Original Article

Fatty Liver in Diabetic

Non-Alcoholic Fatty Liver Disease in Type 2 Diabetes: Effect on Diabetic Control and Lipid Profile

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ABSTRACT

Objective: To determine the frequency of non-alcoholic fatty liver disease in patients with type 2 diabetes and to compare the diabetic control and dyslipidemia in diabetic patients with and without non-alcoholic fatty liver disease.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted in Outpatient Department of Medicine, Jinnah Hospital, Lahore from 31st August 2013 to 28th February 2014.

Materials and Methods: Both male and female with age ranging from 30-60 years having type 2 diabetes for more than 5 years duration were included. Two hundred and sixty diagnosed diabetes patients presenting to outpatient department were enrolled. Screening was done for NAFLD on the basis of ultrasonography. Sampling for HbA1C and lipid profile was done. Data was analyzed using SPSS 17.

Results: Proportion of NAFLD was quite high i.e. 70%. Seventy five patients (28.8%) had abnormal triglyceride level and 72 patients (27.7%) had raised serum cholesterol. Low density lipoprotein was abnormally high in all individuals and high density lipoprotein was low in all individuals. One hundred and six (40.8%) diabetics patients had good control while rest has poor control and 135 patients (51.1%) were obese.

Conclusion: Proportion of NAFLD was quite high in diabetic patients. We should screen every patient for NAFLD as it may reduce the co morbidity.

Key Words: Type II diabetes, Nonalcoholic fatty liver disease, Dyslipidemia, Obesity, Glycosylated Hemoglobin

Citation of article: Dar UF, Majeed T, Umar N, Nayyar U. Non-Alcoholic Fatty Liver Disease in Type 2 Diabetes: Effect on Diabetic Control and Lipid Profile. Med Forum 2016;27(2):10-13.

INTRODUCTION

In 2010 the diabetes world prevalence is about 6.4% among adults (aged 20-79 years) with 285 million adults affected. This will increase by 2030 to 7.7% and 439 million adults. In developing countries between 2010 and 2030, number of adults with diabetes will be increased by 69% and in developed countries there will be 20% increase.[1] Same is the case with Non-alcoholic fatty liver disease (NAFLD) which in western countries is the most common cause of chronic liver disease and has reached epidemic proportions. In western countries, NAFLD is present in approximately 20-30% of adults in general population and among persons who are obese or have diabetes its prevalence increases to 70-90%.There is also increased risk for the development of advanced fibrosis and cirrhosis in such patients.[2]

Type 2 diabetes mellitus (T_2 DM) and NAFLD both are linked with harmful outcomes of the other, T_2 DM is a threat for advanced liver disease and liver allied death in patients with NAFLD, whereas in individuals with T_2 DM, NAFLD may be the sign of cardiovascular risk and mortality[3]. The severity of liver disease is linked with the presence of multiple metabolic abnormalities such as fibrosis accompanying non-alcoholic steatohepatitis (NASH), cryptogenic cirrhosis and ultimately with the hepato cellular carcinoma (HCC). Although the major cause for excess mortality in T_2 DM is cardiovascular risk, the danger of advanced liver disease should no longer be under estimated[4]. In general population of Pakistan the prevalence of NAFLD is 18%. There is a high risk of atherosclerosis in patients with NAFLD regardless of classical cardiovascular risk factors and metabolic syndrome[5].

In a study to determine the prevalence and the metabolic impact of NAFLD in 120 patients with type 2 diabetes mellitus, Seventy three (60.8%) patients had fatty liver whereas forty seven (39.2%) had no fatty liver on ultrasonography. When both groups i.e. first with diabetes and NAFLD and second diabetic group without NAFLD were compared, the outcome levels in first and second group respectively came out as BMI 30.17±3.92 and 23.7±2.55, HbA1c 8.29±088 and 7.02±0.47, Total Cholesterol 198.12±47.6 and

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158.53±41.84 (mg/dl), TG 244.8±128.9 and 117.49±39.29 (mg/dl),LDL 120.1±48.6 and 90.72±34.63 (mg/dl) and LDL 120.1±48.6 and 90.72±34.63 (mg/dl) All the differences were significant showing poor diabetic control and dyslipidemia.[6-8] To decrease liver fat accumulation and prevent the development of non-alcoholic steatohepatitis, cirrhosis or hepatocellular carcinoma and their associated complications, this category of patients should be advised regular checking of blood glucose levels and liver function tests.[9-10]

All the available studies for Pakistani population which differs from developed nations in lifestyle and dietary habits a hall mark of treatment of NAFLD and T2DM are done on smaller population groups i.e. ranging from 100 to 120 patients. Current study will replicate above findings in a larger population. Early detection of NAFLD and dyslipidemia in diabetics will subsequently help prevent morbidities related to atherosclerosis and fatty liver.

MATERIALS AND METHODS

This cross sectional survey was conducted in Outpatient Department of Medicine, Jinnah Hospital, Lahore over a period of 6 months from 31st August 2013 to 28th February 2014. Both male and female with age ranging from 30-60 years having type 2 diabetes for more than 5 years duration were included. Patients with positive HBsAg, Anti HCV, ANA, abnormal TSH determined and a body mass index above 30 kg/m2, history of cerebrovascular accidents and acute or autoimmune hepatitis were excluded. Two hundred and sixty diagnosed diabetes patients presenting to outpatient department were enrolled. Screening was done for NAFLD on the basis of ultrasonography. Included patients were called next day with a 12-h overnight fast. Screening was done for NAFLD on the basis of ultrasonography. Sampling for HbA1C and lipid profile was done by a trained nurse under aseptic conditions. Body mass index was calculated and treated as effect modifiers as it had a non-proportionate effect on both diabetes and NAFLD. On basis of NAFLD screening the participants were divided into two groups i.e. one with NAFLD and other with no NAFLD and subsequently compared. Sampling for HbA1C and lipid profile was done. Data was analyzed using SPSS 17. Chi square and Independent sample t-test were used to analyze the categorical and numerical data respectively. P $\leq$0.05 was considered to be statistically significant.

RESULTS

There were 136 (52.3%) were male while 124 (47.3%) were female with mean age of the patients were 43.5$\pm$8.5 years. Nonalcoholic fatty liver disease was present in 70% individuals. Seventy five patients (28.8%) had abnormal triglyceride level, 72 patients (27.7%) had raised serum cholesterol, low density lipoprotein was abnormally high in all individuals and high density lipoprotein was low in all individuals. One hundred and six (40.8%) diabetics patients had good control while rest has poor control and 135 patients (51.1%) were obese (Table 1). When gender was compared with NAFLD there came out a non-significant difference (Table 2). Similarly there was non-significant association between triglycerides and serum cholesterol with NAFLD (Tables 3-4). However fatty liver disease was significantly associated with un-controlled diabetes when compare to patients with good control. Nonalcoholic disease found more in obese diabetic patients (Tables 5-6)

Table No.I:Demographic information of the patients

Variable	No.	%
Gender		
Male	136	52.3
Female	124	47.7
Non Alcoholic Fatty Liver Disease		
Yes	182	70.0
No	78	30.0
Triglycerides level		
Normal	185	71.2
Abnormal	75	58.8
Cholesterol level		
Normal	188	72.3
Abnormal	72	27.7
Low Density Lipoprotein level		
Normal	260	100.0
Abnormal	-	-
High Density Lipoprotein level		
Normal	-	-
Abnormal	260	100.0
Obesity		
Non-obese	125	48.1
Obese	135	51.9

Table No.2: Comparison of gender according to non-alcoholic fatty liver disease

Gender	Non-alcoholic fatty liver disease	
	Yes	No
Male	95	41
Female	87	37

Using chi square, p value = 0.883 (Non-significant)

Table No.3: Comparison of triglycerides according to non-alcoholic fatty liver disease

Triglycerides	Non-alcoholic fatty liver disease	
	Yes	No
Normal	135	50
Abnormal	47	28

Using chi square, p value = 0.109 (Non-significant)

Table No.4: Comparison of cholesterol according to non-alcoholic fatty liver disease

Cholesterol	Non-alcoholic fatty liver disease	
	Yes	No
Normal	128	60
Abnormal	54	18

Using chi square, p value = 0.257 (Non-significant)

Table No.5: Comparison of HbAIC according to non-alcoholic fatty liver disease

HbAIC	Non-alcoholic fatty liver disease	
	Yes	No
Good	61	45
Poor	121	33

Using chi square, p value = 0.01 (Significant)

Table No.6: Comparison of obesity according to non-alcoholic fatty liver disease

Obesity	Non-alcoholic fatty liver disease	
	Yes	No
Obese	122	13
Non-obese	60	65

Using chi square, p value = 0.001 (Significant)

DISCUSSION

Clinical and pathological commodity named non-alcoholic fatty liver disease (NAFLD) histologically has features that are similar to alcohol induced liver injury, but patients of NAFLD has no history of alcohol intake.[1-5] Histologically it encloses a spectrum that categorises from fat deposition in liver cells without associated inflammation or fibrosis (Simply hepatic steatosis) to hepatic steatosis with necrosis and inflammatory element (Steato-hepatitis) with or without concomitant fibrosis.[12-21] The last entity referred as non-alcoholic steato-hepatitis (NASH) in upto 20% of patients may develop into cirrhosis.[7,11,12]

Current study has revealed different aspects of NAFLD. There is almost equal distribution of male and female in our diabetic sampled population showing equal effect of growing epidemic of diabetes in our developing countries. Patients' mean age was 43.5 years ranging from 30-60 years showing early start of diabetes. Diabetes is more affecting our younger generation. So there is a need of preventing programs to counter this menace. Currently we are facing double burden of disease both infectious and noninfectious. We are still unable to cater the patients coming with chronic liver disease and here we find a rising prevalence of NAFLD and associated diabetes.

Proportion of NAFLD was quite high i.e. 70% such a high percentage is alarming as in non-diabetic individuals it is about 15%, so all the diabetic should be screened for presence of fatty liver. Sampled population lipid profile including fasting cholesterol, triglycerides, low and high density lipoproteins was assessed. Cholesterol and triglycerides level were abnormal in one third population proximately but on the other hand hundred percent individual have abnormal low density protein and abnormal high density protein.[22-26]

CONCLUSION

Proportion of NAFLD was quite high in diabetic patients and ultrasonography which ideally should be by liver biopsy. We should screen every patient for NAFLD as it may reduce the co morbidity.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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