The Prevalence of Hepatitis G Virus Infection among Hemodialysis and Chronic Hepatitis Patients

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Background and study aim: HGV is a type of hepatitis viruses discovered in 1995. HGV is transmitted through parenteral route and seldom seen alone. The clinical course is usually subclinical anicteric and spontaneous clearance of virus particles is common after two years with appearance of anti-HGV antibodies. The aim of this study was to assess the magnitude of HGV infection problem and the impact of HGV infection on the affected patients.

Patients and methods: 64 patients were included in this study, 22 hemodialysis patients, 22 chronic hepatitis patients as well as 20 healthy control subjects. RT PCR was done for HGV RNA to all subjects as well as routine laboratory investigations and anti HCV Ab and HBsAg.

Results: HGV was positive in 5% of healthy controls, 50% of hemodialysis patients, and 36.4% in chronic hepatitis patients. The prevalence of HGV mono-infection was 9.1% in all patients and prevalence of HGV co-infection with HCV and/or HBV was 36.4%. There were no significant differences between HGV positive and negative subjects as regard age, gender distribution, clinical or laboratory measures.

Conclusion: HGV has high prevalence among hemodialysis and chronic hepatitis patients. HGV infection doesn't have an impact on patients clinical or laboratory parameters.

INTRODUCTION

Hepatitis G virus (HGV) is a new type of hepatitis virus which was first identified by Simons et al, 1995 and Linnen et al, 1996 [1,2]. It has been shown that HGV is a single stranded RNA virus with positive polarity which has world-wide distribution, and spread by parenteral transmission [3].

Infection with HGV is common in the world. The detection rate of HGV in the population averages 1.7%. HGV, like other parenteral hepatitis viruses, occurs universally, but no uniformly [4].

HGV virus has clearly established transmission modes, which include mainly blood contamination and occasionally sexual transmission [5,6]. It is frequently found among transfused patients, [7] intravenous drug abusers, hemodialysis (HD) patients, and vertically from infected mother to children [8].

The incubation period of acute viral hepatitis G averages 14-20 days. The clinical picture of HGV infection is commonly similar to that of the subclinical and anicteric types of hepatitis with normal or low aminotransferase activities [9].

The outcome of acute hepatitis may be: (1) recovery with the disappearance of serum HGV RNA and the emergence of anti-E2; (2) development of chronic hepatitis with serum HGV RNA being persistently detectable; (3) presence of HGV RNA without biochemical or histological signs of liver disease [10].

Following clearance of HGV viraemia, most individuals develop conformation dependent antibodies to the envelope glycoprotein E2, and thus E2 antibody serves as a marker of prior infection [11].

In HGV mono-infection liver histopathology shows moderate or mild focal portal hepatitis was prevalent with slight periportal infiltration and lobular components being found in single cases, [12] biliary epithelium desquamation, [13]

periportal fibrosis, [14] and steatosis [15]. There's also evidence that HGV may play a role in the production of lithogenic bile and in the development of cholelithiasis [16].

Patient with HCV/HGV co-infection are treated with pegylated interferon without any impact of HGV viremia on the HCV response to therapy. The HGV viremia usually becomes undetectable after cessation of interferon therapy [17].

Aim of the study: this study aims at measuring the prevalence of HGV infection among hemodialysis patients and chronic hepatitis patients in Zagazig University Hospitals and study the impact of HGV infection on clinical and laboratory parameters of the patients.

PATIENTS AND METHODS

This study was conducted in Tropical Medicine, Internal Medicine and Clinical Pathology departments, Zagazig University Hospitals, between January and March 2012 on sixty four subjects.

The subjects were divided into three groups:

- Group I: Control group included 20 healthy persons.
- Group II: Haemodialysis group included 22 hamodialysis patient.
- Group III: Chronic hepatitis group included 22 patients with chronic viral hepatitis with or without cirrhosis with any Child's grade.

All patients were subjected to:

1. Full medical history.
2. Thorough clinical examination.
3. The following investigations:

- Pelvi-Abdominal ultrasound.
- Routine laboratory investigations including: Complete blood picture by Dyn 1700, Liver function tests by integra 400 analyzer: Total bilirubin, direct bilirubin, total protein, serum albumin, aspartate aminotransferase (AST), alanine aminotransferase (ALT)).
- Anti-HCV antibodies was detected by ELISA (Diasorium KitDiasorium SR, Italy).
- HBsAg
- RT-PCR for HGV-RNA this was done by Easy-to-use Reaction Mix for One-Step RT-PCR, using the LightCycler Carousel-Based System (LightCycler RNA Master SYBR Green 1).

Statistical analysis:

Data were expressed as mean ± SD for quantitative data and number and percentage for qualititative data and comparison was done by paired t test and ANOVA for the former and corrected X^2 for the latter.

RESULTS

The patients of the three studied groups had no significant differences as regard age and gender distribution as shown in Table 1. Males and females are almost equally represented in each group.

The incidence of HBV, HCV and HGV infections in each studied group is represented in Table 2. The serological markers for HBV (HBsAg) and HCV (anti HCV Ab) were used in diagnosis of chronic HBV and HCV hepatitis. All patients of the control group had negative markers for HCV and HBV. Patients in group II (hemodialysis) had equal incidence of HCV and HBV. All patients in group III (chronic hepatitis) had HBV and/ or HCV infection with obvious predominance of HCV (90%). Real time PCR was used to diagnose HGV infection. The incidence of HGV was 5% in healthy controls, 50 % in group II and 36.4% among patients with chronic viral hepatitis as shown in Table 2.

The rate of HGV mono-infection was 9.1% and combined HGV infection with HCV and/or HBV was 36.4% among the whole number of patients (group II and group III) included in the study as shown in Table 3.

There were no significant differences between HGV positive and negative patients in group II and III as regard age and gender distribution as shown in Table 4, it was clearly manifest that HGV infection had no significant impact on the patients liver condition. There were no significant differences between HGV positive and negative patients in groups II and III as regard any of the laboratory parameters enlisted in Tables 5 and 6. There was no significant difference between the HGV positive and negative patients in group III as regard grade of hepatic decompensation and Child grade presented in Table 7.

It became clear that the longer the duration of dialysis the higher the risk of infection in group

II. As shown in Table 8, the duration of dialysis was significantly longer in the HGV positive patients. It's also clear that blood transfusion is a risk factor for HGV transmission as the incidence of positive history of blood transfusion was significantly higher in HGV positive patients.

Table (1): Demographic data in different groups.

	Group I N=20		**Group II N=22**		**Group III N=22**			**P**
Age (mean±SD)	39.65±13.61		40.4±8.18		47.27±14.86		F=2.42	0.09 NS
Gender	No	%	No	%	No	%	X^2	
Males	10	50	10	45.5	11	50	0.12	0.94 NS
Females	10	50	12	54.5	11	50		

NS: non-significant.

Table (2): The incidence of different viral hepatitis infections among the studied groups.

	Group I N= 20		**Group II N= 22**		**Group III N= 22**		X^2	**P**
	No	%	No	%	No	%		
Hepatitis B								
Positive	0	0	7	31.8	6	27.3	7.55	0.023 S
Negative	20	100	15	68.2	16	72.7		
Hepatitis C								
Positive	0	0	7	31.8	20	90.9	36.97	<0.001 HS
Negative	20	100	15	68.2	2	9.1		
Hepatitis G								
Positive	1	5	11	50	8	36.4	10.28	<0.001 HS
Negative	19	95	11	50	14	63.6		

S: significant, HS: highly significant

Table (3): The incidence of HBV, HCV and HGV mono- and multiple infections in whole number of patients in the study.

Viral infection	**N**	**%**
Non	5	11.4
HGV alone	4	9.1
HBV alone	3	6.8
HCV alone	15	34.1
HGV+HBV	7	15.9
HGV+HCV	8	18.2
HCV+HBV	1	2.3
HGV+HCV+HBV	1	2.3
Total	44	100%

Table (4): Distribution of different viral hepatitis infections among all patients groups.

	HGV positive		HGV negative			P
Group II	**N=11**		**N=11**			
Age	39.1±9.55		41.7±6.75		t= 0.74	0.96 NS
Gender	No	%	No	%	cX^2	
Males	6	54.5	7	63.6	0.18	0.68 NS
Females	5	45.5	4	36.4		
Group III	**N= 8**		**N=14**			
Age	44.75±12.87		47.71±16.6		t=0.59	0.56 NS
Gender	No	%	No	%	cX^2	
Males	3	37.5	8	57.1	0.2	0.65 NS
Females	5	62.5	6	42.9		

NS: non-significant

Table (5): Comparison between HGV positive and negative hemodialysis patients as regard laboratory investigations.

	HGV PCR Negative N=11	HGV PCR positive N=11	t	P
Total protein (g/dl)				
Mean±SD	7.76±0.58	7.19±.0.95	1.69	0.105 NS
Albumin (g/dl)				
Mean±SD	4.27±065	3.90±0.96	1.05	0.30 NS
Total bilirubin (mg/dl)				
Mean±SD	0.68±0.23	0.63±0.22	0.48	0.63 NS
ALT (IU/ml)				
Mean±SD	68.9±39.36	42.81±32.92	1.68	0.10 NS
AST (IU/ml)				
Mean±SD	50.18±25.27	38.81±13.89	1.30	0.20 NS
HB (g/dl)				
Mean±SD	11.26±1.32	12.27±1.12	1.92	0.06 NS
RBCs ($x10^6$cell/ mm^3)				
Mean±SD	3.68±0.83	3.60±0.36	0.29	0.76 NS
WBCs (x 10^3cells/ mm^3)				
Mean±SD	5.72±2.25	6.5±1.51	0.96	0.34 NS
PLT (x 10^5 / mm^3)				
Mean±SD	216.18±65.85	202.36±50.13	0.55	0.58 NS

NS: non-significant

Table (6): Comparison between HGV positive and negative chronic hepatitis patients regards laboratory investigations.

	HGV PCR Negative N=14	HGV PCR positive N=8	t	P
Total protein (g/dl)				
Mean±SD	5.89±0.81	6.15±1.16	0.609	0.54 NS
Albumin (g/dl)				
Mean±SD	3.04±0.65	3.20±1.06	0.433	0.669 NS
Total bilirubin (mg/dl)				
Mean±SD	3.75±2.97	3.71±2.15	0.037	0.97 NS
Direct bilirubin (mg/dl)				
Mean±SD	1.74±1.60	1.96±1.154	0.308	0.761 NS
ALT (IU/ml)				
Mean±SD	68.9±39.36	42.81±32.92	1.68	0.10 NS
AST (IU/ml)				
Mean±SD	50.18±25.27	38.81±13.89	1.30	0.20 NS
HB (g/dl)				
Mean±SD	9.90±2.7	9.61±2.87	0.23	0.81 NS
RBCs (x10^6cell/ mm^3)				
Mean±SD	3.30±0.81	3.30±1.10	0.00	1 NS
WBCs (x 10^3cells/ mm^3)				
Mean±SD	7.67±1.10	6.5±1.51	0.461	0.65 NS
PLT (x 10^5 / mm^3)				
Mean±SD	121.57±80.37	116±56.53	1.48	0.15 NS

NS: non-significant

Table (7): Frequency of HGV in relation to Child grade of chronic hepatitis patients group.

	HGV-RNA Negative N=14		HGV-RNA Positive N=8		X^2	P	Significance
	N	%	N	%			
Child grade							
A	4	28.5	2	25	0.1	0.75	NS
B	5	35.7	3	37.5	0.14	0.7	
C	5	35.7	3	37.5	0.14	0.7	

NS: non-significant

Table (8): Frequency of HGV in relation to duration of dialysis and history of blood transfusion in haemodialysis patients group.

	HGV PCR Negative N=11		HGV PCR positive N=11		t	P
Duration of dialysis in months	9.54 ±2.98		15.0 ±6.54		2.59	0.01 S
History of Blood transfusion	No	%	No	%	c X^2	
Negative	10	71.4	4	28.6	4.91	0.02 S
Positive	1	12.5%	7	87.5%		

S: significant

DISCUSSION

From the results of our study it is clear that the rate of HGV mono-infection is far less than HGV co-infection with HCV, HBV or both (9.1% vs 36.4 %). This is consistent with what was found in many previous studies [10,18]. The rate of co-infection (HGV+ HCV and/ or HBV) in the previous studies varied greatly according to the place where the study toke over, it range between 5- 24.5% [19,20].

The rate of infection with HGV in healthy controls in our study was 5%. The prevalence of HGV mono-infection in healthy population and blood donors was estimated in many previous studies among different population worldwide. The results of these studies were as follows arranged from lowest to highest estimated prevalence: 1% in UK, [21] 3% in Iran, [22], 4% in Turkey and Egypt, [23,24], 6% in India, [18] and 18.2% in South Africa [25].

The prevalence of HGV viremia in hemodialysis patients in our study was 50%. This prevalence is highly variable in the previous studies according to the place the study was done. The results of the previous studies were as follows arranged from lowest to the highest: 17.7% in Iran, [22], 19.6% in Germany, [26] and 20% in Italy. [27] This very high prevalence compared to the previous studies may be due to the lack of awareness about the HGV by the infection control programes in Zagazig University Hospitals. The patients with hemodialysis are at higher risk of contacting HGV infection because of the need for repeated transfusion and multiple medical procedures [28,29]. This is consistent with what we found in our study that the patients with positive HGV PCR of the hemodialysis had signficantly higher duration of dialysis in months and significantly higher rate of exposure to blood transfusion.

There was no significant difference between HGV negative and positive patients in hemodialysis and chronic hepatitis groups as regards age and gender distribution. This is against what Loginov et al reported that the HGV positive patients were younger [30]. However, in our study they seam to be insignificantly younger.

There was no significant difference between HGV positive and negative patients as regard all laboratory parameters including liver function tests, ALT level and hematological parameters. This agrees with what was found by Alter, 1996 and Arican et al., who said that HGV infection runs a subclinical anicteric clinical course, with low enzymes and normal biochemical parameters [9,31]. These findings were supported by other studies that suggested that HGV may not be purely hepatotropic [32,33].

The comparison of Child grades in patients with HGV positive and negative PCR in patients in the chronic hepatitis group revealed no significant differences. This is supported by the findings in Bychenko et al., study who said that HGV co-infection with HCV and /or HBV doesn't affect the severity of hepatic disease [34].

CONCLUSION

HGV infection has high prevalence among hemodialysis patients and patients with chronic hepatitis attending Zagazig University Hospitals. The HGV positivity doesn't have any impact on the patients' clinical condition or laboratory parameters.

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Ethical approval: Was granted by the hospital ethics committee and informed consent was obtained from each patient prior to inclusion in the study.

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