

Determination of clinical state of hepatitis B virus infection of patients in Basra governorate

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Summary

Hepatitis B virus is a hepatotropic virus that causes acute and chronic hepatitis, liver cirrhosis and hepatocellular carcinoma; it is responsible for more than one million deaths annually worldwide despite hepatitis B vaccination. So, the aim of the present study was to detect the total markers of HBV (HBsAg, HBsAb, HBeAg, HBeAb, Total anti-HBc and IgM anti-HBc). A total of 126 cases with hepatitis B were recruited from different medical centers in Basra. Serological tests were performed for all cases using ELISA tests. 126 patients were divided into 8 studied groups including: Incubation, Active acute, Acute, Active chronic, chronic, Inactive HBsAg Carrier, HBsAg-negative patients and liver cancer. We conclude that the vast majority of patients were Inactive HBsAg Carrier (54.76 %) followed by acute hepatitis (16.67 %) and HBsAg-negative patients (7.14 %).

تعيين الحالة السريرية للمرضى المصابين بالتهاب الكبد الفيروسي البائي في محافظة البصرة

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الخلاصة

فيروس التهاب الكبد البائي من الفيروسات التي تصيب الكبد مسببة له اصابات مزمنة وتليف وسرطان، وهو مسؤول عن اكثر من مليون حالة وفاة سنويا في العالم بالرغم من وجود اللقاح الخاص به. لذلك هدفت الدراسة الحالية الى تحديد جميع المؤشرات المصلية لفيروس التهاب الكبد البائي في المرضى المتضمنة: المستضد السطحي وازداد المستضد السطحي والمستضد الذائب وازداد المستضد الذائب وازداد المستضد اللبي. حيث جمعت 126 حالة اصابة بالفيروس من قسم الصحة العامة في البصرة، ومن ثم اجريت فحوصات مصلية لمصول المصابين باستخدام تقنية المعايرة الامتصاصية المرتبطة بالانزيم تضمنت جميع مؤشرات الفيروس. وقسمت الدراسة مؤشرات المرضى الى 8 مجاميع هي: مجموعة الحضانة و مجموعة الإصابات الحادة النشطة و مجموعة الإصابات الحادة و مجموعة الإصابات المزمنة النشطة و مجموعة الإصابات المزمنة و مجموعة الحاملين للمرض و مجموعة السالبيين للمستضد السطحي و مجموعة سرطان الكبد. استنتجت الدراسة ان معظم المصابين هم من الحاملين للمرض بنسبة 54.76 % ومن ثم الاصابات الحادة 16.67% و مجموعة السالبيين للمستضد السطحي 7.14%.

Introduction

Hepatitis B virus (HBV) is one of the major diseases of mankind and is a serious global public health problem, Of the 2 billion people who have been infected with the HBV more than 350 million have chronic infections 500,000 to 1.2 million deaths per year caused by chronic Hepatitis, Cirrhosis, and Hepatocellular carcinoma (1). HBV belongs to the family Hepadnaviridae and has some unique properties. It is highly species specific (2). HBV is a partially double-stranded circular DNA virus, consists of a core capsid which contains viral DNA and this is surrounded by an envelope containing surface antigen (HBsAg) that produced during replication of the virus(3). The genes of HBV comprise of genetic codes to create numerous protein products that include Hepatitis B surface Antigen (HBsAg), Hepatitis B core Antigen (HBcAg), Hepatitis B e Antigen (HBeAg) and DNA polymerase (4). These four proteins are of vital significance as they are measured in blood tests and aid in the diagnosis of the virus (5). Outcome of acute hepatitis B virus infection ranges from asymptomatic subclinical infection (70%) and symptomatic acute hepatitis (30%) to fulminant hepatic failure (0.1-0.5%). A proportion of people infected with HBV (5-10% among adults) progress to chronicity, defined as persistence of infection for more than six months (6).

Materials and Methods

Across sectional study was conducted on the following study groups in period between December, 2008 into February, 2010 .The total of 126 individuals of both sexes, consist of 100 male , 26 female with age range 3-80 years. They were obtained from Public health department of Basra Governorate. All samples were tested for (HBsAg, HBsAb, HBeAg, HBeAb, Total Anti-HBc and IgM Anti-HBc), determination were done by using ELISA according to (DRG kit, USA).

Results

As shown in Table (1), a total of 126 patients divided into 8 studied groups including:

Table (1) Distribution of HBV markers with gender and studied groups

| Studied groups | % | Gender | | Markers | | | | | |
|----------------------------------|-------|--------|--------|---------|----------|-------|----------|--------------|----------------|
| | | Male | Female | HBsAg | Anti-HBs | HBeAg | Anti-HBe | IgM anti-HBc | Total anti-HBc |
| Inactive HBsAg Carrier | 54.76 | 57 | 12 | + | - | - | + | - | + |
| Acute | 16.67 | 16 | 5 | + | - | - | + | + | + |
| | | | | + | - | - | - | + | + |
| | | | | + | - | - | + | + | - |
| HBsAg-negative or past Infection | 7.14 | 8 | 1 | - | + | - | - | + | + |
| | | | | - | + | - | + | + | - |
| | | | | - | + | - | + | + | + |
| | | | | - | - | - | - | - | + |
| | | | | - | - | - | + | + | + |
| | | | | - | - | - | + | - | + |
| Chronic | 6.35 | 5 | 3 | + | - | - | - | - | + |
| Active acute | 4.76 | 4 | 2 | + | - | + | - | + | - |
| | | | | + | - | + | - | + | + |
| Incubation | 3.17 | 1 | 3 | + | - | + | - | - | - |
| Liver cancer | 2.38 | 3 | - | + | - | - | + | + | + |
| Active Chronic | 1.59 | 2 | - | + | - | + | - | - | + |
| Vaccinated | 1.59 | 2 | - | - | + | - | - | - | - |
| Non-infected | 1.59 | 2 | - | - | - | - | - | - | - |

P< 0.01

- 1- Incubation group (3.17%): only positive of HBsAg and HBeAg.
 - 2- Active acute (4.76 %): positive of HBsAg, HBeAg , anti-HBc IgM and with or without Total anti-HBc.
 - 3- Acute (16.67 %): positive of HBsAg , anti-HBc IgM and with or without Total anti-HBc.
 - 4- Active chronic (1.59 %): positive of HBsAg, HBeAg and Total anti-HBc.
 - 5- Chronic (6.35 %): positive of HBsAg and Total anti-HBc.
 - 6- Inactive HBsAg Carrier (54.76 %): positive of HBsAg , Anti-HBe and Total anti-HBc.
 - 7- HBsAg-negative patients (7.14 %): negative of HBsAg and Positive or negative of anti-HBs
 - 8- Liver cancer (2.38 %): Clinical state.
- In addition to vaccinate and non-infected groups (3.18 %).

Discussion

Positive results for both HBsAg and anti-HBc IgM indicate an acute HBV infection or a reactivation of a chronic HBV infection (7). HBsAg positivity persists beyond 6 months in 10% of infected individuals and is indicative of chronic hepatitis B (8).Outcome after acute Hepatitis B virus infection and its course may be influenced by the host immune response (9),

Host genetic factors including Hepatitis B virus genotype are widely viewed as common basis of the different outcomes of HBV infection (10).

In this study, during the use a wide range of HBV biomarkers as shown in table (1), in fact all viral markers were important in the diagnosis of the disease and in giving a clear indicated of the cases tested. So using HBsAg marker only for detection of the virus in the medical institutions were not enough to detecting all HBV infections. In approximately 50% of patients with self-limited hepatitis B virus infection, there is a time interval of up to several months between the disappearance of detectable HBsAg and the appearance of anti-HBs. During this time, only the total anti-HBc is detectable; this period is referred to as the “core window” or “window phase” (7). Unfortunately, HBV is extremely hard to cultivate as it does not replicate in any cell line used regularly in diagnostic laboratories (11).

Immune tolerant stage represents the incubation period before immune response to HBV (1) and can last for decades in those who acquired the infection during the perinatal period. Individuals in this group are highly contagious and can transmit HBV easily (7,12). When the tolerogenic effect is lost during the immune tolerant phase, immune-mediated lysis of infected hepatocytes becomes active (12). This stage carries the highest risk of progression to Cirrhosis and HCC (13). HBeAg is produced during active viral replication and may act as an immunogen or a tolerogen, leading to persistent infection (8). Persistent infection of HBV may cause immune system to reach tolerance stage because of the presence HBeAg in high titers. In fact, HBeAg seroconversion is associated with a lower risk of disease progression (13).

The study results indicated that the percentage of active acute and acute groups were (4.76%) and (16.67 %), respectively. The clinical and laboratory features and the outcome at 6 months of HBV acute hepatitis in Vietnam is similar in HBeAg positive and negative patients (14). A small percentage of patients continue to have moderate levels of HBV replication and active liver disease but remain HBeAg-negative (12).

The present study showed the vast majority of patients were inactive HBsAg Carrier group (54.76 %, $P < 0.01$). An inactive carrier forms the largest group in chronic HBV infected patients, around 300 million people are inactive carriers (15). This is thought to mark the end of active viral replication, HBeAg becomes negative, anti-HBe appears and transaminase levels normalize (13).

Furthermore, the percentage of HBsAg-negative patients was (7.14 %). Each case can be studied separately; four cases can be considered complete recovery cases due to the formation of anti-HBs. In fact some persons who are HBsAg-positive will develop detectable anti-HBs; however, these persons are still considered infectious due to the presence of HBsAg (16). Also, there are two cases in which there is IgG anti-HBc only, these can be regarded as incomplete recovery cases or a result of a diagnostic error. IgG anti-HBc remains positive for life following exposure to HBV, also it persists for many years. However, unlike anti-HBs, anti-HBc is not a protective antibody (8). While the last three cases can be classified as recovery from acute infection; the absence of anti-HBs can be due to its undetectable quantity, or as anti-HBs window. Very few patients with chronic HBV infection become HBsAg negative in the natural course of infection. The annual rate of HBsAg clearance has been estimated to be less than 2% in Western patients and even lower (0.1 - 0.8%) in patients of Asian origin (17). However, clearance of HBsAg does not exclude development of Cirrhosis or HCC in some patients. This phenomenon is thought to be linked to the fact that HBV DNA may still be detectable by PCR assay both in serum and liver (11). The clearance of the covalently closed circular form of HBV DNA (cccDNA) has been difficult, and clearance of hepatitis B surface antigen rarely occurs after 1 year of treatment (18). For this reason we did not consider them as complete recovery cases. So in patients with acute hepatitis who ultimately clear the virus Surprisingly, HBV-specific helper and cytotoxic T cells are still present in an activated state several years after recovery from acute hepatitis (19).

The percentage of liver cancer group was (2.38%). HBV may encode oncogenic viral proteins that possibly contribute to Hepatocarcinogenesis. For example, HBx (20). In addition to viral oncogenic proteins, several viral factors, including genotype, BCP mutation, and viral load have been confirmed to be associated with Hepatocarcinogenesis (21). Strong geographic correlations have been found between the incidence of HCC and the prevalence of HBsAg (22).

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