

Original Article

Patterns of Deranged Lipid Profiles in Patients of Chronic Hepatitis C

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Abstract: Liver plays an important role in lipid metabolism and any acute or chronic malfunction of the liver due to viral hepatitis or liver cirrhosis may induce lipid derangements **Objective:** To determine the patterns of deranged lipid profiles in patients of chronic hepatitis C **Methods:** It is a prospective, observational study, conducted at Medicine Department, Mayo Hospital Lahore for 6 months i.e. 1st January to 30th June 2018. After the ethical approval, 160 diagnosed cases of chronic hepatitis C of ages 18-70 years of either gender were selected by non-probability purposive sampling. Informed written consent was taken. Demographic information such as name, age and gender were recorded. Venous blood samples from patients after 10 to 14 hours of fasting were drawn for lipid profiles and sent to pathology laboratory. All results were expressed as mg/dl. Data were analyzed in SPSS version 22 **Results:** Out of 160 patients in this study, there were 94 males and 66 females. Total cholesterol was lower in 62.5% patients, normal in 33.75% patients and higher in 3.75% patients. Triglycerides levels were low in 66.25%, normal in 33.125%, and high in 0.625% patients. Low density lipoprotein (LDL) levels were low in 82.5% patients, normal in 10% and raised in 7.5% patients. High density lipoprotein (HDL) levels were low in 95%, normal in 4.375% & high in 0.625% patients **Conclusions:** Low levels of serum lipids including total cholesterol, triglycerides, LDL and HDL are seen in population suffering from chronic HCV infection.

Key Words: Lipid profile, chronic hepatitis, chronic liver disease, dyslipidemias.

Introduction:

Hepatitis C is characterized by liver inflammation due to hepatitis C virus (HCV). It can result in either acute or chronic ailment. Acute HCV infection is usually asymptomatic. Rarely, it can lead to life-threatening complications. It has been estimated that 15-45% of people clear the virus spontaneously within 6 months after being infected with HCV without requiring any form of medical treatment [1]. Chronic hepatitis C represents hepatic inflammation and necrosis that continues for at least six months, demonstrated by persistently elevated serum alanine aminotransferase levels and characteristic histological findings. Worldwide 170 million people are affected with HCV [2]. Contrary to acute HCV infection, chronic

hepatitis C is manifested by hepatic impairments like portal hypertension and extra hepatic metabolic effects like deranged lipid profile [3]. It eventually leads to chronic liver disease and hepatocellular carcinoma (HCC), hence increased morbidity and mortality associated with it [4].

The lipids are large molecules of naturally occurring compounds. They are organic molecules, soluble in non-polar organic solvents and insoluble in water. There is great structural diversity seen among the lipid molecules and hence they can be categorized into various types. Triglycerides, steroids, phospholipids, glycolipids and lipoproteins are various types of lipids found in human body. *Lipid profile* includes serum triglycerides (TG), total cholesterol (TC),

LDL-cholesterol (LDL), small LDL particles, and HDL-cholesterol (HDL) [5]. Normally synthesis and metabolism of cholesterol & triglycerides are in a state of dynamic balance. Interference in normal balance between synthesis and metabolisms results in dyslipidemia. The role of liver in lipid metabolism is diverse. Various lipoproteins are also synthesized in liver from where they enter the blood circulation [6]. Hence, it is not only the major site for detoxification in human body but also vital in synthesis and metabolism of various proteins & carbohydrates [7].

Thus liver plays an important role in metabolic balance between cholesterol and triglycerides and any acute or chronic malfunction of the liver because of viral hepatitis or liver cirrhosis may induce lipid derangements which are reversible with the clearance of infection [8]. Chronic hepatitis C is the most common cause of chronic liver disease in our country [9]. First HCV is thought to circulate in the serum, bound to lipoproteins. Secondly it is speculated that lipids are shown to have modulating effect on the HCV life cycle. Another important implication of HCV infection on lipid metabolism is occasional severe accumulation of triglycerides in liver. As a result overall lipid metabolism is affected leading to derangements in lipid profile [10].

Recent studies have concluded that decreased levels of lipids are found in chronically infected subjects with HCV. In a study by Mehboob F et al. it was found that total cholesterol was markedly decreased in 15% patients, low to normal in 82.5% & increased in 2.5% patients. Serum triglyceride levels were low to normal in 63.13% patients & HDL was low in 100% patients. Similarly LDL was low in 88.13% patients and raised in 4.38% patients [11].

Nashaat EH showed in his study that patients suffering from chronic hepatitis C had low levels of triglycerides, cholesterol and LDL than those persons who are not infected by HCV. Moreover, he concluded that after viral clearance, the levels of lipids in serum can rise up to the level which poses enhanced risk for cardiovascular disease

necessitating careful follow up of lipid profile after chronic hepatitis C treatment [12].

Mostly chronic hepatitis C patients are not screened as this aspect of disease in terms of outcomes is usually ignored. This study would help clinicians in better control and appropriate treatment of deranged lipid profile of such patients so as to reduce their future risk for cardiovascular/ atherosclerotic events associated with elevated cholesterol and TG levels while minimizing the risks of various cancers and other non cardiovascular diseases associated with abnormally low levels of lipids [13].

Methods:

It is a cross-sectional study, conducted at North Medical Ward, Mayo Hospital Lahore for 6 months i.e. 1st January to 30th June 2018. After the ethical approval, 160 diagnosed cases of chronic hepatitis C of age 20-70 years, both males and females were selected from medical out patients and in patients department of Mayo Hospital Lahore by non-probability purposive sampling. Patients with obesity, diabetes mellitus, hypertension, thyroid, renal and cardiac diseases and dyslipidemias were excluded. Chronic Hepatitis C was labeled as patients having Anti HCV antibody in serum determined by ELISA (enzyme linked immune-sorbent assay) and ALT (alanine aminotransferase) level above 40 IU/ml along with evidence of similar findings for atleast past six months. Informed written consent was taken. Patients' identity was kept confidential. Risks and benefits were explained to the patients. All subjects were interviewed for demographic information such as name, age and gender. Venous blood samples from patients after 12 hours of fasting were drawn for Triglycerides (TG), High density lipoproteins (HDL), Low density lipoproteins (LDL) and total cholesterol (TC) levels. TC was labeled as low (<150mg/dl), normal (150-200mg/dl) or high (>200mg/dl). TG was labeled as low (<150mg/dl), normal (150-200mg/dl) or high (>200mg/dl). LDL was labeled as low (<50mg/dl), normal (50-100mg/dl) or high (>100mg/dl). HDL was labeled

as low (<40mg/dl), normal (41-60mg/dl) or high (>60mg/dl). All results were expressed as mg/dl. All data was analyzed in SPSS version 21. Quantitative variables like age were presented as mean ± standard deviation. The qualitative variables like gender and abnormal lipid patterns were presented as frequencies and percentages.

Results:

Out of 160 patients in this study, there were 94 males and 66 females (Table 1). In the study, 100 patients (62.5%) had low total cholesterol levels, 54 patients had normal total cholesterol (33.75%), while 6 (3.8%) patients had elevated cholesterol levels. Fifty three patients (33.125%) had normal triglycerides levels, low limit in 106 patients (66.25%), and only one patient i.e. 0.625% had elevated TG levels. Low LDL levels were observed in 132 (82.5%) patients, normal level in 16 (10%) patients and 12 patients (7.5%) had elevated LDL levels. A total of 152 (95%) had low HDL levels, 7 patients (4.375%) had normal HDL levels and only one patient had elevated HDL level (Table 2).

Gender	Frequency	Percentage
Male	94	58.8%
Female	66	41.3%
Total	160	100%

Table 1: Distribution of gender of patients

	Normal	Low	High
Total cholesterol	54 (33.8%)	100 (62.5%)	6 (3.8%)
Triglyceride	53 (33.1%)	106 (66.3%)	01 (0.6%)
LDL	16 (10%)	132 (82.5%)	12 (7.5%)
HDL	7 (4.4%)	152 (95%)	1 (0.6%)

Table 2: Distribution of levels of lipid profile

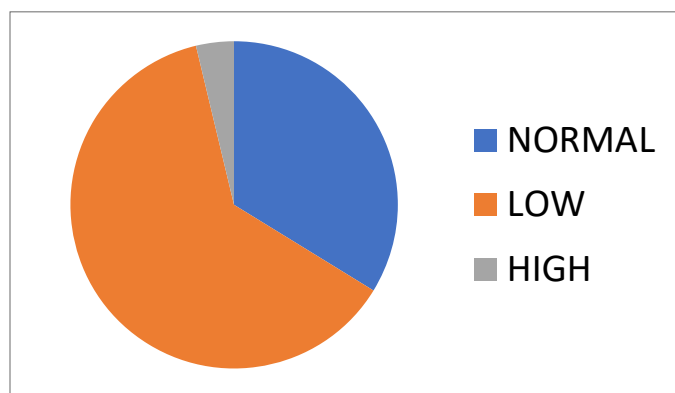


Figure 1: Serum Cholesterol levels

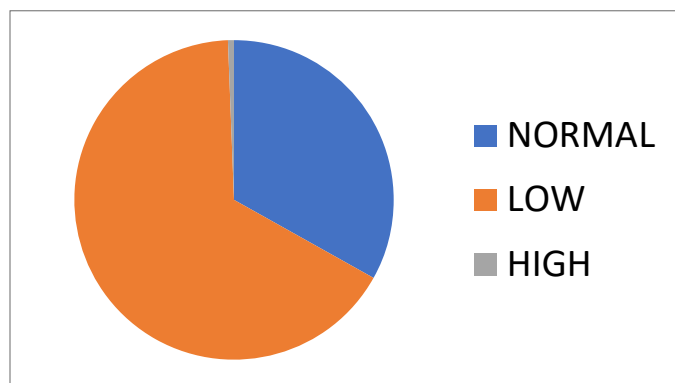


Figure 2: Serum Triglyceride levels

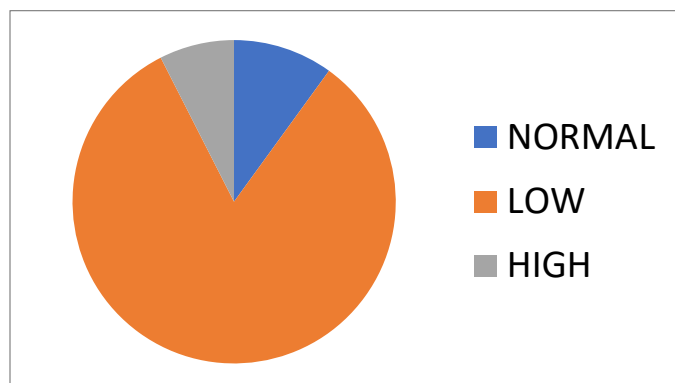


Figure 3: Serum Low density lipoprotein levels

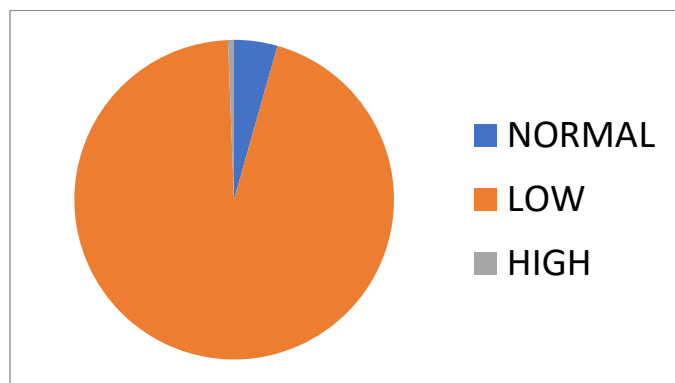


Figure 4: Serum High density lipoprotein levels

Discussion:

HCV infection is a well known entity all over the world now. The results of our study were comparable to the study carried out by Mehboob F *et al.*, in which 97.5% patients had increased cholesterol levels, serum TG was low in 63.13% patients and LDL was low in 88.13% patients & HDL levels were markedly reduced in 100% patients. However, this study included the patients of chronic liver disease regardless of the cause as opposed to our study which included the patients who are suffering from chronic HCV infection [11].

Koike K in his study observed a significant decrease in total cholesterol levels in patients of chronic hepatitis C as compared to those with chronic hepatitis B with comparable liver functions [14]. Hofer H *et al.*, prospectively investigated the prevalence of steatosis in patients suffering from chronic HVC infection as well as effect of antiviral therapy on cholesterol. They concluded that patients suffering from HCV 3a infection had low cholesterol levels in addition to hepatic steatosis [15].

Moriya K *et al.*, studied lipid derangements in chronic hepatitis B and chronic hepatitis C patients with genotype 1b and 2a. They concluded significantly lower cholesterol levels in patients of genotype 1b had levels as compared to genotype 2a and HBV patients with similar status of liver function [16]. Hsu CS *et al.*, carried out a study on 1000 patients to find the association between chronic HCV with metabolic abnormalities. They concluded that HCV infection was associated with lower TG, TC and LDL. However, contrary to our study, patients in their study had elevated HDL levels.

Dai *et al.*, studied lipid derangements in 11,239 residents of an area endemic with HCV in southern Taiwan. They found that the patients suffering from HCV had lower levels of cholesterol and triglycerides. They further stated that HCV itself is responsible for lipid abnormalities of the patients [18]. Siagris D *et al.*, carried out a study to evaluate the lipid abnormalities in patients with chronic HCV and

their relationship with viral load and hepatic histology. They found out that serum lipid levels i.e TC, TG, HDL and LDL were lower in patients suffering from HCV as compared to normal individuals [19].

Su TC *et al.*, in their study found a correlation between HBV and dyslipidemia and concluded that asymptomatic HBV is associated with decreased levels HDL and cholesterol. They emphasized to monitor the risk of atherosclerosis in these patients especially those with reduced HDL [20]. However, in our study, we did not determine the genotype of the HCV and hence we could not resolve whether a particular genotype is responsible for lowering the serum lipid levels.

Conclusions:

It was concluded that Low levels of serum lipids including total cholesterol, triglycerides, LDL and HDL were found in most cases of chronic Hepatitis C. Hence, in future we can recommend practitioners to send lipid profile of such patients to diagnose dyslipidemias earlier for better patient management as low levels are associated with poor outcome of HCV.

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