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Original Research Article

Dyslipidemia and mean lipid profile in patients with liver cirrhosis

Sajjad Sohail[1]*, Muhammad Imran Mustafa[2], Mohammad Arif Shaheen[3], Qazi Masroor Ali[4], Mohammad Sohail Tariq[1]

Department of Medicine, [1]Medical Unit-1, [2]Medical Unit-4, [3]Medical Unit-3, Bahawal Victoria Hospital, Bahawalpur, Pakistan
[4]Department of Medicine, Bahawal Victoria Hospital, Quaid-e-Azam Medical College, Bahawalpur, Pakistan

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***Correspondence:**
Dr. Sajjad Sohail,
E-mail: sajjadsohail68@yahoo.com

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ABSTRACT

Background: Patients with liver disorders are often found to have deranged lipid profile. Clear decline is observed in the levels of cholesterol as well as TG among individuals having severe hepatitis and liver failure as synthesis of lipoprotein is reduced. This study was done to determine the frequency of dyslipidemia and the mean lipid profile values in patients of liver cirrhosis.
Methods: A cross sectional, descriptive study, done at the Department of Medicine, Medical Unit-1, Bahawal Victoria Hospital, Bahawalpur, from July to December 2019. A total of 246 patients presented with cirrhosis of liver of age 20-60 years and both genders were included. Analysis for serum total cholesterol (TC) level, serum triglycerides level, low density lipoprotein (LDL) and high density lipoprotein (HDL) were done and findings were noted.
Results: Mean age was 51.67±6.21 years. Out of the 246 patients, 153 (62.20%) were male and 93 (37.80%) were females with male to female ratio of 1.6:1. Mean values of lipid were, LDL cholesterol 95.76±29.65 mg/dl, HDL 43.37±11.46 mg/dl, TC 147.51±42.69 mg/dl and TG 101.29±21.59 mg/dl. Dyslipidemia was found in 59 (23.98%) patients, whereas there was no dyslipidemia in 187 (76.02%) patients.
Conclusions: Frequency of dyslipidemia in cirrhotic patients is high. Evaluating patients of liver cirrhosis, dyslipidemia need to be considered for early recognition and analysis.

Keywords: Cholesterol, Cirrhosis, Lipoprotein, Triglycerides

INTRODUCTION

Liver cirrhosis is a chronic disorder described as degeneration of liver cells that further progress as fibrosis as well as disorders involving regeneration of nodules that progress in to portal hypertension and complications related to it.[1] Around 1 million deaths because of complications of liver cirrhosis are reported annually from around the world. Presently, cirrhosis is the eleventh commonest cause of global mortality.[2]

Cirrhosis is recorded as one of the major causes of mortality in Pakistan. Esophageal varices, ascites and spontaneous bacterial peritonitis are some of the commonest complications of cirrhosis of liver in among Pakistani population.[3] Local data shows Hepatitis C as the commonest (61.66%) cause linked to liver cirrhosis while Hepatitis B is known to be the 2nd commonest (18.9%) cause whereas alcoholic liver disease is recorded to account 32.0% of the liver cirrhosis cases.[4,5]

Frequent visits to healthcare facilities as well as hospitalizations are required to manage patients with live cirrhosis and its complications.[3,4] Among patients of liver

cirrhosis, child pugh classification is employed for the prediction of survival.[6]

Lipids are necessary for controlling functions of the cells and maintaining homeostasis. In metabolism, synthesis and transportation of lipids, liver has an integral role to play.[7,8] Patients with liver disorders are often found to have deranged lipid profile. Clear decline is observed in the levels of cholesterol as well as TG among individuals having severe hepatitis and liver failure as synthesis of lipoprotein is reduced in these cases.[9] Researchers have found levels of LDL, HDL and TC to be inversely linked with the severity of liver cirrhosis.[7]

As the international literature has shown that liver cirrhosis is associated with dyslipidemia but there is still paucity in data, and also no local data available.[7-9] This study was done to determine the frequency of dyslipidemia and the mean lipid profile values in patients of liver cirrhosis in local population. The results of this study may help the clinicians to design a protocol for early screening of dyslipidemias in patients of liver cirrhosis.

METHODS

This cross sectional, descriptive study was conducted at the Department of Medicine, Medical Unit-1, Bahawal Victoria Hospital, Bahawalpur, from July to December 2019. Approval from Institutional Ethical Committee was taken while informed consent was sought from all the study participants.

A total of 246 patients presented with cirrhosis of liver of age 20-60 years and both genders were included. Patients with lipid lowering drugs or hepatotoxic drugs, acute hepatitis, hypertension, diabetes mellitus, ischaemic heart disease and chronic renal failure were excluded. After taking relevant history, venous blood sample of each patient was taken and sent to institutional laboratory for analysis of serum TC level, serum TG level, LDL, HDL and findings were noted.

Dyslipidemia was labeled if any one of the following found;

TC >200mg/dl, TG >150mg/dl., HDL <40mg/dl in males and <50 mg/dl in females or LDL >130 mg/dl. Cirrhosis was diagnosed on the basis of ultrasonography with small size liver (<5 cm liver span) having coarse texture liver and having any two of the following in addition:

- portal vein diameter >10mm,
- raised bilirubin > 2 mg/dl, jaundice (yellowness of sclera) with bilirubin >2 mg/dl,
- splenomegaly: size of spleen (length)> 13 cm on ultrasound,
- ascites as shifting dullness +ive and presence of fluid in peritoneal cavity on ultrasound.

SPSS version 23.0 was used for data analysis. Frequency and percentages were calculated for qualitative variables like gender, frequency of dyslipidemia. Mean and standard deviation were calculated for age, duration of the disease, TC, TG, LDL and HDL levels. Student t test was used to compare the quantitative variables while chi square test was applied to compare qualitative variables considering p value less than 0.05 as statistically significant.

RESULTS

Age range was noted to be between 20 to 60 years while mean age was 51.67±6.21 years. Majority of the patients, 88 (35.77%) were 51-60 years of age (Table 1). There were 153 (62.2%) male and 93 (37.8%) female. Mean duration of disease was 3.04±2.33 years.

Table 1: Characteristics of study participants (n=246).

Characteristics		No. of Patients (%)
Age (years)	20-30	33 (13.4%)
	31-40	56 (22.8%)
	41-50	69 (28.0%)
	51-60	88 (35.8%)
Gender	Male	153 (62.2%)
	Female	93 (37.8%)
Duration of disease (years)	≤3	132 (53.7%)
	>3	114 (46.3%)

Mean values of lipid were, LDL cholesterol 95.76±29.65 mg/dl, HDL 43.37±11.46 mg/dl, TC 147.51±42.69 mg/dl and TG 101.29±21.59 mg/dl.

Table 2: Stratification of dyslipidemia with respect to study variables.

Age (years)		Dyslipidemia		p-value
		Present	Absent	
Age (years)	20-30	07 (21.21%)	26 (78.79%)	0.640
	31-40	11 (19.64%)	45 (80.36%)	
	41-50	16 (23.19%)	53 (76.81%)	
	51-60	25 (28.41%)	63 (71.59%)	
Gender	Male	37 (24.18%)	116 (75.82%)	0.925
	Female	22 (23.66%)	71 (76.34%)	
Disease duration (years)	<3	24 (18.18%)	108 (81.82%)	0.215
	>3	35 (30.70%)	79 (69.30%)	

Table 2 and 3 show stratification of dyslipidemia and mean values of lipid profile studied with respect to study variables. Dyslipidemia was found in 59 (23.98%)

patients, whereas there was no dyslipidemia in 187 (76.02%). There was no significant difference between different age groups with regards to dyslipidemia but mean lipid profile was having significant difference in age groups except LDL. Stratification of dyslipidemia with respect to gender but mean lipid profile showed significant difference in male and female except TC level. No significant difference of duration of disease on dyslipidemia was found but mean lipid profile has shown significant difference except HDL.

Table 3: Stratification of mean lipid profile with respect to study variables.

Lipid profile	Age		p-value
	20-40 years	41-60 years	
Total Cholesterol (Mean+SD)	138.38+37.61	149.73+44.32	0.0344
Triglycerides (Mean+SD)	96.72+23.33	103.02+20.21	0.0344
LDL (Mean+SD)	94.51+22.18	97.41+31.54	0.4007
HDL (Mean+SD)	41.62+9.71	45.32+12.14	0.0095
	Gender		
	Male	Female	
Total Cholesterol (Mean+SD)	141.18+39.93	157.38+44.71	0.0727
Triglycerides (Mean+SD)	94.46+19.91	107.62+24.39	<0.0001
LDL (Mean+SD)	89.62+26.55	99.91+32.51	0.0109
HDL (Mean+SD)	46.72+12.61	41.38+10.52	0.0004
	Duration of disease		
	≤3 years	>3 years	
Total Cholesterol (Mean+SD)	133.89+38.48	155.32+46.55	0.0001
Triglycerides (Mean+SD)	97.45+19.66	106.32+24.16	0.002
LDL (Mean+SD)	92.06+27.23	99.55+31.43	0.0487
HDL (Mean+SD)	40.46+12.51	40.09+9.62	0.7937

DISCUSSION

Chronic liver disease due to different reasons is commonly linked with dramatic decline in plasma TG and cholesterol levels which could be because of declined synthesis of lipoprotein.[10] Hypercholesterolemia occurs as the main excretory pathways of cholesterol are blocked in CLD.[9] In our study, dyslipidemia was found in 59 (23.98%) patients, whereas there was no dyslipidemia in 187 (76.02%) patients. Mean values of lipid were, LDL cholesterol 95.76±29.65 mg/dl, HDL 43.37±11.46 mg/dl, TC 147.51±42.69 mg/dl and triglycerides 101.29±21.59 mg/dl. Ghadir MR et al reported in his study that mean values of lipid profile in patients of liver cirrhosis were, LDL cholesterol 80.5±20.125 mg/dl, HDL 40.7±10.175 mg/dl, total cholesterol 138.9±34.742 mg/dl and triglycerides 82.2±20.55 mg/dl.[7] EL-Khabbany ZA and Coworkers found dyslipidemia to be a common finding in cases of CLD while 20% of their cases had hypercholestrolemia, 32.5% hypertriglyceridemia, 42.5% low HDL and 22.5% had raised LDL.11 Shimizu H et al in his study reported dyslipidemia in 61.0% patients of chronic liver disease.12 Mandal SK et al in his study has found mean LDL cholesterol 86.58±35.63 mg/dl, HDL 33.50±12.78 mg/dl, total cholesterol 141.5±46.69 mg/dl and triglycerides 120.9±96.23 mg/dl.[9]

Roesch DF et al had shown dyslipidemia in 76.9% patients. Nayak MS et al found that patients having liver diseases had declined lipid levels. Similarly in another study by Mehbob F et al, studying 160 cases of CLD noted that total cholesterol was decreased in 15% of the cases while serum TG were low-to-normal in 63.1% cases.[13-15] HDL-c was found less than normal in all patietns whereas LDL was low in 88.1% of the cases. Irfan S et al in his study had found dyslipidemia in 83.6% patients of liver cirrhosis with mean values for HDL, LDL, TC, TG as 40.2±3, 138.1±9.7, 203.6±24.2 and 197.9±71.2 respectively. Brier C and Colleagues, evaluating plasma lipoproteins among cases of post alcoholic liver cirrhosis, found declined in all lipid profile parameters.[16,17] As per the findings of this study, great care needs to be taken anticipating lipid derangements, particularly while evaluating cases of liver cirrhosis and early screening and management of this condition so that morbidity and mortality associated with these disorders could be minimized.

CONCLUSION

Frequency of dyslipidemia in cirrhotic patients is high. Evaluating patients of liver cirrhosis, dyslipidemia need to be considered for early recognition and analysis.

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