Seroprevalence of Hepatitis E from a Tertiary Care Hospital in Central Delhi, India

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Hepatitis E virus (HEV) is a spherical, non-enveloped, single stranded RNA virus. It has five genotypes. Enterically transmitted hepatitis E virus is a major cause of outbreaks & sporadic cases of viral hepatitis in developing countries like India. Several reports are available in India about well characterised HEV cases, which are mainly about large scale epidemics in communities. However information about the clinical and epidemiological characteristics of HEV cases which may be epidemic or sporadic in origin are scanty in India. This study was planned to determine IgM antibodies and thereby evaluate the Seroprevalence of Hepatitis E in patients with acute hepatitis in Central Delhi & adjoining areas. Prevalence of hepatitis E was studied over a period of two years in 3945 patients by the demonstration of IgM antibodies. In 3945 patients 661 (16.75%) were positive for hepatitis E. Hepatitis E was mainly seen in between April-June. Primary prevention is the cornerstone of HEV control which mainly depends upon improvement of sanitary conditions.

Key Words: Seroprevalence, Hepatitis E virus, Viral Hepatitis, Enterically transmitted.

Acute viral hepatitis E, a self limiting disease presenting as acute, icteric hepatitis, is caused by Hepatitis E virus (HEV). It is a small, non-enveloped RNA virus, icosahedral in shape and 27-34nm in diameter. It has five genotypes: genotype 1 (Asia-Africa), genotype 2 (United States), genotype 3 (Mexico), genotype 4 (Beijing, China) and genotype 5 (Europe). HEV is excreted in faeces and is transmitted by the fecal-oral route usually through contaminated water. It has a long incubation period (28-40days) and affects older children and adults.

HEV has been responsible for major outbreaks of acute infections in developing countries of Asia, Africa and Latin America over the last 50 years. The first documented epidemic of HEV was reported in New Delhi, India in 1955-1956, and 29,300 people were affected. Outbreaks have been reported from several countries of South and South-East Asia, Eastern Europe and North and East Africa. A major outbreak was reported from South Xinjiang in Uighar region of China, in 1986-1988 which lasted for 20 months. In this outbreak 1,19,000 cases were reported. In 1991 HEV outbreak occurred in India (Kanpur) and it affected over 79,000 cases. However information about clinical and epidemiological characteristics of HEV cases which may be from epidemic source or sporadic in origin are scanty in India. So the present study aims to determine the occurrence of specific IgM antibodies to HEV in clinical cases of hepatitis and to correlate the same with existing liver conditions.
MATERIAL AND METHODS

A total of 3945 patients (out-patient department and admitted) with suspected diagnosis of infectious hepatitis presenting to Microbiology Department of Dr R.M.L. Hospital & P.G.I.M.E.R., New Delhi were included. The study was carried out between July 2009 to June 2011. 3-5ml of blood was collected from all these patients. IgM antibodies to HEV was determined using a commercially available IgM capture ELISA (Asia-lion Biotechnology, China) using manufacturer’s instructions. Test was considered positive if the sample optical density (OD) was equal to or higher than cut off value (mean of negative control+0.10). The serological status for other hepatitis markers namely HBsAg (HBV), IgG HCV and IgM HAV were also reviewed. A record of liver function tests (LFT) profile of all these patients were also maintained along with demographic and environmental variants.

RESULTS AND DISCUSSION

Out of a total of 3945 samples, 661 serum samples were positive for HEV IgM. Amongst the sero-positive patients, percentage of males affected were much more as compared to females. Age-wise distribution of Hepatitis E positive patients is shown in Table 1. There was association of HEV and other liver conditions as shown in Table 1. Analysis of results in various months showed its presence mainly in summer season as shown in Fig 1.

HEV is the causative agent of hepatitis E and has been assigned the genus Hepevirus, family Hepeviridae. HEV is enterically transmitted and causes an acute and generally self-limiting infection of the liver but with a higher mortality in general when compared to infections with Hepatitis A virus (HAV), which is transmitted via the same route. The classical epidemiological studies by Vishwanathan4 and recent serological study by Wong et al8, Khuroo9, Panda et al.,10 have convincingly demonstrated that HEV is an important cause of Non-A Non-B viral hepatitis. Occurrence of HEV specific IgM antibodies was noted in 16.75% of serum samples in our study. Similar findings (17.3% from Tamil Nadu3 and 18.8% from Karnataka11) have been reported from other parts of India and also from Iraq (19.4%)12 and Pakistan (14.1%)13. In the current study male preponderance was noted (70.8%) and this correlates with findings of another study from India (67.3% from Karnataka).11 The youngest person found to be sero-positive was 8 months old and oldest person was 78 years old male. However, older children and adults upto 50 years were found to be more susceptible (19.28%) as compared to younger children and adults over 50 years of age. This was similar to a study from Tamil Nadu in which older children (>12years) and adults were more susceptible (18.5%)1 but in another Indian study from Karnataka adults above 20 years of age were more susceptible (20.17%)11. Amongst the 661 HEV positive cases 13 (1.97%) were found to be co-infected with hepatitis B virus (HBsAg positive ). This corroborates with another study.

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>Male</th>
<th>Female</th>
<th>Total no positive (%)</th>
<th>HAV</th>
<th>HCV</th>
<th>HBsAg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>27/219</td>
<td>8/145</td>
<td>35/364 (9.6)</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>11-20</td>
<td>75/256</td>
<td>27/181</td>
<td>102/437 (23.3)</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>21-30</td>
<td>123/515</td>
<td>126/584</td>
<td>249/1099 (22.7)</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>31-40</td>
<td>185/1057</td>
<td>16/159</td>
<td>201/1216 (16.5)</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>41-50</td>
<td>41/251</td>
<td>8/119</td>
<td>49/370 (13.2)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>51-60</td>
<td>12/163</td>
<td>5/85</td>
<td>17/248 (6.8)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&gt;60</td>
<td>5/114</td>
<td>3/97</td>
<td>8/211 (3.8)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>468/2575</td>
<td>193/1370</td>
<td>661/3945 (16.75)</td>
<td>13(1.97)</td>
<td>1(0.15)</td>
<td>9(1.36)</td>
</tr>
</tbody>
</table>

Table 1. Age and sex-wise distribution of IgM-HEV Seropositive patients and its association with other viral markers

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from Karnataka. These findings can be attributed to the fact that Delhi & Karnataka are meso-endemic zones for HBV. Only 1.36% HEV infected patients were positive for IgM HAV antibodies. This may be due to common mode of transmission i.e contaminated food and water. A case (0.9%) was also associated with hepatitis C and this correlates with co-infection rate reported in other studies.

CONCLUSION

In summary, we found that HEV was commonly seen in older children and adults. Since hepatitis E is rampant in India, for both epidemiological and sporadic hepatitis cases, the prevention strategies should aim at providing clean drinking water, proper sewage disposal and good health. Travelers to endemic regions must take precautions against the consumption of contaminated water. Although infection via food appears to be much less common for hepatitis E than for hepatitis A, travellers must maintain vigilance about the risks of contaminated water, ice and food.

REFERENCES


Fig. 1. Seasonal distribution of HEV positive cases
Delhi and transmission studies in rhesus monkey. *Hepatology* 1989; **10**: 466.


