FREQUENCY OF NON-ALCOHOLIC FATTY LIVER DISEASE IN TYPE-II DIABETES MELLITUS

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ABSTRACT: *Objective: Non-alcoholic fatty liver disease (NAFLD) is observed commonly in T2DM, because of insulin obesity and resistance. In obese diabetic patients, NAFLD can be prevented and treated by reducing weight by diet and making regular exercises. The objective of the study was to evaluate the frequency of NAFLD in patients suffering from Type-II DM.*

Materials and Methods:

Study Design: *Descriptive cross-sectional study.*

Place and Duration of the Study: *In this study was conducted at the Department of Medicine, Saidu group of Teaching Hospital, Swat, Pakistan.*

Sample size: *145 patients*

Blood samples of 145 patients were taken with consecutive (non-probability) technique for lipid and glycemic profiles and liver enzymes. Diagnosis of NAFLD was done through ultrasound using Sonoline 450, (B-mode, Probe 3.5Mhz).

Results: *out of 145 patients the results showed the presence of NAFLD in 51% (n=74), where, 49(71%) male and 51(74%) female patients having raised BMI ($p < 0.001$) and hypertension ($p < 0.001$). Further, Metabolic Syndrome was found to be frequent in patients with NAFLD. In NAFDL patients Serum triglyceride and serum cholesterol both were observed significantly increased.*

Conclusion: *In Type-2 diabetic patients, Nonalcoholic fatty liver disease (NAFLD) is more commonly seen with elevated BMI as well as serum triglycerides and serum cholesterol levels. Routine screening of diabetic patients for NA*FLD is not currently recommended.

Keywords: Diabetes mellitus (DM), hepatic steatosis, fatty liver, NAFLD.

INTRODUCTION

Diabetes Mellitus is a known cause of cryptogenic cirrhosis, which is 3rd most common symptom for liver transplantation in the U.S.[1]. Diabetes Mellitus type II and cardiovascular diseases are potential threats to health system throughout the world. Obesity and specifically visceral obesity are known risk factor for these illnesses. Now a day's fatty liver is also an emerging risk factor for diabetes and cardiovascular diseases. Recent data suggest that diabetes is a common reason for liver disease in the united states[2].

NAFLD which is the condition in which there is resistance to insulin and deposition of fat in the liver in the absence of any other cause like hepatitis caused by viruses, autoimmune hepatitis, exercise, alcohol use, deficiency of α-1 antitrypsin and medication like steroids and estrogens.[3] NAFLD is a begin condition which if not treated can lead to more severe form of fat deposition known as NASH. NASH can lead to liver fibrosis and in 10% can cause cirrhosis which ultimately leads to Hepatocellular Carcinoma.[4] NAFLD patients are more prone to DM, cardiovascular diseases, hypertension and Dislipedemia[5] Diabetic patient having NAFLD are at increased risk of developing renal diseases.[6]

Current data suggest that we should screen every patient having diabetes for fatty liver through noninvasive procedures or with liver biopsy just like we are screening adiabetic patient for microvascular and macro-vascular complications.[7]. Local studies suggest that the prevalence of NAFLD is 60.8%. As NAFLD is usually asymptomatic therefore very little work has been done on it especially in the Asian population [8].

The rationale of this study is to find the frequency of NAFLD in type 2 DM on the bases of ultrasound. This study will be very helpful to find out the incidence of this disease in our local set up by using a simple and noninvasive method like ultrasonography. Unfortunately, many doctors think that NAFLD is a benign condition so very little work has been done on this condition. This study will help the clinician to early detect this condition and prevent its progression to NASH, cirrhosis and HCC. This study will also help to manage the patient, develop new strategies in Patient management and prevent complications.

MATERIAL AND METHODS

(A) Study Design: Descriptive Cross-Sectional

(B) Setting**:** Saidu Group of Teaching Hospital

(C) Duration of study**:** Jan 2018 to July 2018

(D) Sample size**:** 145 patients

(E) INCLUSION CRITERIA

1. Type 2 diabetes mellitus age for more than 30 years.
2. Both genders(male and female) included in the study.
3. Non-alcoholics.

(F) EXCLUSION CRITERIA

1. Alcoholic Patients.
2. HBs/Anti HCV positive patients.
3. Patients already having autoimmune Hepatitis, Hemochromatosis, Wilson Diseases.
4. Patients on steroids, Statin, Pioglitazone, Amiodarone and female using oral contraceptive pills.
5. Pregnancy.
6. Type 1 diabetic on insulin.

DATA COLLECTION PROCEDURE

After seeking approval of concerned authority, hospital ethical committee, blood samples of 145 patients were taken with consecutive (Nonprobability) technique for lipids and glycemic profiles and liver enzymes.

Data of type 2 diabetes mellitus patient (with FBS more than 126 mg/dl, RBS more than 200mg/dl) of any duration, presenting to

medical OPD were recorded. For further evaluation, these patients were admitted in the department of medicine of Saidu group of teaching hospitals. Patients fulfilling the inclusion criteria were informed and written consent was taken from them. Type 2 DM patients of any duration were worked up with detailed history and clinical examination along with abdominal ultrasound with sonoline 450 (B-Mode probe 3.5 MHZ), imaging examination was done. To record all the information a pre-design proforma was used. To control confounder and bias in the study, strike exclusion criteria were followed.

STATISTICAL ANALYSIS

SPSS version 20 was used for entry and analyzing all the data collected through design proforma. For categorical variables like sex, NAFLD, frequency and percentages were calculated. For continuous variables like age mean ± SD was calculated. To see the effect of modifiers, Nonalcoholic fatty liver was stratified among the age, sex and duration of Type -2 Diabetes mellitus. The results were presented as tables and graphs.

RESULTS

A total of 145, 71 (49%) male and 74 (51%) females with type -2 DM presenting to the outpatient department were admitted in the medical unit of Saidu group of teaching hospitals Swat. 51% (n=74) of patients having greater BMI (P<0.001) and Hypertension (P<0.001) showed the presence of NAFLD. Patients with NAFLD and was found to have increased frequency of metabolic syndrome. In patients with NAFLD was found to have significantly raised the level of serum triglycerides and serum cholesterol. Patient's age varied from 40 – 70 years and the mean age of the patients was 45.93 ± 8.57 years. Fatty liver was found in 74 (51%) of the patients. For diabetics, in the age group, 40 – 50 (Table No. 1) age-wise distribution was intense.

The mean duration of diabetes was 8.85 ±6.18 years. Mean BMI was 30 ±5.5, and HBA1C was 7.9 ±1.1%.

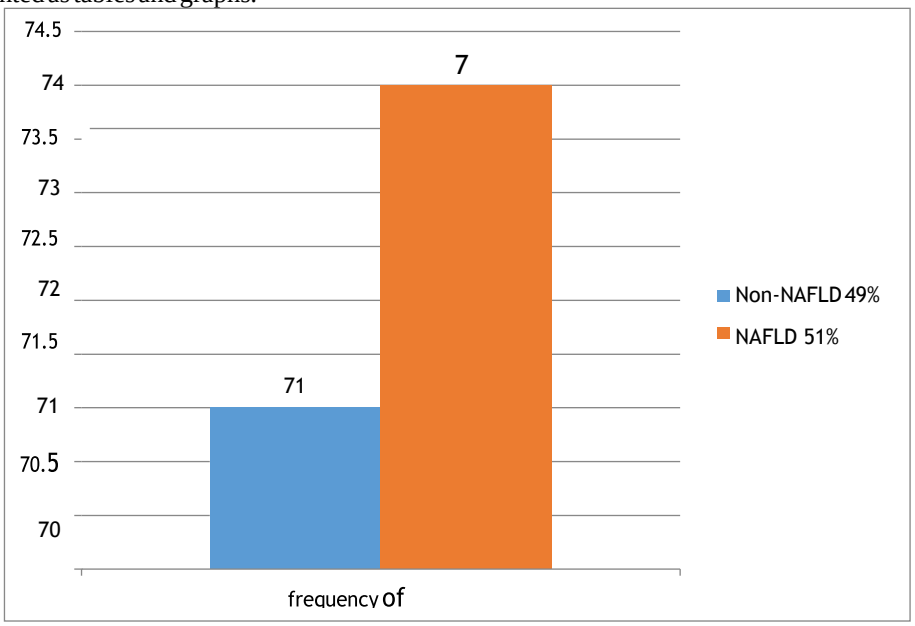

Figure No. 1: Frequency Of Non-Alcoholic Fatty Liver Disease

Main symptoms were itching, weakness and fatigue. Out of 100 patients in which 53 were having NAFLD, fatigue was the main symptom. 93 patients complain was generalized body weakness in which 46 patients had NAFLD. In patients having NAFLD 32% of patients had heaviness in the right side of the abdomen and 42% of patients had pain in right upper part of the abdomen. Serum Albumin and Bilirubin of all the patients were normal. Other biochemical abnormalities were given in table No 2.

NAFLD was less common in old age men ex-smoker or current smoker. 49% patient i.e. 72 patients had mild hepatomegaly on ultrasound, while there was no hepatomegaly in the non-NAFLD patient. The patients who don't have NAFLD, the average liver size was 13±2.4cm and patients who had NAFLD, the liver size was 17.2±3.1 cm. Most of NAFLD patients were obese and their body mass index was higher. Prevalence of HTN, Hyper triglyceredemia HDL, and cholesterol had no significant difference in patients having NAFLD compared to those who don't have NAFLD. Similarly, no difference was there in the apparent severity of diabetes with HbA1c values between the two groups. Further, the treatment routines for diabetes and use of medication for hypertension and hyperlipidemia were similar between the two groups.

Table No. 1: AgeWise Distribution Of Patients

Age Group	Diabetic Patients (No)	Percentages
30-39	16	11
40-49	78	53.7
50-59	29	20
60-69	12	8.2
70 and above	10	6.8

Table No. 3: Biochemical Profile Of Fatty And Non-Fatty Diabetic Patients

Investigation	Fatty liver patients	Non-fatty liver patients
Triglycerides(more than 150 mg/dl	47(32.4%)	39(26.8%)
Serum cholesterol (> 200 mg/dl)	24(16.5%)	18(12.4%)
Serumalkalinephosphatase(>300u/l)	8(5.5%)	05(3.4%)
AlaninAminoTransfareses(>40u/l)	6(4.1%)	6(4.1%)

DISCUSSION

It is predicted that the prevalence of NAFLD and its complications is increasing and will be double by the year 2025.[9] By understanding, the difference in the prevalence of hepatic steatosis and steatosis related liver injury in different ethnic people will help to develop new treatment options and prevention method. NAFLD which is common hepatic disorder is commonly seen in obese and diabetic patients.

Different studies showed different prevalence in a different area. Usually, NAFLD is asymptomatic in Diabetic patient. A study was done in Karachi by luxemi et al who examined 120 diabetic patients and found that 60.8% had NAFLD.[10].

A study was also conducted in Japan in which impaired glucose metabolism was independently detected in healthy middle-aged Japanese adults with a 29% prevalence of NAFLD[11]. Another study which was conducted in Italy showed a prevalence of 20%.[12]. Meanwhile, in the US 20% of the general population had NAFLD.[13] Akbar et al in Saudi Arabia done a study in type 2 DM and found that 55% had NAFLD[14]. In India Gupta et al study showed that 49% of Diabetic patients had NAFLD.[15].

In our study, NAFLD frequency is 51% which is similar to the results from India and other studies conducted in Pakistan. We took abdominal ultrasound as a sole entity for the diagnosis of NAFLD, which is having high sensitivity and specificity if the liver fat content is more than 33% but if the liver fat content is less than 33% then a liver biopsy is the best diagnostic tool.

NAFLD patients are asymptomatic in the initial phase but later on, they become symptomatic with main complaints of fatigue and right upper abdomen heaviness which is evident from multiple studies. In the study, fatigue was observed as a chief complaint in 145 diabetics, out of which, 53 were having fatty liver. Generalized body weakness was observed in 93, out of which 46 (31.7%) were having NAFLD. Among patients with fatty liver disease, pain right upper abdomen was present in 42 and heaviness in the right upper abdomen in 32 (64.70%). Most of the symptoms in NAFLD were because of stretching of the liver capsule i.e. right upper abdomen pain and heaviness. The result from wing kin synetal shows that fatigue and heaviness were the two important symptoms of the 33% patients. Diabetic's mellitus in an important risk factor for NAFLD.

CONCLUSION

Type – 2 diabetic patients with metabolic syndrome having raised BMI, serum cholesterol and triglycerides are more prone to NAFLD. Currently, T2DM patient is not routinely screened for NAFLD.

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