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Original Research Article

Prevalence of hepatitis A virus as cause of acute viral hepatitis in central Karnataka, India

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ABSTRACT

Background: Hepatitis A is a preventable infectious disease with global distribution. Knowledge about the epidemiology of hepatitis A in a particular region will helpful for appropriate management of cases as well as preventive strategies for that region or area could be planned. The aim of the present study was to determine the prevalence of hepatitis A virus (HAV) as cause of acute viral hepatitis (AVH) in Central Karnataka, India.
Methods: Blood samples were collected from AVH cases over a period of six months from June 2015 to November 2015 among patients attending a tertiary care centre, Davangere, Karnataka, India. Samples were tested for HAV IgM antibody (anti-HAV IgM) using a commercially available immunochromatographic assay.
Results: Out of 51 samples tested, 19 (37.25%) were positive for anti-HAV IgM. Seropositivity for HAV was higher in females (43.75%) than males (34.29%). Agewise anti-HAV IgM positivity showed highest rate in 1-5 years age group (50.0%), followed by 6-10 years group (42.86%) with a decline in older age groups (> 15 years).
Conclusions: HAV causes AVH most commonly in early childhood and a small number of adolescents and adults. Females are more commonly infected than males. The preventive strategies and control measures of hepatitis A will be determined by future definition of HAV epidemiology in the Central Karnataka region, India.

Keywords: Acute viral hepatitis, Anti-HAV IgM, Hepatitis A virus, Central Karnataka**,** Immunochromatograhic assay

INTRODUCTION

Hepatitis A virus (HAV) causes acute viral hepatitis (AVH), a major public health problem in India and other developing regions of the world. HAV is a 27 nm, non-enveloped, RNA virus belonging to the genus hepatovirus of the family picornaviridae.[1] HAV infection is transmitted mainly through feco-oral route by consumption of contaminated food and water leading to sporadic as well as epidemic forms of acute hepatitis.[2,3] Infected children usually are asymptomatic or develop mild constitutional symptoms while adults develop more severe liver disease such as cholestatic and relapsing hepatitis which has a prolonged course. However, the disease causes no significant mortality (0.05% -0.1%).[4] Diagnosis of HAV infections is established by serological demonstration of antibody to HAV (anti-HAV). During acute illness, IgM type of antibodies to HAV (anti-HAV IgM) appears persisting for few months, rarely beyond 6-12 months, coinciding with elevated serum aminotransferase activity and faecal HAV shedding. At about the same time, IgG class of antibodies to HAV (anti-HAV IgG) also appears, but persists for prolonged period and is protective in nature.[1] To our knowledge, no

information is available regarding prevalence of HAV as the causative agent for AVH from Central Karnataka region. Therefore, the present study was conducted to determine the prevalence of HAV as cause of AVH in Central Karnataka, India.

METHODS

This is a prospective, cross sectional study carried out for a period of Six months between June 2015 and November 2015 in the department of Microbiology, S. S. Institute of Medical Sciences and Research Centre (SSIMS and RC), Davangere, Karnataka, India. SSIMS and RC is a fast growing 1000 bedded multi superspeciality teaching hospital with state of art infrastructure that takes care of the medical needs of the Central Karnataka region, India. Patients of both sexes and aged 1year to 60 years attending out patient departments (OPDs) of paediatrics and medicine as well as inpatients from the same departments, who were diagnosed clinically as AVH formed the study subjects.[5]

Whole blood (5 ml) was collected from each study subject and allowed to clot naturally. Serum was separated by centrifugation and stored at -20° C until tested. The samples were tested for anti-HAV IgM using a commercially available chromatographic immunoassay (Onsite HAV IgM rapid test-cassette (serum/plasma); CTK Biotech Inc., San Diego, USA) according to manufacturer's protocol. Positive result indicates the presence of anti-HAV IgM in the serum and in the negative result, there is no detectable anti-HAV IgM. The test has a sensitivity of 95.5 % and 100% specificity.

RESULTS

A total of 51 sera samples were tested from which 19 (37.25 %) were positive for anti-HAV IgM. Anti-HAV IgM seropositivity was 43.75% in females whereas, it was 34.29 % in males. Agewise distribution of subjects showed high seropositivity (50%) in 1-5 years age group followed by 6-10 years (42.86 %), 16-20 years (28.57%) and those more than 21 years (25 %), while no positivity for anti-HAV IgM in 11-15 years group (Table 1).

Table 1: Prevalence of HAV as cause of AVH by age group and sex distribution in central Karnataka, India

Age group (years)	Male		Female		Total	
	Positive(n)/ no. tested	% positive anti-HAV	Positive(n)/ no. tested	% positive anti-HAV	Positive (n)/no. tested	% positive anti-HAV
1-5	08/16	50.0%	03/06	50.0 %	11/22	50.0%
6-10	01/04	25.0%	02/03	66.67%	03/07	42.86%
11-15	00/03	00	00/00	00	00/03	00
16-20	02/05	40.0%	00/02	00	02/07	28.57%
21+	01/07	14.29%	02/05	40.0%	03/12	25%
Total	**12/35**	**34.29%**	**07/16**	**43.75%**	**19/51**	**37.25%**

DISCUSSION

HAV has a worldwide distribution with approximately more than 1.4 million new cases of viral hepatitis occurring annually. Seroprevalence of HAV varies with time and geographical location with differences from one country to another, city to city and even within different communities of the same city.[6,7] Risk factors for Hepatitis A are related to water and food. The countries with low endemicity for HAV infection include Japan, Taiwan, Singapore and Hong Kong, whereas those with moderate endemicity include Thailand, Sri Lanka, and Malaysia. High endemicity countries include India, China, Nepal, Bangladesh, Pakistan, Myanmar and Philippines. With improvements in the environmental hygiene and living standards, many countries have witnessed shifting patterns in the prevalence of anti HAV from high to moderate and from moderate to low endemicity.[8] Age distribution of anti-HAV seroprevalence reflect current hepatitis A status in different countries and regions.[6] Since early 1990s, a safe and effective vaccine is available for prevention against Hepatitis A.[1] In the present study, HAV seroprevalence was found to be 37.25%. Reports from similar earlier studies conducted have shown to vary significantly.[2,5,6,9] A study conducted in Mangalore reported 19.31% seropositivity for HAV in the patients presenting with acute viral hepatitis.[1] In another similar study in Brazil, positivity rate for HAV was 30.63 % where as it was 44.8 % in Baghdad.[10,11] Differences between finding from our study and that of others may relate to differences in HAV epidemiology in different population groups.[12]

There is a difference in the infrastructure development as well as performance of municipal services and sanitation practices between different districts of the Central Karnataka region which could have influenced the current prevalence of HAV from this part of Karnataka state, India.[11]

Seropositivity for HAV was higher in females (43.75 %) compared to males (34.29%) in this study. Many investigators have reported the male preponderance for HAV infection in their studies.[1,6,11] However, few have reported to be no difference between males and females to the frequency of HAV infection.[13,14]

In this study, positivity for anti-HAV was found to be high in children under fifteen years age (43.75%). This is in agreement with other earlier studies.[6,11,15] Further analysis revealed that there was a declining trend in HAV seropositivity in adolescents and young adults. These findings of the present study reflect that Central Karnataka region is endemic for HAV infection. In highly endemic regions like India and other developing countries, majority of population have HAV exposure in early childhood. This is because generally, in areas with high endemicity for HAV, low socio-economic status, poor environmental sanitation, decreased personal hygiene are prevalent. Consequently, access to clean water and safe food are less leading to infection early in life, mostly asymptomatic along with development of life long immunity .Therefore, epidemics are rarely reported because older children and adults generally are immune.[14,11] In contrast, recently many studies have reported a much lower anti-HAV positivity rates in this cohort of children with HAV seroprevalence shifted to further ages indicating that adolescents and young adults are at risk of symptomatic HAV infection.[5,12,14,16] Since it is hospital based study and the sample size was small, the precise estimate of disease burden in the community could not be estimated. This is the limitation of the present study.

CONCLUSION

The present study from Central Karnataka region, India found that HAV cause AVH most commonly in young children and a smaller number of susceptible adolescents/adults. However, further studies are warranted to evaluate our findings. The present study also highlight the need for large scale community based studies to obtain epidemiological information which will be essential for planning decision on public health policies including sanitation programmes as well as formulation of vaccination strategies for appropriate use and better control of hepatitis A.

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