A Study on Some Antigens Associated with the Hepatitis B Virus Infection and Those Anti-antigens in Human Sera in the Solomon Islands

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Introduction

Since the successful detection of the Australia antigen, by Blumberg et al. in 1965, in the serum of a patient recieved frequent blood transfusions, cause of the hepatitis B disease have been rapidly elucidated.

Electron microscopy disclosed the structure of a hepftitis B virus (HBV) particle known as the Dane particle by Dane et al. in 1970 and serological studies clarified the HBV associated antigens (Magnius and Espmark, 1972) and their anti-antigens in the sera of HBV infected persons (Almeider et al., 1971). Today, a routine check in the clinical laboratory can detect several antigens of each portion of a HBV particle, such as the hepatitis B surface antigens (HBsAg) also known as the Australia antigen, the hepatits B envelope antigen (HBeAg) and the hepatitis B core antigen (HBcAg), and also detect the anti-antigens (antibodies) against HBsAg and HBeAg in the sera.

It is well known that the titers of each antigen and anti-antigen in the serum repesents the clinical stages of HBV disease. Most of the HBV infected patients will be completely healed of acute hepatitis B in a short time. In the residual patients, some will become healthy carriers and others chronic hepatitis B patients both of which will continously have infective HBV. The later case will subsequently contract a type of liver cirrhoses and hepatocellular carcinoma in the late stage (Obata et al., 1980).

The purpose of this study was to investigate the distribution of HBV invasiveness is the Solomon Islands by semological examination.

Materials and Methods

Sixty-seven deepfreezed human sera imparted from Medical Laboratory, Central

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Hspital, Honiara, the Solomon Islands in 1982 were gualitatively checked for HBV antigens and anti-antigens. Neither ages nor sexes of patients were available on any samples.

Both HBsAg and HBeAg were tested for by the reversed passive hemagglutination test (RPHA) and the presence of both the anti-HBsAg and anti-HBeAg were determined by the passive hemagglutination test (PHA). All of the tests were carried out using commercially available test kits developed by Kokusai Shiyaku Co. Ltd., Japan.

Results

The incidences of positive tests in each serological examination are summerized in Table 1. Anti-HBsAg positive group was the highest one (26.9%) in four. The incidences of about 10 percent were seen in HBsAg and HBeAg positive groups, respectively.

Each person that tested positive for the serological examinations was classified into five categories according to the presence of antigen(s) and / or anti-antigen(s) for investigating clinical valuation of HBV infected individuals (Table 2).

Five cases of HBsAg positive with HBeAg(+) were found (category I). In category II there was one case and in category III 16 cases were seen. Category IV and V have 2 and 3 cases, respectively.

Table 1. Incidence of antigens associated with HBV and those anti-antigens in the Solomon Islands.

No. of Cases	No. of HBsAg (+)	No. of Anti-HBsAg (+)	No. of HBeAg (+)	No. of Anti-HBeAg (+)
67	6 (9.0%)	18 (26.9%)	8 (11.9%)	2 (3.0%)

Table 2. Incidence of positive cases in antigens associated with HBV and those anti-antigens by each person.

Category	HBsAg	Anti-HBsAg	HBeAg	Anti-HBeAg	No. of Cases
I	+	−	+	−	5 (7.5%)
II		−	−	−	1 (1.5%)
III	−	+	−	−	16 (23.9%)
IV		+	−	+	2 (3.0%)
V		−	+	−	3 (4.5%)

Discussion

As mentioned in the introduction, a few patients who could not exclude the HBV after infection will remain as infection soueces, the same as healthy carriers and persistent hepatitis patients who subsequently contract with a liver cirrhosis and finally hepatocellular carcinoma (Obate et al., 1980). Therefore, it is very important for the prevention of the disease to carefully detect the shedders of HBV among the residents in each area. Maternal (Okada et al., 1975) and sexual transmission, and transmission with medical instruments are well known routes of the infection.

A panel of serological examinations tested in this study will offer much useful information for detecting infection sources (Furuta et al., 1981).

In this study, it was very important that five cases were found in category I, carriers which were thought to be the most in fective sources.

Category II in this study should be included with the category containing the cases which tested positive for HBsAg and anti-HBeAg and negative for anti-HBsAg and HBeAg. Because both conditions in category II, HBeAg(−) and anti-HBeAg(−) or (+), were considered to be of egual infectiveness of the virus. In these conditions, the carriers have few HBV and very low infectivity.

Cases in category III, which had one positive test only in the anti-HBsAg test and showed the highest positive incidence in these serological studies, were cases that had completely recovered recoved from HBV infections and were resistant to reinfection and unable to infect other individuals.

Clinical evalutions of the five residual cases in categories IV and V were very complicated and no clear explanations were available. These conditions might only be non-specific reactions in serological tests or might suggest momentary points in the course of a HBV infection.

Five of 67 (7.5%) HBV carrires who have an active HBV infection were observed in our serological examinations in the Solomon Islands. These cases might have been an acute or active chronic hepatitis B disease, because the tested sear were supplied from the patients at Central Hospital.

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