Research Paper

Volume : 4 | Issue : 2 | February 2015 • ISSN No 2277 - 8179

SEROLOGICAL DIAGNOSIS OF HAV AND HEV, THEIR PREVALENCE AND ITS BIOCHEMICAL PARAMETERS CORRELATION IN CLINICALLY SUSPECTED CASES OF ACUTE VIRAL HEPATITIS

Microbiology

KEYWORDS : Hepatitis A virus (HAV), Hepatitis E virus (HEV), ELISA, Hepatitis.

Dr. Hetal Rathod	Resident Doctor, Department. Microbiology Smt.NHL, MMC, VSGH, Ahmedabad.
Dr. Sanjay Rathod	Associate Profesoor, Department. Microbiology Smt.NHL, MMC, VSGH, Ahmedabad.
Dr. Jayshri Pethani	Associate Profesoor, Department. Microbiology Smt.NHL, MMC, VSGH, Ahmedabad.
Dr. N. M. Shaikh	Assistant Professor, Department. Microbiology Smt.NHL, MMC, VSGH, Ahmedabad.
Dr. Parul Shah	Professor and Head of, Department. Microbiology Smt.NHL, MMC, VSGH, Ahmedabad.

ABSTRACT

Introduction: 'Viral Hepatitis' denotes a primary infection of liver by heterogeneous group of Hepatitis virus. They are clinically indistinguishable, leading to morbidity and mortality. Mainly diagnosed by serological and molecular markers. Hepatitis A and Hepatitis E viruses are transmitted by fecal-oral route and cause sporadic as well as outbreaks of acute viral hepatitis.

Objectives: Prevalence of HAV and HEV in patients of acute viral hepatitis along with their correlation between various clinical, serological and biochemical parameters.

Materials and Methods: From December 2013 to November 2014 total 1649 and 1963 samples of suspected cases of acute viral hepatitis with icterus were tested for HAV and HEV respectively. Samples were analysed for HEV IgM and HAV IgM antibody by ELISA.

Results: Out of 1649 samples, 438 (26.56%), were positive for HAV IgM with most cases in age group 1-10 years 359 (81.86%) . Out of 1963 samples 1092 (55.62%) were positive for HEV IgM with most cases in age group 21-30 yrs 458 (41.94%). Males were more affected than Females in HAV IgM and HEV IgM positive cases. Yellowish discoloration of skin and mucus membrane was main presenting symptom with serum billirubin of 3.1-6.0mg/dl in 45.20% and 43 47.00% in HAV IgM and HEV IgM positive cases respectively. SGPT level of 501-750 IU/l, in 28% and 30% in HAV IgM and HEV IgM positive cases respectively.

Conclusion: High prevalence rate is noted for HEV infection. Adult & paediatric age group are affected more in case of HEV & HAV respectively. Jaundice was most common clinical feature with increased billirubin & SGPT level.

INTRODUCTION

Viral hepatitis is Primary infection of the liver by any one of a heterogenous group of 'hepatitis virus'. Different types of hepatitis viruses are, i.e. hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV), hepatitis E virus (HEV) and hepatitis G virus (HGV), causing s a major health event worldwide. [1] Among these HEV & HAV are most common cause of acute hepatitis in human and they are epidemiologically important. Its high prevalence is related to spread of these infectious agents by the fecal-oral route, through close contact with an infectious person or by ingestion of contaminated food or water[1-3]. HAV is a non-enveloped virus 27–32 nm in diameter. The viral genome is a single-stranded RNA of positive polarity, which is non-segmented and is packaged in an icosahedral capsid5. HAV belongs to the genus *Hepatovirus* and is a member of the *Picornaviridae* family. HAV strains in children may become symptomatic needs intervention and can affect adults too6. HEV is a non-enveloped cubic-shaped virus 27–33 nm in diameter and has tooth-like projections on its surface. The viral genome consists of a single stranded RNA of positive polarity4. HEV was classified as a new Hepeviridae family on the basis of its structure and genome organization. The Hepevirus genus is still the only known member of this family. Both viruses transmit via feco oral route and Illness caused by these enterically transmitted viruses are usually mild & self limiting, can presents as fever, nausea, abdominal pain, vomiting, decreased appetite and or yellowish discoloration of skin , mucus membrane & urine along with elevated Serum glutamate pyruvate transaminase (SGPT) & serum billirubin level on laboratory parameters findings8,9. At first look hepatitis found to be very simple & fairly treated but if proper care would not be taken then cases has been reported for chronic hepatitis by these agents in immunocompromised patients. HEV infection is responsible for high mortality rates (up to 20%) in pregnant women[7-9] .

So this study aims to know Prevalence of HAV and HEV in patients of acute viral hepatitis along with their co-existence and correlate between various clinical/serological/biochemical parameters.

MATERIALS & METHODS:

From December 2013 to November 2014, 1649 & 1963 serum samples were collected from the out patient and in ward department of medicine, pediatric and gastrology units in our institute for HAV & HEV respectively .In the outpatient department the subjects were identified with symptoms of jaundice, fever, loss of appetite, abdominal pain, scleral icterus, altered sensorium, encephalopathy and fatigue. Detailed histories of each patient including all biochemical parameters were noted. Patients reactive for HBsAg , known cases of chronic hepatic failure & on alcohol were excluded from study. Blood samples were collected from all the subjects after taking the informed consent. All of the serum samples were tested using commercially available ELISA based kits for anti-HAV IgM & anti -HEV IgM.

RESULTS :

Of the 1649 patients , 26.56 %(438) were positive for anti HAV-IgM & from 1963 patients, 55.62%(1092) were positive for anti HEV IgM . In HEV cases highest age group affected was between 21-30 yrs of age (41.94%) while lowest group affected was pediatric age group between age of 1-10 yrs (4.12%). In HAV cases highest age group affected was between 1-10 yrs of age (81.96%) while lowest group contributed by 41-50 yrs of age group(0.45%).Age wise distribution is depicted in Table-1. males were commonly affected than females(Table-2). Major presenting symptom was yellowish discoloration of skin & mucus membrane, followed by abdominal pain, anorexia & fatigue and least observed was fever and yellowish discoloration of urine (Figure-1). Biochemical markers all were correlated with each case, in which elevated billirubin & SGPT level in serum were noted. Different range and amongst them most frequently noted is de-

picted in Figure -2 & 3. Largest numbers of patients were showing increased billirubin range between 3.1-6.0 mg/dl (45.20%), (47%) In HAV, HEV respectively & smallest range was comprised by > 0-1.0-3.0mg/dl (5%),(3.94%) In HAV, HEV respectively. While in case of HEV and HAV Major cases were following in SGPT range of 501-750I U/L (30%) and (28%) respectively. Youngest patient in case of HAV was of 9 month who was presented with fatal complications like hepatic encephalopathy. 41 out of 86 suspected pregnant women for hepatitis E found to be positive for anti HEV IgM. HAV and HEV coinfection was noted in 38 patients.

In HAV positive cases difference of age groups (up to 10yrs and > 10yrs) by Chi Square p value was less than 0.0001. in cases of HEV difference of age groups (up to 30yrs and > 30yrs) by Chi Square p value was less than 0.0001.

DISCUSSION :

This study reviewed various serological and biochemical parameters of jaundice in patients with features suggestive of acute viral hepatitis. Our study shows HAV is most commonly affecting children (between age of 1-10 yrs) which is 81.96% , This prevalence is comparable to the results reported by B. Mohanavalli,[12] Aggarwal et al.[11] and Arankalle et al.[10] where they reported >95%. Infection rate of HEV was higher in age group of 21-30yrs of age, which similarize with previous study by Ramesh roop rai , who described most common age group of 16-30 yrs of age.[13.]

In HAV and HEV, children and adults respectively were more affected. P value by Chi Square was less than 0.0001 for both HAV and HEV, which was statistically significant.

All confirmed cases were correlated well with biochemical markers which indicate that clinical suspicion can be made on such ground to start empirical treatment. But obviously definite diagnosis by specific anti HEV & HAV IgM should be made to know recent infection & seroprevalence rate which is epidemiological important.

In developing countries most people poor and living in crowded condition except people belonging to higher middle class & upper class. These patients belonging to the overcrowded area, which reflects the poor sanitation and low standard of lifestyle-all these things, contributes to the transmission of infection.

CONCLUSION :

IgM anti-HEV & IgM anti-HAV is a reliable and sensitive marker for diagnosis of recent HEV & HAV infection respectively when suspecting a case of enterically transmitted hepatitis. Out of 1649 patients, 438 patients (26.56%) showed anti HAV IgM antibodies, while out of 1963 patients 1092 (55.62%) were positive for anti HEV IgM antibodies. Liver enzymes level of positive patients showed raised values than normal value. Most common symptom was yellowish discolorationof skin & mucus membrane followed by abdominal pain, fatigue & anorexia. incidence of HEV infection is maximum in young adults (21-30 years) than in paediatric and old age groups while prevalence of HAV was higher in children (1-10yrs.) & lower in young adults. Improve hygiene & living life style can reduce illness. Proper washing of hands thoroughly after contact with an infected person's blood, stools, or other bodily fluid and after using the restroom. Avoid consumption of contaminated food and water. Consumption of properly chlorinated portable drinking water is must.

VACCINATION

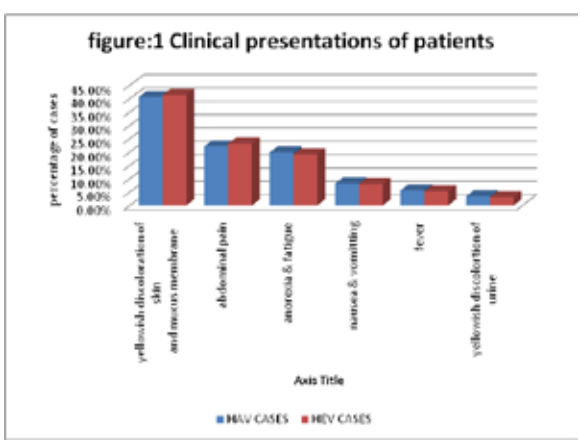
Formalin inactivated and alum conjugated vaccine-2 IM injections with 6-12 months duration in between provides immunity for 20 wks.

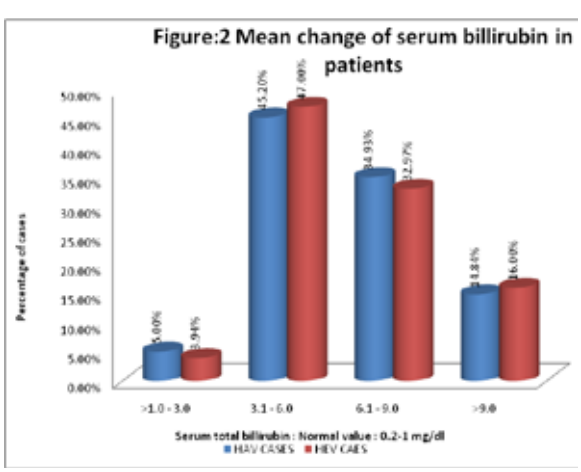
Table -1 : Age wise distribution of positive patients

Age group (Yrs.)	No. of cases for HAV(%)	No. of cases for HEV(%)
<1	1(0.22%)	NIL
1-10	359(81.86%)	45(4.12%)
11-20	61(13.93%)	288(26.37%)
21-30	9(2.05%)	458(41.94%)
31-40	6(1.37%)	203(18.59%)
41-50	2(0.45%)	68(6.23%)
51-60	NIL	18(1.65%)
>60	NIL	12(1.10%)
Total	438(26.56%)	1092(55.62%)

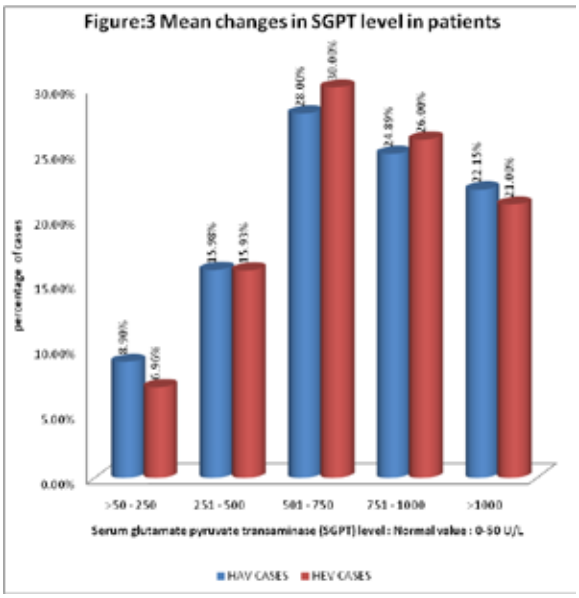
Table -2 : Sex wise distribution of positive patients

Sex	No. of cases for HAV(%)	No. of cases for HEV(%)
Male	227(51.83%)	670(61.36%)
Female	211(48.17%)	422(38.64%)
Total	438(26.56%)	1092(55.62%)





Volume : 4 | Issue : 2 | February 2015 • ISSN No 2277 - 8179



REFERENCE

1. Anathnarayan, paniker;Hepatitis virus; Textbook of microbiology-9 th edition;Universities press-New delhi,2009;p 536-548 | 2. Law B, Diaz-Mitoma F, Safary A. Combined vaccination against hepatitis A and B in children and adolescents. Abstract on 9th Asian Congress of Paediatrics, 23–27 Mars 1997, Hong Kong. J Paediatr Child Health 33 (1): S58. | 3. Jacobsen KH and Koopman JS. The effect of socioeco-nomic development on worldwide hepatitis A virus seroprevalence patterns. Int J Epidemiol 2005; 34(3):600-609. | 4. Balayan MS, Andjaparidze AG, Savinskaya SS, et al. "Evidence for a virus in non-A, non-B hepatitis transmitted via the fecal-oral route". Intervirology 20 (1): 23–31. | 5. Cristina J, Costa-Mattioli M (August 2007). "Genetic variability and molecular evolution of hepatitis A virus". Virus Res. 127 (2): 151–7. | 6. Connor BA (2005). "Hepatitis A vaccine in the last-minute traveler". Am. J. Med.118 (Suppl 10A): 58S–62S | 7. Labrique AB, Thomas DL, Stoszek SK, Nelson KE. Hepatitis E: an emerging infectious disease. Epidemiol Rev 1999; 21:162–179. | 8. Emerson SU, Purcell RH. Running like water—the omnipresence ofhepatitis E. N Engl J Med 2004; 351:2367–2368. | 9. Angelia et al: Hepatitis E Seroprevalence and Seroconversion among US Military Service Members Deployed to Afghanistan. The Journal of Infectious Diseases 2010; 202(9):1302–1308 | 10. Arankalle VA, Tsarev SA, Chadha MS, Alling DW, Emerson SU, Banerjee K, et al. Age-specific prevalence of antibodies to hepatitis A and E viruses in Pune, India,1982 and 1992. J Infect Dis 1995; 171: 447-450 | 11. Aggarwal R, Naik S, Yachha SK, Naik SR. Seroprevalence of antibodies to hepatitis A virus among children in Northern India. Indian Pediatr 1999; 36: 1248-1250. | 12. B. Mohanavalli, E. Dhevahi, Thangam Menon, S. Malathi*, S.P. Thyagarajan: Prevalence of Antibodies to Hepatitis A and Hepatitis E Virus in Urban School children in Chennai, india. Indian Pediatrics 2003; 40:328-331 | 13. Ramesh Roop Rai,Seroepidemiology and role of polymerase chain reaction to detect viremia in an epidemic of hepatitis E in Western India, Tropical Gastroenterology 2008.29;4:202–206. |