Original Article

Seroprevalence of hepatitis C virus among the blood donors in a tertiary care hospital

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Abstract:
Background: Transfusion of blood and blood products although considered as a life saving treatment modality, but may lead to certain infectious and non-infectious complications in the recipients. Objectives: The purpose of this analysis was to monitor the seroprevalence of anti-HCV antibody in the blood donor population in a hospital based blood bank in Hyderabad. Methods: Relevant information of all the blood donors who donated whole blood at the department of Transfusion Medicine, of tertiary care hospital in Hyderabad from the January 1, 2011 to December 31, 2013 was retrieved from the departmental records. The number of donors who were found reactive for anti-HCV antibodies was calculated. Results: Of the total 21,451 blood donors, 20801 were males and 650 were females. The percentage of whole blood donors found seroreactive for anti-HCV antibodies was 0.28 percent. The seroprevalence of anti-HCV in male blood donors was 0.28 per cent and the seroprevalence in female blood donors was 0 percent. Maximum seroprevalence of anti-HCV was observed in the age group of 18 to 30 yr (0.41%) and the minimum in the age group of 51 to 60 yr (0.26%). Conclusion: HCV seroprevalence in our study was 0.28 per cent and a decreasing trend with age was observed. Since, no vaccine is presently available for immunization against HCV infection, transfusion transmitted HCV infection remains a potential threat to the safety of the blood supply. Key words: Anti-HCV, blood donors, tertiary care hospital

INTRODUCTION:
Transfusion of blood and blood products is a life saving treatment modality. However, blood transfusion may lead to certain infectious and non-infectious complications in the recipients. The common transfusion transmissible infections (TTIs) include human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), malaria and syphilis; although many other infectious agents like human T-cell lymphotropic viruses (HTLVs), West Nile virus (WNV), cytomegalovirus (CMV), parvovirus B19 and prions are known to be transmissible through blood transfusion. Hepatitis C virus (HCV) was discovered in 1989 and belongs to the Flaviviridae family. It has been shown to be the cause of up to 90 per cent of cases, previously known as Non-A Non-B (NANB) Transfusion-Related Hepatitis. The transmission of HCV occurs primarily through exposure to infected blood which may be due to blood transfusion, organ transplantation, intravenous drug use, body piercings, tattooing, hemodialysis and occupational exposure. Other modes of transmission include perinatal spread and high risk sexual behavior. HCV is known for its chronicity and leads to cirrhosis in about 10 to 20 per cent of patients and may further progress to hepatocellular carcinoma (HCC). the global seroprevalence of HCV among blood donors varies from 0.4 to 19.2 percent and the estimated risk for HCV transmission is between 0.10 and 2.33 per million units transfused. In India, the Drug and Cosmetics (1st amendment) Rules 1992 (3) Act, mandates the testing of each unit of donated blood for the presence of markers of HIV, HBV, malaria and syphilis. Subsequently, testing for markers of HCV was made mandatory in June, 2001. Tests used for the detection of HCV infection include the HCV antibody enzyme linked immunosorbent assay (ELISA), recombinant immunoblot assay (RIBA), and HCV RNA polymerase chain reaction (PCR). ELISA is the most commonly used in is the assay for detecting HCV antibodies. The purpose of this analysis was to monitor the seroprevalence of anti-HCV antibodies in the blood donor population in a hospital based blood bank in Hyderabad for a period of 2 years (2011-2013)

MATERIAL AND METHODS

This retrospective study was conducted in the department of Transfusion Medicine, of tertiary care hospital in Hyderabad. The hospital has a blood bank and the majority of blood supply comes from replacement donors. As a routine practice, apparently healthy blood donors are selected by the trained medical staff at the department. Consent for infectious marker testing is obtained from all donors at the time of pre-donation counseling. All serum samples obtained
at the time of whole blood donation are examined for various markers of infection including those of HCV. The donor serum samples are analyzed to detect anti-HCV antibodies by using third generation ELISA kits. All the samples that are found positive by ELISA on initial testing were repeat tested in duplicate with the same sample. Samples that are found to be repeat-reactive are considered positive. Relevant information of all the blood donors who donated whole blood during 2011 -2013 was retrieved from the departmental records. Of these, the donors found reactive for anti-HCV were selected.

RESULTS & DISCUSSION:

Of the total 21451 blood donors over 2 years, (97%) were males and (3%) were females. The percentage of whole blood donors found seroreactive for anti-HCV was 0.28 percent. The seroprevalence of anti-HCV antibodies in male blood donors was 0.28 per cent while in female blood donors it was 0 per cent.

Table 1: Age and sex wise distribution of study subjects

<table>
<thead>
<tr>
<th>Year</th>
<th>Age (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>19-40</td>
<td>9458 (96.9%)</td>
<td>0297 (3.1%)</td>
<td>9755 (92%)</td>
</tr>
<tr>
<td></td>
<td>41-60</td>
<td>0817 (96.6%)</td>
<td>0029 (3.4%)</td>
<td>0846 (08%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10275 (96.9%)</td>
<td>0326 (3.1%)</td>
<td>10601 (100%)</td>
</tr>
<tr>
<td>2012-2013</td>
<td>19-40</td>
<td>9704 (96.9%)</td>
<td>0303 (3.1%)</td>
<td>10007 (99.2%)</td>
</tr>
<tr>
<td></td>
<td>41-60</td>
<td>0822 (97.5%)</td>
<td>0021 (2.5%)</td>
<td>10043 (7.8%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10526 (97%)</td>
<td>0324 (3%)</td>
<td>10850 (100%)</td>
</tr>
</tbody>
</table>

Maximum seroprevalence of anti-HCV antibodies was observed in the age group of 19 to 40 yr (0.228%) and the minimum in the age group of 41 to 60 yr (0.0559%). A clear trend of decreasing HCV seroprevalence with advancing age was observed.

Table 2: Seroprevalence of Hepatitis C

<table>
<thead>
<tr>
<th>Year</th>
<th>Total donors screened</th>
<th>Anti-HCV antibody</th>
<th>Age groups (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2011-12</td>
<td>10601</td>
<td>30 (0.22%)</td>
<td>00</td>
</tr>
<tr>
<td>2012-13</td>
<td>10850</td>
<td>31 (0.23%)</td>
<td>00</td>
</tr>
<tr>
<td>Two years</td>
<td>21451</td>
<td>61 (0.28%)</td>
<td>00</td>
</tr>
<tr>
<td>total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A relatively low anti-HCV seroprevalence of 0.66 percent in blood donors has been reported from Delhi. However, two studies done in blood donors of Delhi reported relatively higher anti-HCV seroprevalence rates of 1.57 and 2.5 per cent, respectively. Studies from northern parts of India have reported HCV seroprevalence ranging from 0.53 to 5.1 per cent in blood donors. In a recent study done in Hisar, Haryana, the seroprevalence of anti-HCV antibodies was calculated to be 1 percent. A study done in Orissa reported anti-HCV seroprevalence to be 1.98 percent. A study from Kolkata reported the seroprevalence of HCV as 350 per 100,000 donations in 2005. HCV seropositivity in the western part of India has been reported to be 0.28 per cent by Garg et al. In general, majority of studies carried out in India indicated anti-HCV antibody seroprevalence ranging between 0.4 and 1.09 percent. The seroprevalence of anti-HCV antibody as observed in our donor population was relatively low as compared to other studies. This variation may be attributed to the differences in the sensitivities of ELISA kits used, effectiveness of donor screening to exclude donors with a history of high risk behavior, pre donation counseling and self-deferral by donors. In Pakistan, it is estimated that seroprevalence of hepatitis C virus antibodies among healthy blood donors from different parts of the country, varies from 0.27 to 6.8 percent. The pooled prevalence of HCV infection among blood donors of China was alarmingly high before 1998 (12.87%). However, it dramatically decreased to 1.71 per cent after 1998 when the government prohibited professional donors from donating blood. In the United States seroprevalence in HCV of blood donors was estimated to be 0.3 percent. In Greece also a low prevalence (0.2 to 0.4%) of antibodies to HCV has been reported and a similarly low rate (0.13%) was also reported from Iran. Lower rates of anti-HCV antibodies have also been reported in blood donors of Turkey (0.07%), Saudi Arabia (0.4%), Mexico (0.84%) and Kenya (0.9%). The reported variation in the prevalence of anti-HCV antibodies among blood donors in different regions of the world may be attributed to the differences in the type, literacy rate and level of awareness among the blood donors. Moreover, the differences in the testing methodology employed and the extent of its regulation may also have been factors contributing to the observed differences. The anti-HCV seropositivity showed a decreasing trend with age in our study. Maximum seroprevalence of anti-HCV antibodies was observed in the age group of 18 to 40 years, as also shown in another study from Delhi. On the contrary, some studies have reported an increasing trend of anti-HCV seroprevalence with advancing age.

CONCLUSION:

In conclusion, in our study the percentage of whole blood donors found seroreactive for anti-HCV was 0.28 percent. The anti-HCV seropositivity followed a decreasing trend with age, maximum being in the age group of 18 to 40 yr. Since, no vaccine is presently available for immunization against HCV infection, transfusion transmitted HCV infection remains a potential threat to the safety of the blood supply. It is essential to follow up the anti-HCV reactive blood donors for two reasons; firstly for permanent deferral for blood donation and secondly for early management of the HCV infection. The initiative taken by Government of India (Action Plan of Blood Safety, 2003) to know the status of transfusion-transmissible infections to the donor is a step in the right direction.

REFERENCES:

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