A Study of Seroprevalence of Hepatitis B and C in Type 2 Diabetes Patients in A Tertiary Care Teaching Institute in South India

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ABSTRACT

Introduction: some studies have pointed the relationship between diabetes and HBV and HCV. This study was done to find out the prevalence of HBV and HCV in diabetic population.

Material and Methods: Our study population included 500 diabetic patients. A detailed history, anthropometry and clinical examination was done and recorded from all the patients. We selected a reference population comprising of 500 subjects from Department of General Medicine, Govt. Stanley Hospital between May 2013 and Oct 2013. There were no major systemic disease in the control group including hypertension and hyperlipidemia.

Results: Comparisons were drawn between the diabetic patients group and the control group. There was no significant difference in HBsAg positivity in the diabetic group (8.4%) in comparison to the control population(7.8%). On the other hand anti-HCV positivity detected in 13 diabetic patients (2.6%) and in 6 control subjects (1.2%) confirming the seroprevalence rate of HCV in diabetic population.

Conclusions: The rate of seroprevalence of hepatitis B in the diabetic population does not vary from that in the non diabetic general population. The rate of seroprevalence of hepatitis C is greater in the diabetic population than that in the non diabetic population. Studies have proven that hepatitis C and diabetes can be a vicious combination. HCV in diabetes can hasten the progression and severity for hepatic fibrosis.

Keywords: Type2 DM, Hepatitis B virus, Hepatitis C virus.

INTRODUCTION

Diabetes and hepatitis

Liver, is the largest internal organ, with more than 500 metabolic functions including glucose metabolism. The inter relation between liver and diabetes mellitus is a long established one. It has been noted that people with liver dysfunction have some degree of dysfunction in glucose metabolism and vice versa. Almost 60% of cirrhotic have glucose intolerance.[1] 20% of cirrhotics have overt diabetes mellitus. Conversely diabetics are noted to have liver dysfunction ranging from abnormal liver function test values to steatohepatitis.

In 1994, in a study of 34 patients suffering from cirrhosis caused by HCV, Allison et al showed that 50% had diabetes mellitus. This is a stark contrast to the 9% of diabetes in patients with cirrhosis due to non HCV etiology. In the same year, Ozyilkan et al noted an increase in the presence of HCV antibodies in diabetics.[2] Many other studies have been conducted on this subject and have concurred with the above study. They all reported a link between diabetes and chronic HCV infection.

Studies have also shown that chronic HCV infection may cause insulin resistance and this will further contribute to the progression of fibrotic changes in the liver and the diabetes. Studies linking HCV infection and type 2 DM have been performed elsewhere. Wang et al reported that HCV infection and type 2 DM had a moderate association in certain counties in Taiwan.[3] Certain studies also concluded that there was no connection between HCV and diabetes.

A similar study has not been performed in the Indian population where the prevalence of diabetes is far greater than that in the above countries.

We wanted to ascertain if there is any connection between HBV infection and diabetes and if it could also lead similar complications attributed to chronic HCV. Our study explored seroprevalence of HBV and HCV in diabetic population.

Objectives

- To find out the prevalence of Hepatitis B infection in diabetic population.
- To find out the prevalence of Hepatitis C infection in diabetic population.
- To compare the prevalence with those in normal control population.
- To find out any association between the chronic HBV and HCV infection and diabetes. To suggest the relevance of routine screening for these chronic infections in diabetic population.

MATERIAL AND METHODS

For the study, T2DM patients attending outpatients clinic and medical ward in Govt Stanley Medical College Hospital were evaluated on the basis of clinical, biochemical and ultrasonographic findings. Patients were selected based on the inclusion exclusion criteria.

Inclusion criteria

1. All the patients with atleast a one year history of T2DM, on anti-diabetic agents and or insulin therapy.
2. Age between 25-65 yrs.

Exclusion criteria

1. Alcohol intake more than 30grams/day in males and more than 20 grams/day in females
2. History of any severe co-morbidity such as malignancy,

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3. Intake of medications known to cause fatty liver disease. -steroids, synthetic estrogens, heparin, calcium channel blockers, amiodarone, valproic acid, antiviral agents, methotrexate,
4. History of parenteral nutrition
5. Hereditary disorders and inborn errors of metabolism
6. Starvation
7. Acute fatty liver of pregnancy, HELLP Syndrome

Our study population included 500 diabetic patients and to compare the seroprevalence rates in patients without DM we selected a reference population comprising of 500 subjects without DM, hypertension and hyperlipidemia who came for preventive health check up at the Department of General Medicine, Govt. Stanley Hospital between May 2013 and Oct 2013. Before the start of the study ethical clearance was taken from the institutional ethical board and informed consent was taken from the patients.

A detailed history, anthropometry and clinical examination was done and recorded from all the patients. All patients in the study had undergone relevant investigations including complete blood count, blood sugar, liver function test, HBsAg, Anti HCV antibodies and Lipid Profile. Serological testing for HBsAg and anti HCV were done using third generation microparticle enzyme immune assay.

STATISTICAL ANALYSIS

Data was descriptively expressed as mean± SD or number and percent. Comparisons between groups were made using student t test for continuous variables and p values were ascertained for each variable. Multi variate logistic regression model was used to study the independent effects of each of these factors. These included socio-demographic variables, laboratory measurements and clinical characteristics

RESULT

Comparisons were drawn between the diabetic patients group and the control group. Mean age, BMI, ALT, and alcohol consumption were comparable between the two groups. FBG was significantly higher in the diabetic group. There was no significant difference in HBsAg positivity in the diabetic group (8.4%) in comparison to the control population (7.8%). On the other hand anti-HCV positivity detected in 13 diabetic patients (2.6%) and in 6 control subjects (1.2%) confirming the seroprevalence rate of HCV in diabetic population. As the prevalence rate increased only for anti-HCV positivity, we limited the analysis to searching the correlates of anti-HCV seropositivity in diabetic patients. The distribution of clinical characteristics and socio demographic variables were similar in both anti-HCV positive and anti-HCV negative patients. 60% of patients who were anti-HCV positive had normal ALT levels. In the control population, 39% had ALT levels in the normal range. 23% of anti-HCV positive patients had a prior history of blood transfusion, underlying the fact that blood transfusion even to date is the single most important risk factor for HCV virus transmission. 7.7% of anti-HCV positive patients were on hemodialysis which was significantly higher than the control population proving that hemodialysis is another risk factor in the epidemiology of HCV infection.

Table-1 depicts the comparison of study and control groups based upon the following parameters such as body
mass index, fasting plasma glucose, viral markers and alcohol consumption.

Table-2 shows the relationship between hepatitis C Vs smoking and alcohol. Table-3 explains the risk of hepatitis and their relationship between duration and therapy for diabetes.Table-4 depicts the relationship between hepatitis and previous exposure to blood and blood products and other risk factors like tattooing, i.v drug abuse.

	nTARFTTr Patients	Control Subjects	P-Value
	27±4.5	**24±3.9**	**<0.00i**
BMI			
FPG	155±55	85±12	<0.001
ALT	30±20	24± 15	<0.001
HBsAg			
Negative Positive	458 (91.6%) 42 (8.4%)	461 (92.2%) 39 (7.8%)	0.817
Anti-HCV			
Negative Positive	487 (97.4%) 13 (2.6%)	494 (98.8%) 6(1.2%)	0.165
Alcohol consumption			
No Yes	372 (74.4%) 118 (25.6%)	395 (79.0%) 105 (21.0%)	0.279

Table-1: Comparison of control and study subjects

DISCUSSION

In this study the sero prevalence rates of HBsAg and anti HCV were studied in both diabetic population as well as normal control population. Sero prevalence of HBsAg in diabetic population

	Anti-HCV negative n=(487)	Anti-HCV positive N=13	OR (95% CI)	P-Value
Educational status				
primary school/lower middle School/higher	350 (71.9%) 137 (28.1%)	9 (69.2%) 4 (30.8%)	1.00 1.14 (0.34-3.75)	0.835
Active smoking				
No Yes	317 (65.1%) 170 (34.9%)	8 (61.5%) 5 (38.5%)	1.00 1.17 (0.38-3.62)	0.791
Alcohol Consumption				
No Yes	366 (75.2%) 121 (24.8%)	10 (76.9%) 3 (23.1%)	1.00 0.91 (0.25-3.35)	0.884
Clinico-laboratory Measurements BMI				
<25 25-30	190 (39.0%) 194 (39.8%)	4 (30.8%) 4 (30.8%)	1.00 0.98 (0.24-3.97)	0.977

Table-2: Relationship between hepatitis C and smoking,alcohol and educational status.

>30	**103 (21.1%)**	**5 (38.5%)**	**2.31(0.61-8.77)**	**0.221**
ALT(IU/L) <24	292 (60.0%)	5 (38.5%)	1.00	
24-40	98 (20.1%)	4 (30.8%)	2.38 (0.63-9.05)	0.202
>40	97 (19.9%)	4 (30.8%)	2.41 (0.63-9.15)	0.197
Clinical characteristics Duration of diabetes <l year	49 (10.1%)	2 (15.4%)	1.00	
>lyr	438 (89.9%)	11 (84.6%)	0.62 (0.13-2.86)	0.535
Treatment regimen Diet control with/without OHA	390 (80.1%)	9 (69.2%)	1.00	
Insulin therapy with/without OHA	97 (19.9%)	4 (30.8%)	1.79 (0.54-5.93)	0.342
History of Jaundice No	472 (96.9%)	11 (84.6%)	1.00	
Yes	15 (3.1%)	2 (15.4%)	5.72(1.16-28.11)	0.032

Table-3: Duration and therapy of diabetes and hepatitis

History of hospital admin				
no Yes	412 (84.6%) 75 (15.4%)	11 (84.6%) 2 (15.4%)	1.00 1.00 (0.22 — 4.60)	0.999
History of surgical operation				
no Yes	464 (95.3%) 23 (4.7%)	12 (92.3%) 1 (7.7%)	1.00 1.68 (0.21 — 13.49)	0.625
History of blood transfusion				
no Yes	476 (98.1%) 9 (1.9%)	lO (76.9%) 3 (23.1%)	1.00 15.9 (3.73 — 67.6)	<0.001
History of i.v drug abuse				
Yes No	 487 (100.0%)	 13 (100.0%)		
History of tattooing				
no Yes	482 (99.0%) 5 (1.0%)	12 (92.3%) 1 (7.7%)	1.00 8.03 (0.87 - 74.1)	0.066
History of hemo dialysis				
No Yes	485 (99.3%) 2 (0.7%)	12 (92.3%) 1 (7.7%)	1.00 20.2 (1.71-238.4)	0.017

Table-4: Heaptitis and risk factors

was 8.4% in comparison to 7.8% in the control population showing no significant difference. However anti HCV was positive in 2.6% of the diabetic population in comparison to the 1.2% in the control group showing that individuals with diabetes mellitus had approximately 2 times higher rate anti HCV sero positivity.

Many previous studies conducted across the globe have also reported similar findings in terms of higher sero prevalence of HCV in diabetic patients.[11] However interpreting these studies should be done with caution as increased prevalence rates could merely be an artefact of control selection.[12] Mason et al collected the control group from a subset referred for radio iodine thyroid scans from the same clinic and hence in that study thyroid illness could be a contributing factor toward sero positivity. In our study the control group comprised of people who came for a routine preventive check up in our hospital. Type 2 DM patients in our hospital were at more risk of exposure to HCV when compared with the reference population but the sero prevalence rates of anti-HCV in our control population was still lower than the previous studies.

A common argument may be that diabetic patients are at increased risk for HCV because of self monitoring, insulin injection, frequent hospitalization etc. If true, HBV sero positivity should also have increased, which is not so in our case. Our study proves that the prevalence rate of HBV was similar to the control group showing that diabetes mellitus is not a risk factor for HBV sero positivity. Our study raises the possibility of a causal role of HCV infection in T2DM.[13]

CONCLUSION

The rate of seroprevalence of hepatitis B in the diabetic population does not vary from that in the non diabetic general population.The rate of seroprevalence of hepatitis C is greater in the diabetic population than that in the non diabetic population. Studies have proven that hepatitis C diabetes can be a vicious combination.HCV in diabetes can hasten the progression and severity for hepatic fibrosis.We advocate the routine screening of those who are diabetics for HCV.We advocate better safe practices during blood transfusion, hemo dialysis and surgery, to prevent transmission of HCV.

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