

Predictive Value of Serum pgRNA on HBeAg Clearance in Patients with Chronic Hepatitis B with Low HBeAg Levels Treated with Pegylated Interferon

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Abstract: *Objective:* To study the predictive value of serum pregenomic RNA (pgRNA) on HBeAg clearance in patients with chronic hepatitis B with low HBeAg levels during pegylated interferon therapy. *Methods:* Twenty chronic hepatitis B patients with HBeAg positive and quantitative <50S/CO were selected for this study. The subjects underwent pegylated interferon therapy for 48–96 weeks and were followed up in the outpatient clinic after treatment. The patients were then divided into groups based on whether their HbeAg turned negative. The predictive ability of each indicator for HBeAg negative conversion was evaluated in the HBeAg negative group and the HBeAg positive group. *Results:* The results of logistic regression analysis suggested that pgRNA and HBcrAg were better indicators for predicting the clearance of HBeAg after treatment. *Conclusion:* For patients with chronic hepatitis B with low HBeAg levels, pgRNA is a good indicator in predicting HBeAg clearance during pegylated interferon therapy.

Keywords: Serum pgRNA; Pegylated interferon; Low HBeAg level; Chronic hepatitis B; HBeAg clearance; Predictive value

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1. Introduction

Hepatitis B is a common hepatitis virus infection that can lead to serious complications such as liver disease and liver cancer. Pegylated interferon is a commonly used treatment method for Hepatitis B. However, the efficacy of this treatment varies among patients, some of whom may experience symptoms of low HBeAg levels ^[1]. Therefore, it is very important to study the predictive value of HBeAg clearance in patients with chronic hepatitis B with low HBeAg levels treated with pegylated interferon. This article will present a study addressing this issue, which focused on the predictive value of serum pregenomic RNA (pgRNA) in predicting HBeAg clearance in chronic hepatitis B patients with low HBeAg levels treated with pegylated interferon. By discussing this research, we can better understand the treatment of chronic hepatitis B and how to predict the treatment effect.

2. Materials and methods

2.1. Information

Twenty chronic hepatitis B patients with positive HBeAg and quantitative HBsAg < 50S/CO who were referred to the Department of Infectious Diseases and Department of Gastroenterology of Shaanxi Provincial People's Hospital were selected January 2021 to December 2022 for this study. The patients selected were diagnosed based on the Guidelines for the Prevention and Treatment of Chronic Hepatitis B (2019 Edition) [2].and pegylated interferon is used for treatment for 48–96 weeks. Male and female are 16 cases, 4 cases, aged 29–45 (30.28 ± 3.25) years old. The research protocol was approved by the Ethics Committee of Shaanxi Provincial People's Hospital, and all volunteers signed an informed consent.

2.2. Methods

Based on the follow-up of patients in the outpatient clinic, the patients were divided into two groups based on whether the HbeAg results turned negative. As a result, 10 cases were included in the HBeAg negative group and another 10 were included in the HBeAg positive group. The predictive ability of each indicator for HBeAg clearance was then evaluated.

Serum hepatitis B virus pregenomic RNA (HBV pgRNA) was measured by Simultaneous Amplification and Testing (SAT) method with an HBV-SAT kit (Shanghai Rendu Biotechnology Co., Ltd. China). Nucleic acid extraction and purification was carried out before measuring serum pgRNA. The virus RNA was purified, and the serum pgRNA was then measured. The linear detection was $1.00E+02$ - $1.00E+08$ copies/mL, and the minimum detection limit was 15 copies/mL. Serum HbcrAg was detected using a kit.

2.3. Data analysis

SPSS25.0 statistical software was used to carry out logistic regression analysis, where $P < 0.05$ was considered to be statistically significant.

3. Results

In this group of experiments, the results of Logistic regression analysis suggested that pgRNA and HbcrAg were better indicators for predicting the clearance of HBeAg after treatment.

Table 1. Logistic regression analysis results

Indicator	AUC	Cut off value	Sensitivity (%)	Specificity (%)	Standard error	Significance	Lower limit of 95% CI	95% CI upper bound
pgRNA (log ₁₀ copies/mL)	0.762	2.41	70.00	85.00	0.101	0.010	0.552	0.908
HbcrAg (log ₁₀ U/mL)	0.755	5.01	55.00	100.00	0.106	0.016	0.545	0.904
HbsAg (log ₁₀ U/mL)	0.581	3.11	100.00	30.00	0.122	0.515	0.368	0.773

4. Discussion

Chronic hepatitis B is a chronic disease caused by the hepatitis B virus (HBV) that affects millions of people. Being HBsAg positive means that the patient has been infected with the hepatitis B virus and is still carrying the virus. HBeAg is a marker of the hepatitis B virus, and when it disappears, it means the patient's immune

system has begun to control the infection. Although antiviral therapy has become the standard treatment for chronic hepatitis B, some patients still cannot achieve HBeAg clearance [3-7]. This may be caused by a variety of factors, including but not limited to the following: (i) Insufficient duration of treatment: In some cases, antiviral treatment needs to be continued for several years or even longer to achieve HBeAg clearance. If the duration of treatment is insufficient, the patient may not fully recover. (ii) Viral drug resistance: Hepatitis B virus may develop drug resistance to certain drugs, which may lead to treatment failure. In this case, it is necessary to switch to other drugs to treat the patient. (iii) Immune function problems: Some patients may have problems with their immune system [8-11], which causes the hepatitis B virus not being eliminated completely. In this case, adjuvant immunotherapy may be required to help eliminate the virus. (iv) Patient's condition: The patient's overall health status, age, liver function, etc. will also affect the treatment effect. If patients have other diseases or comorbidities, treatment for these problems may be required [12-15]. In summary, although antiviral therapy can help most patients achieve HBeAg clearance, it might not work for some patients. When treating these patients, it is necessary to conduct a comprehensive assessment, determine the treatment plan, and conduct regular monitoring during the treatment process to ensure that the patient receives the best treatment.

This study aimed to evaluate the predictive value of serum pgRNA in predicting HBeAg clearance in chronic hepatitis B patients with low HBeAg levels treated with pegylated interferon. The results of the study showed that serum pgRNA has a certain predictive value of HBeAg clearance in patients with chronic hepatitis B with low HBeAg levels treated with pegylated interferon. Specifically, through the observation and analysis of chronic hepatitis B patients with low HBeAg levels [16], it was found that pgRNA levels were significantly correlated with the loss of HBeAg in serum samples before and after treatment. The study also showed that the lower the pgRNA level, the higher the HBeAg loss. The results of this study suggest that serum pgRNA can serve as a predictor for assessing HBeAg clearance in chronic hepatitis B patients with low HBeAg levels treated with pegylated interferon. This discovery is very meaningful for clinical treatment and can help doctors predict the patient's condition before treatment and adjust the treatment plan in time during treatment. However, there are also some limitations to this study. The study sample size was relatively small and failed to cover a wider population.

pgRNA and HBcrAg were better indicators for predicting the clearance of HBeAg after treatment.

5. Conclusion

For chronic hepatitis B patients with low HBeAg levels, the use of serum pgRNA during pegylated interferon therapy can well predict HBeAg clearance.

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Disclosure statement

The author declares no conflict of interest.

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