The Prevalence of Hepatitis C and Human Immunodeficiency Virus Antibodies in Thalassemic Patients in Shiraz

M.R. Kadivar, M.D., A. R. Mirahmadizadeh, M.D., MPH., A. Karimi, M.D., A. Hemmati, M.D., MPH.

Abstract

Background: Thalassemic patients are one of the high-risk groups of hepatitis C virus (HCV) and human Immunodeficiency virus (HIV) infection. The study of HCV and HIV seroprevalence and some qualitative risk factors in this target group can be valuable for prevention of the infection.

Method & material: This study was undertaken in the year 1999 to determine the prevalence of HCV and HIV infection among thalassemic patients in Shiraz, Southern Iran. A total of 147 patients (55.1% males, and 44.9% females with mean age of 13.62±4.82 year) who received multiple blood transfusions were screened for HCV and HIV by ELISA-II method in Dastgeibeh Hospital in Shiraz, Southern Iran.

Result: Forty of 147 subjects (27.2%) were positive for antibody to hepatitis C virus (anti-HCV). No antibody to HIV virus was detected in any of the subjects. Jaundice was observed in 13.6% of HCV seropositive patients. The duration and interval of blood transfusion did not reach the level of statistical significance when HCV seropositive subjects were compared with seronegative ones. Serum protein, albumin, SGOT and SGPT were significantly higher in HCV positive patients but this difference was not significant for alkaline phosphates and bilirubin.

Conclusion: Routine screening of blood donors will markedly decreases the incidence of transfusion infections due to HCV and HIV among recipients.

Key words: Thalassemia, HCV, HIV

Introduction

Patients with thalassemia major require repeated blood transfusion, exposing them to the risk of transfusion transmitted diseases. This risk is related to the probability of being exposed to the infected units of blood. This probability again depends on the prevalence of carriers among the blood donors in the population and the number of units transfused. Chronic liver disease occurs frequently in polytransfused patients with betathalassemia. In the past, an important role in determining post-transfusion hepatitis was played by hepatitis B virus, but blood donor screening for HBV markers, widely performed today, and HBV vaccination programmes have strongly reduced the risk of HBV-dependent liver infection. Thus non-A non-B hepatitis remains the most common post-transfusion liver disease.

The transmission of disease like HIV and CMV, also poses a serious threat to repeatedly transfused patients. Since the discovery of hepatitis C virus in 1989, and the subsequent development of serological tests for the detection of antibodies directed against this virus, it has been recognized that large proportions of populations in all parts of the world are infected by the hepatitis C virus. Hepatitis C virus infection is perhaps more notorious than hepatitis B virus because of the greater risk of chronicity (50-80%) and its sequelae.

The predominant risk factors for HCV infection are intravenous drug use, tattooing and exposure to blood products, occupational risk and ethnicity.

In contrast to hepatitis B, sexual spread and vertical transmission of HCV from the mother to the neonate are relatively uncommon. The risk of acquiring HCV from a single HCV-contaminated needle stick accident is reported to be about 5%. The percentage of those with chronic HCV progressing to cirrhosis is estimated to be 20%. Hepatocellular carcinoma may result as late consequence of the chronic HCV infection.

HCV may exist in blood in two forms: as a free virus or as virus in the form of immune complexes. The prevalence of anti-HCV in many populations at risk is very high. Beta thalassemic patients who are routinely treated with blood transfusion are a population at risk for HCV and HIV infection and the risk for developing an acute or chronic hepatitis is very high.
In view of this fact, the present study was planned to understand the status of transfusion-transmitted diseases of HCV and HIV infection in thalassemic patients.

**Materials and Methods**

Between March to June 1999, the prevalence of markers for HCV and HIV was evaluated in a population of 147 thalassemic patients who received periodic blood transfusion in Shiraz, Iran. Ethical approval for the study was obtained from the ethics committee at Shiraz University of Medical Sciences.

For each subject about 3 ml serum was collected from the blood samples taken before the transfusion and samples were preserved at -40°C for HCV and HIV testing. Screening for HCV antibody was performed using an ELISA standard.

HIV antibody testing including ELISA was also performed, but positive samples were confirmed by the western blot procedure. Data regarding demographic characteristics were obtained. All patients were investigated for liver function tests. Statistical analyses were performed using the chi-square and ANOVA to compare differences between populations.

**Results**

The sample composed of 55.1% males and 44.9% females. The average age of patients was 13.6±4.8 years (range of 4-30 yr). Subjects had been receiving transfusion regularly (21.7±9.8 days) in the thalassemia clinic of Dastgheyb Hospital. The average duration of transfusion therapy among subjects was 12±4.5 years.

Forty of 147 (27.2%) thalassemic patients (22 males, 18 females) were positive for anti-HCV (Table 1).

**Table 1: Frequency of HCV+ and HCV- cases in thalassemic patients in relation to sex in Shiraz-Iran, 1999**

<table>
<thead>
<tr>
<th>Sex</th>
<th>HCV Positive</th>
<th>HCV Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>22</td>
<td>59</td>
<td>81</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>48</td>
<td>66</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>107</td>
<td>147</td>
</tr>
</tbody>
</table>

There was no significant difference between the mean age in seropositive cases (11.4±4.6 years) and seronegative ones (13.5±4.4 years).

The seropositive patients had higher mean serum protein, SGOT, SGPT, albumin, alkaline phosphatase, direct and total bilirubin than seronegatives (Table 2). The differences between values were statistically significant except for alkaline phosphatase, direct and total bilirubin.

**Table 2: LFT results in thalassemia HCV+ and HCV- patients in Shiraz-Iran, 1999**

<table>
<thead>
<tr>
<th>Test type</th>
<th>HCV Positive</th>
<th>HCV Negative</th>
<th>Total</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>9.4±1.07</td>
<td>8.1±0.68</td>
<td>8.71±1.1</td>
<td>P&lt;0.0005</td>
</tr>
<tr>
<td>Albunmin</td>
<td>3.07±0.48</td>
<td>2.87±0.36</td>
<td>2.97±0.43</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Alkal. Phosphatase</td>
<td>4.29±0.38</td>
<td>3.63±0.25</td>
<td>3.95±0.35</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>SGOT</td>
<td>42.6±24.14</td>
<td>37.6±24.35</td>
<td>39.8±24.5</td>
<td>P&lt;0.005</td>
</tr>
<tr>
<td>SGPT</td>
<td>36.6±20.5</td>
<td>31.6±20.6</td>
<td>32.9±20.8</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Direct Bilirubin</td>
<td>1.16±0.65</td>
<td>1.45±0.78</td>
<td>1.31±0.73</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Total Bilirubin</td>
<td>0.68±0.64</td>
<td>0.81±0.55</td>
<td>0.74±0.48</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

Thalassemic patients who were positive for anti-HCV had a history of jaundice; however, the relation between those findings and anti-HCV was not statistically significant (Table 3).

The duration of blood transfusion was lower in seropositive patients (20±6.9 days) than seronegative ones (22.2±10.7 days), which was not statistically significant. Anti-HIV antibody was not detected in any of the samples.

**Table 3: Frequency of jaundice in thalassemia HCV+ and HCV- patients in Shiraz-Iran 1999**

<table>
<thead>
<tr>
<th>Jaundice</th>
<th>HCV</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Negative</td>
<td>35</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>107</td>
</tr>
</tbody>
</table>

**Discussion**

Thalassemic patients are conventionally treated by regular transfusion of 1 to 3 units of blood every 2 to 4 week. Monitoring the two transfusion-transmitted infections of HCV and HIV in these patients is thus important.

To the best of our knowledge, no study has been carried out to date to evaluate HCV and HIV infection in thalassemics in Shiraz. Although we have not introduced a control group matched for age and sex, the presence of HCV antibody in 27.2% of thalassemics in this region indicates the comparatively high transmission rate of HCV infection, which also has an undetermined direct cost to the health care system.

In some studies, a prevalence of 5.3% has been reported in thalassemics. The prevalence in this study is in the range of that reported in several other studies but is lower than those reported by others.

No differences existed between anti-HCV seropositive and anti-HCV seronegative regarding the age, sex, duration and interval of blood transfusions and presence of jaundice.

A significant correlation was found between biochemical evidence of liver dysfunction, chronic liver inflammation and anti-HCV positivity.


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There was no significant difference between the two groups regarding serum alkaline phosphatase and bilirubin too. But anti-HCV seropositive had a significantly higher SGOT, SGPT, protein and albumin level than seronegative.

It is important to remember, however, that anti-HCV screening does not diagnose all cases of hepatitis caused by the hepatitis C virus. It is possible, therefore, that in the group of anti-HCV negative subjects, some patients have had HCV-dependent chronic hepatitis. 23 Conversely, unresolved acute HCV hepatitis may go through chronic evolution because of infection due to a different blood-borne viruses.

This study confirms that blood transfusions are still the major cause of hepatitis-C infection, so undoubtedly, we need new diagnostic assays, which are more specific and sensitive for screening of blood products. Further studies are also needed to assess the need for and response to the interferon therapy in these patients.

References
