

THE PREVALENCE OF ANTI-HBC ANTIBODY AMONG HBS AG-NEGATIVE LIBYAN BLOOD DONORS AND ITS ASSOCIATION WITH HBV DNA IN THE SERUM

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ABSTRACT

A hundred blood donors with hepatitis B surface antigen (HBs Ag) negative serology were enrolled in our study. These blood donors were investigated for the presence of antibodies to HBV core antigen (anti-HBc). Positive anti-HBc samples were further screened for anti-HBs antibodies, and for hepatitis B virus (HBV) DNA by real time Polymerase Chain Reaction technique.

Results: The donors found to be Anti-HBc positive were 14 (represent 14% of all donors), among them 11 were positive for both Anti-HBc antibodies and anti-HBs antibodies, while three donors were positive for Anti-HBc antibodies alone. All Anti-HBc positive samples were investigated by Polymerase Chain Reaction technique and found to be negative for HBV-DNA (which it might be attributed to low sensitivity of the used Polymerase Chain Reaction technique). Despite that, it would be much safer to introduce anti-HBc screening for blood donors and discard all blood units which are positive for anti-HBc alone.

Key words: HBV infection; anti-HBc; HBV-DNA; blood donors; Libya.

1. INTRODUCTION

Hepatitis B virus (HBV) is the most common cause of viral hepatitis. HBV infect about 2 billion cases worldwide, among them there are more than 400 million people suffering from chronic infections[1,2]. Furthermore, HBV is still an important cause of death around the world due to liver cirrhosis, and hepatocellular carcinoma[1].

In Libya, despite the introduction of HBV vaccination for all neonates and people at high risk since 1993, the country is considered as a region with a low-intermediate endemicity (2-7% category), with more than 120 thousand chronic HBV carriers [2, 3].

It is well known that, HBV infection is transmitted mainly through sexual contact, blood transfusion, and parenteral routes. [1] Although, viral screening before blood donation in Libya includes HBsAg, Anti-HCV and anti-HIV assays, negative HBsAg does not exclude "occult HBV infection" (OBI) [2], which occurs in some people and characterized by HBsAg-negative in the serum, detectable HBV DNA in the liver, regardless of the presence or absence of HBV DNA in the serum [4].

Positive anti-HBcIgM test indicates acute infection and becomes undetectable within a period of 6 months, whereas the anti-HBcIgG stays detectable lifelong, and indicates previous or current HBV infection. It has been found that positive anti-HBc alone with detectable HBV DNA blood donors may transmit HBV [5]. In HBsAg-negative cases, the positive serum anti-HBc suggests OBI [6].

The aim of this study was to determine the prevalence of anti-HBc positivity and presence of HBV DNA in the sera of anti-HBc positive donations.

2. METHODOLOGY

In this cross-sectional study we studied 100 HBsAg-negative healthy blood donors (all of them were males) in the blood transfusion center of Zliten teaching hospital for anti-HBc positivity and presence of HBV DNA in the

sera of anti-HBc positive donations. Of them 60 were voluntary donors and the remaining 40 were replacement donors.

Any donor looked sick, anemic, his body weight below 50 Kgs or his blood pressure was low; was excluded from the study.

An informed consent was obtained from every participant donor before collecting 5 milliliters of blood under aseptic technique using disposable 5 ml syringe. A sterile test tube was used to separate the serum by centrifugation at 3000 rpm. Then the serum was transferred to vial before preserving at -20°C.

Routine viral screening tests for, HBsAg, anti-HIV, and anti-HCV were done. The negative samples were further tested for anti-HBcIg G. All positive anti-HBc samples were further investigated for anti-HBs. The detection of HbsAb and antiHbcIgG are done by (ELFA), (Biomérieux, Marcy-. l'Etoile, France).

All positive anti-HBc samples were tested for the presence of HBV-DNA by using the real-time PCR (HBV Real- TM QualiQ kit, NLM. Italy) that had a sensitivity of 105 IU/ml).

The SPSS statistical package, version 19 (SPSS, Chicago, IL) is used for statistical analysis and the chi-square test was used for the analysis of categorical variables.

3. RESULTS

All the participant donors were males (100%) with negative HBsAg, negative anti-HCV, and negative anti-HIV results. Their age ranged from 18 to 53 years old (mean age 33.32 ± 8.732).

Out of the 100 HBsAg negative blood donors, 14 (14 %) were found to be anti-HBc positive. Three of whom were "anti-HBc alone" (3%) and 11 were positive for both anti-HBc and anti-HBs antibodies (11%). All the anti-HBc positive samples did not show any detectable HBV- DNA. Among the 5 donors belonging to the age group of older than 49 years, 2 were found to be positive for anti-HBc. However; among the 3 donors in the age group of 14 to 19 years no one showed seropositivity for anti-HBc (0 %).

Out of 60 voluntary donors, 8 were anti-HBc positive (13.3 %) and among 40 replacement donors, there were 6 positive anti-HBc samples (15 %).

The statistical analysis of the prevalence of anti-HBc showed that there were no significant correlation between the prevalence rate of anti-HBc and the age group ($P = 0.363$), and the type of the donors ($P = 0.814$).

4. DISCUSSION

Our study showed that the prevalence of anti-HBc sero-positivity among 100 HBsAg-negative Libyan blood donors was 14 % (14/ 100), which was lower than the findings of studies were conducted in Saudi Arabia, Turkey, and India (20.8%, 21.1%, 30.1 %) respectively [5,7,8]. In Libya, a pilot study was conducted in Tripoli reported that, the prevalence of anti-HBc sero-positivity was 15.6% , which is roughly similar to our findings[9]. The

Prevalence of anti-HBc in blood donors in Zliten Teaching Hospital and in Tripoli were nearly identical to that of Indian study, which was 15.9% [8]. On the other hand; our finding was higher than those found in studies were conducted in India, Egypt, Lebanon, and Syria (10.9%, 10.3%, 11%, 10.32%) respectively [8,9,10,11].

Another study was conducted in Tripoli (Libya) found that, the prevalence of anti-HBcsero-positivity was 10%. This variation could be related to the differences in sample size and /or to the prevalence of HBV infection in these different countries [12]. However, the prevalence of an anti-HBc in UK and Germany, were quite low (0.07% and 1.5%) respectively [8].

In our study, out of 14 positive anti-HBC samples, only 3 were positive for anti-HBc alone, while HBV-DNA were not detectable in all the 14 positive anti-HBC donors, taking in consideration, the low sensitivity of the used real-time PCR in this study . This finding was different compared to other studies, which were conducted in Tripoli (Libya), and detected HBV-DNA in 3% of donors in one and 10.5% in another study [12].In neighbor countries, the prevalence were 6.25% and 11.54% in different studies in Egypt[12,13,14], while in Italy was 4.86% [15].The absence of detectable HBV-DNA in the serum does not exclude OBI , particularly in the blood donors with positive anti-HBcIg, specially during the window period, in which the anti-HBcIgM is the only available diagnostic serological marker [12].

5. CONCLUSION

In conclusion, despite the fact that introduction of anti-HBc antibodies screening before blood transfusion will result in elimination of a considerable amount of donated blood, It would be valuable in making blood transfusion for our patients much safer. Hence, we recommend adopting anti-HBc testing and discarding all positive anti-HBc alone blood units. Further studies to evaluate the prevalence of occult hepatitis B infection among Libyan blood donors, using a more sensitive PCR, is highly recommended.

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