

Frequency of Metabolic Syndrome in Patients with Chronic Hepatitis C Virus Infection

KALIM ULLAH KHAN¹, AMIR TAJ KHAN², MUHAMMAD ISHFAQ³, FARAMOZ KHAN⁴, MUHAMMAD NAEEM⁵, MUHAMMAD KHALID⁶

¹MBBS, FCPS (Medicine), Assistant professor Medicine Department NMC/QHAMC Nowshera

²MBBS, FCPS (Medicine), District Specialist, DHQ Hospital Buner, KPK

³MBBS, FCPS (Medicine), Assistant professor Medicine Department, Hayatabad Medical complex Peshawar

⁴MBBS, FCPS, District Medical Specialist, DHQ Hospital Daggar Buner, KPK

⁵MBBS, FCPS, DHQ Hospital Daggar Buner, KPK

⁶MBBS, FCPS medicine, Associate Professor Medical department, NMC/QHAMC Nowshera

Corresponding author: Muhammad Ishfaq, Email: dashfaq@gmail.com

ABSTRACT

Introduction: The frequent cause of liver disease in the whole world is due to Hepatitis C virus. According to the estimate the worldwide infection due to hepatitis C virus ranges from 150 to 200 million cases. Amongst these cases the chronic infection are found in about 85% cases. In the globe the most important cause of mortality and morbidity is Hepatitis C virus. In the whole world Chronic Liver disease and hepatocellular carcinoma of about 25% is due to hepatitis C virus.

Objective: To find out the occurrence of metabolic syndrome in patients with chronic hepatitis C virus infection.

Materials and Methods: This study was Descriptive cross sectional research study, which was directed at Department of Medicine, Hayat Abad Medical complex, Peshawar, Khyber Pakhtunkhwa Pakistan. The time duration for our study was 8 month. In our study about 147 patient were observed to find out the frequency of metabolic syndrome in patients with chronic hepatitis C virus infection

Results: According to the results of our study, among 147 patients the analysis of age wise distribution was as follow; n= 20-25 Years 6(4.1%), 26-30 Years 26(17.7%), 31-35 Years 51(34.7%), 36-40 Years 28(19.0%), 41-50 Years 22(15.0%) and in 51-60 Years it was 14(9.5%). 49.12 years having standard deviation of ± 2.142 was the mean age in our study. In our study gender wise distribution, amongst 147 patients 108(73.5%) were male while 39(26.5%) were female. 131(89.1%) patients were observed to have metabolic syndrome with chronic hepatitis C virus infection.

Conclusion: Our study concludes that there is no uncommon occurrence of metabolic syndrome in cases with HCV infection. There is significant association of metabolic syndrome with Hepatitis C Virus (HCV) when HCV infection have more than 3 year's duration.

Keywords: Frequency; Metabolic Syndrome; Chronic hepatitis C virus infection; Mortality; Morbidity

INTRODUCTION

The frequent cause of liver disease in the whole world is due to Hepatitis C virus. According to the estimate the worldwide infection due to hepatitis C virus ranges from 150 to 200 million cases. Amongst these cases the chronic infections are found in about 85% cases.¹ In the globe the most important cause of mortality and morbidity is Hepatitis C virus. In the whole world Chronic Liver disease and hepatocellular carcinoma of about 25% is due to hepatitis C virus.² According to the study done in Pakistan on general population the hepatitis C virus infection prevalence was observed to be 4.7% and is increasing.³ While HCV is hepatotropic, it also well-known to affect the metabolic system and the metabolic disturbance caused by hepatitis C virus is called HCV associated dysmetabolic syndrome (HCADS). Steatosis, insulin resistance IR/Diabetes and hypercholesterolemia describe this syndrome cause by metabolic disturbance due to hepatitis C virus.⁴

In about 80% of cases the HCV infection associated insulin resistance has been reported. Impaired fasting glucose tolerance and DM higher prevalence have been observed in patient infected by HCV genotype-1. Viral RNA level replication is associated with resistance of insulin. In patient infected with HCV genotype 1 infection it is observed to have TNF- α increase level, suppressing of cytokine signaling and reduction in substrate protein insulin receptor substrate-1 and -2. Additionally, The HCV infection is also observed to down-regulate insulin receptor and glucose transporter-4 gene, peroxisome proliferators-activated receptors and hypoadiponectinemia.⁵ Chronic viral hepatitis is revealed to be linked with amplified risk of diabetes mellitus to glucose metabolism impairment. Insulin resistance is observed to have association with fatty degeneration of hepatocytes. In the liver tissue the core protein of the virus causes to stop the low density lipoprotein secretion which causes fatty degeneration. In susceptible individuals HCV also cause to activate the autoimmune response against the beta cells that produce insulin.⁶

The relationship between HCV infection and metabolic syndrome is suggested by a recent study.¹ Fatty liver disease have

possibility to be cause by HCV infection, which is a sign of hepatic steatosis, and is acknowledged element of metabolic syndrome.⁷ In patients having chronic liver disease autonomous mortality predictors are the discrete constituents of metabolic syndrome.⁸ In patient infected with HCV, metabolic disorders treatment accords with the HCV treatment. On the other hand, in patients having concerns of HCV tempted insulin resistance, the antiviral treatment shows impaired response.⁹ In patient infected with HCV the metabolic syndrome prevalence is observed to be about 25%.¹⁰

Different Studies have been conducted in different parts of the globe to display frequencies of metabolic syndrome in patients with hepatitis C infection. Keeping this in mind we aim to conduct a study observe frequency of metabolic syndrome in patients with chronic hepatitis C virus infection in Khyber Pakhtunkhwa, Pakistan.

MATERIAL AND METHODS

This study was Descriptive cross sectional research study, which was directed at Department of Medicine, Hayat Abad Medical complex, Peshawar, Khyber Pakhtunkhwa Pakistan. The time duration for our study was 8 months. In our study about 147 patients were observed to find out the frequency of metabolic syndrome in patients with chronic hepatitis C virus infection. The criteria for inclusion in our study was age 20-60 years, both genders and chronic hepatitis C while the criteria for exclusion in our study was patients with decompensate liver disease, pregnant Women and all those having co-infection with hepatitis B and HIV. If the above-mentioned condition is included in the study, it will act as confounders, to present biasedness in result of the study.

Data Collection Procedure: Ethical and research committee approved our study. After approval the patient that meet the inclusion criteria having HCV infection presenting with metabolic syndrome were enrolled in our study. An informed written consent was signed from all the patient meeting the inclusion criteria.

From all the included patient the information including history in detail, clinical examination, circumference of the waist, height,

weight, including BMI calculation. Blood was taken from the patients and sent to the laboratory of the hospital for the analysis of anti HCV Antibodies, HBs Ag, fasting blood sugar, high density lipoprotein, and Triglycerides. Standardized techniques were used to measure weight of body, height, BMI and blood pressure. In order to control confounders to exclude biasedness in our study, exclusion criteria were strictly followed.

Data Analysis: SPSS version 16.00 was used for analysis of the data of our study. For quantitative variables like age, blood pressure, BMI, HDL, TG, and fasting blood sugar calculation for mean and standard deviation was done. For qualitative variables like gender, and metabolic syndrome calculation of frequency and percentages was done. To see effect modifiers metabolic syndrome was stratified for age, gender and BMI. Chi square test was performed by keeping p value ≤ 0.05 as significant.

RESULTS

This study was Descriptive cross sectional research study, which was conducted at Department of Medicine, Hayat Abad Medical complex, Peshawar, Khyber Pakhtunkhwa Pakistan. In our study about 147 patient were observed to find out the frequency of metabolic syndrome in patients with chronic hepatitis C virus infection. According to the results of our study, among 147 patients the analysis of age wise distribution was as follow; 20-25 Years n = 6(4.1%), 26-30 Years n = 26(17.7%), 31-35 Years n=51(34.7%), 36-40 Years n = 28(19.0%), 41-50 Years n = 22(15.0%) and in 51-60 Years it was 14(9.5%). 49.12 years having standard deviation of ± 2.142 was the mean age in our study.

In our study gender wise distribution, amongst 147 patients 108(73.5%) were male while 39(26.5%) were female.

131(89.1%) patients were observed to have metabolic syndrome with chronic hepatitis C virus infection (89.1%) (Table No 2)

Table 1: Descriptive Statistics (N=147)

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Raised plasma fasting glucose	147	100	125	108.75	6.638
Raised Blood pressure	147	130	190	160.61	18.899
Raised TG	147	130	190	160.82	17.366
Reduced HDL Cholesterol	147	19	40	31.57	6.288
Waist circumference	147	81	101	91.49	5.716

Table 2: Distribution Of Metabolic Syndrome Of Sample Size (N=147)

Metabolic syndrome	Frequency	Percent	Valid Percent	Percent
Yes	131	89.1	89.1	89.1
No	16	10.9	10.9	100.0
Total	147	100.0	100.0	

DISCUSSION

The frequent cause of liver disease in the whole world is due to Hepatitis C virus. According to the estimate the worldwide infection due to hepatitis C virus ranges from 150 to 200 million cases. Amongst these cases the chronic infection are found in about 85% cases.¹ In the globe the most important cause of mortality and morbidity is Hepatitis C virus. In the whole world Chronic Liver disease and hepatocellular carcinoma of about 25% is due to hepatitis C virus.² This study was Descriptive cross sectional research study, which was directed at Department of Medicine, Hayat Abad Medical complex, Peshawar, Khyber Pakhtunkhwa Pakistan. In our study about 147 patient were observed to find out the frequency of metabolic syndrome in patients with chronic hepatitis C virus infection. According to the results of our study, among 147 patients the analysis of age wise distribution was as follow; n= 20-25 Years 6(4.1%), 26-30 Years 26(17.7%), 31-35 Years 51(34.7%), 36-40 Years 28(19.0%), 41-50 Years 22(15.0%)

and in 51-60 Years it was 14(9.5%). 49.12 years having standard deviation of ± 2.142 was the mean age in our study. In our study gender wise distribution, amongst 147 patients 108(73.5%) were male while 39(26.5%) were female. 131(89.1%) patients were observed to have metabolic syndrome with chronic hepatitis C virus infection (89.1%). The existence of obesity, dyslipidemia, hypertension and insulin resistance label the metabolic syndrome. When HCV and metabolic disorder occur together then they increase the risk for the development of various problems. They also disturb overall activities of metabolism and other risk factors including inflammatory markers, chronic infections, micro albuminuria, hyperuricemia and coagulation disorders. In the whole world including Asian countries the metabolic syndrome prevalence is increasing. In our study metabolic syndrome was observed in 16 (17.78%) of the included patient. Our study was in accordance with the study conducted previously, which shows 21.6% prevalence.¹¹ Another study done¹² that found it in 24.7% cases. On the other hand, in another study¹³ a lower number in 12.4% cases was observed than our study. Different factors determine the number of this syndrome. It might be due to due to races difference, factors that affect genetic or this may be due to resources not only in term of life quality but also in term of medical facility like hepatitis C virus infection treatment. There are many reasons for high metabolic syndrome in patient with HCV, amongst which one may be due protein produce by the virus which cause activation of TNF- α and the function of the insulin receptor substrate (IRS) proteins is inhibited which cause insulin resistance due to decrease expression of glucose transporter and lipoprotein lipase in peripheral tissues.¹⁴ Steatosis and fibrosis progression have been noted to be associated with the insulin resistance that can affect the antiviral therapy of against HCV with pegylated interferon and ribavirin.^{15, 16} Previous Studies have shown that severity of the disease is associated with the duration of the problem.^{17, 18}

CONCLUSION

Our study conclude that there no uncommon occurrence of metabolic syndrome in cases with HCV infection. There is significant association of metabolic syndrome with Hepatitis C Virus (HCV) when HCV infection have more than 3 year's duration.

Conflict of interest: The authors declare that they have no conflict of interest.

Author contributions: Kalim mullah khan data analysis, Muhammad Ishfaq and Faramoz khan manuscript writing/editing, Muhammad Naeem data analysis, Amir Taj data collection, Muhammad Fayaz manuscript writing/editing.

REFERENCES

- Negro F, Alael. Hepatitis C virus and type 2 Diabetes. *World J Gastroenterol.* 2013;15:1537-47.
- White DL, Ratziu V, EL -Serag HB. Hepatitis C infection and risk of diabetes. A systematic review and Meta analysis. *Hepatology* 2013;49:831-44.
- Umar M, Bushra HT, Ahmad M, Khurram M, Usman S, Arif M, et al. Hepatitis C in Pakistan. A review of available data. *Hepat Mon.* 2014;10(3):205-14.
- Pattullo V. I.H. Hepatitis C and diabetes. One treatment for two diseases? *Liver int*2014;30:356-64.
- Lonardo A, Adinolfi LE, Petta S. Hepatitis C and diabetes: the inevitable coincidence? *Expert Rev. Anti Infect Ther.* 2013;7:293-308.
- Sheikh H, Karira KA, Rahvu AA, sheikh QH, sheikh Y, Rani M, Risk of type II diabetes in viral hepatitis B/C patient. *JLUMHS.*2014;10:11-4.
- Kotronen A, Yki-Jarvinen H. Fatty liver: a novel component of the metabolic syndrome. *ArteriosclerThrombVasc Biol.* 2013;28(1)27-38.
- Stepanova M, Rafiq N, Younossi ZM. Components of metabolic syndrome are independent predictors of mortality in patients with chronic liver disease: a population-based study. *Gut.* 2013;59(10):1410-5.
- Cacoub P, Carrat. Bedoissa P. insulin Resistance Impairs sustained virological response rate to pegylated interferon plus Ribavirin in HIV-Hepatitis C virus co-infected patients. *Antivir Ther.*2013;14:839-45.

10. Huang JF, Chuang WL, Yu ML, Yu SH. Hepatitis C virus infection and metabolic syndrome – A community based study in an endemic area of Taiwan Kaohsiung J Med Sci. 2012;25:299-305.
11. Stehouwer CD, Henry RM, Ferreira I. Arterial stiffness in diabetes and the metabolic syndrome: a pathway to cardiovascular disease. Diabetologia. 2008 Apr. 51(4):527-39. [Medline].
12. Elnakish MT, Hassanain HH, Janssen PM, Angelos MG, Khan M. Emerging role of oxidative stress in metabolic syndrome and cardiovascular diseases: important role of Rac/NADPH oxidase. J Pathol. 2013 Nov. 231(3):290-300. [Medline].
13. Yubero-Serrano EM, Delgado-Lista J, Pena-Orihuela P, et al. Oxidative stress is associated with the number of components of metabolic syndrome: LIPGENE study. Exp Mol Med. 2013 Jun 21. 45:e28. [Medline]. [Full Text].
14. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011-2014. NCHS Data Brief. 2015 Nov. 1-8. [Medline].
15. Saklayen MG. The global epidemic of the metabolic syndrome. Curr Hypertens Rep. 2018 Feb 26. 20(2):12. [Medline].
16. Goossens GH. The role of adipose tissue dysfunction in the pathogenesis of obesity-related insulin resistance. Physiol Behav. 2008 May 23. 94(2):206-18. [Medline].
17. Gustafson B, Hammarstedt A, Andersson CX, et al. Inflamed adipose tissue: a culprit underlying the metabolic syndrome and atherosclerosis. Arterioscler Thromb Vasc Biol. 2007 Nov. 27(11):2276-83. [Medline].
18. Lann D, LeRoith D. Insulin resistance as the underlying cause for the metabolic syndrome. Med Clin North Am. 2007 Nov. 91(6):1063-77, viii. [Medline].