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RESEARCH ARTICLE

PREVALENCE OF HEPATITIS C VIRUS INFECTION IN TYPE 2 DIABETIC PATIENTS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Hepatitis C virus infection has been associated with various extra-hepatic manifestations, and diabetes mellitus is one of these. Chronic hepatitis C virus infection and type 2 diabetes mellitus cause long-term complications in affected patients. Moreover, both disorders are common. **Methods:** In this study 300 patients with previously confirmed diabetes or newly diagnosed diabetes according to World Health Organization criteria. The presence of hepatitis C virus infection was tested by third generation ELISA kit. **Results**: Out of 300 diabetics, 33 were found to be anti-HCV positive and all of them had type 2 diabetes mellitus. Serum alanine aminotransferase level was raised in positive cases as compared to the seronegative patients. **Conclusion:** The results show that there is a strong association between HCV and T2DM in the region as evident from significantly higher prevalence of HCV infection in diabetics as compared to the control group in the present study.

Key words: Diabetes Mellitus, Hepatitis C virus Infection, Alanine aminotransferase,

INTRODUCTION

There is an increasing prevalence of diabetes mellitus (DM) worldwide. It has been projected that 300 million people worldwide will have the condition by 2015. Type-2 DM constitutes about 90% of the entire population with DM; hence type-2 DM will form the bulk of the estimated increase in prevalence by the year 2015 [1]. Type 2 diabetes has become more prevalent as people become more obese and live a more sedentary lifestyle. Risk factors strongly associated with type 2 diabetes include family history, body fat distribution, age, sex, smoking, and physical activity. It has also been suggested that in addition to these genetic, biologic, and demographic factors, HCV infection is associated with type 2 diabetes [2]. The awareness of viral hepatitis has increased over the past few decades. Hepatitis C virus (HCV) infection is a common cause of acute and chronic hepatitis, and leads to cirrhosis and hepatocellular carcinoma. It is estimated that nearly 150 to 200 million people have been in contact with HCV worldwide, and approximately 85% have chronic infection. Several studies from different parts of the world have found that 13% to 33% of patients with chronic HCV have associated diabetes, mostly type II DM [3]. Furthermore, most of the anti-HCV positive diabetic patients presented with abnormal liver function tests [4].

Regarding diabetes mellitus and chronic HCV infection, there are several studies that demonstrated a correlation between the two diseases. A study performed in the USA on 9,822 subjects showed that the risk of DM is 3.8 times higher in HCV infected patients [5]. A second study on 10,275 subjects without DM, followed-up for 9 years, showed an increased incidence of DM in patients with positive anti HCV antibodies, 12 times higher than in general population [6]. A study performed in Spain on 176 patients with DM demonstrated that the prevalence of anti HCV antibodies was 11.5%, as compared to 2.5% in blood donors (6,172 tested) [7]. Prevalence of DM in the general population of India has gone up from < 2% before 1977 to > 12% since 2000 [8]. In India, the prevalence of HCV ranges from 0.3 to 4% in the general population [9]. There are only a few studies from India to document the relationship between the two diseases in question [10,11]. Most studies in India have shown a predominance of HCV genotype III with prevalence ranging from 12% to 64% [12]. But effect of HCV genotype III on the prevalence of DM is not widely known.

Type 2 diabetes is a debilitating disease condition especially in people above 30 years of age and this may evolve throughout their life-span. Hence, the co-infection of type 2 diabetes and HCV has been established to worsen these condition, with this scenario it has become very necessary for a screening exercise to determine the prevalence rate of HCV among diabetic patients so as to increase awareness of the populace and health practitioners on the dangers of the co-infectious state of this virus with diabetes. This study aims to evaluate the prevalence of hepatitis C virus (HCV) infection, clinical and biochemical status of liver function in Type 2 diabetes mellitus patients.

METHODS

The study was carried out on a sample of 300 consecutive persons both out patients and inpatients with confirmed type 2 diabetes at a tertiary care Hospital between January 2010 and December 2011. The exclusion criteria were history of taking hepatotoxic drugs, evidence of acute clinical hepatitis and those who are HBsAg positive. Data regarding age, sex, and background characteristics of diabetes (family history of diabetes, duration and type of diabetes mellitus) and reports of Serum bilirubin, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase were collected. A control group comprising of 3000 healthy blood donors were taken from the same hospital who visited the blood bank during the study period. Controls were excluded from the study if they had diabetes. All the sera were tested for the presence of antibodies against HCV by a third generation enzyme immunoassay kit. The tests were performed according to instructions with adequate controls.

RESULTS

In this study, out of the total 300 diabetic subjects studied, 33 (11%) turned out to be anti-HCV positive. All of these 33 subjects (100%) had type II diabetes. Among them, 15 (45%) subjects were male and 18 (55%) subjects were female. Regarding the duration of diabetes in the anti-HCV positive subjects, 16 (48%) had diabetes for less than 5 years, 10 (30%) had it for 6 -10 years, 7 (22%) had it for >11-15 years. On observing the age groups of anti HCV positive diabetic patients, it was noticed that 1 subject (3%) was in the 20-30years range, 8 (24%) in the 31-40 years range, 15 (45%) were in the 41-50 years range and 9 were (28%) were above 50years of age.

Considering individuals with family history of diabetes, it was realized that that those without family history had a higher prevalence of 60% while those with family history recorded a prevalence of 40%. Blood transfusion history was also compared

in HCV status in the type 2 diabetes patients. Those that never had any blood transfusion showed a higher prevalence rate of82% while those with an evidence of blood transfusion recorded 18%. Biochemical markers of liver function were found to be significantly higher in seropositive cases than seronegative patients. Controls were predominantly males with a median age of 27 years, among this 0.2% (7) were positive for HCV antibodies. The seroprevalence was 11% in patients with T2DM as compared to the control group in whom prevalence rate was 0.2%.Distribution of HCV pattern in type 2 diabetic patients was shown in Table 1.

Table 1: Distribution of HCV pattern in type 2 diabetic patients

Variables	HCVNegative (n=267)	HCV Positive (n=33)
Age		
20-30	22 (8.2%)	1 (3%)
31-40	68 (25.4%)	8 (24%)
41-50	137 (51%)	15 (45%)
50 above	40 (15%)	9 (28%)
Gender		
Female	142 (53%)	18 (55%)
Male	125 (47%)	15 (45%)
Family history of diabetes		
No	162 (61%)	20 (60%)
Yes	105 (39%)	11 (40%)
Duration of diabetes		
1-5 years	182 (68%)	16 (48%)
6-10 years	74 (28%)	10 (30%)
>11 years	11 (4%)	7 (22%)
History of blood transfusion		
No	259 (97%)	27 (82%)
Yes	8 (3%)	6 (18%)
Liver function tests		
ALT		
Normal	259 (97%)	6 (18%)
Increased	8 (3%)	27 (82%)
AST		
Normal	259 (97%)	6 (18%)
Increased	8 (3%)	27 (82%)
Serum bilirubin		
Normal	259 (97%)	6 (18%)
Increased	8 (3%)	27 (82%)
Alkaline Phosphatase		
Normal	259 (97%)	6 (18%)
Increased	8 (3%)	27 (82%)

DISCUSSION

The association of diabetes mellitus with chronic liver disease has been recognized many years ago. Russian endocrinologists reported abnormalities of glucose tolerance in 28% of patients with chronic liver disease in 1977 [13]. The increased frequency has been supported in many other studies. Simo *et al*, in 1996 found that HCV infection in diabetic patients was 4.39 times higher compared to the control group [14]. Similarly, a study in Pakistan reported a higher frequency of HCV infection, particularly genotype 2a, among diabetic patients [15]. The prevalence rate of 11% recorded in this study is in agreement with the work of Simo *et al* who also recorded 11.5% against 2.5% when prevalence of

HCV infection was checked among diabetic patients and blood donors respectively.

In this study the occurrence of HCV among type 2 diabetes was higher in subjects aged 41–50 years, this agrees with the findings of Mehta *et. al*. who showed that individuals of >40 years are more prone to type 2 diabetes. Equally in this study, subjects less than 33 years of age recorded a very low prevalence of HCV infection, which also agrees with the report of Mehta et al. that type 2 diabetes, occurs more often with HCV infection in those older than 40 years of age. It was also observed in some previous studies, that older patients were more likely to have HCV infection as compared to those in the younger age groups [16]. The high seropositivity recorded in older group may be because of more parenteral exposures as compared to younger people and thus greater chances of transmission of infection. We also observed that majority of the seropositive patients had diabetes of less than 5 years duration. This shows that the chronicity of diabetes mellitus is not a predisposing factor for HCV infection.

A significant difference was observed in participants with a family history of diabetes mellitus and those without. Interestingly, this coincides with the work of Muller *et al* and Del *et al* Where it was found that increased occurrence was associated with family history of diabetes mellitus and this variable may be one of the reasons of higher frequency of diabetes mellitus type 2 in this group of patients [17,18]. We also observed elevated liver enzymes; especially ALT has a direct relationship with seropositivity in the diabetic population, showing the relevance of this as a screening test in diabetics. In a study by Mason *et al*,

more than 20% of diabetes patients with consistently elevated serum aminotransferases had evidence of HCV infection [19].

CONCLUSION

There is a significant association between hepatitis C virus and type 2 diabetes from the findings of this research work which might be on the increase, this calls for an urgent need to educate the populace on the dangers of the co-infection of HCV and diabetes it's also vital for all health care practioners to come to terms with the early diagnosis and Management of this condition in affected patients. The presence of raised serum SGPT/ Alanine Amino Transaminase (ALT) levels in diabetic subjects should be considered as an indication for further investigations of chronic liver disease and especially HCV infection. Further investigation into the association of the two conditions is needed and may elucidate the temporal relationship and improved management strategies.

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