Hepatitis-B surface antigen and antibody in Black and White patients with venereal diseases

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SUMMARY The prevalence of both the hepatitis-B surface antigen (HBsAg) and its specific antibody (anti-HBs) was significantly greater in the sera of White patients suffering from sexually transmitted diseases than that in White blood donors. However, Black patients with venereal diseases did not show an increased prevalence of either HBsAg or anti-HBs. These findings support the view that heterosexual transmission of the hepatitis-B virus is less likely to occur in populations in whom this infection is largely acquired before the age of sexual maturity.

Introduction

One of the many important new facts to emerge about virus hepatitis type-B since the discovery of the hepatitis-B surface antigen (HBsAg) is the frequency with which the disease is transmitted by non-parenteral routes. Unfortunately, the exact routes and their relative importance remain uncertain. Particularly confusing at present is the role played by sexual contact in the spread of the hepatitis-B virus (HBV). HBsAg has been demonstrated in the semen (Heathcote et al., 1974; Linne mann and Goldberg, 1974) and vaginal secretions (Darani and Gerber, 1974) of individuals with HBs antigenaemia. However, while an increased prevalence of HBsAg and its specific antibody (anti-HBs) has consistently been found in the sera of patients attending venereal disease clinics (Fulford et al., 1973; Jeffries et al., 1973; Szmuness et al., 1975; Vranckx, 1975), studies in prostitutes have yielded conflicting results (Adam et al., 1974; Papaevangelou et al., 1974; Frösner et al., 1975). Moreover, investigation of the families of chronic carriers of HBV has usually failed to show a higher prevalence of HBsAg in spouses than in other family members (Berris et al., 1973; Szmuness et al., 1973; de la Concha et al., 1974), suggesting that heterosexual intercourse may not be an important means of transmission. In spite of this confusion, there seems little doubt that homosexual, particularly anal, transmission is important (Fulford et al., 1973; White et al., 1974; Szmuness et al., 1975).

One possible explanation for the inconclusive results on heterosexual transmission of the virus has been suggested by Frösner et al. (1975)—namely, that sexual transmission may be more important in highly developed countries with a low chronic HBV carrier rate and where HBV infection is mainly acquired in adult life. White South Africans are known to have a low prevalence of HBs antigenaemia, while the Blacks have a high prevalence (Bersohn et al., 1974) and the infection is acquired mainly during childhood and adolescence, before sexual activity starts (Macnab et al., 1977, unpublished data). We have been able to study individuals with venereal diseases from these two populations. We report here our findings.

Materials and methods

Sera from 473 White and 227 Black patients attending a venereal disease clinic in Johannesburg were tested for the presence of HBsAg and anti-HBs. Over 50% of the Black patients were suffering from syphilis (usually primary, but in some cases secondary or latent) and 20% had gonococcal or non-gonococcal urethritis. Urethritis (gonococcal or non-gonococcal) was present in two-thirds of the White patients and syphilis in only a small percentage. In some patients more than one venereally
transmitted disease was present. No attempt was
made to consider the venereal diseases separately
in respect to the presence of HBsAg and anti-HBs.
Apparently healthy voluntary blood donors were
used as controls; there were 2460 White controls
and 1200 urban Black controls.
HBsAg was detected in the serum by solid-phase
radioimmunoassay using the Austria II–I$^{131}$ test
(Ling and Overby, 1972). All positive results were
confirmed by using the neutralising antibody
technique (Prince et al., 1973). Anti-HBs was
detected by both passive haemagglutination (Vyas
and Shulman, 1970) and radioimmunoassay (Gins-
berg et al., 1973).
The data were analysed statistically using the $\chi^2$
test.

Results

The prevalence of HBsAg and anti-HBs in the
White and Black patients with venereal diseases
and in the White and Black blood donors is shown
in the Table. The difference in the prevalence of
HBsAg between the White patients and the White
controls was significant ($\chi_1^2=6.80$, $p<0.01$), as
was the difference in the prevalence of anti-HBs
($\chi_1^2=9.03$, $p<0.01$). The differences in the preva-
ence of HBsAg and anti-HBs between the Black
patients and Black blood donors were not signi-
ficant (HBsAg: $\chi_1^2=1.16$, $p>0.05$; anti-HBs: $\chi_1^2=2.67$, $p>0.5$).

<table>
<thead>
<tr>
<th></th>
<th>Whites</th>
<th>Blacks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HBsAg</td>
<td>Anti-HBs</td>
</tr>
<tr>
<td>White patients</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Venereal diseases</td>
<td>(4/473)</td>
<td>(42/473)</td>
</tr>
<tr>
<td>Blood donors</td>
<td>(0/16)</td>
<td>(5/3)</td>
</tr>
<tr>
<td></td>
<td>(4/2460)</td>
<td>(131/2460)</td>
</tr>
</tbody>
</table>

The number of positive results and the total number of individuals in
each group is given in parentheses.

The number of homosexual patients in both the
White and Black groups was small, and was not
significantly different in the two groups. The
average age of the White patients was 30-1 years
and of the Black patients 31-6 years.

Discussion

The HBV carrier state is common in southern
African Blacks (Bersohn et al., 1974), prevalences of
up to 16% being recorded by counter immuno-
electrophoresis in some rural areas of the sub-
continent. The incidence by radioimmunoassay in
urban Blacks is 4% (Macnab and Kew, 1977,
unpublished data). As in other African countries
(Williams et al., 1973) the infection is acquired
largely during childhood (Macnab et al., 1977,
unpublished data). By contrast, South African
Whites have the same low prevalence of the HBV
carrier state as Whites living in North America or
England (Bersohn et al., 1974; Kew et al., 1976),
and the infection seems to be acquired mainly in
adult life. Frössner et al. (1975) have suggested that
transmission of HBV by sexual contact may be
more important in more sophisticated populations
in which the infection is likely to be acquired during
adult life. Our finding of a significantly greater
prevalence of HBV infection in White patients with
venereal diseases when compared with White blood
donors but not in Black patients with similar
diseases compared with Black blood donors lends
support to this view.

Other explanations for the different findings in
the two racial groups must be considered. Male
homosexuals appear to be at high risk from
acquiring HBV infection as a result of sexual
contact (Fulford et al., 1973; White et al., 1974;
Szmuness et al., 1975) (although this may be a
function only of promiscuity), and different numbers
of such individuals may have been present in the
groups studied. Only a small proportion of the
patients admitted to being homosexual, and the
numbers were similar in Whites and Blacks. As the
prevalence of anti-HBs in a population increases with
age, different age structures of the patients with
venereal diseases in comparison with blood donors
might offer another explanation. Although the
exact ages of the blood donors used as the control
groups in the present study were not analysed, the
average age of the White patients was 30 years and
that of the Black patients 31 years, and it is very
unlikely that the average age for the blood donors
was less than this. Kačáki et al. (1975) reported a
higher prevalence of HBs antigenaemia in patients
with syphilis than in those with gonorrhea. A
different pattern of sexually transmitted diseases
was present in the two racial groups studied, syphilis
being far more common and gonorrhoea infection
far less common in the Blacks than in the Whites.
This pattern of venereal disease would favour a
higher incidence of HBV infection in the Black
patients as compared with Black controls than in
the White patients compared with their controls.
The fact that we found the opposite strengthens the
argument that HBV infection is less likely to be
transmitted by sexual contact in less sophisticated
populations in whom the infection has almost always
been acquired before the age of sexual maturity.
References


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