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Original Research Article

Study of serum lipid profile in patients with chronic liver disease and its correlation with child Pugh class: a hospital based observational study in North Indian patients

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ABSTRACT

Background: Liver disease impacts on hepatic synthesis of lipoproteins and lipogenesis but data on dyslipidemia during disease progression are limited. We want assess the patterns of dyslipidemia in with different etiology liver disease and its correlation with Child Pugh score from non-advanced (non-ACLD) advanced chronic liver disease (ACLD) as it is unclear how progression to ACLD impacts on dyslipidemia-associated cardiovascular risk. Aim and objectives of current study were to determine serum lipid profile in patients with chronic liver disease and its correlation with Child Pugh score.
Methods: It was Cross sectional, observational study conducted in 200 patients at KPS post graduate institute of medicine, GSVM medical college, Kanpur from December 2020 to October 2022.
Results: In this study mean value of Serum Cholesterol (mg/dl) was 135.25 (27.88), Serum Triglycerides (mg/dl) was 122.27 (36.29), HDL Cholesterol was 46.92 (10.36), LDL Cholesterol was 62.77 (22.59), VLDL Cholesterol was 25.62 (8.71). In this study maximum patients of chronic liver disease were due to chronic alcohol intake which account for 76% patients, 2nd most common aetiology of chronic liver disease were chronic viral hepatitis and rest were due to Wilson disease, Budd Chiari syndrome non cirrhotic portal fibrosis and cryptogenic. Patients of chronic liver disease have negative correlation on lipid profile with Child Pugh score.
Conclusions: From our study its was concluded that patients having higher CTP score having more derangement (low) in serum lipid profile (specially) serum cholesterol, serum HDL, serum VLDL) than the patients having low CTP score.

Key Words: Chronic liver disease, CTP score, Serum lipid profile

INTRODUCTION

Chronic liver disease in the clinical context is a disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis.[1] "Chronic liver disease" refers to disease of the liver which lasts over a period of six months. It consists of a wide range of liver pathologies which include inflammation (chronic hepatitis), liver cirrhosis and hepatocellular carcinoma.[2] Liver disease affect hepatic synthesis of lipoproteins and lipogenesis but data on lipid profile during disease progression are limited.[3] We want to assess the patterns of lipid profile in patients with different etiology chronic liver disease and its correlation with Child Pugh score. For this study we have evaluated every patients of chronic liver disease over age 18 get a test so you know what your levels are and can do something about them if you need to: measurements in the same patient can show physiological and analytical variation. Serum lipid profile include; Total Cholesterol,

Triglycerides, HDL, LDL Cholesterol, VLDL.[4] A complete lipoprotein profile as the initial test for evaluating cholesterol. You'll probably have to fast for 8 to 12 hours before it to make sure it's not affected by any food you recently ate. Serum lipid profile usually gives results for four different lipoproteins.[5] Total cholesterol: 240 milligrams per deciliter (mg/dl) or less is normal. 201 to 240 mg/dl is borderline. More than 240 mg/dl is high. For HDL ("good cholesterol"), more is better: 60 mg/dl or higher is good, it protects against heart disease. For LDL ("bad cholesterol"), lower is better: Less than 100 mg/dl is ideal. 100 to 129 mg/dl can be good, depending on your health. 130 to 159 mg/dl is borderline high. 160 to 189 mg/dl is high. 190 mg/dl or more is very high. High triglycerides (150 mg/dl or greater) also raise the odds for heart disease somewhat.[6]

Aim and objectives

Aim and objectives of current study were to determine serum lipid profile in patients with chronic liver disease and its correlation with Child Pugh score

METHODS

Study design

It was Cross sectional, observational study conducted in 200 patients at KPS post graduate institute of medicine, GSVM medical college, Kanpur from December 2020 to October 2022. Age group 20 to 60 years (male & female both)**,** having chronic liver disease of different etiology, willing to participate in the study was included. Patient not giving consent to participate in the study, patients taking Statins, PCSK9 inhibitor, Fibrate were excluded from study.

Statistical analysis

Data was entered, cleaned and coded in a MS Excel spreadsheet. Analysis of data was performed using SPSS Version 20.0. Continuous variables were expressed as means and standard deviation if normally distributed and as median and interquartile range if not normally distributed. Categorical variables were expressed as percentages. Comparison of percentages between the two or more groups was done using Chi-square test. Comparison of parametric continuous variables between three groups was done using one-way ANOVA. Correlation between two continuous variables was done using Pearson correlation coefficient. P valueof less than 0.05 considered statistically significant.

RESULTS

Majority of patients belong to age groups 41 to 50 years which account almost 33% of all study patients. In this study out of 200 patients 167 (83.5%) were male and 33 (16.5%) were female. In this study mean value of serum cholesterol (mg/dl) was 135.25 (27.88), serum triglycerides (mg/dl) was 122.27 (36.29), HDL cholesterol was 46.92 (10.36), LDL Cholesterol was 62.77 (22.59), VLDL Cholesterol was 25.62 (8.71).

Table 1: Distribution of cases according to age of the patient (n=200).

Age of the patient (years)	N (%)
18-30	15 (7.5)
31-40	62 (31)
41-50	66 (33)
51-60 years	57 (23.5)
Mean age of the patient in years (SD)	44.77 (10.1)

Table 2: Mean biochemical markers for the study group (n=200).

Parameters	Mean (SD)	Range
Serum cholesterol (mg/dl)	135.25 (27.88)	76-242
Serum triglycerides (mg/dl)	122.27 (36.29)	68-322
HDL cholesterol	46.92 (10.36)	20-87
LDL cholesterol	62.77 (22.59)	16-145
VLDL cholesterol	25.62 (8.71)	14-72

Table 3: Distribution of cases according to aetiology of liver disease (n=200).

Aetiology of liver disease	N (%)
Alcoholism	152 (76)
Hepatitis B	20 (10)
Hepatitis C	12 (6)
Cryptogenic	11 (5.5)
BCS	3 (1.5)
Wilson disease	1 (0.5)
NCPF	1 (0.5)

Table 4: Correlation of Child Pugh score with lipid profile (n=200).

Parameters	Correlation coefficient with CTP score	P value
Serum cholesterol (mg/dl)	-0.681	<0.001
Serum triglycerides (mg/dl)	-0.676	<0.001
HDL cholesterol	-0.465	<0.001
LDL cholesterol	-0. 406	<0.001
VLDL cholesterol	-0.435	<0.001

In this study maximum patients of chronic liver disease were due to chronic alcohol intake which account for 76% patients, 2nd most common aetiology of chronic liver disease were chronic viral hepatitis and rest were due to Wilson disease, Budd Chiari syndrome non cirrhotic portal fibrosis and cryptogenic.

Table 5: Association of lipid profile markers with CTP score (n=200).

Parameters		CTP=5-6	CTP=7-9	CTP=10-15	P value
Serum cholesterol	**Normal**	7	89	93	0.003
	Deranged	0	11	0	
Serum triglycerides	**Normal**	7	97	93	0.218
	Deranged	0	3	0	
Serum HDL	**Normal**	5	62	59	<0.001
	Deranged	2	38	34	
Serum LDL	**Normal**	7	100	93	-
	Deranged	0	0	0	
Serum VLDL	**Normal**	2	54	82	<0.001
	Deranged	5	46	11	

Patients of chronic liver disease have negative correlation on lipid profile with Child Pugh score. In this study its was found that patients having higher CTP score having more derangement (low) in serum lipid profile (specially) serum cholesterol, serum HDL, serum VLDL than the patients having low CTP score.

DISCUSSION

Chronic liver disease is marked by the gradual destruction of liver tissue over time. The causes of chronic liver disease can be any condition that results in the gradual degradation and renewal of the hepatocyte. Lipids have an essential role in cell structure and metabolism. Triglyceride are the major storage form of energy. Cholesterol is an important constituent of cell membranes and precursor of steroid hormones. The 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. An impaired lipid metabolism is often found in patients with chronic liver diseases.[7] Unfortunately, few studies are available concerning serum lipid and lipoprotein levels in patients with liver cirrhosis and chronic active hepatitis.[8] Deranged lipid profile is a common finding in chronic liver disease. It helps diagnosis of severity of liver disease and also acts as a good prognostic sign. Lipid profile must be done in all cases with advanced liver disease.[9] Patient of chronic liver disease usually do not have any symptom and signs of lipid abnormalities in them. In most of the studies done on lipid abnormality done in chronic liver disease have shown that significant adverse effect on lipid profile in these patients.[10] Regarding this topic, very few studies has been documented in our Indian population who are suffering from chronic liver disease.[11] So, the present study has been done to know the lipid profile changes in relation to chronic liver disease in Northern India. In the present study 200 patients of chronic liver disease based on their Child Pugh score classified in three classes; 7 (3.5%) patients belong to CTP class A, 100 (50%) CTP class B and 93 (46.5%) belong to CTP class C. In our study the in patients with chronic liver disease mean value of serum cholesterol 135.25 mg/dl, serum triglyceride 122.27, HDL cholesterol 46.92 mg/dl, LDL cholesterol 62.77mg/dl and VLDL cholesterol is 26.62 mg/dl. In our study the mean value total cholesterol in patients of Child Pugh class A is 142.25mg/dl, Child Pugh class B is 135.25 mg/dl and Child Pugh class C is 128.7 mg/dl. This shows that patients of chronic liver disease had lower level of total cholesterol and their level progressively decreasing as per increasing Child Pugh score. On analyzing the correlation of total cholesterol with Child Pugh score it was found that there is strong negative correlation between them. The correlation coefficient found in the study was= -0.7012. It shows that as the Child Pugh score increases in patient of chronic liver disease the level of total cholesterol decreases. In our study the mean value of HDL cholesterol in patients with CLD is 46.92 mg/dl. In Child Pugh class A is 50.92% Child Pugh class B is 46.92 mg/dl, Child Pugh class C Child Pugh 42.92% mg/dl this data shows that patients of chronic liver disease had lower level of HDL and their level progressively decreeing as per increasing Child Pugh score. In our study the on analyzing the correlation of HDL with Child Pugh score it was found that there is strong negative correlation between them. The correlation coefficient found in the study was r=-0.46 with p value <0.001 that is study is statically significant. In our study the mean LDL in patient of chronic liver disease is 62.77 mg/dl their level decreasing slight with increasing in CTP sore with correlation coefficient r=-.0.46 p valve >0.05. In our study analyzing the correlation VLDL cholesterol with Child Pugh sore it was found that there is strong correlation between them r=-0.430. In our study there is no significant difference in total cholesterol, triglyceride, HDL, LDL, and VLDL in male and female patients. Deranged lipid profile is a common finding in chronic liver disease. It helps in diagnosing severity of liver disease and also at as good prognostic indicator. In chronic liver disease due to decreased bio synthetic capacity of liver unusually low level of cholesterol triglyceride and VLDL found.

Limitations

Limitations of current study was single centered with small study population. Further multicentric study with large

sample size with prospective cohort studies are needed to validate its efficacy.

CONCLUSION

In patients with chronic liver disease mean value of serum cholesterol 135.25 mg/dl, serum triglyceride 122.27, HDL cholesterol 46.92 mg/dl, LDL cholesterol 62.77mg/dl and VLDL cholesterol is 26.62 mg/dl. Mean total cholesterol in patients of Child Pugh class A is 142.25mg/dl, Child Pugh class B is 135.25 mg/dl and Child Pugh class C is 128.7 mg/dl. This shows that patients of chronic liver disease had lower level of total cholesterol and their level progressively decreasing as per increasing Child Pugh score, it was found that there is strong negative correlation between them the correlation coefficient found in the study R=-0.681. Patients of chronic liver disease have lower triglyceride but the triglyceride level progressively decreasing as per increasing CTP score. The mean value of HDL cholesterol in patients with CLD is 46.92 mg/dl in Child Pugh class A is 50.92% Child Pugh class B is 46.92 mg/dl, Child Pugh class Child Pugh 42.92% mg/dl this data shows that patients of chronic liver disease had lower level of HDL and their level progressively decreeing as per increasing Child Pugh score, there is strong negative correlation between them. The correlation coefficient found in the study was r=-0.46 with p value <0.001. The mean LDL in patient of chronic liver disease is 62.77 mg/dl their level decreasing slight with increasing in CTP sore with correlation coefficient r=-0.46 p valve >0.05. The mean value of VLDL cholesterol is 26.62mg/dl, on analyzing the correlation VLDL cholesterol with Child Pugh sore it was found that there is strong negative correlation between them r=-0.430. Dyslipidemia is a common finding in chronic liver disease. It helps in diagnosing severity of liver disease and also act as good prognostic indicator. In chronic liver disease due to decreased biosynthetic capacity of liver unusually low level of cholesterol, triglyceride, HDL and VLDL found.

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