EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 7
699-701
Year: 2018

IMPORTANCE OF HIGH VIRAL LOAD INDICATORS AS A FACTOR OF PROGRESSION OF CHRONIC HEPATITIS B TO LIVER CIRRHOSIS

***Dr. Aziza Khikmatullaeva, Muazzam Abdukadirova, Nargiz Ibadullaeva, Mukhayyo Asilova, Nataliya Kan**

Research Institute of Virology, Uzbekistan.

***Corresponding Author: Dr. Aziza Khikmatullaeva**
Research Institute of Virology, Uzbekistan.

Article Received on 17/05/2018 **Article Revised on 07/06/2018** **Article Accepted on 28/06/2018**

ABSTRACT
There is no reliable information about the effect of viral load on the outcome of chronic hepatitis B. To determine the significance of high viral load as a prognostic marker of the development of LC, we conducted an analysis of medical records of 65 patients with hepatitis B virus, who were on dispensary records for at least 5 years and annually donated blood for the quantitative determination of HBV DNA. There were patients aged 35-65 years, 30 men (52.7%) and 25 women (47.3%). All of them were naive patients who had not previously received antiviral treatment. There is a relationship between HBV DNA and the progression of chronic hepatitis B to LC. The risk of LC increases with the increase in viral load.

KEYWORDS: Chronic hepatitis B, hepatitis B virus, liver cirrhosis, viral load, polymerase chain reaction.

BACKGROUND
Hepatitis B virus (HBV) is a hepatotropic, non-cytopathic virus.[1,2] Chronic forms of viral hepatitis B, a constant reservoir of this infection, do not decrease, but increase.[3] Terrible outcomes of the disease, such as liver cirrhosis (LC) and hepatocellular carcinoma (HCC), pose a serious danger to patients with chronic hepatitis B (CHB), from which 20 to 35% of patients die from the onset of time.[4]

It is known that viral hepatitis B is a viral infection that affects the liver and can cause acute and chronic disease. About 300 million people are chronic patients infected with the HBV (these are patients with hepatitis B surface antigen for more than 6 months). Annually, about 686 000 people die from hepatitis B infection, including LC and liver cancer as a result of chronic hepatitis B infection.[5] According to the results of WHO research one out of 12 people in the world is a patient of CHB, but most of them do not even suspect of their disease. This circumstance is the result of low awareness of the population about the disease and the ways of its transmission. It has been established that annually more than 1 million people become ill with hepatitis B and 20% develop LC, which in 3% leads to hepatocellular carcinoma (HCC) (in the absence of timely treatment patients die by 40-45 years). It is also known that people infected with HBV are 25 times higher than those who are not infected have a risk of developing HCC, and as much as 50-55% of cases of HCC is associated with HBV infection.[6]

A constant inflammatory chronic process in the hepatic cells, their continuous death and subsequent proliferation can lead to an increase in genetic damage, which increases the risk of increasing fibrotic changes in the liver.[7] According to a number of authors Elgouhari HM, et al. a high level of HBV DNA is a pronounced predictor of progression to LC in patients with CHB at all stages of the pathological process.

Determination of viral load of HBV in plasma or serum is extremely important in clinical practice. The quantitative determination of HBV DNA serves as the main criterion for evaluating the effectiveness of antiviral therapy. At the same time it has been established that certain factors of the virus and organism are associated with an increased risk of developing LC. One of the factors of the virus, affecting the outcome of the disease, is the concentration of the virus in the blood serum.

The aim of this study was to determine the significance of high viral load as a prognostic marker of the development of LC.

MATERIALS AND METHODS
To determine the significance of high viral load as a prognostic marker of the development of LC, we conducted an analysis of medical records of 65 patients with HBV, who were on dispensary records for at least 5 years and annually donated blood for the quantitative determination of HBV DNA. There were patients aged 35-65 years, 30 men (52.7%) and 25 women (47.3%).

All of them were naive patients who had not previously received antiviral treatment. Detection of HBV DNA in plasma and determination of the viral load was carried out by polymerase chain reaction (PCR) using the Ampli-Sens HBV Monitor-FL kit (Russia) with a certified lower threshold of 15 IU/ml in the Reference Laboratory of the Research Institute of Virology. Evaluation of the severity of liver fibrosis and LC was assessed using instrumental methods (ultrasound and liver elastometery on the FibroScan, (France).

RESULTS

All observed patients were naive patients who had not previously received antiviral treatment. To conduct research, we divided the viral load into low, average and high groups. A retrospective observation of the plasma HBV concentration was performed. Figure shows the effect of viral load on the outcome of the disease. The initial level of HBV DNA was from 15 to 10^2 IU/mL (20 people), $>10^2$ to 10^5 IU/mL (23 people), from $>10^5$-10^7 IU/mL (22 people).

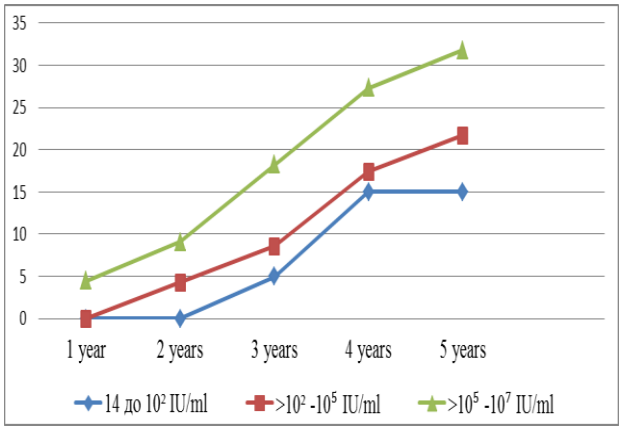

Figure: Dependence of risk of development of LC from viral load HBV DNA.

Annually, the study of the concentration of the virus in the blood was performed in the patients with CHB. At the Research Institute of Virology, we started counting from the time of treatment without considering the time of onset of the disease. The patients did not know about their disease until they accidentally detected HBsAg in the blood and applied to the Research Institute of Virology. We were interested in the level of the circulating virus and the outcome of the disease. A year later the first examination of the group of patients with low and average viral load showed that there was no LC. A year later the LC was noted in 1 (4.5%) of 22 patients with a high concentration of the virus in the blood. After 2 years, the LC was determined in 4.3% of cases in the group with an average and 9.1% with a high concentration of the virus. After 3, 4 and 5 years, the LC was diagnosed in 5%, 15%, 15% of patients with low virus content respectively, with an average viral load in 8.6%, 17.4%, 21.7% of cases and with a high blood concentration of the virus in 18.2%, 27.3%, 31,8% of patients respectively.

DISCUSSION

The main problem of the complexity of identifying liver diseases is associated with the peculiarities of its innervation, which results in the absence of any complaints of the patient and the symptoms of the disease. Manifestations of the disease can range from a completely asymptomatic clinical picture or mild symptoms such as nausea, loss of appetite, abdominal discomfort and to severe clinical manifestations with jaundice, hepatic encephalopathy, liver failure and hepatic coma. Recognition of the pathology of the liver is difficult for specialists because of the poor clinical picture. The outcome of liver diseases is liver fibrosis and LC with the development of portal hypertension and hepatic-cell insufficiency. The introduction of molecular diagnostic methods allowed obtaining more in-depth information about the HBV. With PCR, it was possible to determine not only the phase of the biological activity of the virus, but also the viral load of HBV DNA in the blood plasma. According to authors Chen, C, 2006; Iloeje, U, 2006 it is proved that the level of viral load is the predictor of the progression of the pathological process in the liver of patients with CHB.[9,10]

For clinical practice it is extremely important to define the viral load in CHB in the blood serum. Certain factors of the virus and organism are associated with the increased risk of developing LC. One of the factors of the virus, affecting the outcome of the disease, is the concentration of the virus in the blood serum. We managed to establish the existence of the relationship between the level of HBV DNA and the progression of CHB to LC. Transformation to LC depended on the level of viral load in the blood. The results of our studies coincided with the 11-year-old population study in Taiwan, which found that the cumulative incidence of LC increased with the level of HBV DNA in the blood serum and was 4.5% in patients with HBV DNA levels <300 copies / ml to 36.2% in patients with a DNA level $>10^6$ copies / ml. Moreover, the risk of developing the LC was not dependent on HBsAg and the level of ALT.[10]

CONCLUSIONS

Thus, the results obtained indicate that there is a relationship between the viral load of HBV DNA and the progression of chronic hepatitis B to LC, and the risk of LC increases with increasing virus concentration in the blood. A high level of HBV DNA is a predictor of the progression of CHB to LC.

REFERENCES

1. Huang CC, Kuo TM, Yeh CT, et al. One single nucleotide difference alters the differential expression of spliced RNAs between HBV genotypes A and D. Virus Research, 2013; 174: 18–26.
2. Kim SY, Kyaw YY, Cheong J. Functional interaction of endoplasmic reticulum stress and hepatitis B virus in the pathogenesis of liver

diseases. World Journal Gastroenterology, 2017; 23: 7657–65.
3. Raimondo G, Allain JP, Brunetto MR. Statements from the Taormina expert meeting on occult hepatitis B virus infection. Journal Hepatology, 2008; 49: 652–57.
4. Fattovich G, Bortolotti F, Dorato F. et al. Natural history of chronic hepatitis B: special emphasis on disease progression and prognostic factors. Journal of Hepatology, 2008; 48: 335–52.
5. World Health Organization. Hepatitis B. Fact sheet, April 2017. http://www.who.int/mediacentre/factsheets/fs204/ru/
6. Lupberger J, Hildt E. Hepatitis B virus-induced on cogenesis. World J Gastroenterology, 2007; 13: 74–81.
7. Shi W, Zhang Z, Ling C, Zheng W, et al. Hepatitis B virus sub genotyping: history, effects of recombination, misclassifications, and corrections. Infection Genetics and Evolution, 2013; 16: 355–61.
8. Elgouhari HM, Abu-Rajab Tamimi TI, Carey WD. Hepatitis B virus infection: understanding its epidemiology, course, and diagnosis. Cleve Clin J Med, 2008; 75(12): 881-89. doi: 10.3949/ccjm.75a.07019.
9. Chen, C. Risk of hepatocellular carcinoma across a biological gradient of serum hepatitis B virus DNA level. JAMA, 2006; 295: 65–73.
10. Iloeje UH, Yang HI, Su J, Jen C.L. Predicting cirrhosis risk based on the level of circulating hepatitis B viral load. Gastroenterology, 2006; 130(3): 678–86.