HEPATITIS B e ANTIGEN AND ANTIBODY IN ASYMPTOMATIC CHINESE WITH HEPATITIS B SURFACE ANTIGENEMIA IN TAIWAN


Departments of Internal Medicine and Pediatrics*, National Taiwan University Hospital, Taipei, Taiwan, Republic of China

Summary

Two hundred and twenty two asymptomatic carriers of hepatitis B surface antigen (HBsAg) with age between 4 months and 68 years, 172 healthy persons with antibody to HBsAg (anti-HBs) and 85 healthy persons seronegative for both HBsAg and anti-HBs were studied by double immunodiffusion for the evaluation of the meaning of hepatitis B e antigen (HBeAg) and its antibody (anti-HBe). In 222 asymptomatic carriers, HBeAg was detected in 32.4% and anti-HBe in 31.5%. The geometric titer of HBsAg was 1:2159 in the HBeAg positive and 1:149 in the anti-HBe positive persons. Frequencies of HBeAg and anti-HBe in asymptomatic carriers of HBsAg correlated closely with age. The highest frequency of HBeAg was found in the first decade in 64%, decreasing steadily to 20.8% in the fourth and then suddenly down to 4.1% in the fifth decade. A reverse trend was observed in anti-HBe frequency. From our analysis, it is likely that the high frequency of HBeAg in serum of Chinese, especially in females of fertile age, might be an important contributing factor for the high rates of hepatitis B virus (HBV) infection and HBsAg carrier in Taiwan. The presence of HBeAg/anti-HBe system is not only a marker of infectivity and prognosis but also a chronologic marker of HBV infection.

Key Words: HBeAg, anti-HBe, asymptomatic HBsAg carrier.

Introduction

In Taiwan hepatitis B virus (HBV) infection has been shown to be very prevalent and the carrier rate of hepatitis B surface antigen (HBsAg) also has been shown to be surprisingly high (17%)1–3. The high prevalence of HBV infection and HBsAg carrier rate were also shown in the Chinese descendant in Singapore4) and in U.S.A5).

The vertical and intrafamilial transmission of HBV from Chinese mothers with high HBsAg carrier rate might be a contributing factor for the high prevalence of HBsAg carriers in Chinese6,7).

The prevalence of hepatitis B e antigen (HBeAg) in the serum of HBsAg carriers has been demonstrated to be associated with evidence of increased replication of HBV as shown by a correlation with the elevation of DNA polymerase activity and abundant presence of Dane particles8–10). The presence of HBeAg in HBsAg carrier mothers has been shown to correlate with increased risk of vertical transmission to neonates11,12).
In the present study, the frequencies of HBeAg and its antibody (anti-HBe) in asymptomatic carriers of different age groups in Taiwan were evaluated.

Materials and Methods

Two hundred and twenty two asymptomatic HBsAg carriers were from three groups of apparently healthy people. The first group of 153 healthy HBsAg carriers with age between 15 and 68 years were from the Health Service or the Human Dock of The National Taiwan University Hospital. The second group comprised 44 of the 68 HBsAg carriers between 10 and 19 years of age; these carriers were selected after screening 229 apparently healthy junior middle school students. These 197 asymptomatic carriers had normal level of transaminases. The last group of 25 HBsAg carriers with age between four months and 10 years were from healthy children visiting the Well-Baby Clinic of the same hospital for a routine physical examination or vaccination for diphtheria-pertussis-tetnus-polio.

One hundred and seventy-two subjects with antibody of HBsAg (anti-HBs) and 85 subjects seronegative for HBV surface markers were adults from the first group.

HBsAg was detected by reversed passive hemagglutination for the first two groups and by radioimmunoassay using Abbott Ausria II for the third group. Anti-HBs was detected by passive hemagglutination.

HBeAg and anti-HBe were detected by a double immunodiffusion method after Magnus and Espmark with slight modifications. Excessive peripheral gel on the standard microscopic slides was cut away to enhance more immune precipitation. Sera were concentrated five-fold by adding Lyphogel prior to the test. The anti-HBe serum and the HBeAg serum used showed identical immunoprecipitation line to the reference HBeAg and anti-HBe sera kindly provided by Dr. Robert H. Purcell, Laboratory of Infectious Disease, National Institute of Allergy and Infectious Diseases, National Institute of Health, Bethesda.

Results

In 222 asymptomatic carriers, HBeAg was detected in 32.4% and anti-HBe in 31.5%. The geometric mean titer of HBsAg was 1:2159 in the HBeAg positives and 1:149 in the anti-HBe positives (p<0.001, Student's t-test). In 87 healthy persons seropositive for anti-HBs, none was HBeAg positive and only 2 (2.3%) were anti-HBe positive. Neither HBeAg or anti-HBe could be detected in 85 healthy persons negative for both HBsAg and anti-HBs (Table 1).

In the asymptomatic HBsAg carriers, the frequency of HBeAg and anti-HBe correlated closely with age. The prevalence of HBeAg was highest in the first decade (64%) and decreased steadily to 20.8% in the fourth and then suddenly down to 4.1% in the fifth decade. A reverse trend was observed in anti-HBe fre-

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<th>Table 1. HBeAg and anti-HBe in healthy subjects</th>
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<td>Asym. HBsAg carrier b</td>
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<td>Asym. anti-HBs carrier c</td>
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<td>Surface marker (−) b,c</td>
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a: HBeAg and anti-HBe studied with immunodiffusion.
b: HBsAg studied with radioimmunoassay or reversed passive hemagglutination.
c: Anti-HBs studied with passive hemagglutination.