

To determine the frequency of type II diabetes mellitus in hepatitis C positive and Hepatitis C negative patients presenting in a tertiary care hospital

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ABSTRACT

Aim: To determine the frequency of type II diabetes mellitus in hepatitis C positive and hepatitis negative patients presenting in a tertiary care hospital

Study design: Case control study, carried out in Medical Ward, Mayo Hospital, Lahore for six months.

Results: Age distribution which shows that the common age of the patients was 51-60 years in both groups i.e., 37(37%) in cases and 41(41%) in controls, mean and sd was calculated as 53.43 ± 4.12 in cases and 55.72 ± 3.83 in controls, 47(47%) were male in cases group and 51(51%) in control group while 53(53%) in cases, the frequency of type II diabetes mellitus in hepatitis C positive and hepatitis negative patients reveals 28(28%) in cases and 8(8%) in controls were positive.

Conclusion: The frequency of type II diabetes mellitus is high among patients with hepatitis C virus than hepatitis negative patients. So, it is recommended that every patient who present with hepatitis C virus, should be sorted out for type II diabetes mellitus. However, it is also required that every setup should have their surveillance in order to know the frequency of problem.

Keywords: Type II Diabetes Mellitus, Hepatitis C, Positive, Negative, Frequency

INTRODUCTION

HCV is a tremendous health problem not only in Pakistan but also worldwide. World health organisation estimates that approximately 3% of world population (more than 170 million) have been infected with HCV so far¹. The issue continues to worsen, especially in developing countries and approximately 10 million cases are present in Pakistan. HCV causes chronic persistent hepatitis, liver cirrhosis, hepatocellular carcinoma and fulminant hepatitis². Infection with HCV affects not only the liver but extra hepatic tissue as well and may combine with many unrelated diseases and comorbid conditions. The extra hepatic manifestations including essential cryoglobulinemia, porphyria cutanea tarda, membranous glomerulonephritis and bone marrow suppression has strongly been recognised including diabetes mellitus Type II^{3,4}. DM is a syndrome with disordered metabolism and hyperglycaemia due either to a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate. Type II diabetes is a debilitating disease condition especially in people above 30 years of age and this may evolve throughout their life-span⁵. Prevalence of type II diabetes mellitus among HCV positive patients was found to be 34.4% as compared to 6% in HCV negative patients in previous studies^{6,7,8}. As previous studies showed that patients with HCV compared with normal population are at increased risk of

developing of diabetes mellitus type 2 and thus resulting in increased risk of acute and chronic complications of diabetes mellitus that can result in severe morbidity^{9,10,11}. With this scenario it has become very necessary for a screening exercise to determine the frequency of diabetes mellitus among HCV patients as hepatitis C has its own complications like cirrhosis and hepatocellular carcinoma, superimposed on it diabetes mellitus, can double the burden of hepatitis C related morbidity and mortality. So our study on one side will show the seriousness of this problem and at the same time will increase awareness of the population and health practitioners on the danger of the coexistence of diabetes with this virus so that that early detection and treatment of diabetes mellitus and HCV can be made possible through early intervention, thus preventing their serious complications¹². Patients were assigned a diagnosis of type II diabetes mellitus with documented use of oral hypoglycemic/ insulin or random blood glucose level greater than 200 mg/dl or fasting blood glucose level greater than 126 mg/dl on two or more occasions. Anti HCV antibodies were detected in patients serum by Enzyme Linked Immuno-Sorbant Assay (ELISA) method.

MATERIALS AND METHODS

It was a case control study conducted in all general medical wards of Mayo Hospital Lahore and was completed in six months. Sample size of 200 cases (100 in each group) was calculated with 80% power of test, 1% level of significance and taking expected

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percentage of type ii diabetes mellitus in both groups i.e. 33% in cases and 5.6% in controls i.e. patients with and without hepatitis C with non-probability purposive sampling. All cases newly diagnosed having hepatitis C (as per operational definition) and all controls without hepatitis C of age 40-70 years of either sex were included. Patients with Type 1 diabetes mellitus and on drugs causing hyperglycemia like steroids were excluded. Informed consent was taken. Anti HCV antibodies were detected in all patient's [cases and controls] serum by Enzyme Linked Immuno-Sorbent Assay (ELISA) method and blood sugar was checked in KEMU pathology laboratory Mayo Hospital Lahore. Data was entered in computer programme SPSS version 10. Mean and standard deviation was calculated for age. Frequency and percentage were calculated for gender and diabetes mellitus Type II. Odd ratio [OR] were calculated to see the association of type II diabetes mellitus with anti HCV positive patients. OR>2 was considered as significant.

RESULTS

Age distribution showed that the common age of the patients was 51-60 years in both groups i.e., 37(37%) in Cases and 41(41%) in controls, 39(39%) in cases and 30(30%) in controls were between 61-70 years while only 24(24%) in cases and 29(29%) in controls were between 40-50 years of age, mean and SD was calculated as 53.43±4.12 in cases and 55.72±3.83 in controls. Gender distribution, where 47(47%) were male in cases and 51(51%) in control while 53(53%) in cases and 49(49%) in controls were female. The frequency of type II diabetes mellitus in hepatitis C positive and hepatitis C negative patients reveals 28(28%) in cases and 8(8%) in controls were positive and 72(72%) in cases and 92(92%) in controls were negative for presence of diabetes mellitus (Table 1).

Table 1: The frequency of type ii diabetes mellitus in hepatitis c positive and hepatitis c negative patients (n=200) Odds Ratio= 4.47 i.e. >2 (Significant)

Diabetes mellitus	Cases	Control
Yes	28(28%)	8(8%)
No	72(72%)	92(92%)

DISCUSSION

An estimated 3% of the world's population (170+ million persons) is infected with the hepatitis C virus (HCV), 55–80% with chronic infection¹³. HCV is a significant cause of global morbidity and mortality, responsible for approximately 25% of both chronic liver disease (CLD) and hepatocellular carcinoma (HCC). HCV infection has also been convincingly linked to several extra-hepatic manifestations including essential mixed cryoglobulinemia, glomeronephritis, and porphyria cutanea tarda¹⁴. Based on early clinical observation, type II diabetes

mellitus (DM) was suggested to be another potential extrahepatic manifestation of HCV infection, with excess risk postulated to be due to either direct viral involvement or secondary to HCV-induced liver damage. However, even a small increase in DM risk in HCV-infected patients may be clinically important, as available pharamcotherapies for HCV are less effective with concomitant DM¹⁵ and progression of liver disease has been shown to be worsened¹⁶.

A number of epidemiologic studies have demonstrated significant excess DM risk with HCV infection^{17,18}. However, others found no significant excess risk or excess risk limited to specific segments of the population. With this scenario it became very necessary for a screening exercise to determine the frequency of diabetes mellitus among HCV positive patients as hepatitis C has its own complications like cirrhosis and hepatocellular carcinoma, superimposed on it diabetes mellitus, can double the burden of hepatitis C related morbidity and mortality.

Our results are reflecting the findings of number of studies shown that 13–33% (median 25%) of patients with chronic HCV infection are diabetic^{19,20,21}. This prevalence is significantly higher than that in matched healthy controls. In 2000, Mehta et al²² reported an important survey addressing a link between DM and HCV status in a representative sample of the general population of the USA through the Third National Health and Nutrition Examination Survey (NHANES III). After adjustment for DM confounding factors such as age, race, high body mass index, and low socioeconomic status, they found that persons older than 40 years of age with HCV infection were 3 times more likely than those without HCV to have type 2 DM (odds ratio: 3.77; 95% confidence interval: 1.8–7.87).

A local study by Nasir Khokhar²³ determined if there was an association of chronic hepatitis C virus infection with diabetes mellitus and recorded 17.27% of the patients suffering from diabetes mellitus had hepatitis C virus, this prevalence is slightly lower than in our study and another local study also following the relevant findings i.e., 19%, this slight lower prevalence may be due to the reason that these studies were conducted in 2002 and 2004 while after passing almost 8-10 years, this prevalence may be increased²⁴.

Three prospective studies also evaluated whether HCV infection increases risk of developing type II diabetes^{25,26,27}. All had serological confirmation of HCV and exclusion of DM at baseline.

The reasons why chronic HCV infection would induce type 2 diabetes could be manifold. Several experimental studies have suggested a direct role of the virus in promoting DM risk. Within HCV core-transgenic mice, hepatocyte associated degradation of the HCV core protein leads to negative interaction with insulin signaling by reducing IRS-1

phosphorylation and downstream signaling by Akt²⁸ and by promoting IRS-1 and IRS-2 degradation²⁹. In one study, the virus has also been localized in 39% of pancreatic islets in HCV-infected humans and occurs in approximately 54% of all cells within affected islets. Although there is no evidence of increased apoptosis, these HCV+ islet cells exhibit morphologic changes as well as derangement in glucose-stimulated insulin release (b-cell dysregulation)³⁰. However, it has also been suggested that HCV infection promotes DM risk as a tertiary consequence of HCV-induced liver damage. Indeed, it is well-established that advanced cirrhosis induces dysregulation of glycemic control which may result in overt diabetes³¹.

Considering the above findings of the current study with in agreement with other studies confirms higher frequency of type II diabetes mellitus in hepatitis C positive than hepatitis C negative patients presenting in a tertiary care hospital.

CONCLUSION

Frequency of type II diabetes mellitus is high among patients with hepatitis C positive than hepatitis C negative patients. So, it is recommended that every patient who present with hepatitis C virus, should be sorted out for type II DM. However, it is also required that every setup should have their surveillance in order to know the frequency of problem.

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