Introduction

Despite effective vaccination, hepatitis B is an important worldwide public health issue. Serological screening tests, high precision selection of blood donors and an effective vaccination against hepatitis B infection have clearly decreased the risk of HBV transmission through transfusion of infected blood, there is still a possibility that infected blood units from occult carriers being released into the blood supply.

The aim of this study was to determine the prevalence of anti-HBc among Iranian blood donors and evaluate the presence of HBV DNA in HBsAg negative plasma samples.

Methods: In the present study, 5000 HBsAg negative samples were collected from donors in blood transfusion centers in Tehran. All HBsAg negative samples were tested for the presence of anti-Hbc antibody and anti-HBs antibody (HBsAb) using ELISA method. Also, all HBsAg negative samples were tested for the presence of HBV DNA by real-time PCR.

Results: Four hundred ninety nine (9.98%) out of the 5000 HBsAg negative blood donors were anti-Hbc positive. Out of 499 anti-Hbc positive samples that were tested for anti-HBs, 394 (78.4 %) were anti-HBs positive, and 275 (62.7%) had an antibody titer greater than 100 IU/mL. HBV DNA was detected in two samples.

Conclusion: In countries with intermediate rate of HBV infection like Iran, the prevalence of anti-Hbc antibody in HBsAg negative blood donors is found to be high. As a result, routine anti-Hbc screening of HBsAg-negative blood donors without complementary tests (anti-Hbs / HBV-DNA) can limit the number of blood transfusions. Therefore, it might be better to include the detection of HBV DNA along with the routine tests.

Keywords: Anti-Hbc, blood donor, HBsAg negative, HBV-DNA, Hepatitis B Virus

Original Article

Occult Hepatitis B Virus Infection among Iranian Blood Donors: A Preliminary Study

Zahra Alizadeh MSc1,2, Saeideh Milani MSc1, Zohreh Sharifi PhD1

Abstract

Background: Although serological screening tests for blood-borne hepatitis viruses have effectively reduced the risk of HBV transmission through transfusion of infected blood, there is still a possibility that infected blood units from occult carriers being released into the blood supply.

The aim of this study was to determine the prevalence of anti-HBc among Iranian blood donors and evaluate the presence of HBV DNA in HBsAg negative plasma samples.

Methods: In the present study, 5000 HBsAg negative samples were collected from donors in blood transfusion centers in Tehran. All HBsAg negative samples were tested for the presence of anti-Hbc antibody and anti-HBs antibody (HBsAb) using ELISA method. Also, all HBsAg negative samples were tested for the presence of HBV DNA by real-time PCR.

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Conclusion: In countries with intermediate rate of HBV infection like Iran, the prevalence of anti-Hbc antibody in HBsAg negative blood donors is found to be high. As a result, routine anti-Hbc screening of HBsAg-negative blood donors without complementary tests (anti-Hbs / HBV-DNA) can limit the number of blood transfusions. Therefore, it might be better to include the detection of HBV DNA along with the routine tests.

Keywords: Anti-Hbc, blood donor, HBsAg negative, HBV-DNA, Hepatitis B Virus

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In this study, we determined additional anti-Hbc or HBV NAT tests which should be used to decrease the residual risk of HBV infection thorough blood transfusion.

Material and Methods

Study design

This cross-sectional study was carried out among blood donors from May 2008 to March 2009 in Tehran province. Also a questionnaire was completed by blood donors (asking for their age, sex, the number of blood donations, and prior history of hepatitis B vaccination).

A total of 5000 blood donors who were negative for hepatitis B surface antigen (HBsAg), hepatitis C virus antibody (HCV Ab) and human immunodeficiency virus antigen-antibody (HIV Ag-Ab) were selected.

ELISA tests

Serum samples were tested by ELISA method using monoclonal antibody against IgM-IgG-HBc Ab (DADE Behring, Germany) and antibody against hepatitis B surface antigen (HBsAb) (DADE Behring, Germany) according to the manufacturer’s instructions.

Real-Time PCR

All Serum samples were examined by Real time PCR and their viral load was measured. HBV-DNA was extracted using a QIAamp Viral DNA Mini kit (QIAGEN) according to the manufacturer’s instructions. For the detection of HBV-DNA, Real-
another sensitive HBV NAT method was used. These individuals ¿UPWKHSUHVHQFHRI WDLQHGIURP¿UVWWLPH HBV infection or low-level chronic infection. Two samples ob-

otions

distributions obtained from Occult hepatitis B infection (OBI) donors depends on the presence of anti-HBs and viral load. Considering the high prevalence of anti-HBc (9.98%) in our study, performing anti-HBc tests without additional tests (anti-HBs / HBV-DNA) in HBsAg-negative blood donors can make about 10% of donated blood unusable. Under such condition, in our country with high anti-HBc prevalence, screening of blood donors with HBV-NAT would be more effective than anti-HBc screening. In conclusion, decrease in the prevalence of anti-HBc due to hepatitis B vaccina-

Discussion

The residual risk of HBV infection in endemic regions is mainly associated with chronic HBV carrier blood donors with occult hepatitis and undetectable HBsAg level. In a study, the prevalence of anti- HBc in the general population in Tehran was 14.2%. In our study, 499 (9.98%) blood donors were positive for anti-HBc. Among them 394 (78.4%) were positive for anti-HBs antibody. Assessing the risk of HBV transmission from anti-HBc positive donors depends on detection of HBV DNA and presence or absence of anti-HBs antibody. The presence of high titer HBV virions in peripheral blood makes it possible for anti-HBs antibodies to neutralize the infectivity of the viruses.

In this study 105 samples (21%) of isolated anti-HBc antibody in HBsAg-negative blood donors could be a marker of resolved HBV infection or low-level chronic infection. Two samples obtained from first-time blood donors were PCR positive. To con-

Table1. Demographic, serological and molecular markers of the blood donors.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>Gender No (%)</th>
<th>Male</th>
<th>4655 (93.1%)</th>
<th>Female</th>
<th>345 (6.9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of donations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>First- time</td>
<td></td>
<td></td>
<td>835</td>
<td>(16.7%)</td>
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<tr>
<td>Periodic</td>
<td></td>
<td></td>
<td>4170</td>
<td>(83.4%)</td>
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<tr>
<td>Serological markers</td>
<td></td>
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<tr>
<td>Anti-HBc-Positive</td>
<td></td>
<td></td>
<td>499</td>
<td>(9.98%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First- time donors</td>
<td></td>
<td></td>
<td>65</td>
<td>(13%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodic donors</td>
<td></td>
<td></td>
<td>434</td>
<td>(87%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-HBs-Positive</td>
<td></td>
<td></td>
<td>394</td>
<td>(78.4%)</td>
<td></td>
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<tr>
<td>HBV-DNA-positive</td>
<td></td>
<td></td>
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<tr>
<td>First- time</td>
<td></td>
<td></td>
<td>2</td>
<td>(0.04%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Periodic</td>
<td></td>
<td></td>
<td>0</td>
<td>(0.0%)</td>
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</tr>
</tbody>
</table>

was periodic blood donors with HBsAg and anti-HBs and finally none of them had prior history of hepatitis B vaccina-

were first-time blood donors, negative for HBsAg and anti-HBs and finally none of them had prior history of hepatitis B vaccina-

thus, increasing the number of blood donors and the reten-

The risk of transfusion-transmitted HBV infection from blood products obtained from Occult hepatitis B infection (OBI) donors depends on the presence of anti-HBs and viral load. Considering the high prevalence of anti-HBc (9.98%) in our study, performing anti-HBc tests without additional tests (anti-HBs / HBV-DNA) in HBsAg-negative blood donors can make about 10% of donated blood unusable. Under such condition, in our country with high anti-HBc prevalence, screening of blood donors with HBV-NAT would be more effective than anti-HBc screening. In conclusion, decrease in the prevalence of anti-HBc due to hepatitis B vaccina-

References

3. Luisa Romanò, Claudio Velati, Giuseppe Cambiè, Laura Fomiatti, Claudio Galli, Alessandro Remo Zanetti. Hepatitis B virus infection among first-time blood donors in Italy: prevalence and correlates be-
