Serological Survey of Hepatitis B Virus (HBV) Markers in Out- and In-patients in a University Hospital

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— Of a total of 13,596 patients and 1,876 blood donors in a university hospital examined, 550 (4.1%) patients and 31 (1.7%) donors possessed hepatitis B surface antigen (HBsAg) in their blood. The higher incidence of HBsAg in the patient population than in the blood donors verified the view that medical personnel and hospitalized patients are at increased risk of acquiring HBV infection. To assess the actual hazard of the HBsAg-positive patients, we examined hepatitis Be antigen (HBeAg) and its antibody (anti-HBe) status of 228 HBsAg-positive patients and found that 39 (18%) were positive for HBeAg and 168 (74.5%) were positive for anti-HBe. This indicated that only one fifth of the HBsAg-positive patients should be drawn attention in terms of HBV transmission within a hospital. ——— HBsAg; HBeAg; anti-HBe; seroepidemiology

Hepatitis B virus (HBV) infection within hospitals has been recognized as an occupational hazard in the health care profession (Maynard 1978). The prevalence of hepatitis B surface antigen (HBsAg) and its antibody was investigated well in medical and dental personnel, while not many works were done to clarify the prevalence of HBV markers among the patient population (Maynard 1978). The present study was undertaken to reveal the incidence of HBsAg among out- and in-patients in a university hospital and to characterize the HBsAg-positive patients in terms of hepatitis B e antigen (HBeAg) and its antibody (anti-HBe) status in order to clarify their actual infectivity.

Sera of 13,596 patients and 1,876 blood donors collected from March 1980 to October 1982 were tested for HBsAg by enzyme immunoassay (Auszyme II, Abbott Laboratories, North Chicago, IL.). HBeAg and anti-HBe were also determined by enzyme immunoassay (HBe EIA, Abbott Laboratories) on 228 HBsAg-positive sera with sufficient volume.

Table 1 shows the frequency of HBsAg detected among the patients and blood donors. The prevalence of HBsAg in the patients population (4.1%) was more than twice that of the blood donors which was similar to the prevalence of the HBV carriers in Japan. Our result supported the previous work (Maynard 1978) that the frequency of HBsAg in the hospital admissions was approximately twice that in the general population and verified the view that medical personnel and hospitalized patients are at increased risk of incurring HBV infection.

When we consider the control and prevention of HBV transmission within a hospital,

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TABLE 1. *Prevalence of HBsAg detected by enzyme immunoassay in the out-, in-patients and blood donors*

	Number of cases tested	Number of positive cases	%
Patients	13,596	550	4.1*
Out-patients	7,671	258	3.4
In-patients	5,925	292	4.9
Blood donors	1,876	31	1.7*

* The difference is statistically significant ($p=0.001$)

TABLE 2. *HBe/anti-HBe status of 228 HBsAg-positive patients*

	HBeAg (+) anti-HBe (-)	HBeAg (+) anti-HBe (+)	HBeAg (-) anti-HBe (-)	HBeAg (-) anti-HBe (+)
Number of patients (%)	39 (18.0)	3 (1.5)	18 (6.0)	168 (74.5)

further characterization of HBsAg-positive patients in regard to HBe/anti-HBe status is of practical importance. When we examined the HBe/anti-HBe status of 228 HBsAg-positive patients, only 18% was revealed to have HBeAg while 74.5% possessed anti-HBe (Table 2). These figures resembled the prevalence of HBeAg (19%) and anti-HBe (81%) in the asymptomatic carriers of HBV rather than that in patients with chronic liver diseases in which the ratio of HBeAg and anti-HBe was approximately 1:1 (Fukuda et al. 1981). Three patients (1.5%) were shown to have both HBeAg and anti-HBe in their blood. This coexistence of HBeAg and anti-HBe was reported in patients who were in the way of the seroconversion from HBeAg to anti-HBe (Suzuki et al. 1981). It has been established that HBeAg is a reliable marker of high infectivity and that anti-HBe, on the contrary, suggestive of very low infectivity, if not at all (Miyakawa and Mayumi 1982). In conclusion, it is true that medical personnel is at risk of incurring HBV infection but only the minority (one fifth in our study) of HBsAg-positive patients incur a risk of HBV infection within a hospital and the interruption of HBV transmission should be accomplished by careful precautions when dealing with the infectious patients, their blood and their excretions.

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