Original research article

A study to evaluate the role of lipid profile in a patient with cirrhosis and to assess its relationship to the severity of cirrhosis.

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Abstract

Aim: to determine role of lipid profile in a patient with cirrhosis and to assess its relationship to the severity of cirrhosis. **Methods** The present study was conducted in the Department of Biochemistry, Patna. Medical College and Hospital, Patna, Bihar, India from June 2019 to December 2019. Serum lipid profile was observed in these patients. **Results:** Mean total cholesterol in cirrhotic study group was 144.47±16.10 and in control group was 160.61±15.65. 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 81.50±14.27 and in control group was 91.96±17.75. Mean of LDL cholesterol was higher in control group than in study group that was statistically significant as p value 0.0012. **Conclusions:** Serum cholesterol and HDL level decreases with progression of cirrhosis. In future serum lipid profile can be used in classification criteria for assessing severity of liver cirrhosis.

Keywords: Chronic liver disease, Lipid profile, Severity of liver cirrhosis

Introduction

Lipids are essential component of biological membrane, free molecules and metabolic regulators that control cellular function and homeostasis. The liver plays a key role in the metabolism of plasma lipids and lipoproteins. It receives fatty acids and cholesterol from peripheral tissues and diet, packages them into lipoprotein complexes and releases these complexes back into circulation. Chronic liver disease due to various causes is often associated with reductions in plasma TG and cholesterol level due to reduced lipoprotein biosynthetic capacity. Lipoproteins are large macromolecular complexes that transport hydrophobic lipids (primarily triglycerides, cholesterol, and fat-soluble vitamins) through body fluids (plasma, interstitial fluid, and lymph) to and from tissues. The triglycerides of VLDL are derived predominantly from the esterification of long-chain fatty acids in the liver.

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As with chylomicrons, the triglycerides of VLDL are hydrolysed by Lipoprotein lipase especially in muscle, heart, and adipose tissue.[1-3]

The cholesterol in LDL accounts for more than one-half of the plasma cholesterol in most individuals.[4-6] Approximately 70% of circulating LDL is cleared by LDL receptor–mediated endocytosis in the liver. As majority of endogenous cholesterol is synthesized in the hepatic microsomes, synthesis and metabolism of cholesterol is impaired in chronic liver disease resulting in a decrease in plasma levels.[7] Severe metabolic impairment in cirrhosis can produce a worsening of the serum lipoprotein pattern. High-density lipoprotein (HDL) cholesterol and its major apolipoproteins have been shown to be reduced in cirrhosis, as also the serum levels of low-density lipoprotein (LDL) cholesterol.[8] Worldwide, cirrhosis is the 14th most common cause of death, but in Europe, it is the 4th most common cause of death.[9] Many patients die from the disease in their fifth or sixth decade of life.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 Biochemistry, Patna Medical College and Hospital, Patna, Bihar, India from June 2019 to December 2019. After taking informed consent and the approval of the protocol review committee and institutional ethics committee.

Methodology

Total 100 patients with liver cirrhosis and 100 age, sex matched healthy controls, who were admitted to medical wards during the period of study was included in the study. All the patients with liver cirrhosis diagnosed previously on the basis of history, ultrasound, fibroscan, UGI endoscopy were included in the 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. 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.[10]

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviation

Results

Table 1: Age and gender distribution of subjects with cirrhosis

Age Group (Years)	Male N	Female N	Total N
Below 30	2	2	4
30-40	3	3	6
40-50	41	10	51
50-60	27	6	33
Above 60	5	1	6
Total	78	22	100

Table-2: Age and Gender distribution of control group

Age Group (Years)	Male N	Female N	Total N
Below 30	1	2	3
30-40	8	5	13
40-50	39	10	49
50-60	25	7	32
Above 60	2	1	3
Total	75	25	100

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

Lipid	Cirrhotic group Mean ± Standard Deviation	Control group Mean ± Standard Deviation	' t' test	P value
Total cholesterol (mg/dl)	144.47±16.10	160.61±15.65	-5.4166	< .00001
LDL cholesterol (mg/dl)	81.50±14.27	91.96±17.75	-3.2674	0.0012
VLDL cholesterol (mg/dl)	25.24±4.15	26.4±3.67	-4.3841	< .00001
HDL cholesterol (mg/dl)	38.71±3.41	42.77±3.57	-7.241	< .00001
Triglycerides (mg/dl)	120.41±19.69	136.31±18.57	-4.3255	< .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 144.47±16.10 mg/ dl and in control group was 160.61±15.65mg/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 al.[11] 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 al.[12] 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 al.[13] 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 81.50±14.27 mg/dl and in control group was 91.96±17.75mg/dl. Mean of LDL cholesterol was higher in control group than in study group that was statistically significant as p value 0.0012.In a study by Nangliya et al.[11] 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 al.[12] 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 al.[13] 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 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 49.3 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.[14] In astudy 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.[15]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.[15,16]

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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