

Original Research Article

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Seroprevalance of Viral Hepatitis in a Tertiary care Hospital in North India

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ABSTRACT

Keywords

Seroprevalence,
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Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. In recent years India and other transitional economies are showing a significant epidemiological shift of HAV infection from high endemicity to intermediate endemicity. Approximately 240 million people are chronically infected with HBV worldwide, while 150 million people are infected with HCV. There is a need for study of these etiological agents in jaundice for appropriate management as well as prevention of viral hepatitis. The aim of the present study was to evaluate seroprevalence of viral hepatitis A, B and C and E in patients presenting with viral Hepatitis. The study population comprised of 9263 patients presenting with acute hepatitis. Samples were collected from patients with clinically suspected acute infectious hepatitis at Hospital. Serum samples were collected. Seroprevalence rate was calculated and stratified by age. Out of the 9263 adults with acute viral hepatitis studied, HAV was found to be the most common etiological agent (12.3%), followed by HEV (4.97%), HBV (3.54%) and HCV (2.08%). Co-infections with more than one virus were present in 7 cases; HBV-HCV co-infection being the most common.

Introduction

Hepatitis is an inflammation of the liver, most commonly caused by viral infections. Hepatitis A and Hepatitis E virus (HEV) is considered a major etiological agent of enterically-transmitted viral hepatitis.

Hepatitis A infection is endemic in less developed countries, although a decrease in its prevalence has been observed recently in areas where sanitary conditions have been improving (de Paula *et al.*, 2001). Hepatitis B virus (HBV) is transmitted by parenteral, vertical and sexual

routes, whereas hepatitis C virus (HCV) is usually transmitted by transfusion (de Paula *et al.*, 2001; Acharya *et al.*, 2006).

All types of viral hepatitis produce clinically similar illness. These range from asymptomatic and inapparent to fulminate and acute fatal infections on one hand, and from subclinical persistent infections to rapidly progressive chronic liver disease with cirrhosis and hepatocellular carcinoma (Mohana Lakshmia *et al.*, 2011) on the other.

Areas of the world can be characterized as having high, intermediate and low endemicity for hepatitis A. In recent years India and other transitional economies are showing a significant epidemiological shift of HAV infection from high endemicity to intermediate endemicity (Elisabetta Franco *et al.*, 2012).

According to the World Health Organisation (WHO), approximately 240 million people are chronically infected with HBV worldwide, while 150 million people are infected with HCV (Rachna Behal *et al.*, 2008).

There is a need for study of these etiological agents in jaundice for appropriate management as well as prevention of viral hepatitis. Since there is paucity of data regarding seroprevalence of viral hepatitis in North India therefore, this study was undertaken to determine the prevalence of hepatotropic viruses among patients presenting with viral hepatitis.

Materials and Methods

This prospective study was conducted in the Department of Microbiology at Lady Hardinge Medical College, which is a tertiary care hospital in Northern India, from January 2013 to August 2015. Samples were collected from patients with clinically suspected acute infectious hepatitis at Hospital. Serum samples were collected from 9263 patients.

The material collected was whole blood using sterile disposable syringes under aseptic precautions. 5ml of blood was withdrawn by venepuncture, and it was collected in a sterile test tube without adding any anticoagulant. Serum was separated and stored at -20°C until tested. The serum samples were tested by using ELISA Kits

for the following viral markers.

Hepatitis B virus surface antigen (Biorad ELISA HbsAg)

IgM antibodies to Hepatitis A virus. (DRG Diagnostics HAV IgM).

IgM antibodies to Hepatitis E virus. (MBS SRL HEV IgM).

Antibody Hepatitis C virus. (Biorad ELISA Anti HCV

The optical density (OD value) value was taken in ELISA reader and cut off value was calculated as per manufacturers guidelines. All serum samples having antibody index above 1.1 were considered positive and those below 0.9 were taken as negative.

Results and Discussion

A total of 9263 patients were evaluated. Of the 9263 patients, 1906 were children, and 7357 were adults. Table 1 refers to the general characterization of the sample, with the population distribution according to age.

Out of 9263 patients, viral aetiology was confirmed in 622 (6.7%) cases while in 8641 (93.2%) cases no hepatitis virus could be detected. Hepatitis A virus was found in the maximum number of cases (12.3%), followed by HEV (4.97%), HBV (3.54%) and HCV (2.08%).

Table 2 compares seroprevalence of viral hepatitis in children and adults. In children hepatitis A showed the highest seroprevalence (31.92%) followed by HBV (4.09%) while in adults hepatitis E had the highest seroprevalence (6.5%), followed by HBV (4.03%) and HCV (2.13%).

Table 3 shows the age-specific prevalence of

parenterally-transmitted hepatitis viruses (HBV and HCV). There was a strong trend for increasing HBV infection rate with increasing age. High rates of HBV infection were seen in 51-60 years (9.32%) and above 60 years (14.1%). The age-specific seroprevalence of HCV increased with age, with the highest prevalence at the above 60 years (8.39%) followed by 51-60 years (1.3%) and 1-10 years (1.3%) respectively.

Highest prevalence of HAV and HEV was seen in the age group of 1-10years (39.62%) and 21-30 years respectively. Infection with more than one virus was detected in 7 cases, the most common being HBS and HCV co-infection in 3 cases. Co-infection of HEV with other viruses was present in 3 cases (1 case of HEV with HCV and 2 cases of HEV with HAV).

The present study was conducted to evaluate the seroprevalence of Hepatitis A, B, C and E viral markers among children and adults. In our study, HAV (12.3%) was identified to be the most common cause of acute hepatitis followed by HEV (4.9%), HBV (3.54%) and HCV(2.08%). Similar finding have been reported by P. Jain (Jain *et al.*, 2013) HAV (26.96%) was identified as the most common cause of acute hepatitis followed by HEV (17.97%), HBV (16.10%) and HCV (11.98%).

In our study Hepatitis A virus was commonest etiological agent in children (31.9%) whereas HEV (6.3%) was the commonest etiological agent among adults. In other studies Lakshmi *et al.*, (2011) from South India reported seroprevalence of HBV as the commonest cause of viral hepatitis in adults followed by HEV (29.8%). In our study prevalence of Hepatitis A in children was found to be 40.5%. whereas Tandon (Tandon *et al.*, 1984) and panda (Prakash *et al.*, 1998) reported higher incidence of hepatitis A in children, 67% and 55.8%

respectively. Kazemi (Seyed *et al.*, 2007) *et al.*, in Iran reported high incidence of HAV 44.3% in children. The high prevalence rate of hepatitis A in children is attributed to their susceptibilities to infection due to poor hygiene, overcrowding and poor sanitary conditions, when there is abundant shedding of HAV in the faeces.

Seroprevalence of hepatitis B virus infection is low in our study (3.54%) when compared to other studies by P. Jain 26.96%⁶. LiviaMelo Villar (LiviaMelo *et al.*, 2014) from Brazil reported HBV infection 1.8%, Karatekin *et al.*, from Turkey reported 3.8%. Wanga B reported the overall seroprevalence of HBV 6.1%.

In age wise incidence lowest seroprevalence of Hepatitis B was seen in 0-1years age group which indirectly indicates the low incidence of vertical transmission of hepatitis B infection. The successful introduction of the HBV vaccine into the National Immunization Program in India has had a great impact on the prevalence of HBV markers among children. The results of the present study showed that universal vaccination of infants has contributed directly to the reduction in the prevalence of HBV.

The peak prevalence of hepatitis B and Hepatitis C was observed in the older age groups, above 50 yrs. Higher prevalence in older age groups may be attributed to iatrogenic factors including vaccinations by the use of unsterilized kits, transfusion of unscreened blood, and etc. Further the trend of immunization against hepatitis-B has been introduced in the recent few years. Therefore the older age group population having a higher prevalence of HBs Ag de in our study is presumptively due to lack of immunization against the disease in their time.

Table.1 Number of patients in different age groups

Age group	No. of patients
0-1 yr	153 (0.99%)
1-10 yrs	874 (7.4%)
11-20yrs	879 (22.3%)
21-30yrs	4027 (46.7%)
31-40yrs	1885 (20.3%)
41-50yrs	829 (8.9%)
51-60yrs	354 (3.8%)
Above 60 yrs	262 (2.8%)
Total	9263

Table.2 Seroprevalence of viral hepatitis in children and adults

Viral Hepatitis	Children	Adults
HBV	4.09%	4.03%
HCV	1.8%	2.13%
HAV	31.9%	4.43%
HEV	1.2%	6.3%

Table.3 Seroprevalence of Hepatitis B and Hepatitis C in different age groups

Age group	Total no. of patients	HBV	HCV
0-1yr	153	2 (1.3%)	4 (2.6%)
1-10yr	874	28 (3.2%)	12 (1.3%)
11-20 yr	879	48 (5.4%)	20 (2.2%)
21-30yr	4027	142 (3.5%)	67 (1.66%)
31-40 yr	1885	63(3.34%)	35 (1.85%)
41-50 yr	829	22 (2.65%)	12 (1.4%)
51-60yr	354	33 (9.32%)	21 (5.9%)
Above 60yr	262	37 (14.1%)	22 (8.39%)
Total	9263	328(3.54%)	193 (2.08%)

In our study seroprevalence of HCV was low (2.08%) in children and adults. Jain *et al.*, reported a high prevalence of HCV was seen in both children (6.29%) and adults (18.54%). Mushtaq *et al.*, (2009) from Aligarh reported low seroprevalence of HCV in children (2.03%)

In conclusion, viral hepatitis is a significant problem in North India. The high incidence of HAV in children shows that there is a

need for proper sanitation and including hygienic food habits. Health education of parents is also necessary to control these infections in children. Our present study indicates vaccination of adults against hepatitis B virus has led to decrease in the incidence of hepatitis B.

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