HBeAG AND ANTI-HBe IN THE MALAYSIAN POPULATION AND IN MALAYSIAN PRISONERS

S.H. TON, C.G. LOPEZ* and R. NORIAH

Department of Biochemistry, Faculty of Medicine, University Kebangsaan Malaysia.
*National Blood Services Centre, General Hospital, Kuala Lumpur, Malaysia.

INTRODUCTION

Many lines of evidence indicate that hepatitis B e antigen (HBeAg) is closely associated with the presence of hepatitis B virus (HBV) and can be used as a marker of infectivity. It has been established that HBeAg when found in the serum containing hepatitis B surface antigen (HBsAg) signals a high infectivity both in vertical and horizontal transmission of HBV (Alter *et al.*, 1976; Maynard *et al.*, 1976; Okada *et al.*, 1976).

In view of the fact that about 5.5% of our blood donors is HBsAg positive (Ton *et al.*, 1979) and also because prisoners have to be called upon to donate blood occasionally, a study was carried out to determine infectiousness of both groups and to compare these with a normal non-blood donor population group. Prisoners were chosen to represent an institutionalized group as it has been reported that institutionalized groups have a higher incidence of HBV markers (Muniz *et al.*, 1971).

MATERIALS AND METHODS

Serum samples were processed from blood taken aseptically from random blood donors, normal non-blood donors and from prisoners as described previously (Ton *et al.*, 1979). Random blood donors were those donating blood on a voluntary non-remunerating basis. Normal non-blood donors were those who were either in the faculty or hospital clerical or non-medical, non-laboratory staff. The samples were tested for HBsAg (Abbot, Ausria II-125) and HBeAg/anti-HBe (Abbot-HBe/anti-HBe). Radioactive counting of samples was done on the packard Autogamma Scintillation Spectrometer, Model 5110. The cut off values were as recommended by the manufacturer.

RESULTS

As shown in Table 1, the incidence of HBsAg (4.8%) in the random blood donors is higher (twice) that of the prisoners while

Table 1

Prevalence of HBsAG, HBeAG and anti-HBe in the blood of donors and prisoners.

	No. examined	Positive for		
		HBsAG	HBeAG	Anti-HBe
Random blood donors	146	7(4.8%)	3(2.1%)	22(15.1%)
Prisoners	46	1(2.3%)	1(2.3%)	12(28%)
Normal non-blood donors	18	0	0	0

Table 2
Relationship between HBeAG, anti-HBe and HBsAG in the blood of donors and prisoners.

Relationship	Normal non-blood donors (n=18)	Random blood donors (n=146)	Prisoners (n=43)
No. positive for HBsAg, HBeAg and Anti-HBe	0	0	0
No. positive for HBsAg and HBeAg	0	3(2%)	1(2.5%)
No. positive for HBsAg and Anti-HBe	0	3(2%)	1(2.5%)
No. positive for HBeAg and Anti-HBe only	0	0	1(2.5%)

the incidence of HBeAg is the same in both groups. The anti-HBe in the prisoners, however, is about twice that of the random blood donors. All the 18 normal non-blood donors do not have HBsAg, HBeAg or anti-HBe. The relationship between the three markers in all the three groups is shown in Table 2.

About 2.5% of the random blood donors were positive for both the HBsAg and HBeAg while 2.5% of the prisoners' blood were positive for the two antigens. One prisoner's blood was positive for both the HBeAg and the anti-HBe but negative for HBsAg.

DISCUSSION

The sequence of HBV marker events, with the appearance of HBeAg and anti-HBe in the serum of individuals actually infected with HBV becomes clear when patients with acute type B hepatitis are followed up. It has been reported (Aikawa *et al.*, 1978) that HBeAg appears early within the period of HBs antigenaemia, and disappears faster than HBsAg. Anti-HBe appear later than the antibody to the core of Dane particles (anti-HBc) but earlier than anti-HBs. It can be assumed that such seroconversion from HBeAg to anti-HBe also occurs in individuals chronically infected with HBV. The identification of seroconversion to anti-HBe in asymptomatic carriers of HBV is thought important because carrier with HBeAg may transmit HBV vertically and horizontally (Alter *et al.*, 1976; Okada *et al.*, 1976). A study of the prevalence of HBeAg and anti-HBe may provide a valuable opportunity to portray the natural course of chronic HBV infection in the community.

Several reports indicate that there is a correlation of the e antigen with chronic liver disease in HBsAg carriers while the presence of anti-HBe is associated with the absence of liver disease (Nielsen *et al.*, 1974; Magnius *et al.*, 1975).

Thus, it is highly probable that about 2% of our apparently normal healthy blood donors and about 2.5% of the prisoners might have liver dysfunction and high infectivity.

As shown in Table 2 one specimen was positive for HBeAg and anti-HBe in the absence of HBsAg. The presence of HBeAg in the absence of HBsAg has been reported in the sera of four Ugandian adults (Tabor *et al.*, 1980). The absence of HBsAg in this specimen could either be due to the low level of HBsAg in the circulation undetectable by the RIA technique or the removal of the HBsAg produced by the immune system. Of the 18 normal non-blood donors, none

had HBsAg, HBeAg nor anti-HBe in their sera.

It is interesting to note that the HBsAg in the random blood donors is twice that of the prisoners. However, the percentage frequency of HBeAg is almost the same in both groups thus indicating that the percentage of more infectious blood is similar. The percentage frequency of HBsAg positivity with anti-HBe positivity (Table 2) is also similar in both groups thereby indicating that the rate of conversion of highly infectivity to relatively low infectivity is almost the same. Therefore, as the risk factor with respect to post transfusion HBV infection in the prisoner group is not higher than in the normal blood donor population, the Transfusion Service can go on depending on prisoners as a source of blood donor.

SUMMARY

The incidence of HBsAg in random blood donors was found to be twice that of the prisoner population. The anti-HBe however, was about twice that in the prisoners when compared with the random blood donors. Both the random blood donors and the prisoners had similar incidence of HBeAg. The percentage frequency of HBsAg positivity with anti-HBe positivity was also similar in both groups. The 18 normal non-blood donors did not have HBsAg, HBeAg or anti-HBe.

REFERENCES

AIKAWA, T., SAIRENJI, H., FURUTA, S., KIYOSAWA, K., SHIKATA, T., IMAI, M., MIYAKAWA, Y., YANASE, Y. and MAYUMI, M., (1978). Seroconversion from hepatitis B e antigen to anti-HBe in acute hepatitis B virus infection. *New Engl. J. Med., 291* : 439.

ALTER, H.J., SEEFF, L.B., KAPLAN, V.J., MCAULIFFE, V.S., WRIGHT, E.C., GERIN, J.L., PURCELL, R.H., HOLLAND, P.V. and ZIMMERMAN, H.J., (1976). Type B hepatitis the infectivity of blood positive for e antigen and DNA polymerase after accidental needle stick exposure. *New Engl. J. Med., 294* : 746.

MAGNIUS, L.O., LINDHOLM, A., LUNDIN, P. and IWANSON, S., (1975). A new antigen-antibody system:clinical significance in long term carriers of hepatitis B surface antigen. *J.A.M.A., 231* : 356.

MAYNARD, J.E., BARRETT, D.H., MURPHY, B.L., BRADLEY, D.W., BERQUIST, K.R. and BENDER, T.R., (1976). Relation of e antigen to hepatitis B virus infection in an area of hyperendemicity. *J. Infect. Dis., 133* : 339.

MUNIZ, F.J., MALYSKA, H. and LEVIN, W.C., (1971). Au antigen in blood from prisoners. *New Engl. J. Med., 284* : 501.

NIELSEN, J.D., DIETRICHSON, O. and JUHL, E., (1974). Incidence and meaning of the 'e' determinant among hepatitis B antigen positive patients with acute and chronic liver diseases. *Lancet, ii* : 913.

OKADA, K., KAMIYAMA, I., INOMATA, M., MIYAKAWA, Y. and MAYUMI, M., (1976). e antigen and anti-e in the serum of asymptomatic carrier mothers as indicators of positive and negative transmission of hepatitis B virus to their infants. *New Engl. J. Med., 294* : 746.

TABOR, E., ZIEGLER, J.L. and GERETY, R. (1980). Hepatitis B e antigen in the absence of hepatitis B surface antigen. *J. Infect. Dis., 141* : 289.

TON. S.H., LOPEZ, C.G. and HASNAH, H., (1979). Prevalence of anti-HBc in Malaysian male blood donors and its correlation with DNA polymerase activity. *Southeast Asian J. Trop. Med. Pub. Hlth., 10* : 1.