

ORIGINAL ARTICLE

Seroprevalence and Co-infection of Hepatitis B and Hepatitis C among Patients in a Tertiary Care Hospital in Eastern India

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Abstract

Introduction: Hepatitis B (HBV) and Hepatitis C (HCV) are two common viral infections causing cirrhosis.

Aim: The aim of this study was to find the seroprevalence of HBV and HCV along with occurrence of co-infection of HBV and HCV in patients attending a tertiary care hospital.

Materials and Methods: The study was done for a period of one year (January to December 2016) in the Department of Microbiology, Medical College, Kolkata. After obtaining ethical clearance and informed consent from the patients, serum samples were collected from all patients referred to Department of Microbiology for antibody to HCV and Hepatitis B surface antigen (HBsAg) screening. ELISA was performed for anti HCV antibody and HBsAg. The results and relevant clinical information were noted and analysis was done.

Results: A total of 10802 samples were received, of which 316 (2.92 %) were HBsAg positive, 115 (1.06%) were HCV antibody positive and a total of 7 (0.07%) patients were positive both for HBsAg and Anti HCV antibody. There was male preponderance. Anti HCV antibody was more common in age below 10 years and in thalassemia patients. Out of 7 patients positive for both, 5 patients were on regular blood transfusion due to beta thalassemia and 2 patients had history of chronic liver disease.

Conclusion: In this study, it was found that there was seroprevalence of 2.92 % of HBsAg, 1.06% of HCV antibody and 0.07% positive both for HBsAg and HCV antibody among the patients of a tertiary care centre in Eastern India.

prevalence. Diagnostic procedures include serum HCV antibody testing, HCV RNA measurement, viral genotype and subtype determination and, lately, assessment of resistance-associated substitutions. As long as a prophylactic vaccine is not available, the HCV pandemic has to be controlled by treatment and prevention strategies, effective screening programmes and global access to treatment.³

Single infection with either hepatitis B or hepatitis C virus represents one of the major causes of chronic liver disease globally. However, in endemic areas a substantial number of patients are infected with both viruses mainly due to the common routes of transmission. There are studies which have shown that dually infected patients carry a greater risk of advanced liver disease, cirrhosis and hepatocellular carcinoma compared with infection in patients by one virus. Due to lack of large scale population based studies the exact number of HBV/HCV co-infected patients is unknown. Moreover, the true number of patients with HBV/HCV co-infection is further underestimated due to the unknown prevalence of occult HBV infection in patients with chronic HCV infection. The reported prevalence of HBV/HCV infection in different studies reveals wide differences depending on the geographical region, the study population, the selection criteria of the patients' and the study design.⁴

There is paucity of studies regarding the co-infection of Hepatitis B and Hepatitis C in India and few studies that are available are mostly from North India. Hence, this study was designed to find the serological prevalence of

Introduction

Hepatitis B virus infection is a major public health problem worldwide, around 30% of the world's population show serological evidence of current or past infection. Hepatitis B virus is a partly double-stranded DNA virus with several serological markers like HBsAg, anti-HBsAb, HBeAg, anti-HBeAb, and anti-HBc IgM and IgG. It is transmitted through contact with infected blood and semen. A safe and effective vaccine has been available since 1981, and the implementation of universal vaccination in infants has resulted in a sharp decline in prevalence. Hepatitis B infection may lead to liver cirrhosis or hepatocellular carcinoma.¹

Hepatitis C is a major cause of acute

hepatitis and a common aetiological agent for cirrhosis of liver. It is the leading cause of liver transplantation and the most common chronic blood borne infection.² Hepatitis C virus (HCV) is a hepatotropic RNA virus that causes progressive liver damage, which might result in liver cirrhosis and hepatocellular carcinoma. Globally, between 64 and 103 million people are chronically infected. Major risk factors for this blood-borne virus infection are unsafe injection drug use and unsterile medical procedures (iatrogenic infections) in countries with high HCV

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Received: 07.05.2018; Accepted: 06.06.2019

Table 1: Gender distribution of the total population and samples positive for HBsAg, anti HCV or both

Gender	Total population (n = 10802)	HBsAg positive (n = 316)	Both positive (n = 7)	Anti HCV positive (n = 115)
Male	6320 (58.5%)	210 (66.5%)	6 (85.7%)	66 (57.4%)
Female	4482 (41.5%)	106 (33.5%)	1 (14.3%)	49 (42.6%)

Table 2: Age distribution of the total population and samples positive for HBsAg, anti HCV or both

Age (years)	Total population (n = 10802)	HBsAg positive (n = 316)	Both positive (n = 7)	Anti HCV positive (n = 115)
0 – 10	2902 (26.9%)	24 (7.6%)	5 (71.4%)	52 (45.2%)
11 – 20	2480 (22.9%)	44 (13.9%)	2 (28.6%)	24 (20.9%)
21 – 30	2790 (25.8%)	76 (24.1%)	Nil	11 (9.6%)
31 – 40	1650 (15.3%)	63 (19.9%)	Nil	11 (9.6%)
41 – 50	560 (5.2%)	53 (16.7%)	Nil	8 (6.9%)
51 – 60	310 (2.9%)	38 (12.1%)	Nil	6 (5.2%)
>60	110 (1%)	18 (5.7%)	Nil	3 (2.6%)

Table 3: Population type in the total population and samples positive for HBsAg, anti HCV or both

Population type	Total population (n = 10802)	HBsAg positive (n = 316)	Both positive (n = 7)	Anti HCV positive (n = 115)
Antenatal group	2658 (24.6%)	40 (12.6%)	Nil	1 (0.9%)
Pre-operative	1400 (12.9%)	65 (20.6%)	Nil	4 (3.5%)
Haemodialysis	2830 (26.2%)	97 (30.7%)	Nil	12 (10.4%)
Thalassemia	2974 (27.5%)	60 (18.9%)	5 (71.4%)	92 (80%)
CLD	940 (8.8%)	54 (17.2%)	2 (28.6%)	6 (5.2%)

Hepatitis B and Hepatitis C infection along with the occurrence of co-infection of HBV and HCV, risk factors and epidemiological features in patients attending a tertiary care hospital in Eastern India.

Materials and Methods

The study was done for a period of one year (January to December 2016) in the Department of Microbiology, Medical College, Kolkata. After obtaining ethical clearance from the institutional review board and informed consent from the patients, 4ml of blood in a clotted tube and relevant clinical information was collected from all patients referred to Department of Microbiology for antibody to Hepatitis C virus (HCV) and Hepatitis B surface antigen (HBsAg) screening. Serum was separated by centrifugation at 1500 rpm for 5 minutes.

The serum sample was used for performing Enzyme Linked Immunosorbent Assay (ELISA) for detection of anti HCV antibody by Hepa-Scan (Bhat Biotech, Bangalore, India) and HBsAg by Hepa-Scan (Bhat Biotech, Bangalore, India). The test was performed according to the manufacturer's instructions, optical density (OD) was noted and positive was taken above the cut-off value. The

relevant clinical information was also noted in the study proforma. All data were entered in Excel spreadsheet (Microsoft, USA) and analysis was done using SPSS version 16.

Results

A total of 10802 patients, who were referred to the Department of Microbiology, Medical College, Kolkata for anti HCV and HBsAg screening during the period of one year (January to December 2016) were included in the study.

Out of 10802 samples 316 (2.92 %) were HBsAg positive, 115 (1.06%) were HCV antibody positive. Among these patients, a total of 7 (0.07%) patients were positive both for HBsAg and anti HCV antibody. There was male preponderance seen in all groups (Table 1).

Anti HCV antibody was more common in age below 10 years (45.2%) whereas HBsAg was more positive in 21 to 40 years of age (Table 2). 5 patients positive for both HBsAg and HCV were less than 10 years age. Anti HCV antibody was significantly positive (P value is less than 0.0001 and Chi squared equals 18.992) among patients less than 10 years age.

Most of HCV antibody was present in thalassemia patients (80%) whereas

Table 4: Risk factors for the samples positive for HBsAg, anti HCV or both

Associated risk factor	HBsAg positive (n = 316)	Both positive (n = 7)	Anti HCV positive (n = 115)
Blood transfusion	126 (39.9%)	7 (100%)	88 (76.5%)
History of surgical procedure	1 (0.3%)	Nil	1 (0.9%)
Intravenous drug user	2 (0.7%)	Nil	Nil
History of sexual exposure	7 (2.2%)	Nil	2 (1.7%)
Not known	180 (56.9%)	Nil	24 (20.9%)

haemodialysis was related to HBsAg positive patients (Tables 3 and 4). HCV was significantly related to thalassemia patients (P value is less than 0.0001 and Chi squared equals 157.734). There was a prevalence of 92/ 2974 (3.1%) of HCV among thalassemia patients. Out of 7 patients positive for both HBsAg and HCV antibody, 5 (71.4%) patients were on regular blood transfusion due to beta thalassemia and 2 (28.6%) patients had history of chronic liver disease (CLD).

Discussion

Total global HCV prevalence is estimated at 2.5% (177 .5 million of HCV infected adults), ranging from 2.9% in Africa to 1.3% in Americas. The estimated prevalence of HCV in the whole Asian continent is 2.8%, accounting over 60% of the cases worldwide. The prevalence of anti-HCV in the general population of South Asia including Afghanistan, Bangladesh, India and Pakistan is 2.5%, being 6.7% in Pakistan and 0.8% in India.⁵ There is paucity of large-scale prevalence studies on Hepatitis C in the general population of India. The reported prevalence rates vary (range 0.09% – 2.02%) as shown by the large population based studies.⁶ This study showed a prevalence of 1.06% of anti HCV antibody among the patients of a tertiary care centre in Eastern India. In a community based study done in 1999 in West Bengal, among 2973 subjects, 0.87% were HCV antibody positive.⁷

The overall rate of HBsAg positivity has been reported to range between 2% and 8% in most studies.⁸ Based on the prevalence of Hepatitis B surface Antigen (HBsAg), different areas of the world are classified as having high ($\geq 8\%$), intermediate (2–7%) or low (<2%)

HBV endemicity. Countries which have high endemicity include South-East Asia, China, most of Africa, most of Pacific Islands, the Amazon basin and parts of the Middle East. Countries with intermediate endemicity include South Asia, Eastern and Southern Europe, Russia and Central and South America. The areas with low endemicity include United States, Western Europe and Australia.⁹ In the present study there is a prevalence of 2.92 % HBsAg positive cases. In a similar study done in Mumbai, out of 21782 patients screened for HBsAg, 2.42% were positive.¹⁰

There is a coexistence of HIV, HBV and HCV due to the common routes of transmission. In a study done in Morocco, out of 503 HIV-infected patients there was a prevalence of HIV/hepatitis co-infection in 10.6%; 5.2% of patients were HBV surface antigen positive, and 5.4% of patients were anti-HCV positive.¹¹ However, though there are quite a number of studies regarding co-infection of HBV or HCV in HIV patients, there are few studies regarding the co-infection of HBV and HCV and the rates are vastly variable. In a study done in Pakistan, it was seen that out of 845 patients 1.3% were seropositive for both HBsAg and anti-HCV co-infection.¹² In a study done in Delhi among a total of 106,238 blood donors tested, 18 were positive for HBV and HCV showing a prevalence of 0.017%.¹³ In another study done on 220 subjects no co-infection of HBV and HCV were found.¹⁴ In this study, however there is a prevalence of 0.07% co-infection of HBsAg and HCV antibodies.

There was male preponderance seen in this study. Anti HCV antibody was more common in age below 10 years (45.2%) which is contrary to the findings of Chowdhury *et al* where the prevalence of HCV increased from 0.31% in subjects <10 years of age to

1.85% in those \geq 60 years.⁷ HBsAg was more positive in 21 to 40 years of age which is similar to the prevalence of HBsAg of 2.97% and there was a peak prevalence after the second decade of life.¹⁵ Among the 7 patients having dual infection for both HBsAg and HCV 5 patients were less than 10 years age and 2 were in 11-20 years of age.

Anti HCV antibody was more common in thalassemia patients (80%) whereas haemodialysis was related to HBsAg positive patients. There are reports that the prevalence of HBsAg positivity in chronic kidney disease patients undergoing haemodialysis and renal transplant is 5.2–18.7%.¹⁶ There was a prevalence of 3.1% of HCV antibody among thalassemia patients. The prevalence of HCV was estimated 8% among thalassemia patients in Iran.¹⁷ Out of 7 patients positive for both, 5 (71.4%) patients were on regular blood transfusion due to beta thalassemia and 2 (28.6%) patients had history of chronic liver disease (CLD).

Conclusion

In this study, it was found that there is seroprevalence of 2.92% of HBsAg, 1.06% of HCV antibody and 0.07% positive for both for HBsAg and anti HCV antibody having co-infection or dual infection among the patients of a tertiary care centre in Eastern India. Anti HCV antibody was more common in age below 10 years and thalassemia patients. Out of 7 patients positive for both, 5 patients were on regular blood transfusion due to beta thalassemia and 2 patients had history of chronic liver disease. However, larger field studies are required to corroborate these findings.

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