

Seroprevalence of HGV among blood donors with HCV and / or HBV in Tikrit City

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Abstract

Viral hepatitis is a global health problem. In our country, any blood donor is investigated laboratory for hepatitis viruses before blood donation to other person, but the investigations usually include only HBV and HCV. So, this study is considered the first one concerning HGV in Tikrit City. This study was conducted to detect HGV among blood donors as a blood borne pathogen in addition to evaluate the frequency of HBV and HCV among blood donors in Tikrit City. The laboratory diagnosis of blood samples revealed that HBsAg was found in 1.74% of blood donors, anti-HCV antibodies in 0.73% and both HBsAg and anti-HCV antibodies in 0.1% of blood donors. The current work revealed that anti-HGV antibodies were found in 27.2% of blood donors with anti-HCV antibodies and 3.84% of those with HBsAg. No one of blood donors with both HBsAg and anti-HCV antibodies had anti-HGV antibodies. The presence of anti-HGV antibodies among blood donors indicates that these blood donors were previously exposed to HGV, so; it is necessary to enroll HGV for screening program of all blood donors.

الإنتشار المصلي لفيروس التهاب الكبد نوع G بين متبرعي الدم المصابين بفيروس التهاب الكبد نوع C مع/ أو فيروس التهاب الكبد نوع B في مدينة تكريت

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الخلاصة

يعد التهاب الكبد الفيروسي مشكلة صحية عالمية. في بلدنا، أي متبرع دم يفحص مختبرياً للكشف عن فيروسات التهاب الكبد قبل إعطاء الدم إلى شخص آخر، إلا أن هذه الفحوصات تشمل فقط فيروس التهاب الكبد نوع B وفيروس التهاب الكبد نوع C. لذلك فإن هذه الدراسة تعتبر الأولى في مدينة تكريت فيما يخص فيروس التهاب الكبد نوع G. أجريت هذه الدراسة للكشف عن فيروس التهاب الكبد نوع G بين متبرعي الدم كمسبب مرض ينتقل عن طريق الدم بالإضافة إلى تحديد تكرار فيروس التهاب الكبد نوع B وفيروس التهاب الكبد نوع C بين متبرعي الدم في مدينة تكريت. أظهر التشخيص المختبري لعينات الدم أن المستضد السطحي HBsAg كان موجوداً في 1,74% من متبرعي الدم، الأجسام المضادة لفيروس التهاب الكبد نوع C في 0,73%، وكل من المستضد السطحي HBsAg والأجسام المضادة لفيروس التهاب الكبد نوع C في 0,1% من متبرعي الدم. أظهرت الدراسة الحالية وجود الأجسام المضادة لفيروس التهاب الكبد نوع G بنسبة 27,2% بين متبرعي الدم الذين لديهم الأجسام المضادة لفيروس التهاب الكبد نوع C، وبنسبة 3,84% بين متبرعي الدم الذين لديهم المستضد السطحي HBsAg. لم تتواجد الأجسام المضادة لفيروس التهاب الكبد نوع G بين متبرعي الدم الذين لديهم الأجسام المضادة لفيروس التهاب الكبد نوع C والمستضد السطحي HBsAg بنفس الوقت. إن وجود الأجسام المضادة لفيروس التهاب الكبد نوع G بين متبرعي الدم يشير إلى أن هؤلاء المتبرعين سبق وأن تعرضوا إلى هذا الفيروس، لذلك فإن من الضروري إدراج فيروس التهاب الكبد نوع G ضمن برنامج الفحص لكل متبرعي الدم.

Introduction

Infection with hepatitis B virus (HBV) and hepatitis C virus (HCV) causes considerable morbidity and mortality 400 million people worldwide. This virus is second only to tobacco as a known cause of human cancer. Each year, 600,000 die from HBV-related liver disease or hepatocellular carcinoma (1, 2). Hepatitis C virus was discovered in 1989. Infection with hepatitis C occurs throughout the world, with a current estimate of 170 million infected people. Much of the seroprevalence data are based on blood donors, who represent a carefully selected population in many countries (3). Chronic hepatitis C results in 10,000 death annually (4). In 1995, hepatitis G virus (HGV), or GB virus C (GBV-C), was discovered in sera from two patients. HGV and GBV-C (GBV-C) are two isolates of the same virus. Hepatitis G virus is an RNA virus of 9 to 10 kb, similar to that of hepatitis C and members of flaviviridae family. The virion structure of HGV is similar to that of HCV. Hepatitis G virus replicates in lymphocytes rather than in hepatocytes (5). Hepatitis G virus is found worldwide, with prevalence rates of 2%- 4% among blood donors and 35% among HIV infected patients. In addition to being closely related to HCV, data suggested that 10-20 % of patients infected with hepatitis C are also infected with hepatitis G (5, 6). Several studies suggest that HGV viremia prolongs the survival of HIV-positive individuals after seroconversion (7).

worldwide. Hepatitis B virus was discovered in 1965. Chronic hepatitis B infection remains a major health problem, affecting approximately

Materials and Methods

The study included 2975 blood donors who attended Blood Bank Center in Tikrit Teaching Hospital for the period from 14th January to 13th June 2013. Blood sample was drawn from each blood donor for laboratory detection of HBsAg as a marker of HBV and anti-HCV as a marker of HCV. Detection of HGV included samples with positive result for one or both previous markers. Serum obtained from each blood sample was separated into three tubes and stored in deep freeze until the time of testing. Detection of anti-HGV antibodies was done by using Diagnostic Automation, Inc. 23961 Craftsman Road, Suite D/E/F, Calabasas, CA 91302 USA. Detection of HBV was done by using Heganostika HBsAg Uni-Form II (bioMerieux Bv/Boseind 15, 5281 RM Boxtel, The Netherlands) and detection of HCV was done by using Bioelisa HCV kit (Biokit, S.A Spain).

Results

The laboratory diagnosis of blood samples revealed that HBsAg was found in 52 out of 2975 blood donors (1.74%), anti-HCV antibodies in 22 (0.73%) and both HBsAg and anti-HCV antibodies in 3 blood donors (0.1%)... Table 1. The current work revealed that anti-HGV antibodies were found in 6 out of 22 (27.2%) blood donors with anti-HCV antibodies and 2 out of 52 (3.84%) of those with HBsAg. No one of blood donors with both HBsAg and anti-HCV antibodies had anti-HGV antibodies... Table2.

Table (1):- Seroprevalence of HBV and HCV among blood donors.

Total No. of blood donors	HBsAg		anti-HCV		HBsAg and anti-HCV	
	No.	%	No.	%	No.	%
2975	52	1.74	22	0.73	3	0.1

Table (2):- Seroprevalence of HGV among blood donors with HCV and/or HBV.

Blood donors with	Total No.	Anti-HGV	
		No.	%
anti-HCV	22	6	27.2
HBsAg	52	2	3.84
anti-HCV and HBsAg	3	0	0
Total	77	8	10.39

Discussion

Following infection with HBV, the first marker appears in the circulation is HBsAg (5). The present findings indicated that HBsAg was found in 1.74 % of blood donors. A previous study in Tikrit City revealed that HBsAg found in 3.4% of blood donors (8). A cross-sectional survey among Saudi blood donors in Tabuk showed a prevalence of HBsAg in 3% (4). The prevalence of carriers, particularly among blood donors, in northern Europe, North America and Australia is 0.1% or less; in central and eastern Europe it is up to 5%; in southern Europe, the countries bordering the Mediterranean, and parts of Central and South America the frequency is even higher; and in some parts of Africa, Asia and the Pacific region as much as 20% of the apparently healthy population may be HBsAg positive (2, 3). The current work

detected the antibodies against HCV in 0.73% of blood donors. Antigens of hepatitis C are not detectable in blood, so diagnostic tests attempt to demonstrate antibody. Unfortunately, the antibody responses in acute disease remain negative for 1 to 3 weeks after clinical onset and may never become positive in up to 20% of patients with acute, resolving disease. Current tests measure antibodies to multiple hepatitis C antigens by either enzyme immunoassay or immunoblot testing. Even with these newer assays, IgG antibody to hepatitis C may not develop for up to 4 months, making the serodiagnosis of acute hepatitis C difficult (5,9). A previous study in Tikrit City revealed that HCV found in 0.8% of blood donors (8). Another study reported that the prevalence of HCV among Saudi male blood donors is 2.7% (10). Almost 4 million Americans (1.8% of the

population of the United States) have antibody to HCV, indicating ongoing or previous infection with this virus. Hepatitis C has been described as a silent epidemic, killing more people than AIDS in the USA (1). Prevalence is intermediate in eastern and southern European countries, even higher in Japan, and most prevalent in Middle East; frequencies of HCV infection of up to 30 % have been recorded in areas of Egypt (9). Since HBV and HCV share the same route of transmission, they may be found in the same sample. The current findings indicated that both HBsAg and anti-HCV antibodies were found in 0.1% of blood donors. Data obtained by the current study revealed that HBV is found in a higher rate than HCV in blood donors. This may be related to the route of transmission. The HBV is transmitted more efficiently than HCV. The development of specific laboratory tests for hepatitis B confirmed the importance of the parenteral routes of transmission, which may result from accidental inoculation of minute amounts of blood or fluid contaminated with blood during medical, surgical and dental procedures; immunization with inadequately-sterilized syringes and needles; intravenous and percutaneous drug abuse; tattooing; body piercing; acupuncture; laboratory accidents; and accidental inoculation with razors and similar objects that have been contaminated with blood (1,3). Hepatitis B surface antigen has been found in most body fluids including saliva, semen, and cervical secretions. Under experimental conditions, as little as 0.0001 ml of infectious blood produced infection. Transmission is therefore possible by vehicles such as inadequately sterilized hypodermic needles and instruments used in tattooing and ear piercing (5). However, it is clear that while blood transfusion and

the transfusion of blood products are efficient routes of transmission of HCV; these represent a small proportion (about 15%) of cases of acute clinical hepatitis in the United States and number of other countries (with the exception of patients with haemophilia) (1). The present data revealed that anti-HGV antibodies were found in 27.2% of blood donors with HCV and 3.84 % of those with HBV. A study was performed in Kirkuk City revealed that no one of blood donors with HCV had anti-HGV antibodies (11). In Saudi Arabia, the co-infection rate of HGV was 31% in patients with HCV infection (12). Several studies concerning HGV were done in Iran. The HGV is common in blood donors and in the general population. In comparison, the prevalence rates of HBV, HCV, and HIV are all significantly lower than HGV among Iranian blood donors (13). Anti-E2 prevalence in Iranian blood donors was reported to be 4.2% (14). Another study in Iran reported that HGV co-infection was highly prevalent among Korean blood donors who are infected with HBV or HCV. The same study revealed that population negative for HCV and HBV are a low risk group for HGV infection (15). Frequency of anti-E2 of HGV in β -thalassemia major patients was reported to be 25% (16). The HGV has been detected in 1.7% of blood donors from the USA, a prevalence higher than that of HCV (1,6). Another study revealed that 16% of healthy Spanish blood donors were exposed to HGV, indicating that additional routes of viral transmission besides parenteral exposure might exist. An even higher prevalence of exposure to HGV (52%-73%) was found in several groups at risk of parenteral exposure to infectious agents, i.e., intravenous drug users, transfusion history, hemophiliacs, and HCV- positive patients (17). In

Taiwan, the prevalence of anti-envelope antibody to HGV was found in 11% of healthy blood donors, 13% of intravenous drug users and 21% of patients with hemodialysis (18). Infection with HGV is widely distributed in humans. Infection causes chronic liver inflammation with its associate sequelae (19). Tanaka *et al* (20) investigated 59 patients with transfusion-associated non-A, non-B hepatitis. They found that 12 (20%) were infected with HGV; 11 of the 12 with HGV were

infected also with HCV. It is clear from the studies above that the seroprevalence of HGV is different in various regions and various groups. The method of laboratory diagnosis may play a role in these differences, in addition to host factors including genetics and immune status. Also, the behavior factors may affect the rout of transmission. However, several studies are needed concerning HGV in our country.

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