



## Serum lipid pattern in patients of liver cirrhosis

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### Abstract:

**Background:** Cirrhosis is a complication of many liver diseases characterized by abnormal structure and function of the liver. Liver synthesizes the various lipoproteins involved in transporting cholesterol and lipids throughout the body. This makes liver an important site for lipid metabolism as well as its transport. Thus liver cirrhosis is associated with lipid abnormalities.

**Aim:** To study lipid profile pattern in patients with cirrhosis.

**Materials and Methods:** 30 patients with cirrhosis (cases) and 30 age and sex matched healthy patients (controls) were studied in the department of Biochemistry and central investigation laboratory in MGM Hospital, Aurangabad. Lipid profile (total, LDL, and HDL cholesterol and triglyceride) were done in both cases and control. Results were obtained by using statistical analysis.

**Results:** In patients with liver cirrhosis, there was a significant decrease in lipid profile levels compared to the healthy control group ( $p < 0.05$ ).

**Conclusion:** Dyslipidemia is a common finding in liver cirrhosis. Lipid profile should be advised in all cases with liver cirrhosis.

**Key words:** Dyslipidemia, LDL, HDL, Cholesterol, Triglycerides.

### Introduction:

Lipids are considered as one of the important biomolecules which control cellular functions and homeostasis and liver is an important site for metabolism of lipid. It contributes both in exogenous and endogenous cycles of lipid metabolism and transport of lipids through plasma.<sup>1</sup> In lipid transport, apolipoproteins which are synthesized in liver, function as structural components of lipoprotein particles. Apo lipoproteins mediate the transport and uptake of cholesterol and lipid by way of its high affinity interaction with different cellular receptors. Apolipoproteins play important role in lipoprotein

metabolism. Thus making liver as the principal site of formation and clearance of lipoproteins.<sup>2</sup> This shows involvement of liver in many steps of metabolism and transport of lipid. Thus in severe liver disease, lipid metabolism is affected in variety of ways.

Cirrhosis of the liver is a result of advanced liver disease. Increase incidence of cirrhosis is found in the middle age group (35-45 yrs) individuals. It is characterized by replacement of liver tissue by fibrosis (scar tissue) and regenerative nodules (lumps that occur due to attempted repair of damaged tissue); and often areas of regeneration develop. The surviving cells multiply in an attempt to regenerate and form

"islands" of living cells that are separated by scar tissue. These islands of living cells have a reduced blood supply, resulting in impaired liver function.<sup>3</sup> Impaired function causes yellowish discoloration of skin, itching, easy bruising from decreased production of blood clotting factors etc.

Cirrhosis of the liver results in gross distortion in liver architecture. Owing to reduced liver biosynthetic capacity, low levels of triglycerides (TG) and cholesterol are usually observed in chronic liver disease. Portal hypertension, hepatic encephalopathy hepatorenal syndrome, spontaneous bacterial peritonitis and esophageal variceal bleeding are the major complications of cirrhosis.<sup>4</sup>

Various hepatic parenchymal diseases result in alterations in lipoproteins structure and transfer through the blood.<sup>5</sup> This study was conducted to determine serum lipid profile in patients with cirrhosis and study its relationship to the severity of cirrhosis.

### **Aim of study:**

To study the levels of serum total cholesterol, HDL, LDL, Triglycerides in patients of liver cirrhosis.

### **Material and Method:**

The study was carried for duration of one year from August 2013 to July 2014 in the department of Biochemistry and central investigation laboratory in MGM Hospital, Aurangabad. Institutional ethical committee clearance was obtained for the study. Informed consent were taken from all the cases and control for this study.

#### **a) Study groups:**

30 patients of liver cirrhosis

30 normal controls (age and sex matched)

Those with cancer, acute pancreatitis, diabetes mellitus, renal failure, and acute gastrointestinal bleeding, and patients with history of malabsorption, malnutrition, malignancy, hyperthyroidism, hyperlipidemia, recent parenteral nutrition, history of taking glucose or lipid lowering drugs were excluded.

#### **b) Blood sampling:**

The fasting blood samples (5-8 ml fresh blood) were drawn and collected in a clean, disposable plastic tube from anterior cubital vein under aseptic condition for the estimation of serum total cholesterol, HDL, Triglycerides. Concentration of all the parameters were measured by Dimension RxL fully automated analyzer using the kits supplied by Siemens.

#### **c) Statistical analysis:**

The results obtained were statistically analysed by SPSS version 18 using student t-test and one way ANOVA.

### **Results:**

The most common cause of cirrhosis was alcoholic (63%) followed by HCV (27%) and HBV (10%) as shown in Table 1.

**Table 1: Causes of cirrhosis in patients**

Causes	Number (n=30)	%
Alcoholic	19	63
HCV	8	27
HBV	3	10

There was a significant decrease in serum total cholesterol, HDL and LDL cholesterol level (especially LDL and total cholesterol levels with p value 0.028 and 0.02 respectively). All four variables (HDL, LDL, total cholesterol and TG) were significantly lower in cirrhotic patients than in the control group. There was a significant correlation between decrease in serum total cholesterol, HDL and LDL cholesterol level (especially LDL and total cholesterol levels) (Table 2 and Figure 1).

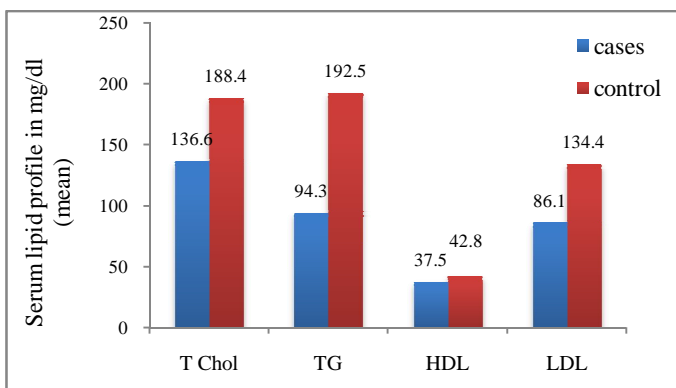
**Table 2: Mean of lipid profiles in cirrhotic patients compared with the control group**

Lipid profile	Cases	Control	P Value
<b>Total Cholesterol</b>	136.6±63.5	188.4±36.6	0.02
<b>TG</b>	94.3 ± 42.3	192.5± 58.6	0.012
<b>HDL Cholesterol</b>	37.5± 12.3	42.8± 19.4	0.040
<b>LDL Cholesterol</b>	86.1 ± 49.1	134.4± 29.5	0.028

Values are given as Mean ± SD.

p-value <0.05 considered as statistically significant.

**Figure 1: Mean of serum lipid profile in cirrhotic patients compared with the control group.**



## Discussion:

Chronic liver disease causing disruption of liver tissue and hence derangement of lipid metabolism has been shown in various studies.<sup>6</sup> Decreased levels of VLDL, total cholesterol, HDL-cholesterol were found in these patients. Our study showed that patients with liver diseases had lower lipid levels and all four parameters of lipid profile (HDL, LDL, total cholesterol and TG) were significantly lower in patients with liver cirrhotic than in the control group. Besides, the amount of decrease in the serum HDL, LDL and total cholesterol was significant with increasing severity of liver damage. Liver cirrhosis treatment includes preventing further damage to the liver, treating its complications,

preventing liver cancer or detecting it early and liver transplantation.

This decrease in the serum total cholesterol and TG levels in patients with cirrhosis of liver compared with healthy control has been observed previously in many other studies, which is expected, as the synthetic functions of the liver are decreased. Study conducted by Perales et al<sup>2</sup> (1997), have shown that in chronic liver disease condition without cholestasis; lipid profile i.e. LDL, HDL and VLDL levels significantly decrease and become worse as the disease progresses. This finding supports our observations that as the liver disease progresses the functioning of liver is affected adversely, causing low levels of LDL, HDL and total cholesterol in patients. Siagris et al<sup>7</sup> (2006) from Greece found lower total cholesterol level in patients compared to the comparison group. According to Joel et al<sup>8</sup> (2006) most common cause of cirrhosis is alcoholism accounted for 60 to 70% of cases followed by HBV infection in 10% of cases. In our study 63% were alcoholic and 27% and 10% were having HCV and HBV infection respectively (Table 1) which is similar to the finding with Joel et al.

In this study we observed decreased levels of total cholesterol, triglycerides, LDL and HDL in patients with liver cirrhosis. Other studies like Taylor et al<sup>9</sup> (1979) also show similar findings. Decrease in lipid levels is also observed in disorders like malabsorption, malnutrition, malignancy and hyperthyroidism. Hence the patients suffering from or diagnosed as having other concomitant illnesses should be excluded from the study<sup>10</sup>.

## Conclusion:

The decrease observed in the measured levels of serum total cholesterol, LDL and HDL in cirrhotic patients are related to the progress in cirrhosis. Lipid derangements are commonly seen in chronic liver disease. It helps in diagnosis of severity of liver disease and also acts as a good prognostic sign. Lipid profile should be advised in all cases with advanced liver disease. Further studies on lipid abnormalities in these patients and the need for

treatment are recommended. This kind of study requires a large group of cases and controls for further study.

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**CONFLICT OF INTEREST: The authors declare that they have no competing or conflict of interest.**

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