Original article

Prevalence of hepatitis E and hepatitis B dual infection in North India (Delhi)

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Abstract. *Background and Aim:* The prevalence of dual infection was 2.8% (26/927). Majority of these patients had presented with acute flare of a chronic liver disease (42.3%) followed by acute jaundice (38.5%).We found HEV infection to be was highly prevalent among 20 to 40 years of age group. In the case of HBV only 5.37% (5/93) children were affected in the age group 0-10 years. *Methods:* Serum samples from 1147 proven HEV infection suspected were collected and tested for HBsAg and HEV (IgM) antibodies using enzyme linked immunosorbent assay kits (*bio Merieux*, France). *Results:* There were the 32.16% (367/1141) HEV positive cases. We found maximum HEV positivity in the age group of 21-30 years. There were 2.8% (26/927) HEV and HBV dully infected patients. The total 44.68% (273/611) suspected of acute hepatitis/jaundice were HEV positive. *Conclusion:* The HEV found to be was highly prevalent among 20 to 40 years of age group. The males were more frequent than females for HEV and HBV infection. In the children's, there were lower attack of both HEV and HBV. The maximum patients were having acute hepatitis/jaundice in both HEV and HBV infection. There were 26 dually infected patients in 12 months. (www.actabiomedica.it)

Key words: HEV-Hepatitis E virus, HBV-Hepatitis B virus, ANC- Ante natal checkup, CLD- Chronic liver disease

Introduction

HEV epidemics have been reported from several developing countries that involved large number of cases. The first well defined epidemic was reported retrospectively from New Delhi, India in 1955 in which 29,000 cases were identified (1). Sporadic HEV infection has been reported from different parts of the world including India, Central and South Asia, North Africa and Central America (2-5). This hepatitis has not seen in western countries except when imported from endemic area, but recently occasional cases have been reported from Europe. The disease is now called type E hepatitis and its causative agent hepatitis E virus (HEV) (6).

It accounts for 30-50% of acute sporadic virual hepatitis both in children and adults. It affects mostly young adults and the disease is more severe among pregnant women especially during their third trimester (2).The incubation period in both man and experimental animals is approximately 2-8 weeks. HEV is a positive stranded RNA virus with a genome of −7.2 kb in size and has a poly A tail at the 3'end it has three open reading frames. Frames ORF 1, ORF 2 and ORF 3. The nonstructural ORF 1 gene is situated at 5'end of the virus while the structural genes (ORF 2 and ORF 3) are at the 3'end (7).

Type B hepatitis is the most widespread and the most important type of viral hepatitis. More than a third of world's population is estimated to have been

infected by hepatitis B virus (HBV).A proportion of cases (1-10 percent) remain chronically infected. They may be asymptomatic carriers or may progress to recurrent or chronic liver disease or cirrhosis. A few of them may develop hepatocellular carcinoma after many decades.

HBV is a 42 nm DNA virus with an outer envelope and an inner core, 27 nm in diameter, enclosing the viral genome and a DNA polymerase (8). Hepatitis B occurs throughout the world the infection is usually sporadic. The prevalence of hepatitis carries varies widely in different countries such as in equatorial Africa, South East Asia, China, parts of South America, have highly endemicity and low endemicity in the developed countries in India there is intermediate endemicity.

Methods

The study was carried out in the Clinical Microbiology Division, Department of Laboratory Medicine at the All India Institute of Medical Sciences (AIIMS). At this referral institute patients suspected with acute viral hepatitis associated illnesses are seen in the medicine out-patient clinics. As a routine, our laboratory follows the World Health Organization (WHO) testing strategies for HEV test. As an investigative protocol at the institute, all confirmed HEV positive patients are screened for Hepatitis B (HBsAg) also .We collected 3-5 ml blood sample by the venipuncture process of acute viral hepatitis suspected under 100% sterile condition. Then centrifugation used for serum separation for 10-15 min and the serum separated out which used as testing sample. Serum samples from 1147 proven HEV suspected were collected, labeled with a laboratory identification serial number and tested for HBsAg and for HEV(IgM) antibodies using enzyme linked immunosorbent assay kits (*bio Merieux*, France). Data on demographics, sexual behavior, medical history, clinically diagnosis the Jaundice, chronic liver disease, HIV and ANC screening of pregnant females of these patients were recorded.

Assessment of hepatitis B infection

HBsAg was done by enzyme linked immune-sorbant assay (ELISA) using commercial kit (Hepanostika HBsAg Ultra kit manufactured by BIOMERIEUX) according to the manufacturer's protocol.

Ethical considerations

The study protocol was approved by the Committee of Ethics at the All India Institute of Medical Sciences, India. This was a case study ; therefore no consent form was applicable.

Results

HEV Prevalence study

We studied 1141 suspected to have acute viral hepatitis over 1 year. There were the 32.16% (367/1141) from which 33.55% (252/751) males and 29.48% (115/390) female patients were HEV positive. Among these 1141 suspected, 927 suspects were tested for HBV (HBsAg) and HEV(IgM antibodies) both. We found 12.08% (112/927) patients were HBsAg positive. We found maximum HEV positivity in the age group of 21-30 years, 40% (136/340) and 14.28% (18/126) in the age group of 0-10 years, 29.94% (44/152) in age group of 11-20 years, 36.48% (85/233) in age group of 31-40 years. There was 29.33% (44/147) in age group of 45-50 years and 27.97% (40/143) in the age group of >51 years (Fig. 1). From the total of HEV suspected we diagnosed 44.68% (273/611), acute hepatitis/jaundice HEV positive cases and 28.50% (63/221) were having chronic liver disease (CLD). 57.14% (4/7) were HEV positive from total HIV suspected. Among the ANC diagnosis pregnant female 11.47% were HEV positive (7/61) (Fig. 2).

Dually infected prevalence study

There were 26 patients who were dually infected 2.8% (26/927).There were 20/26 (76.92%) males and 6/26 (23.07%) of dully infected (Fig. 3). There were 38.46% (10/26) dually patients of acute hepatitis / jaundice, 42.30% (11/26) of CLD (chronic liver dis-

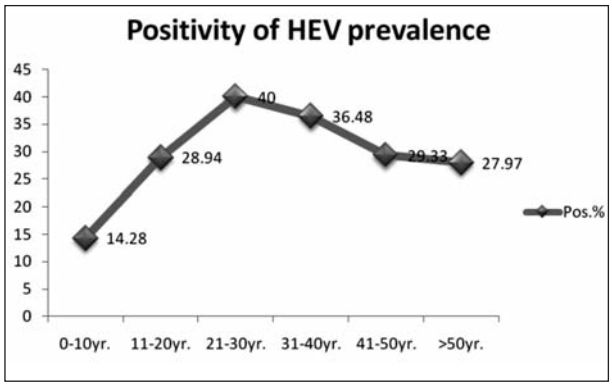

Figure 1. Showing the positivity of HEV prevalence with respect to age

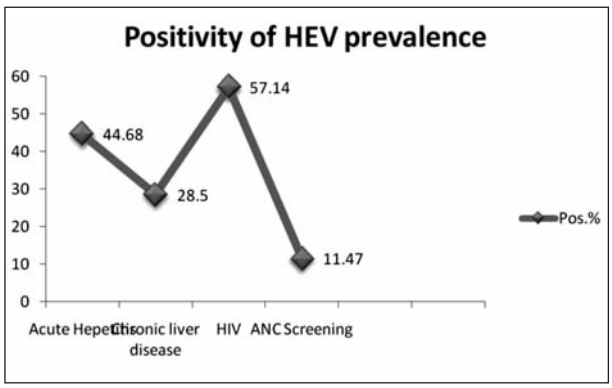

Figure 2. Showing clinically diagnosis wise HEV positivity

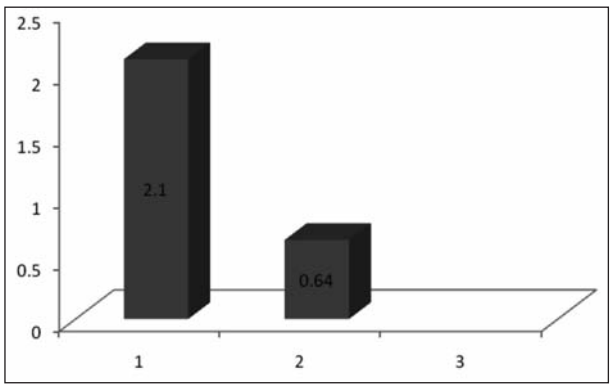

Figure 3. Showing dual infection in HEV/HBV tested suspects

ease) and 3.84% (1/26) dually patients were HIV positive. There were no dually patients in ANC pregnant female (Fig. 4).

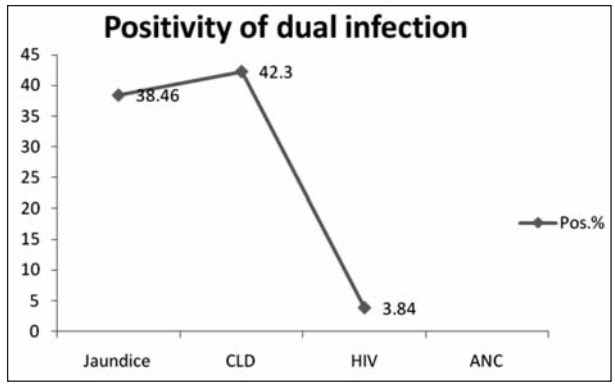

Figure 4. Showing clinically diagnosis wise dual infection

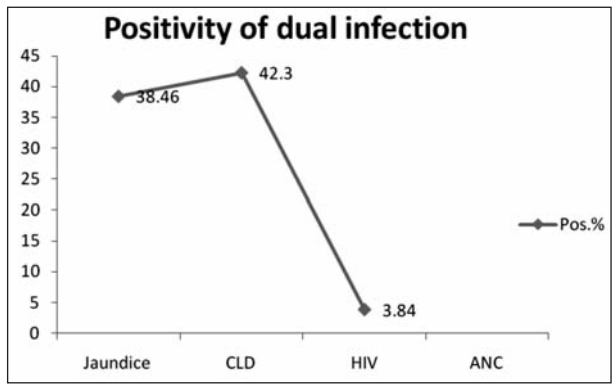

Figure 5. Showing age wise dual infection

Among dually infected patients majority were from 31-40 years age group 9/26 (34.61%) followed by 3/26 patients were from 11-20 years age group (11.53%). The 5/26 dually patients (19.23%) were from 21-30 years age group. There were 7/26 (26.92%) and 2/26 dually patients (7.69) from the age group 41-50 years and >50 years respectively. There were no dually patients from the age group 0-10 years during whole study (Fig. 5).

Discussion

Hepatitis E was first recognized during an epidemic of hepatitis in Kashmir valley in 1978 (9). It is an ecologically determined disease that spreads through faecal contamination of drinking water. Cont-

amination of water sources usually occurs either via recession of flood waters from sewerage pipes and opens drains, or in crowded living conditions with unsafe water supply and disposal of human waste, as in refugee camps and rapidly-growing urban slums (10). Viral hepatitis is a major public health problem in India, which is hyper endemic for HAV and HEV. Seroprevalence studies reveal that 90%-100% of the population acquires anti-HAV antibody and becomes immune by adolescence. Many epidemics of HEV have been reported from India. HAV related liver disease is uncommon in India and occurs mainly in children. HEV is also the major cause of sporadic adult acute viral hepatitis and ALF. Pregnant women and patients with CLD constitute the high risk groups to contract HEV infection (11). IgM anti-HEV antibodies were detected in 0.67% of the patients suggesting that although subclinical infection exists the prevalence is very low (12).

We did not found any study of dual infection of HEV and HBV from north india.This is a novel study of dual infection of HEV and HBV co-infection. In the present study data of 1 year was analyzed during this period. 1141 serum sample obtained from patients presented with acute hepatitis, chronic liver disease, HIV or for ANC check-up at All India Institute of Medical Sciences (AIIMS). The serum samples from these patients were tested for HEV. Of these, 32.16% (367/1141) and 12.08% (112/927) had detectable levels of HEV IgM antibodies and HBsAg respectively.

Our data showed highest prevalence of HEV in the age group of 21-30 years (40%) followed by 31-40 years (36.48%). The HBV infection was more common in 41-50 years age group. There were the 18.8% HBsAg positive. Clinical diagnosis wise study showed jaundice as the common clinical feature in both HEV positive & HBsAg positive patients. Under the estimation of gender wise frequency males (33.55%) were more HEV IgM antibodies positive than females (29.40%).Our important aim was the estimation the frequency of HEV & HBV dual infection in these suspected. We obtained surprising results during this study. There are very few studies on the dual infection of HEV and HBV. In dual infections study the prevalence was 2.8% (26/927). Majority of these patients had presented with acute flare of a chronic liver disease (42.3%) followed by acute jaundice (38.5%). Among the ANC pregnant female 11.47% were HEV positive (7/61).

But since none of these patients were carrying any other marker of active HBV infection. It is possible that these previously HBV infected chronic carriers/chronic liver disease patients were secondarily infected with HEV which resulted in the current flare of transaminitis and resulting hepatitis. Twenty-six patients were HBV and HEV infected both in 927 HEV and HBV suspected cases.

Conclusion

In the present study, infection with HEV found to be was highly prevalent among 20 to 40 years of age group. the males were more frequent than females for hev and HBV infection. in the children, there were lower attack of both HEV and HBV.

Especially in the case of HBV. Only 5.37% (5/93) children were affected in the age group 0-10 years. The maximum patients were having acute hepatitis/jaundice in both HEV and HBV infection. But there were different results in the clinical diagnosis wise study for dually infected patients. The maximum dually infected patients were having chronic liver disease (CLD) with acute flare.

We studied maximum no of dually patient in small study period. We found 26 dually infected patients in 12 months. The estimation of the frequency of HEV and HBV dual infection was also a first study in AIIMS.

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