Original article

Frequency of Hepatitis B Virus carrier by Detecting AntiHBc Antibody among HBsAg Negative Blood Donors

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Abstract:

Background & Objective: Transfusion associated hepatitis B virus (TAHBV) infection continues to be a major problem despite mandatory screening for hepatitis B surface antigen (HBsAg). This is because HBsAg is not detected during the window period of the infection. This study was designed to assess the frequency of anti HBc antibody among HBsAg negative donor and also to determine the demographic profile of healthy blood donors.

Material & Method: This cross sectional observational study was carried out in the Department of Transfusion Medicine, BSMMU, Dhaka during the period of May 2014 to April 2015. A total number of 100 consecutive healthy blood donors who were clinically and physically healthy and serologically found to be free from HBsAg, HCV and HIV by rapid chromographic test were included in this study. Results: Within the 100 patients among them h/o jaundice was found in 17(17.0%). There all (100.0%) subjects had negative HBsAg and 14(14.0%) subjects had positive anti HBc-Ab. Anti HBc-Ab was statistically significant (p<0.001) in Z-test. Conclusion: This study was undertaken to assess the prevalence of anti HBc antibody among healthy blood donors with HBsAg negative in rapid chromatography method. The prevalence of anti HBc antibody was about 14(14.0%) among 100 HBsAg negative blood donors. H/O blood donation was found in almost two third 65(65.0%). So, anti HBc antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.

Key Words: HBsAg; HBV; ELISA; Anti HBc.

Introduction:

Hepatitis B virus (HBV) infection is a serious global health problem affecting two billion people worldwide, and 350 million people suffer from chronic HBV infection1. Despite mandatory screening for HBsAg by ELISA for over 20 years, transfusion-associated HBV (TAHBV) continues to be a major problem worldwide, more in patients receiving repeated transfusions3-5. It has been demonstrated that some HBsAg-negative individuals and those reactive for anti-HBc continue to replicate HBV1. Thus the absence of HBsAg in the blood of apparently healthy individuals may not be sufficient to ensure lack of circulating HBV. Blood containing anti-HBc with or without detectable presence of HBsAg might be infectious; therefore, routine blood donor screening for anti-HBc has been implemented in some countries resulting in a decrease in the risk of post-transfusion HBV infection8-10.

Generally, HBV Infection is diagnosed by the detection of HBsAg in the serum or plasma of

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an individual. Detection of HBsAg in blood is a diagnostic marker for infection with HBV and in the blood banks screening for HBsAg is carried out routinely to detect HBV infection. Occult HBV infection is defined as the presence of HBV DNA in blood or liver tissues in patients negative for HBsAg but who may or may not be positive for HBV antibodies. It is possible that, donors with occult HBV infection, who lack detectable HBsAg might have exposure to HBV infection indicated by positive for antibodies against HBV core antigen and HBV DNA, are a potential source of HBV infection. This study is intended to be conducted among healthy donor to determine the presence of anti HBc antibody (total) that are screened and found to be HBsAg negative and thus allowed to donate blood in Bangladesh.

Methods:
This study was carried out from May 2014 to April 2015 on the blood donor who was clinically and physically healthy and serologically found to be free of HBsAg, HCV and HIV by rapid chromatographic test. The donors with positive HBsAg and who will not give consent are excluded from the study. The preliminary screening panel for each patient was included the complete history, physical examination and the necessary laboratory tests. Therefore during this study period 100 samples were enrolled according to inclusion and exclusion criteria.

This assay was based on competitive ELISA. All data were compiled and edited meticulously by thorough checking and rechecking. All omission and inconsistencies were corrected and were removed methodically. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 16.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as mean, standard deviation, and categorical variables as frequencies and percentages. Z-test was used for proportion test. P-value was considered to be statistically non significant if >0.05 and statistically significant if \( \leq 0.05 \).

Results:
This cross sectional observational study was carried out with an aim to assess the frequency of anti Hbc antibody among HBsAg negative donor. A total of 100 healthy blood donors who were clinically and physically healthy and serologically found to be free of HBsAg study was done in Transfusion Medicine Department of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during May 2014 to April 2015, were included in this study. A total of 100 blood donors screened during the study there majority (94.0%) subjects were male and 6(6.0%) subjects were female. Male female ratio was 15.7:1. and among them majority subject (60%) belonged to 21-30 years(Fig.-1) The mean age was found 27.8±6.4 years with range from 18 to 45 years.

**Figure I: Bar diagram shows age distribution of the study subjects**

Among the donors H/O jaundice was found in 17(17.0%) cases. H/O jaundice was found in 17(17.0%) cases among them 10(58.8%) subjects had jaundice duration of 6-10 years age. H/O blood donation was found in 65(65.0%) cases among them 47(72.3%) subjects had blood donation duration of 1-5 times. (Table-I)

**Table I: Distribution of the study subjects according to clinical findings (n=100)**

<table>
<thead>
<tr>
<th>Clinical findings</th>
<th>Number of subjects</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H/O Jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>Duration of Jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childhood</td>
<td>3</td>
<td>17.7</td>
</tr>
<tr>
<td>6-10 years ago</td>
<td>10</td>
<td>58.8</td>
</tr>
<tr>
<td>11-15 years ago</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>H/O blood donation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Duration of H/O blood donation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 times</td>
<td>47</td>
<td>72.3</td>
</tr>
<tr>
<td>6-10 times</td>
<td>18</td>
<td>27.7</td>
</tr>
</tbody>
</table>

Anti HBc Ab total was found in 14% which
indicated the persistence of carrier state or the recent past infection with convalescence and which was statistically significant (p < 0.001). (Table- II)

**Table II: Distribution of the study subjects by anti HBc-Ab (n=100)**

<table>
<thead>
<tr>
<th>Anti HBc-Ab</th>
<th>Number of subjects</th>
<th>Percentage</th>
<th>Z value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>14</td>
<td>14.0</td>
<td>4.03</td>
<td>&lt;0.001&lt;sup&gt;s&lt;/sup&gt;</td>
</tr>
<tr>
<td>Negative</td>
<td>86</td>
<td>86.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

s = significant
P value reached from Z-test

**Discussion:**
Hepatitis B virus is considered as one of the most common viruses spreading through blood transfusion and organ transplants. This usually results in more considerable cases of disease and mortalities; so it is necessary to perform tests for viral infection in all blood donors. Transfusion associated Hepatitis B virus (TAHBV) continues to be a major problem despite mandatory screening for Hepatitis B surface Antigen (HBsAg). Presence of HBsAg is the common method for detecting hepatitis B infection. Unfortunately, this marker is not detected during the window period of the infection<sup>6,7</sup>. During this window period, detection of the anti HBc serves as a useful serological marker for HBV infection. To address this issue a total of 100 healthy blood donors were included in this study. It was observed that 60(60.0%) of the subjects were age belonged to 21-30 years. The mean age was found 27.8 ± 6.4 years with range from 18 to 45 years. In another study<sup>4</sup> found the median age of blood donors was 32 years varied from 18 to 50 years<sup>7</sup>. In another study found the median age of blood donors was 32 years varied from 16 to 59 years<sup>3</sup>, which is comparable with the current study. On the other hand higher mean age (38 ± 11 years) among 1000 donors<sup>11-13</sup>, which may be due to geographical variations, racial and ethnic differences and different lifestyle of their study population.

It was found that H/O jaundice was found in 17(17.0%) cases among them 4(23.5%) cases had anti HBc-Ab positive. Out of these 17 donors 10(58.8%) subjects had jaundice 6-10 years of ago. H/O blood donation was found in 65(65.0%) cases among them 47(72.3%) had donated blood 1-5 times. Our study showed that 14(14.0%) subjects had positive anti HBc-Ab. The difference was statistically significant (p < 0.001) in Z-test. Out of the 1027 HBsAg negative blood samples screened<sup>4</sup>, 18.3% were found to be anti-HBc positive. Another study showed the prevalence of HBsAg, anti-HBc total (IgG and IgM)<sup>15</sup>, anti- HBs were investigated and was found to be 3.5,10.9, 5.7 and 3% respectively among blood donors. So, anti HBc antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.

**Conclusion:**
This study was undertaken to assess the prevalence of anti HBc antibody among healthy blood donors with HBsAg negative in rapid chromatography method. The prevalence of anti HBc antibody was about 14(14.0%) among 100 HBsAg negative blood donors. Most of the subjects were in 21-30 years age group and male predominant 96(96.0%). H/O blood donation was found in almost two third 65(65.0%). So, anti HBc antibody screening is a useful tool for estimating the risk of transfusion transmitted HBV infection.
References: