

Section

General Medicine

Original

Article

Comparative Analysis of Indices of the Liver Function Tests in Patients with and without Non- Alcoholic Fatty Liver Disease at a Teaching Hospital in Hapur

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ABSTRACT

Background: Non-Alcoholic fatty liver disease (NAFLD) has become a worldwide health concern with increase in the global incidence of obesity and it is now considered the hepatic component of the metabolic syndrome.

Aims and Objective:

The study's aim was to compare the indices of the Liver Function tests in compensated chronic liver disease patients with and without NAFLD.

Methods: A total of 100 consecutive patients with compensated chronic liver disease were recruited into the study. A structured questionnaire was administered to obtain relevant socio-demographic data. NAFLD was diagnosed based on clinical, biochemical, ultrasonographic and in a few histological features. The Adult Treatment Panel III criteria were used to identify patients with the metabolic syndrome.

Results: In our study, 100 participants were recruited into study. 40 out of 60 patients (67%) showed grade-1 fatty liver findings and 20 out of 60 patients (33%) showed grade-2 fatty liver. Approximately 19% had fatty liver finding. The mean (SD) age of persons with NAFLD was 45.12 (\pm 8.07) years compared to 47.49(\pm 11.79) years for persons without NAFLD. The difference was not statistically significant ($p=0.2$). Body mass index (BMI), central obesity (waist circumference), fasting blood sugar, blood pressure, total cholesterol and triglycerides were significantly higher in the NAFLD group ($p < 0.05$) respectively.

Conclusions: Indices of the deranged Liver functions were more prevalent in persons with NAFLD. It is recommended that patients with NAFLD be screened for metabolic syndrome and appropriate therapy instituted to decrease the risk of both hepatic and cardiovascular complications.

Keywords: SGPT, SGOT ; NAFLD

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INTRODUCTION

NAFLD is now recognized as one of the most frequent reason of liver tests elevation without clinical symptoms. Insulin resistance is considering as having a central role in NAFLD pathogenesis. In hepatocytes, IR is related to hyperglycemia and hyperinsulinemia, formation of advanced glycation end-products, increased free fatty acids and their metabolites, oxidative stress and altered profiles of adipocytokines. Nonalcoholic fatty liver disease (NAFLD) is a chronic liver disease which refers to the presence of hepatic steatosis without significant intake of alcohol.¹ A significant alcohol intake is considered as ingestion of >20g/day or >140g/week of alcohol for males and >10g/day

or >70g/ week of alcohol for females.² Non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis and hepatocellular carcinoma.¹ Most patients with this condition are asymptomatic and few present with vague right upper abdominal pain, malaise and fatigue. Others present with abnormal liver function tests or incidental finding of fatty liver on abdominal ultrasound scan for other reasons.³⁻⁵ At present, the global prevalence of NAFLD is estimated at about 9% in developing countries and 30% in developed countries.⁶ NAFLD has become a worldwide health concern. It is frequently associated with obesity, type 2 diabetes mellitus and hyperlipidemia and has been described as the

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hepatic component of the metabolic syndrome.⁷ The reported prevalence of obesity in several series of patients with NAFLD varied between 30 and 100 percent, the prevalence of type 2 diabetes mellitus varied between 10 and 75 percent, and the prevalence of hyperlipidemia varied between 20 and 92 percent.⁷ About 80% of NAFLD patients have associated features of metabolic syndrome. Metabolic syndrome is an important risk factor for cardiovascular disease incidence and mortality. A descriptive study of the clinical characteristics of NAFLD in South Africa showed that NAFLD affects all spheres of the society especially the poorest and least educated with more than one third presenting with steatohepatitis, while 17% had advanced liver fibrosis. In a study carried out in SIMS, Hapur; among persons with diabetes, the prevalence of NAFLD was 9.5% compared to 4.5% in persons without diabetes. It has been postulated that NAFLD is closely associated with the other indices of the metabolic syndrome. The purpose of this study was to compare the indices of the metabolic syndrome in patients with and without NAFLD attending the medical out-patient clinic and medical wards of SIMS, Hapur.

METHODS

Study Design

This is a Randomized, Prospective and Comparative case control study in Saraswathi Medical College and Hospital, Hapur (Uttar Pradesh).

Study Area:

The study was conducted in Hapur District, Uttar Pradesh, India.

Study Period:

The study was completed from August 2017 to Nov 2018.

Study Setting:

The study was carried out in the metabolic clinic in Department of Medicine, Saraswathi Medical College and Hospital, Hapur (UP).

Study Population:

This study population comprised 100 participants. 40 out of 60 patients (67%) showed grade-1 fatty liver findings and 20 out of 60 patients (33%) showed grade-2 fatty liver. All the people with age group 20 years and above living in the study area were eligible to participate in the study.

SELECTION OF CASES

Inclusion Criteria:

1. Adult patients (more than or 18 years aged) reporting first time/regularly associated with SIMS hospital for management of Hypertension issue are selected.
2. Only mild to moderate grade hypertensive patients were taken
3. Patients consenting for the study

Exclusion Criteria:

Cases with the following findings will be excluded:

1. Patients with known thyroid disorders.
2. Hypertensive patients suffering from any other medical problems and on medications affecting thyroid function, lipid profile and blood pressure were excluded from the study.
3. 3 Patients with history of drug abuse or history of psychiatric disorder
4. Other factors causing hypertension
5. Cancer or suspicion of malignancy
6. Pregnancy

7. Angina
8. Hypertensive emergency

Study Population:

Sample size was calculated by the probability sampling formula below:

$$N = Zpq/d$$

Where, n = sample size, z = statistical certainty chosen, p = proportion of hypothyroid individuals with hypertension, q = 1- p and d = precision desired.

Ethical Approval:

This current study was approved by the **Ethical Committee** of the Institute and all guidelines of the ethical committee were followed. The aim and objectives of the study were explained to the ethical committee.

Informed Consent:

A written signed informed Consent letter was obtained from each patient before starting the procedure. The involvement of the subject was voluntary.

A structured questionnaire regarding the age, sex, duration of Hypertension, BMI were measured. Personal history was taken from each patient e.g. smoking habit, BP (Blood pressure), family history of renal disease, hypertension and diabetes etc. A detailed history was taken from the participants with emphasis on the alcohol intake, history of risk factors of CLD, patient's medications, symptoms suggestive of cardiac, respiratory and renal co-morbidities. A thorough clinical examination was performed looking for stigmata of chronic liver disease. Blood pressure was measured in a sitting position after a minimum of 15 minutes of acclimatization and before blood sampling using a mercury sphygmomanometer (Accoson-England). Weight (kg) and height (centimeters) was measured with patient on light clothes and shoes/hat/cap off using the RGZ-120 health scale stadiometer. Body mass index was calculated using the formula: Weight (kg)/Height² (m²). Waist and hip circumference (centimeters) was taken at the midpoint between the lower margin of the last palpable rib

STATISTICAL ANALYSIS

Biochemical Statistical analyses were done by SPSS 21 software. Results were put in the tables as mean and standard deviation and were significance analyzed by using unpaired Student's t-test. The level of significant was set as P < 0.05: Significant and P > 0.05: Non-significant.

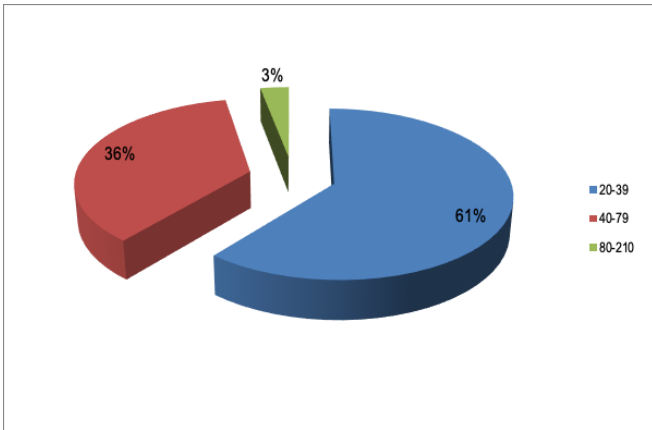
RESULTS

Liver Enzymes and AST, ALT/SGPT, SGOT association

In our study 40 out of 60 patients (67%) showed grade-1 fatty liver findings and 20 out of 60 patients (33%) showed grade-2 fatty liver. Approximately 19% had fatty liver finding-

Table 1: Liver Function Test (SGPT) distribution in non-alcoholic fatty liver disease patients

SGPT U/L	No of Patients	% of patients (rounded off)
20-39	61	61
40-79	36	36
80-210	3	3
TOTAL	100	100



Graph 1: % of Patients relating to SGPT distribution

EMPERICAL STATISTICAL ANALYSIS BY MEANS OF TABULAR AND GRAPHICAL PRESENTATION

Out of 100 patients of non-alcoholic fatty liver disease 61% patients had SGPT in the range of 22-39U/L, 36% patients had SGPT in the range of 42-79U/L and 3% patients in the range of 82-210U/L.

COMPUTATION OF STATISTICAL MEASURES

Mean =43.4925
 Variance = 702.0569
 Standard deviation = 26.469

Conclusion

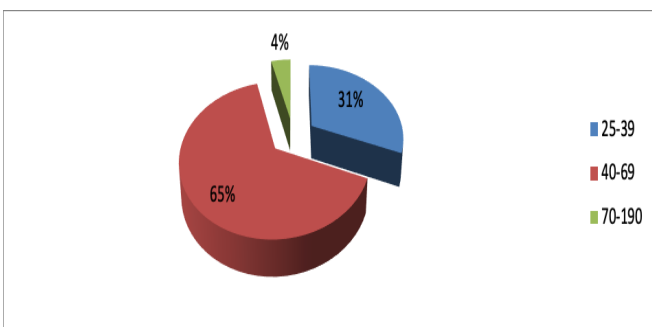
The standard deviation is 26.469, which is not a high value that means that not many patients are away from mean value (43.49)

Recommendation

It is advisable to maintain the SGPT less than 40 U/L the study reveals 61% of patients are within normal limits and rest 39% are outside the normal limit. Hence SGPT value are deranged in majority of patient of NAFLD and important association as well.

Table 2: Liver Function Test (SGOT) distribution of non-alcoholic fatty liver disease patients

SGOT (U/L)	No of Patients	% of patients (rounded off)
25-39	31	31
40-69	65	65
70-190	4	4
TOTAL	100	100



Graph 2: % of Patients (rounded off) relating to SGOT distribution

EMPERICAL STATISTICAL ANALYSIS BY MEANS OF TABULAR AND GRAPHICAL PRESENTATION

Out of 100 patients of non-alcoholic fatty liver disease 31% patients had SGOT/AST in the range of 25-39U/L, 65% patients had SGOT in the range of 40-69U/L and 4% patients in the range of 70-190U/L.

COMPUTATION OF STATISTICAL MEASURES

Mean =50.014
 Variance = 395.3647
 Standard deviation = 19.8402

Conclusion

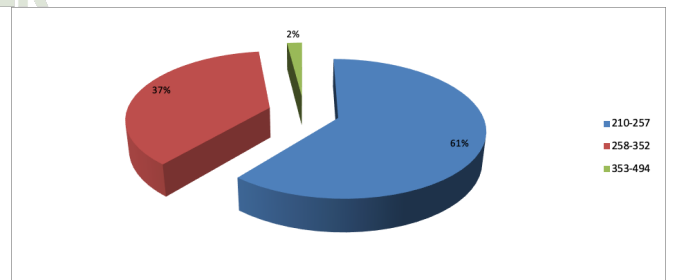
65% of the patients were nearer to the mean value i. e. 50.0 and remaining 35% of the patients were away from the mean value. As only 35% are away from the mean value, the standard to be not high and the standard deviation worked out as 19.84 which is not a high value.

Recommendation

It is advisable to maintain the level of SGOT less than 40 U/L the study reveals 31% of patients are within the normal range and rest 69% are outside normal limit. Hence SGOT level are important predictor of NAFLD.

Table 3: Liver Function Test (Alkaline Phosphatase) distribution of non-alcoholic fatty liver disease patients

Alk Phos (IU/L)	No of Patients	% of patients (rounded off)
210-257	61	61
258-352	37	37
353-494	2	2
TOTAL	100	100



Graph 2: % of Patients relating to Alkaline Phosphatase distribution

EMPERICAL STATISTICAL ANALYSIS BY MEANS OF TABULAR AND GRAPHICAL PRESENTATION

Out of 100 patients of non-alcoholic fatty liver disease 61% patients had Alk Phos. In the range of 210-257IU/L, 37% patients had Alk. Phos. In the range of 258-352IU/L and 2% patients were in the range of 353-494IU/L.

COMPUTATION OF STATISTICAL MEASURES

Mean =264.769
 Variance = 1613.7557
 Standard deviation = 40.173

Conclusion

As the standard deviation is high means most of the patients are away from the mean value i.e. 264.769.

Recommendation

It is advisable to maintain the level the Alk. Phos. Within normal range with maximum value 258IU/L. The data reveals around 61% of patients are safe from NAFLD and 39% of patients are prone to NAFLD.

DISCUSSION

Non- alcoholic fatty liver disease is a common liver disorder which needs early detection and monitoring of the patients as the incidence of the disease is constantly increasing. The Objectives of our study to know the prevalence of fatty liver in non- alcoholic patients who attended the Medicine OPD and indoor of Saraswathi institute of medical college, Hapur. The Limitations of our study was small sample size selection bias. The prevalence of NAFLD in our study population was 21.27% approximately (including patient attending, medicine OPD and indoor patients) As it is a hospital-based study it does not include the general population, so the study is based on selected population. In a recent study done in china the median prevalence of NAFLD was found to be 10%,but ranged from 1% to more than 30%.^{7,8} The patient in our study were in the age group 20-90years(mean age 55years).In our study patients were mostly in their 4th, 6th and 7th decade of life. According to a study done by Koehler EM,et al,⁸ it was found that NAFLD is common in elderly although the prevalence decreases with advancing age. In our study NAFLD was found to be more common in women (63 out of 100). According to study done by DH Akbar & AH Kawther,⁹ showed that there was a significant relation between presence of NAFLD in female. Male: Female ratio was 1:3.6.In our study, male: female ratio was 1:0.58 The reason for this may be that most of the male patients in our study group were employees and most of them were alcoholics, hence they could not qualify for the diagnosis of NAFLD, whereas the females, mostly housewives had sedentary lifestyle and were non alcoholics. In our study done by Newton JL,S. Karger AG¹⁰ found fatigue to be a significant problem in NAFLD and showed day time sleepiness and autonomic dysfunction to be associated with NAFLD. Day time sleepiness can frequently be associated with obstructive sleep apnea in those with NAFLD. In study done by Kagansky N, Levy S¹¹ showed 27% of patients suffered from RUQ abdominal pain. In 1973, Kerne et al showed high prevalence of fatty liver in obese patients.¹² Bacon and colleagues reported a prevalence of obesity in his patients.¹³ Walness et al in his study however showed steatohepatitis in 18.5% of markedly obese patients and 2.7% of lean patients.¹⁴ Pawell EE et al¹⁵ and Walness IR et al¹⁶ showed in their study that rapid weight loss leads to deposition of fat in the hepatocytes leading to fatty liver or NASH. In an autopsy study, Walnes and Lentz¹⁷ found obesity, diabetes or both to be present in 20-22% patients with steatohepatitis. In our study 29 out of 100 patients had hypertriglyceridemia. In study done by Schult A, et al¹⁸ showed overweight and hypertriglyceridemia to be associated with non-alcoholic fatty liver disease. In our study out of 100 patients- Mean value of AST/SGOT = 50.02: value of ALT/SGPT=41.45 & AST: ALT was 0.82. In a study done by Adler et al (1979) (n=29),¹⁹ Ludwig et al (1980)(n=20),²⁰ Itoh et al(1987) (n=16),²¹ Diehl et al (1988)(n=39),²² have shown almost similar reflections in the AST and ALT values and their ratio of AST to ALT was less than 1. So, our study corroborated with his observation. In study of Amarpurkar D, et al²³ prevalence of NAFLD on ultrasound abdomen was 16.6%. Liver biopsy is considered

the gold standard for diagnosis and differentiating NASH from steatosis with and without inflammation and also to exclude other liver diseases.

CONCLUSION

In our study, SGOT/AST was found to be elevated in only 10% of cases (6 out of 60 cases), whereas SGPT/ALT was found to be elevated in 45% of cases (27 out of 60). AST & ALT ratio was 0.85 which corroborated with other studies. There is currently no specific treatment for NASH and NAFL is usually asymptomatic therapy is mainly directed to correct nutritional habits, lifestyle and behavior and prevention of co-morbidities like diabetes, obesity, dyslipidemia and hypertension. These co-morbidities are essential elements of metabolic syndrome/insulin resistance. So, to prevent NAFLD we should raise awareness in the general population to avoid sedentary lifestyles, stick to healthy food habits avoid overeating, performing yoga and daily exercise, therapy preventing insulin resistance/metabolic syndrome. As there is increasing incidence of Diabetes Mellitus and obesity in India which are considered to be important predisposing/ risk factors for NAFLD, it is logical to expect increase in incidence of NAFLD in India.gr

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