

Study on lipid profile and it's correlation to the severity of cirrhosis of liver

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Abstract

Background: Cirrhosis is a pathologically defined entity that is associated with a range of characteristic clinical manifestations with fibrosis and the conversion of normal liver architecture into structurally abnormal nodule. Early diagnosis and definitive treatment of the etiology plays an important role in the prognosis. Cirrhosis was believed to be irreversible; however, it has become apparent that there can be reversal of fibrosis by removing the etiological agent. With this background our study was aimed to observe lipid profile in patients with liver cirrhosis and to observe the correlation between lipid profile and the severity of cirrhosis of liver. **Materials and Methods:** A cross-sectional study was conducted on 100 patients who were admitted in a teaching hospital with the liver cirrhosis. Liver cirrhosis was diagnosed based on Clinical findings, Ultrasonography of abdomen (USG) findings and on biochemical parameters. For assessment of severity of liver cirrhosis, Child Pugh criteria was used in which the cirrhotic patients was divided into three classes. **Results:** Out of total of 100 patients, most of the patients were between 45-55 years of age. Average age of the patients was 54.5+8.5 years. Among the 100 patients 76 were male and 24 were female. Based on the Clinical findings, Ultrasonography of abdomen (USG) findings and biochemical parameters the patients were classified in to three classes of Child Pugh. Patients among the 'Class C' of Child Pugh score, the mean total cholesterol value was 98.0 mg/dl, which was lowest when compared to other classes with statistical significance ($p < 0.001$). Patients among "Child Pugh Class A" had a mean cholesterol value of 122.31 mg/dl, whereas in "Child Pugh Class B" the mean triglyceride level was 107.42mg/dl and in patients with "Child Class C", the mean triglyceride level was 83.51 mg/dl. The result was statistically significant with the 'p value' < 0.001 . In the sample studied, patients in Child Pugh class C has least mean HDL level of 20.02 mg/dl, and patients in Child Pugh Class B has slightly higher mean HDL level of 26.45 mg/dl. Patients in the "Child Pugh Class A" had highest mean value of 41.25 mg/dl. The results were significant with a p value < 0.001 . **Conclusion:** In our study all the parameters in lipid profiles were found to be significantly decreased in patients with liver cirrhosis. It was also observed that all the parameters of lipid profiles were significantly lower in patients belonging to "Child Pugh Class C" when compared to "class B and A".

Keywords: Biochemical parameters, Child Pugh score, Cirrhosis, Lipid profile, Ultrasonography.

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INTRODUCTION

Chronic liver disease is a progressive destruction and regeneration of the liver parenchymal cells leading to fibrosis and cirrhosis. Cirrhosis is a pathologically defined entity that is associated with a range of

characteristic clinical manifestations. It is defined by the World Health Organization (WHO) as a diffuse process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodule.¹ Cirrhosis is a common finding in autopsy studies ranges from 4.5% to 9.5% of the general population.^{2, 3} When cases of cirrhosis are reviewed, many patients have one or more of the classic risk factors including alcoholism, obesity, diabetes and hypertriglyceridemia.⁴ The diagnosis of cirrhosis is based on widespread nodules in the liver combined with fibrosis.⁵ Ultrasonography provides an important view on hepatic architecture and it is cost effective. Nodularity of the liver is often found in cirrhosis but are also present in steatosis.^{6,7} However, the width of the caudate lobe, relative to the right lobe is a poor predictor of cirrhosis.⁸ Transient elastography is a

non-invasive method used in evaluation of liver cirrhosis.⁹ Early diagnosis and definitive treatment of the etiology plays an important role in the prognosis.¹⁰ Cirrhosis was believed to be irreversible; however, it has become apparent that there can be reversal of fibrosis by removing the etiological agent.^{11, 12} With this background our study was aimed to observe lipid profile in patients with liver cirrhosis and to observe the correlation between lipid profile and the severity of cirrhosis of liver among the patients admitted in a teaching hospital.

MATERIALS AND METHODS

We have conducted a cross-sectional study on all patients who were admitted in a teaching hospital with the liver cirrhosis during the period from January 2019 to February 2020, to collect a study sample of 100 cases. Liver cirrhosis was diagnosed based on Clinical findings, Ultrasonography of abdomen (USG) findings and on

biochemical parameters. For assessment of severity of liver cirrhosis, Child Pugh criteria was used in which the cirrhotic patients was divided into three classes (Table 1 and Table 2). Patient suffering from comorbidities like diabetes mellitus, nephrotic syndrome, thyroid dysfunction and patient on therapy with lipostatic agents were excluded from the study. Institutional Ethical Committee clearance was obtained before starting the study and the data was tabulated with Microsoft office - Excel sheet. Data was further analyzed by Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, US). Chi square test was used to find the significance and P value was obtained for all the variables. Lipid profile including serum total cholesterol, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, very low density lipoprotein (VLDL) cholesterol and serum triglycerides was measured in all cases after 10 hours of overnight fast.

Table 1: Child Pugh criteria for severity of Liver cirrhosis

Points	Class	One year survival	Two year survival
5-6	A	100%	85%
7-9	B	80%	60%
10-15	C	45%	35%

Table 2: Allotment of points for Child Pugh criteria

Parameter	units	1 point	2 points	3 points
Total bilirubin	mg/dl	<2	2-3	>3
Serum albumin	mg/dl	>3.5	2.8-3.5	<2.8
Prothrombine Time	seconds	<41<1.7	4-6/1.7-2.3	>2.3
Ascites	presence	None	Mild	Moderate / severe
Hepatic encephalopathy	presence	None	Grade I-II	Grade III-IV

RESULTS

Out of total of 100 patients, most of the patients were between 45-55 years of age. Average age of the patients was 54.5±8.5 years. Among the 100 patients 76 were male and 24 were female. Based on the Clinical findings, Ultrasonography of abdomen (USG) findings and biochemical studies the patients were classified in to three classes of Child Pugh (Table 3). Biochemical parameters were presented in Table 4 and Lipid profile of all the patients was presented in Table 5.

Table 3: Distribution of Child Pugh class in the sample studied

Child Pugh Class	A	B	C	Total
Number of patients	20	42	38	100

Table 4: Biochemical Parameters among the patients

Parameter	Serum bilirubin	SGOT	SGPT	ALP	Albumin	Blood urea	Serum Creatinine
Units	mg/dl	IU/L	IU/L	IU/L	gm%	mg/dl	mg/dl
Mean	2.4	158.1	138.3	211.4	3.2	46.6	1.3
SD	1.6	201.4	144.2	56.4	0.6	24.5	0.9

Table 5: Lipid profile among the patients of liver cirrhosis

Parameter	Units	Mean	SD
Total Cholesterol	mg/dl	124.0	33.6
Triglycerides	mg/dl	114.9	20.4
LDL	mg/dl	111.4	25.3
HDL	mg/dl	29.5	8.2
VLDL	mg/dl	12.5	4.2

Patients among the 'Class C' of Child Pugh score, the mean total cholesterol value was 98.0 mg/dl, which was lowest when compared to other classes with statistical significance ($p < 0.001$). Patients among "Child Pugh Class A" had a mean cholesterol value of 122.31 mg/dl, whereas in "Child Pugh Class B" the mean triglyceride level was 107.42mg/dl and in patients with "Child Class C", the mean triglyceride level was 83.51 mg/dl. The result was statistically significant with the 'p value' < 0.001 . In cirrhotic patients in "Child Pugh Class A", the mean LDL level was 129.50 mg/dl when compared to the patients in "Child Class B" had 108.81 mg/dl and those in "Child class C" had a level of 20.38 mg/dl. The result was significant with a p value of < 0.001 . In the sample studied, patients in Child Pugh class C has least mean HDL level of 20.02 mg/dl, and patients in Child Pugh Class B has slightly higher mean HDL level of 26.45 mg/dl. Patients in the "Child Pugh Class A" had highest mean value of 41.25 mg/dl. The results were significant with a p value < 0.001 .

DISCUSSION

In a similar study conducted by Suman *et al.*,¹³ a total of 150 patients with cirrhosis were included Majority of the patients were in the age group between 41 to 50 years (31.3%). The youngest patient studied in the group was 36 years old and the oldest was 85 years old. Average age of the study population was 55.8 ± 10.1 years and the age ranged from 36 to 85 years. The median age in the study group was 55 years. In a study conducted by Mohammad *et al.*,¹⁴ the most affected age group was 41 to 50 years of age. Phukan *et al.*,¹⁵ also found in their study that the most common affected age group was 41-50 years (41%). Among the patients studied, 76% were males and 24% were females. Majority of the patients with cirrhosis were males with male to female ratio of 3.1:1. Mandal *et al.*,¹⁶ had conducted studies in total 120 cirrhotic patients as cases from which 80 were male and 40 female patients. In another study conducted Nangliya *et al.*,¹⁷ had observed in their study that of 150 clinically diagnosed patients of cirrhosis (cases) 66% were males and 34% were females. which is also in concordance with our study. The incidence of liver cirrhosis is more common in men probably because they are more prone to high risk activities, substance abuse and alcohol abuse. In a study conducted by Maskey *et al.*,¹⁸ the most common presenting complaint of the cirrhotic patients was abdominal distension. On clinical examination of the studied samples, 52% had ascites, 41.3% had pallor, 41% had pedal edema, 36% had jaundice, 27.3 had caput medusa, 24.7% had flapping tremor, 22.7% had gynecomastia, 22% had splenomegaly, 19.3% had hepatomegaly 16.7% had parotid swelling, 15.3% had

glossitis, 14% had spider naevi, 12% patients had palmar erythema and 10% had clubbing,. Ascites (52%) was the most common clinical sign found in patients with cirrhosis in the present study followed by pallor and pedal edema. According to study conducted by Makey *et al.*,²⁰ the most common presenting signs were ascites (100% in young cirrhotics versus 84.4% in adult cirrhotics) and icterus (93.3% in young cirrhotics vs. 84.4% in adult cirrhotics), followed by loss of body hair (73.3% vs. 71.1% in young and adult cirrhotics respectively) and spider naevi (46.7% vs. 61.1% in young and adult cirrhotics respectively). In both the studies, ascites is the most common clinical finding. Our findings were in contrast to the results observed in the study conducted by Makey *et al.*,²⁰ where jaundice was the second most common clinical finding; pallor was the second most common clinical sign in the present study. This can be attributed to the fact that many of the patients in the present study had hematemesis (36%) and malena (31.3%). A study conducted by Jatav *et al.*,¹⁹ shown a similar lipid profile findings in patients with cirrhosis when compared to the group of non-cirrhotic individuals. This study also observed a significant decrease in serum total cholesterol, LDL cholesterol, VLDL cholesterol, HDL cholesterol, and serum triglyceride levels in liver cirrhosis patients when compared to the control group. A study done by Kumar *et al.*,²⁰ shown that the reduction in the LDL cholesterol level was proportionate to the severity of liver damage in cirrhosis as detected by the Child Pugh scoring system. Ghadir *et al.*,²¹ observed in their study that according to Child-Pugh classification criteria, 11 patients had score "A," 14 score "B," and 25 had score "C" from total 50 patients. It was observed that there was a significant ($P < 0.05$) negative correlation between liver damage according to Child Pugh criteria and serum total, HDL, and LDL cholesterol level. HDL levels were considered predictors of severity as observed in the study done by Habib *et al.*²²

CONCLUSION

In our study all the parameters in lipid profiles were found to be significantly decreased in patients with liver cirrhosis. It was also observed that all the parameters of lipid profiles were significantly lower in patients belonging to "Child Pugh Class C" when compared to "class B and A" thus concluding that lipid profile progressively decreases with increase in severity of cirrhosis.

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