

Prevalence and Severity of Steatosis in Chronic Hepatitis C patients

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ABSTRACT

Background: Hepatitis C virus infection is a worldwide health issue. The rise in the prevalence of steatosis may be attributed to alterations in eating patterns, changes in the nutritional content of food, and changes in lifestyle, such as decreased physical activity and high sedentary lifestyle, as well as etio-pathogenic variables that influence individuals from infancy.

Objective: To determine prevalence and severity of steatosis in chronic hepatitis C patients

Methodology: The current study was cross sectional study piloted at the Gastroenterology Department, Hayatabad Medical Complex, Peshawar. The duration of study was six months after synopsis approval from August 2021 to January 2022. Totally 200 patients fulfilling the inclusion criteria were included in our study. Under aseptic conditions, a liver biopsy was done using an 18G lumbar puncture needle. All the Data analysis was done by using IBM SPSS version 24.

Results: The overall frequency of steatosis was 80 (40%). On the basis of degree of steatosis, mild steatosis was observed in 53 (58.89%) subjects, moderate steatosis in 31 (34.44%) patients while severe steatosis was observed in 6 (6.67%) subjects.

Conclusion: Our study concludes that steatosis is a common histological characteristic in patients with chronic hepatitis C virus infection. Steatosis is more prevalent in female patients than males. Study based on large sample size is recommended to get better findings.

Keywords: Prevalence; Severity; Steatosis; Hepatitis C

INTRODUCTION

Hepatitis C virus infection is a worldwide health issue. According to estimates, 170 million individuals are infected with chronic Hepatitis C virus, and about three million people die each year as a result of HCV-related diseases¹. Regrettably, hepatitis C infection is not a reportable condition in Pakistan, and there is no data collecting mechanism on national level for risk factor assessment. In Pakistan, it is believed that roughly 6% of the population has been infected with hepatitis C virus².

In many countries of the globe, including Pakistan, chronic infection of hepatitis C virus is a leading cause of chronic liver disease^{3,4}. It is often associated with consequences such as portal hypertension and liver failure. The transmission of the disease is facilitated by improper injections and transfusions, as well as body tattoos and acupuncture⁵. Lymphocytic follicles, bile duct damage, and fibrosis are histological characteristics of chronic hepatitis C, which vary by area^{6,7}.

The buildup of fat in liver cells is known as steatosis. Hepatocytes naturally contain tiny quantities of fat that are required for their metabolism; nevertheless, when liver fat surpasses 5 to 10% of its mass, we might infer steatosis^{8,9}. Hepatic steatosis is a prevalent ailment, with incidence rates ranged from 17% (China) to 30% (United States)¹⁰⁻¹². Because of the growing trend in prevalence and incidence, hepatic steatosis is now regarded a worldwide health concern¹³. The rise in the prevalence of steatosis may be attributed to alterations in eating patterns, changes in the nutritional content of food, and changes in lifestyle, such as decreased physical activity and high sedentary lifestyle, as well as etio-pathogenic variables that influence individuals from infancy. Steatosis is more frequent in Western nations, with a 20–30% prevalence rate¹⁴. A sedentary lifestyle, intake of alcohol, type 2 diabetes mellitus, hepatitis viruses and resistance to insulin are all linked with steatosis¹⁵⁻¹⁷. Fat accumulation in the cytoplasm of hepatocytes is a complicated pathological process involving a variety of variables that affect fat metabolism¹⁸.

Steatosis has been characterized as a histological hallmark of chronic hepatitis C, and it corresponds with patient parameters such as obesity and viral factors such as hepatitis C virus genotype¹⁹. Steatosis and genotype 3 have been associated to increased hepatic fibrosis in individuals with steatosis. The steatosis degree is strongly associated with the extent of liver

fibrosis. Furthermore, steatosis has been linked to a reduced response to HCV treatment²⁰. The pathogenesis of steatosis caused by hepatitis C is yet unknown. It is hypothesized that HCV core protein interacts with Apolipoprotein, causing steatosis. Another hypothesis is that the core protein interacts with a transcriptional regulator of lipid metabolism (retinoid X receptor). According to some ideas, the core protein causes oxidative stress in the mitochondria, which leads to fat buildup²¹. The aim of the current study was assessing prevalence and severity of steatosis in chronic hepatitis C patients.

MATERIALS AND METHODS

The current study was cross sectional study piloted at the Gastroenterology Department, Hayatabad Medical Complex, Peshawar. The duration of study was six months after synopsis approval from August 2021 to January 2022. Non-probability consecutive sampling technique was used for selection of the subjects. Proper study approval was taken from the ethical and research committee of the hospital. All the patients of both the sex and age range from 18-60 years who are positive for HCV serum antibodies and having detectable HCV-RNA in serum by polymerase chain reaction were included in our study. Patients with decompensated liver problem, hyperlipidaemia, diabetes mellitus, BMI>30, alcohol intake, deranged coagulation profile, autoimmune problems, depression or psychotic patients, patients with heart problems and patients on medication that cause steatosis were excluded. Totally 200 patients fulfilling the inclusion criteria were included in our study. Informed consent was signed in written form from all the subjects included in the current study. Under aseptic conditions, a liver biopsy was done using an 18G lumbar puncture needle. After the biopsy, participants were kept in the clinic for four hours in a right lateral posture and were monitored every half hour for pulse and blood pressure. Histopathology was performed on biopsy specimens that had been preserved in formalin. A specialist histopathologist provided the biopsy report. Steatosis was graded on histopathology as mild in case of less than 33% hepatocytes, moderate in case of 33-66% hepatocytes and steatosis was graded as severe in case of more than 66% hepatocytes. All the Data analysis was done by using IBM SPSS version 24. Continuous variables were computed as

mean and standard deviation whereas categorical variables were counted as frequency and percentages.

RESULTS

In the current study, 200 subjects were enrolled. Among 200 subjects, males were 90 (45%) whereas females were 110 (55%). (Figure 1) The mean (SD) age in the current study was 38.0 (6.12) years. The overall frequency of steatosis was 80 (40%). (Figure 2) On the basis of degree of steatosis, mild steatosis was observed in 53 (58.89%) subjects, moderate steatosis in 31 (34.44%) patients while severe steatosis was observed in 6 (6.67%) subjects. (Table 1) Based on gender, 36 (40%) male were observed with steatosis while in female subjects, steatosis was observed in 54 (49%) subjects. (figure 3) Age wise distribution of steatosis in hepatitis C virus patients was observed as 22 (24.44%) in age group 18-30 years, 27 (30%) in age range of 31-40 years, 32 (35.56%) in age group 41-50 years while 9 (10%) subjects with steatosis were observed in age group 51-60 years. (Figure 4)

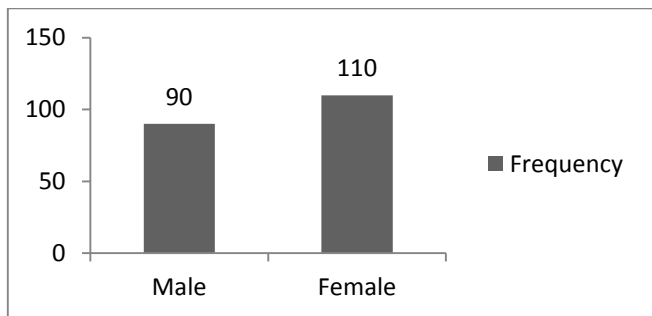


Figure 1: Gender wise distribution of subjects

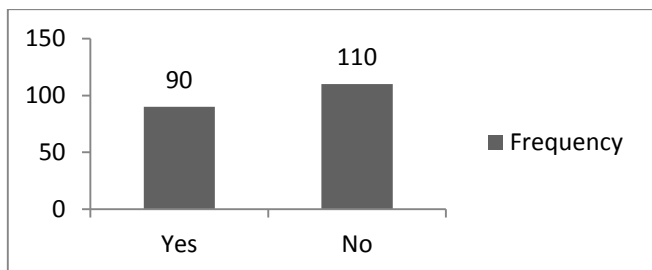


Figure 2: Overall frequency of steatosis in hepatitis c virus patients

Table 1: Degree of severity of steatosis in hepatitis c virus patients

Severity degree of steatosis	Frequency	Percentage
Mild	53	58.89%
Moderate	31	34.44%
Severe	6	6.67%

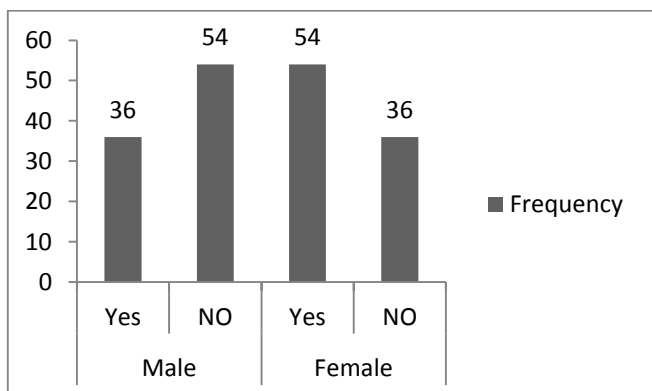


Figure 3: Gender wise distribution of of steatosis in hepatitis c virus patients

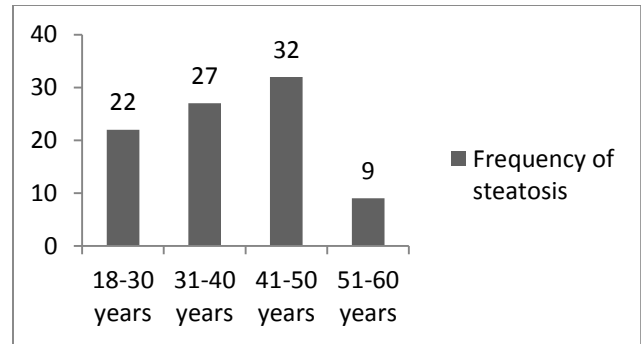


Figure 4: Age wise distribution of steatosis in hepatitis c virus patients

DISCUSSION

In Pakistan, like entire globe, chronic hepatitis C virus infection is the leading cause of chronic liver disease^{3, 4}. In individuals with chronic hepatitis C virus infection, hepatic steatosis, defined as increased lipid buildup in the cytosol of liver cells, is a common histological characteristic^{22, 23}. Perhaps in the absence of other potentially steatogenic variables such as alcohol, drugs, or metabolic disorders, histological investigations have shown that approximately 50% of Chronic Hepatitis C virus individual's exhibit varied degrees of hepatic steatosis, according to the research²⁴.

In the current study, the overall frequency of steatosis was 80 (40%). Contrary to our findings, another study carried out by Matos et al. reported a very high prevalence (67%) of steatosis in chronic hepatitis c infected patients²⁵. This disparity in steatosis prevalence between the two studies could be attributable to the severity of the illness, the prevalence of dominant age group, and genotype of the virus. Other studies also reported high frequency of steatosis as compared to our study²⁶. In accordance with our study, a previous study carried out by Hourigan et al. reported 41% prevalence of steatosis in hepatitis-C virus patients²⁷. Another study also reported comparable frequency of steatosis in hepatitis C virus patients²⁸.

In our study, among 200 subjects, males were 90 (45%) whereas females were 110 (55%). This was not in accordance with the study done by Khokhar et al. who reported male predominance in their study²⁹.

In the current research, based on gender, 36 (40%) male were observed with steatosis while in female subjects, steatosis was observed in 54 (49%) subjects. The association of female gender with steatosis is reported in various previous studies^{30, 31}.

On the basis of degree of steatosis, mild steatosis was observed in 53 (58.89%) subjects, moderate steatosis in 31 (34.44%) patients while severe steatosis was observed in 6 (6.67%) subjects. In accordance with our findings, another study reported similar results³².

Age wise distribution of steatosis in hepatitis C virus patients was observed as 22 (24.44%) in age group 18-30 years, 27 (30%) in age range of 31-40 years, 32 (35.56%) in age group 41-50 years while 9 (10%) subjects with steatosis were observed in age group 51-60 years. Steatosis may be detected in individuals with chronic hepatitis C from the age of 20 to the old age, according to our findings. Other studies¹² found that the frequency of steatosis rose dramatically as people became older. Every ten years, the proportion of patients doubles. The occurrence of steatosis in young persons who do not drink alcohol and who do not have obesity or dyslipidemia suggests that hepatitis C is primarily associated with development of liver damage. Some researchers³³ found that in persons infected with genotype 3 hepatitis virus, attaining a persistent virological response following therapy resulted in the elimination of steatosis, demonstrating genotype 3 hepatitis C's potential to cause steatosis³⁴. Other research has also shown that core protein of HCV genotype 3 may impede the release of very low-density lipoproteins in liver and, as a result, cause steatosis³⁵.

CONCLUSION

Our study concludes that steatosis is a common histological characteristic in patients with chronic hepatitis C virus infection. Steatosis is more prevalent in female patients than males. Study based on large sample size is recommended to get better findings.

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