

Sero-prevalence of Hepatitis E Virus in Blood Donors: The Current Scenario in a Tertiary Care Teaching Hospital of North India.

Neetu Kukar¹, Neerja Jindal², Ravinder Garg³, Arunpreet Kaur⁴, Ram Niwas Maharishi⁵, Harkiran Arora⁴.

¹Assistant Professor, Department of Immune Haematology & Blood Transfusion, GGS Medical College & Hospital, Faridkot, Punjab, India.

²Professor, Department of Microbiology, GGS Medical College & Hospital, Faridkot, Punjab, India.

³Associate Professor, Department of Medicine, GGS Medical College & Hospital, Faridkot, Punjab, India.

⁴Resident, Department of Immune Haematology & Blood Transfusion, GGS Medical College & Hospital, Faridkot, Punjab, India.

⁵Professor, Department of Immune Haematology & Blood Transfusion, GGS Medical College & Hospital, Faridkot, Punjab, India.

ABSTRACT

Background: Hepatitis E Virus (HEV) infection occurs predominantly by the faeco oral route. Cases of transmission through blood transfusion have also been reported. Currently, blood donors in India are not screened for HEV. So the present study has been undertaken to know the sero-prevalence of HEV and to determine the status of endemicity of this infection. The aim of this study is to determine the sero-prevalence of hepatitis E virus (HEV) among blood donors in a tertiary care teaching hospital. **Method:** 551 blood donors' samples analysed for presence of Anti HEV IgG using 3rd generation HEV ELISA kit. The serum samples were also tested for detection of HIV, HBsAg, HCV infections, Syphilis and Malaria. **Results:** The study included 551 donors, of which 99% (546) were males. The sero-positivity for anti-HEV IgG antibodies was 10.7%, the maximum sero-positivity being in the age group 51-65. All the donors were non-reactive for HIV, HCV, HBsAg infections, Syphilis and Malaria. **Conclusion:** High Prevalence of IgG antibodies (10.7%) shows that HEV is endemic in our region. However, more studies with confirmatory assays need to be done before making it a mandatory screening test for blood donors.

Keywords: Blood donors, Hepatitis E, Sero-prevalence, Transfusion transmitted viruses.

INTRODUCTION

Blood transfusion is a life-saving measure in various medical & surgical emergencies. However, it also carries the risk of transfusion induced transmissible infections like HIV, hepatitis, syphilis, malaria & less frequently, toxoplasmosis, brucellosis & some other viral infections (Ebstein-Barr virus, cytomegalovirus & herpes virus).^[1] Lately, threat of Parvovirus B19 and Hepatitis E has also been reported through blood transfusion.^[2] Transmission of Hepatitis E Virus (HEV) occurs predominantly by the faeco-oral route. Worldwide, HEV infection causes >3 million symptomatic cases of acute hepatitis every year that results in approximately 70,000 deaths.^[3] However, recently HEV transmission has also been reported through blood transfusion. It (HEV) was recognized as a threat to blood safety after several cases of transmission by transfusion and/or transplantation were described.^[2,4] Arankalle and Chobe from their study on blood donors in Pune (India) suggested that in countries where HEV is endemic, transmission of hepatitis E might be associated with blood transfusion.^[5]

Currently, blood donors in India are not screened for HEV infection. The data on the sero-prevalence of HEV varies widely worldwide (0.4-20.6%). As there is paucity of similar data from different regions of India, the present study was undertaken to determine the sero-prevalence of anti-HEV IgG antibodies among blood donors of Malwa region of Punjab (India). This would help to know the status of endemicity of this infection and the risk of transmission through blood transfusion in this region.

MATERIALS AND METHODS

This prospective study was undertaken on 551 blood donors who had no history of hepatitis or any other systemic illness. Taking all aseptic precautions, 2 ml of blood was collected from each blood donor in a sterile test tube. The serum was separated and stored in sterile serum storage vials at -20°C. Anti-HEV IgG were detected by using 3rd generation HEV ELISA kit (Immuno-vision-USA, which is a subsidiary of ERBA diagnostics). This in-vitro qualitative enzyme linked immune-sorbent assay uses HEV specific highly immune-reactive recombinant antigen derived from conservative regions of hepatitis E virus. The serum samples were also subjected to tests for detection of HIV, HBsAg, HCV, syphilis and malaria.

Name & address of corresponding author

Dr Ravinder Garg
Associate Professor
Deptt of Medicine
GGS Medical College & Hospital
Faridkot, Punjab, India
E Mail: drravindergarg@gmail.com

RESULTS

Of the 551 voluntary blood donors tested for HEV antibodies, majority 546 (99%) were males. Their age ranged between 18-65 years. Out of these 551 donors, 59 (10.7%) tested positive for anti-HEV IgG antibodies. The correlation of HEV positivity to age showed that the lowest sero-positivity (9.2%) was in the age group 18-30 years followed by 15% in 31-50 years and 20% in age group 51-65 years [Figure 1]. All the 551 donors were found to be negative for HIV, HCV, HBsAg, Syphilis and malaria.

DISCUSSION

The reported prevalence of anti HEV IgG antibody in blood donors is variable.^[6,7,8] In most developed countries, the prevalence is in the range of 2-4% with the exception of two recent studies from South West England and South West France which reported prevalence of 16% and 16.6% respectively.^[9,10] From developing countries like Iran & India, it was found to be in a higher range (11.5% and 18.6%) respectively.^[11] A study from southern India reported sero-prevalence of 20-40% in young adults.^[12] In our study, sero-positivity for IgG antibodies in North West India (Malwa region –Punjab) was 10.7%. This difference could be because of variability in the demographics of populations studied and HEV antibody detection assays used in the demonstration of HEV IgG antibodies. In developing countries, HEV sero-prevalence among blood donors who represent general population could also be because of poor sanitation and environmental conditions prevailing in these countries. Kaufmann et al are of the opinion that when standard confirmation assays are not employed for detecting IgG antibodies, the difference in sero-prevalence between different populations must be interpreted with caution.^[13]

Along with regional variations, the differences in sero-prevalences have also been reported with the age & the gender of the blood donors.^[2] In the present study, sero-positivity increased with the increasing age and it was maximum in the age group of 51-65 years. This is similar to the findings from China, Japan and Denmark which have also shown a continuous rise in sero-prevalence with age with peaks at around 60 years or higher age groups.^[14] However, in Egypt 65% of the children below the age of 10 years were reported to be HEV seropositive suggesting a widespread exposure early in life.^[15] In many reports, there is male preponderance in HEV sero-positivity (Japan, Iran).^[16,17] In others, no difference in sero-prevalence with gender (France, Brazil) has been reported.^[18] As vast majority of the donors in our

study were males (99%), we were not able to assess the gender factor.

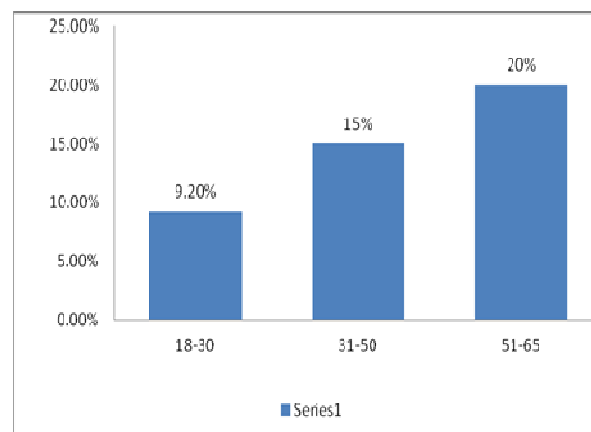


Figure 1: Relation of Age with HEV Positivity

The presence of anti-HEV IgG antibodies is generally taken as an evidence of prior exposure to HEV and provides an evidence of endemicity of HEV infection. In order to be transmissible through blood, the donor should be in a phase of asymptomatic viraemia and be positive for HEV RNA. A study on Japanese blood donors reported the prevalence of IgG antibodies in 7% and HEV RNA in approximately 1.2%.^[19] With 3 of the 200 (1.5%) donors positive for HEV RNA in their study, Arankalle and Chobe (Pune) suggested the possibility of transmission of HEV by transfusion.^[20] High prevalence of IgG antibodies (10.7%) shows that HEV is endemic in our region, but before making it a mandatory screening test on blood donors, further studies with confirmatory assay of HEV need to be undertaken.

Limitation of the present study- HEV RNA could not be done due to financial constraints. This makes it difficult to comment on the risk of HEV transmission through blood transfusion.

REFERENCES

1. Nagarekha K. Analysis of the sero-prevalence of HIV, HBsAg, HCV and syphilitic infections detected in the pretransfusion blood: A short report. *International Journal of Blood Transfusion and Immunohematology* 2012;2:1-3.
2. Bajpai M, Gupta E. Transfusion transmitted hepatitis E: Is screening warranted? *Indian J Med Microbiol* 2011;29:353-8
3. Rein DB, Stevens G, Theaker J The global burden of hepatitis E virus genotype 1 and 2 in 2005. *Hepatology*. 2012;55:988-97.
4. Matsubayashi K, Kang JH, Sakata H, Takahashi K, Shindo M, Kato M, et al. A case of transfusion-transmitted hepatitis E caused by blood from a donor infected with hepatitis E virus via zoonotic food-borne route. *Transfusion*. 2008;48:1368-75.
5. Arankalle VA, Chobe LP. Hepatitis E virus: Can it be transmitted parenterally? *J Viral Hepat* 1999;6:161-4.
6. Guo QS, Yan Q, Xiong JH, Ge SX, Shih JWK, Ng MH, et al. Prevalence of hepatitis E virus in Chinese blood donors. *J Clin Microbiol* 2010;48:317-8.

7. Taremi M, Gachkar L, Mahmoud Arabi S, Kheradpezhoh M, Khoshbaten M. Prevalence of antibodies to hepatitis E virus among male blood donors in Tabriz, Islamic Republic of Iran. *East Mediterr Health J* 2007;13:98-102.
8. Christensen PB, Engle RE, Hjort C, Homburg KM, Vach W, Georgsen J et al. Time trend of the prevalence of hepatitis E antibodies among farmers and blood donors: A potential zoonosis in Denmark. *Clin Infect Dis* 2008;47:1026-31.
9. Mansuy JM, Legrand-Abravanel F, Calot JP, Peron JM, Alric L, Agudo S, et al. High prevalence of anti-hepatitis E virus antibodies in blood donors from South West France. *J Med Virol* 2008;80:289-93.
10. Dalton HR, Stableforth W, Thurairajah P, Hazeldine S, Remnarace R, Usama W, et al. Autochthonous hepatitis E in Southwest England: Natural history, complications and seasonal variation and hepatitis E virus IgG seroprevalence in blood donors, the elderly and patients with chronic liver disease. *Eur J Gastroenterol Hepatol* 2008;20:784-90.
11. Assarehzadegan MA, Shakerinejad G, Amini A, Rezaee SA. Seroprevalence of hepatitis E virus in blood donors in Khuzestan Province, Southwest Iran. *International Journal of Infectious Diseases* 2008;12:387-90.
12. Macedo G, Pinto T, Sarmiento JA, Vale AM, Ribeiro. The first assessment of hepatitis E virus seroprevalence in Northern Portugal. *Acta Med Port* 1998;11:1065-8.
13. Kaufmann A, Kenfak-Foguena A, Andre C, Canellini G, Bugisser P, Moradpour D, et al Hepatitis E virus seroprevalence among blood donors in Southwest Switzerland. *PLoS one* 2011;6(6):211-50.
14. Mushahwar IK. Hepatitis E virus: Molecular virology, clinical features, diagnosis, transmission, epidemiology and prevention. *J Med Virol* 2008;80:646-58.
15. Panda SK, Thakral D, Rehman S. Hepatitis E virus. *Rev Med Virol* 2007;17:151-80.
16. Aminiafshar S, Alimaghani M, Gachkar L, Yousefi F, Attarchi Z. Anti Hepatitis E Virus Seropositivity in a Group of Blood Donors. *Iranian J Public Health* 2004;33:53-6.
17. Takahashi M, Tamura K, Hoshino Y, Nagashima S, Yazaki Y, Mizuo H et al. A Nationwide Survey of Hepatitis E Virus Infection in the General Population of Japan. *J Med Virol* 2010;82:271-81.
18. Bortoliero AL, Bonametti AM, Morimoto HK, Matsuo T, Reiche EM. Seroprevalence for hepatitis E virus (HEV) infection among volunteer blood donors of the Regional Blood Bank of Londrina, State of Parana, Brazil. *Rev Inst Med Trop Sao Paulo* 2006;48:87-92.
19. Gotanda Y, Iwata A, Ohnuma H, Yoshikawa A, Mizoquchi H, Endo K et al. Ongoing subclinical infection of hepatitis E virus among blood donors with an elevated alanine aminotransferase level in Japan. *J Med Virol* 2007;79(6):734-42.
20. Arankalle VA, Chobe LP. Retrospective analysis of blood transfusion recipients: Evidence for post-transfusion hepatitis E. *Vox Sang* 2000;79:72-4.

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