

HEPATITIS B VIRUS AND HEPATITIS C VIRUS CO-INFECTION AMONG OUTDOOR PATIENTS AND INDOOR PATIENTS OF TERTIARY CARE HOSPITAL, BHAGALPUR, BIHAR, INDIA

Ranjan Kumar¹, Shiv Kumar Mehi², Sudha, Amit Kumar³

¹Tutor, Department of Microbiology, JLNMC, Bhagalpur, Bihar, India.

²Tutor, Department of Microbiology, JLNMC, Bhagalpur, Bihar, India

³Assistant Professor, Department of Obstetrics and Gynaecology, JLNMC, Bhagalpur, Bihar, India.

⁴Associate Professor, Department of Microbiology, JLNMC, Bhagalpur, Bihar, India.

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Corresponding Author:

Dr. Shiv Kumar Mehi,

Email: dr.skmehi@gmail.com.

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) have several important similarities including worldwide distribution, hepato-tropism, similar modes of transmission and the ability to life threatening critical illness that occurs most of tenin patients who do not have pre-existing liver disease. **Material & Methods:** This study was an observational study conducted in the Department of Microbiology, over a period of 1 year from June 2022 to May 2023 with following objectives to detect hepatitis B surface antigen (HBsAg) by rapid card test, to detect anti-HCV antibodies by rapid card test and to find the prevalence of co-infection with hepatitis B and hepatitis C viruses. Blood samples were received from patients irrespective of age and sex, constituted the material for the present study during the period of one year. The specimen included whole blood. All samples were tested on Hepa card and Tri-dot card for the detection of hepatitis B virus and hepatitis C virus respectively and results were interpreted as per Clinical Laboratory Standards Institute guidelines. **Results:** Out of 2600 patient's samples, 1200 (46.15%) patients were from OPD and 1400 (53.84%) were from IPD. 1250 (48.07%) were male patients and 1350 (51.92%) were female patients. Of age and sex, constituted the material for the present study during the period of 1 year. 196 patients were positive for hepatitis virus infection. **Conclusion:** Hepatitis virus infection was highest in the age group 21-40 and lowest in the age group above 80 years. Hepatitis B was more in males as compared to females and more in OPD as compared to IPD. Hepatitis C infection was seen more in males as compared to females and more in IPD as compared to OPD patients.

INTRODUCTION

Hepatitis viruses are a heterogeneous group of viruses that are taxonomically diverse but all are hepatotropic and cause acute inflammation of the liver.^[1] There are six types of hepatitis viruses i.e. hepatitis A, B, C, D, E, and G. Type F is provided to be a mutant of type B virus and not a separate entity so type F was deleted as a separate hepatitis virus.^[2] Infected patients are at higher risk of developing liver-related incidents, which include liver failure, liver cirrhosis and hepatocellular carcinoma.^[3] Acute hepatitis sometimes progresses to chronic hepatitis and it rarely leads to acute liver failure.^[4] Acute liver failure is a rare but life threatening critical illness that occurs most of tenin patients who do not have pre-

existing liver disease.^[5] Acute liver failure is an uncommon disorder that leads to jaundice, coagulopathy and multisystem organ failure.^[6] Hepatitis B and hepatitis C virus transmit through perinatal, parenteral and sexual route. Hepatitis B virus (HBV) is the most widespread and the most important type among hepatitis viruses. Through it commonly produces acute self-limiting hepatitis, which may be sub clinical or symptomatic; it is also capable of causing arrange of hepatitis complications including chronic hepatitis, fulminant hepatitis, liver cirrhosis and liver cancer. Hepatitis B virus is the only DNA virus among hepatitis viruses. It belongs to the family Hepadnaviridae, under the genus Ortho hepadna virus. Hepatitis B virus infects more than 300 million people worldwide and is a common cause

of liver disease and liver cancer.^[7]Hepatitis B virus is a complex 42 nm double-shelled particle. The envelope of the virus contains hepatitis B surface antigen (HBsAg). It encloses an inner icosahedral 27 nm nucleocapsid i.e. core, which contains hepatitis B core antigen (HBcAg).The viral deoxyribonucleic acid (DNA) is a closed ,circular, partially double-stranded molecule of 3.2kilo base (rcDNA).^[8]Under the electron microscope, sera from type B hepatitis patients show three types of particles: the most abundant form is a spherical particle, 22 nm in diameter; the second type of a particle is filamentous or tubular with a diameter of 22 nm and of varying length (~200 nm); and the third type of particle, far fewer in number, is a double-walled spherical structure, 42 nm in diameter. This particle is the complete hepatitis B virus. It was first described by Dane in 1970 and so is known as the Dane particle. The outer surface envelope is made up of HBsAg and inner 27 nm size nucleocapsid consist of core antigen (HBcAg) and pre core antigen (HBeAg) and partially double-stranded DNA. 9 Hepatitis C virus is a 50-60 nm virus with a linear and single-stranded RNA genome.^[9]There are about 175 million hepatitis C virus infected patients worldwide that constitute 3% of the world's population. Hepatitis C virus is a hepatotropic ribonucleic acid (RNA) virus that causes progressive liver damage.^[10]It consists of three structural proteins-the nucleocapsid core protein C and two envelope glycoprotein's (E1 and E2) and seven non-structural proteins-NS1, NS2, NS3, NS4A, NS4B, NS5A and NS5B.^[11]It belongs to the family Flaviviridae and genus hepacivirus.^[12]Hepatitis C virus (HCV) infection is an important cause of cirrhosis and hepatocellular carcinoma worldwide.^[13]Viruses of the Flaviviridae family possess a positive-strand RNA genome that in the case of HCV is 9.6 kb long and encodes for a single polyprotein of ~3,000 amino acids.^[14]Hepatitis B and hepatitis C virus infections represent significant public health issues worldwide.^[15]Hepatitis B virus and hepatitis C virus are distinct viruses with completely different life cycles.^[16]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.^[17]Acute HBV/HCV co-infection is more prevalent in patients who inject drugs.^[18]Co-infected patients represent a diverse group with various patterns of viral replication and great variations of immune profile.^[19]Patients with dual hepatitis B virus and hepatitis C virus infection have more severe liver disease and are at an increased risk for progression to hepatocellular carcinoma.^[20] Interactions between hepatitis B virus and hepatitis C virus have been difficult to study because of the lack of appropriate model systems.^[21]Dual infection with hepatitis B virus and hepatitis C virus in the same host ranges from 1 to 15%.^[22]

MATERIALS AND METHODS

The present study was undertaken to detect the prevalence of hepatitis B virus, hepatitis C virus and their co-infection in our tertiary care hospital. This study was an observational study conducted in the Department of Microbiology, over a period of 1 year from June 2022 to May 2023 with following objectives to detect hepatitis B surface antigen (HBsAg) by rapid card test, to detect anti-HCV antibodies by rapid card test and to find the prevalence of co-infection with hepatitis B and hepatitis C viruses. Blood samples were received from patients irrespective of age and sex, constituted the material for the present study during the period of one year. The specimen included whole blood. All samples were tested on Hepa card and Tri-dot card for the detection of hepatitis B virus and hepatitis C virus respectively and results were interpreted as per Clinical Laboratory Standards Institute guidelines.

RESULTS

Out of 2600 patient's samples, 1200 (46.15%) patients were from OPD and 1400 (53.84%) were from IPD. 1250 (48.07%) were male patients and 1350 (51.92%) were female patients.

Table 1: Frequency of patients from OPD and IPD

Department	No. of patients	Frequency
OPD	1200	46.15%
IPD	1400	53.84%
Total	2600	100%

Table 2: Distribution of patients according to sex

Sex	Total no. of patients	Percentage
Male	1250	48.07%
Female	1350	51.92%
Total	2600	100%

Table 3: Department wise distribution of hepatitis viruses in patients

Name of department	No. of patients	Percentage
Surgery	59	30.10%
Orthopaedics	27	13.77%

Medicine	21	10.71%
Psychiatry	18	9.18%
Ophthalmology	18	9.18%
OBG	17	8.67%
ENT	17	8.67%
CCU	4	2.04%
Chest	4	2.04%
Urology	3	1.53%
Other	8	4.08%
Total	196	100%

Table 4: Distribution of patients according to age

Age	No. of patients	Percentage
0-22	8	4.08%
23-42	65	33.15%
43-62	60	30.61%
63-82	61	31.12%
>82	2	1.02%
Total	196	100%

Table 5: Distribution of positive hepatitis virus of patients according to sex

Sex	Total no. of patients	Percentage
Male	120	61.22%
Female	76	38.77%
Total	196	100%

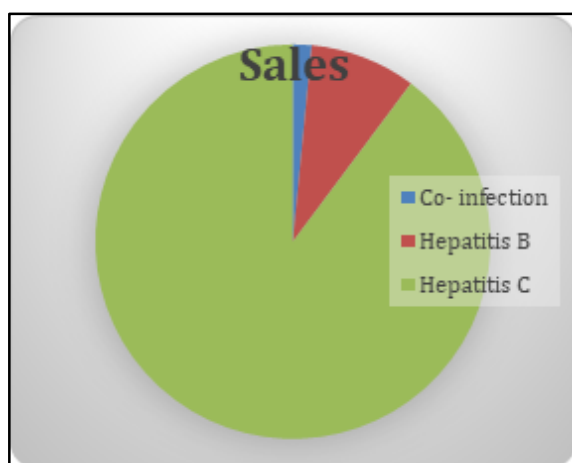


Figure 1: patient's samples positive for hepatitis B and hepatitis C virus infection

Co-infection -3 (1.53%), Hepatitis B -17(8.67%), Hepatitis C- 176 (89.79%).

DISCUSSION

A total of 2600 samples received from patients irrespective of age and sex, constituted the material for the present study during the period of 1 year.196 patients were positive for hepatitis virus infection.

Table 1 shows the frequency of patients from OPD and IPD. Out of 2600 patients 1200patients were from OPD (46.15%) and 1400 patients were from IPD (51.92%). Out of 2600 patients only 196 patients were positive with hepatitis B, hepatitis C and co -infection.

Table 2 Show the distribution of patients according to sex. Out of 2600 patients 1250 patients were male (48.07%) and 1350 patients were female (51.92%).

Table 3 Shows department wise distribution of hepatitis virus in patients. Out of 196 patients 59

patients were from surgery department (30.10%),27 patients were from orthopaedics department (13.77%), 21 patients were from medicine department (10.71%),18 patients were from psychiatry department (9.18%), 18 patients were from ophthalmology department (9.18%), 17 patients were from OBG department (8.67%), 17 patients were from ENT department (8.67%), 4 patients were from CCU (2.04%), 4 patients were from Chest (2.04%), 3 patients were from urology (1.5%) and 8 patients were others department (4.08%).

Table 4 Shows distribution of patients according to age. In present study, from 196 positive patients, hepatitis virus infection was highest in age group 23-42 and lowest in age group above82years which shows similar result comparable to study of Khan et al and Omote.^[27,28]

Table 5 Shows distribution of positive hepatitis virus of patients according to sex. Out of 196 patients 120 were male (61.22%) and 76 were female (38.77%). Prevalence of hepatitis virus among males (60.22%) and females (39.78%), comparable with the study of Junejo et al (67.5%) for males and (32.5%) for females and Agarwal et al (67.4%) for males and (32.6%)for females.^[22,23]

Figure 1 shows that out 196 patients only 17 patients with hepatitis B virus(8.67%), 176 patients with hepatitis C virus (89.79%) and 3 patients with co infection of hepatitis B and hepatitis C virus (1.53%). In the present study, prevalence of hepatitis B virus was 17(8.67%), which is comparable with the study of Malhotra et al (1.5%) and Hassuna et al (0.9%).^[15,19] Prevalence of hepatitis C virus was 176 (89.79%), which is comparable with the study of Hassuna et al (6%), Baseke et al (5.6%) and Lin et al (5.7%).^[19,21]Prevalence of co-infection of both hepatitis B and hepatitis C viruses were3 cases (1.53%)which is comparable with study of Malhotra

et al (0.8%) and Lin et al (0.7%).^[24] Out of 196 patients, 153 (60.2%) were male patients and 101(39.8%) were female patients.

CONCLUSION

Male patients showed more positivity of hepatitis virus as compared to female's. Patients were more from OPD as compared to IPD. Patients were more from surgery department and less from urology and other departments. Hepatitis virus infection was highest in the age group 21-40 and lowest in the age group above 80 years. Hepatitis B was more in males as compared to females and more in OPD as compared to IPD. Hepatitis C infection was seen more in males as compared to females and more in IPD as compared to OPD patients. Out of co-infected patients, both were males and both from IPD (one from surgery and one from the psychology department).

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