

# Dyslipidemia in Chronic Liver Disease

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## ABSTRACT

**Objective:** to find changes in lipid metabolism in patients suffering from chronic liver disease.

**Design:** Prospective, non interventional observational study.

**Setting:** Medical unit –II Sheikh Zayed Medical College Rahim Yar Khan.

**Duration:** Jan 2007 to July 2007.

**Patients and Methods:** 160 Patients admitted in Medical unit –II with a diagnosis of chronic liver disease were included in the study. Fasting lipid profile was done in all cases. Results were compiled and studied.

**Results and Observations:** Male patients were 102(63.75%) and 58(36.25%) were female patients. Total cholesterol was markedly decreased in 24(15%) patients. Low to normal range was present 132(82.5%) patients. Hypercholesterolemia was seen in 4(2.5%) patients. Hyper triglyceridemia was seen in one patient. Serum triglyceride levels were low to normal in 101(63.13%) patients. HDL-c was below normal in all cases. LDL were low in 141(88.13%) patients, normal in 12(7.50%) patients and high in 7(4.38%) patients.

**Conclusion:** Dyslipidemia is a common finding in chronic liver disease. Lipid profile should be done in all cases with advanced liver disease.

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

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## INTRODUCTION

Lipids are essential component of biological membranes, free molecules and metabolic regulators that control cellular function and homeostasis.<sup>1</sup> Liver plays a vital role in lipid metabolism. It contributes both in exogenous and endogenous cycles of lipid metabolism and transport of lipids through plasma. 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. The transport of triglycerides, cholesterol and fat soluble vitamins from the liver to peripheral tissue and transport of cholesterol from peripheral tissue to liver is by lipoproteins. Apolipoproteins activate enzyme important in lipoprotein metabolism and to mediate the binding of lipoproteins to cell surface receptors. Liver is the principal site of formation and clearance of lipoproteins. This shows liver is involved in many steps of lipid metabolism and lipid transport. Thus in severe liver disease lipid metabolism is profoundly disturbed. It is affected in a variety of ways. Dyslipidemia seen in chronic liver disease differs from most of the other causes of secondary dyslipidemia because circulating lipoproteins are not only present in abnormal amount

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but also they frequently have abnormal composition, electrophoresis mobility and appearance<sup>2</sup>. Pre beta and alpha bands can be absent on electrophoresis in all types of liver disease<sup>2</sup>.

Cholestatic liver disease has been most extensively studied. There is marked elevation of free cholesterol and phospholipids in obstructive liver disease. In acute hepatocellular disease such as alcoholic or viral hepatitis, there is a cholestatic phase and similar changes may be seen e.g. increased cholesterol and phospholipid levels<sup>2</sup>.

In chronic liver disease due to decreased biosynthetic capacity of liver unusually low levels of cholesterol and triglycerides are found.

The purpose of this study is to see the lipid metabolism derangement in patients suffering from chronic liver disease.

## PATIENTS AND METHODS

160 patients admitted in Medical unit – II Sheikh Zayed Medical College Rahim Yar Khan during Jan, 2007 to July, 2007 were included in the study. The patients were suffering from chronic liver disease.

## INCLUSION CRITERIA

1. The patients were suffering from chronic liver disease irrespective of their etiology of this illness.
2. The patients belonged to class B and C of Child Pugh's Classification.

## EXCLUSION CRITERIA

The patients suffering from concomitant illnesses like diabetes Mellitus, Hypertension or thyroid problem were not included.

After taking complete history and physical examination, fasting blood samples were sent for lipid profile. Results were compiled and analyzed.

## RESULTS AND OBSERVATIONS

Total numbers of 160 patients were included in the study. Their age and sex distribution was as follows.

Table I: Age and Sex Distribution (n=160)

Age in years	Male n=102	%age	Female n=58	%age
20-30	10	9.80	3	5.17
31-40	23	22.55	12	20.69
41-50	62	60.78	28	48.28
51-60	04	3.92	12	20.69
61 and above	03	2.94	03	5.17

Most of the cases belonged to middle age group.

Table II: Lipid Profile Total Cholesterol (n=160) Normal up to 200 mg/dl

Total Cholesterol mg/dl	Male n=102	%age	Female n=58	%age
50-100	10	9.80	14	24.14
101-150	81	79.41	39	67.24
151-200	08	7.84	04	6.90
201-250	02	1.96	01	1.72
251 and above	01	0.98	0	0.00

Very low cholesterol level was seen in 24 patients 10 male (9.80%) and 14 (24.14%) female patients. Low to normal level was seen in 132 patients. 89 (87.25%) were male patients and 43(74.14%) were female patients. Hypercholesterolemia was seen in 4 patients 3(2.94%) male and one female patient (1.72%).

Table: III S. Triglycerides Normal upto 150 mg/dl

S. triglycerides mg/dl	Male n=102	%age	Female n=58	%age
50-75	12	11.76	06	10.34
76-100	70	68.63	20	34.48
101-125	14	13.73	26	44.83
126-150	05	4.90	06	10.34
151 and above	01	0.98	0	0.00

Most of the patients 148 (92.5%) show decreased serum triglyceride levels.

Table: IV: HDL-c Levels Normal above 50 mg/dl

HDL-c mg/dl	Male n=102	%age	Female n=58	%age
20-30	1	0.98	3	5.17
31-40	89	87.25	50	86.21
41-50	12	11.76	05	8.62
51-60	0	0.00	0	0.00
61 and above	0	0.00	0	0.00

Table: V: LDL-c Levels Normal upto 150 mg/dl

LDL-c Levels mg/dl	Male n=102	%age	Female n=58	%age
50-75	10	9.80	21	36.21
76-100	13	12.75	07	12.07
101-125	62	60.78	28	48.28
126-150	11	10.78	1	1.72
151 and above	06	5.88	1	1.72

It was concluded that total cholesterol, triglycerides, HDL and LDL levels were reduced in most of the cases. (P value < 0.001). Some patients were having normal levels. A few patients showed hyperlipidemia. It shows dyslipidemia is a common finding in cases suffering from chronic liver disease.

## DISCUSSION

Dyslipidemia is a frequent finding in chronic liver disease. Dyslipidemia is also seen in other illnesses like diabetes Mellitus and chronic renal failure etc. Many national studies are available regarding dyslipidemia in Diabetes Mellitus or chronic renal failure<sup>3</sup>. To the best of our knowledge no study was done in chronic liver disease in Pakistan. Internationally this subject has been dealt in detail. Many studies are available in which not only the derangement of lipid metabolism is shown but also its relation with the etiology of the chronic liver disease is made clear<sup>4</sup>.

Fernandez and Rodriguez CM<sup>5</sup> documented in their study that Hepatitis C genotype 3 chronic liver diseases is associated with serum lipid changes and these changes are reversible with sustained viral response. This interference with lipid pathway is related to viral load.

Brier C et al<sup>6</sup> studied lipoproteins, HDL-apolipoproteins and activities of hepatic lipase and lecithin cholesterol acyl transference in the plasma of patients with post alcoholic liver cirrhosis. Their results showed that in alcoholic cirrhosis, total cholesterol, HDL, VLDL, HDL-cholesterol and HL were all decreased. Intermediate density lipoproteins were not detectable in cirrhosis. LDL from cirrhotic patients contained more triglycerides and less esterified and free cholesterol.

Dyslipidemia in different liver disease like chronic hepatitis, liver cirrhosis, hepato-cellular carcinoma and metastatic liver disease was studied by Ooik et al<sup>7</sup>. They found out that different lipid abnormalities are present in different liver diseases e.g. in chronic hepatitis, liver cirrhosis and hepato-cellular carcinoma the triglyceride and cholesterol levels decreased while LDL – triglyceride fraction increased, metastatic liver cancer showed a lower HDL – fraction level but higher levels of other parameters than hepato-cellular carcinoma.

Jiang J, et al<sup>8</sup> concluded that plasma levels of triglycerides, cholesterol, free fatty acids, HDL, low density lipoproteins Lpa, Apo A, and Apo B, were decreased in cases of hepato-cellular carcinoma they suggested that this may be due to hepato-cellular impairment and this also suggests poor prognosis. Marked lipid abnormalities are found in patients suffering from Hepatitis C and HIV coinfection<sup>9</sup>.

In our study we found decreased levels of total cholesterol, triglycerides, LDL and HDL in chronic liver disease irrespective of its etiology. Hypolipidemia is also found in malabsorption, malnutrition, malignancy, hyperthyroidism and immunoglobulin disorders<sup>10</sup>. That is why the patients suffering from other concomitant illnesses were not included in the study.

Hypolipidemia is more marked in cases suffering for hepatitis C virus especially genotype 3a and this abnormality is directly related to viral load and viral response<sup>11,12,13</sup>. As in our country the common type of HCV is genotype 3a. It is recommended that lipid profile should be done in all cases suffering from chronic liver disease especially when it is due to HCV genotype 3a.

## REFERENCES

1. Chiang JY, Nuclear receptor regulation of lipid metabolism: potential therapeutics for dyslipidemia, diabetes, and chronic heart and liver diseases. *Curr Opin Investing Drugs*. 2005 Oct; 6(10):994-1001.
2. Miller JP, Dyslipoproteinaemia of liver disease. *Baillieres Clin Endocrinol Metab*. 1990 Dec; 4(4):807-32.
3. Khalid Amin, Masood Javed, Muhammad Abid, et al: Pattern of dyslipidemia in patients with CRF. *Professional Med J Mar* 2006; 13(1): 79-86.
4. Wisniewska-Ligier M, Wozniakowska-Gesicka T, Kups J, Sulat-Syncerek D. Lipid metabolism in children with chronic hepatitis C, A preliminary report. *Hepatogastroenterology*. 2006 Nov-Dec; 53 (72):887-91.
5. Fernandez-Rodriguez CM, Lopez-Serrano P, Alonso S, Gutierrez ML, et al: Long-term reversal of hypocholesterolaemia in patients with chronic hepatitis C is related to sustained viral response and viral genotype. *Aliment Pharmacol Ther*. 2006 Aug 1; 24(3): 507-12.
6. Breier C, Lisch HJ, Braunsteiner H. Lipoproteins, HDL-apolipoproteins, activities of hepatic lipase and lecithin-cholesterol acyltransferase in the plasma of patients with post-alcoholic end-stage liver cirrhosis. *Klin Wochenschr*. 1983 Sep 15; 61(18):929-31.
7. Ooi k, Shiraki K, Sakurai Y, Morishita Y, Nobori T. Clinical significance of abnormal lipoprotein patterns in liver diseases. *Int J Mol Med*. 2005 Apr; 15(4):655-60.
8. Jiang J, Nilsson-Ehle P, Xu N. Influence of liver cancer on lipid and lipoprotein metabolism. *Lipids health Dis*. 2006 Mar 3; 5:4.
9. R Bedimo, R Ghurani, M Nsuami, D Turner, M-B Kvanli, G Brown and D Margolis. (2006) Lipid abnormalities in HIV/hepatitis C virus-coinfected patients. *HIV Medicine* 7:8, 530-536.
10. Andrikoula M, Avades T. Hypolipidaemia is not always indicating liver dysfunction. A review of primary and secondary high density lipoprotein and low density lipoprotein deficiencies. *Minerva Med*. 2006 Dec; 97(6):487-94.
11. Jarmay K, Karacsony G, Nagy A, Schaff Z. Changes in lipid metabolism in chronic hepatitis C. *World J Gastroenterol*. 2005 Nov 7; 11(41): 6422-8.
12. Siagris D, Christofidou M, Theocharis GJ, Pagoni N, Papadimitriou C, et al: Serum lipid pattern in chronic hepatitis C: histological and virological correlations. *J Viral Hepat*. 2006 Jan; 13(1): 56-61.
13. Rubbia-Brandt L, Leandro G, Spahr L, Giostra E, Quadri R, Male PJ, Negro F, Liver steatosis in chronic hepatitis C: a morphological sign suggesting infection with HCV genotype 3. *Histopathology*. 2001 Aug; 39(2): 119-24.