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Research Article

An assessment of dyslipidemia in patients of chronic liver disease

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ABSTRACT

Objectives: To assess the dyslipidemia in patients of chronic liver disease presenting at Holy Family Hospital, Rawalpindi.

Materials & Methods: This cross sectional study was conducted at Department of Medicine, Holy Family Hospital, Rawalpindi from April 2018 to October 2018 over the period of 6 months. A total of 92 patients with chronic liver disease and age 20-60 years of either gender were included. Dyslipidemia was assessed in selected patients.

Results: Mean age was 39.18 ± 10.04 years. Out of the 92 patients, 76 (82.61%) were male and 16 (17.39%) were females with male to female ratio of 4.7:1. Dyslipidemia was found in 53 (57.61%) patients, whereas there was no dyslipidemia in 39 (42.39%) patients.

Conclusion: This study concluded that thefrequency of dyslipidemia in chronic liver disease patients is high.

Keywords: chronic liver disease, dyslipidemia, triglycerides.

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 liverparenchyma leading to fibrosis and cirrhosis.[1] Chronic liver disease refers to disease of the liver which had lasted over a period of 6 months. It consists of a wide range of liver pathologies which include inflammation (chronic hepatitis), liver cirrhosis, and hepatocellular carcinoma.[2]Liver is the principal site for formation and clearance oflipoproteins. It receives fatty acids and cholesterol fromperipheral tissues and diet, packages them intolipoprotein complexes and releases these complexesback into the circulation. Hence it is not surprising thatliver diseases can affect plasma lipid levels in a variety ofways. Chronic liver diseases due to various causes areoften associated with dramatic reductions in plasmatriglyceride and cholesterol level due to reducedlipoprotein biosynthetic capacity. Cholestasis isassociated with hypercholesterolemia as the majorexcretory pathway of cholesterol is blocked in thisdisorder. Apart from the various complications seen incirrhotic patients, chronic dyslipoproteinemia is onewhich can lead to alterations in cellular

membrane lipids,that result in formation of abnormal RBCs, such asechinocytes, and alterations in membrane function withpotential pathophysiologic consequences.[3,4]

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. 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. 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.[5]

Therefore, it is reasonable to expect an abnormal lipid profile in those with severe liver dysfunction. There is prominent decline in plasma cholesterol and triglyceride (TG) levels in patients with severe hepatitis and hepatic failure because of reduction of lipoprotein biosynthesis. For reduced liver biosynthesis capacity, low levels of TG and cholesterol is usually observed in chronic liver diseases.[6,7]

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 but also they frequently have abnormal composition, electrophoresis mobility and appearance.[3,8] Shimizu H et al[9] in his study reported dyslipidemia in 61.0% patients of chronic liver disease.

As the dyslipidemia in chronic liver disease patients is associated with high morbidity and mortality and on searching the literature, we had found no local study on this topic, so the rationale of this study was to determine the frequency of dyslipidemia in chronic liver disease patients in local population. The results of this study will not only provide us with the local stats of the problem but also will be a useful addition in the existing literature. This will also help the clinicians for early analysis of dyslipidemia and preventive measures in these particular patients for reducing the morbidity and mortality of these patients.

OPERATIONAL DEFINITIONS:

1. **Chronic liver disease:** presence of all of the following with duration >3 months was deemed as positive;

a. **Liver size**: enlarged (>3 fingers below costal margin on palpation and percussion) or shrunken (<5 cm liver span) as well as on ultrasonography.

b. **Ascites**: accumulation of fluid in the peritoneal cavity clinically (shifting dullness and fluid thrill positive on percussion) was taken as positive.

c. **Spidernevi:** vascular lesions consisting of a central arteriole surrounded by many smaller vessels (on clinical examination).

d. **Palmar erythema**: reddening of palms at the thenar and hypothenar eminences.

e. **Jaundice**: yellow discoloration of the skin and mucous membranes (on clinical examination).

f. **Increased bilirubin:**>2 mg/dL.

g. **Caput medusa**: dilated periumbilical collateral veins due to portal hypertension and was assessed on physical examination.

- **Dyslipidemia:** was considered as yes if any one of the followings were present:

o Total Cholesterol level >200mg/dl.
o Triglyceride level >150mg/dl.
o High density lipoprotein (HDL) <40mg/dl in males and <50 mg/dl in females.
o Low density lipoprotein (LDL) >130 mg/dl

MATERIAL AND METHODS

This cross sectional study was conducted at Department of Medicine, Holy Family Hospital, Rawalpindi from April 2018 to October 2018 over the period of 6 months. A total of 92 patients with chronic liver disease and age 20-60 years of either gender were included.

Patients with Hypertension, Diabetes Mellitus and Ischaemic heart disease (assessed on history), patients taking lipid lowering drugs, H/o hepatotoxic drugs intake, patients with chronic renal disease and patients not willing to be included in the study were excluded from the study.

Study was approved by the ethical committee and written informed consent was taken from every patient.

5 ml blood sample of each patient was sent to the institutional pathology laboratory for measurement of lipid profile and presence or absence of dyslipidemia as per-operational definition.

All this data was recorded on a specially designed proforma which contain two parts. Part 1st included the patient's bio-data while part 2nd contained the study variables.

All the data was entered and analyzed by using SPSS version 20.0. Age, duration of disease, height, weight and BMI were presented as mean and standard Deviation (SD). Frequencies and percentages were calculated for categorical variables like gender, child pugh class (A/B/C) and dyslipidemia (present/absent).Effect modifiers like age, gender, child pugh class (A/B/C), duration of disease and BMI were controlled by stratification. Post stratification Chi square test was applied. P-value ≤ 0.05 was considered as significant.

RESULTS

Age range in this study was from 20 to 60 years with mean age of 39.18 ± 10.04 years. Out of 92 patients with chronic liver disease, dyslipidemia was noted in 53 (57.61%) patients. (Fig. 1)

Patients were divided into two age groups, age group 20-40 years and age group 41-60 years. Total 53 (57.61%) patients belonged to age group 20-40 years and 39 (42.39%) patients belonged to age group 41-60 years. dyslipidemia was found in 32 (60.38%) patients and 21 (52.50%) patients respectively in age group 20-40 years and age group 41-60 years. Statistically insignificant association between dyslipidemia and age groups was observed with p value 0.495. (Table 1)

Male patients were 76 (82.61%) and female patients were 16 (17.39%). Dyslipidemia was noted in 46 (61.84%) male patients and 06 (37.50%) female patients. But the difference was not statistically significant with p value 0.073. (Table 2)

Total 43 (46.74%) patients belonged to >3 months- 1 years duration of disease group and 49 (53.26%) patients belonged to >1 year duration of disease group. Dyslipidemia was noted in 20 (46.51%) patients and 33 (67.35%) patients respectively in both groups. Statistically significant association between dyslipidemia and duration of disease was observed with p value 0.044. (Table 3)

Total 19 (20.65%) patients belonged to child pugh class A followed by 30 (32.61%) patients to class B and 43 (46.74%) patients to class C. dyslipidemia was seen in 13 (68.42%) patients, 20 (66.67%) patients and 20 (46.51%) patients respectively in child pugh class A, B and C. Association between dyslipidemia and child pugh class was not significant with p value 0.130. (Table 4)

Out of 51 (55.43%) non-obese patients, dyslipidemia was noted in 29 (56.86%) patients. Among the 41 (44.57%) obese patients, dyslipidemia was noted in 24 (58.54%) patients. But the difference was not statistically significant with p value 0.872. (Table 5)

Figure 1: Distribution of patients with Dyslipidemia (n=92).

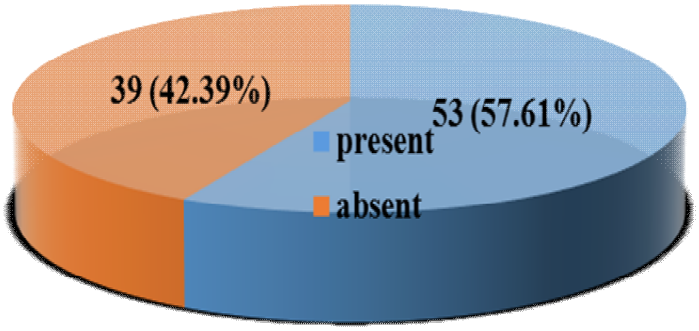

Table 1: Stratification of Dyslipidemia with respect to age.

Age (years)	Dyslipidemia		Total	p-value
	Present	Absent		
20-40	32 (60.38%)	21 (39.62%)	**53 (57.61%)**	
41-60	21 (52.50%)	19 (47.50%)	39**(42.39%)**	**0.495**
Total	**53 (57.61%)**	**39(42.39%)**	**92**	

Table 2: Stratification of Dyslipidemia with respect to gender.

Gender	Dyslipidemia		Total	p-value
	Present	Absent		
Male	46 (61.84%)	30 (38.16%)	**76 (82.61%)**	
Female	06 (37.50%)	10 (62.50%)	16 (17.39%)	**0.073**
Total	**53 (57.61%)**	**39 (42.39%)**	**92**	

Table 3: Stratification of Dyslipidemia with respect to duration of disease.

Duration of disease	Dyslipidemia		Total	p-value
	Present	Absent		
>3 months- 1 years	20 (46.51%)	23 (53.49%)	**43 (46.74%)**	**0.044**
>1 year	33 (67.35%)	16 (32.65%)	49 (53.26%)	
	53 (57.61%)	**39 (42.39%)**	**92**	

Table 4: Stratification of Dyslipidemia with respect to Child Pugh Class.

Child Pugh Class	Dyslipidemia		Total	p-value
	Present	Absent		
Class A	13 (68.42%)	06 (31.58%)	19 (20.65%)	
Class B	20 (66.67%)	10 (33.33%)	30 (32.61%)	
Class C	20 (46.51%)	23 (53.49%)	43 (46.74%)	**0.130**
Total	**53 (57.61%)**	**39 (42.39%)**	**92**	

Table 5: Stratification of Dyslipidemia with respect to BMI.

BMI	Dyslipidemia		Total	p-value
	Present	Absent		
≤30	29 (56.86%)	22 (43.14%)	**51 (55.43%)**	
>30	24 (58.54%)	17 (41.46%)	41 (44.57%)	**0.872**
Total	**53 (57.61%)**	**39 (42.39%)**	**92**	

DISCUSSION

Dyslipidemia in patients with chronic liver disease is atherogenic in nature and it is characterized by increased levels of serum triglycerides and decreased levels of HDL cholesterol.[10]Although low density lipoprotein (LDL) cholesterol levels may not be different in patients with chronic liver disease, there are important differences in the subpopulations of LDL particles. Higher levels of small, dense LDL particles (nontype A), which are more atherogenic than type A LDL particles, are

seen in patients with chronic liver disease.[11] Studies have also demonstrated that patients with chronic liver disease have significantly increased levels of oxidized LDL, which is highly atherogenic.[12-13] There are also important differences in the HDL subfractions in patients with chronic liver disease.[14] In a study consisting of 16 patients with fatty liver and 24 control subjects, Kantartzis et al demonstrated that fatty liver is significantly and independently associated with lower levels of high density lipoprotein 2 (HDL2) cholesterol, which is more potently antiatherogenic, but had no effect on HDL3 cholesterol levels.[14] The mechanisms for these profound alterations in lipid and lipoprotein profiles in chronic liver disease are not well understood, but they have generally been attributed to hepatic overproduction of the very low density lipoprotein (VLDL) particles and dysregulated clearance of various lipoproteins from the circulation.[15]

Age range in my study was from 20 to 60 years with mean age of 39.18 ± 10.04 years. Majority of the patients 52 (56.52%) were between 20 to 40 years of age. Out of the 92 patients, 76 (82.61%) were male and 16 (17.39%) were females with male to female ratio of 4.7:1. Dyslipidemia was found in 53 (57.61%) patients, whereas there was no dyslipidemia in 39 (42.39%) patients.In a study of 200 patients, mean age of the patients was 39.65 ± 12.45. Dyslipidemia was noted in 168 (84%) patients. Total 120 (60%) were males and 80 (40%) were females. Dyslipidemia was in 100 (83.33%) male patient 68 (85%) female patients. Insignificant (P = 0.8450) association of gender with dyslipidemia was noted.[16]

Roesch-Dietlenetal[17] showed dyslipidemia as 76.92% but Shimizu H[9] found dyslipidemia rate as 61% in patients of liver cirrhosis. In a cross sectional study, 171 patients with cirrhosis of liver were included. Out of 171 cirrhotic patients, dyslipidemia was found in 143(83.6%) patients. Dyslipidemia was found commonly in liver cirrhotic patients. Dyslipidemia worsens with severity of liver cirrhosis i.e. mild cirrhosis (29.4%) & severe cirrhosis (100%) according to child-Pugh classification.[18]

In another study[19] of chronic liver disease, 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.[19]

In a study conducted by EL-Khabbany ZA[20] it was concluded that dyslipidemia is a frequent finding in a patient with chronic liver disease, which worsened with increased severity of CLD. Of the 40 studied cases with CLD, 8(20%) had hypercholestrolemia, 13(32.5%) had hypertriglyceridemia, 17(42.5%) had low HDL and 9(22.5%) had high LDL.[20] Abbas et al[21] also found that hypocholesterolemia is a common finding in decompensated chronic liver disease and has got significant association with Child-Pugh class. As severity of liver dysfunction increased, these levels decreased proportionately. Results also revealed that males were more hypocholestrolemic than females.[1]On the whole, it is concluded that there is high percentage of dyslipidemia in chronic liver disease patients.

CONCLUSION

This study concluded that thefrequency of dyslipidemia in chronic liver disease patients is high. So, we recommend that in every patient of chronic liver disease, dyslipidemia should be taken into consideration and its early recognition and management should be done in order to reduce the morbidity and mortality of the community.

REFERENCES:

1. Lewis JH, Stine JG. Review article: prescribing medications in patients with

cirrhosis - a practical guide. *Aliment PharmacolTher*. 2013;37(12):1132-56.
2. EL-Kabbany ZA, Hamza RT, Ibrahim SA, Mahmoud NH. Dyslipidemia and hyperinsulinemia in children and adolescents with chronic liver disease: relation to disease severity. Int J Adolesc Med Health. 2013;2:1-7.
3. Mandal SK, Sil K, Chatterjee S, Ganguly J, Chatterjee K, Sarkar P, et al. A study on lipid profiles in chronic liver diseases. National J Med Res. 2013;3(1):70-2.
4. Friedman LS. Current medical diagnosis and treatment 2014. [S.l.]: Mcgraw-Hill. 2014; pp. 16
5. Ghadir MR, Riahin AA, Havasupai A, Nooranipour M, Habibinejad AA. The relationship between lipid profile and severity of liver damage in cirrhotic patients. Hepat Mon. 2010;10(4):285-8.
6. Sen A, Kumar J, Misra RP, Uddin M, Shukla PC. Lipid profile of patients having non-alcoholic fatty liver disease as per ultrasound findings in north Indian population: a retrospective observational study. *J Med Allied Sci.* 2013;3(2):59-62.
7. Speliotes EK, Massaro JM, Hoffmann U. Fatty liver is associated with dyslipidemia and dysglycemia independent of visceral fat: the Framingham Heart Study. Hepatology. 2010;51(6):1979–87.
8. Okeke EN, Daniyam CA, Akanbi M, Ugoya SO, Emmanuel I. Lipid profile of patients with liver cirrhosis in Jos, Nigeria. J Med Tropics. 2010;12:56-9.
9. Shimizu H, Phuong V, Maia M, Kroh M, Chand B, Schauer PR, et al. Bariatric surgery in patients with liver cirrhosis. Surg Obesity Rela Dis. 2013;9(1):1–6.
10. Targher G, Day CP, Bonora E. Risk of cardiovascular disease in patients with nonalcoholic fatty liver disease. N Engl J Med. 2010;363(14):1341–1350.
11. Nseir W, Shalata A, Marmor A, Assy N. Mechanisms linking nonalcoholic Fatty liver disease with coronary artery disease. Dig Dis Sci. 2011;56(12):3439–3449.
12. Norris AL, Steinberger J, Steffen LM, Metzig AM, Schwarzenberg SJ, Kelly AS. Circulating oxidized LDL and inflammation in extreme pediatric obesity. Obesity (Silver Spring) 2011;19(7):1415–1419.
13. Vos MB, Weber MB, Welsh J, et al. Fructose and oxidized low-density lipoprotein in pediatric nonalcoholic fatty liver disease: a pilot study. Arch PediatrAdolesc Med. 2009;163(7):674–675.
14. Kantartzis K, Rittig K, Cegan A, et al. Fatty liver is independently associated with alterations in circulating HDL2 and HDL3 sub-fractions. Diabetes Care. 2008;31(2):366–368.
15. Taskinen MR, Adiels M, Westerbacka J, et al. Dual metabolic defects are required to produce hypertriglyceridemia in obese subjects. ArteriosclerThrombVasc Biol. 2011;31(9):2144–2150.
16. Javid RA, Bashir S, Ahmad K. Study of Dyslipidemia in Patients of Liver Cirrhosis Presenting at D.G Khan Hospital. P J M H S 2016;10:194-96.
17. Roesch-Dietlen F, Pérez-Morales A, Melo-Santisteban G, Díaz-Blanco F, Martínez-Fernández S, Martínez JA, et al. [Frequency and clinical, biochemical and histological characteristics of nonalcoholic fatty liver disease in patients with gallstone disease]. Cir Cir. 2008 Feb;76(1):37–42.
18. Irfan S, Younas H, Ahmed W. Frequency of dyslipidemia and mean lipid profile in liver cirrhosis. P J M H S 2014;8:786-88.
19. Mehboob F, Ranjha FA. Dyslipidemia in Chronic Liver Disease. P J M H S 2007;1:103-5.

20. EL-Kabbany ZA, Hamza RT, Ibrahim SA, Mahmoud NH. Dyslipidemia and hyperinsulinemia in children and adolescents with chronic liver disease: relation to disease severity. Int J Adolesc Med Health 2013;2:1-7.
21. Abbasi A, Bhutto AR, Butt N, Lal K, Munir SM. Serum cholesterol: could it be a sixth parameter of Child-Pugh scoring system in cirrhotic due to viral hepatitis? J Coll Physicians and Surg Pak 2012;22(8):484-7.