

Hepatitis C and Hepatitis B Infections and Their Co-Infection in Patients Attending a Tertiary Care Hospital

Rajeswari Pilli¹, N. Padmaja², Deborah Purushottam M.³

¹Department of Microbiology, Konaseema Institute of Medical Sciences, Amalapuram, Andhra Pradesh, India.

²Department of Microbiology, Konaseema Institute of Medical Sciences, Amalapuram, Andhra Pradesh, India.

³Department of Microbiology, Konaseema Institute of Medical Sciences, Amalapuram, Andhra Pradesh, India.

ABSTRACT

BACKGROUND

Most of the liver diseases worldwide is caused by hepatitis B virus (HBV) and hepatitis C virus (HCV) infections which manifest both as acute and chronic illnesses. HBV and HCV together cause chronic infection in more than 500 million people and deaths in one million. Hepatitis C virus (HCV) is a leading cause of chronic hepatitis, liver cirrhosis, and hepatocellular carcinoma (HCC). The present study was done to evaluate the proportion of HBV, HCV and HBV-HCV co-infections.

METHODS

Study was done from November to January 2020 and blood samples were collected from patients attending the inpatient and outpatient departments in KIM's hospital, Amalapuram. A total of 1850 blood samples were taken from patients before undergoing any invasive or surgical procedure for testing anti-HCV antibodies and Hepatitis B surface antigen. Tests were done by using Hepacard rapid immunochromatographic test for HBsAg and HCV Tridot ELISA for HCV antibodies.

RESULTS

Proportion of HBV and HCV was found to be 2.0 % and 3.1 % respectively with higher rates in males. HBV is found in majority of patients in 20 - 30 years age group; whereas, HCV was more commonly seen in 61 - 70 years age group. Coinfection with HBV and HCV was seen in 0.10 % of the individuals visiting the hospital.

CONCLUSIONS

Screening of high-risk individuals is compulsory because of comparatively higher rate of HBV and HCV infections among the hospital-based population. Most important preventive measure to control HBV and HCV infection is to bring awareness among people by health education of safe sexual practices and improved safety of blood and its products.

KEYWORDS

HCV, HBV, Co Infection, Cirrhosis

Corresponding Author:

*Dr. Rajeswari Pilli,
Flat No. T1, Gopiratna Towers,
D. No. 11 - 12 - 2, Badam Vari Street,
Kakinada - 533002,
Andhra Pradesh, India.
E-mail: rajeswari1807@gmail.com*

DOI: 10.18410/jebmh/2020/458

How to Cite This Article:

*Pilli R, Padmaja N, Purushottam DM.
Hepatitis C and Hepatitis B infections and
their co-infection in patients attending a
tertiary care hospital. J Evid Based Med
Healthc 2020; 7(39), 2209-2212. DOI:
10.18410/jebmh/2020/458*

Submission 03-07-2020,

Peer Review 15-07-2020,

Acceptance 18-06-2020,

Published 28-09-2020.

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BACKGROUND

Infection with hepatitis B and C viruses has become a major public health problem. 30 % of world population is affected by Hepatitis B infection and about 2 billion people have serological evidence of infection. Hepatitis C virus infects approximately 3 % of world population placing about 170 million people at risk of developing liver disease^{1,2} Cirrhosis and hepatocellular carcinoma are common chronic sequelae of Hepatitis B and C infections. Nearly 80 % of mortality is seen among patients of hepatocellular carcinoma and approximately 1.4 million people deaths every year, due to Hepatitis B and C together making it seventh leading cause of death worldwide.^{3,4} HBV and HCV is found in blood and blood - derived body fluids of infected person. Percutaneous or mucosal exposure to blood and other body fluids results in transmission. IV drug use or shared needles, multiple sex partners, use of unsterilized syringes and needles, organ / tissue transplant, tattoo/ piercing, invasive surgical procedure are possible risk factors for transmission. India has around 40 million HBV carriers accounting 10 % – 15 % of the entire pool of HBV carriers of the world.⁵ If the infection is acquired during infancy or childhood the risk of chronicity is more. Every year approximately one million infants are at risk of becoming carriers in India. Global epidemiology of Hepatitis B infection has reduced because of availability of effective vaccine since 1982. Most of the individuals having acute hepatitis C are asymptomatic, while approximately 70 % – 90 % of them become chronic carriers due to non - clearance of virus during the acute phase of disease. 5 to 20 % of individuals develop cirrhosis and death occurs in 5 % of infected people with chronic sequelae.⁶ HBV / HCV co - infection is seen in highly endemic areas and among people with a high - risk of parenteral transmission as both infections share common modes of transmission. Patients with dual HBV / HCV infection have a higher risk of progression to cirrhosis and decompensated liver disease. People with chronic infection mostly act as a potential source of infection for the community because they are not aware of the infection and go unnoticed which are not diagnosed. The present study was done to evaluate the proportion of HBV and HCV among patients attending KIMS Hospital, Amalapuram and also to know the patients coinfectd with both HBV and HCV infection.

METHODS

Institutional Ethical Committee approval was obtained before commencement of the study. The present retrospective study was done in the Department of Microbiology from November 2019 to January 2020. Blood samples were collected from patients attending the inpatient and outpatient departments in KIM's hospital, Amalapuram. A total of 1850 blood samples were taken from patients before undergoing any invasive or surgical procedure for testing anti HCV antibodies and Hepatitis B surface antigen were included in the study.

Data Collection

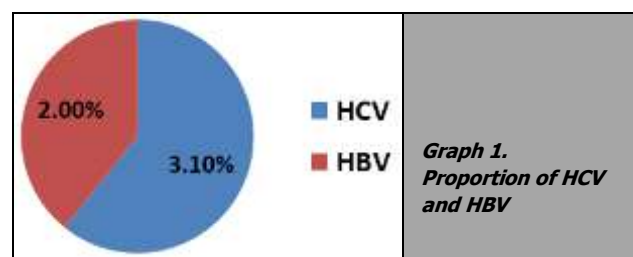
From previous records Hepatitis B antigen and Hepatitis C antibodies data was collected along with the patient's age, gender, residence, education, marital status, risk factors and department.

Processing of Sample

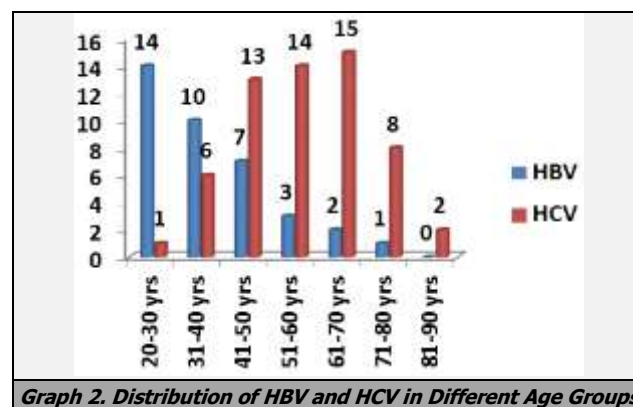
Hepatitis B surface antigen was detected by Hepacard rapid immunochromatographic test (J. Mitra and Co. Private Limited, India) and screening for HCV antibodies was done by fourth generation HCV Tridot ELISA (J. Mitra and Co. Private Limited, India).

RESULTS

In the present study, a total of 1850 patients was screened for HCV and HBV infection. Of which 59 people were positive for HCV antibodies making the overall proportion of Hepatitis C virus infection as 3.1 % and 37 people were HBsAg positive with a proportion of 2 % for HBV infection (Graph I).



In case of HCV, 35 (59 %) cases were males and 24 females (41 %) showing male predominance. Similarly, HBV also showed majority in males about 23 (62 %) and in females 14 cases (37 %). Majority of HCV cases are seen in the age group of 61 – 70 yrs. whereas HBV was more among age group 20 – 30 yrs. (Graph II).



Graph II shows HBV proportion is more in 20 - 30 years age group and then gradually decreased with increase in age whereas HCV is least seen in 20 - 30 years & 81 - 90 years age and goes to peak level in 61 - 70 years followed by 51 - 60 years age group.

Table I shows distribution of HBV and HCV positive individuals according residence, education and marital status. Highest percentage of HCV and HBV seen in married, uneducated and rural people.

Marital Status	HCV (n = 59)		HBV (n = 37)	
	Frequency	%	Frequency	%
Married	54	91.5 %	19	51 %
Single	5	8.4 %	18	49 %
Education				
Educated	9	15 %	12	32 %
Uneducated	50	85 %	25	67 %
Residence				
Urban	4	7 %	3	8 %
Rural	55	93 %	34	92 %

Table 1. Profile of HCV and HBV Positive Individuals

Department	HCV (n = 59)	HBV (n = 37)
Medicine	32	24
Surgery	11	4
Obstetrics & Gynaecology	3	5
Ophthalmology	5	1
Orthopaedics	8	3

Table 2. Department Wise Distribution of HCV and HBV Positive Individuals

Among 1850 patients, only 2 individuals (0.10 %) were found to be co - infected with both HBV and HCV infection. All co - infected patients were males (100 %) and belong to age group 51 - 70 years. These co - infected cases had chronic viral hepatitis and blood transfusion was the risk factor identified in one (50 %) co infected case.

DISCUSSION

Hepatitis B and C is a serious "silent epidemic" in India. Chronic carriers are sometimes unaware of their status and continue to infect others. In the present study proportion of Hepatitis B infection was 2 % in hospital based population. Various other hospital based population studies in many parts of India such as Uttar Pradesh, Rajasthan and Karnataka the proportion of HBsAg was 3.9 %, 0.87 % and 1.63 % respectively.^{7,8,9} Seroprevalence of Rajasthan and Karnataka was less than our present study whereas Uttar Pradesh seroprevalence was much higher than our study. The prevalence of Hepatitis B infection depends on host factors, behaviour and environment and so it not only varies in different countries but also different regions of our country.

The proportion of HCV in the present study was 3.1 % which was higher than Agarwal et al⁷ done in Uttar Pradesh 1.76 % and Abhijit et al¹⁰ in North East India 0.4 %. Higher prevalence of HCV about 5.5 % noted in Haryana done by Sharma A et al.¹¹ Similar to HBV, seroprevalence of HCV also varies in different parts of India.

In India, the prevalence of HBsAg is 3 - 4.2 % and antibodies against HCV are present in approximately 15 million people with a prevalence rate of 2 %.¹² In the present study proportion of HCV is higher compared to HBV. Availability and implementation of HBV vaccination may reduce the prevalence of HBV. HCV because of its ability of

persistence and production of chronic and irreversible liver damage along with non - availability of vaccines made HCV more severe than HBV and a major public health concern.

In the present study males were predominant in both HBV (62 %) and HCV (59 %) compared to females which was in correlation with other studies like Agarwal et al, Abhijit et al and Sharma A et al. This may be because females have more intense innate, humoral and cellular immune responses to viral infections and to vaccination compared to male subjects. On the other hand estradiol and oestrogen receptors protect liver cells from oxidative stress, inflammatory damage and apoptosis which contribute to fibrosis and malignant transformation preceding HCC.¹³ Majority of HBV cases were in 20 - 30 years age group in the present study which was in correlation with Abhijit et al whereas HCV was more seen in 60 - 71 years age group in correlation with Reid et al.¹⁴ Mostly the primary reason for HCV in older age group may be because of longer duration of this infection.

In the present study HCV and HBV infection was more in married people rather than unmarried which is correlating with other studies.⁷ As route of transmission is sexual contact in HBV and HCV infection, it is more common in couples than singles.

In the present study only 0.10 % were coinfectd with both HBV and HCV which was approximately in correlation with Agarwal et al (0.16 %) and lesser than Saravanan et al¹⁵ (5.9 %). Coinfected people are at higher risk to develop Hepatocellular carcinoma and other life threatening complications.

Blood transfusion was the risk factor for both HBV and HCV infections. Other risk factors like unsterilized needles and syringes also attributed to HBV outbreaks in various parts of India. Preventive measures against HBV were improved by inclusion of HBV vaccination in National Immunization schedule all over country by Government of India in 2011. Screening all donors for HCV and HBV before blood transfusion also one of the major preventive measure for these infections.

CONCLUSIONS

Screening of high-risk individuals is compulsory because of comparatively higher proportion of HCV and HBV among the hospital-based studies and also because it is a major public health concern in the rural population. Risk of liver failure increases with co infection of both HCV and HBV. Preventive measures like safe injections, safe blood supply, health education about awareness of safe sex, early detection of infection and implementation HBV vaccination in high risk groups will lead to improved public health. All viral infection studies should be under surveillance for improvement of health care.

Financial or Other Competing Interests: None.

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