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Short communication

Evaluation of the Status of Immunity to HBV Infection in a Group of Basic Medical Science Students in Tabriz

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Abstract

Background and Aims: Hepatitis B is a viral infection that attacks the liver and can cause both acute and chronic disease. Thus, the present study focused on antibody titer among HBV-vaccinated medical students in order to evaluate the efficacy of Hepatitis B vaccine and the associated factors.

Materials and Methods: In this cross-sectional study, 184 medical students were enrolled. Blood samples were taken from the participants in order to detection of antibody against Hepatitis BsAg by ELISA. Data analysis was done by Chi-square and Fisher's exact tests.

Results: According to the obtained results, 1.1% of the students had a negative titer, while another 53.8 % were in the borderline situation; whereas 45.1% produced a positive titer. Furthermore, the results revealed that there was no statistically significant difference between Hepatitis B antibody titer values and variables such as gender (P<0/05).

Conclusion: By considering the fact that medical students are at greater risk of HBV infection, it is necessary to schedule the determination of serum anti-HBs titer to improve the immunization programs and to decrease the risk of infection before internship program. Re-vaccination (booster shot) is also necessary for people with low titers anti- HBs or loss antibody and controls their antibody titers, and also in who are considered as high-risk group in the society.

Keywords: Vaccination; Anti-HBs; Basic medical students; Tabriz

Introduction

Hepatitis B virus (HVB) is one of the most common pathogens in the world. HBV causes a range of liver diseases, from acute hepatitis to chronic hepatitis, and long-term replication of the virus leads to cirrhosis in 25% of carriers and eventually hepato-cellular carcinoma (1). The extent and severity of HBV infection depends on various host and virus factors. HBV infection is usually diagnosed by the presence of virus surface antigen (HBsAg) and anti-HBc antibodies (2). Some patients develop a type of chronic viral infection with no serological markers for HBV without detecting HBsAg, is called occult HBV infection. The occult HBV infection is defined with the presence of HBV-DNA in liver or serum with undetectable HbsAg level (3).It is estimated that 257 million worldwide people are chronic carriers of the virus and 887000 of them die each year as a result of infections such as hepatocellular carcinoma (4). The prevalence of HBV infection in Iran is about 2% and Hepatitis B is the most important

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cause of liver disease and mortality this country (5, 6). Hepatitis B virus is also the most common virus transmitted through medical centers (7). Currently, the most important way to prevent hepatitis B virus infection is vaccination, which reduces about 95-95% of deaths from the virus (8, 9). The general vaccination program has been mandatory in Iran since 1993 (10). Following vaccination, the only serological index that appears after vaccination in the serum is antiHBsA; is produced against a highly immunologic antigen. The antibody titer against HBsAg required to cause immunity from the vaccine is more than 10 mIU/ml, the titers 10-30 mIU/ml gives moderate immunity and the titer higher than 30 mIU/ml gives good immunity (11). More than 90% of patients less than 40-50 years old show high antibody titers after the third dose of vaccine and 5-15% of individuals do not produce enough antibodies after vaccination (9, 12).The reason for this is not clear but there are probably several host factors, including genetics, HLA systems, fatty liver, vaccine quality, and so on may play an important role in non-responder individuals (13).

About 10% of vaccinated patients who respond to vaccination lose their anti-HBs after 2 years(12). However, very different results have been reported, decreasing the titer of anti-HBs is associated with reduced immunity to hepatitis B. Some factors are related to the effectiveness of the vaccine such as sex, age, weight, genetic factors, type of vaccine, the time elapsed since the last dose, and so on (14). Some studies have shown, high level of Abs after vaccination may causes longer immunity (15). Some studies found that the majority of vaccinated health personnel do not normally measure their antibody titers after vaccination. Therefore, measuring the titer of immunogenic antibodies is useful especially in high-risk groups of the community, including medical staff (in order to estimate their immunogenicity and determine the best revaccination protocol in high-risk groups. The estimated risk for hepatitis B infection in this group is 2–10 times more than general population (16).

Basic medical sciences will continue their education in medical centers after this period, are faced probability of dealing with infected samples. Therefore, the present study aimed to determine the frequency of antiHBs among university students in Tabriz, capital of East Azerbaijan.

Methods

The present study is a descriptive cross-sectional observation and we examined the medical students of a basic medical science course in Tabriz who were not aware of the immune status against hepatitis B virus. The study population was selected 184 students from basic science students of the medical school. All participants in this study signed the written consent and completed the question-naires. Then 5cc blood was taken from all of them and the amount of anti-HBs antibodies was measured by ELISA Pishtaz Teb Company Ki (non-immune anti-HBs titer <10mUI/ml and immune anti-HBs titer ≥10 mIU/mL). Accordingly, the study population were classified into three categories: non-protective (antibody titer less than10 mIU/mL and), with relative protection (antibody titer between 10 and 30 and equal to each of these values in mIU/mL) and with ccomplete protection (antibody titers above 30 mIU/mL). The results of this study were analyzed using SPSS version 24 and Chi-square test, and P-value <0.05 was considered as a significant level.

Statistical analysis: To assess the normal distribution of continuous data, the Kolmo-gorov-Smirnov test was applied. Due to the abnormal distribution of anti-HBs anti-bodies data, Spearman correlation test was used to evaluate the relationship between age and serum levels of anti-HBV antibodies.

Results

This study was performed on 184 basic medical students Tabriz university medical sciences.Participants in the study ranged in age from 19 to 30 years.

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Table 1. Demographic and other features of subjects and relative seropositivity to anti-HBs among university students				
Variables	Antibody titer mIU/ml			P value
	<10	10-30	>30	
Antibody titer	2 (1.1%)	99 (53.8%)	83(45.1%)	
Female (n=117)	0	63 (53.4)	54(46.6%)	> 0.05
Male (n=67)	2 (3%)	37 (55.2%)	28(41.8%)	

The mean age of the subjects was 21.9 with 2.6 standard deviation. Two (1.1%) students did not have a protective titer (<10 mIU/ml), 99 (53.8%) students had a titer the relative protector (10-30 mIU/ml) and 83(45.1%) students had the full protection titers (> 30 mIU/ml). Table 1 shows the frequency distribution of anti-HBs titer status by age in the subjects.

There was no significant relationship between safety level and age. Antibody levels 46% in women, 41% in men above 30 and 54% in women, 55% in men were between 10 and 30. There was no significant difference between the two sexes in antibody level. 166 (89.9%) students were unaware of their safety status and vaccination. A Chi-square test was used to evaluate the relationship between antibody level and age, sex, vaccination at birth, the possibility of infection, and needle insertion. There was no statistically significant difference between the antibody level and the cases mentioned above (P value> 0.05). According to the result of Spearman correlation test, there was a weak but statistically near significant correlation between age and serum levels of Anti-HBs Ab (r = 0.14, P = 0.051) (fig. 1).

Discussion

According to the obtained results, 1.1% of the students had a negative titer, while 98.8% produced a positive titer.The standard rate for proper immunization is 95% (range 80-100%), this is achieved in the present study (8).

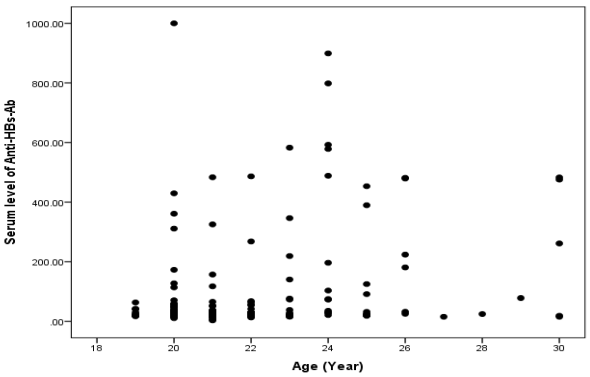

Fig. 1. The relationship between age and serum level of anti-HBs Ab among Medical students (n=184).

Of these, 45.1% of students had appropriate antibody titers against hepatitis B virus, and 53.8% had intermediate titers. This figure indicates the appropriate status of vaccination and vaccine response among students. The results of the present study are relatively consistent with the results of similar studies in Gilan (94.7%) (1) and Kurdistan (86%) (12), while these results are higher than that the results of studies in Shiraz (36%), Ahvaz (48.6%), Mexico (54.3) and Taiwan (53.5%) (19-17, 10).

Variation in the rate of anti-HBs persistence in previous studies, may be largely attributed to differences in the type and dose of vaccines, schedule of immunization, age of initial vaccination, socio-economic status, intervals bet-

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ween vaccine administrations, genetic pool of the target population and natural exposure to HBV infection.

In this study, no significant relationship was seen between age and immune status, this finding was also reported by other studies (20). While in some studies, such as aging, reduced immunity (10, 18). This may be due to the difference in the mean age of the two groups.

In some studies, the rate of vaccine response in men was slightly lower than women (21, 22) but in the present study, there wasn't a significant difference between men and women (even with a high rate of women in the study population 63%). This finding was similar to other study (20). The results also showed that there was no significant difference in Hepatitis B antibody titer in students based on the history of needle insertion, which is consistent with a study conducted in Ardabil in 1995 by Firoozzad (23).

According to some studies, the antibody titer against Hepatitis B declines over time (24, 25). Therefore, antibody titer control is recommended in later years for people who have been safe. This is especially important for employees and medical science student. Since these individuals may be exposed to HBV in terms of educational status and professiona-lism. In our study, the subjects who had antibody titers between 10 and 30 were 62.5%, which could be due to the long distance from the vaccination. These group were suggested to measure amount of antibodies before entering the clinical course. The booster dose maybe is necessary for these group and check again HBV antibody titer after a month.

The present study demonstrates surprising results the high number of basic medical students about 89.9% that not sure about their vaccination status .The study showed that the first-year medical students have lack of knowledge and awareness about Hepatitis B its ways of transmission, risk factors, and methods of preventions compared to the fifth-year medical students (26). According to this content, measuring the anti- HBs titer for all medical basic student at the beginning of the entering the university or employment seems to be necessary in order to identify and inject a Hepatitis B vaccine dose for this group in a timely manner.

Conclusion

By considering the fact that medical students are at greater risk of HBV infection, it is necessary to schedule the determination of serum anti-HBs titer to improve the immunezation programs and to decrease the risk of infection before internship program. Revaccination (booster shot) is also necessary for people with low titers of anti- HBs or loss antibody and controls their antibody titers. And also in who are considered as high-risk group in the society.

Acknowledgment

Not applicable.

Conflict of interest

The authors of the current study declared no conflict of interest.

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References

1. Baba Mahmoodi F. Evaluation of hepatitis B antibody (HBS) levels in nursing staff of Gaemshahr Razi Hospital and it's variation with duration of immunity post HB vaccination. J Mazandaran Univ Med Sci. 2000;10(27):48-53.

2. D'Souza R, Foster GR. Diagnosis and treatment of chronic hepatitis B. J R Soc Med. 2004;97(7):318-21.

3. Raimondo G, Locarnini S, Pollicino T, Levrero M, Zoulim F, Lok AS, et al. Update of the statements on biology and clinical impact of occult hepatitis B virus infection. J Hepatol. 2019;71(2):397-408.

4. Tarky AM, Akram WA, Al-Naaimi AS, Omer AR. Epidemiology of viral hepatitis B and C in Iraq: a national survey 2005-2006. Zanco J Med Sci. 2013;17 (1):370-80.

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5. Rezaei N, Asadi-Lari M, Sheidaei A, Gohari K, Parsaeian M, Khademioureh S, et al. Epidemiology of hepatitis B in Iran from 2000 to 2016: a systematic review and meta-regression analysis. Arch Iran Med. 2020;23(3):189-96.
6. Habibiyan R. Efficacy of complete hepatitis B-vaccination in health care workers. J Shahrekord Univ Med Sci. 2003;5(1):42-47.
7. Sepkowitz K. Nosocomial Hepatitis and Other Infections Transmitted by Blood and Blood Products: Mandell. Douglas, and Bennett's Principles and Practice of Infectious Diseases 6th Ed, Philadelphia. 2005:3381-91.
8. Kahn J. Preventing hepatitis A and hepatitis B virus infections among men who have sex with men. Clin Infect Dis. 2002;35(11):1382-7.
9. Rezaee R, Aghcheli B, Poortahmasebi V, Qorbani M, Alavian SM, Jazayeri SM. Prevalence of national responsiveness to HBV vaccine after 22 years of Iranian expanded program on immunization (EPI): a systematic review and meta-analysis study. Hepat Mon. 2015;15(5): e23618.
10. Hashemi SMA, Hashemzadeh F, Bahrampour H, Nekoei F, Joharinia N, Sarvari J. The evaluation anti-HBsAb titer among university students in Shiraz, 2019. Iran J Med Microbiol. 2020;14(4):297-306.
11. Practices ACoI. recommended adult immunization schedule: United States, october 2007-September 2008. Ann Intern Med. 2007;147(10):725-9.
12. Zuckerman JN. Protective efficacy, immune-therapeutic potential, and safety of hepatitis B vaccines. J Med Virol. 2006;78(2):169-77.
13. Namdari S, Arabsolghar R, Sharifzadeh S, Farhadi A, Toopchi S, Seyyedi N, et al. Anti-HBs Antibody Levels and Anti-HBc Detection Among HBV-Vaccinated Freshmen Enrolled in the Department of Laboratory Sciences, Shiraz University of Medical Sciences, Iran. Shiraz E Med J. 2018;19(7):e64831.
14. Chathuranga L, Noordeen F, Abeykoon A. Immune response to hepatitis B vaccine in a group of health care workers in Sri Lanka. Int J Infect Dis. 2013;17(11): e1078-e9.
15. Chang M-H, You S-L, Chen C-J, Liu C-J, Lai M-W, Wu T-C, et al. Long-term effects of hepatitis B immunezation of infants in preventing liver cancer. Gastroenterology. 2016;151(3):472-80.
16. Araujo MW, Andreana S. Risk and prevention of transmission of infectious diseases in dentistry. Quintessence Int. 2002;33(5):376-82.
17. Lu JJ-Y, Cheng C-C, Chou S-M, Hor C-B, Yang Y-C, Wang H-L. Hepatitis B immunity in adolescents and necessity for boost vaccination: 23 years after nationwide hepatitis B virus vaccination program in Taiwan. Vaccine. 2009;27(47):6613-8.
18. Norouzirad R, Shakurnia AH, Assarehzadegan M-A, Serajian A, Khabazkhoob M. Serum levels of anti-hepatitis B surface antibody among vaccinated population aged 1 to 18 years in ahvaz city southwest of iran. Hepat Mon. 2014;14(1):e13625.
19. Cárdenas-Perea ME, Gómez-Conde E, Santos-López G, Pérez-Contreras I, Díaz-Orea MA, Gándara-Ramírez JL, et al. Hepatitis B surface antibodies in medical students from a public university in Puebla, Mexico. Hum Vaccin Immunother. 2016;12(7):1857-62.
20. Dumaidi K, Al-Jawabreh A. Persistence of anti-HBs among Palestinian medical students after 18-22 years of vaccination: a cross-sectional study. Hepat Mon. 2015; 15(11):e29325.
21. Sumadewi K, Rachmanu M, Udiyani D, editors. Titer of anti-HBs antibodies following a booster vaccination among medical students. IOP Conference Series: Materials Science and Engineering; 2018:IOP Publishing.
22. Al Ghamdi SS, Fallatah HI, Fetyani DM, Al-Mughales JA, Gelaidan AT. Long-term efficacy of the hepatitis B Vaccine in a high-risk group. J Med Virol. 2013;85(9):1518-22.
23. Fattah FZ, Bolivian M, Sadegh A. The evaluation of Hepatitis B Antibody titer among vaccinated students in Ardebil College of Dentistry. Iran J Med Microbiol. 2016;10(3):68-72.
24. Nagashima S, Yamamoto C, Ko K, Chuon C, Sugiyama A, Ohisa M, et al. Acquisition rate of antibody to hepatitis B surface antigen among medical and dental students in Japan after three-dose hepatitis B vaccination. Vaccine. 2019;37(1):145-51.
25. Behre U, Bleckmann G, Crasta PD, Leyssen M, Messier M, Marie Jacquet J, et al. Clarification to Long-term anti-HBs antibody persistence and immune memory in children and adolescents who received routine childhood hepatitis B vaccination. Hum Vaccin Immunother 2012;8:813-18.
26. Ibrahim N, Idris A. Hepatitis B awareness among medical students and their vaccination status at Syrian Private University. Hepat Res Treat. 2014;2014:131920.

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