

SEROPREVALENCE OF HEPATITIS A & E VIRUS IN A TERTIARY CARE HOSPITAL, VIJAYAWADA, ANDHRA PRADESH

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ABSTRACT

Background: Acute viral hepatitis (AVH) caused by enterically transmitted hepatitis A virus (HAV) and hepatitis E virus (HEV) poses a major health problem in developing countries like India. Both viruses are transmitted primarily by the feco-oral route mainly through contaminated water. This study was undertaken to determine the prevalence of HAV and HEV and incidence of co-infection of HAV and HEV in patients presenting with AVH. **Materials and Methods:** The study was conducted in the Virology Research and Diagnostic Laboratory, on suspected cases of acute viral hepatitis attending government general hospital, Vijayawada. All the serum samples collected from the patients were screened for IgM antibodies to HAV and HEV by IgM capture ELISA method. **Result:** A total of 221 samples were tested and a seroprevalence of 12.21% (27) was observed in our study. Antibodies to HAV were detected in 5.4%(12) and seropositivity for HEV was 3.2% (09). HAV infection was observed in the age group <15 years and HEV in >30 years. Out of a total of 12 patients positive for HAV infection, males were 07, and females were 05. HEV IgM was positive in 09 patients, of which 07 were males and females were 02. Co-infection was noted in six cases (2.7%) of which 4 male and 2 were females. **Conclusion:** The present study points toward HAV being the prime etiological agent for acute viral hepatitis in children and HEV in adults. A comparatively lower prevalence may be a consequence of an overall declining trend due to improved living standards and environmental hygiene.

INTRODUCTION

Acute viral hepatitis (AVH) caused by enterically transmitted hepatitis A virus (HAV) and hepatitis E virus (HEV) poses a major health problem in developing countries. Both viruses are transmitted primarily by the feco-oral route through contaminated water. Outbreaks and sporadic cases of hepatitis A and E occur globally and are closely associated with unsafe drinking water, inadequate sanitation and poor hygiene and health services in resource-limited countries.^[2,3]

HAV, being the most common cause of acute hepatitis in the paediatric age group remains self-limiting and does not progress to chronic liver disease. Children with HAV commonly present with nonspecific gastrointestinal symptoms and jaundice with cholestasis. HAV in adults has a more severe course than in children.^[4,5] HAV is a non-enveloped 27-nm, heat, acid and ether-resistant ribonucleic acid (RNA) virus belonging to genus Hepato-virus of Picornaviridae family. Antibodies to HAV (anti-HAV) can be detected during acute illness when

serum aminotransferase activity is elevated and faecal HAV shedding is still occurring. This early antibody response is predominantly of the IgM class and persists for several months, rarely for 6-12 months. During convalescence, however, anti-HAV of the IgG class becomes the predominant antibody.^[6] Hepatitis A is a vaccine-preventable disease but the vaccine has not been deployed in India,^[7] as more than 80% of children by the age of 10 years develop antibodies as a result of natural infection,^[8] and since the disease is often clinically insignificant in this age group, the use of vaccine is not justified and is still a subject of debate.^[7]

HEV is known to cause infection in young to middle-aged adult population as compared to children with a greater predilection to cause outbreaks in the community as compared to HAV.^[9] HEV is a non-enveloped virus with a single-stranded positive-sense RNA in the genus *Herpes virus* of family *Herpesviridae*. The IgM and IgG classes of antibodies to HEV can be detected, but the former falls rapidly after acute infection, reaching low levels within 6 months.^[6] HEV causes high mortality in

pregnant women, 20-30% as compared to 0.2-1% in general population.^[12] The infection during pregnancy is associated with an increased risk of prematurity, abortion, low birth weight, perinatal mortality, fulminant hepatitis and maternal mortality.^[13]

In children as well as adults with pre-existing chronic liver disease, Co-infection with HAV – HEV can develop into fulminant hepatitis leading to serious complications and increased mortality.^[15] Although the clinical diagnosis of the co-existence of HAV and HEV viruses as a cause of viral hepatitis is difficult and cannot be differentiated from mono-infection, laboratory diagnosis either by serology or polymerase chain reaction (PCR) can be a useful tool in the diagnosis of the simultaneous presence of both the viruses.^[16]

Most of the studies show an increase in the seroprevalence of HAV, HEV and their co-infection. There is a noticeable shift in the disease spectrum from children to adults as a result of improvement in the socio-economic conditions and there has been an emphasis on the promotion of increased sanitary infrastructure by India under the Swachh Bharat (Clean India) mission since 2014.^[17] In consideration of all, the study was undertaken to highlight the viral agents responsible for causing hepatitis in patients presenting with jaundice in Government General hospital, Vijayawada and to develop strategies for surveillance of preventable viral hepatitis at the community level. The perseverance of this retrospective study was to analyze the presence of HEV and HAV among cases of viral hepatitis and to study their epidemiological pattern regarding gender, age and season in patients attending government general hospital, Vijayawada.

MATERIALS AND METHODS

A retrospective analysis of 221 samples received in Viral Research and Diagnostic Laboratory, Department of Microbiology from patients attending Government General Hospital with features suggestive of acute viral hepatitis were included in the study.

Serum samples were tested for the presence of IgM antibodies to HAV and HEV with commercially available ELISA kits (General Biological Corp, HEPAVASE MA-96 for HAV IgM ELISA and MP diagnostics for HEV IgM ELISA) following the manufacturers protocol.^[18,19] Specimens with absorbance values greater than the cut-off value were considered REACTIVE for anti-HAV IgM and anti-HEV IgM

Statistical analysis of the data collected was done using SPSS version 16(Microsoft Office, Redmond, Washington, USA).

RESULTS

A total of 221 samples were tested for the presence of IgM antibodies to HAV and HEV. An overall seroprevalence of 12.21% was observed with a prevalence rate of 5.4% for HAV, 4% for HEV and 2.7% for Co-infection with HAV and HEV in our study.

Out of 12 samples tested positive for HAV, males were 7 and females were 5 and children below the age of 15 years were most infected. HEV infection was seen in 09 individuals of which males were 07 and females were 02. HEV prevalence was seen in adults above 30 years of age. Co-infection with HAV and HEV was noticed in 6 cases among which 4 were males and 2 were females. Four cases of co-infection were observed in the age group 16 to 30 years.

Cases with infection of HAV and HEV were present throughout the year and an increase in HEV was noted at the beginning of the rainy season. None of these differences were statistically significant.

DISCUSSION

This retrospective study was undertaken to determine the prevalence of HAV and HEV and their co-infection in patients presenting with symptoms of Acute hepatitis attending government general hospital, Vijayawada.

An overall prevalence rate of 12.21% was observed for hepatitis viruses A and E in our study. Seroprevalence for HAV was 5.4% which coincides with studies by Meghna S Palewar et al,^[20] at 6.7% and Samaddar A et al,^[21] with 6.96% whereas Monika et al,^[22] and Shinde et al,^[23] reported a higher prevalence at 9.4% and 10.9%.

Seroprevalence for HEV was 4% in our study where most of the studies reported a higher prevalence at 8.5% by Palewar MS et al,^[20] and 9.63% by Samaddar A et al.^[21]

Co-infection with Hepatitis A and E viruses was 2.7% in our study and correlates this with study by Samaddar A et al,^[21] reporting at 2.07%. Most other studies reported a lower incidence with Murhekar MV^[24] at 1.3%, Shinde RV,^[23] at 0.8% and Palewar MS^[20] at 0.6%. A higher prevalence rate of 5.1% was reported by Agarwal et al,^[25] and 5.31% by Das et al.^[16]

The reasons behind this declining trend may be due to the high prevalence of antibodies in the general population, the availability of vaccines, improved living standards and environmental hygiene.^[26]

Prevalence for both HAV and HEV were higher in males (77.78%, 58.33%) than in females (22.22%, 41.67%) as also reported by Shinde et al,^[23] at 61.9%, 54.1% in males and 38.6% and 45.8% in females.^[22,27] This could be related to greater exposure of men in their professional and social activities.

HAV infection is a disease of infants and young children and the same was observed in our study with

25% of total HAV positivity in children below 15 years. On the other side, HEV infection was reported in the population above 30 years of age, more frequent in males than in females. The risk and severity of HEV infection increase with age and are predominantly seen among young adults. In the study conducted by Takahashi M et al,^[28] Hepatitis E was more common in young adults (15-44 years). The low prevalence of anti-HEV antibodies in children is attributable to a lack of exposure to HEV in children.^[28] This seems paradoxical for an enteral infection transmission, in which exposure is theoretically the same for all people subject to the terms of hygiene (Pawlotsky, 2002).^[29] It is possible that HEV infection is usually anicteric and goes unnoticed in children. These findings also agree with the results found in some other studies too.^[27,30] The age-specific seroprevalence of antibodies to HEV was studied in Pune, India where they accomplished that antibodies to HEV were uncommon in children and reached a peak prevalence of 33-40% in early adulthood.^[31]

In our study, 2.7% of co-infection were below the age of 45 years, with increased incidence in 16-30 years age group (4 cases) which is in conjunction with other studies by Shinde et al,^[23] reporting co-infection rate was high in 16-25 years age group. Bansal et al,^[32] reported that among coinfecting individuals majority were adults. The possibility for co-existence of infection may be due to the same mode of transmission, doubtful immunity from both the viruses or a divergent strain of virus which could not be ruled out. Co-infection with HAV and HEV does not affect the prognosis of the patient much as these cases usually resolve with conservative treatment but in rare cases may lead to acute liver failure or hepatic encephalopathy.^[22,26]

Seasonal variation of HAV and HEV was studied and cases were reported throughout the year as these infections are endemic in India as reported in other studies,^[27] with a peak of HAV infections observed in the month of February whereas others reported in rainy and winter season. It is possible that cross-contamination of drinking water with sewage and fecal contamination of water pipelines could be the reasons for the report of positive cases. Jain et al,^[34] reported the maximum number of cases in the months from February through June (i.e. autumn and summer seasons). Whereas Bhagra S et al,^[35] studied the seasonal trend more during the winter season (19 January to 31 March), summers (1 April to 15 June) and monsoons (16 June to 31 July). We have collected the laboratory-based data therefore true seasonal variation in the community could not be assessed.

Out of the total patients tested negative for HEV and HAV infection, four patients were found to be positive for HBsAg. Thus, seronegative patients can be screened for HBV and HCV infection for proper confirmatory diagnosis and thereby proper treatment plan and avoid the complications that encounter.

CONCLUSION

While it is always challenging to diagnose the etiological agent as HAV and HEV clinically, biochemical analysis and serological testing will help in diagnosing the presence of IgM antibodies to the viruses as a tool to early diagnosis. This can lead the clinician in early management of the cases and undertaking preventive measures by the local health authorities.

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