WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 10, 274-280. Research Article ISSN 2277– 7105

EVALUATION OF THE ANTI-HBC ANTIBODY SCREENING TEST IN DENOTATION OF HBS AG. AMONG BLOOD DONORS IN THI-QAR PROVINCE/IRAQ

Alyaa A. Hafudh[1], Saad A. Ateia*[2], Alaa H. Abed[3] and Riyadh K. Abdulah[4]

[1]Dept. of Pathological Analysis, Coll. of Sciences, Thi-Qar Uni./ Iraq
[2]Dept. of Microbiology, Coll. of Medicine, Thi-Qar Uni.
[3]Dept. of Family & Community Med., Coll. of Medicine, Thi-Qar Uni.
[4]Al-Hussien teaching hospital, Thi-Qar health directorate,

Article Received on
06 Aug 2015,

Revised on 27 Aug 2015,
Accepted on 18 Sep 2015

***Correspondence for Author**
Saad A. Ateia
Dept. of Microbiology, Coll. of Medicine, Thi-Qar Uni.

SUMMARY

Viral Hepatitis Type B is a serious public health problem throughout the world. Hepatitis B virus still to be the major causes of chronic hepatitis. Although, the blood banks using HBs Ag and anti-HBc Ab. as a screening tests for HBV, the post transfusion hepatitis B infections remain occur . the aim of this study is evaluation of efficacy of anti-HBc Ab in screening HBV infections among the blood donors in Thi-Qar province. A total of 13775 blood donors were involved in the study. The HBs Ag and anti-HBc antibody was detected by using ELISA technique. The study shows that the prevalence of anti-HBc alone was high among blood donors 379 (2.75%) when compared to the donors that gave positive results for both markers and HBs Ag alone ,13 (0.09%) and 20 (0.14%) respectively, with high significant differences among these groups under ($p< 0.001$). While the study shows no significant differences between the donors that gave positive results for both markers and HBs Ag only under ($p< 0.05$). In conclusion, the prevalence of anti-HBc among blood donors was high in compared with HBs Ag and this test showed high specificity & positivity among blood donors and this test requires for more researches to support the role of this antibody as a diagnostic and screening test for hepatitis B infections among blood donors and other medical settings.

KEYWARDS: HBV serological markers, Blood transfusion, HBV prevalence.

BACKGROUND

Hepatitis B virus infection is a potentially life-threatening liver infection caused by the hepatitis B virus. When first infected, a person can develop an acute infection, which can range in severity from a very mild illness with few or no symptoms to a serious condition requiring hospitalization. It is a major global health problem and can cause chronic liver disease and chronic infection and puts people at high risk of death from cirrhosis of the liver and liver cancer, more than 240 million people have chronic (long-term) liver infections. About 600 000 people die every year due to the acute or chronic consequences of hepatitis B.[1,2]

Hepatitis B prevalence is highest in sub-Saharan Africa and East Asia. Most people in these regions become infected with the hepatitis B virus during childhood and between 5–10% of the adult population is chronically infected. In the Middle East and the Indian subcontinent, an estimated 2–5% of the general population is chronically infected. Less than 1% of the population in western Europe and North America is chronically infected.[1,3] HBV is carried in the blood and other body fluids of people who are infected. It is usually spread by contact with infected blood or body fluids injury or injection, from a pregnant mother to her baby during birth and unprotected sexual intercourse.[4,5]

In the typical course of acute hepatitis B , HBs Ag may be detected by ELISA or immune-fluorescent methods as early as 1–2 weeks or as late as 11–12 weeks after exposure, and its persistence is a marker of chronicity and are cleared with recovery. Antibodies to the HBV proteins arise in different patterns during acute hepatitis B. Antibody to HBcAg (anti-HBc) generally appears shortly before onset of clinical illness and it a marker and most reliable means of previous infection. Also, when the anti-HBc detected in patients serum alone this mean that the HBV infection in remote past; "low-level" HBV carrier; window period or false-positive or nonspecific reaction.[2,4,6]

Unsafe blood transfusion is one of the routes of transmission for HBV infection. In spite of, all blood donors being tested routinely for hepatitis B surface antigen (HBs-Ag) as a marker for HBV, the cases of post-transfusion hepatitis B virus infection are remain occur. Generally occult HBV infection is defined as the detection of HBV-DNA in the serum or tissue of subjects who have negative test for HBs-Ag. In addition, antibodies to hepatitis B core (HBc) antigen are marker to acute, chronic and resolved HBV infection that remain detectable

forever. Consequently anti-HBc is detected in anyone who has been infected with HBV, while the level of HBs-Ag in the circulation becomes too low to be distinguished.[7,8,9]

Present study was designed to assess the prevalence of anti-hepatitis B core (anti-HBc) positivity and presence of HBs Ag in serum samples of healthy blood donors in the main blood bank and evaluation of efficacy of anti-HBc Ab in screening HBV infections among the blood donors in Thi-Qar province.

METHODOLOGY

Data collection

The data were collected from the main blood bank in Al-Nasiriya city, Thi-Qar province/Iraq through the period (July – December /2014), ELISA technique was used to screening for HBs Ag and anti-HBc antibody by using commercial kits (Foresight-USA). The total number of investigated blood donors was 13775 individuals including (13650) males and (125) females. The blood donors were divided into three groups according to the frequency of HBV markers, the first involved the donors with positive reactions to both markers, the second represents the blood donors which shown positive results to the HBs Ag only and the third group involved donors with anti-HBc antibody positive alone.

Statistical analysis

The SPSS program (version 19) was used to analyze the data by T- test and ANOVA test.

RESULTS

In this study, the number of positive cases for all groups was 412 (2.99%) of blood donors as shows in table (1) which distributed between groups as follow: the first group of donors involved (13) persons representing (0.09%) of donors as shown in table (1). In the second group the HBs Ag was detected in (20, 0.14%) of blood donors with no significant differences between these groups under ($p< 0.05$). While, the third group including the donors with anti-HBc antibody positive alone involved (379) persons representing (2.75%) with high significant differences under ($P < 0.001$) in comparison with first and second groups (table 2).

Table (1): The total sero-positivity of HBV infection among blood donors.

Reaction	No.	Percent (%)
Positive	412	2.99
Negative	13363	97.01
Total	13775	100

Table (2): The prevalence of HBV markers according to groups in blood donors.

Markers	Reaction	No.	Percent
HBs & anti-HBc	Positive	13	0.09
	Negative	13762	99.91
HBs	Positive	20	0.14
	Negative	13755	99.86
Anti-HBc	Positive	379	2.75
	Negative	13396	97.25
Total		13775	100

The study shown that the anti-HBc antibody test gave good positivity rate and has a highly specificity (97.2%) in diagnosis of HBV infections among individual under study when compared with HBs Ag positivity for the same individual with high significant differences ($P<0.001$) as shown in table (3).

Table (3): the relationship between anti-HBc and HBs Ag positivity among blood donors.

Anti-HBc	HBs Ag		Total
	Positive	Negative	
Positive	13	379	392
	39.4%	2.8%	2.8%
Negative	20	13363	13383
	60.6%	97.2%	97.2%
Total	33	13742	13775
	100%	100 %	100%

DISCUSSION

The anti-HBC may be the only serological marker to HBV infection that can be detected in blood donors which may considered a marker for previous infection , low grade chronic infection or in infection with atypical variant strains of HBV. Also, the possibility of false positive results not to be excluded.[1,2]

The HBs Ag can usually be detected in blood after (1-2) weeks following exposure and disappear within (6) months of infection in 90% of people with hepatitis B. In the remaining

percent (10%) the HBs Ag persists after 6 months which is an indicator for chronic hepatitis B.[3,4]

In approximately 50% of patients with self-limited hepatitis B virus infection, there is a time interval of up to several months between the disappearance of detectable HBs Ag and the appearance of anti-HBs. During this time, only the anti-HBc is detectable; this period is referred to as the "core window" or "window phase".[1,4]

Anti-HBc antibody remain detectable in the human serum for long period after resolved of HBV infections. So, this marker is widely used for diagnosis of infections and epidemiological study despite the fact that, the antibody immune response to all HBV proteins have been determine in many persons with infections.[10,11]

The results was accepted to some studies in Iraq that shown high rate of anti-HBc in the persons under studies. Even though , the percentage of incidence of this antibody was lower than in these studies may be due to differences in the size of samples , geographical area , economic state and social effects . Also, the prevalence of HBV depending on environmental and host factors such as nutritional state and the defect in immune response to infections.[12,13,14]

By comparing the results of anti-HBc to the results of HBs Ag. when applied on the same group of blood donors, it can be clearly noticed that anti-Hbc carries a low true positive cases detection ability . But, it shows a very high ability in excluding true negative persons. Therefore, when used together in the screening process, anti-HBc test is very much useful in confirming the true negative persons. As far as, the prevalence of hepatitis B in Iraq is low.[11,12,14,15] and it is a chronic not-acute killer disease, it will be very much useful to add/ ask for the anti-HBc test in the screening programs in the Iraqi hospitals and private clinics. That is because in non-common and non-acute killer diseases, highly specific tests are needed. This gives hand to avoid any unnecessary investigations or other management procedures.[10,11,16]

The highly significant differences between the markers under study indicates that the anti-HBc Ab. is an important serological marker for screening HBV infections among blood donors in order to reduces occurrence of post transfusion hepatitis B infections. In the other hand, the anti-HBc Ab. should be used in diagnosis of hepatitis B infections in the other

medical sites not only in the blood banks and the physicians especially in Iraq should be not used HBs Ag alone in early diagnosis of HBV illness among the patients in the hospitals or private clinics which may lead to increase the incidence of infections.

CONCLUSION

The anti-HBc antibody is a good marker in diagnosis and screening of HBV infections among the blood donors with high specificity in comparing with HBs Ag.

ACKNOWLEDGEMENT

We would like to thank the manager and workers in viral screening department in the main blood bank, Thi-Qar health directorate, Iraq, for their support.

REFERENCES

1. World Health Organization, 2013.
2. Centers for Disease Control and Prevention. (2010). Hepatitis B.
3. Carter J.B. and Saunders V.A. (2007). Virology Principles and Applications. 1ist ed. John Wiley & Sons Ltd.
4. Brooks G.F., Carroll K.C., Butel J.S. and Morse S.A. (2007). Jawetz, Melnick, & Adelberg's Medical Microbiology. 20th ed. McGraw-Hill Companies.
5. Pramoolsinsup C. Management of viral hepatitis. B.J Gastroenterol Hepatol. 2002; 17: 125-145.
6. Liang T.J. Hepatitis B: The Virus and Disease. Hepatology, 2009; 49(5):13–21.
7. Delavari M., Shahabi-Nejad N., Renzaho A.M.N., Zahedi M.J. and Owhadi A.R. Frequency of Anti-HBc & HBV DNA detection in blood donors of Kerman province, Iran . J. Blood Disord. Transfus. 2011; 2:1 .
8. Behzad-Behbahani A, Mafi-Nejad A, Tabei S.Z., Lankarani K.B., Torab A. and Moaddeb A. Anti-HBc & HBV-DNA detection in blood donors negative for hepatitis B virus surface antigen in reducing risk of transfusion associated HBV infection. Indian J. Med. Res. 2006; 123(1): 37-42.
9. Kao J.H., Chen P.J., Lai M. and Chen D.S. Occult hepatitis B virus infection and clinical outcomes of patients with chronic hepatitis. C.J clinical Microbiol, 2002; 40: 4068.
10. Tabor E., Hoofnagle J.H., Barker L.F., Pineda-Tamondong G., Nath N., Smallwood L.A. and Gerety R.J. Antibody to hepatitis B core antigen in blood donors with a history of hepatitis. Transfusion. 1981; 21(3): 366-71.

11. Velati C., Fomiatti L., Baruffi L., Piccinini V., Prati D., Reina A., Lobbiani A., Zanetti A., and Romanò L. Criteria for hepatitis B virus screening and validation of blood components in Italy: the position of the SIMTI HBV working group. Blood Transfus. 2011; 9(4): 455–461.
12. Ata allah M.Tarky A.M., Akram W., Al-Naaimi A.S. and Omer A.R. Epidemiology of viral hepatitis B and C in Iraq: a national survey 2005-2006. Zanco J. Med. Sci., 2013; 17(1): 370-380.
13. Hamadi S.S., Al-Hmudi H.A. and Hameed M.M. Detection of anti-HBc and anti-HBs antibodies in blood donors negative for hepatitis B virus surface antigen. Med. J. Basrah Uni. 2012; 30(1): 26-29.
14. Mahmood A.A, Addose S.A., Salih H.A.LM and Al- Khadi A. seroprevalence of HBs ag and Anti HCV positive blood donors in Najaf governorate. Iraqi J.comm. med. 2001; 14(10): 29 – 33.
15. Al – Juboury A.W.F., Salih H.A.LM., AL- Assadi M.K. and Ali A.M. Seroprevalence of Hepatitis B and C among Blood Donors in Babylon Governorate-Iraq. Medical Journal of Babylon, 2010; 7: 1-2.
16. Kleinman S.H., Kuhns M.C., Todd D.S., Glynn S.A., McNamara A., DiMarco A. and Busch M.P. Frequency of HBV DNA detection in US blood donors testing positive for the presence of anti-HBc: implications for transfusion transmission and donor screening. Transfusion. 2003; 43(6): 696-704.