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General Medicine

STUDY OF LIPID PROFILE ABNORMALITIES IN CORRELATION WITH SONOLOGICAL GRADING OF NAFLD.

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ABSTRACT

Background: NAFLD is a significant cause of chronic liver disease and is now regarded as the hepatic manifestation of the metabolic syndrome. The morbidity and mortality related to NAFLD is expected to rise with the upsurge of obesity and type 2 diabetes mellitus. It encompasses a wide spectrum that ranges from fat accumulation in hepatocytes to hepatic steatosis with inflammatory component that may or may not have associated fibrosis. The aim of the present study is to investigate the association of lipid profile abnormalities in patients with different grades of fatty liver.

Methods: A total of 100 cases diagnosed with NAFLD on ultrasound were divided in to 3 groups based on sonological grading. They were further divided based on age into five groups. of which 55 are males, and 45 are females. All patients were subjected to complete history taking and clinical examination, fasting lipid profile, routine laboratory investigations, thyroid profile.

Results: in this study of 100 patients, 52 % are grade I, 30 % are grade II, and 18 % are grade III NAFLD. Serum TG, TC, LDL-C, and HDL-C levels were abnormally raised in 57%, 55%, 60%, and 59% patients, respectively. Thirty-three cases are diabetic, eight individuals consume alcohol, and Thirty individuals are overweight in the present study population.

Conclusions: The sonological grade of the Fatty liver correlate with the biochemical lipid abnormalities i.e., with higher the grade of fatty liver more is dyslipidemia.

KEYWORDS :

INTRODUCTION

Non-alcoholic fatty liver disease (NAFLD) is a major cause of chronic liver disease worldwide [1], occurring when fat is deposited (steatosis) in the liver, not due to excessive alcohol use. It encompasses a wide spectrum that ranges from fat accumulation in hepatocytes (simple hepatic steatosis) to hepatic steatosis with inflammatory component (steatohepatitis) that may or may not have associated fibrosis.

The global prevalence of NAFLD is estimated at 24%; the highest rates are reported from South America and the Middle East, followed by Asia, the USA, and Europe. [2]

The prevalence of fatty liver in India has been shown to be as high as 15%-30%. The important risk factors associated with this disease are obesity, diabetes mellitus, and dyslipidemia. At the time of diagnosis, most NAFLD patients had no symptoms or signs of liver disease, although many patients report fatigue or malaise and a sensation of fullness or discomfort on the right side of the upper abdomen. Hepatomegaly is the only physical finding in most patients.

NAFLD is more common in people who have certain conditions, including obesity and conditions that may be related to obesity, such as type 2 diabetes. Researchers have found NAFLD in 40 to 80 percent of people who have type 2 diabetes and in 30 to 90 percent of people who are obese. [3]

Dyslipidemia in NAFLD is typically characterized by increased serum triglyceride levels, increased LDL cholesterol, and decreased HDL cholesterol. Patients with NAFLD are at heightened risk for cardiovascular disease as assessed by a variety of measures such as Framingham Risk Scores. NAFLD is associated with metabolic risk factors such as obesity, metabolic syndrome, dyslipidemia, insulin resistance (IR), and type 2 diabetes [4].

NASH can lead to complications, such as cirrhosis and liver cancer. People with NASH have an increased chance of dying from liver-related causes.[5] A liver biopsy remains the only method to distinguish NASH from simple steatosis and reference methods to establish the extent of liver damage and fibrosis [6]. Recent studies have emphasized novel pathophysiologic mechanisms involving environmental and genetic factors that result in the development of necroinflammation and fibrosis [7,8].

The objectives of the present study are to investigate the association of lipid profile abnormalities in patients with different grades of fatty liver. The majority of the patients were in Grade I, followed by Grade II and Grade III. The total cholesterol level was significantly higher among fatty liver Grade III than Grade I and Grade II.

MATERIAL & METHODS

2.1. Case studying

This is a hospital-based cross-sectional study conducted in the Department of Medicine, Dr. Pinnamaneni Siddhartha Institute of medical sciences. A total of 100 patients, which included 55 males and 45 females, were evaluated sonographically for fatty liver in our department. All patients of the age of more than 30 years diagnosed as nonalcoholic fatty liver by ultrasound were included in the study only after taking informed consent. The patients with high BMI, diabetes, and alcohol intake of < 30 gm/d were included in the study.

2.2. Grading of non-alcoholic fatty liver on ultrasonography [9]

Grade I: Minimal diffuse increase in the fine echoes. Liver appears bright compared to the cortex of the kidney.

Grade II: Moderate diffuse increase in the fine echoes. Slightly impaired visualization of the intrahepatic vessels and diaphragm.

Grade III: Marked increase in the fine echoes. Poor or no visualization of intrahepatic vessels and diaphragm and poor penetration of the posterior segment of the right lobe of the liver.

BMI was calculated for all the subjects by using the formula [weight (kg)/height (meter^2)].

RESULTS

A total of 100 cases diagnosed with NAFLD on ultrasound are included in the study, of which 55 are males, and 45 are females. Of

this, 52 % are grade I, 30 % are grade II, and 18 % are grade III NAFLD. Serum TG, TC, LDL-C, and HDL-C levels were abnormally raised in 57%, 55%, 60%, and 59% patients, respectively. Thirty-three cases are diabetic, eight individuals consume alcohol, and Thirty individuals are overweight in the present study population. We found that in our study, there is a correlation between sonological grade of the fatty liver to that of biochemical lipid abnormalities i.e., with higher the grade of fatty liver more is dyslipidemia.

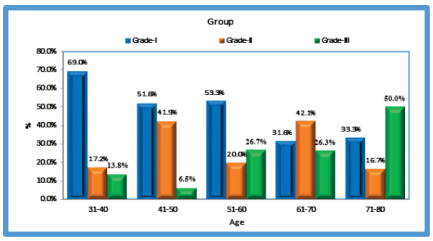


TABLE – 1: Age distribution and grades of fatty liver

TABLE 1 depicts the frequency distribution of different grades of Fatty liver in different age groups in our study.

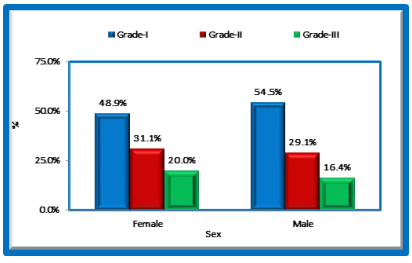


TABLE – 2: sex distribution in different grades of fatty liver

Table 2 shows the different grades of Fatty liver in both sexes.

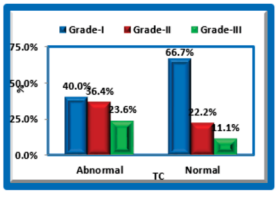
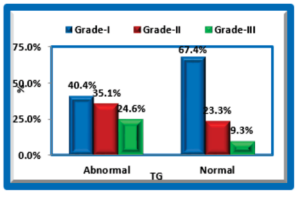


TABLE – 3



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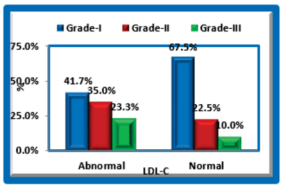

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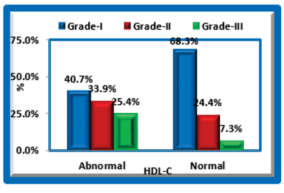

TABLE – 6

Table 3- 6 depicts the graphical representation of the level of each lipid abnormalities in relation to the grade of the fatty liver based on ultrasound.

DISCUSSION

NAFLD is a significant cause of chronic liver disease and is now regarded as the hepatic manifestation of the metabolic syndrome. The morbidity and mortality related to NAFLD is expected to rise with the upsurge of obesity and type 2 diabetes mellitus.

NAFLD is increasingly recognized as a major cause of liver-related morbidity and mortality because of its potential to progress to fibrosis, cirrhosis, liver failure, and hepatocellular carcinoma. Most of the patients with NAFLD are asymptomatic. The disease is discovered either incidentally during routine laboratory examination or when the patient is investigated for other conditions. Patients with NAFLD are heavily enriched with metabolic risk factors, including atherogenic dyslipidemia. Liver biopsy is the gold standard for the diagnosis of NAFLD. But because of its invasiveness, complication, painfulness, and sampling error, it is not feasible in every asymptomatic case. In this aspect, ultrasonography offers a promising role to diagnose NAFLD Increased lipid profile among NAFLD subjects had been reported in many studies.

A study by Clark in the USA found that NAFLD subjects were higher in patients with high triglycerides levels.[10]

In another cross-sectional study in Brazil, Type-2 diabetic patients have a high prevalence of ultra-sonographic NAFLD, and its presence is associated with obesity, hypertriglyceridemia, and high-normal ALT levels. Non-alcoholic fatty liver disease in diabetic patients may develop and progress independent of the diabetes progression itself. [11] However, Lizardi-Cervera et al., in a study that includes 359 individuals with NAFLD, Overweight was present in 46.79% and obesity in 36.49% of patients. it is found that the high level of cholesterol was found in 63 percent of the NAFLD subjects. [12]

In our study of all the 100 cases of NAFLD diagnosed by ultrasound 52% has grade I, 13% and 18% are grade II, III respectively in comparison with, a study by Atif Latif et al. conducted in 73 subjects with NAFLD, 42.5%, 37%, and 20.5% had grade I, II and III NAFLD respectively and all parameters showed significant increase in frequency of abnormal results with increasing grade of NAFLD except TG. A significant difference was found in mean TC, LDL-C, HDL-C, and non-HDL-C between grades of NAFLD. [13]

In a study by Mahaling et al. conducted in 70 cases who were diagnosed as NAFLD on ultrasonography, grade I NAFLD cases was 47.15%, grade II was 42.85%, and grade III was 10%. The mean age of the patients was 49.14 years. The male to female ratio was 3:4. Serum triglycerides, total cholesterol, LDL, and VLDL levels were raised in 67.14%, 45.71% 34.28%, 25.71% of cases, respectively. Low serum HDL levels were seen in 62.85% of patients. [14]

A study by Manohar Lal et al. conducted in 128 individuals with a mean age of the patients was 48.78±14.23 years, and 45.3% of the patients were males. The study found an abnormal profile of lipid levels among patients with fatty liver. The majority of the patients were in Grade 0 (43.8%), followed by Grade I (32%), Grade II (17.2%), and Grade III (7%). [15]

In our study, serum total cholesterol, triglycerides, serum LDL shows statistically significant abnormalities with increasing grades of NAFLD. With the increase in age, the grade of fatty liver tends to be higher among the affected individuals. A significant difference is seen among triglycerides and HDL-C in different grades of fatty liver.

A limitation of our study is that the diagnosis of NAFLD was based on ultrasonography and was not confirmed by liver biopsy as well as a lack of controls to investigate the risk of NAFLD. The correlation of grade of obesity with the level of lipid abnormality and relation with duration of diabetes and lipid derangement is not done in our study.

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