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Research Article

Incidence of Hepatitis E Virus among Elevated Liver Enzymes (ALT, AST) in Sudanese Patients

Myada Ahmed Musa Haroon*, Amira Altom Fawzi Osman
Department of Microbiology and Immunology, Alzaiem Alazhari University, Khartoum, Sudan

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ABSTRACT

Background: Hepatitis E Virus (HEV) infection is a newly recognized serious threat to global public health and Africa is suspected to be among the most severely affected regions in the world.

Objective: This study aimed to detect the frequency of anti-hepatitis E IgM, among elevated liver enzyme patients.

Methods: The current study is descriptive cross-sectional study carried out between April to august 2016, Ninety Patients with high liver enzyme ALT and AST and non B non C hepatitis attended Ibn senaa hospital Khartoum north, Omdurman teaching hospital and bahri teaching hospital bahri north, sedan were collected and tested by using (ELISA) kit

Results: show that Out of the 90 samples tested in order to evaluate the effect of age on HEV seropositivity, there was a significant difference ($p<0.05$) between HEV seropositivity and age group.

Conclusion: Study demonstrates the high prevalence rate of HEV seropositivity among non-hepatitis patients with high level enzyme ALT, AST. This will raise the potential risk of HEV infection by blood transfusion and may be the source of the outbreak.

Keywords: Anti-HEV IgM (anti-HEV immunoglobulin M), Hepatitis E virus, Alanine Amino Transferase (ALT), Aspartate Amino Transferase (AST)

***Correspondence:** Myada Ahmed Musa Haroon, Department of Microbiology and Immunology, Alzaiem Alazhari University, Khartoum, Sudan, E-mail: myadakursi@gmail.com

INTRODUCTION

Hepatitis E is a liver disease caused by the hepatitis E virus, a non-enveloped, positive-sense, single-stranded Ribonucleic Acid (RNA) virus. Hepatitis E should therefore be considered a risk to transfusion safety, especially in high-risk recipients (pregnant females, patients with pre-existing chronic liver disease, and immune-compromised patients), for two reasons. Firstly, the HEV-positive donor may have asymptomatic viraemia with normal aspartate transaminase and ALT and (Clemente-Casares P, *et al*., 2003; Lewis HC, *et al*., 2008) secondly; the time of seroconversion is not clearly defined (Mansuy JM, *et al*., 2004). Viraemia in individuals infected with HEV is usually of short duration but there are reported instances of protracted viraemia such as after acute HEV hepatitis in children (Amon JJ, *et al*., 2006). A brief incubation period can be followed by asymptomatic phase although the infection in the recipient is generally asymptomatic apart from mild jaundice and elevated ALT. Elevated ALT and AST levels are associated with a recent acute HEV infections this provided a unique opportunity to diagnose asymptomatic and symptomatic HEV infection in an occupationally exposed group (Kumar N and Sarin SK, 2013). The presence of seropositive anti-HEV and increased levels of ALT and AST usually indicate recent HEV infection (Fukuda S, *et al*., 2004) and may signify a recent introduction of HEV.

MATERIALS AND METHODS

The current study is descriptive cross sectional study carried out between April to august 2016. Here, ninety patients (90) with high liver enzyme ALT and AST and non B non C hepatitis attended different hospitals of Sudan selectively like-Ibn Sina Specialized Hospital Khartoum (North), Omdurman Teaching Hospital and Khartoum Bahri Teaching Hospital (North). Sudanese were recruited in this study which was approved by Alzaeim Alazhari University (AAU) and ethical approval was provided by the ministry of health, Medical Specialization Ethics Review Board, Sudan. The blood specimens were collected by vein puncture into sterile plain containers for serological analysis. The samples were centrifuged, and sera were collected immediately. The collected sera were stored at -20°C until processed and tested by Enzyme-linked immunosorbent assay (ELISA) and the presence of anti-HEV IgM antibody which was considered as an evidence for new exposure.

Statistics

Data were entered in to the computer using SPSS software and double checked before analysis. Significance of differences was determined using the chi-square test. Similarly, the statistical significance was set at p values<0.05.

RESULTS AND DISCUSSION

Frequency of HEV IgM among elevated liver enzyme ALT, AST

Out of the 90 samples which were tested, 34 subjects (37.7%) were HEV IgM positive, while 56 subjects (62.2%) were negative for HEV IgM *(Table 1)*.

Table 1: Frequency of HEV IgM among elevated liver enzyme ALT, AST

Valid	Frequency	Percent
Negative	56	62.20%
Positive	34	37.70%
Total	90	100%

Influence of gender on HEV IgM seropositivity elevated liver enzyme ALT, AST

The result presented in *Table 2* demonstrates that there was no significant difference ($p>0.05$) between males and females.

Table 2: Influence of gender on HEV IgM seropositivity elevated liver enzyme ALT, AST

Gender	N and p	Negative	Positive	Total
Male	Number	27	27	54
	Percent	30%	30%	60%
Female	Number	23	13	36
	Percent	25%	14.4%	40
Total	Number	50	40	90
	Percent	55%	44.4%	100%

Influence of age on HEV IgG seropositivity among elevated liver enzyme ALT, AST

The age range of the patients was from 20 years and above 50 years among which the age group, 20-29 (yrs) showed HEV IgM positive 5(35.8%), whereas 9(64.2) showed HEV IgM negative. Similarly, from the age group 30-39 years 4(20%) showed HEV IgM positive and 16(80%) showed HEV IgM negative. The age group, 40-49 years showed 21(65.6%) HEV IgM positive and 11(34.4%) HEV IgM negative. The age group 50 and above showed 4(16.7%) HEV IgM positive and 20(83.3%) HEV IgM negative. There was significant difference ($p<0.05$) between HEV seropositivity and age group *(Table 3)*.

Table 3: Influence of age on HEV IgM seropositivity among elevated liver enzyme ALT, AST

Age (yrs)	Negative	Positive	Total
20-29	9(64.2%)	5(35.8%)	14
30-39	16(80%)	4(20%)	20
40-49	21(65.6%)	11(34.4%)	32
50 and above	4(16.7%)	20(83.3%)	24
Total	50	40	90

Influence of residence on HEV IgM seropositivity among elevated liver enzyme ALT, AST

The results presented in *Table 4* demonstrate that there was significant difference ($p<0.05$) between the residence in rural and urban and HEV IgM seropositivity *(Table 4)*.

Table 4: Influence of residence on HEV IgM seropositivity among elevated liver enzyme ALT, AST

Residence	N and percent	Negative	Positive	Total
Rural	Number	33	9	42
	Percent	36.7%	10%	53.3%
Urban	Number	17	31	48
	Percent	18.9%	34.4%	46.7%
Total	Number	50	40	90
	Percent	55.6%	44.4%	100%

Type E hepatitis is one of the important hygienic infectious problems of developing countries as like as other oral-fecal transmitted infections and the development of serological methods provided useful clinical and epidemiological information about this infection (Dalton HR 2013; Barzilai A, *et al.*, 1995).

We studied the anti-HEV seropositivity in a group of non-hepatitis B non C patients with high liver enzyme and noticed a prevalence of 37.7%, which correlates with the prevalence of endemic areas. The obtained value is higher than those obtained. The overall prevalence of anti-HEV IgM antibody among our study, is higher than those reported by Zhao C, *et al.*, 2009 in Makkah, Saudi Arabia (18.7%) (frequency=56). Aggarwal R and Naik S, *et al.*, 2009 studied voluntary blood donors with an elevated Alanine Aminotransferase (ALT) level at Japanese Red Cross Blood Center and found it to be 7.1% whereas, de Niet A, *et al.*, 2012 denoted 7%. Likewise, the prevalence of anti-HEV IgM seems to be higher than that reported by several other researchers which were noted to be (15.5%). Lauren in blood transfusion Center of Suez Canal University hospital explored the prevalence of anti-HEV IgM and found to be around 20.9% to 26% (Belbezier A, *et al.*, 2014). Growing evidence suggests that elevated ALT and AST levels are associated with recent acute HEV infection. Similar results were obtained in our study and thus provided a unique opportunity to diagnose asymptomatic and symptomatic HEV infection. The presence of seropositive IgM anti-HEV and increased levels of ALT and AST usually indicates recent HEV infection which signifies recent introduction of HEV. Seroprevalence in Sudan was lower than countries of the Eastern Mediterranean Region that report up to 52% seroprevalence for anti-HEV (Belbezier A, *et al.*, 2014).

We noticed no sexual association of anti-HEV seropositivity which correlates with other studies that similar to that found by Belbezier A, *et al.*, 2014 and Aggarwal R and Naik S, 2009.

In the current study, seroprevalence of anti-HEV IgM increased with age, (35.8%) in subjects from 20-29 years to (83.3%) in subject more than 50 years, that was similar with Belbezier A, *et al.*, 2014 and Aggarwal R and Naik S, 2009. Some studies which stated that older age has higher HEV seroprevalence rates (Abravanel F, *et al.*, 2012 and Kamar N, *et al.*, 2012). Other studies have found older age to be a risk factor for anti-HEV positivity (Baylis SA, *et al.*, 2011). It is probable that this represents cumulative exposure over time.

In terms of area of residence, 36.7% of the patients living in the urban area were negative for IgM antibody to HEV. Similarly, 10% were positive among those who lived in rural area ($p=0.000$). This depicts the results seem to be similar to Belbezier A, *et al.*, 2014. However, it cannot be acceptable as per the perspectives of the results depicted by Mansuy JM, *et al.*, 2004 in South West Franc. Which stated that the prevalence rate was more in rural as compared to that in the urban subjects, these results indicate that the populations with higher density may be at greater risk of hepatitis E.

CONCLUSION

This study demonstrates the high prevalence rate of HEV seropositivity among non-hepatitis patients with high level enzyme ALT, AST. This will raise the potential risk of HEV infection by blood transfusion and may be source of outbreak. Importance of evaluating HEV screening for blood donors to avoid the transmission of HEV to the patients and the high prevalence of HEV infection coupled with the elevated ALT and AST values suggest that HEV infection should be treated as an occupational illness and therefore suggest the urgent need for the introduction of some of the range of effective preventive strategies to improve settings in the community.

ETHICAL APPROVAL

This study was approved by ministry of health Medical Specialization Ethics Review Board, Sudan.

CONSENT FOR PUBLICATION

Authors are revised and agreed for publish the study.

DATA AVAILABILITY

The data supporting this study are from previously reported studies which have been cited.

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