

Status of Liver Enzymes in Non Alcoholic Fatty Liver in Obese Type-2 Diabetic Subjects

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Abstract: Non alcoholic fatty liver disease (NAFLD) is a fatty liver disease occurring in patients without alcohol consumption. It includes a broad spectrum of liver disease, from fatty infiltration, inflammation and cirrhosis and is associated with obesity, hyperlipidemia and diabetes mellitus. An increase in the BMI and levels of FBS, total cholesterol, triglycerides, LDL, VLDL, SGPT, ALP, GGT level and a decrease in HDL was observed in non alcoholic fatty liver group. Obesity, hyperglycemia, dyslipidemia and elevated liver enzymes level are seen more frequently in non alcoholic fatty liver in type-2 diabetic obese patients.

Keywords: NAFLD, BMI, LFT, ALT, ALP and GGT

1. Introduction

Non alcoholic fatty liver disease (NAFLD) also describes a clinicopathological condition that is characterized by significant lipid deposition in the hepatocytes of the liver parenchyma in patients with no history of excessive alcohol consumption. The spectrum of this disease is broad, ranging from a simple steatosis to non alcoholic steatohepatitis, fibrosis and cirrhosis. Obesity, insulin resistance and diabetes are well known risk factors for the development of a fatty liver [1][2]. Non-alcoholic fatty liver disease (NAFLD) is an entity that includes patients with simple steatosis (SS) and non-alcoholic steatohepatitis (NASH), which has the propensity of progressing to cirrhosis and hepatocellular carcinoma [3].

2. Material and method

Subjects were selected from those attending the medical outpatient department of G.R. Medical College, Gwalior (MP). A total number of 200 cases were included in our study, diagnosis being based on ultrasonography. Out of these, 100 were non obese and non diabetic healthy controls and 100 were obese with type-2 diabetic patients of both sexes included in the study, excluded based on significant alcohol consumption (>20 g/day). A written informed consent was obtained from the patients. Approval for conducting the study was obtained from the institutional ethics committee of G.R. Medical College, Gwalior (MP). The patients were further evaluated by the measurement of BMI, fasting blood sugar, total cholesterol (TC), triglycerides (TG), low density lipoprotein (LDL), high density lipoprotein (HDL), very low density lipoprotein (VLDL), total bilirubin, alanine aminotransferase (ALT), alkaline phosphatase (ALP), gamma glutamyl transpeptidase (GGT). The data was entered and analyze into Statistical packages for social science (SPSS version 21.0).

3. Observation and Results

The average age of the patients was 52 ± 8 years (Ranging from 36 to 74). Thirty nine (39%) were males and Sixty-one (61%) were females. Comparison of means of serum biochemical markers between fatty liver and non fatty liver (healthy) groups is presented in **Table**. The values of all these biochemical study parameters except HDL were elevated in fatty liver disease patients as compared to non fatty liver disease group and the differences were found to be statistically significant (P value <0.01 and <0.001). Correlation coefficient analysis was performed for risk factors of nonalcoholic fatty liver. P value less than 0.05 was considered statistically significant. Body mass index and triglycerides were positively correlated with fatty liver.

Comparison of laboratory abnormalities between no fatty liver (healthy control) and nonalcoholic fatty liver

Table

Study Variables	No NAFLD n=100	NAFLD	P-Values
BMI	21.6±1.88	32.85±3.89	P<0.001**
FBS	87.46±13.46	148.0±37.7	P<0.001**
Total Cholesterol (mg/dl)	186.3±21.09	248.4±41.9	P<0.001**
TG (mg/dl)	122.09±19.49	187.7±55.05	P<0.001**
HDL (mg/dl)	47.45±6.14	33.27±7.02	P<0.001**
LDL (mg/dl)	114.1±20.20	161.7±39.3	P<0.001**
Total bilirubin (mg/dl)	0.72±0.26	1.22±0.50	P<0.01**
ALT (IU/L)	27.34±6.44	54.16±16.1	P<0.001**
ALP (IU/L)	179.7±336.75	292.6±21.0	P<0.01**
GGT (IU/L)	25.05±5.24	49.39±9.15	P<0.001**

* Significant at P<0.01, ** significant at P<0.001

4. Discussion

The prevalence of NAFLD is high in conditions associated with insulin resistance, such as obesity, type-2 diabetes mellitus, dyslipidemia and the metabolic syndrome [4]. The presence of NAFLD correlates significantly with BMI [5]. In our study only BMI was taken as a marker for obesity, raised BMI showed strong correlation with presence of fatty liver. In diabetic fatty liver group, the mean BMI was 33.85 ± 3.79

where as in non-fatty liver group it was 22.6 ± 1.88 (P value < 0.001). In literature, among severely obese patients with diabetes, the prevalence of NAFLD has been found to be 100% [6]. Obesity, especially visceral obesity, is frequently associated with NAFLD and their coexistence in the same individual increases the likelihood of having more advanced forms of liver disease. NAFLD occurs in 60% -95% of people with obesity [7]. The relationship between fatty liver, impaired glucose tolerance, diabetes mellitus and hyperlipidemia is well established. It has been demonstrated that insulin resistance leads to higher free fatty acid load to the liver, consequently higher triglyceride synthesis and increased secretion of triglyceride rich very low density lipoprotein (VLDL) from the liver. Hypertriglyceridemia have been also strongly correlated with liver fat accumulation [6][8][9]. Our study showed FBS levels in fatty liver disease group were higher than healthy control group, which confirmed the obvious dysglycemia in these patients (P value 0.001). We also found that increased triglyceride levels (mean 263.7 ± 55.05) in diabetic fatty liver group as compared to control healthy group (triglycerides mean 122.09 ± 19.49) and the results were statistically significant (P value < 0.001). In a correlation coefficient analysis triglycerides were also found to be increase in obese type 2 diabetic obese nonalcoholic fatty liver population. The study was conducted in China also found that fatty liver positively correlated with plasma triglyceride levels and negatively with plasma HDL-C level [10]. In our study also, the elevated total cholesterol positively correlated with fatty liver disease. The levels of ALT, ALP and GGT were also elevated in obese type 2 diabetic fatty liver patients. This is also reported in other studies as well [11]. In this study, Though raised ALT levels are taken as the first marker of fatty infiltration of the liver [12]. We also noted the marked difference between the mean values of alkaline phosphatase in the two groups [13]. Our study has got few limitations. The diagnosis of NAFLD in our study was based on ultrasonography and exclusion of the known causes of chronic liver disease, but this was not confirmed by liver biopsy.

5. Conclusion

The prevalence of non alcoholic fatty liver is high in type- 2 diabetic patients and obesity, dyslipidemia, dysglycemia, elevation of liver enzymes are increased in fatty liver than in non fatty liver subjects. The independently associated risk factors for diabetic fatty liver are the raised BMI and elevated levels of triglycerides.

6. Future Scope

It is possible that in coming years the hope of new therapeutic and diagnostic strategies based on nonalcoholic fatty liver type 2-diabetic complications can be translated in to real clinical treatments.

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