesterol (p-0.001), triglyceride (P<0.001) and low density lipoprotein (P-0.009) and significantly lower high density lipoprotein (P-0.009) than patient without non alcoholic fatty liver disease patient.

Table 1 Demographic and clinical characteristics of of type 2 diabetes mellitus patient with or without non-alcoholic liver disease.

Characteristics	Categories	Type 2 diabetes mellitus		P value
		NAFLD	NON NAFLD	
Age in years± SD		54 ±12.2	57 ±12.7	0.159
Gender	Male	35	44	0.166
	Female	50	41	
Hypertension	Yes	53	29	<0.001
	No	32	56	
Smoking	Yes	15	9	0.186
	No	70	76	
Total		85	85	

Table 2: Anthropometrics parameters of type 2 diabetes mellitus patient (170) with or without non-alcoholic liver disease

Characteristics	Type 2 diabetes mellitus		P value
	NAFLD(mean±SD)	NON NAFLD (mean±SD)	
BMI	26.00 ±3.89	23.45 ±3.55	<0.001
Hip circumference (cm)	94.93 ±10.29	89.07± 8.74	<0.001
WC(cm)	90.85 ±9.48	82.95 ±8.14	<0.001
Waist /hip ratio	0.96± 0.95	0.93± 0.62	0.023

BMI: body mass index, WC: waist circumference

Table 3: Laboratory parameters of type 2 diabetes mellitus patient (170) with or without non-alcoholic fatty liver disease

Characteristics	Type 2 diabetes mellitus(170) mean±SD		P value
	NAFLD(85)	NON NAFLD(85)	
FPG (mg/dl)	165± 65	136± 60	0.002
PPG(mg/dl)	248 ±82	202± 82	<0.001
HBA1C	8.5 ±2	7 ±1.5	<0.001
Total cholesterol	178±51	149±38	<.001
HDL	37 ± 12	43± 10	<0.001
LDL	106 ±41	92 ±26	0.009
TG	155(115-182)	115(92.5-150)	<0.001MW

FPG: Fasting plasma glucose, PP: post prandial glucose, HBA1C: glycated haemoglobin, TC: Total cholesterol, HDL: High density lipoprotein, LDL: low density lipoprotein, TG: Triglycerides, MW: Mann Whitney

DISCUSSION

A study from Taiwan showed the NAFLD was more common in 40-64 years was risk whereas study from India showed NAFLD was more prevalent in the 61-70 years age group, our study showed average age group of the patient with T2 Diabetes mellitus with NAFLD was 54 though there was no significant age group difference in between NAFLD and non NAFLD group. This study showed hypertension was significantly more prevalent in NAFLD group than non NAFLD similar to finding in a study done by Banejee S et al which reported hypertension as a risk factor for the NASH.^[8] There was no significant gender difference between NAFLD and non NAFLD group in study done by Bedogni et al^[9], similarly in our study there was no gender difference in between NAFLD and non NAFLD population. In study done by Y Liu et al reported cigarette smoking as an independent risk factor for NAFLD^[10], in our study smoking status was not significant between NAFLD and non NAFLD which may be because of small number of smoker population in our study. With the increase in obesity, insulin resistance increases. Body mass index was independent predictors for NAFLD as shown by study done by Williamson M et al.^[11], similarly in our study body mass index was significantly more in NAFLD population. HbA1C was a predictor for NAFLD as shown by study done by Williamson M et al.^[11], in our study too HbA1C was significantly higher in NAFLD group, in contrast to our study finding Ferreira et al in their study reported that there was no difference between level of HbA1C in between NAFLD and non NAFLD group which may be because of small number of study population in their study.

The limitation of the study were as sole diagnosis of NAFLD was based on Ultrasonography finding, we didn't perform liver biopsy, workup for the autoimmune hepatitis and markers of insulin resistance due to financial constraints. We recommend further study on liver biopsy proven NAFLD.

CONCLUSION

We found in our study smoking, dyslipidemia, obesity, elevated sugar profile, hypertension as a risk factors for the NAFLD in population of diabetes mellitus.

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CONFLICT OF INTEREST

Conflicts of interest declared none.

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