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Analysis of SGOT and SGPT in Non-Alcoholic Fatty Liver Disease and comparison with Normal Patients

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Abstract

Background: Obesity has reached epidemic proportions in India in the 21st century and it is estimated that about 5% of country's population is morbidly obese

Methods: This paper focuses on analyzing the importance of biochemical parameters in non-alcoholic fatty liver disease including SGOT, SGPT and their implications in the evolution of the disease by using standard procedure of selected biochemical parameters.

Results: The present study showed that the value of SGOT and SGPT were significantly high in non-alcoholic fatty liver disease patient compared to normal patients.

Conclusions: Our study also shows that non-alcoholic fatty liver disease patient have a high risk of critical condition and developing sever disease and show poor prognosis compared normal patent.

Keywords: SGOT, SGPT, DM-2

Introduction

Obesity has reached epidemic proportions in India in the 21st century and it is estimated that about 5% of country's population is morbidly obese. The percentage of obese individuals in developed and developing countries is also steadily increasing. The reasons for this are quite diverse and many. Trend of changing life style and food habits are noteworthy. National Family and Health Survey 2005-06 by Mumbai based International Institute for Population Sciences revealed that 12.1% males and 16% of females are obese or overweight. Epidemiological studies in India suggest the prevalence of NAFLD from 9 to 32%. [1] With respect to the population of India, which is well above 1 billion, the numbers of people who are obese or overweight is staggering. As the percentage of obesity rises so rises the incidences and prevalence's of diseases associated with obesity like Coronary Artery Disease Diabetes mellitus etc.

Ludwig in 1980 described a series of patients with chronic liver disease and steatohepatitis [2] on liver biopsy with a histological pattern similar to that of the Alcoholic Liver Disease. Interestingly all the patients denied alcohol intake and except one all were obese of being obscure cause the disease was named Non Alcoholic Steatohepatitis, thus opening up the horizon of Non Alcoholic Fatty liver disease.

The term 'NASH' was first introduced by Ludwig et al. in 1980 to describe histological changes indistinguishable from alcoholic hepatitis in patients with no or insignificant (less than 20 g/day) alcohol intake. From the pathogenic point of view, NAFLD has been classified as primary and secondary; primary NAFLD is usually associated with insulin resistance or metabolic syndrome, whereas secondary NAFLD is caused by intake of some drugs, surgery,

or total parenteral nutrition. Published literature on NAFLD from India is sparse.

This may be related to –

i. The fact that the condition was recognized fairly recently

ii. A presumption that the condition is benign and has a non-progressive course

iii. A large burden of viral hepatitis in India tends to reduce the priority accorded to this condition. [3]

When hepatic steatosis is present in the absence of excessive alcohol consumption, it is termed non-alcoholic fatty liver disease (NAFLD). NAFLD encompasses a spectrum of disorders ranging from simple steatosis to inflammatory steatohepatitis (NASH) and cirrhosis. Non-alcoholic fatty liver disease has emerged as the most common cause of chronic liver disease worldwide. [4] NAFLD can lead to hepatocellular carcinoma. NAFLD is an independent determinant of cardiovascular disease (CVD). [5] NAFLD is therefore a complex problem with implications far beyond the liver. The pathogenesis of diabetes and NAFLD are intimately related to insulin resistance and hyperinsulinemia. [6] Type-2 DM increases the risk of liver-related death by up to 22-time fold in patients with NAFLD. [7] In patients with Type-2 diabetes, the prevalence of NAFLD is as high as 75%. [8] Diabetes mellitus is frequently observed in patients with NAFLD, being present in 18-45% of cases. [9,10] Type-2 DM is a risk factor for progressive liver disease and mortality in patients with NAFLD, whereas NAFLD is a marker of cardiovascular risk and mortality in patients with diabetes. Hence, the diagnosis and evaluation of fatty liver is an important part of management of diabetes. The Prevalence of NAFLD is high in conditions associated with insulin resistance such as - obesity, Type II DM, Dyslipidaemia and Metabolic Syndrome.

NAFLD is an integral part of metabolic syndrome and comprises of a cluster of abnormalities such as dysglycemia, dyslipidaemia, hypertension, obesity with insulin resistance as a central pathogenic mechanism. HbA1c levels were increased in fatty liver group compared to non-fatty liver group confirming obvious dysglycemia. [11]

NAFLD is commonly characterized by elevated levels of markers of liver injury like alanine amino transferase (ALT), aspartate amino transferase (AST) and Gamma Glutamyl transferase (GGT), of these liver enzymes, ALT is most closely related to liver fat accumulation, and is often used in epidemiological studies as a surrogate marker for NAFLD. The ratio of AST/ALT is usually less than 1 in patients who have either no or minimal fibrosis, although this ratio may be greater than 1 with the development of cirrhosis. Amino transferase levels are sensitive indicators of liver cell injury and are helpful in recognizing hepatocellular diseases. Ultrasound scans are very useful to detect fatty changes in the liver and are inexpensive and do not expose a person to any radiation danger. If fatty changes are found in more than 30% of liver lobules a diagnosis of fatty liver is made. Ultrasonic features of a fatty liver include: Bright pattern, vascular blurring and deep attenuation. USG has a sensitivity of 89% and specificity of 93% in detecting steatosis and sensitivity and specificity of 77% and 89% respectively in detecting increased fibrosis. [12]

ALT and GGT activities, despite remaining within the reference interval, might be an important preclinical marker of NAFLD and MS. Although the mechanism through which serum ALT and GGT are related to the risk for NAFLD and MS remains to be elucidated, ALT and GGT might be not only indicators of liver injury by hepatic steatosis, but also an early indicator of impaired insulin signalling, subclinical inflammation, and oxidative stress. [13,14] In mild oxidative stress conditions such as fatty liver, GGT is induced and is able to compensate for the oxidative stress, thereby limiting liver damage and progression to NASH. [14,15]

GGT is a metabolic and a cardiovascular risk marker, given that it predicts the occurrence of metabolic syndrome and of cardiovascular disease. For every 10U increase in the GGT levels, there is a 2% increase in presenting fatty liver, and high levels of GGT increase the risk of NAFLD four-fold. [16]

Materials and Methods

A study was conducted in Pacific Institute of Medical Sciences, Rajasthan, from March 2019 to December 2021 on non-alcoholic fatty liver disease patient. The source population was all cases of non-alcoholic fatty liver disease admitted at PIMS with a confirmed

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diagnosis of non-alcoholic fatty liver disease reported by central laboratory. In Inclusion Criteria Sample above 20-60 year of age.

Ex –smokers, ex-alcohol drinker Patient was in exclusion criteria.

About 2 ml blood was drawn using perfectly dry and sterile vacutainer. The serum was separated with the help of centrifuge machine within 1 hours of collection to prevent artifactual changes in SGOT and SGPT. A total number of 100 patients admitted at Pacific Institute of Medical Sciences Udaipur, was form the subjects of the present study. Out of these 50 patients were suffering from non-alcoholic fatty liver disease, and 50 were normal patients. Efforts will be made to match all anthropometric factors comparable to both the groups of patients.

Clinical Methodology: Symptoms (Weakness, loss of appetite, Nausea,), serum SGOT and SGPT were recorded by using Autoanalyzer EM-640

Statistical Analysis**:** For the quantitative analysis, we used the software SPSS software. In this meta-analysis, all p values reported were two-tailed with the statistical significance set at $\leqslant 0.05$.

Result

The present study showed that the value of mean and standard deviation of SGOT in normal patients was (26.87 ± 8.82) and in non-alcoholic fatty liver disease patient (59.17 ± 31.17) with P value was (<0.005) significant.

And about SGPT the value of mean and standard deviation of SGPT in normal patients was (25.91 ± 8.75) and in non-alcoholic fatty liver disease patient (62.42 ± 31.57) and P value was (<0.005) significant.

The study showed that SGOT and SGPT level was significantly high in non-alcoholic fatty liver disease patient compare to normal patients. (Table 1, Fig 1.2)

Table 1: comparison of SGOT and SGPT between Normal Patient and non-alcoholic fatty liver disease patients.

S. No	Test	Normal Patient		Nafld Cases		P Value
		Mean	SD	Mean	SD	
1	SGOT	26.87	8.82	59.17	31.17	P < 0.005
2	SGPT	25.91	8.75	62.42	31.57	P < 0.005

Fig 1. Comparison of SGOT between Normal Patient and non-alcoholic fatty liver disease patients.

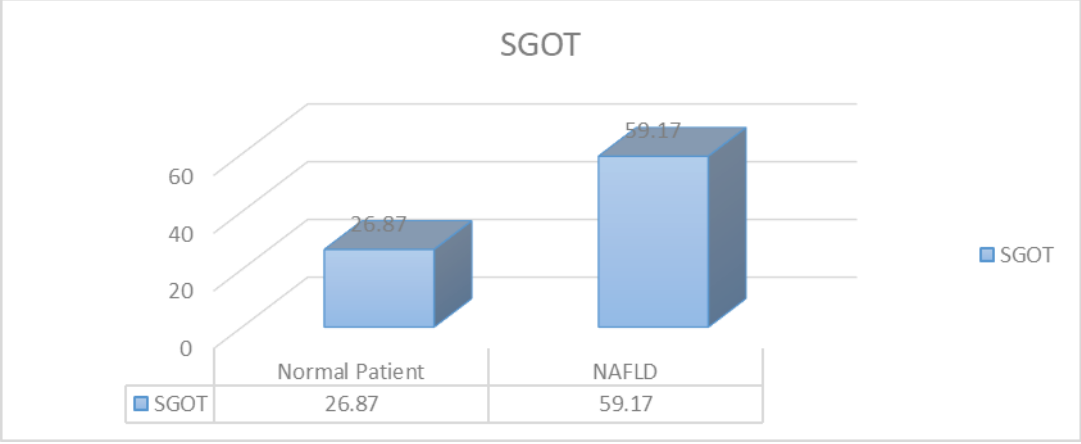

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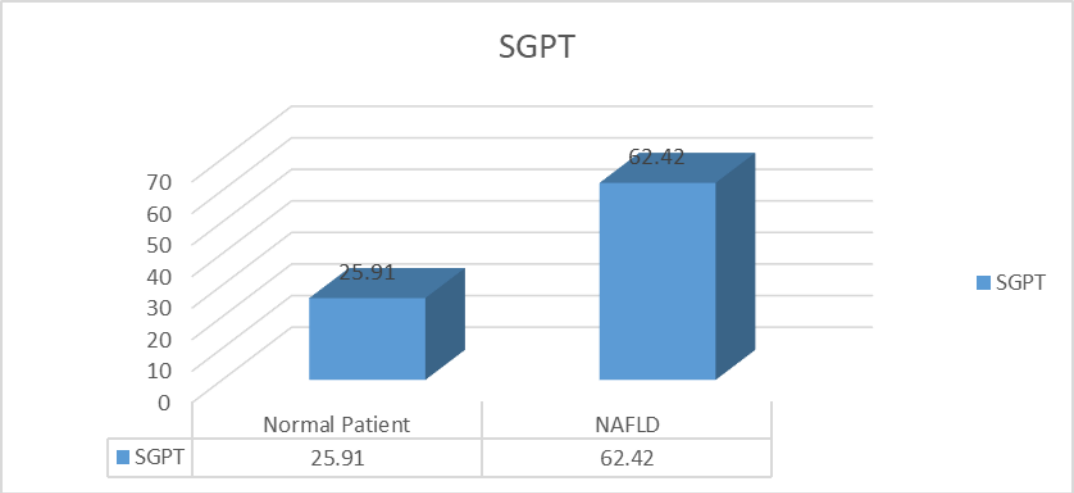
Fig 2. Comparison of SGPT between Normal Patient and non-alcoholic fatty liver disease patients



Discussion

Our study found significant increase in liver enzymes SGOT and SGPT with P value p <0.005 in NAFLD patients compare to normal patient. Similar Studies by Chitkara et al concluded that mild chronic elevations of liver enzymes reflect underlying insulin resistance. [17]

Balogun et al, Nannipieri et al, and Wannamethee et al found elevated levels of ALT and GGT in cases of type 2 DM with NAFLD compared to controls. [18] [19] [20]

Raised liver enzymes as relatively sensitive and easily obtained markers of NAFLD reflect chronic fat deposition in the liver that may be useful in the diagnosis of NAFLD in type 2DM.

Westerback et al: had demonstrated that ALT was closely associated with liver fat unlike AST and GGT and hence ALT is used as a surrogate marker for many epidemiological studies. T2DM is directly linked with dyslipidaemia due to lack of effect of insulin. Altered atherogenic lipoprotein pattern and elevation of some liver enzymes have been identified as independent risk factors for development of cardiovascular disease. [21]

Demacker et al conclude that As ALT is closely related to hepatic fat accumulation [22], it is indirect measure of NAFLD (Andre et al 2005).[23] In Indian study Jayarama and Sudha (2012) noted NAFLD in 60% cases of T2DM significantly associated with high BMI and duration of diabetes. They also observed positive correlation of ALT with fasting and post prandial blood glucose level and duration of DM.[24] Saligram et al (2012) observed raised ALT as a surrogate marker of NAFLD in 25.6% newly diagnosed T2DM patients with raised triglycerides and low HDL levels.[25]

Conclusion

The present study done on Normal patient and non-alcoholic fatty liver disease patient admitted in Pacific Institute of Medical Sciences, Umarda, Udaipur. Total 100 patients were included for this study .50 was normal patient and 50 was non-alcoholic fatty liver disease patient. 20-60 age group was taken for this study the study shows that the mean value and standard deviation of SGOT and SGPT were significantly high in non-alcoholic fatty liver disease patient compare to Normal patient.

Our study also shows that non-alcoholic fatty liver disease patients have a high risk of critical condition and developing sever disease and also show poor prognosis compare to normal patent.

Ethical Clearance: Research project approved by the ethics committee of Pacific Institute of Medical Sciences, Umarda Udaipur- 313005, Rajasthan, INDIA.

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