Study Of Lipid Profile In Cirrhotic Patients

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Abstracts: Background &Objective: liver cirrhosis is a chronic inflammatory condition associated with lipid abnormalities. The aim is to study lipid profile in liver disease and to determine the lipid profile in patients with cirrhosis and to asses if it relates to the severity of the cirrhosis. Materials and Methods: In an analytical cross-sectional study, 40 patients with cirrhosis (case) and 40 age- and sex-matched healthy normolipidemic patients (control) were studied in Dhiraj General Hospital, Pipariya, and Vadodara. Details including personal characteristics, etiology of cirrhosis, and lipid profile (total, LDL, and HDL cholesterol and triglyceride) was taken for each patient (both case and control). Statistical analysis was done and results were documented. Results: In patients with cirrhosis, there was a significant decrease in serum total cholesterol, triglyceride, LDL and HDL cholesterol levels compared to the control group (mean of 132 vs. 186, 78 vs. 182, 76 vs. 137, and 41 vs. 47 mg/dL, respectively; all $p<0.05$). Interpretation & Conclusion: Serum total, LDL and HDL cholesterol level in patients with cirrhosis is inversely correlate with severity of cirrhosis. [Nayak M et al NJIRM 2012; 3(5) :89-93]

Keywords: Cirrhosis, Dyslipidemia Lipid profile

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Introduction: Lipids are essential component of biological membranes, free molecules and metabolic regulators that control cellular function and homeostasis.[1] Liver plays a vital role in lipid metabolism. It contributes both in exogenous and endogenous cycles of lipid metabolism and transport of lipids through plasma. Synthesis of many apolipoproteins takes place in liver.

The apolipoproteins are required for the assembly and structure of lipoproteins. Lipoproteins play an important role in the absorption of dietary cholesterol, long chain fatty acids and fat soluble vitamins. The transport of triglycerides, cholesterol and fat soluble vitamins from the liver to peripheral tissue and transport of cholesterol from peripheral tissue to liver is by lipoproteins. Apolipoproteins activate enzymes important in lipoprotein metabolism and to medi-ate the binding of lipoproteins to cell surface receptors. Liver is the principal site of formation and clearance of lipoproteins. This shows liver is involved in many steps of lipid metabolism and lipid transport. Thus in severe liver disease, lipid metabolism is profoundly disturbed. It is affected in a variety of ways.[2]

Dyslipidemia seen in chronic liver disease differs from that found in most of the other causes of secondary dyslipidemias because circulating lipoproteins are not only present in abnormal amount but they also frequently have abnormal composition, electrophoretic mobility and appearance. Pre beta and alpha bands can be absent on electrophoreses in all types of liver disease.[3]

Cirrhosis of the liver is a chronic, diffuse (widely spread throughout the organ), degenerative disease in which the parenchyma (the functional organ tissue) deteriorates; the lobules are infiltrated with fat and structurally altered; dense perilobular connective tissue forms; and often areas of regeneration develop. The surviving cells multiply in an attempt to regenerate and form "islands" of living cells that are separated by scar tissue. These islands of living cells have a reduced blood supply, resulting in impaired liver function Cirrhotic patients need frequent visits and multiple hospitalizations for management of cirrhosis or its complications. However, choosing the proper treatment plan depends on the severity, type of liver damage and possibility of assessing its extent. To evaluate cirrhosis, Child-Turcotte-Pough criteria can be used[2]. Major complications of cirrhosis include portal hypertension, esophageal varices, hepatomegaly, hypersplenism, ascites, spontaneous bacterial peritonitis, hepatorenal syndrome type I and II, hepatic encephalopathy, hepatopulmonary syndrome, malnutrition, coagulapathy, fibrinolysis factor deficiency, thrombocytopenia, bone disorders, osteopenia,

osteoporosis, osteomalacia, hematologic disorders, anemia, hemolysis, neutropenia, diabetes mellitus, cancer, heart or renal failure, pancreatitis, *etc* [4-6]. Due to the high prevalence of chronic liver disease in India, this study to determine lipid profile in patients with cirrhosis and to assess if it relates to the severity of cirrhosis.

Material and Methods: The present prospective study was conducted in Department of, clinical chemistry, Dhiraj General Hospital, S.B.K.S. Medical institute& research centre, Piparia. Waghodiya, Gujarat. The study included 40 patient of cirrhosis as case and 40 healthy normolipidemic subjects as control. Approval was taken from research ethics committee of S.B.K.S medical college, Vaghodia, Vadodara, before starting the study.

Inclusion criteria:

- Age >18 year
- Both Male and Female
- Indoor patients of Dhiraj General Hospital.

Exclusion Criteria:

- Patient with acute pancreatitis, hyperlipidemia, gastrointestinal bleeding.
- Comorbid major psychiatric diagnosis.
- Patients with Diabetes mellitus, taking lipid lowering drugs
- Patients with history of renal disorder.

A questionnaire including personal characteristics such as age, gender and etiology of cirrhosis (e.g., HBV, HCV, drugs and toxins, chronic liver congestion, Wilson's disease, autoimmune hepatitis, hemochromatosis, α1-antitripsin deficiency and cryptogenic cirrhosis) was completed for each patient. Then the diagnostic method used for the diagnosis of cirrhosis was determined. The methods included either liver biopsy or combination of clinical signs and symptoms and sonography. Furthermore, 40 age- and sex-matched healthy normolipidemic people, referring to the hospital laboratory were selected as our comparison group and their serum lipid profile was measured.

After consent was given venous blood sample were collected after 12 hours overnight fasting. Each test tube containing a blood sample was immersed in crushed ice before analysis. The samples were centrifuged for 10 min at a speed of 3000 r.p.m. (R -8 CLABORATORY CENTRIFUGE), to separate the serum in a 12 ×75 mm test tube. All lipid profile was measured by using available kits in TRANSASIA (ERBA MANNHEIM) CHEM-5 PLUSV2 which has open system with photometric accuracy. Standard IFCC protocols were used for all analysis. LDL concentration was calculated using Freidwald Formula.

Stastical analysis: Statistical analysis was performed using statistical software. Data were analyzed by SPSS. Results were expressed as means ± SD, χ^2; one-way analysis of variance (ANOVA) and *Student's t* test were used. A p value <0.05 was considered statistically significant.

Result: n Our study, the most common causes of cirrhosis were alcoholic (65%) followed by HBV (25%) (Table- 1).

Table : 1 Causes of cirrhosis in patients

causes	NUMBER (N=40)	%
Alcoholic	26	65
HCV	1	2.5
HBV	10	25
Wilsons Disease	2	5
Haemochromatosis	1	2.5
Autoimmune Causes	0	0

Characteristics of study subjects: 40 patients with liver cirrhosis made up of 34 males and 6 females and 40 controls; 30 males,10femaleswere studied (Table -2). The mean age of study group and control were 40±10 and 39±9years respectively. The mean weight of patients in the study group and control group were 57±8 kg and 69±7kg respectively; p <0.001.
(Table -2)

Table:2 : General Characteristics of Patients with livers cirrhosis and controls

Characteristic	Patients With Liver Disease(N=40)	Control Groups (N=40)	P Value
Age (Years)	40±10	39±9	>0.001
Sex (M/F)	34/6	30/10	
Weight (kg)	57±8	69±7	<0.001

Biochemical investigations were presented in (Table-3) shows that the mean serum albumin concentration was 3.3 ± 0.4 and 4.7 ± 0.5 g/L in the study group and controls respectively, $p < 0.001$

Table : 3 Biochemical investigation of liver disease (cases) and a healthy(controls).

characteristic	Patients with liver disease(N=40)	Control groups (N=40)	P value
Total protein(g/L)	8.11±0.5	7.9±0.7	0.14
Albumin (g/L)	3.3±0.4	4.7±0.5	<0.001
ALT(SGPT) (U/L)	49±8	21±6	<0.001
AST(SGOT) (U/L)	91±10	24±8	<0.001
ALP(U/L)	175±100	69±52	<0.001

The more severe the liver damage is, the more decline in lipid levels is detected, especially in LDL and total cholesterol levels. However, no correlation was observed between the serum TG level and the extent of liver damage. All four variables (HDL, LDL, total cholesterol and TG) were significantly lower in cirrhotic patients than in the comparison group (Table -4).

Table :4 **Mean values of lipid profiles in cirrhotic patients in comparison with the control group**

Lipid	Cases	Control	P Value
Total Cholesterol	132.6	186.8	0.026
TG	78.3	182.5	0.008
HDL Cholesterol	41.2	47.8	0.049
LDL Cholesterol	76.1	137.4	0.022

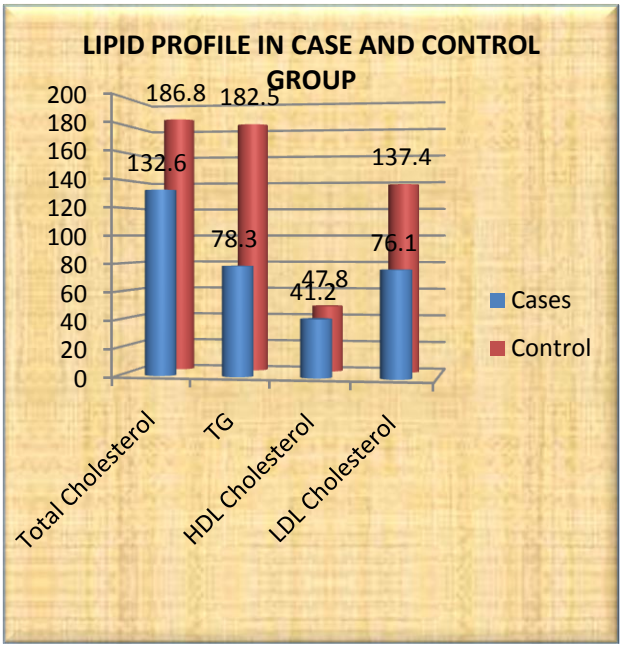
Interpretation was done according to p-value as follows

*p< 0.05 is considered significant

**p<0.001 is considered highly significant

p ≥ 0.05 is considered not significant

Graph -1



Discussion: Dyslipidemia is a frequent finding in chronic liver disease. Dyslipidemia is also seen in other illnesses like diabetes Mellitus and chronic renal failure etc. Many national studies are available regarding dyslipidemia in Diabetes Mellitus or chronic renal failure.[3]

Dyslipidemia in different liver disease like chronic hepatitis, liver cirrhosis, hepato-cellular carcinoma and metastatic liver disease was studied by Ooik et al.[7] They found out that different lipid abnormalities are present in different liver diseases e.g. in chronic hepatitis, liver cirrho-sis and hepato-cellular carcinoma the triglyceride and cho-lesterol levels decreased while LDL-triglyceride fraction increased, metastatic liver cancer showed a lower HDL-fraction level but higher levels of other parameters than hepato-cellular carcinoma.

According to Joel et al[8] most common cause of cirrhosis is alcoholism accounted for 60 to 70% 0f cases followed by HBV infection in 10% of case

mehboob et al [9] ,who studied 160 patient with chronic liver disease stated that Most of the cases belonged to middle age group.

In present study there were lower lipid levels found in patients with liver diseases, and all four studied variables (HDL, LDL, total cholesterol and TG) were significantly lower in cirrhotic patients than in the control group. Furthermore, the amount of decrement in the serum HDL, LDL and total cholesterol (but not TG) had a positive correlation with the severity of liver damage. For instance, the same results were obtained in a study by Mehbob, et al[9], who studied 160 patients with chronic liver diseases. There were significant declines in the serum total cholesterol and TG levels of patients. Another study in Greece was performed by Siagris ,et al [10] on 155 patients infected with HCV and 138 healthy people who served as the comparison group, where the serum total cholesterol level was lower in patients than the comparison group. In this study, the final results also showed that liver damage is correlated with total cholesterol, HDL and LDL but not with TG levels. Hypolipidemia is also found in malabsorption, malnutrition, malignancy, hyperthyroidism and immunoglobulin disorders.[11]

Perales et al[12], found that in patients with chronic liver disease without cholestasis, LDL, HDL and VLDL levels decline and become worse as the disease progresses. This finding is in keeping with our observations that in severe liver disease as the liver function deteriorate, more declines is observed in LDL, HDL and total cholesterol levels. Other studies by Taylor[13], Jarikre [14] and Ahaneku [15]in southern Nigeria documented that all the lipid fragments in cirrhotics are lower than in control.

Conclusion: In conclusion, lipid abnormalities exist in patients with liver cirrhosis. The levels of serum total cholesterol, LDL and HDL in patients with cirrhosis are related to the progress in cirrhosis. Patients with liver cirrhosis thus, should be routinely screened for such abnormalities. Further studies on lipid abnormalities in these patients and the need for treatment are recommended.

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