The prevalence of hepatitis B infection in a rural South African HIV clinic

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The prevalence of hepatitis B virus (HBV) infection in 1,765 HIV-positive patients in rural Eastern Cape was 7.1%. This is lower than the previously reported rural prevalence and is similar to urban prevalence. Male sex and baseline alanine aminotransferase (ALT) were significant predictors of HBV status. Most HBV-positive patients had normal baseline ALT, making ALT an insensitive screening test for HBV status.

Results

Between December 2008 and October 2009, 1,765 adult patients were tested for HBVsAg, of whom 126 were positive, giving an overall prevalence of 7.1%. The prevalence was 5.5% in females and 12.1% in males (chi-squared p<0.001). One thousand, one hundred and sixty-nine (66%) had already commenced ART, and HBVsAg prevalence was similar in those on and off ART (6.6% vs. 8.2%, chi-squared p=0.207). Patient HBVsAg status, demographic and laboratory variables and results of analysis are summarised in Table I.

On univariate analysis, ALT at baseline was associated with HBVsAg positivity (odds ratio (OR) 2.11, 95% confidence interval (CI) 1.32 - 3.38). After adjustment, the association remained but was weaker (OR 1.79, 95% CI 1.11 - 2.89, p=0.017), possibly because sex and ALT were strongly associated, with 21% of men and 11% of women having ALT>40 IU/l (chi-squared p<0.001). At baseline, 89/116 (77%) of HBVsAg-positive patients had normal ALT.

After adjustment for age and baseline ALT, male sex remained strongly associated with HBVsAg positivity (OR 2.59, CI 1.68 - 4.00, p<0.001). Age was not associated with HBVsAg positivity.

Discussion

In this Eastern Cape cohort, the prevalence of HBV-HIV co-infection was 7.1%. This figure is lower than the 20% prevalence previously estimated in rural South Africa, but is similar to the estimated prevalence in urban cohorts. Male sex and abnormal baseline ALT were independent predictors of HBVsAg positivity in our cohort.

Previous estimates of rural co-infection rates may not be applicable to the rural population of South Africa as a whole. A study of goldminers in South Africa found a prevalence of 20%, but participants were drawn from a number of African countries, and 94% were male.

Male sex is a risk factor for HBV positivity in HIV-negative South Africans and is thought to be the result of either the observed prolonged replicative phase of the virus in boys or differences in the sexual behaviours of men and women. Our data are the first to suggest that male sex is also a risk factor for HBV positivity in HIV-positive South Africans; further study is warranted to determine if the reasons for this correlation are similar to those in the HIV-negative population.
Studies have found ALT to be an unreliable marker of HBV status in HIV-positive adults, possibly because of the high prevalence of other factors that affect ALT, including opportunistic infections and drugs.1,3 We found an association between baseline ALT and HBV status in multivariate analysis. However, 77% of HBV-positive patients had a normal baseline ALT, so it is not a sensitive marker for HBVsAg positivity. Studies have shown that abnormal baseline ALT predicts high HBV viral load and risk of toxicity on ART. Baseline ALT may therefore be more useful as an addition to HBV testing than as a predictor of HBV status.

A limitation of this study is that HBVsAg was the only available measure of chronic HBV infection. A previous study has shown that occult HBV infection may account for two-thirds of all HBV infections, although the clinical implications of this are not well known.2 Patients were selected for the study by attending for routine blood tests, which might have biased the sample towards patients established on ART. However, the prevalence of HBV was similar among those on and off ART, suggesting that no important bias was introduced. Lamivudine is known to increase the rate of HBVsAg loss. Therefore, some patients on lamivudine might have cleared HBVsAg before testing.

We explored the association between ALT measured on entry into the treatment programme and a positive test for HBVsAg, as many patients had commenced an ART regimen containing lamivudine at the time of HBV testing. The maximum time from baseline measurement to HBV testing was 4 years. An important assumption is therefore that few HBV transmissions occurred in that time; this is reasonable, given the relatively short time period and that many HBV transmissions in South Africa are thought to occur in childhood.6

**Table I. Baseline demographic and laboratory data with results of univariate and multivariate analysis exploring risk factors for HBVsAg positivity**

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>HBVsAg +ve</th>
<th>HBVsAg -ve</th>
<th>Crude OR (95% CI)*</th>
<th>Adjusted OR (95% CI)*</th>
<th>Wald test p-values for the multivariate model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (N)</td>
<td>1 765</td>
<td>126</td>
<td>1 639</td>
<td>-</td>
<td>-</td>
<td>&lt;-0.001</td>
</tr>
<tr>
<td>Male</td>
<td>440 (25)</td>
<td>53 (42)</td>
<td>387 (24)</td>
<td>2.64 (1.76, 3.95)</td>
<td>2.59 (1.68, 4.00)</td>
<td>0.001</td>
</tr>
<tr>
<td>Age (years)</td>
<td>31.8 (26.3, 39.2)</td>
<td>32.0 (27.2, 39.4)</td>
<td>31.8 (26.1, 39.2)</td>
<td>1.01 (0.99, 1.02)*</td>
<td>0.99 (0.97, 1.01)†</td>
<td>0.482</td>
</tr>
<tr>
<td>CD4 cells/µl</td>
<td>207 (99 369)</td>
<td>176 (99 315)</td>
<td>210 (99 373)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ALT (IU/l)</td>
<td>≤40 1 400 (86)</td>
<td>89 (77)</td>
<td>1 311 (87)</td>
<td>Referent</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td></td>
<td>&gt;40 222 (14)</td>
<td>27 (23)</td>
<td>195 (13)</td>
<td>2.11</td>
<td>1.79</td>
<td>0.017</td>
</tr>
</tbody>
</table>

*Crude and adjusted analyses include 1 488 patients with full data set.
†Age is included in the model as a continuous variable. The OR is therefore for a one-year increase in age.

References


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