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Research Article

STUDY OF LIPID PROFILE IN PATIENTS WITH CHRONIC LIVER DISEASE

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A B S T R A C T

Chronic liver disease is a disorder that presents with progressive destruction of liver tissue. liver has a central role in body metabolism and performs some very important metabolic functions. it has a key role in lipid metabolism including synthesis, storage, break down as well as lipid disorders. Lipids are an important component of biological membranes and have other functions like steroid hormone synthesis etc. the present study was planned to evaluate the various lipid profile components in patients diagnosed with chronic liver disease. Fifty patients diagnosed with chronic liver disease were enrolled for the study. Fifty age and gender matched individuals constituted the control group. For all subjects thus enrolled, fasting blood samples were collected and evaluated for serum lipid profile. Results obtained were later subjected to statistical analysis. It was observed that CLD patients had lower concentration of lipid components as compared to healthy control group. The study recommends regular screening of lipid profile and to identify more biochemical markers for evaluation of the severity of disease.

INTRODUCTION

Chronic liver disease (CLD) is a clinical condition in which progressive destruction and regeneration of liver parenchyma leads to fibrosis and further cirrhosis. The common symptoms of CLD are jaundice, fatigue, nausea, poor appetite, abdominal distension and intestinal bleeding (Khare S *et al*, 2015).Several etiological factors can lead to development of CLD. These include alcoholism, portal hypertension, Autoimmune, Hepatitis B, C and others (Radicheva MP *et al*, 2018).

A range of different radiological and blood investigations are helpful in detection and diagnosis of various hepatobiliary abnormalities. These investigations also help in identifying the basis of clinically suspected disease of liver and to figure out the severity of liver disease (Al-Jumaily EF *et al*, 2012).For predicting prognosis of end-stage liver disease and severity, various prognostic models are recommended. Child Pugh (CP) score and Model for end stage liver disease are the generally prognostic scores. Lipids are essential component of biological membranes, free molecules and metabolic regulators which control homeostasis and cellular function (Chiang JY *et al*, 2005).Liver is a major organ which plays a crucial role in lipid metabolism & several stages of lipid synthesis and transportation. Lipoproteins, endogenous lipids and apolipoproteins are synthesised in liver, liver is the site where 80% cholesterol is synthesised from hepatocellular microsomes, as serum lipid panel expect to be abnormal during the progression damage of liver (Jarikre AE *et al*, 1996).

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Chronic liver disease affects people in their most productive years of life and has a significant impact on the economy as a result of premature death, illness, and disability (Poynard T *et al*, 1997 and Bellentani S *et al*, 1999). Cirrhosis is an advanced stage of liver fibrosis that is accompanied by distortion of the hepatic vasculature. Frequently multiple etiological factors contribute to the development of cirrhosis, as exemplified in epidemiological studies that identified regular (moderate) alcohol consumption, age above 50 years, and male gender as risk factors in chronic hepatitis C or older age obesity, insulin resistance/type 2 diabetes, hypertension and hyperlipidemia (all features of the metabolic syndrome) in NASH (Bellentani S *et al*, 1997, Clark JM 2006 and Farrell GC *et al* 2006).

The present study was planned compare compaoints of lipid profile in CLD patients healthy controls.

METHODOLOGY

Study Design

This prospective study was conducted in the Department of Biochemistry in collaboration with Department of Gastroenterology at Mahatma Gandhi Medical College and Hospital, Jaipur after seeking approval from the Institutional Ethics Committee (IEC).

Fifty diagnosed patients of CLD, age 20 to 65 years, either gender, were enrolled for the study. Pregnant and lactating females and patients with acute liver disease and malignancies were excluded.

Fasting blood samples were collected for all enrolled subjects and control and evaluated for serum Lipid profile including

serum Cholesterol, serum triglycerides (TG), High density lipoprotein (HDL), Low density lipoprotein (LDL) and Very low density lipoprotein (VLDL).

Lipid profile

- Serum Cholesterol -(*Enzymatic method*)
- Serum Triglycerides -(*Enzymatic method*)
- High density lipoprotein (HDL) -(*Phosphotungstic acid method*)
- Low density lipoprotein (LDL) –(*Calculated by Cholesterol-{HDL+VLDL}*)
- Very low density lipoprotein (VLDL) –(*Calculated by Triglycerides/5*)

Observation

	Control group (n=50)	Patient group (n=50)	t-value	p-value
Cholesterol (mg/dL)	150.06 ± 26.92	112.15 ± 43.01	5.283	0.0001
Triglycerides (mg/dL)	128.48 ± 24.35	113.44 ± 28.61	2.831	0.006
HDL (mg/dL)	43.67 ± 8.62	29.31 ± 14.63	5.980	0.000
LDL (mg/dL)	80.70 ± 26.42	60.16 ± 35.96	3.255	0.002
VLDL (mg/dL)	25.69 ± 4.87	22.69 ± 5.72	2.824	0.006

	No. of participants	Percentage
Child Pugh A	4	8%
Child Pugh B	26	52%
Child Pugh C	20	40%

RESULT

In the present study mean age in control group (47.85 $\pm$ 12.77 years) and CLD patient group (48.18 $\pm$ 11.89 years) was comparable. Majority of CLD patients were categorized as CP grade B (52 %) or C (40%). Only 8% of the patients were grouped as CP grade A. All components of lipid profile were significantly lower in the CLD patients as compared to healthy controls.

DISCUSSION

In this present study comparison of lipid profile including serum Cholesterol, TG, HDL, LDL and VLDL in between liver cirrhotic patients and control group was done. It is observed after comparison that low levels of serum cholesterol, TG and HDL were found in cirrhotic patient with the progression of liver disease. Hypercholesterolemia and hypertriglyceridemia are strongly associated with the progression of liver disease.

A reduction in TC serum levels is believed to be a consequence of decreased synthesis or partial blockage of the same esterification processes, likely due to a decline in the production of the enzyme ACAT (acyl CoA: cholesterolacyl transferase). Decreased VLDL levels are associated with deficiencies in the microsomal triglyceride transfer protein (MTP) and a partial inhibition of cholesterol synthesis (Habib A *et al*, 2005 and Jiang M *et al*, 2010). The formation of LDL is directly related to the production of VLDL and, when the metabolism of this lipoprotein is impaired, the other downstream lipid fractions also undergo changes. The drop in HDL levels suggests that there is a strong correlation between prognosis and decreased synthesis of Apoprotein AI (Apo AI), the major HDL lipoprotein (Mirandola S *et al*, 2010, Nashaat EH *et al*, 2010 and Petit JM *et al*, 2003).

Sachdeva S *et al*, 2018 showed in their study that mean of serum total cholesterol in cirrhotic study group was 147.29+17.14 mg/ dl and in control group was 163.86+17.63 mg/dl. Mean of total cholesterol was higher in control group as compare with control group as it was statistically significant as p value <0.05.Another study by Nangliya VJ *et al*, 2015 presented similar findings that mean of serum total cholesterol in cirrhotic study group was 141.06+22.64 mg/dl and in control group was 175.69+16.41 mg/dl, statistically significant as p value is <0.05. LDL cholesterol in patient group was 82.81+13.17 mg/dl and in control group was 107.28+9.04 mg/dl.

Mandal SK *et al*, 2013 reported in their study that serum total cholesterol in patient group was 141.5+46.69 mg/dl and in control group was 192+21.34 mg/dl. Mean of serum total cholesterol was observed higher in control group as compared to patient group, that was statistically significant as p value <0.05 as same with the mean of LDL cholesterol in cirrhotic study group was 83.55+16.08 mg/dl and in control group was 92.88+17.15 mg/dl. Mean of LDL cholesterol was higher in control group than patient group that was statistically significant as p value 0.0014.

Chrostek L *et al*, 2014 observed in their study that the concentrations of lipids and lipoproteins in the liver diseases are deranged. The mean concentrations of cholesterol, HDL-cholesterol, and LDL-cholesterol were significantly decreased in liver cirrhosis of both origin (alcoholic and non-alcoholic).Triglycerides-rich lipoproteins comprise very low-density lipoprotein (VLDL) and chylomicrons. The assembly and secretion of VLDL particles take place in the liver cells and both elements, apolipoprotein B and microsomal triglyceride transfer protein (MTP), are necessary for these processes. It has been shown that MTP plays a role in transferring lipid to nascent apolipoprotein B and hepatic induction of MTP, resulting in a reduction in hepatic TG accumulation and improvement of VLDL export, which increases the serum level of TG (Gordon DA *et al*, 2000 andShindo N *et al*, 2010).

plasma lipids and lipoproteins tend to decrease with parenchymal liver disease, and the level and composition of the lipoproteins depends on the activity of enzymes involved in lipid metabolism. These include lipoprotein lipase (LPL), lecithin-cholesterol acyltransferase (LCAT), and hepatic triglyceride lipase (HTGL) **(**McIntyre N 1978 and Sabesin SM *et al*, 1980**).**

Ghadhir MR *et al*, 2010showed that in patient their was a significant decrease in serum triglyceride, total, LDL and HDL cholesterol levels compared to the control group (mean of 82 vs 187, 138 vs 184, 80 vs 137, and 40 vs 44 mg/dL), respectively; all p= <0.05.

Boemeke L *et al*, 2015concluded their study that hypercholesterolemia contributes to the evaluation of the severity of liver disease, due to the association between the reduction of cholesterol and the other lipid profile components as TG, HDL, LDL and VLDL.

CONCLUSION

There is a significant decrease in serum lipid profilein patients with Chronic liver disease when it is compared with the control group. Lipid profile including serum total cholesterol, TG, HDL, LDL and VLDL can be used to assess the severity

of liver disease; it could be a good reliable marker for the liver disorders.

Conflict of interest

The authors declare that they have no conflict of interest related to the publication of the manuscript.

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