Prevalence of non alcoholic fatty liver disease and its biochemical parameter

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Abstract

Background: Nonalcoholic fatty liver disease (NAFLD) has been emerging as the most common chronic liver condition in the world and is a clinicopathologic entity increasingly recognized as a major health burden in developed countries. Different laboratory tests are extremely useful in achieving a better understanding of diseases, and thereby, allow making decision for better management. The examination of different biochemical parameters usually provides excellent clues to the cause of the disease. **Objective:** To see the prevalence of non-alcoholic fatty liver disease and its biochemical predictors. **Material and Methods:** An observational study was carried out in the Department of Biochemistry, Army Medical College, Comilla during the period of January 2017 to June 2017. The main outcome variable are prevalence of NAFLD and its biochemical marker: ALT, AST, TG, total cholesterol, LDL and HDL in a patient with non alcoholic fatty liver disease. Ultrasonography of hepatobiliary system was done to all patients to find out fatty change in the liver, ALT, AST, Total cholesterol, TG, HDL, LDL was done. **Results:** This study showed the prevalence of non alcoholic fatty liver disease (NAFLD) was 32.6%. The findings of all biochemical parameters were raised in NAFLD patients in comparison with nonfatty liver group and the differences were found to be statistically ($P < 0.05$) significant. As it is shown, the mean + SD of serum ALT (IU/L) were 60.1+24.1 and 42.7+21.4 were significantly higher in NAFLD patients as compared to non fatty liver disease ALT (19.61+5.91) and AST (24.57+5.52). All the lipid profile parameters (mg/dl) total cholesterol (201.36+50.29, triglyceride (TG) (199.62+63.36) and LDL (119.12+39.80) were significantly higher in NAFLD patients as compared to non-NAFLD group total cholesterol (164.42+35.56), TG (153.12+19.50) and LDL(119.12+39.80). Paradoxically higher HDL (38.29+6.32 vs 44.64+28.84) was seen on non-NAFLD group.**Conclusions:** NAFLD is associated with changes in biochemical parameters in cases of NAFLD. It also highlights the importance of routine lipid profile in subjects should be more closely observed for NAFLD and liver complications.

Keu word : Non alcoholic fatty liver, disease, biochemical, chronic liver

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Introduction

Non alcoholic fatty liver disease (NAFLD) is a type of chronic liver disorder which is gaining significant importance worldwide. NAFLD represents sprectrum of conditions characterized histologically by macrovesicular hepatic steatosis and occurs in those who do not consume alcohol in amounts generally considered to be harmful to the liver[1]. It is considered as the most common chronic liver disease in affluent societies, affecting 2-10% of the general population, encompassing a wide range of diseases from simple steatosis to nonalcoholic steatohepatitis (NASH) in both children and adults[1,2]. The liver cell damage that is observed in patients with NASH can lead to cirrhosis or even end-stage liver disease[3,4]. Absence of sign and symptoms, and non availability of sensitive and specific diagnostic tests, limits the ability to estimate the prevalence of NAFLD[3,4].

It has also been observed that with modernization, a sedentary lifestyle and a lack of exercise are tied in with an increased prevalence of diabetes mellitus (DM), obesity, hypertension and hypertriglyceridemia. These are considered to be important causes of nonalcoholic fatty liver disease (NAFLD). In the majority of patients, NAFLD is associated with metabolic risk factors such as obesity, diabetes mellitus, and dyslipidemia. Approximately 20-25% of the cases progress into cirrhosis with all its ramifications

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including hepatocellular carcinoma and the need for liver transplantation[1,4].

Biochemical tests are extremely useful for accomplishing a better understanding of the disease, and thereby allows thought full management decisions to be made. An ultrasound examination of the liver has relatively high sensitivity (60-95%) and specificity (88-95%)[5]. Therefore, the diagnosis of NAFLD has been made on liver ultrasound examination and the measurement of different biochemical parameters indicating liver injury or damage. Conflating the results into various scores may fortify the diagnosis[6]. However, researchers are still looking for simple diagnostic tools with greater sensitivity and specificity that could serve as a screening test for excessive fat accumulation in the liver. The data indicate that NAFLD may have male preponderance or an equal gender distribution and may even occur in the absence of diabetes and obesity[7]. NAFLD can occur at all ages including childhood, though the highest prevalence is described in those between 40-50 years of age. With some limitations, both population and hospital-based studies from the west report that around 10-24 percent ecumenical population (Guatemala) and 57-75 percent obese individual may have NAFLD[8]. Thus, in view of the above contest, the present study was under taken to see the prevalence of non-alcoholic fatty liver disease and its biochemical predictors in Bangladeshi population.

Materials and Methods

An observational study was carried out in the Department of Biochemistry, Army Medical College, Comilla during the period of January 2017 to June 2017. Nonalcoholic Fatty Liver Disease was diagnosed by noninvasive imagining liver ultrasound procedure. In addition, blood tests were performed to assess liver function and to exclude other causes of liver disease. The exclusion of significant alcohol intake was essential. Presence of abnormal fat accumulation in the liver found by X-rays and ultrasound images confirmed the diagnosis. Data were collected by interview of the patients / attendants; clinical examination and laboratory investigation. All data will be entered, checked, rechecked and scrutinized by the principal investigator for following standard procedure and will be analyzed by SPSS software Program version 20.

Result

In table I, the mean+SD of age is 44.8±7 years, BMI is 27.45±2.69 Kg/m^2,waist hip ratio is 0.905±0.845, In table II, sex distribution among study population (n=46) is male 56.5% and female 43.5%. Where as prevalence of fatty liver distribution among study population (n=46) is fally liver 32.6% adn non fatty liver 67.4% (Table-III). The finding of all biochemical parameters were raised in NAFLD patients in comparison with non fatty liver group and the differences were found to be statistically significant (P< 0.05) As it is shown, in the table IV and V.

Table I: Anthropometrics in study group (n=46)

Anthropometric	Mean±SD
Age (years)	44.8±7
BMI (Kg/m^2)	27.45±2.69
Waist hip ratio	0.905±.0.845

Table II: Sex distribution among the study population (n=46)

Sex distribution	Number	Percentage(%)
Male	26	56.5
Female	20	43.5

Table III: Prevalence of Fatty liver in study populations on ultrasound (n=46)

USG	Number	Percentage(%)
Fatty liver	15	32.6
Non fatty liver	31	67.4

Table IV: Variations of liver enzymes among study populations (n=46)

Liver Enzymes	Fatty liver disease (n=15) Mean±SD	No fatty liver disease (n=31) Mean±SD	df	t	P value
ALT (IU/L)	60.11±24.1	19.61±5.91	14.49	7.257	0.001
AST (IU/L)	42.75±21.4	24.57±5.52	14.69	5.149	0.001

Table V: Lipid profile in population of this study (n=46)

Lipid Profile	Fatty liver disease (n=15) Mean±SD	No fatty liver disease (n=31) Mean±SD	df	t	P value
TC (mg/dL)	201.36±50.29	164.42±35.56	20.36	3.423	0.001
TG (mg/dL)	199.62±63.36	153.12±19.50	15.18	4.515	0.001
HDL(mg/dL)	38.29±6.32	44.46±7.64	34.864	3.31	0.001
LDL (mg/dL)	119.12±39.80	89.64±28.84	20.87	3.45	0.001

n= number of patients,
s= significant
ns=not significant
d=degree of freedom
p value <0.05 at level of significance

Discussion

NAFLD, which is characterised by a wide spectrum of liver pathology ranging from mere liver steatosis to the more severe non-alcoholic steatohepatitis, resembles alcohol-induced liver disease, but develops in subjects who are not alcohol consumers and have negative tests for viral and auto-immune liver diseases[9,10]. The prevalence of fatty liver varies from 10 to 20%[6]. In the present study, increased body weight, BMI and waist measurement were more prevalent in patients with NAFLD. BMI was significantly higher non alcoholic fatty liver disease. Obesity is the most common entity associated with NAFLD that has been reported in studies[11].

In this study, NAFLD was diagnosed using ultrasonography the prevalence was 32.6%. Although the gold standard for diagnosing of NAFLD is magnetic resonance imaging,[12] many studies have suggested that ultrasonography is a useful, safe, noninvasive, and widely available method for diagnosis and follow-up of patients with NAFLD, especially in epidemiological studies [13,14]. Hence, in this study, we used this assay for diagnosis of NAFLD and for improving its accuracy a single radiologist had performed the procedure.

The reported prevalence rate of ultrasonographically diagnosed NAFLD in different studies and regions had a wide range of variability. The reported range of NAFLD varies from 20% to 60% in developed countries and from 1% to 30% in developing and Asian countries [15,16]. Prevalence of NAFLD has reported to be 34%, 21.8%, 10%, and 24.3% in the United States, Japan, China, and South Korea, respectively[17,18,19,20]. Several studies have demonstrated the prevalence of NAFLD in different groups of the Iranian population[21,22,23]. The range was from 2.9% by Rogha *et al*.[21] to 43.8% in a substudy from Amol cohort health study by Amirkalali *et al*.[24]

Although NAFLD has emerged as the commonest liver problem worldwide and is found in up to one-third of the general population [9,10] there is little information on the true profile of patients with NAFLD in clinical practice. It has been well established that many biochemical abnormalities occur in chronic liver diseases. A number of studies have shown that NAFLD patients have significant increase in TG, total cholesterol, VLDL and LDL cholesterol, where as decreased HDL was noticed. Similarly deranged AST, ALT and ALP were observed in greater percentages in patients of NAFLD than those without NAFLD. The results of our study also support these observations. As is seen, increase in all the above mentioned biomarkers, which can be very important in treatment aspect.

In this study the mean±SD of serum ALT (IU/L) were 60.1+24.1 and 42.7+21.4 were significantly higher in NAFLD patients as compared to non fatty liver disease ALT (19.61+5.91) and AST (24.57+5.52) values were found than controls and the variances between them were shows significant (P<0.005) values. All the lipid profile parameters (mg/dl) total cholesterol (201.36+50.29, triglyceride (TG) (199.62+63.36) and LDL (119.12+39.80) were significantly higher in NAFLD patients as compared to non-NAFLD group total cholesterol (164.42+35.56), TG (153.12+19.50) and LDL(119.12+39.80). Paradoxically higher HDL (38.29+6.32 vs 44.64+28.84) was seen on non-NAFLD group. Bajaj et al.[12] had also reported that the subjects with NAFLD had significantly higher values of total cholesterol and serum triglycerides. Increased lipid profile among NAFLD subjects had been reported in many studies. Clark et al.[25] in USA in a cross-sectional study found that NAFLD subjects were higher in high triglycerides levels. In another cross sectional study in Brazil, subjects with NAFLD had a higher triglyceride[26]. However, Lizardi- Cervera et al.[27] in Mexico found that the high level of cholesterol was found in

63 percent of the NAFLD subjects. Similar findings were found also by other researchers[28,29]. Many studies during the recent years revealed that liver enzymes including AST and ALT can be useful to detect or predict NAFLD and its grading, but due to the high variability of liver enzymes, it does not seem that these enzymes have a definite role in the accurate diagnosis of fatty liver. Obika also showed that liver enzymes do not appear to have any association with diagnose of NAFLD[30].

Conclusion

We conclude that, NAFLD is commonly seen in patients, and its prevalence is likely to increase with the rising incidence of obesity. The independently associated risk factors for NAFLD are the raised BMI, waist/hip ratio, as well as higher levels of liver enzymes. Serum triglyceride and serum cholesterol levels are significantly raised in NAFLD patients than in non fatty liver patients. The high prevalence of severe derrangements also highlights the importance of performing routine serum triglycerides and cholesterol level and other liver function tests for monitoring in patients. NAFLD should be actively required to treat and should also be monitored for complications.

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