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Hepatitis E virus infection rate in hemodialysis patients in Baghdad city

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ABSTRACT

Introduction: When someone is immunocompromised, such as a patient receiving hemodialysis for renal failure, the hepatitis E virus (HEV) is the most prolific viral pathogen. In addition to the fecal-oral route of transmission, blood-borne HEV infection has also been documented in recent times. We looked into the true state of HEV infection in individuals receiving routine hemodialysis based on these findings.

Aim of study: To investigate the seroprevalence of HEV among individuals receiving hemodialysis (HD).

Patients & Methods: In this cross-sectional study, data were collected from a total of ninety patients on maintenance haemodialysis (HD) attending the HD dialysis centres of Al-Kadhimiya Educational Hospital, Al-Yarmouk Teaching Hospital and Al-Shu'ala General Hospital between November 2023 and March 2024. The presence of anti-HEV IgG antibodies in serum samples was determined using an enzyme-linked immunosorbent assay (ELISA) kit.

Results: HEV-IgG seropositive results were found in 22 (36.67%) of 60 haemodialysis patients. 11 (18.33%) patients were males and 11 (18.33%) were females with an insignificant difference, but the result was negative in each control group. In addition. The 20 (33.33%) patients infected with HEV were from Karakh city and 2 (3.33%) were from Rasafa city with significant difference ($p \leq 0.05$).

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INTRODUCTION

The family Hepeviridae includes HEV. HEV is a 32–34 nm-diameter, positive-sense, single-stranded, non-enveloped RNA virus [(1)]. While the fecal-oral route is the most common way that HEVs are transmitted, there are other ways as well, such as organ donation and

hemodialysis, which is a subset of blood transfusions. HEV is one of the common nosocomial transmitted infections that patients getting maintenance HD usually develop. The immunocompromised state of chronic HD patients and the parenteral transmission of HEV are the reasons for this increased exposure risk. Consequently, persons with HD are susceptible to HEV infection [(2)]. People with chronic nephron illness, especially those undergoing HD, may experience modest and reversible clinical indications of HEV infection, can develop severe cases of the infection. Although its significance, HD patients are rarely routinely tested for HEV at HD centres, especially in nations where the disease is endemic [(3)]. Disparities in HEV infection between groups of compromised people and donors who are healthy are observed in healthcare settings [(4)]. Immunodeficient patients' prolonged HEV viral infection durations and less adequate HEV clearance could be one reason [(5)]. For SOT recipients, a chronic HEV infection was defined as HEV replication (viremia), or HEV RNA detectable in the bloodstream, for a period of three months or more following the start of the infection [(6)]. Moreover, three months following the initial identification of HEV viremia, patients receiving transplants may experience spontaneous clearance of HEV infection. On the other hand, it was noted that several persons in good health tested positive for HEV for more than six months [(7)].

PATIENTS AND METHODS

Participants in this study included 60 frequent HD patients (28 females and 32 males) from three dialysis facilities: Al-Shu'ala General Hospital, Al-Yarmouk Teaching Hospital, and Al-Kadhimiya Educational Hospital. There were thirty individuals and donors who appeared to be in good health made up the control group.

The samples were collected from November 2023 to March 2024. Hepatitis E virus-IgG antibody was discovered through the enzyme-linked immunosorbent test (ELISA) kit for HEV IgG (Elabscience, USA).

RESULTS

Out of 60 HD patients, 60 HD patients 22 (36.67%) had positive results for anti-HEV IgG antibodies, but all samples in the healthy group lacked anti-HEV IgG antibodies, with highly significant difference. (Table 1). Out of 60 HD patients, 11 (18.33%) were males and 11 (18.33%) were females with no significant difference. (Table 2). Of the 60 HD patients 20 (33.33%) of patients infected with HEV were from Karakh city and 2 (3.33%) were from Rasafa city. (Table 3)

Table 1: Anti-HEV IgG seropositivity rates in study groups

Anti-HEV IgG	**Anti-HEV IgG**			
	HD patients		**Control group**	
	No.	**%**	**No.**	**%**
Positive	22	36.67	0	0
Negative	38	63.33	30	100
Total	60	100	30	100
P.value	**<0.001**			

Table 2: Association of HEV seropositivity with sex

Variable	**Anti-HEV IgG**			
	Positive		**Negative**	
	No.	**%**	**No.**	**%**
Sex				
Male	11	18.33	21	35
Female	11	18.33	17	28.34
Total	22	36.66	38	63.34
P.value	**0.99 NS**			

Table 3: According to Region, HD patients' HEV infection distribution.

Variable	Anti-HEV IgG			
	Positive		Negative	
	No.	%	No.	%
	City			
Karkh	20	33.33	26	43.33
Rusafa	2	3.33	12	20
Total	22	36.66	38	63.33
	P. value			
	0.0039			

DISCUSSION

The study revealed that 22 (36.67%) of patients with end stage renal disease have HEV antibodies comparing with 0% of the group under control. The outcome proved to be significant (P<0.001). The potential of contracting hepatitis infections is higher in patients undergoing ongoing dialysis care. In Baghdad reported that HEV infection was detected in (9.3%) of patients with hemodialysis by PCR technique and A significant variance was present (p<0.001) [8] . 6.7% of hemodialysis patients tested positive for anti-HEV IgG antibodies, according to the study, whereas all samples in the healthy group tested negative with a noticeable variation. As result was significant (p<0.001) that agree with current study. Iran research revealed that HEV seroprevalence ranged from 1.1% to 14.2% in people in general and 6.3% to (28.3%) in patients on dialysis [9]. A study from southwest region of Iran, found that 51.19% of the population obtaining dialysis exhibited HEV infection [10]. According to data published in Lebanon, anti-HEV IgG antibodies were detected in (21.63%) percent of the 171 individuals who were evaluated while undergoing HD care in three distinct hospitals [11]. In Egypt, reported that 22.9% were sero-positive for HEV IgG (12). Other study, in North-Eastern Greece, found notable differences in HEV IgG frequency between dialysis centres, with values varying from 3.8% to 21.7% [13]. Infections are the major causes of mortality and morbidity in hemodialysis patients. Hence, the Adenovirus can affect individuals receiving HD who have persistent kidney disease [14]. The current investigation was agreement with other study who revealed that was no obvious distinction between the sexes with HEV infection in HD patients [8]. Other study from Gorgan, north of Iran, found no relation between sex and HEV infection in patients with renal failure undergone hemodialysis [15]. Numerous studies found no statistically significant association among males and females in HD patients [10].

However, other studies reported that no difference was noticed in the distribution of adenovirus in males and females [16]. A different study discovered that none of the risk factors tested in the study, including sex, education, or the kind of drinking water, were connected to HEV seropositivity [17]. Other study showed that HEV was detected with predominance of males than females (56 % vs. 44.6%) [18].

However, no statistical analysis significant difference (p > 0.05). Kogias et al (13)found no statistically significant association among males and females in HD patients.

The results of this investigation showed that the highest level of HEV infection and adenovirus were from Karakh city in HD patients. The results were highly-significant (p<0.001**). The current study agreement with other study found that the rate of HEV infection increased in patients in Baghdad [19]. The aftermath of the war left Iraq in a terrible state; sewage pollution and destruction of the water supply infrastructure made

hepatitis E endemic. The majority of HEV infections, according to other studies, occurred in Baghdad, Iraq [20]. There was a substantial correlation between HEV infection and water samples that were bacteriologically hazardous or had unsatisfactory residual chlorine concentrations. In June, reports surfaced of high HEV infection rates, low chlorine concentrations, and contaminated water.

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Conflict of interest
No conflict between interests exists, according to the researchers.

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