HEPATITIS B INFECTION AMONG THE INDIGENOUS COMMUNITIES LIVING IN THE PERIPHERY OF CROCKER RANGE PARK, SABAH

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ABSTRACT

The detection of antibodies to hepatitis B antigen using the immuno-agglutination method as directed by lmmunoComb II HBs Ag Kit demonstrated 51 of 294 (17.35%) of the indigenous communities living in the periphery of Crocker Range Park, Sabah were exposed to hepatitis B. On the other hand, 118 of 260 (45.38%) serum samples showed reactivity for antibody against HBs antigen when tested using the ELISA method as specified by Abott ELISA (AUSZYME) Kit. When compared against the more sensitive ELISA method, only 22 of 51 (43.14%) of the agglutination reactive sera demonstrated high ELISA titres. Almost all individuals who tested positive for hepatitis B antigen using ELISA method did not exhibit the disease manifestations commonly associated with the hepatitis B infection (HBV). These asymptomatic individuals within the communities may potentially serve as an important focal point from which dissemination of hepatitis B to the rest of the indigenous communities living in these highland villages may occur. The study also demonstrates the specificity of the ELISA method in detecting HB antigens compared to the agglutination method that generally tends to give false-positive values due to cross-reacting anti gens found in the samples.

INTRODUCTION

Hepatitis B infection is a public health concern in view of the fact that it can lead to hepatocellular carcinoma (HCC), liver cirrhosis and chronic hepatitis. Further there appears to be close relationship between high incidence of hepatocellular carcinoma and infection with hepatitis B within a given population (Reference?). Sabah has a high prevalence of HBV infection, with HBs Ag infection rate thought to be up to 20% (Reference?). A high incidence of HBV infection has also been observed among babies of mothers who have not been immunised with hepatitis B vaccination (Mack 1999). He reported a high rate of transmission of the disease that can occur vertically through the fetus by the carrier mothers who tested positive for hepatitis B e antigen. In addition, HBV infection can be transmitted horizontally by sexual contact, transfer of blood products from an infected individual by injection with shared needles, ear piercing and tattooing.

Several epidemiologic studies of hepatitis B infection in South East Asia and the Far East revealed high incidence of the disease in China (5-18%) and Taiwan (15-20%) Chen et al. (2000). Muddier and Canapati (2000) reported the highest incidence with a carrier rate of 23.35% among the Indian island tribe of the Nicobarese from the Nicobar island situated in the Bay of Bengal. Various laboratory markers have been used for hepatitis, which include liver enzymes and detection of antibodies to hepatitis B virus. The serological method of Enzyme Linked Immunosorbent Assay (ELISA) gave the quantitative value in titres of antibodies detected in the serum.

This study focused on the indigenous communities living in the periphery of Crocker Range Park, Sabah in our attempt to determine the extent of exposure of these communities to hepatitis B virus. We have taken the opportunity also to compare and evaluate the sensitivity of the two techniques for detection of hepatitis B viral antigens using the immuno-agglutination method (Immunocomb II HBs Ag Kit) and the enzyme-linked immunosorbent assay method (Abott ELISA AUSZYME Kit).

MATERIALS AND METHODS

The villages for the study were identified and the number of respondent was selected at random between 15-23 October 1999. Informed consent was sought to have their agreement and cooperation in the study. They were registered for their demographic data from various age groups of between 11-75 years old. Questionnaires regarding past medical history with signs of jaundice, abdominal distention and rashes will be recorded.

Single blood samples of about 10 ml from the respondents were taken. Serum samples were separated and kept at -20ºC until use and subsequently screened for antibodies to HBs antigen using New Generation Immunocomb II HBs Ag Kits. The positive results were taken when there was agglutination as compared to positive and negative controls. The serum samples were further screen for antibodies to HBs Ag using Abott (AUSZYME) ELISA technique. Samples with absorbent readings in excess of the cut-off control were considered positive and those less than the cut off-control were considered negative. The procedures were followed as described by the manufacturer. Results obtained from utilising both techniques, the agglutination and the ELISA methods, were systematically compared to determine their suitability for use in the field. Data analysis was carried out using SPSS computer program.

RESULTS

A total of 294 serum samples were tested for the presence of antibody against HBs antigen taken at random from the respondents in various communities situated at the periphery of Crocker Range, Sabah Park. Fifty-one of 294 (17.35%) of the serum samples were positive for antibody against HBs antigen when tested using the ImmunoComb II HBsAg 90' Kit. A total of 260 serum samples were available for the detection of antibody against HBs antigen using an Enzyme Linked Immunosorbent Assay (ELISA) technique from AUSZYME Abott Kit. One hundred and eighteen of the 260 (45.38%) serum samples showed reactivity for antibody against HBs antigen.

When compared to the more sensitive ELISA method, only 22 of 51 (43.14%) reactive samples for antibody against HBs antigen detected from ImmunoComb II HBs Ag 90' showed high ELISA titres.

Table 1: The percentage of positive cases of antibody to HBs Ag by us ing ImmunoComb II HBs Ag 90' according to age groups.

Age Groups/Yrs	Number positive	Total serum	(%) positive
11-20	15	78	19.23
21-30	8	45	17.77
31-40	11	71	15.49
41-50	4	31	12.90
51-60	3	28	10.71
61	10	39	25.64
Total Samples	51	192	17.46

Two samples with missing age data were excluded in the age group. The majority of the communities are mainly of Kadazandusun and Murut ethnic groups. The reactivity of serum samples which indicates previous exposure to HBV infection in these two ethnic groups were 17.56% (38 of 216) for the Kadazandusun and 14.86% (11 of 74) for the Murut.

DISCUSSION

The use of ImmunoComb HBs Ag Kit to detect human antibodies against HBs Ag provides a useful tool for assessing exposure of the communities to hepatitis B infection. The method can be conveniently adapted for use in the field for seroepidemiologic study and the test results can be rapidly generated on the same day with minimum requirement for sophisticated instrumentation. The reliability of the results can be determined by using the positive and negative controls. An obvious drawback to this agglutination method is in its qualitative value; thus unable to give an indication on the extent of the exposure with respect to time and intensity.

By using ImmunoComb HBs Ag Kit, 17.35% (51 of 294) of the indigenous communities living in the vicinities of the Crocker Range Park were shown to have been previously exposed to hepatitis B viral infection. Our result was comparable to those obtained in studies carried out in China and Taiwan (Chen et al. 2000) which demonstrated a similarly high rate of exposure to HBV infection. The high rate of exposure occurs mainly among the young age groups of between 11-20 years and the elderly in those above 61 years old.

The confirmation of true positive samples was not carried out in the study after screening with ImmunoComb HBs Ag Kit. However, subsequent screening by using Abott (AUSZYME) ELISA demonstrate higher rate of reactivity in the serum samples. The use of ELISA technique to quantify exposure to hepatitis B requires high degrees of precaution to prevent false positive reaction especially to prevent contamination of the reagents and samples. Therefore, in this study the risk of false positive reaction by using an ELISA techniques can be minimise with more stringent in the various steps in the procedures. However, there may have been some false positive samples as the kids may show false positive reaction in term of non specificity and sensitivity.

There may be some respondents following the infection that was not detected by the screening techniques. Duraisamy et al. (1993) reported that the relation between the viral load and the period of infectivity before antibody is detected would give a false impression of non-infectivity.

Almost all of the respondents comprising of the indigenous communities settling around the periphery of Crocker Range does not demonstrate a clinical features of hepatitis B during the period of study. These include those presented with high titres demonstrated in 43.14% of the positive serum samples by using ImmunoComb II HBs Ag and subsequently tested by using Abott ELISA (AUSZYME) HBs Ag screening were reactive for HBs antigen were mainly asymptomatic. However, the long-term sequelae of infection from these respondents could not be rule out. The high carrier rate in this study would create a risk for the dissemination of the hepatitis B in the communities and depriving them of blood donation.

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