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Study of Serum Lipid Profile in Patients of Liver Cirrhosis: A Prospective Study

Dr. Shilpi Sikarwar[1], Dr. Ajay Pal Singh[2*]
[1]Assistant Professor, Department of Pathology, Gajra Raja Medical College, Lashkar, Gwalior, Madhya Pradesh, India
[2]Professor, Department of Medicine, Gajra Raja Medical College, Lashkar, Gwalior, Madhya Pradesh, India

Original Research Article

***Corresponding author**
Dr. Ajay Pal Singh

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Abstract: Plasma lipid can be affected by variety of ways in patient's of liver disease. Liver cirrhosis is associated with reduction in plasma TG and TC levels due to reduction in lipoprotein biosynthetic capacity. To study the lipid profile in patients of liver cirrhosis. One hundred and fifty subjects were studied after dividing them in to Case Group (n=75, patients with liver disease) and Control (n=75, age and sex matched apparently healthy subjects). Child Pugh Score (CPS) was used to assess the liver cirrhosis. MELD score was also estimated. Lipid profile was measured for all the subjects and correlated with different parameters. Mean age of cases and control group was 43.47±14.12 and 43.21±14.47 years respectively (p=0.914). Majority of the Cases and control were male (74.66%) and 77.30% respectively. TC and HDL level was low in subjects belong to CPS class C in comparison to subjects belong to CPS class B (p=0.03). Level of LDL, TG and VLDL were observed low in Cases which belongs to CPS class C in comparison to cases belong to CPS class B (p>0.05). Total serum protein and serum albumin was significantly low in Cases compared to Control (p=0.001) whereas serum globulin was significantly higher in Cases as compared to control cohort (p=0.001). Decrease in lipid level was noted in liver cirrhosis patients and severity of liver cirrhosis has lead to even more lower level of lipid in CPS class C compared to class B.

Keywords: Child Pugh Score, serum protein, lipid profile, MELD score.

INTRODUCTION

Liver is the important organ in the homeostasis maintenance of lipid levels in the organism [1]. Consumption of alcohol can result in to fatty liver, alcoholic hepatitis and ultimately, alcoholic cirrhosis in some patients.

In Western countries, alcohol has become the major culprit for the development of liver cirrhosis, and it is exponentially increasing in countries like Japan and India [2, 3].

Liver cirrhosis is the final result of chronic liver damage. Liver cirrhosis is characterized by parenchymal injury leading to extensive fibrosis and nodular regeneration. Data show that about 30% of the heavy drinkers liver cirrhosis. Several factors are responsible for this development including sex, obesity, drinking patterns, dietary factors, non-sex-linked genetic factors and cigarette smoking [4, 5]

Severity of the liver cirrhosis is estimated using Child Pugh Score (CPS). Reports have shown that severity of liver cirrhosis also lead to derangement of lipid profile. In India, data is limited on study of lipid profile abnormality in cases of alcoholic cirrhosis. Hence in present study we tried to study the lipid profile in patients of liver cirrhosis and correlate the lipid levels with severity of the disease.

MATERIALS AND METHODS

A Case-Control study was performed on 150 subjects at Shree Diagnostic Centre. Study cohort was divided as Case Group (n=75, patients with liver disease) and Control (n=75, age and sex matched apparently healthy subjects).

Subjects having age ≥18 years and ≤80 years of both the sexes were included. The diagnosis of liver cirrhosis was performed on the basis of signs and symptoms of the disease, physical and clinical examination along with the abdominal ultrasound imaging, and biochemical liver panel known as liver function tests which included mainly alanine and Aspartate aminotransferese (ALT and AST), prothrombin time, Y-glutamyl transferase (Y-GT) wherever required, bilirubin, albumin and total serum proteins. The serological test (HBs antigen and Anti HCV) were also used to support the diagnosis of viral infections.

Patients who have used insulin or other hypoglycemic drugs within previous 30 days, used cholesterol lowering drugs within previous 30 days and

with other disease that may alter the lipid level like diabetes mellitus, hypertension, chronic smoker, nephritic syndrome and thyroid dysfunction were excluded from the present study.

Normal rage of serum lipid profile was considered as follows; total serum cholesterol (TC):150-200 mg/dl, HDL-C; 35-60 mg/dl, LDL-C; <130 mg/dl, serum triglyceride; 45-165 mg/dl, VLDL-C; 9-33 mg/dl and cholesterol/HDL ratio; <4.5.

Child pugh score or the child –turcotte pugh score is used to assess the prognosis of chronic liver disease, mainly cirrhosis. The score employs five clinical measures of liver disease. Each measure is cored 1-3 with 3 indicating most severe derangement.

Child pugh score is divided in to three class viz. A (5-6 points), B (7-9 points) and C (10-15 points).

MELD score was also used for the interpretation and scored as >40 (71.3% mortality), 30-39 (52.6% mortality), 20-29 (19.6%) mortality, 10-10 (6% mortality) and <9 (1.9% mortality).

There we have used International Normalized ratio (INR) as tool in place of prothrombin time (PT).

All the data was recorded using structured schedule (case report form) and entered for tabulation in Microsoft excel sheet.

All the data was analyzed using IBM SPSS ver. 20 software. Cross tabulation and frequency distribution was used to prepare the tables. Chi square test was used to compare the frequency and percent distribution in cases and control groups. Student t test was applied to compare the mean ± SD of difference between cases and control. P value of <0.05 is considered as significant.

RESULTS

Mean age of cases and control group was 43.47±14.12 and 43.21±14.47 years respectively (p=0.914). Majority of the cases belong to age group of 29-39 years (30.67%) and control belong to age group of 40-50 years (32%).

Majority of the Cases and control were male (74.66%) and 77.30% respectively. Most common etiology of liver cirrhosis was alcoholic (56.2%) followed by hepatitis B (14.6%).

In present study serum level of total bilirubin (4.61±4.47), SGPT/ALT (57.47±61.08) and SGOT/AST (100.91±102.91) were observed in cases which were found significantly higher in comparison to control i.e. total bilirubin (0.85±0.32), SGPT/ALT (31.44±12.83) and SGOT/AST (33.69±13.76) respectively (p=0.001).

Majority of the cases belong to child pugh class of C (53.30%). There was only one patient who belong to class A. In present study maximum number of patients (613%) had MELD score of 10-19 and minimum number of cases (6.7%) had MELD score <10.

Table-1: Comparison of Child Pugh Class with Serum Lipid profile status of Cases

Child Pugh Class	A (n=1)	B (n=34)	C (n=40)	P value
TC (mg/dl)	120	145.55±44.48	127.03±27.6	0.03
HDL (mg/dl)	28	34.24±8.21	30.17±7.19	0.03
LDL (mg/dl)	95	83.35±21.81	75.98±24.11	0.17
TG (mg/dl)	110	88.56±44.91	87.16±24.36	0.86
VLDL (mg/dl)	18	22.45±14.54	18.17±5.58	0.09

Data is expressed as mean±SD

Table-2: Comparison of serum protein level with Cases and Control

Parameters	Cases	Control	P value
Total serum protein (g/dl)	6.27±0.86	6.87±0.57	0.001
Serum albumin (gm/dl)	2.66±0.72	4.05±0.49	0.001
Serum globulin (gm/dl)	3.60±0.82	2.81±0.58	0.001

Data is expressed as mean±SD

DISCUSSION

Deranged plasma lipid profile is a routine observation in patient with liver cirrhosis. However, Indian evidences are limited on this, but subject has been studied in detail worldwide. In present study we tried to document derangement in lipid profile in cirrhotic patients and we also tried to observe that if there is any correction with the severity of liver damage.

In present study we found that lipid parameters including TC, TG, HDL, LDL, and VLDL were significantly low in patients of liver cirrhosis as compared to Control group. In a similar study by Brier

C *et al.*, [6] on lipoproteins in the plasma of patients with post alcoholic liver cirrhosis,

Showed that in alcoholic cirrhosis, TC, HDL, VLDL, HDL were all decreased which is in agreement to present study findings. Similar findings were reported by Selimoglu MA *et al*., [7] Findings of present study and previous authors is supported by the fact that hypolipidemia in patients with liver cirrhosis is because of decline in synthetic function. Several previous studies conducted elsewhere showed that all the lipid parameters in liver cirrhosis were lower compared to control group [8, 9]. However, Mandal SK *et al*., [10] who studied 120 patients with chronic liver disease found that with the exception of triglyceride level, there was a significant decrease in total cholesterol, LDL,VLDL and HDL cholesterol levels compared to the control group ($p<0.05$). Several previous authors like Okeke *et al*., [11] and Ghadir *et al.*, [12] also showed significant derangement of lipid profile in cirrhotic patients which again supported the findings of present study.

In present study we also found that TC and HDL level were low in subjects belong to CPS class C in comparison to subjects belong to CPS class B ($p=0.03$). Level of LDL, TG and VLDL were observed low in Cases which belongs to CPS class C in comparison to cases belong to CPS class B ($p>0.05$). In support to finings of present study, Salimoghlou MA *et al*., [7] found that HDL level were significantly lower in CPS class B compared to CPS class A. Perales J *et al*., [13] also found that in chronic liver disease, there was a significant decline in lipid levels with the progression of disease process. However, Mandal SK *et al.*, [10] did not find any significant correlation of progression of liver damage with serum lipid levels.

Bassani L *et al*., [14] studied 314 patients with liver cirrhosis showed that the TC levels diminished with a CPS class progression ($P<0.001$). CPS class C was significantly associated with lover levels of LDL (<70 mg/dL; $P<0.001$), HDL (<40 mg/ dL; $P<0.001$) and TG (<70 mg/dL; $P=0.003$). Findings of Bassani *et al*., [14] are hand in hand with the present study findings. These findings were consistent with previous studies that showed changes in lipid metabolism in advanced stages of cirrhosis [15-17].

Cross sectional nature and small sample size were the main limitation of present study; due to that present study findings cannot be applied to large population; a large randomized clinical trial is need to strengthen the present study findings.

CONCLUSION

In present study there was significant decrease in lipid profile in liver cirrhosis patients that means the low level of lipid exist in patients with liver cirrhosis which is also further correlated with the severity of liver cirrhosis because we found that the CPS class C patients had lowest serum lipid levels as compared to class B patients.

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