Frequency of Hepatitis E Virus among Pregnant Women Attending Khartoum Hospitals

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Abstract

Background: Hepatitis E virus (HEV) causes large-scale epidemics of acute viral hepatitis, particularly in developing countries with high mortality rate among pregnant women. The infection is more severe, often leading to fulminant hepatic failure and death in a significant proportion of patients.

Objective: The aim of this study was to verify the frequency of Hepatitis E virus among pregnant women attending Khartoum hospitals.

Methods: Enzyme linked immunoassay (ELISA) was done to determine the presence of anti-HEV IgG among 90 pregnant women during the period from July to September 2013.

The results: HEV IgG antibodies were detected in 41.1% (37/90). The highest percentages were recorded in the second and third trimesters of pregnancies (37.8% and 48.7%) respectively.

Conclusion: This study found a high frequency of anti- HEV IgG among Sudanese pregnant women in Khartoum.

Keywords: Anti-HEV IgG, ELISA, Hepatitis E virus, Pregnant women, Sudan.

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Introduction

Hepatitis E virus (HEV) is a spherical, non-enveloped, single-stranded RNA virus [1,2] that belongs to the new genus, Hepevirus [3]. This pathogen is responsible for at least 50% of acute non-A non-B hepatitis in developing countries. Hepatitis E virus infection is a major cause of human viral disease with clinical and pathological features of acute hepatitis; in related studies, Stoszek *et al*. and Patra *et al*. reported prevalence rates of 84.3% and 60% among pregnant women in Egypt and India, respectively [4,5]. Hepatitis E virus causes sporadic infection, but also large epidemics, usually transmitted through orofecal route due to contaminated food or water [6,7]. A large outbreak of hepatitis E virus infection was reported in June 2004 in the internally displaced population camps of Darfur-Western-Sudan [8]. It affects primarily young adults and is generally mild [9]; however the mortality rate is higher among pregnant women, especially during the second and third trimesters of pregnancy [10,11]. In Sudan a case fatality ratio of 17.8% was found in an outbreak in Darfur during 2004, with a ratio of 31.1% among pregnant women [12]. HEV infection can be diagnosed by either detection of viral particles in stool using electron microscopy or detection of anti-HEV antibodies in serum. Similar to hepatitis A virus, HEV occurs in high concentrations in the stool in the weeks immediately prior to the onset of symptoms. Viral shedding in the stool usually continues about two weeks after the onset of

jaundice, although in a few persons viral shedding has persisted as long as four weeks. Antibodies to HEV are detectable in nearly all infected patients upon presentation of their illness [13]. The aim of this study was to verify the frequency of Hepatitis E virus among pregnant women attending Khartoum hospitals.

Patients and Methods

The current descriptive, cross-sectional study carried out between July and September 2013. 90 pregnant women attended different hospitals in Khartoum, Sudan were recruited in this study. This study was approved by Al-Neelain University ethical committee board and an informed consent was obtained from each patient before collecting the demographic and clinical data. Five-mL blood samples were obtained by venipuncture for serological analyses. Samples were centrifuged and sera were separated immediately. Sera were stored at $-20^{O}C$, and tested for the presence of anti-HEV IgG antibody by enzyme-linked immunosorbent assay (ELISA) (DS-EIA-ANTI-HEV-G). The presence of anti-HEV IgG antibody was considered as the evidence for prior exposure to HEV. All collected data were analyzed using SPSS. Descriptive statistics were reported as the mean ± SD for continuous variables and as the frequency (%) for dichotomous variables. To evaluate the relationship between different factors we performed chi-square analysis. Quantitative variables were compared using independent t-test. *P. values* < 0.05 were considered statistically significant.

Results

A total of 90 pregnant women attended different hospitals in Khartoum were enrolled in the current study. All of the patients were found to be healthy on routine antenatal medical examination. Overall HEV IgG sero-prevalence rate among pregnant women in Khartoum,

Sudan over the two month period was 41.1% (37/90). The age distribution of pregnant women seropositive for HEV IgG ranged from 16 to 42 years and their median age was 32 years. The seroprevalence was highest 45.9% among pregnant women 16 - 24 years age, followed by 35.1% in 25 – 33 year group, then 19.0% in 34 - 42 year group. However, there was no statistically significant correlation between increasing age and HEV sero-positivity and no statistically significant difference in prevalence by age group. The seroprevalence was also higher in women in the third trimester (48.7%) than in the second and first trimester. Despite the high HEV prevalence among pregnant women, symptoms and signs compatible with acute viral hepatitis were not found frequently, this was indicated by only 5.4 % complaining of current jaundice, but more than quarter of them were have a history of jaundice.

Demographical and clinical data

Characteristic	No.	%
Study group	**90**	100
Anti-HEV IgG antibodies		
Positive	**37**	41.1
Negative	**53**	58.9
Distribution of age groups among positive pregnant women		
16 – 24	**17**	45.9
25 – 33	**13**	35.1
34 – 42	**07**	19.0
Duration of pregnancy among positive pregnant women		
1st trimester	**05**	13.5
2nd trimester	**14**	37.8
3rd trimester	**18**	48.7
Signs and symptoms		
Jaundice	**02**	05.4
Previous history of jaundice	**10**	27.0

Discussion

This study found very high overall frequency rates (41.1%) of HEV antibody among pregnant women, suggesting the possibility of subclinical infections. The overall frequency of HEV among pregnant women attending Khartoum hospitals is higher than that found in Darfur, Western-Sudan (31.1%) and lower than in Egypt (84.3%) and India (60%) [4,5].

Until now, no epidemic cases of HEV infection have been reported in Khartoum, despite the high prevalence of IgG antibodies to this virus. Furthermore, no signs and symptoms compatible with acute viral hepatitis were found that would indicate past HEV infection among these pregnant women except 10 cases. Probably, the initial HEV infection occurred early in life, and, as with early childhood exposure to hepatitis A virus in countries where it is somewhere endemic, the children do not become ill. Therefore, epidemiological studies of people in various age groups and in children are also needed.

The interaction of Hepatitis E and pregnancy is fascinating and has provided new insights into the pathophysiology and understanding of the immunology and host susceptibility factors and their interaction to produce the disease processes. The severe liver injury due to HEV infection during pregnancy may be related to several possible factors, such as differences in immune and hormonal factors occurring during pregnancy, the genetic and environmental factors with its occurrence in certain developing countries [14].

The policy of not screening for HEV antibodies in pregnant women and in blood and organ donors in most countries is based on the low risk of its associated diseases like screening of HIV as an example which should be screened because of its high risk. Recently HEV screening program has been recommended as part of the routine in several countries. The antenatal

screening program also should be performed to minimize prenatal HEV transmission to take further precaution to protect fetus's life [15].

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