

METABOLIC SYNDROME IN CASES WITH HEPATITIS C VIRUS INFECTION

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ABSTRACT

Background: Hepatitis C virus (HCV) infection is one of the leading causes of morbidity and mortality in the developing world and metabolic syndrome can further worsen the condition. **Objective:** To determine the frequency of metabolic syndrome in cases with hepatitis C virus infection. **Methodology:** A total of 90 patients diagnosed as cases of HCV infection either by PCR or ELISA were selected in this cross sectional study, from 1st July to 31st December 2016. Detailed sociodemographic data like age, gender, weight, height, BMI and clinical data like duration of HCV, and other data like waist circumference, lipid profile (fasting), blood sugar, blood pressure were also recorded. Metabolic syndrome was labelled as yes according to National Cholesterol Education Program Adult Treatment Panel III criteria for Asian-Americans. The data was analyzed by using SPSS version 21. **Results:** In this study there were 90 cases out of which were 60 (66.67%) were males and 30 (33.33%) females. The mean age was 41.23±7.16 years and mean duration of HCV was 7.41±3.24 years. Metabolic syndrome was seen in 16 (17.78%) of the cases. It was seen in 11 (18.33%) out of 60 males and 5 (16.67%) out of 30 females with p value of 1.12. On stratification of age groups, it was seen in 10 (19.23%) out of 42 cases in age group of 15 to 39 years (p= 0.89). The results were significantly associated with metabolic syndrome and HCV where maximum cases were seen in cases that had the duration of HCV more than 3 year where it was seen in 12 (27.27%) out of 32 cases with p value of 0.01. **Conclusion:** The prevalence of metabolic syndrome in cases with HCV infection is not uncommon and the duration of HCV infection more than 3 years is significantly associated with metabolic syndrome.

Key words: HCV, Metabolic Syndrome, DM, Hypertension

INTRODUCTION

Hepatitis C virus (HCV) is not only highly prevalent in the developing world, but its number is increasing in the developed world as well. More than 80% of patients suffering from HCV infection develop chronicity, and significant number of the patients with chronic hepatitis C infection develop liver cirrhosis over a period of 10–20 year. Hepatocellular carcinoma is the end stage complication seen in such cases.^{1,2} This chronic infection by HCV increases oxidative stress and hence pro-inflammatory cytokine are released, which can cause tissue damage, and lead to progressive fibrosis, cirrhosis, carcinoma, and end stage liver failure.^{1,2} Chronic HCV is considered as the one of the major causes of liver transplant.^{3,4}

Metabolic syndrome (MS) is a combination of various clinical manifestations such as hyperglycaemia, obesity, hypertension, dyslipidaemia, and insulin resistance (IR).³ These all derangements lead to atherosclerosis and type 2 diabetes mellitus (DM), which are considered as the major worst consequences of MS, and pose a burden on global health issues. The data has suggested that the atherogenic process is regulated by intervening inflammatory mechanisms.⁴ Insulin resistance is thought to be a key feature in

the pathogenesis of MS. It has been increasingly detected as playing a key role in the inflammatory processes.⁵ A number of metabolic disturbances have been shown to be directly and indirectly associated with HCV infection. The association between hepatitis C infection and metabolic syndrome (MS) has become the subject of interest over the past decade, particularly in areas with high prevalence rate of both.^{5,6} The objective of this study was to determine the frequency of metabolic syndrome in patients with HCV infection.

METHODOLOGY

Study Design: Cross Sectional Study. **Setting:** Department of Medicine, Sheikh Zayed Medical College/Hospital, Rahim Yar Khan. **Duration of Study:** 1st July to 31st December 2016.

Sampling Technique: Non probability consecutive sampling. The study subjects were diagnosed cases of HCV infection either by PCR or ELISA.

Inclusion Criteria: Both sexes, with age range of 15 to 60 years and diagnosed cases of HCV for at least 1 years either by PCR or ELISA.

Exclusion Criteria: Known cases of DM, cases with end stage liver, renal or cardiac disease and Pregnancy. In this study, a total of 90 patients

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diagnosed as of HCV infection either by PCR or ELISA were selected. Detailed sociodemographic data like age, gender, and clinical data like duration of disease, and other data like waist circumference, lipid profile (fasting), blood sugar, blood pressure were also recorded. Metabolic syndrome was labelled as yes according to National Cholesterol Education Program Adult Treatment Panel III criteria for Asian-Americans. The cases with presence of at least three of the following were labelled as Metabolic syndrome (MS): (1) waist circumference >90 cm in men or >80 cm in women; (2) Triglycerides (TG) >150 mg/dL; (3) High Density Lipoprotein (HDL-C) <40 mg/dL in men or <50 mg/dL in women; (4) blood pressure >130/85 mmHg or current use of antihypertensive medications; (5) Fasting Plasma Glucose (FPG) >100 mg/dL

Statistical analysis was done using SPSS version 21. Qualitative data was presented as frequencies and percentages while quantitative data as mean and standard deviation. Post stratification chi square test was applied taking p value less than 0.05 as significant.

RESULTS

In this study, there were 90 cases out of which were 60 (66.67%) males and 30 (33.33%) females. The mean age was 41.23 ± 7.16 years and mean duration of HCV was 7.41 ± 3.24 years. Metabolic syndrome was seen in 16 (17.78%) of the cases. It was seen in 11 (18.33%) out of 60 males and 5 (16.67%) out of 30 females with p value of 1.12 as in Table I.

Table I: Metabolic syndrome versus gender (n=90)

Gender	Metabolic syndrome		Total
	Yes	No	
Male	11 (18.33%)	49 (81.67%)	60 (100%)
Female	05 (16.67%)	25 (83.33%)	30 (100%)
Total	16 (17.78%)	74 (82.22%)	90 (100%)

(P value = 1.12)

On stratification of age groups, it was seen in 10 (19.23%) out of 42 cases in age group of 15 to 39 years ($p = 0.89$) as shown in table II. The results were significantly associated with metabolic syndrome and HCV where maximum cases of

(MS) were seen in cases that had the duration of HCV more than 3 year where its was seen in 12 (27.27%) out of 32 cases with p value of 0.01 Table III.

Table II: Metabolic syndrome versus age groups (n=90)

Age groups (years)	Metabolic syndrome		Total
	Yes	No	
15 to 39	10 (19.23%)	42 (72.41%)	52 (100%)
40 to 60	6 (15.79%)	32 (84.21%)	38 (100%)
Total	16 (17.78%)	74 (82.22%)	90 (100%)

(P value = 0.89)

Table III: Metabolic syndrome versus duration of HCV (n=90)

Duration of HCV	Metabolic syndrome		Total
	Yes	No	
≤ 3 years	4 (8.70%)	42 (91.30%)	46 (100%)
> 3 years	12 (27.27%)	32 (72.73%)	44 (100%)
Total	16 (17.78%)	74 (82.22%)	90 (100%)

(P value = 0.01)

DISCUSSION

Metabolic syndrome is labelled by presence obesity, dyslipidemia, hypertension and insulin resistance. When occurring together, can complicate the condition as they increase the risk of developing various disease and also affect the whole metabolic activities and many other risk factors such as inflammatory markers, chronic infections, micro albuminuria, hyperuricemia and disorders of coagulation have also been under extensive discussion as part of the spectrum of metabolic syndrome. The prevalence of MS is increasing worldwide including Asian countries.

In the present study MS was seen in 16 (17.78%) of cases. This was similar to a study conducted by Oliveria et al that found this prevalence of 21.6% in their study.⁷ Another study done by Huang et al, found it in 24.7% cases.⁸ However, Sersté et al found it in 12.4% cases only in their large cohort of patients with chronic hepatitis C.⁹

The number of this syndrome is variable due to different factors. First of all it can be due to difference in races, genetic factors or the availability of the

resources not in terms of quality of life only but also the medical facilities regarding the treatment of the infection like hepatitis C virus infection.

There were multiple criteria used to label the metabolic syndromes, including American Heart Association (AHS), International Diabetes Federation (IDF) and National Cholesterol Education Programme (NCEP) ATP III. The IDF criteria used the definition of metabolic syndrome adopting lower waist circumference and fasting glucose cut-offs to define obesity and hyperglycemia as compared to the others.¹⁰

Among the many reasons of higher metabolic syndrome in cases with HCV may be production of proteins by the virus that can activate TNF- α expression and inhibit the function of insulin receptor substrate (IRS) proteins, which contribute to insulin resistance by decreasing glucose transporter (GLUT-4) expression and lipoprotein lipase in peripheral tissues.¹¹

It is noted that the insulin resistance has frequently been associated with steatosis, fibrosis progression that can also affect and lead to lower response to antiviral therapy against HCV infection in cases that are treated with pegylated interferon and ribavirin.^{12,13}

Studies have proved in the past that the degree of severity is directly related to the duration of illness.^{14,15} However no such cut off values of 3 years were used in any of the study. There was also no significant association established in the previous study regarding prevalence of metabolic syndrome.

CONCLUSION

The prevalence of metabolic syndrome in cases with HCV infection is not uncommon and the duration of HCV infection more than 3 years is significantly associated with metabolic syndrome.

Conflict of interest

There is no conflict of interest among authors.

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