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Hepatitis B virus markers in patients with schistosomiasis, liver cirrhosis and hepatocellular carcinoma in Khartoum, Sudan.

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Abstract

Markers of hepatitis A and B virus were tested in 88 adult Sudanese subjects in Khartoum, Sudan. The subjects consisted of 25 control hospitalized patients, 21 volunteer blood donors, 23 patients with hepatosplenic schistosomiasis, 13 patients with liver cirrhosis and 6 patients with hepatocellular carcinoma (HCC). Antibody to hepatitis A virus was detected in 96% of the total. Hepatitis B surface antigen (HBsAg) was positive in 4, 24, 22, 31, and 67% of the subject groups, respectively. Antibody against hepatitis B core antigen (HBcAb) of undiluted serum was positive in 60, 57, 65, 77 and 83%, and there was no difference in incidence among the groups. It was positive in 200X diluted serum in 4, 24, 17, 23 and 60%. HBsAg and HBcAb (200X) were detected more often in HCC patients than in the control subjects (p less than 0.01). Hepatitis B virus is an important factor in the etiology of HCC in the Sudan.

KEYWORDS: hepatitis B virus markers, liver cirrhosis, hepatocellular carcinoma, schistosomiasis, Sudan

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Hepatitis B Virus Markers in Patients with Schistosomiasis, Liver Cirrhosis and Hepatocellular Carcinoma in Khartoum, Sudan

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Markers of hepatitis A and B virus were tested in 88 adult Sudanese subjects in Khartoum, Sudan. The subjects consisted of 25 control hospitalized patients, 21 volunteer blood donors, 23 patients with hepatosplenic schistosomiasis, 13 patients with liver cirrhosis and 6 patients with hepatocellular carcinoma (HCC). Antibody to hepatitis A virus was detected in 96% of the total. Hepatitis B surface antigen (HBsAg) was positive in 4, 24, 22, 31, and 67% of the subject groups, respectively. Antibody against hepatitis B core antigen (HBcAb) of undiluted serum was positive in 60, 57, 65, 77 and 83%, and there was no difference in incidence among the groups. It was positive in 200× diluted serum in 4, 24, 17, 23 and 60%. HBsAg and HBcAb (200×) were detected more often in HCC patients than in the control subjects ($p < 0.01$). Hepatitis B virus is an important factor in the etiology of HCC in the Sudan.

Key words : hepatitis B virus markers, liver cirrhosis, hepatocellular carcinoma, schistosomiasis, Sudan

Hepatitis B (HB) virus is more prevalent in Southeast Asia and Japan than in Europe or America, and is known to be important to the etiology of liver cirrhosis (LC) and hepatocellular carcinoma (HCC) (1). Vaccines against HB have been administered to infants shortly after birth in these regions (1). HB virus is believed to be hyperendemic in Africa (1), but the incidence of carriers of HB virus (HBV) markers has not been studied in depth in the Sudan (2-7). We had a chance to investigate the incidence of markers of HB and hepatitis A in patients with schistosomiasis, LC and HCC who were admitted to Ibn Sina Hospital in Khartoum, Sudan.

Subjects and Methods

The 88 subjects (Table 1) consisted of 25 control patients hospitalized in the department of otorhinolaryngology or urology, 21 volunteer blood donors, 23 patients with schistosomiasis mansoni, 13 LC patients and 6 HCC patients. The patients with liver diseases were diagnosed by peritoneoscopy and liver biopsy. Patients with schistosomia-

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Table 1 Subjects and incidence of hepatitis virus markers[a]

		Hospital control	Blood donor	Schistosomiasis	Liver cirrhosis	Hepatocellular carcinoma	Total
Number		25	21	23	13	6	88
Age	Mean	41.0*[b]	23.9**[c]	41.5*[b]	51.5*[b]	52.2	39.3
	SD	16.4	4.4	17.7	14.0	9.3	16.8
Sex	Male	15**[d]	21**[d],*[e]	17*[e]	11	2*[e]	66
	Female	10	0	6	2	2	20
	?					2	2
HBsAg	−	23(92)	15(71)	16 (69)	9(69)	1 (17)	64(72.7)
	±	1 (4)	1 (5)	2 (9)	0 (0)	1 (17)	5 (5.7)
	+	1 (4)**[f]	5(24)	5 (22)	4(31)	4 (67)**[f]	19(21.6)
Anti-HBc (1×)	−	7(28)	5(24)	6 (26)	2(15)	0 (0)	20(22.7)
	±	3(12)	4(19)	2 (9)	1 (8)	1 (17)	11(12.5)
	+	15(60)	12(57)	15 (65)	10(77)	5 (83)	57(64.8)
Anti-HBc (200×)	−	19(76)	16(76)	17 (74)	7(54)	2 (40)	61(70.1)
	±	5(20)	0 (0)	2 (9)	3(23)	0 (0)	10(11.5)
	+	1 (4)**[g]	5(24)	4 (17)	3(23)	3 (60)**[g]	16(18.4)
	Not tested					1	1
Anti-HAV	−	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.0)
	±	1 (7)	1 (5)	0 (0)	1((9)	0 (0)	3 (4.2)
	+	14(93)	19(95)	21(100)	10(91)	4(100)	68(95.8)
	Not tested	10	1	2	2	2	17

a : Numbers in parentheses indicate percentage.

b, *d-g* : Significantly different between the values with the same letters : *, $p < 0.05$; **, $p < 0.01$.

c : Significantly different from all other groups : **, $p < 0.01$.

Abbreriations : HBsAg, hepatitis B surface antigen; Anti-HBc, antibody to hepatitis B core antigen; Anti-HAV, antibody to hepatitis A virus.

sis had hepatosplenomegaly, portal hypertension and esophageal varices, and had liver histology consistent with periportal fibrosis characteristic of schistosomiasis (8).

Serum samples were obtained in December 1987 and tested by radioimmunoassay at Okayama University Hospital for hepatitis B surface antigen (HBsAg), antibody to hepatitis B core antigen (anti-HBc) and antibody to hepatitis A virus (anti-HAV) using Austria II-125, CORAB and HAVAB kits (Abott Laboratories), respectively. Anti-HBc was measured both in undiluted and in 200× diluted sera. HBsAg was evaluated as being negative when the cutoff index was less than 1, positive when over 5 and ± when between the two values. Anti-HBc and anti-HAV were evaluated as being negative when the inhibition percent was under 30%, positive when over 70% and ± when between the two values.

Statistical analyses were carried out by the chi-square test with Yates' correction and Student's *t*-test.

Results

The results are shown in Table 1. All subjects were over 15 years of age. The blood donor group had the youngest average age of the 5 groups ($p < 0.01$). LC patients were older than the subjects of the other groups except for the HCC group ($p < 0.05$). The blood donors were all males, as in the Sudan females are not normally allowed to donate blood.

HBsAg was positive in 22% of all of the subjects. HBsAg was more often positive in HCC patients (67%) than in the hospital controls (4% ; $p < 0.01$), but there were no significant differences among the other groups.

Anti-HBc (1×) was positive in 65% of all of the subjects. There were no significant differences among the groups. However, when anti-HBc was diluted 200×, it was positive in 18% of the subjects and more often observed in HCC patients (60%) than in the hospital controls (4%, $p < 0.01$).

Anti-HAV was positive in 96% of all of the subjects, and there were no differences in incidence among the groups.

Discussion

The prevalence of HBV has been investigated throughout the world (1-3) and is still being evaluated in developing countries such as the Sudan. HBV infection is common in the Sudan. Anti-HBc (1×) was positive in 60% of the hospitalized controls and 57% of the blood donors in this study, which is similar to the 73% reported for Ethiopia (9), a country neighboring the Sudan.

HBsAg was reported to be positive in 20% of 98 patients without apparent liver disease in Omdurman, adjacent to Khartoum, Sudan (4,7), in 12.3% of 365 voluntary blood donors in southern Sudan (5) and in 10.8% of 5,270 young males in Ethiopia (9). In the present study, HBsAg was positive in 4% of the hospitalized controls and 24% of the blood donors. The high incidence among the blood donors may be explained by their young age. A larger scale survey will be necessary to determine the incidence among the general population.

HBsAg was positive in 31% of 13 LC patients and in 67% of 6 HCC patients in this study, indicating that HBV plays an important role in the etiology of LC and HCC in the Sudan. Aflatoxin has been shown to be a major etiological factor of HCC in Uganda (10) and Kenya (11), countries neighboring the Sudan. As far as we know, there is no published data concerning the incidence of HBV markers in LC and HCC patients in the Sudan.

Portal hypertension due to schistosomiasis is common in the Sudan (6,12). The present study did not show a difference in the incidence of hepatitis B virus markers be-

tween the hospital controls or blood donors (Anti-HBc ; 57, 60%, HBsAg ; 4, 24%) and the schistosomiasis patients (Anti-HBc ; 65%, HBsAg ; 22%). This result is not consistent with an earlier report that HBV infection occurred twice as often in 20 patients with schistosomiasis as in the controls (6). Chronic HB infection in schistosomiasis is important, as patients with dual infection have more clinical signs of chronic liver disease (13,14), more destructive liver cell lesions in the form of chronic active hepatitis or LC (13,15), and a greater risk of spreading HB as they carry the HBe antigen (15).

Hepatitis A continues to be endemic in the Sudan and infects almost all of the population during childhood (1). Anti-HAV was positive in 96% of the adults in this study. In addition, hepatitis non-A, non-B is a common cause of outbreaks of acute hepatitis in adults in the Sudan (7,16). As these viral infections are spread by fecal-oral routes, public health measures, such as provision of clean water and adequate disposal of sewage, should be taken (1).

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