African Journal of Biotechnology Vol. 11(52), pp. 11509-11511, 28 June, 2012
Available online at http://www.academicjournals.org/AJB
DOI: 10.5897/AJB12.952
ISSN 1684-5315 ©2012 Academic Journals

Short Communication

Detection of hepatitis B virus (HBV)-DNA levels among seropositive HBsAg patients in Basrah province, Iraq

Awatif H. Issa[1], Hayder Abdul Hussein Al-Hmudi[1], Neama Y. Habil[2] and Kasim Abass Askar[2]*

[1]College of Science, University of Basrah, Basrah, Iraq.
[2]School of Biomedical and Biological Sciences, Faculty of Science and Technology, University of Plymouth, Plymouth, PL4 8AA, United Kingdom.

Accepted 23 May, 2012

Hepatitis B is an indolent disease that seldom causes symptoms until complications of cirrhosis and liver cancer occur. The level of circulating HBV has recently been shown to be the strongest predictor of the development of cirrhosis and hepatocellular carcinoma. The aim of the present study was to determine hepatitis B virus (HBV)-DNA concentration as a guide for disease development and the natural history of the disease, and also to design antiviral therapy regimens in seropositive HBsAg patients in Basrah province. 38 seropositive HBsAg patients were used in this research. Quantitative serum HBV-DNA assay was carried out using the RT-PCR technique and the mean ages of the patients were 43 ± 12 years. The number of patients with undetectable HBV-DNA (least than 200 copies/ml) was 9/38 (23.69%). HBV-DNA above 10^5 copies/ml (46163359 ± 47377134) was observed in 17/38 (44.73%) of the patients ($p<0.05$), while HBV-DNA less than 10^5 copies/ml (22252 ± 21016) was observed in 12/38 (31.58%) of the patients. It was concluded that HBV DNA viral load was higher in HBeAg negative or positive chronic hepatitis patients than in those with inactive HBsAg carrier.

Key words: Hepatitis B virus, seropositive HBsAg patients, hepatitis B virus (HBV)-DNA.

INTRODUCTION

Hepatitis B virus (HBV) is one of the major diseases of mankind and is a serious global public health problem. Of the two billion people who have been infected with the HBV, more than 350 million have chronic infections where 500,000 to 1.2 million deaths per year are caused by chronic hepatitis, cirrhosis and hepatocellular carcinoma (Issa et al., 2012). Furthermore, hepatitis B is an indolent disease that seldom causes symptoms until complications of cirrhosis and liver cancer occur. However, hepatitis B infection is associated with an excess mortality, mainly from hepatocellular carcinoma (HCC) and cirrhosis and its complications (Brooks et al., 2007). The level of circulating HBV has recently been shown to be the strongest predictor of the development of cirrhosis and HCC (Chen et al., 2006). The National Institutes of Health (NIH) workshop on management of hepatitis B recommended that anti-viral treatment be considered in patients with HBeAg positive or HBeAg negative chronic hepatitis and HBV DNA 10^5 copies/ml (Lok et al., 2001).

According to National Institute of Health, HBV-DNA above 10^5/ml in serum of chronically HBV infected persons is the basic condition for the diagnosis of chronic hepatitis B (Lok and McMahon, 2001). The level of 20,000 IU/ml (around 10^5 copies/ml) has been arbitrarily selected as the level below which there is a relatively low likelihood of hepatic damage, although this can still occur (Lok et al., 2001). The fundamental characterization of HBsAg patients in Basrah province is still poorly understood, therefore, our objective was to determine HBV-DNA concentration as a guide for disease development and the natural history of the disease. Another aim of this paper was to design antiviral therapy regimens in seropositive HBsAg patients in Basrah province.

MATERIALS AND METHODS

Patients with chronic hepatitis B infection, diagnosed on the basis of a positive HBsAg longer than six months were used for this study. None of the patients were treated with antiviral drugs such as

*Corresponding author. E-mail: awatifhissa@yahoo.com.

Table 1. HBV-DNA levels among studied groups.

Studied group	Number	Percentage	HBV-DNA level (mean ± SD)
Inactive HBsAg carrier	9	23.69	Undetectable (least than 200 copies/ml)
Inactive HBsAg carrier	12	31.58	22252 ± 21016 (least than 10^5 copies/ml)
HBeAg negative or positive chronic hepatitis	17	44.73	46163359 ± 47377134 (above 10^5 copies/ ml)

interferon-α and nucleoside analogues. The study included 38 seropositive HBsAg patients, nine women (23.69%) (aged 25 to 70 years) and 29 men (76.31%) (aged 23 to 75 years) who were attending a local private laboratory for clinical analysis in Basrah province. HBV-DNA concentration was measured by real time-PCR technique (Device Smart Cycler, USA) according to Sacace Biotechnology kit (Awatif et al., 2012). All the chemicals used in this research were of analytical grade.

Statistical analysis

The values of serum viral titers were presented as mean ± standard deviation (SD). The statistical significance of difference in mean of variables between more than two groups was assessed by analysis of variance (ANOVA) test for any significant differences (associated probability < 0.05). All statistics were carried out using the Statistical Package for the Social Sciences (SPSS) software, version 7.5.

RESULTS

The mean ages of the patients were found to be 43 ± 12 years. However, HBV-DNA was not detected (least than 200 copies/ml) in 9/38 (23.69%) of patients. Likewise, the reduction of HBV (22252 ± 21016) viraemia (least than 10^5 copies/ml) was discovered in 12/38 (31.58%) of the patients, according to these data, these patients can be considered as inactive HBsAg carriers (Table 1). The number of persons ($p<0.05$) with HBV-DNA above 10^5 copies/ml (46163359 ± 47377134) were observed in 17/38 (44.73%), according to these data, these patients can be considered as HBeAg negative or with positive chronic hepatitis. Furthermore, these patients needed antiviral therapy (Table 1).

DISCUSSION

The significance of hepatitis B virus serum titers has been examined in several clinical situations. In our study, HBV DNA viral load was higher in HBeAg negative chronic hepatitis or HBeAg positive chronic hepatitis patients than in those with inactive HBsAg carrier.

Serum HBV DNA and HBeAg are the two other key markers appearing precociously, and are indicative of active viral replication (Sablon and Shapiro, 2005). The natural history of chronic HBV infection can be divided into distinct phases: immune tolerance, immune clearance, inactive carrier of HBsAg and immune stage or reactivation (Conjeevaram and Lok, 2003; Bihla et al., 2010). Each phase is characterized by distinct patterns of serologic markers, HBV DNA levels and changes in serum levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) that indicate the immunologic and necroinflammatory status of the patient (Chu and Liaw, 2004).

Patients with HBeAg-negative chronic HBV are distinguished from inactive HBV carriers by the presence of $>10^4$ HBV DNA copies/ml (or >2000 IU/ml). In contrast, inactive HBV carriers usually have undetectable HBV DNA (Lok and McMahon, 2001). As compared to the HBeAg-positive patients, anti-HBe positive patients had lower median serum HBV DNA levels (Wong et al., 2004).

Indication for therapy is based on the combination of three criteria: serum HBV DNA levels, (above 10^5 copies/ml), serum aminotransferase levels (above the upper limit of normal) and histological grade and stage; liver biopsy shows moderate to severe necroinflammation (Bihla et al., 2005).

The reduction of HBV viral load in most carriers confirms the importance of natural immunological processes in HBV infections (Villeneuve, 2005). Although HBV DNA assays are not presently recommended for the routine evaluation and management of patients with chronic HBV infections, they nevertheless provide very useful additional information concerning viral replication; especially in situations when patient serological profiles fall outside of classical patterns (Sablon and Shapiro, 2005). A reduction of viral load is a very good indicator, indicating HBV infection is reduced (Łapiński et al., 2006). So, it is expedient, to use such prognostic factors that will allow the decision of treatment of HBV infected patients despite detecting low viral load. It seems that the examination of viral load can facilitate the initiation of antivirus treatment.

The measurement of HBV DNA in serum cannot only help monitor treatment efficacy but also indicates breakthrough infection should drug resistance occur (Sablon and Shapiro, 2005).

Conclusions

In conclusions, this is the first study that shows HBV DNA viral load higher in HBeAg negative or positive chronic hepatitis patients than in those with inactive HBsAg

carrier. In addition, high HBV-DNA viral load may suggest the development of chronic hepatitis, and can be considered as a good prognostic guide for antiviral therapy. Finally, further studies are necessary under different laboratories to improve and strengthen these results and to increase our knowledge on these very interesting effects as a potential marker for hepatitis patients.

REFERENCES

Issa AH, Saad SH, Salow Al-bdour, Hayder AA, Neama YH, Kasim AA (2012). Association between HLA-DRB1 alleles and susceptibility to chronic hepatitis B inpatients of Basrah province, Iraq. Afr. J. Biotechnol., 11(21): 4893-4898.

Bihla F, Alaeia M, Negroa F (2010). The new EASL guidelines for the management of chronic hepatitis B infection adapted for Swiss physicians. Swiss Med. Wkly. 140(11-12): 154-159.

Brooks GF, Carroll KC, Butel JS, Morse, SA (2007). Jawetz, Melnick, Adelbergs. "Medical Microbiology" 24th edition, Lange McGraw Hill, New York, pp. 446-484.

Chen C, Yang HI, Su J (2006). For the reveal-HBV Study Group. Risk of hepatocellular carcinoma across a biological gradient of serum hepatitis B virus DNA level. J. Am. Med. Assoc., 295(1): 65-73.

Chu CM, Liaw YF (2004). Natural history differences in perinatally versus adult acquired disease. Current Hepatitis Reports, 3: 123-131.

Conjeevaram HS, Lok A (2003). Management of chronic hepatitis B. Hepatol., 38: 90-103.

Łapiński TW, Kovalczuk O, Flisiak R, Pancewicz J (2006). s• Levels of HBV-DNA, sFas and sFasL among healthy HBsAg carriers in period of three years. Adv. Med. Sci., 51: 46-50.

Lok AS, Heathcote EJ, Hoofnagle JH (2001). Management of hepatitis B: 2000- summary of a workshop. Gastroenterology, 120(7): 1828-53.

Lok AS, McMahon BJ (2001). Chronic hepatitis B. Hepatology, 34(6): 1225-1241.

Sablon E, Shapiro F (2005). Advances in Molecular Diagnosis of HBV Infection and Drug Resistance. Int. J. Med. Sci., 2(1):8-16.

Villeneuve JP (2005). The natural history of chronic hepatitis B virus infection. J. Clin. Virol., 34(1): 139-142.

Wong D, Yuen M, Tse E, Yuan H, Sum S, Hui C, Lai C (2004). Detection of Intrahepatic Hepatitis B Virus DNA and correlation withhepatic necroinflammation and fibrosis. J. Clin. Microbiol., 42(9): 3920-3924.