Prevalence of Enteroically Transmitted hepatitis viruses in patients attending a tertiary - Care Hospital in South India

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ABSTRACT

The prevalence of enterically transmitted hepatitis viruses, namely, hepatitis A virus (HAV) and hepatitis E virus (HEV) were studied in 404 patients with acute hepatitis attending a tertiary-care hospital in south India. Presence of current HAV/HEV infection was ascertained by the demonstration of IgM antibodies. In 381 patients tested for both agents, HAV IgM was present in 51(13.3%) and HEV IgM present in 66(17.3%). There was dual infection in 3 males (0.8%). HEV infection was seen mostly in older children and adults with only 5.5% occurring in children <12 years of age. HAV infection was commonly seen to occur in <12 years of age group (52.7%). One hundred and twenty-six patients were from the Vellore region, among whom HAV and/or HEV aetiology was observed in 28.5%. In this region there did not appear to be any correlation between occurrence of acute hepatitis due to these viruses and rainfall or environmental temperature. Acute hepatitis due to enteric hepatitis viruses was seen throughout the year.

Key words: Hepatitis A virus, Hepatitis E virus, Enteroically transmitted hepatitis.

INTRODUCTION

The two enterically transmitted hepatitis viruses, namely, hepatitis A virus (HAV) and hepatitis E virus (HEV) are endemic in many tropical regions where conditions of hygiene and sanitation are poor. Acute hepatitis due to HAV and HEV occur sporadically and outbreaks of epidemic proportions occur when food and water have been contaminated by sewage1. Hepatitis A infection is self-limiting and exposure to the virus ensures immunity to re-infection2. Hepatitis A has an incubation period of 2-3 weeks, occurs asymptomatically in some and the age group most affected are young children. In areas where sanitary conditions have improved, the epidemiology of hepatitis A is changing and the prevalence of cases has shifted to adulthood3. In general, hepatitis E resembles hepatitis A, having similar routes of transmission and clinical picture. However, hepatitis E has a longer incubation period and affects older children and adults. This infection has a higher mortality rate of 10-20% in women in the last trimester of pregnancy4.

In this study, the prevalence of HAV and HEV have been investigated among patients attending a large tertiary-care hospital in Vellore, south India, presenting with symptoms of acute hepatitis. A previous report from this hospital showed the association of HEV with sporadic cases of acute hepatitis in this region4. In the present study we have investigated the prevalence of HAV and HEV in acute hepatitis over a 3-year period, from June 1996 to May 1999. The objective was to obtain a pattern, if any, in the occurrence in relation to seasons. We also looked at certain demographic features and the clinical outcome in these patients.

MATERIAL AND METHODS

Subjects: We received serum samples from 404 patients who presented with acute hepatitis to the outpatient department of Christian Medical Hospital (CMCH),
Vellore, India during the period June 1996 through May 1999. HAV or HEV aetiology was suspected in these patients. Screening for both agents was done for 381 patients, among them there were 36 patients 12 years of age or below (18 male, 18 female) and 345 patients over 12 years of age (225 male and 120 female).

Methods: Evidence of HAV infection was ascertained by IgM demonstration (HAVAB-M, IMx, Abbott Laboratories, IL USA) with a microparticle enzyme immunoassay (MEIA). HEV infection was detected by IgM demonstration (Genelabs Diagnostics, Singapore) in a microtiter plate enzyme-linked immunoabsorbent assay (ELISA). All positives were re-tested for confirmation.

Data of average rainfall and the mean maximum temperature per month in the Vellore region was collected from the Regional Meteorological Centre, Chennai, to study the influence of environmental conditions on HAV or HEV occurrence.

The Chi² test was used to assess the significance of the differences in age related prevalence of the two viruses among the 381 sera tested for both agents.

OBSERVATIONS

Testing for the two viral agents was done on 381 of 404 sera from patients with acute hepatitis received during a 3-year period. Among the 381 patients, HAV IgM was positive in 51(13.3%), HEV IgM positive in 66 (17.3%) and dual infection was seen in 3(0.8%). Among 36 young children (≤12 years), there was HAV IgM positivity in 19(52.7%) and HEV IgM was seen in only 2(5.5%). In the 345 older patient group (>12 years), 32(9.2%) were IgM positive for HAV and 64(18.5%) were IgM HEV positive (see table). In the age related incidence of the two viruses, the low prevalence of HEV among the younger group relative to the prevalence of HAV was highly significant (Chi² = 19.4, p=0.00001). There was a statistically significant increase in prevalence of HEV among the older age group compared to the prevalence of HAV (Chi²=12.39, p=0.0004). In this series of patients, there were 24 cases of jaundice complicating pregnancy, 8(33.3%) were proven to be of HEV aetiology.

Demographic data showed that 126 patients were from the Vellore region, of whom 17 were positive for HAV and 19 were positive for HEV, including two who had dual infection. The occurrence of HAV and HEV positive cases did not show a definitive seasonal pattern in the Vellore region and occurred throughout the year (see figure). The mean temperature of the warmer months from March-June was >35°C and that of the cooler months from November-January was <30°C. The prevalence of the two viruses in the Vellore region did not show any variation in relation to rainfall.

DISCUSSION

Nearly one-third of 404 patients seen in this hospital in Vellore, south India,

<table>
<thead>
<tr>
<th>Age group (in years)</th>
<th>n</th>
<th>HAV IgM No. Positive (%)</th>
<th>HEV IgM No. Positive (%)</th>
<th>Chi² (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>36*</td>
<td>19(52.7)</td>
<td>2(5.5)</td>
<td>19.4 (p=0.00001)</td>
</tr>
<tr>
<td>&gt;12</td>
<td>345**</td>
<td>32(92)</td>
<td>64(18.5)</td>
<td>12.39 (p=0.0004)</td>
</tr>
</tbody>
</table>

*1 male had dual infection
**2 males had dual infection
with acute hepatitis tested for HAV and/or HEV had evidence of enterically transmitted hepatitis viruses. HAV IgM was positive in 59(15.4%) and HEV IgM was positive in 66(16.6%) showing almost equal prevalence of both viruses. Further analysis was done on the 381 patients in whom both HAV and HEV were tested for and among these 114(29.9%) had evidence of HAV or HEV infection and 3 had dual infection. It should be inferred that in the remaining patients acute hepatitis may be due to other agents.

This study has shown that HEV infection occurs more often in older children and adults, while HAV occurs mostly in children under 12 years. This is in conformity with data that show that exposure to HAV occurs early in life. HEV was seen to cause acute hepatitis in only 2 patients (5.5%) of the younger age group. More recently, HEV infection among children under 14 years of age have been reported in India.

The prevalence of these two viruses in the community as observed in this hospital based study may be obscured due to several reasons. These include the fact that patients are treated in small clinics where alternative medicines are administered. Further, the high cost of the tests may deter requests for testing by the clinicians in our hospital. The limitations of the data strongly argues for the need for community based studies.

Clinical information was available on seven of the 8 pregnant women infected by HEV infection. There was recovery from hepatitis documented in all of these 7 with a favourable outcome of pregnancy in 5. Six of them were in their third trimester of pregnancy. One of them with fulminant hepatitis recovered but underwent medical termination of pregnancy. One woman delivered a dead foetus. We did not find the increased mortality reportedly associated with HEV during pregnancy in this small series of patients.

The three patients (0.8%) who were positive for both anti-HAV IgM and anti-HAV were males, aged 8,13 and 25 respectively. The 25 year old patient came to this hospital for evaluation of a prolonged
phase of acute hepatitis A of two months duration, presenting with jaundice and persistently elevated liver enzymes. On follow-up after 2 months, this patient showed improvement with decrease in the liver enzyme levels. The other two dually infected patients had typical symptoms of acute hepatitis. In an earlier report from India where acute liver failure in children was studied, HAV and HEV were found in 60% of the cases*. The same study showed that dual infection with HAV and HEV formed the single largest aetiological subgroup of acute liver failure patients (22.5%).

The data on the occurrence of HAV and HEV on a monthly basis also shows that the two viruses are seen almost throughout the year. The increase in the number of positive cases during 1998-1999 as seen in the figure is probably a reflection of the increase in the number of patients tested in these 2 years rather than an increase in incidence. The prevalence of these viruses did not show any pattern with respect to rainfall. This can be verified only by a community based study.

Among the 381 patients, 239 were from southern India and the others were from northern India and the neighbouring countries. Of the patients from southern India, 71 (29.7%) had hepatitis due to HAV or HEV showing that these viruses are active in this region. Patients from northern India and the neighbouring countries, particularly those requiring long-term treatment are admitted in this hospital. Many of the other HAV or HEV positive cases hailing from outside south India would have been attendants of patients and may have been exposed to these viruses in the Vellore region during their long stay locally. This further suggests that these two viruses are endemic in this region.

**CONCLUSION**

In summary, we have found that HEV is commonly seen in older children and in adults as described in other studies. HAV is seen to occur mostly among young children and a smaller number of susceptible adolescents/adults who were not exposed to the virus earlier. Though these two agents are endemic in this region, the occurrence of mixed infection is minimal. One-third of acute hepatitis cases presenting to this hospital thus appear to be due to enterically transmitted hepatitis virus, i.e., HAV or HEV and more rarely due to both.

**Acknowledgements**

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**REFERENCES**


