

Seroprevalence and Coinfection of Hepatitis B and Hepatitis C Virus in a Rural Tertiary Care Hospital

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Abstract

Introduction: Hepatitis B virus (HBV) and hepatitis C virus (HCV) have several important similarities including worldwide distribution, hepatotropism, similar modes of transmission, and the ability to induce chronic infections that may lead to liver cirrhosis and hepatocellular carcinoma. Coinfection with both HBV and HCV is linked with higher morbidity as well as mortality and impacts health-care resource utilization.

Objectives: This study aims to understand the occurrence of HBV, HCV, and its coinfection in a rural tertiary care hospital.

Methods: The study was done from March 2022 to August 2022 in the Department of Microbiology of a rural tertiary care hospital. Patients who visited outdoor patient departments or were admitted to indoor patient departments were advised to undergo HBV and HCV tests for screening before any invasive/surgical procedure was included in the study. Enzyme-linked immunosorbent assay and rapid immunochromatographic test were performed for HCV antibody and hepatitis B surface antigen (HBsAg).

Results: A total of 10,765 samples were tested for HBV and HCV. Out of them 483 (4.48%) samples were positive for HCV antibody. HBsAg was positive in 195 (1.81%) samples. Coinfection of both hepatitis B and C was found in 10 (0.09%) cases. HCV antibody was detected in 257 (53.21%) males and HBsAg was detected in 127 (65.13%) male samples.

Conclusions: Strict adherence to universal precautions and proper disposal of used material should be implemented to decrease the risk of transmission of HBV and HCV. Immunization with HBV vaccine is recommended. Regular surveillance and precise estimate of the occurrence of hepatitis B, hepatitis C, and HBV/HCV co-infection would be needed to formulate policy decisions and plan communal health interventions.

Key words: Coinfection, Hepatitis B, Hepatitis C, Seroprevalence

INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) have several important similarities including worldwide distribution, hepatotropism, similar modes of transmission, and the ability to induce chronic infection that may lead to liver cirrhosis and hepatocellular carcinoma.^[1] HBV and HCV infections represent significant public health issues globally. They are important causes of morbidity and

mortality. An estimated 400 million persons are carriers of HBV worldwide; 75% of whom reside in Asia and the Western Pacific, and HCV infection is estimated at approximately 170 million people globally.^[2] HBV and HCV are endemic in India and have an etiological role in acute hepatitis, 50%–70%, of which leads to chronic liver disease in India, there are estimated 43–45 million hepatitis B surface antigen (HBsAg) carriers and 3%–4% of the Indian population is infected with HBV (HBsAg positive). Current estimations indicate that approximately 1.8%–2.5% of the Indian population is presently infected by HCV.^[3] HBV and HCV account for a substantial proportion of viral hepatitis, caused by either of the five hepatotropic viruses: A, B, C, D, and E. All of these viruses cause acute hepatitis showing symptoms of fatigue, loss of appetite, fever, and jaundice. The majority of the patients recover fully, but

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small proportion die due to acute hepatitis. Cirrhosis and hepatocellular carcinoma are common chronic sequelae of hepatitis B and C infections.^[4]

This study aims to understand the occurrence of HBV, HCV, and its coinfection in a rural tertiary care hospital.

METHODS AND MATERIALS

The study was done from March 2022 to August 2022 in the department of microbiology of a rural tertiary care hospital.

Inclusion Criteria

Patients who visited outdoor patient departments or were admitted to the indoor patient departments were advised to undergo HBV and HCV for screening before any invasive/surgical procedure was included in the study.

Exclusion Criteria

Previously diagnosed cases of HBV and HCV infection were excluded from the study.

Ethical Approval

Approval from the Institutional Ethical Committee was obtained before the commencement of the study. Informed consent was obtained from all participants before specimen collection.

Data Collection

Epidemiological information including demographic (age, sex, and occupation), clinical data, and information regarding risk factors (history of blood transfusion, intravenous drug abuse, sexual contact, and tattooing) was obtained from patients at the time of blood sample collection.

Specimen Collection

Universal (standard) safety precautions were observed during the collection and handling of the specimen. A volume of 5 mL venous blood sample was collected by venipuncture from all patients advised for HBsAg and HCV antibody tests. All the samples were labeled properly and processed.

Processing of Blood Sample

The blood was allowed to clot for 45 min at room temperature, and the serum was separated. Screening of HBV infection was done by determination of HBsAg using chromatography-immunoassay-based card test (diagnostic enterprises). Immunoglobulin G antibodies to HCV were determined using a chromatography-immunoassay-based test (HCV Tridot, Diagnostic Enterprises). Samples reactive by card test were further

confirmed by commercially available kit based on enzyme-linked immunosorbent assay (ELISA) (Hepalisa– J. Mitra and Co. Private Limited, India) for HBV and 3rd-generation ELISA (HCV Microlisa– J. Mitra and Co. Private Limited, India) for HCV according to the manufacturer's instructions.

RESULTS

The study was done from March 2022 to August 2022 in the Department of Microbiology of a rural tertiary care hospital. A total of 10,765 samples were tested for HBV and HCV. Out of them 483 (4.48%) samples were positive for HCV antibody. HCV antibody was detected in 257 (53.21%) males and 226 (46.79%) females [Chart 1]. HBsAg was positive in 195 (1.81%) samples. HBsAg was detected in 127 (65.13%) male samples and 68 (34.87%) female samples [Chart 2].

Coinfection of both hepatitis B and C was found in 10 (0.09%) cases [Chart 3].

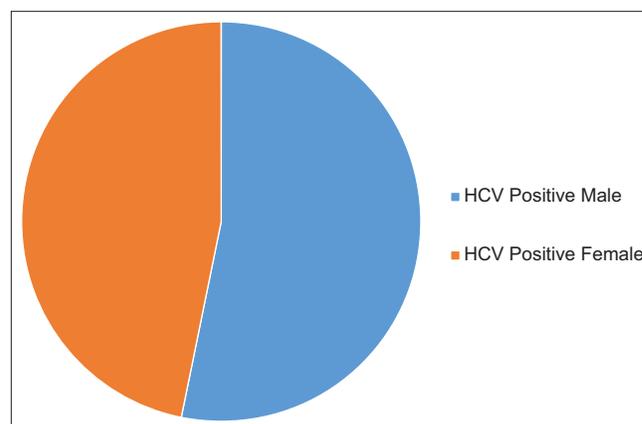


Chart 1: Hepatitis C virus antibody was detected in 53.21% of males and 46.79% of females

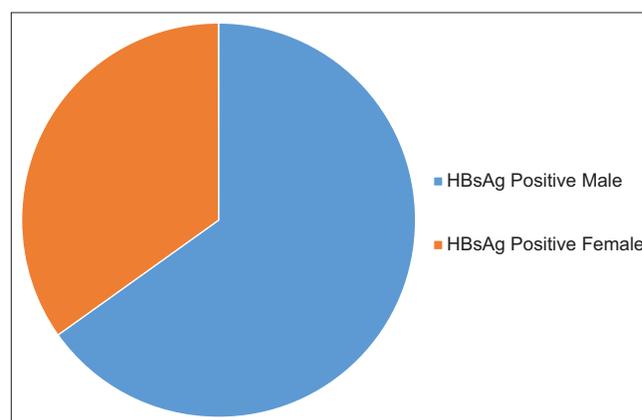


Chart 2: Hepatitis B surface antigen was detected in 65.13% of male samples and 34.87% of female samples

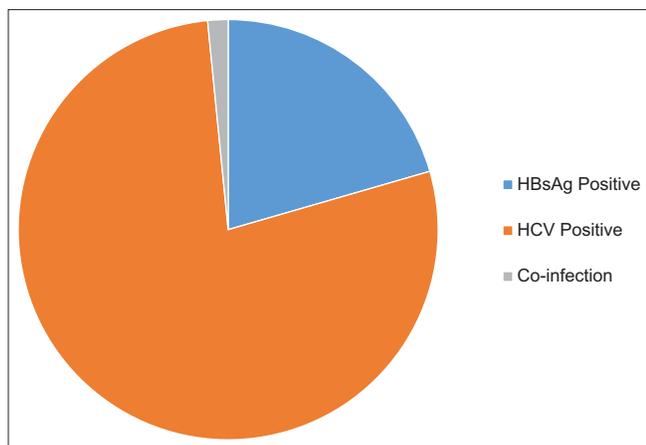


Chart 3: Hepatitis B surface antigen and hepatitis C virus coinfection was seen in 0.09% of cases

DISCUSSION

In the present study, a total of 10,765 samples were tested for HBV and HCV. Out of them 483 (4.48%) samples were positive for HCV antibody. HCV antibody was detected in 257 (53.21%) males and 226 (46.79%) females.

In the study done by Agarwal *et al.*, 3750 participants were screened for HBV and HCV infection, and seroprevalence of HCV was found to be in 1.76% population. The higher seroprevalence of anti-HCV antibodies was found among males, 36 males were HCV antibody positive, 30 females were HCV antibody positive.^[4]

In the study done by Rahaman *et al.*, a total of 10,802 samples were received, of which 115 (1.06%) were HCV antibody-positive.^[5]

In the study done by Tripathi *et al.*, HCV coinfection was present in 10/620 (1.61%) patients.^[6]

In the study done by Saravanan *et al.*, 2.2% of cases were HCV antibody-positive. Male gender predominance was observed (86%) (48 males and eight females).^[7]

In the study done by Chandra *et al.*, anti-HCV was positive in 10 (8.3%) cases.^[8]

In the study done by Ankur, the prevalence of anti-HCV antibodies was 4/358 (1.1%) patients.^[9]

In the study done by Malhotra *et al.*, the total 262 patients, 88 (33.5%) were found to be having HCV infection.^[2]

In the study done by Grewal *et al.*, in out of 100 cases, 40 were anti-HCV positive.^[3]

In the study done by Dinesha *et al.*, of 1612 samples tested for HCV antibody, 618 (38.3%) samples were found to be HCV seropositive.^[10]

In the study done by Shanmugam *et al.*, a total of 18,589 people were screened, HCV infection in 56 (prevalence 0.3%).^[11]

In the present study, a total of 10,765 samples were tested for HBV and HCV; out of them, HBsAg was positive in 195 (1.81%) samples.

In the study done by Malhotra *et al.*, (1.5%) cases were found to be positive for HBsAg.^[2]

In the study done by Grewal *et al.*, out of 100 cases, 26 were HBsAg positive.^[3]

In the study done by Agarwal *et al.*, overall, the seroprevalence of HBV infection was found to be 3.9%.^[4]

In the study done by Rahaman *et al.*, a total of 10,802 samples were received, of which 316 (2.92%) were HBsAg positive.^[5]

In the study done by Tripathi *et al.*, out of a total of 620 patients studied, HBV was detected in 2.25% of patients.^[6]

In the study done by Saravanan *et al.*, HBV was detected in 9% of patients.^[7]

In the study done by Chandra *et al.*, HBsAg was positive in 15% of cases.^[8]

In the study done by Ankur *et al.*, overall, the prevalence of HBsAg was (1.7%).^[9]

In the study done by Dinesha *et al.*, HBsAg was tested for 1612 samples and found 131 (8.1%).^[10]

In the study done by Shanmugam *et al.*, a total of 18,589 people were screened, with HBV infection detected in 303 (prevalence 1.63%).^[11]

In the present study, coinfection of both hepatitis B and C was found in 10 (0.09%) cases.

In the study done by Desikan *et al.*, the prevalence of HBV/HCV coinfection in India was found to be 1.89%.^[1]

In the study done by Malhotra *et al.*, coinfection with HBV/HCV was observed in 2 (0.8%) patients.^[2]

In the study done by Grewal *et al.*, 4% had coinfection of HBV and HCV.^[3]

In the study done by Agarwal *et al.*, coinfection with HBV/HCV was seen in 0.16%.^[4]

In the study done by Rahaman *et al.*, a total of 10,802 samples were received, total of 7 (0.07%) patients were positive both for HBsAg and anti-HCV antibodies.^[5]

In the study done by Tripathi *et al.*, coinfection of both (HBV/HCV) is in 0.16% of cases.^[6]

CONCLUSIONS

Awareness through health education of safe sexual practices and improved safety of blood products are among the most important preventive measures to control HBV and HCV infection. The blood used for transfusion should be screened for HBV and HCV by adopting methods such as polymerase chain reaction or using nucleic acid techniques. Strict adherence to universal precautions and proper disposal of used material should be implemented to decrease the risk of transmission of HBV and HCV. Immunization with HBV vaccine is recommended. Regular surveillance and precise estimates of the occurrence of hepatitis B, hepatitis C, and HBV/HCV coinfection would be needed to formulate policy decisions and plan communal health interventions.

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