Original Research Article

Hepatitis C virus co-infection among people living with HIV/AIDS in a Nigerian Teaching Hospital

V.O. Mabayoje, M.A. Muhibi, R.A. Akindele, C.A. Akinleye, P.S. Mabayoje, O.S. Babatunde

Aim: This study is the first attempt conducted to determine the co-infection rates of Hepatitis C virus among people living with HIV/AIDS (PLWHA) in our hospital. This is expected to lead to improvement in treatment protocols.

Background: Co-infection of Hepatitis C virus infection and HIV (Human Immune Deficiency Virus) infection is not to be unexpected as they share routes of infection. The detection of such patients is particularly important as the treatment may involve life threatening drug interactions. This could result in shorter life expectancy of the patients.

Materials and Methods: This is a prospective study. A total of 280 subjects living with HIV/AIDS were recruited into this study. Sera of the participants were subjected to anti-HCV antibody (IgG) screening using third generation ELISA kit from DIA.PRO, Italy. The prevalence of HCV was determined and bar charts and tables were utilised to depict the prevalence rates of various groups.

Results: Sixty five (23.2%) of the participants were found to be co-infected. No association was established between age, sex, partners status, previous transfusion, and number of partners.

Conclusion: The prevalence of 23.2% for HCV among PLWHA reported for this community is alarming. More focus should be directed on management of HCV component of coinfection than it is done now. Further studies are recommended employing molecular techniques to determine subtypes of HCV that may be predominant and why this figure of co-infection is so high in the study location.

© 2013 Polish AIDS Research Society. Published by Elsevier Urban & Partner Sp. z o.o. All rights reserved.
the HIV positive subjects was 8.6% much lower than what was obtained in North America and Europe (20–25%) [5].

Co-infection with HCV in individuals infected with HIV is associated with higher incidence of liver injury, hepatic decompensation and decreased survival time than that seen in only HIV-monoinfected population. The HCV genotypes encountered were types 1 and 2. Co-infected individuals were likely to be male, older in age and have lower CD4 counts than HIV monoinfected individuals. Though none of the differences reached statistical significance [7]. This makes early diagnosis of associated HCV infection imperative as it could affect HIV treatment outcomes and prognosis.

Predictive factors of HIV patients likely to be co-infected with HCV include intravenous drug users (IDU), recipients of blood and blood products [8]. Others are high alanine aminotransferase (ALT) levels, country of residence, ethnicity and stage of HIV disease [8].

It has been conclusively established that co-infection with HCV in this group of patients is associated with increased morbidity and mortality compared to HIV-monoinfected patients [9].

Co-infection with hepatitis C has also been associated with increased severity and incidence of neurocognitive defects in these patients [10]. It should also be remembered that HIV on its own exerts neurocognitive defects. Thus a thorough neurological evaluation of these patients is essential and probably should be made mandatory at first contact.

The objective of this study is to determine the prevalence of hepatitis C virus among people living with HIV/AIDS on highly active antiretroviral therapy (HAART) in our hospital and consequently determine the co-infection rate with both HIV and HCV. This would lead to more effective decision making in choosing appropriate treatment modalities as drug interactions in co-infected patients could lead to more severe progressive disease including mitochondrial toxicity, hepatomegaly/steatosis, pancreatitis and lactic acidosis, e.g. ddI should not be used in combination with RBV [11].

2. Materials and methods

Study population: blood samples were collected from 280 consecutive HIV positive individuals on antiretroviral therapy (ART) with adequate data from administered questions. The participants were recruited between September 2012 and January 2013 from people living with HIV and AIDS who came to access treatment in our centre and gave informed consent to participate in the study. Ethical clearance was obtained from the Research committee of the Lautech Teaching Hospital research committee (LTH/REC/2013/01/29/127).

2.1. Setting

The study was carried out in Osogbo the capital city of Osun state in Nigeria. It is an urban setting with a population of 3,416,959. The residents are majorly Yoruba however there are other ethnic groups including Hausas, Igbo and those of Edo state origin. The weather pattern is typically tropical.

2.2. Testing for HCV

About 5 ml of blood sample were collected from every participant by venepuncture into EDTA vacutainer bottle (maker: BD,PL6,78KJUK Ref. 367836). This was centrifuged at 1200 x g for 10 min and 1 ml plasma was harvested into 2 plain bottles for anti-HCV antibody detection with third generation enzyme immunoassay technique.

The plasma from every participant was diluted with DILSPE (sample diluent prepared commercially by DIA.PRO, Sesto San Giovanni, Italy). Each sample was further diluted with DILAS (by DIA.PRO) alongside the negative controls in triplicate, the calibrator in duplicate and a positive control as provided by the kit manufacturer. After the micro plate was incubated and wells washed, all the wells were treated with enzyme conjugate except the first blanking well. The micro plate was incubated again and the chromogen/substrate mixture was added after the second washing.

The reactions were stopped with sulphuric acid and the optical density (OD) was read at 450 nm immediately. The cut-off value for the batch was determined and individual results were interpreted as negative (<0.9) and positive (>1.1) and equivocal (0.9–1.1) as appropriate. HIV is usually diagnosed by screening for the antibody using Kits from two different sources Determine and Unigold.

2.3. Statistical analysis

Data was collected both from records and administered questions. The analysis was in two levels. The first was descriptive taking into account the socio-demographic characteristics. The second was based on finding any relationship between CD4 levels and HCV positivity using t-test.

Inclusion criteria: (1) HIV positive patients, (2) patients on HAART, (3) only patients being managed in our facility.

Exclusion criteria: (1) HIV negative patients, (2) patients not on HAART.

3. Results

Two hundred and eighty patients who had sufficient retrievable data and already diagnosed as HIV positive were included in the analysis. A greater proportion (42.5%) of the patients were between the ages of 30–39 years. One hundred and ninety four (69.2%) of the total were females. Of the 280 patients, 65 (23.2%) were HCV positive and 215 (76.8%) were negative. The majority of HCV positive patients were females (68.92%). In terms of educational achievement those with primary and no education at all were the most common 39.3% and 23.2% respectively. Majority of the subjects (66.1%) were married. Occupational analysis revealed that most of the patients (57.5%) were self-employed.

Further domestic analysis revealed that the majority (61.8%) of patients had only one partner, while only 5.4% had two partners or more.

The majority of the patients had no previous history of blood or blood product transfusion, however two patients had received one unit each in the past while only one had previous history of multiple transfusions.

Sixty and 113 of the patients had seropositive and seronegative partners for HIV respectively, while the remaining 107 did not know the status of their partners. There was no statistical significance between being HCV positive and CD4 counts.

4. Discussion

Human immunodeficiency virus (HIV) and hepatitis C virus (HCV) share similar routes of infection and therefore co-infection in the same individual should not be unexpected. A total of 130 million people around the world are estimated to be infected with HCV and 40 million with HIV. Shared routes of transmission mean that co-infection is common affecting an estimated 4–5 million individuals around the world [12]. HIV positive patients from countries in sub-Saharan Africa have an HCV antibody prevalence of 3.7–8.2% [13–15], the majority of which are likely to have been the result of nosocomial transmission [16]. This figure is much lower than what we obtained in our study (23.2%).
Co-infection with HIV and hepatitis B virus (HBV) is more common than co-infection of HIV and hepatitis C virus (HCV). Though more attention has been given to HCV coinfection with HIV as a result of its (HCV) greater association with chronic liver disease. Natural history studies with HIV–HCV coinfection have also shown more rapid progression of liver disease, and end-stage liver disease due to hepatitis C is now a leading cause of death in HIV-infected patients [17].

Among these patients it was discovered that the incidence of Hepatitis C coinfection was higher (Fig. 1) among females (68.92%) than males $p = 0 < 0.005$. This is at variance with similar work carried out in a tertiary institution in south west Nigeria where the incidence of coinfection was higher in males. However studies in another tertiary institution in the same environment revealed an equal incidence of HCV coinfection in both sexes [18]. These differences could be due to the different degrees of emphasis placed on hygiene in various regions, those placing more emphasis have lower prevalence rates.

The age group with highest incidence of co-infection was between 30 and 39 years (Fig. 2). This agrees favourably with the results determined between 1996 and 2007 in studies carried out in Atlanta, Georgia, USA [19]. This might be expected as a result of the sustained sexual activity within this age group. Age is a known risk factor and it was expected that those in the much higher (40 years and above) age groups would reveal even higher incidence of co-infection than was obtained in this study.

Table 1
Social demographic variable of the co-infected subjects.

<table>
<thead>
<tr>
<th>Character</th>
<th>Range</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0–9</td>
<td>13</td>
<td>4.64</td>
</tr>
<tr>
<td></td>
<td>10–19</td>
<td>7</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>20–29</td>
<td>33</td>
<td>11.79</td>
</tr>
<tr>
<td></td>
<td>30–39</td>
<td>199</td>
<td>42.5</td>
</tr>
<tr>
<td></td>
<td>40–49</td>
<td>6</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>50 years</td>
<td>45</td>
<td>16.07</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>100.0</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>86</td>
<td>30.71</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>194</td>
<td>69.29</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>100.0</td>
</tr>
<tr>
<td>Education</td>
<td>No education</td>
<td>65</td>
<td>23.2</td>
</tr>
<tr>
<td></td>
<td>Primary education</td>
<td>110</td>
<td>39.3</td>
</tr>
<tr>
<td></td>
<td>Secondary education</td>
<td>17</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>54</td>
<td>19.3</td>
</tr>
<tr>
<td></td>
<td>Post graduate</td>
<td>34</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>100.0</td>
</tr>
<tr>
<td>Occupation</td>
<td>Unemployed</td>
<td>74</td>
<td>26.43</td>
</tr>
<tr>
<td></td>
<td>Self employed</td>
<td>161</td>
<td>57.5</td>
</tr>
<tr>
<td></td>
<td>Paid employee</td>
<td>45</td>
<td>16.01</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>100.0</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>78</td>
<td>27.9</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>185</td>
<td>66.1</td>
</tr>
<tr>
<td></td>
<td>Widow</td>
<td>16</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>280</td>
<td>100.0</td>
</tr>
</tbody>
</table>

It has been shown that an important risk factor for coinfection includes multiple sexual partners [20]. Our study revealed (Table 2) that only 5.45% had more than one partner while 21.4% had a single partner who was also HIV positive. In studies carried out in a group of patients in Canada poverty was found to play a significant role in HIV/HCV coinfection [21], however in this study this did not seem to be the case as most of our subjects were involved in one form of employment or the other (Table 1). Those unemployed constituted 26.43% of the total population.

Blood transfusion has been mentioned as a risk factor for both HIV and hepatitis C infection. In this study there was no statistically evident association. Only two of the participants had been previously transfused and just one admitted to having been transfused more than once (Table 2). Of those positive for HCV antibodies there was no statistical significance between HCV
positivity and CD4 count using the t-test. Though lower counts would have been expected, the CD4 counts varied between 14 and 1025.

5. Conclusion

The HIV/HCV co-infection rate of 23.5% obtained in this study is alarming. It means more attention has to be paid to HCV than previously has been. It is recommended that the HCV status of the patients also be determined at point of entry and treatment instituted as appropriate. Further studies need to be carried out including determination of the actual hepatic damage caused by HCV co-infection.

Conflict of interest

None declared.

Financial disclosure

This is a prospective study. Information was retrieved from routinely kept records. All authors contributed to the purchase of hepatitis C kits only. All other tests were carried out by the hospital. We were granted ethical permission.

References


