Prevalence of anti-hepatitis C virus antibodies among blood donors and risky groups in Diyala

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Summary:
Objective: To determine the prevalence of hepatitis C virus (HCV) infection among blood donors and risky population in Diyala province.

Materials and methods: In this retrospective study, the records of HCV screening and confirmatory tests were reviewed for the period 1996-2001. Third generation Enzyme-linked immunosorbent assay (ELISA) and Enzyme immunoassay were used as screening and confirmatory tests respectively.

Results: The prevalence of HCV infection among blood donors was 0.15%, with the highest in 1997. The highest prevalence rates were found among multiple blood recipient; hemophilia, thalassemia and hemodialysis patients (27.3%, 16.9% & 14.3%) respectively. Whereas, the patients with chronic hepatitis B infection and those with acute icteric hepatitis showed slightly elevated prevalence (2.9% & 2.1%) respectively. The overall prevalence in the province was 9.9/105 population. The mean age of infected patients was 29.7 years and the male: female ratio was 3:1.

Conclusion: The prevalence of HCV infection in Diyala population is relatively low. However, the HCV infection is concentrated in certain risky groups, particularly multiple blood recipients.

Key words: Hepatitis C virus infection, Blood donors, Hemophilia.

Introduction:
Infection with hepatitis C virus is a significant public health problem that has important clinical consequences. It has been estimated that 3% of the world population have been infected with HCV, with more than 170 million chronic carriers at risk of developing liver cirrhosis and/or liver cancer. HCV infection accounts for the majority of posttransfusion hepatitis (PTH) worldwide. Globally, 0.5%-1.5% of the blood donors are anti-HCV antibodies positive with great geographical variation. In health care settings, needlestick accident from HCV viremic patient may lead to HCV transmission in 3%-10% of cases. Furthermore, multiple blood recipients, such as thalassemia, hemophilia, hemodialysis patients and those undergoing organ transplantation are at high risk for HCV infection. In Iraq, the prevalence of anti-HCV among the general population was 0.5%-0.9%, and among blood donors was 0.7%-0.7%.

Materials and methods: The records of virology unit in the public health laboratory in Baquba (the center of Diyala province) were reviewed for the period 1996 to 2001. The number of anti-HCV positive cases among blood donors and risky groups were recorded. Additionally, information including age, sex, occupation and the time of diagnosis were also recorded. All data were statistically analyzed. Third generation Enzyme-linked immunosorbent assay (ELISA) was used for detection of specific anti-HCV antibodies. The assay procedure was followed according to manufacturer's instructions. Repeatedly positive sera were confirmed by immunoblot assay, in the reference laboratory for viral hepatitis at the center of disease control in Baghdad.

Results: Throughout the period of the study, a total of 47169 subjects were screened and 145 were anti-HCV positive. 109 (75.1%) of them were males and 36 (24.9%) were females. The overall M:F ratio was 3:1. The distribution of anti-HCV positive cases by years was shown in table (1).

Table (1): Distribution of HCV positive cases by year.

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The infection rate ranges between 0.1% - 0.5%, while the mean infection rate was 0.3%. The overall prevalence rate of anti-HCV in the province was 9.9/10^5 population (the total population is 1,181,746). The results also revealed that there was no marked monthly variation in the distribution of Anti-HCV positive cases throughout the study period. The mean infection rate among the blood donors was 0.15%, with slightly variation among the years of the study, Table (2).

Table (2): Distribution of HCV positive blood donors by year

<table>
<thead>
<tr>
<th>Years</th>
<th>No. tested</th>
<th>No. positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>7707</td>
<td>17</td>
<td>0.21</td>
</tr>
<tr>
<td>1997</td>
<td>3621</td>
<td>18</td>
<td>0.49</td>
</tr>
<tr>
<td>1998</td>
<td>4825</td>
<td>4</td>
<td>0.08</td>
</tr>
<tr>
<td>1999</td>
<td>8500</td>
<td>7</td>
<td>0.08</td>
</tr>
<tr>
<td>2000</td>
<td>9148</td>
<td>3</td>
<td>0.03</td>
</tr>
<tr>
<td>2001</td>
<td>8189</td>
<td>13</td>
<td>0.15</td>
</tr>
<tr>
<td>Total</td>
<td>42140</td>
<td>62</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Table (3), revealed the infection rates among all study groups, the highest infection rate was found among multiple blood recipient groups; hemophilias (27.3%), thalassemics (16.6%) and hemodialysis patients (14.3%). Elevated infection rate was also found among patients with chronic hepatitis B infection and those with acute icterus (2.9% & 2.1%) respectively. Health care workers (HCWs) and household contacts are another risky groups that showed slightly higher rates of infection (0.8% & 1.2%) respectively.

Table (3): number and percentage of HCV positive among study groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. tested</th>
<th>No. positive</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood donors</td>
<td>42140</td>
<td>62</td>
<td>0.15</td>
</tr>
<tr>
<td>Acute icterus</td>
<td>1656</td>
<td>35</td>
<td>2.1</td>
</tr>
<tr>
<td>HCWs</td>
<td>649</td>
<td>5</td>
<td>0.8</td>
</tr>
<tr>
<td>Midwives</td>
<td>384</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Prisoners</td>
<td>625</td>
<td>4</td>
<td>0.64</td>
</tr>
<tr>
<td>Thalassemia</td>
<td>136</td>
<td>23</td>
<td>16.9</td>
</tr>
<tr>
<td>Hemophilia</td>
<td>11</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>Contacts</td>
<td>486</td>
<td>6</td>
<td>1.23</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>35</td>
<td>5</td>
<td>14.3</td>
</tr>
<tr>
<td>CHB cases</td>
<td>34</td>
<td>1</td>
<td>2.94</td>
</tr>
<tr>
<td>Gypsies</td>
<td>13</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>46169</td>
<td>145</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Discussion:
Hepatitis C is a bloodborne viral infection that being considered as the major causative agent of PTH throughout the world 1, 17. Infection by HCV can cause self-limiting mild viremia, but more frequently chronic liver disease with possible progression to cirrhosis and hepatocellular carcinoma 4,18. HCV infection is diagnosed primarily by the detection of anti-HCV antibodies in the serum. In Iraq, screening of blood donors and risky groups for anti-HCV antibodies was started since 1995, using ELISA techniques with the confirmation by immunoblot assay.In the present study, the overall infection rate in the blood donors was 0.15%. This slightly lower infection rate compared to other local studies may be attributed, at least in part, to the strict selection of volunteers before blood donation 14, 15, 19. Furthermore, the results also showed that the infection rate by years among blood donors were in a decreasing pattern throughout the study period affirming the effectiveness of he control measures adopted in this respect. Regarding the risk groups, the highest infection rate was found among hemophilias (27.3%). Although the total number of hemophilia patients in Diyala province is too small to be accepted statistically, however, hemophilia is a well-recognized risk for acquisition of HCV infection 13, 20. Similarly, thalassemics and hemodialysis patients showed higher infection rates (16.9% & 14.3%) respectively. These multiple blood recipient groups were most probably acquired HCV infection through transfused blood as several previous studies from different localities had reported that multiple blood recipients were highly vulnerable for HCV infection 11, 16, 21. The implementation of HCV screening in blood banks, although has greatly reduced the rate of PTH 57,22, however, the relatively long period between HCV infection and the development of detectable circulating antibodies (mean 12 weeks), may limits the sensitivity of the screening assays, particularly among those at low risk of HCV infection such as blood donors 8, 23, 24. The results in the current study also revealed a relatively higher infection rate among HCWs and private midwives (0.8% & 0.3%) respectively. Again these results were consistent with the previous studies reported a high prevalence of HCV infection among HCWs 9, 14. The transmission of HCV infection in the health care settings from patients to health care providers following needlestick and exposure to other body fluids has been documented 17,25. Likewise, transmission to HCV negative patients following exposure to an HCV infected HCW or patient has also been reported 10, 26. Previous studies on the transmission of HCV to household contacts with
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Jabbar IS. Prevalence of hepatitis C antibodies in hemodialysis patients. M.Sc. thesis. College of Medicine, University of Baghdad.


References:


