RESEARCH
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ROLE OF APOLIPOPROTEINS (APO A1/ APO B) IN NON- ALCOHOLIC FATTY LIVER DISEASE (NALFD)

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Abstract

Introduction- A more general name for patients with simple steatohepatitis and steatosis, which can progress to liver cirrhosis or even hepatocellular cancer, is non-alcoholic fatty liver disease (NAFLD). Roughly 90% of NAFLD patients with simple steatosis and steatohepatitis will not have a higher death rate, however 10% to 30% of patients with NASH (non-alcoholic steatohepatitis) may experience inflammation and hepatocellular damage. As a result, cirrhosis, increasing fibrosis, and end-stage liver disease occur in 25–40% of NASH patients.

Material and Methods- It was a Hospital Based Cross Sectional Observational Study, Duration 2 years and this study was include a total 140 subjects, which will divided in two groups Group I and Group II.

Result- In our study we conclude that the level of Apo A1 is higher (2.42±0.54) in grade I and (7.27±1.25) in grade II when compared with controls (1.49±0.27) having p value <0.05 and t value 15.06. In our study we conclude that the level of Apo B is lower in cases (0.72±0.12) and (0.33±0.13) in group 1 and group 2 when compared with controls (1.00±0.17) having p value <0.05.

Conclusion- Our study's results indicate that alterations in the levels of apoA1 and apo B and contribute to the disease's worsening. Our findings imply that the severity of NAFLD may be correlated with an increase in Apo A1 level and a decrease in Apo B level. In our study we find a positive correlation between Grade 1 and Grade 2 NAFLD patients.

Keywords- NAFLD, metabolic syndrome, progressive fibrosis.

Introduction

Triglyceride build up in the liver cells that is not caused by excessive alcohol consumption (>30 g/d for men and >20 g/d for women), drug use known to cause steatosis, or other coexisting chronic liver illnesses is referred to as "non-alcoholic fatty liver disease" (NAFLD). 1. In the targeted population, the prevalence of NASH is 10%–24% and NAFLD is 1%–5%, respectively. There is a close relationship between NAFLD incidence and severity and body mass index (BMI). Currently, NAFLD will rise in morbidly obese people2,3,4 and overweight people to 5% to 74% in 90%. NAFLD affects between 9% to 32% of the general population in India.5, 6

PATHOGENESIS OF NAFLD and NASH:

Not all of the pathogenesis of NASH is understood. NAFLD conditions include chemical exposure, medication side effects, nutritional problems, and surgical operations. A sequence of events that starts with steatosis can eventually lead to fibrosis and inflammation, which in turn can lead to cirrhosis and end-stage liver disease.7.

Reduced export as VLDL is the outcome of hyperinsulinemia brought on by insulin resistance, which raises intra-hepatocyte fatty acids by boosting glycolysis metabolism and lowering apolipoprotein B-100. Steatosis, often known as fatty liver, is the resultant elevation of fatty acids and triglycerides in hepatocytes.

METABOLIC SYNDROME:

Fibrosis can be independently predicted by metabolic syndrome. Approximately 70–90% of NAFLD patients have metabolic syndrome. One important bridge that connects NAFLD and the metabolic syndrome is insulin resistance. 8.

A. Hypertriglyceridemia: >1.7 mmol/l or when under medical intervention.
B. Impaired glycemia after therapy or during fasting (>5.6 mmol/l).
C. Waist circumference > 94 cm for men and > 80 cm for women is considered central obesity.
D. Hypertension: more than 135/85 mm Hg or under therapeutic supervision.
E. Low HDL cholesterol, measured at 135/85 mm Hg, or under treatment. GENDER: NAFLD is more common in males than females but development of fibrosis is higher in females than males. [9,10]

The metabolic syndrome is identified by the following symptoms:-

CLINICAL FEATURES OF NAFLD:-

Following Symptoms are:-

1. Fatigue (<10%)
2. Pain or discomfort in the right upper subcostal area (30–40%)
3. Abdominal distension Normal examination
4. Pedal oedema
5. Gastrointestinal bleeding

Following Signs are:-

1. Increased body mass index (BMI): Consequences of cirrhosis include increased waist circumference and stigma associated with chronic illness (truncal obesity).Lipomatosis/ lipodystrophy / lipoatrophy

Biochemical Investigations:-

1. Up to 4-5 times the rise in alanine aminotransferase (ALT) and aspartate aminotransferase (AST).
2. A preponderance of AST/ALT values may suggest cirrhosis
3. Alkaline phosphatase (ALP) rise of up to two times Bilirubin - elevated in last stage

1. Prothrombin time - prolonged in last stage
2. Albumin - decreased in last stage

Serum iron overload markers are 25%, but they do not signify hemochromatosis.

IMAGING: -

Ultrasonography:-

Hepatic steatosis is detected by ultrasound as having coarsened echotexture and increased echogenicity. If cirrhosis has developed from steatohepatitis, a nodular liver surface may be seen in addition to fibrotic abnormalities.

Fibro scan:-

Fibrotic livers have an accumulation of fibrous tissue in the hepatic parenchyma, making them less elastic. Pulsed-echo ultrasound is used by TE (Fibro scan) to provide a "liver stiffness measurement" (LSM) that serves as a stand-in for fibrosis. NAFLD and LSM correlated with liver fibrosis.[11] Though, there are numerous disadvantages of TE in NAFLD. Patients above the age of 52 with central obesity (BMI >35 kg/m2) and those with type 2 diabetes all exhibit invalid results. Despite being designed for fat people, the Fibro scan XL probe has less LSM failures.

Computed tomography/Magnetic resonance imaging

The following CT scan results for NAFLD are useful for analysis: • The mean CT Hounsfield unit in the liver (diffuse hypoattenuation) is less than that in the spleen. • The identification of fatty incursion foci. The MRI results for NAFLD are as follows:

• There is an intensity reduction in concentrated areas where the liver has deposited fat on T1-weighted images. Small lesions are easily recognized on MRI in the early stages. • Phase contrast imaging provides sufficient data regarding hepatic fatty intrusion, allowing for a reliable quantitative assessment of the disease's state. Although costlier than a CT scan or USG, it is more accurate and sensitive and useful in ruling out fatty infiltration.

Apolipoprotein A and Apolipoprotein B

Through their intermediation connections with receptors, lipid transport proteins, and enzymes, apolipoproteins (Apo A and Apo B) are lipid-binding proteins that are dependable carriers of lipids in the circulation and have a significant function in lipid transport and metabolism. The modified apolipoproteins serve as ligand and enzyme cofactors. With the exception of free fatty acids, all plasma lipids are carried in plasma as lipoproteins and are insoluble in water. The lipoproteins are composed of a phospholipid sheath encircling a core of cholesterol and triglycerides. This outer shell surrounds the apolipoproteins. The most important protein in low-density lipoproteins (LDL), intermediate-density lipoproteins (IDL), and very-low-density lipoproteins (VLDL), commonly referred to as "bad cholesterol," is apolipoprotein B (Apo B). Since there is only one Apo B molecule per particle, Apo B plays a critical role in the quantity of these particles in plasma. The primary protein in high-density lipoprotein (HDL), sometimes referred to as the "good cholesterol," apolipoprotein (ApoA1), can be used as a gauge to determine HDL content.

Material and Methods-

Study design- It was a Hospital Based cross sectional observational study.

Study period- Duration 2 years

Based on Based on hospital statistics and Epidemiological studies in India the Prevalence of NAFLD is estimated around 9-32% in the general Indian population of previous past 3 years.[12] So, following formula will be used to estimate the sample size.

Study Population- Grade 1 and Grade 2 of Non-Alcoholic fatty liver disease (NAFLD) reporting in SGT Hospital during the study period was included in the study.

This study will include a total 140 subjects, which will divided in two groups. Group I and Group II.

The Inclusion and Exclusion Criteria are as follows:

Inclusion criteria:

All patients who are admitted and correlate with NAFLD will be included in the study.

Exclusion criteria:

1. Alcohol consumption.
2. Liver cirrhosis or malignancy or past history of dyslipidemia or cardiovascular disease.
3. Positive serologic marker for hepatitis B.
4. Smoker
5. Investigate for hepatitis B antigen

Statistical Analysis:-

Serum levels of Apo A1 and Apo B and was be analyzed on SPSS software (USA inc.) version 23.

Result:-

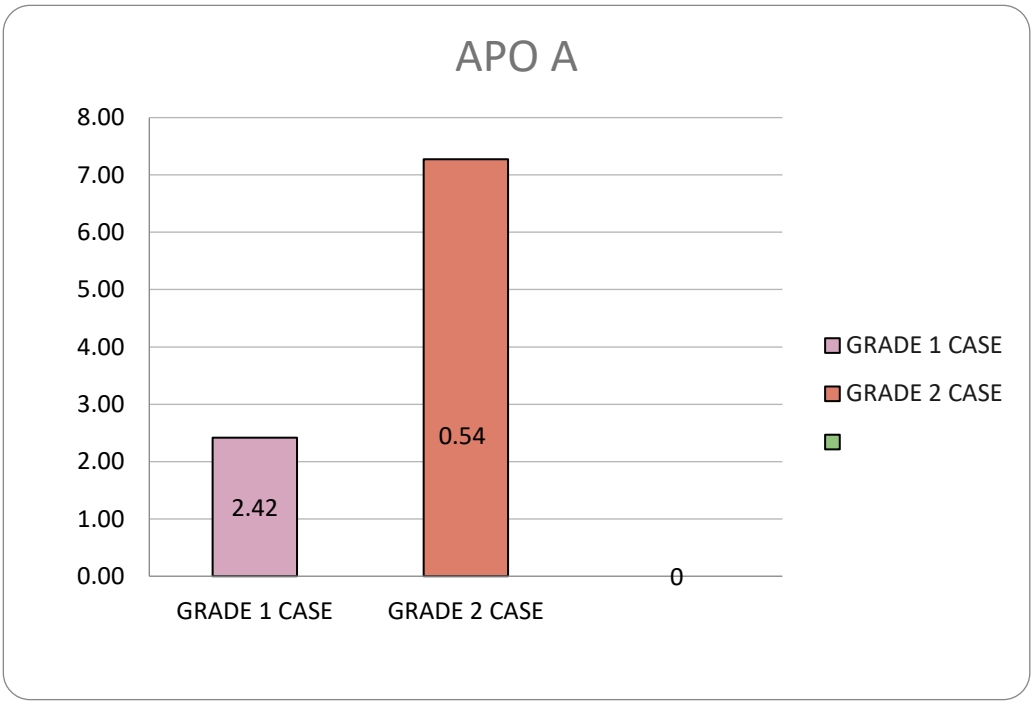

Figure 1- Apo A (Grade 1 and Grade 2 NAFLD)

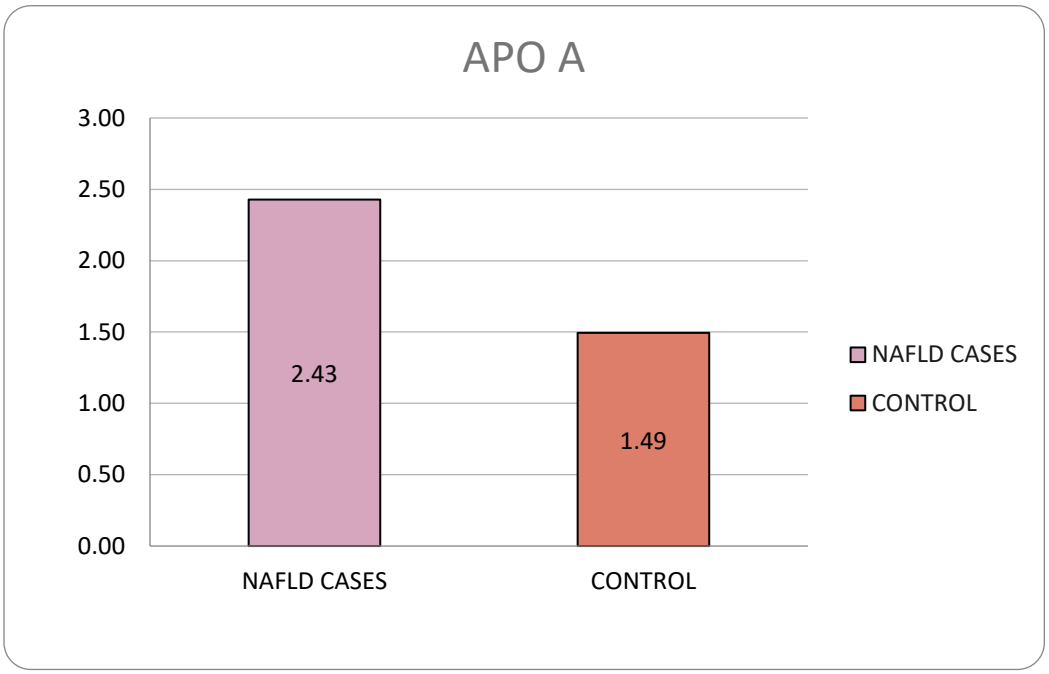

Figure 2- Apo A (NAFLD cases and control)

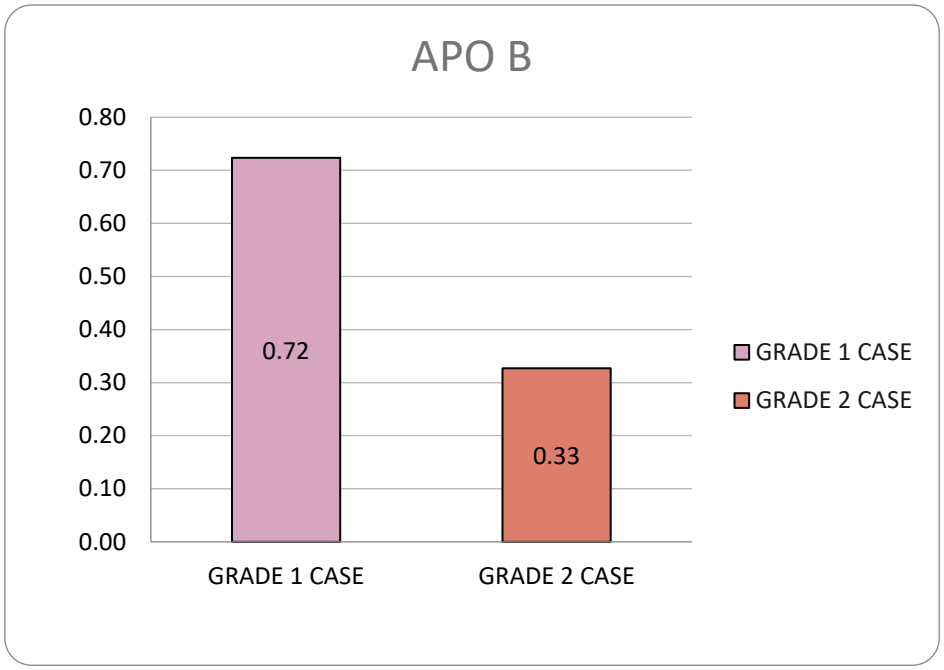

Figure 3- Apo B (Grade 1 and Grade 2 NAFLD)

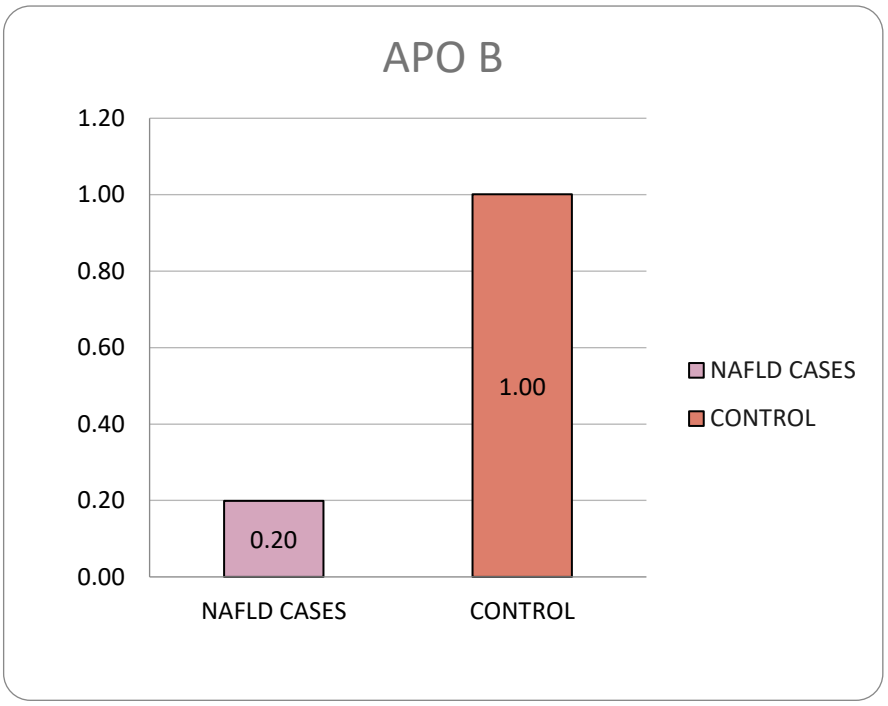

Figure 4- Apo B (Cases and control)

Figure 1 shows the Apo A (Grade 1 and Grade 2 NAFLD). Figure 2 shows the Apo A (NAFLD cases and control), Figure shows the 3- Apo B (Grade 1 and Grade 2 NAFLD) and Figure 4 shows the Apo B (Cases and control)

Discussion-

Because of its gradual cirrhosis and liver failure, non-alcoholic fatty liver disease (NAFLD) is becoming more well recognized as a major cause of liver-related morbidity and mortality. Age and gender matched healthy volunteers as well as clinically diagnosed NAFLD cases (n = 140) are included in the current investigation. This study will include a total 140 subjects, which will have divided in two groups. Group 1 (70 patients) and Group 2 (70 patients) on the basis of radiologically features. In our study we conclude that the level of Apo A1 is higher (2.42±0.54) in grade I and (7.27±1.25) in grade II when compared with controls 1.49±0.27 having p value <0.05 and t value 15.06. Similar studies was conducted by Ren et al.'s found that both APOA1 and APOB had the predictive value of NAFLD [13]. In our study we conclude that the level of Apo B is lower in cases (0.72±0.12) and (0.33±0.13) in group 1 and group 2 when compared with controls 1.00±0.17 having p value <0.05. Previous Korean study showed that development of NAFLD was correlated with elevated measurements of waist circumference, fat mass, abdominal fat, percentage of body fat, iron, triglycerides, and Apo B.

Conclusion-

The "metabolic syndrome" is hypothesized to manifest in the liver as "non-alcoholic fatty liver disease" since patients with NAFLD are also more likely to have insulin resistance, obesity, hypertension, and dyslipidemia. Our study's results indicate that alterations in the levels of apoA1 and apo B contribute to the disease's worsening. Our findings imply that the severity of NAFLD may be correlated with an increase in Apo A1 level and a decrease in Apo B level. In our study we find a positive correlation between Grade 1 and Grade 2 NAFLD patients.

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