

Seroprevalence of Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) and Co-Infection in the Patients Presenting With Acute Viral Hepatitis-A Tertiary Care Centre Experience

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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 such as India. Co-infection with both viruses may lead to serious complications.

AIM: This study was done to determine prevalence of HAV and HEV in patients presenting with Acute Viral Hepatitis and the co-infection of HAV and HEV in these patients.

MATERIAL AND METHOD: A cross-sectional study was conducted in the Tertiary care Hospital. 484 patients presenting with Acute Viral Hepatitis were considered in the study from Jan 2019 to Dec 2019. Serum samples were analyzed for IgM anti-HAV and IgM anti-HEV (Dipro) for the detection of HAV and HEV infection, respectively, using commercially available ELISA kits.

RESULTS: The seroprevalence of HAV- and HEV-positive patients was 15.9% (n=77) and 14.2% (n=69), respectively. The coinfection of both HAV and HEV in patients with acute viral hepatitis was 1.4%. Out of 484 patients 53% (n=256) were male and 47% (n=228) were female, of which 41% belong to rural area and 59% to urban area. The age-wise distribution is 0-10 (12.6%), 11-20 (23.3%), 21-30 (26.2%), 31-40 (15.4%), 41-50 (12.3%), 51-60 (5.9%) and > 60 (3.9%). The transmission of HAV and HEV was more seen in summers and rainy season.

CONCLUSION: HAV and HEV infections are a major cause of viral hepatitis in India and globally. As both HAV and HEV spread by feco-oral route so, improving levels of personal hygiene among lower socio-economic population and early detection can prevent the complications.

Key words: Hepatitis A Virus, Hepatitis E Virus, Acute Viral Hepatitis, Feco-oral Route,

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I. Introduction

Acute viral hepatitis mostly caused by hepatitis A and hepatitis E virus which are enterically transmitted viruses and have great public health importance because both are due to poor hygiene and poor sanitation. Their prevalence's are very closely related to the level of economic development and access to safe drinking water and sanitation.[1,5]

Hepatitis A virus (HAV) is a 27-nm diameter, and belongs to family Picornaviridae while HEV is 27-34 nm in diameter and belongs to family Hepeviridae. Both viruses are round, non-enveloped and are single-stranded RNA viruses. They are heat, acid and as well as ether-resistant.[1] Both the viruses are transmitted by feco-oral route and the transmission is favored by poor personal hygiene and poor sanitation.[5]

HAV affects infants and young children in developing countries but its epidemics are rare.[4] The infection is usually sub-clinical or acute and remains self-limited and does not progress to chronic liver disease. Hepatitis A virus remains contagious for about two weeks before the symptoms appear. [3] HEV is restricted usually to older children and young adults and usually causes self-limiting viral infection followed by recovery. It can induce fulminating acute hepatitis in pregnant women, producing mortality of approximately 80%. [7,8]

HAV antibodies (anti-HAV) and HEV antibodies (anti-HEV) can be detected during acute illness when serum aminotransferase activity is elevated. IgM class antibodies are the first one in the early response and persists for several months but during convalescence period, anti-HAV and anti-HEV of the IgG class becomes the predominant antibody [2]

II. Aim And Objectives

This study was conducted to determine the prevalence of HAV and HEV infection in patients presenting with acute viral hepatitis and also the prevalence of their co-infection in different age groups.

III. Material And Methods

StudyDesign : Present study is retrospective study, which included 484 sera of patients (both In patient and out patients) presenting with acute viral hepatitis from Jan 2019 to Dec 2019 in a tertiary care, Hospital in North India.

Inclusion Criteria: Samples with request of both HAV IgM and HEV IgM were included in this study.

Exclusion Criteria: Samples with request of either HAV IgM or HEV IgM were not included in this study.

Procedure:On the basis of history, serum samples were analysed for IgM anti HAV and IgM anti-HEV for the detection of acute hepatitis A and acute hepatitis E, respectively using commercially available ELISA kits (Dipro Diagnostics for HAV IgM ELISA and HEV IgM ELISA). All tests were carried out as per the manufacturer’s instructions.Statistical analysis was done by using SPSS system .test for quantitative variable. [1,2]

IV. Results

A total of 484 serum samples were processed for HAV and HEV IgM in Viral Research Diagnostic lab of a Tertiary care Hospital. Among all the samples, 256 samples were from male patients and 228 samples were from female patients. Maximum patients were in the age group of 21-30 (n= 127) followed by 11-20 years (n= 113). Out of 484 samples, 77 (15.9%) samples were only HAV IgM positive, 69 (14.2%) samples were only HEV IgM positive and 7 (1.4%) samples were found positive for both HAV and HEV IgM. The overall prevalence of HAV and HEV infection was found 31.6% (n=153).HAV infection is more common in males (54.5%) as compare to females (45.5%). While HEV infection is more common in females(59.4%) as compare to males (40.6%). The coinfection of HAV and HEV comes out to be 4.5% (n=7). The rise in cases was observed in the month of June, July and August 2019 i.e 34.2%, 35%, 25.7% for HAV and 23.6%, 21.0%, 21.4% for HEV respectively.

Table 2 . Distribution of HAV and HEV Positive cases (n=153)

<i>Name of the virus</i>	Male	Female
HAV	42	35
HEV	28	41
HAV+HEV coinfection	4	3
Total	74	79

Table 1. Age-Wise Distribution of HAV and HEV tested cases (n=484)

Age Group (Years)	Total Cases Studied	Total positive cases		
		HAV	HEV	Coinfection HAV and HEV
0-10	61	29	7	2
11-20	113	24	18	1
21-30	127	19	22	3
31-40	75	2	9	1
41-50	60	2	9	0
51-60	29	1	2	0
>60	19	0	2	0
Total	484	77	69	7

V. Discussion

Hepatitis A Virus (HAV) and Hepatitis E virus (HEV) infections are important public health problems especially in developing countries like India and they are responsible for sporadic hepatitis in adults. India is hyperendemic for HEV, with the disease presenting both as outbreaks and as cases of acute sporadic viral hepatitis. Most of these outbreaks are due to contamination of drinking water supplies with sewerage water.

HAV is considered to be the most common cause of viral hepatitis worldwide. But in the present study, no significant difference between the seroprevalence of HAV and HEV was found. Though seroprevalence of HAV (24%) was slightly higher than HEV (22.2%), which is in concordance with the results of other studies from different regions of the country, no significant difference was seen in clinical presentation among HAV and HEV cases. [6, 7, 8]

It is considered that HAV infection is a disease of infants and young children and the same was found in our study with 38% of total HAV positivity was seen in children less than 10 years. On the other side, HEV positive cases were found maximum in population of 21–30 (32%) age group with slightly more frequent in males than females. This justifies the preponderance of HEV infection in older children and young adults. [1,2,6]

HAV infection prevalence was seen more in males and that to (n=42) as compare to females. This could be due to that the outdoor and social activities of males may make males more vulnerable for exposure to HAV infection. [9] HEV infection was seen more in females (n=41) and that to among pregnant females. The Immunologic changes during pregnancy may lead to suppression of T cell-mediated immunity, making pregnant women more susceptible to viral infections like HEV infection. [10]

Our study was conducted mainly to determine the prevalence of HAV and HEV and their co-infection in this region. The overall seroprevalence of HAV and HEV is 31.6%, which is similar to the study done by Ajoon et al in 2015 who reported seroprevalence of HAV and HEV viral makers in 29.9% cases but this is comparatively lower than Vitral et al who reported overall seroprevalence of HAV and HEV in 49% cases. [2,5] Co-infection with HAV and HEV was found in 7 cases (4.5%) which is lower than various other studies done in India. [1,2,3,8]

In the present study the transmission of HAV and HEV was more in summers and rainy season. This is because the Hepatitis A virus is an extremely stable virus and can survive for 12 weeks to 10 months in water. [11,12] In this regard, the virus is relatively resistant to heat or chemical inactivation and this situation allow the dissemination of HAV infection. Therefore, disruption of sanitation and water supplies was the most likely contributing factor for the seasonal occurrence of hepatitis A and E. [13]

VI. Conclusion:

Hepatitis A virus (HAV) and hepatitis E virus (HEV) infections remain as matter of a significant public health concern. Both viruses are transmitted primarily by the feco-oral route, and cause a disease that is indistinguishable without serologic testing. Prevalence of HEV mandates the screening for HEV because it may lead to grave consequences, especially in pregnant women. Improving levels of personal and food hygiene and proper sanitary conditions are of immense public health value in prevention of feco-orally transmitted Hepatitis A and E viruses. Vaccines can be used as a preventive strategy in high risk cases, but they are not readily available in the market.

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CONFLICT OF INTEREST: None

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