

Incidence of Hepatitis G virus in patients with hematological malignancies with repeated blood transfusion

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Abstract

Background: Hepatitis G virus and GB virus C (GBV-C) are RNA viruses that were independently identified in 1995, and were subsequently found to be two isolates of the same virus. Blood transfusion is the main risk factor for HGV transmission. Patients with hematological malignancies usually require frequent blood transfusions which make them more vulnerable to HGV infection. The aims of this study was to estimate the transmission rate of HGV in patients with hematological malignancies having multiple blood transfusion

Methods: This cross sectional study was carried out at the national center of hematology, Almustansiriya University and department of microbiology in Baghdad university college of medicine in Baghdad / Iraq from January till June 2012. The study involved 60 patients (39 males & 21 females) diagnosed with hematological malignancies.

Results: Of the sixty patients, seventeen patients (28.3 %) had IgM HGV positive, while 43 (71.7%) of patients had HGV IgM negative which was statistically significant when compared to control group

Conclusion: the incidence of HGV increase in patient with hematological malignancies receiving multiple blood transfusions .

Keywords: incidence, hepatitis G virus, hematological malignancies, blood transfusion

1. Introduction

Two different laboratories in the USA isolated a new flavivirus- like RNA virus in the years 1995 and 1996. The first laboratory named it "G B virus-C (GBV-C)" and the other "hepatitis G virus (HGV)". Both viruses were subsequently considered different genotypes of the same virus because they were found to share most of the nucleotide and amino acid sequences [1]. Both viruses have a single stranded RNA genome of approximately 9.4 kb. It encodes a single poly protein of 2900 amino acids in which the nonstructural proteins are located at the C terminal end and the structural proteins at the N terminal end [2]. They are member of the Flaviviridae family and are phylogenetically related to hepatitis C virus, but appear to replicate primarily in lymphocytes, and poorly if at all in hepatocytes (3). GBV-A and GBV-B are probably Tamarin viruses, while GBV-C infects humans (4). Parenteral, sexual and vertical transmissions of GBV-C have all been documented, and because of shared modes of transmission, individuals infected with HIV are commonly co-infected with GBV-C. Among people with HIV infection, the prevalence of GBV-C viremia ranges from 14 to 43% (5)

Patients with hematological malignancies, such as acute or chronic leukemia require blood and blood products for sustaining life. Therefore, these patients are considered at a high risk for contracting transfusion transmissible infections [6]. Although the precise transmission rate is unknown, an elevated prevalence of HGV-RNA has been described in subjects at risk for parenteral infections, such as blood and blood products recipients, intravenous drug abusers, and patients on hemodialysis [6-8]. The present data on the prevalence of HGV is conflicting with studies showing rates of 7% in Japan [9] up to 29% in Germany [10]. Some studies reported that HGV prevalence in healthy blood donors ranged from 1.2 to 4.2 percent [4, 11].

2. Patient and methods

This cross sectional study was carried out at the National Center of Hematology, Almustansiriya University and department of microbiology in Baghdad medical college in Baghdad, Iraq from January till June 2012. The study involved 60 patients (39 males & 21 females) diagnosed with hematological malignancies with 30 healthy donor controls. Written informed consents were obtained from all patients and controls. The study was approved by the ethical committee of the national center of hematology in Almustansiriya University. The age and gender ratios were similar in the groups of patients and controls: median age 35.5 years (range 17-61) and 33.4 years (22-55), M/F 1.8 and 1.7 respectively. All patients and controls were HIV negative and had not been transfused before starting the study; no other risk factors for blood-borne diseases were present in patients or controls. All patients underwent blood tests, lymph node and bone marrow biopsy in order to diagnose and characterize the hematological malignancy.

Five milliliters of blood samples were withdrawn from patients and controls. They were centrifuged and serum was separated. Serum was stored in aliquots at -20°C . Repeated freezing and thawing was avoided. All the biochemical parameters were done by routine laboratory methods unless otherwise stated. HGV IgM and IgG were detected with commercially available enzyme linked immunosorbent assay (CUSABIO BIOTECH CO.LTD).

2.1 Statistical analysis

Statistical analysis was performed using Fisher's exact test and the chi-square test, as suitable. $p < 0.05$ considered statistically significant.

3. Results

There were no significant differences in age, gender between the two groups ($p > 0.05$) as in table 1. Of the sixty patients with hematological malignancies, 17 patients (28.3%) had positive result for HGV IgM which was highly significant when compared to control healthy controls (6.6%) as shown in table 2, while the results for HGV IgG showed 23 patients (38.3%) and 5 healthy controls (16.7%) were positive which was statistically significant when compared to control group which shown in table 3

Regarding distribution of HGV IgM positive result according to hematological malignancies, there were 3/14 (21.4%), 5/16 (31.2%), 2/13 (15.3%), and 7/17 (41%) for AML, ALL, CML, and CLL respectively while for HGV IgG positive result there were 3/14, 6/16, 4/13, and 10/17 for AML, ALL, CML, and CLL respectively. The high incidence were found in CLL for both IgM and IgG with 41% and 58.8% respectively

Table 1. The demographic and clinical characteristics of all patients in study group

Characteristic	Patients	Controls	P value
Number of patients	60	30	
Age - Median (years) Range(year)	35.5 17-61	33.4 22-55	NS
Sex (male/Female)	37/23	19/11	NS
Primary Diseases	Patient Number (%)		
AML	14(23.3)		
ALL	16(26.6)		
CML	13(21.6)		
CLL	17(28.3)		

NS= not significant, AML; Acute myeloblastic leukemia, ALL; Acute lymphoblastic leukemia, CML; Chronic myelocytic leukemia, CLL; Chronic lymphocytic leukemia.

4. Discussion

HGV or the GB virus C (GBV-C) has recently been isolated in patients with acute, chronic or post-transfusion hepatitis (12, 13). It is now absolutely clear that HGV and its variant, GBV-C, are prevalent agents with a high carrier rate in the volunteer donor population (8, 13). Although there has been a rapid increase in the epidemiologic and molecular knowledge of about this virus, its clinical relevance remains largely unresolved (6).

Our findings clearly showed that patients with hematological malignancies are frequently subjected to HGV due to multiple blood transfusions and that they suffer from severe immunosuppression, which has a significant influence on the clearance of HGV viremia and the production of anti-E2 immune response.

Table 2. Result of HGV IgM in patients and controls

IgM	Positive	Negative	P-Value
Patients	17(28.3%)	43(71.7%)	Chi-sq.(5.64) P-value <0.017 Highly Significantly
control	2(6.6%)	28(93.4%)	

Table 3. Result of HGV IgG in patients and controls

IgG	Positive	Negative	P-Value
Patients	23(38.3%)	37(61.7%)	Chi-sq.(4.381) P-value <0.036 Significant
control	5(16.7%)	25(83.3%)	

In conclusion, this study showed that there is significant increase in incidence of HGV IgM and IgG in patient with hematological malignancies compared to healthy control donor, although multiple blood transfusions are the most important risk factor for transfusion related viral infections, still type of hematological malignancies play a role in this increment. Despite of strict screening programs for HBV and HCV in blood bank, HGV should be put into consideration in screening program to prevent and decrease this serious infection.

5. References

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