

Evaluation of Lipid Profile in Patients with Liver Cirrhosis

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ABSTRACT

Introduction: 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. 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. Due to the high prevalence of chronic liver disease in our country, we conducted this study to determine lipid profile in patients with cirrhosis.

Material and methods: The present study was conducted in the Department of Medicine, Govt. Medical College, Patiala on 100 patients with liver cirrhosis and 50 age, sex matched healthy controls, who were admitted to medical wards during the period of study. Then they were subjected to detailed history taking, clinical examination and relevant investigations as per case requirement using a Performa specially designed for this study. All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used as a test of significance. Probability value of less than 0.05 was regarded as significant.

Results: Mean total cholesterol in cirrhotic study group was 147.29 ± 17.14 and in control group was 163.86 ± 17.63 . Mean VLDL cholesterol in cirrhotic study group was 24.11 ± 4.05 and in control group was 27.1 ± 3.65 . In cirrhotic group, there were 86 males and 14 females out of 100. In control group, 40 were males and 10 were females out of 50.

Conclusion: Our study concluded that there is decrease in lipid profile parameters in cirrhotic patients, more severe the cirrhosis, there is greater fall in lipid profile parameters.

Keywords: Cirrhosis, Cholesterol, Hepatitis

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. 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.² 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. Data regarding lipid levels in cirrhosis was available when Austin Flint had suggested that the blood cholesterol level was affected by the liver diseases. 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,³⁻⁵ or older age obesity, insulin resistance/type 2 diabetes, hypertension and hyperlipidemia (all features of the metabolic syndrome) in NASH.^{6,7} Over the years, many clinical and biochemical parameters have been suggested in order to predict more accurately the prognosis of cirrhotic patients and correctly assess their survival rate. Due to the high prevalence of chronic liver disease in our country, we conducted this study to determine lipid profile in patients with cirrhosis.

MATERIAL AND METHODS

The present study was conducted in the Department of Medicine, Govt. Medical College, Patiala on 100 patients with liver cirrhosis and 50 age, sex matched healthy controls, who were admitted to medical wards during the period of study (November 2015-october 2017). All the adult patients with liver cirrhosis diagnosed previously on the basis of history, ultrasound, fibroscan, UGI endoscopy were included in the study. Patients fulfilling the selection criteria were selected and a written informed consent in patient's language was obtained. Then they were subjected to detailed history taking, clinical examination and relevant investigations as per case requirement using a Performa specially designed for this study. Patients with history of taking lipid lowering drugs and those with history of hyperlipidemia were excluded from the study. Serum cholesterol and triglyceride levels were analysed by in vitro enzymatic colorimetric kit method. HDL estimation was done by enzymatic kit method after precipitation of serum by phosphotungstate and magnesium chloride.⁸

STATISTICAL ANALYSIS

All the data was arranged in a tabulated form and analysed using SPSS software. Student t test was used as a test of significance. Probability value of less than 0.05 was regarded as significant.

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RESULTS

In cirrhotic group, there were 86 males and 14 females out of 100. In control group, 40 were males and 10 were females out of 50.

Table 1 shows the age and Gender distribution of subjects with cirrhosis. Age distribution of patients in between 31-40 was 4 (2 males, 2 females), 41-50 was 57 (48 males, 9 females), 51-60 was 32 (29 males, 3 females), 61-70 was 6 (all males), and 71-80 was 1 (all males) with total number of patients being 100 (86 males and 14 females).

Table 2 shows the age and gender distribution of control group. Age distribution of patients in between 31-40 was 0, 41-50 was 27(22 males, 5 females), 51-60 was 19 (16 males, 3 females), 61-70 was 3 (2 males, 1 female) and no patient in age group of 71-80 with total number of patients being 50 (40 males, 10 females).

Table 3 shows the comparison of lipid profile in cirrhotic patients and control group. Mean total cholesterol in cirrhotic study group was 147.29 ± 17.14 and in control group was 163.86 ± 17.63 . Mean of total cholesterol was higher in control group than in study group that was statistically significant as p value $< .00001$. Mean LDL cholesterol in cirrhotic study group was 83.55 ± 16.08 and in control group was 92.88 ± 17.15 . Mean of LDL cholesterol was higher in control group than in study group that was statistically significant as p value 0.0014 . Mean VLDL cholesterol in cirrhotic study group was 24.11 ± 4.05 and in control group was 27.1 ± 3.65 . Mean of VLDL cholesterol was higher in control group than

in study group that was statistically significant as p value $< .00001$. Mean HDL cholesterol in cirrhotic study group was 39.63 ± 3.33 and in control group was 43.88 ± 3.61 . Mean of HDL cholesterol was higher in control group than in study group that was statistically significant as p value $< .00001$. Mean Triglycerides in cirrhotic study group was 120.27 ± 19.80 and in control group was 135.28 ± 18.69 . Mean of triglycerides was higher in control group than in study group that was statistically significant as p value $< .00001$.

DISCUSSION

In our study comparison of mean total cholesterol in cirrhotic patients and control group was done. Mean 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 than in study group that was statistically significant as p value $< .00001$. In a study by Nangliya et al⁹ Total cholesterol in cirrhotic study group was 141.06 ± 22.64 mg/dl and in control group was 175.69 ± 16.41 mg/dl. Mean of total cholesterol was higher in control group than in study group that was statistically significant as p value < 0.05 . In similar previous Study by Suman et al¹⁰ Total cholesterol in cirrhotic study group was 147.54 ± 35.46 mg/dl and in control group was 190.55 ± 39.82 mg/dl. Mean of total cholesterol was higher in control group than in study group that was statistically significant as p value < 0.05 . It is evident from study by Mandal et al¹¹ that total cholesterol in cirrhotic study group was 141.5 ± 46.69 mg/dl and in control group was 192 ± 21.34 mg/dl. Mean of total cholesterol was higher in control group than in study group that was statistically significant as p value < 0.05 . Mean 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 in study group that was statistically significant as p value 0.0014 . In a study by Nangliya et al⁹ LDL cholesterol in cirrhotic study group was 82.81 ± 13.17 mg/dl and in control group was 107.28 ± 9.04 mg/dl. Mean of LDL cholesterol was higher in control group than in study group that was statistically significant as p value < 0.05 . In another study by Suman et al¹⁰ LDL cholesterol in cirrhotic study group was 89.37 ± 25.97 mg/dl and in control group was 120.28 ± 27.01 mg/dl. Mean of LDL cholesterol was higher in control group than in study group that was statistically significant as p value < 0.05 . In similar previous study by Mandal et al¹¹ LDL cholesterol in cirrhotic study group was 86.58 ± 35.63 mg/dl and in control group was 122.8 ± 19.29 mg/dl. Mean of LDL cholesterol was higher in control group than in study

Age Group (Years)	Male N (%)	Female N (%)	Total N (%)
31-40	2	2	4
41-50	48	9	57
51-60	29	3	32
61-70	6	0	6
71-80	1	0	1
Total	86	14	100

Table-1: Age and gender distribution of subjects with cirrhosis

Age Group (Years)	Male N (%)	Female N (%)	Total N (%)
31-40	2	2	4
41-50	48	9	57
51-60	29	3	32
61-70	6	0	6
71-80	1	0	1
Total	86	14	100

Table-2: Age and Gender distribution of control group

Lipid	Cirrhotic group Mean \pm Standard Deviation	Control group Mean \pm Standard Deviation	't' test	P value
Total cholesterol (mg/dl)	147.29 ± 17.14	163.86 ± 17.63	-5.5278	$< .00001$
LDL cholesterol (mg/dl)	83.55 ± 16.08	92.88 ± 17.15	-3.2759	0.0014
VLDL cholesterol (mg/dl)	24.11 ± 4.05	27.1 ± 3.65	-4.3998	$< .00001$
HDL cholesterol (mg/dl)	39.63 ± 3.33	43.88 ± 3.61	-7.155	$< .00001$
Triglycerides (mg/dl)	120.27 ± 19.79	135.28 ± 18.69	-4.4582	$< .00001$

Table-3: Comparison of lipid profile in cirrhotic patients and control group

group that was statistically significant as p value <0.05. In the study conducted by Wang et al in 2014 identified 6719 (83.16%) male patients and 1361 (16.84%) female patients. The average age of all of the patients was 50.5 years at the time of diagnosis. Infantile hepatitis syndrome patients were the youngest (2.5 years of age), followed by the metabolic group (27.2 years of age). Viral hepatitis, alcohol, and mixed etiology were more prevalent in the male group, whereas autoimmune diseases, cryptogenic cirrhosis, and metabolic diseases were more prevalent in the female group.¹² In a study conducted by Janicko et al in 2013 found significant difference in the level of total serum cholesterol between surviving and deceased patients. Cholesterol was confirmed as a significant predictor of mortality in univariate logistic regression analysis, and independent predictor beside bilirubin, creatinine and MELD score in multivariate logistic regression analysis. Addition of serum cholesterol level to a prognostic model based on total bilirubin, creatinine and INR increased its accuracy by 4%. Adding cholesterol to the MELD score improved prediction accuracy by 3%. There was no significant difference in serum levels of triglycerides between surviving and deceased patients. Serum cholesterol is a routinely measured parameter, which has independent prognostic value in patients with liver cirrhosis.³³ A study conducted by Ghadir et al in 2010 found that in patients with cirrhosis, there was a significant decrease in serum triglyceride, total, LDL and HDL cholesterol levels compared to the comparison group (mean of 82 vs 187, 138 vs 184, 80 vs 137, and 40 vs 44 mg/dL, respectively; all p<0.05). Serum total, LDL and HDL cholesterol level in patients with cirrhosis is inversely correlate with severity of cirrhosis.^{13,14}

CONCLUSION

Dyslipidemia is common in chronic liver disease. Our study concluded that there is decrease in lipid profile parameters in cirrhotic patients, more severe the cirrhosis, there is greater fall in lipid profile parameters. We can use lipid profile parameters in all the cirrhotic patients to assess severity of disease.

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