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Trend in seroprevalence of Hepatitis E virus among blood donors of North estern Madhya Pradesh India

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ABSTRACT

Background & AIMS – Safe blood and blood products should be offered to all patients in need for blood transfusion. Hapatitis E virus is emarging as a potential threat to blood safety. Its prevalence in blood donors varies across the globe. Establishing the seroprevalence of the disease is ethical to informing the direction of preventive and control strategies. The aim of this study therefore was to establish the hapatitis E seroprevalence among blood donors in the north eastern Madhya Pradesh.

Methology – The study was conducted at the blood bank of a tertiary care hospital. Serving predominantly the people of north eastern Madhya Pradesh. A prospective analysis of blood donors over a period of one years was done to assess the seroprevalence and trend of hepatitis E infection. Serum anti IgM was detected by insight HEV-IgM rapid immunochromatographic assay (Tulip Diagnostic (P)LTD.Goa,INDIA)

Result- A total of 632 blood donors ware studied, out of which 543 (85.92%) ware males and 89 (14.08%) were females. The overall seroprevalence of hepatitis E IgM antibody was 6.64% (42/632) majority of the sero-positive donors were more than 45 years.

Conclusion – Study shows HEV seroprevalence among blood donors is 6.64%. As the prevalence of occult hepatitis E infection may represent a threat to safe blood transfusion, therefore further studies with nucleic acid amplification testing are needed to provide more details about the status of HEV infection in blood donors.

KEYWORDS HEV virus, seroprevalence, blood donors.

Introduction

Hepatitis E is virus (HEV) is non enveloped, single stranded RNA virus of Hepeviridae family, it classified into four geno type. HEV 1 and 2 have been found only in humans and are endemic in many part of south east Asia and Indian subcontinents, where as genotype 3 and 4 also found in pigs, wild boars and other animal species [1,2]. Infection of humans by genotype 3 associated with chronic hepatitis in immune suppressed individuals, such as patients who have received organ transplants, persons with HIV infections and patients having hematological malignancies [3,4].

The HEV transmission have been associated with feacally contaminated water or food similar to what is observed in HAV. Genotypes 3 and 4 are zoonotic and typically are associated with sporadic food borne transmission form consumption of undercooked meat products or viscera [5]. Mother to child and transfusion transmission have been reported [5,6]. Person to person spared is relatively uncommon, sexual transmission is unproven.

HEV infection usually asymptomatic but symptomatic cases are indistinguishable form other forms of Hepatitis, Atypical manifestation include fulminant hepatic failure in pregnant women and chronic liver disease in immune suppressed patients (solid organ transplant recipients, patient treated for malignancy or those with HIV infection).

The supply of safe blood or blood products in transfusion medicine is critical to avoiding the transmission of infectious diseases. There is limited data on the prevalence of HEV are available in our country. Studies shows there is prevalence of HEV in India varies from 4 – 20% in different geographic areas [7,8,9,10]. In the present prospective study we evaluated the seroprevalence of hepatitis E virus among non- remunerated blood donors in north-eastern Madhya Pradesh.

The present study aimed to determine the trend of HEV infection and to compare the prevalence with that of other country. The results of this prevalence studies should help in epidemiological survey and creation of strategies to prevent spread of HEV infection in the local population.

Material and methods

The study was conducted at the blood bank of Shyam Shah Medical College Rewa, Madhya Pradesh. In this prospective study we collected blood sample of 632 non remunerated voluntary and replacement donors from september 2013 to September 2014. They ware carefully selected for donation after a complete physical examination and satisfactorily answering the donor questionnaire and after taking their written consent. At the end of the blood collection, donor blood samples ware obtained for serological testing.

Serum anti HEV IgM was detected by insight HEV-IgM rapid immunochromatographic assay (Tulip Diagnostic (P)LTD. Goa,INDIA) as per the manufacturer's instructions. Along with all mandatory screening test (HIV1, HIV2, HCV, HBsAg, Syphilis and malaria parasite,) All reactive samples ware retested and samples showing test reactivity on both occasion were considered positive and were included for calculation of seroprevalence. The statistical analysis of data was performed using the Graphpad Instat software.The statistical difference was evaluated by applying the chi-square test. Where $p < 0.05$ was considered significant.

Result

Out of total 632 blood donors 543 (85.92%) ware male while

89 (14.08%) ware female, suggesting male to female ratio (6.1:1), The overall seroprevalence of HEV was 6.64% (table no 1). Donors in age group > 45 year had the highest prevalence (16.42%), while donors in age group < 30 year had the least prevalence (3.63%). With advancement in the age of donors the seroprevalence of HEV increased (figure 1)

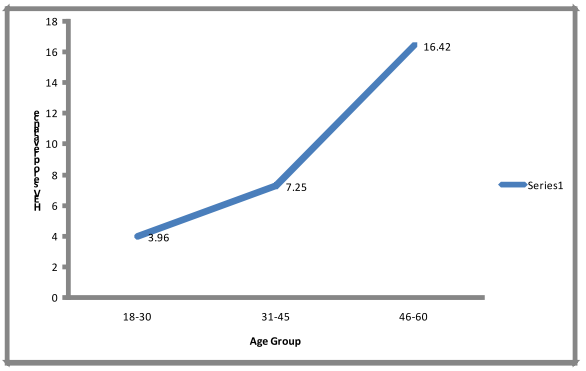
Table 1 - Comparison of seroprevalence in various donor categories.

All Donors	HEVIgMPositive	HEV IgM Negative	P – Value
n (632)	n = 42 (6.64%)	n = 590 (93.6%)	-
sex – male(n=543) Female(n=89)	37 (6.81%) 05 (5.62%0	506 (93.19%) 84(94.38%)	- (p=0.8206)
Voluntary(n= 470) Replacement(n= 162)	29 (6.17%) 13 (8.03%)	441 (93.83%) 149 (91.97%)	(p=0.4641)
Age – (Years) 18-30 (n= 303) 31-45 (n= 262) 46-50 (n= 67)	 12 (3.96%) 19 (7.25%) 11 (16.42%)	 291 (96.04%) 243 (92.75%) 56 (83.58%)	 (p=0.0009)

A higher seroprevalence rate was observed among replacement blood donors (8.03%) than the voluntary blood donors (6.17%) and Male blood donors having more seroprevalence rate than female donors (6.81% versus 5.62%) however difference is not statistically significant.(p=0.8206)

Out of 632 blood donors test, 03 (0.47%) positive for HIV, 09 (1.42%) found positive for HBsAg. 2 sample (0.32%) tested positive for HCV and all are negative for syphilis and malaria.

Figure No. - 01



Discussion

In our study among the 632 blood donors screened, the overall seroprevalence of HEV observed to be 6.64%. This sero prevalence is similar to that reported in Switzerland, Brazil, [11,12]. However our rate is considerable lower than that reported in blood donors in U.S., England and France [13,14,22]. Unfortunately seroprevalence data from different region of India are not available thus striking geographical seroprevalence in India difficult to interpret, however one study in pune by Arankalle VA at al shows similar results. [15] Comparisons between studies are difficult due to HEV detection assays methods used in studies and the various commercially available test shows important difference in sensitivity [16]. Laboratory test further depend upon prevalence as well as on the viral genotype present in the study population. Thus an HEV Rapid kit based on genotype 1 and 2 might not completely represent genotype 3 and 4 transmitted by zoonosis [1,2,17]

The present study revealed that HEV infection was more prevalent among replacement blood donors (8.03%) than voluntary blood donors (6.17%), however difference is not statistically significant.(P =0.4641)

Stratifying the prevalence data into various age groups, the study revealed on age effect on the prevalence of HEV among the studied population highest prevalence was seen among donor in age group ≥ 45 years(fingers1). This agrees with the similar studies where higher prevalence of HEV was observed in older age group,[14,18].

the age - dependent seroprevalence may simply reflect a long standing stable situation in which people are evenly exposed to HEV in the course of their life.

Grouping the prevalence data in to sex, a insignificantly higher prevalence was observed in males (6.81%) compared to females (5.62%), higher HEV seroprevalence in males than in females is also reported in other studies [19].

Thus education and motivational programs, predonation counseling, ensuring 100% voluntary blood donations, encouraging more females to participate in blood donation along with advanced technology such as nucleic acid testing (NAT) for donor screening help in decreasing the HEV infection by blood transfusion.

Table 2 - Comparison of HEV seroprevalence among blood in different countries.

Country	Seroprevalence	Year	Reference
Switzerland	4.9%	2010	11
Brazil	2.3%	2006	12
USA	18%	2002	13
England	16%	2008	14
India	4-20%	2000,2011,2014	8,9,15
France	52.5%	2011	22
Egypt	42.2%	1998	20
Italy	0.74%	1994	21
Present Study	6.64%		

Conclusion

In summary, we have found that sero prevalence of HEV among non remunerated blood donors is 6.64% in our study. Since blood transfusion is only a minor source of HEV Infection and we did not examined HEV RNA ,therefore further studies with nucleic acid amplification testing are needed to provide more details about the status of HEV infection in blood donors.

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