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 (±8.07) years compared to 47.49(±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

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. 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. Non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis and hepatocellular carcinoma. 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. At present, the global prevalence of NAFLD is estimated at about 9% in developing countries and 30% in developed countries. 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
hepatic component of the metabolic syndrome. 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. 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 outpatient 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:

\[ N = \frac{z^2 \cdot p \cdot (1-p)}{d^2} \]

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

<table>
<thead>
<tr>
<th>SGPT U/L</th>
<th>No of Patients</th>
<th>% of patients (rounded off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-39</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>40-79</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>80-210</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>SGOT (U/L)</th>
<th>No of Patients</th>
<th>% of patients (rounded off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-39</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>40-69</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>70-190</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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 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

<table>
<thead>
<tr>
<th>Alk Phos (IU/L)</th>
<th>No of Patients</th>
<th>% of patients (rounded off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>210-257</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>258-352</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>353-494</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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.
REFERENCE

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