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Analysis of Detection Results of Hepatitis B Virus Serological Markers in College Students

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Abstract

Background: According to WHO estimates, more than 2 billion people worldwide have been infected with Hepatitis B Virus, and hepatitis B has seriously harmed human health.

Objective: This study aims to understand the current status of hepatitis B infection in college students, to explore the performance patterns and composition ratios of hepatitis B virus serum markers, and to propose corresponding preventive measures for the diagnosis and treatment of hepatitis B infection in colleges and universities.

Methods: In this paper, 681 people were selected from the four grades of a university by

random sampling method. A total of 2724 college students were used to detect two pairs of serum hepatitis B by ELISA. At the same time, the corresponding questionnaires were conducted.

Results: A total of 1947 hepatitis B virus serum markers were detected in 2724 serum samples, and the total positive rate was 71.5%. The hepatitis B virus serum markers formed a total of 7 serological patterns. The positive rates of HBsAg, HBeAg and anti-HBcAg were 1.32%, the positive rates of HBsAg, anti-HBc and anti-HBe were 0.44%, and the positive rates of anti-HBs and HBsAg were 0.44% and 0.55%, respectively, and the positive rate of total infection group was 2.75%. At the same time, the factors that affect the total positive rate of hepatitis B include: whether the vaccine is vaccinated, whether the birth place is rural or urban; the factors affecting the single positive rate of serum anti-HBs markers also include gender.

Conclusion: The HBsAg positive rate of hepatitis B virus serological markers in college students is lower than the national average. The hepatitis B vaccine for college students is the most effective preventive method for active immunization of hepatitis B. Colleges and universities should strengthen health education interventions, isolate patients early, and strive for full coverage of hepatitis B vaccine.

Keywords: College Students, Serological Markers, Serological Testing, HBV

1. Introduction

As a kind of hepatitis virus, the disease caused by hepatitis B virus (HBV) invading the liver is called hepatitis B. Hepatitis B is highly contagious. According to WHO estimates, more than 2 billion people worldwide have been infected with HBV, of which 257 million are chronic HBV-infected, and about 780,000 people die each year from chronic HBV-related diseases[1, 2]. According to the latest literature research, the prevalence of HBsAg in China is estimated to be 6.1% in 2016, and the number of people with chronic HBV infection is about

86 million, with a diagnosis rate of 18.7% and a treatment rate of 10.8%[3]. The positive rate of HBsAg in China is 9.75%, In crowded colleges and universities, college students are at high risk of contracting hepatitis B[4]. Foreign studies have shown that the risk of HBV infection in people over 20 years old is 3.7 times that of people under 20 years of age[5]. In view of this, the development of this experiment is to understand the status of hepatitis B infection in college students, to explore the performance pattern and composition ratio of HBV serum markers, and to propose corresponding preventive measures for the diagnosis and treatment of hepatitis B infection in colleges and universities.

2. Objects and methods

2.1. Object

The subjects were undergraduate students in a university in 2015, and 681 students were randomly selected from freshmen, sophomores, juniors, and seniors. A total of 2,724 college students formed a research sample.

2.2. Methods

The HBV serum marker was tested by ELISA serological test (the reagent used was provided by Shanghai Rongsheng Biopharmaceutical Co., Ltd.) and used in strict accordance with the operating instructions. At the same time, the relevant self-made questionnaires were used to obtain the relevant basic information of the subjects. In the course of the investigation, 2,724 questionnaires were issued and collected.

2.2.1. Collection and detection of specimens

A syringe with a one-time measuring range of 5 mL was used to take 2 mL of the venous blood of the tester on an empty stomach in the morning, and was quickly separated by a centrifuge to obtain serum, which was then stored in an environment of -20 ° C for use. Two pairs of indicators of hepatitis B were detected by ELISA.

2.2.2. Questionnaire survey

The content of the questionnaire includes general characteristics (age, gender, etc.), whether

the household registration is rural or urban, whether it has been vaccinated against hepatitis B, family members (whether or not there are hepatitis patients), whether the items are dedicated, whether they take the initiative to check the medical examination, and whether there is a bad lifestyle, et al.

2.3. Statistical methods

Statistical analysis of the data was performed using SPSS 17.0 software, and the χ^2 test was used, where $P < 0.05$ indicates that the difference was statistically significant.

3. Results

3.1. General conditions

Among the 2,724 college students, the youngest is 18 years old, the largest is 24 years old, and the average age is (21.45±1.022) years old; among them, 1473 boys and 1,251 girls; 2112 people from rural areas and 612 people from cities. The basic situation is shown in Table 3.1.

Table 3.1 Basic information of the respondents (n, %).

Basic situation	Yes	No	%
Hepatitis B vaccine	2223	501	81.6
Whether the item is special	2340	384	85.9
vaccination can prevent infection	2629	95	96.5
Family members with HBV	252	2472	10.1
Active medical examination	365	2359	13.4

3.2. Hepatitis B infection

3.2.1. Positive detection of HBV serum markers

The total positive rate is the proportion of those with positive or negative serum markers. The total positive rate of 2724 students is 71.5% (1947/2724). The tables below showed the results(Table 3.2, Table 3.3).

Table 3.2 Detection of positive rate of serum markers in 2724 subjects (n, %).

Serum markers	HBsAg	anti -HBs	HBeAg	anti -HBe	anti -HBc
Positive number	75	1872	36	93	141
Positive rate	2.8	68.7	1.3	3.4	5.2

Table 3.3 Comparison of total positive rate of serum markers (n, %).

Variable	Positive number	tested Positive	Positive rate	χ^2	*P*
Birthplace City	528	612	86.3	84.789	0.000
Rural	1419	2112	67.2		
Vaccination group	1678	2223	75.5	95.225	0.000
Unvaccinated group	269	501	53.7		

3.2.2. Statistical analysis of HBsAg positive rate and anti-HBs levels in each grade.

The result is shown in Table 3.4.

Table 3.4 Statistical analysis of HBsAg positive rate and anti-HBs levels in all grades.

Grade	HBsAg level				anti-HBs level			
	Positiver numbe	Positive rate	χ^2	*P*	Positiver numbe	Positive rate	χ^2	*P*
Fresh-man	17	2.49	0.029	0.865	461	67.69	0.084	0.772
Sopho-more	18	2.64	0.028	0.867	466	68.43	0.031	0.860
Junior	19	2.79	0.103	0.748	469	68.87	0.169	0.681
Senior	21	3.08	0.433	0.510	476	69.90	0.769	0.380

3.2.3. Detection pattern and proportion of HBV serum markers

A total of 2,724 serum samples were detected, of which 1947 samples were tested for serum HBV standards, and 7 patterns were formed, as shown in Table 3.5.

Table 3.5 Distribution table of serum HBV standard detection patterns of college students

Mode	HBsAg	anti -HBs	HBeAg	anti -HBe	anti -HBc	*n*	positive rate %
1	-	+	-	-	-	1779	65.3
2	+	-	-	+	+	12	0.44
3	-	+	-	+	+	81	3.0
4	+	-	+	-	+	36	1.32
5	+	-	-	-	-	15	0.55
6	-	-	-	-	+	12	0.44
7	+	+	-	-	-	12	0.44
Total						1947	71.5

3.2.4. Detection of anti-HBs

Serum anti-HBs markers were positive for 1779 cases, and the positive rate was 65.3% (1779/2724). The χ2 test was performed on gender, place of birth, and vaccination. The results are shown in Table 3.6.

Table 3.6 Comparison of single positive rates of serum anti-HBs markers (n, %).

Variable		Positive number	Total number	Positive rate（%）	χ^2	P
Gender	Male	888	1473	60.3	11.907	0.000
	Female	891	1251	71.2		
Birthplace	City	459	612	75.0	10.708	0.000
	Rural	1320	2112	62.5		

Vaccination group	1602	2223	72.1	81.175	0.000
Unvaccinated group	177	501	35.3		

4. Discussion

It can be known from the basic information in Table 3.1 that the hepatitis B vaccination rate of the students surveyed is 81.6%, and the hepatitis B vaccine vaccination does not reach the full coverage; while the active medical examination only accounts for 13.4%, reflecting the students' awareness of health prevention is still weak. Schools should encourage students to strengthen the vaccination of hepatitis B vaccine, while expanding publicity efforts to achieve full coverage of vaccination prevention. In the results of Table 3.3, the total positive rates of serum markers were compared with each other, whether the birthplace is rural or urban (χ^2= 84.789, $P < 0.001$), whether vaccination (χ^2= 95.225, $P < 0.001$), the difference was statistically significant. Among them, the total positive rate of hepatitis B in urban students is higher than that in rural areas. The positive rate of single anti-HBs is higher than that in rural areas. This phenomenon may be related to the large-area vaccination of hepatitis B vaccine in urban students. Although the hepatitis B vaccine is also promoted in rural areas, the area of inoculation is not large. The vaccination awareness of the students are not too high, and the vaccination rate is still very low[6]. On the one hand, rural students have limited economic ability, and they live frugally in daily life, resulting in lower immunity. On the other hand, rural students have relatively poor health awareness and relatively lack of knowledge about infectious diseases.

In Table 3.4, the sample survey results of four grades showed that there was no significant difference between the positive rate of HBsAg and the positive rate of anti-HBs among the grades (P>0.05), and the positive rate increased with the increase of grades, but the increase in infection rate is not obvious. A study has shown that anti-HBs are detected in one year after the full immunization of hepatitis B vaccine, the positive rate is 95.4%, and still reaches 91.14% after 6 years[7], which indicates that it is necessary to carry out full-course immunization of hepatitis B vaccine, which not only improves itself, but also reduce

contagiousness. The pattern of HBV infection in Chinese universities is mainly ① HBsAg, HBcAb, HBeAb; ② HBsAg, HBeAg, HBcAb; ③ HBsAg and HBcAb positive; ④ HBsAg and HBeAg positive[8].

Table 3.5 shows a total of 7 combinations of hepatitis B "two pairs and a half". Anti-HBs positive is more common in patients who have been infected with HBV, in patients with hepatitis B recovery, or who have been vaccinated against hepatitis B vaccine, indicating that the body has hepatitis B Immunity. Among them, the proportion of model 1 reached 65.3%. This phenomenon has been related to the vaccination and publicity work of hepatitis B vaccine and the improvement of self-health awareness of college students in the past 20 years. The positive rates of model 1 and model 2 were lower than those of healthy people[9]. The other detection modes are different in composition and have different meanings. Model 1 indicates that hepatitis B virus is very active in the body, the disease is active, and the infection is strong; Model 2 indicates that HBV infection tends to recover, and the disease is contagious in the recovery period. From the comparison results of Table 3.3 and Table 3.6, it can be concluded whether the total positive rate or the single anti-HBs positive rate, the vaccination group is higher than the non-vaccination group, this result indicates that the college students Vaccination against hepatitis B is the most effective preventive method for active immunization of hepatitis B.

HBV is a serious hazard and its prevention work is particularly important. Due to its crowded population, colleges and universities have become a key area for the prevention and treatment of hepatitis B, and the prevention and treatment tasks will be even more arduous. It is necessary to strengthen the management of HBsAg carriers, regularly detect and control the source of infection, cut off the route of transmission, and protect susceptible populations[9]. In order to prevent more effectively, the following suggestions are given: (1) Health education for hepatitis B prevention and treatment for students to improve their awareness of prevention. (2) Inoculation of high-risk contacts. For example, the staff of the canteen will be vaccinated on a regular basis, and the tableware will be disinfected in time to prevent hepatitis B infection. (3) For the treatment of highly infectious patients, the blood, excreta and private items should be strictly disinfected. In addition, the school hospital should also actively carry

out hepatitis B vaccination for uninfected students, in order to achieve full coverage, enhance students' immunity, reduce the occurrence and prevalence of hepatitis B, and improve students' health.

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References

[1] WHO.Global hepatitis report,2017[EB/OL].[2018-04-01].http://www.who.int/hepa -titis/publications/global-hepatitis-report2017/en/.

[2] WHO.Hepatitis B fact sheets[EB/OL].[2018-05-25]. http://www.who.int/news-roo -m/fact-sheets/detail/hepatitis-b.

[3] The Polaris Observatory Collaborators, Global prevalence, treatment,and preven -tion of hepatitis B virus infection in 2016:a modellingv study[J].Lancet Gastroenterol Hepatol,2018,3(6):383-403.

[4] Zhao R, Liu Q, Zhuang GH.A meta-analysis of the test results of five indicators for hepatitis B virus of college freshmen in current mainland China[J].Zhonghua Yu Fang Yi Xue Za Zhi,2018, 52(8):849-854.

[5] Ng KP,Ngeow YF,Kr MR.Hepatitis B seroprevalence among university of Malaya students in the post universal infant vaccination era. Med J Malaysia,2013,68(2):144-147.

[6] Liu S,Gong LY.Six-year follow-up observation on the immune effect of hepatitis B vaccine[J].Chinese school health,1997,18(6):450-51.

[7] Lu Y, Liang XF, Wang FZ,et al.Hepatitis B vaccine alone may be enough for preventing hepatitis B virus transmission in neonates of HBsAg (+)/HBeAg (-)mothers[J].Vaccine,2017,35: 40-45.

[8] Liu YR,Han PF.Detection and Analysis of Serum Markers of Hepatitis B Virus in 4741 Cases of Physical Examination[J].Hubei Journal of Preventive Medicine, 2001,12(2):29-30.

[9] Zhang YL, Zhang XV, He F.A "two-and-a-half" and ALT test for hepatitis B in a school from 2004 to 2007[J]. Medical Animal Control, 2008, 24(9): 709.