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Hepatitis B virus markers in Japanese immigrants and their descendants in Bolivia and native Bolivians

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Summary: A survey of hepatitis B virus (HBV) markers of Japanese immigrants, their descendants and native Bolivians was performed in two agricultural settlements in Bolivia. The prevalence of HBV markers in sera, either hepatitis B surface antigen (HBsAg) or its antibody (HBsAb), was higher in the Japanese (46.4%) than in the native Bolivian (12.9%) adult generations of both colonies. There was no significant difference between Japanese (4.3%) and Bolivian (0.9%) school children in one colony, but a high percentage (32.6%) was recognized among Japanese children in the other colony. The numbers of adw subtypes were unexpectedly high among these HBsAg positive Japanese children, compared to those in Japan. Antibody to hepatitis delta virus (HDV) was detected in one case. These data suggested that although horizontal transmission of adw HBV had occurred within the Japanese population, HBV and HDV were not endemic to this geographic area. *Gastroenterol Jpn 1990;25:335–338*

Key words: *hepatitis B virus; hepatitis delta virus; Japanese immigrants, seroepidemiology; subtype*

Introduction

Several migrant studies on hepatitis B virus (HBV) have contributed toward clarifying the major route of HBV transmission, because the prevalence of HBV infection and the distribution of hepatitis B surface antigen (HBsAg) subtypes in immigrant populations reflect those in their places of origin[1,2]. Seroepidemiological information, however, for HBV infection in small localities is still insufficient. A recent survey in Rumania has shown a high prevalence of HBsAg positivity among the population; more than 70% of those HBsAg carriers have antibody to hepatitis delta virus (HDV) in their sera[3]. It is well known that the Israeli immigrants from Rumania and the USSR also have a high positive prevalence of both HBsAg and antibody to HDV[3]. These findings may introduce new aspects of the epidemiology of HDV[4].

In South America, many communities were omitted from the seroepidemological investigation for HBV, and little information is available on people other than native. Recently, endemic hepatitis has been reported in Columbia[5,6]. Additional information on hepatitis in South America can be found only in local reports[7]. We reported the prevalence of infection markers for both HBV and human T lymphotropic virus type I (HTLV-I) among the Japanese population in Bolivia and the

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Table 1 Seroprevalence of HBV markers in Japanese immigrants and their descendants in Bolivia and native Bolivians

Generation Ethnic group	Adults (Age>=20)		School children (Age 8-17)		
	Japanese	Bolivian	Japanese	mixed parentage	Bolivian
Colonia Okinawa					
Number examined	178	150	69	10	117
HBsAg positive	5 (2.8)	3 (2.0)	1 (1.5)	0 (0.0)	0 (0.0)
HBsAb positive	84 (47.2)	12 (8.0)	2 (2.9)	0 (0.0)	1 (0.9)
HBsAg or HBsAb	89 (50.0)	15 (10.0)	3 (4.3)	0 (0.0)	1 (0.9)
Colonia San Juan					
Number examined	128	44	95	5	6
HBsAg positive	4 (3.1)	0 (0.0)	9 (9.5)	0 (0.0)	0 (0.0)
HBsAb positive	49 (38.3)	10 (22.7)	22 (23.2)	0 (0.0)	0 (0.0)
HBsAg or HBsAb	53 (41.4)	10 (22.7)	31 (32.6)	0 (0.0)	0 (0.0)

Number in parentheses indicate percentages

independent seropositivity of each virus[8]. In the present paper, we dealt with the distribution of the HBsAg subtype and prevalence of antibody to HDV in addition to prevalence of HBsAg and its antibody (HBsAb), and the results of an extensive survey of native Bolivians.

Subjects and Methods

The materials of this study consisted of sera from the Japanese and Bolivian populations living in two Japanese agricultural settlements, "Colonia Okinawa" and "Colonia San Juan" located in the suburbs of Santa Cruz in Bolivia. The geographic and historic aspects of these colonies have been described briefly in a previous report[8]. The Japanese settlers in these colonies form relatively closed social groups with little social or marital interaction with native Bolivians in the neighborhood. The Japanese populations in Colonia Okinawa and Colonia San Juan were 997 (184 households) and 1131 (224 households), respectively. Approximately the same number of natives live in both districts. The birth places of the immigrants to Colonia Okinawa were limited to Okinawa prefecture, where HBV is known to be endemic[9], 50% of the total number of households in Colonia San Juan had come from Nagasaki, 11% from Fukuoka, and the rest from other parts of Japan.

When routine health check-ups of Japanese residents in both colonies were performed in August 1986, venous blood samples were collected and their sera were frozen until assay three months later in Tokyo, Japan. We also conducted these health check-ups for native Bolivians of these two colonies in August 1987. Persons who received these health check-ups did not appear to have any serious health problems.

HBsAg and HbsAb were assayed by the reverse passive hemagglutination method (RPHA) and the passive hemagglutination method (PHA), respectively. HBsAg subtypes were determined using the enzyme immunoassay kit with monoclonal antibodies specific to epitope 'd', 'y', 'r', and 'w' (Institute of Immunology, Tokyo). Antibody to HDV was detected using a radioimmunoassay kit (Dainabott, Tokyo).

Results

In all, 802 sera were analyzed for this study: in Colonia Okinawa, 178 from Japanese and 150 from native Bolivian adults, 69 from Japanese, 10 from subjects of mixed Japanese/Bolivian parentage, and 117 from Bolivian school children; and in Colonia San Juan, 128 from Japanese, 44 from native Bolivian adults and 95 from Japanese, 5 from children of mixed parentage and 6 from Bolivian school children.

The numbers and percentages of HBsAg and HBsAb positive cases in each group are shown in **Table 1** according to generation, ethnic group and place of residence. The markers of either HBsAg or HBsAb were found in 46.4% (50.0% in

Table 2 HBsAg titers and subtypes in HBsAg positive subjects

			titer (RPHA)	subtypes	anti-delta
Colonia Okinawa					
Adults	Japanese	1	> 512 X	adr	negative
		2	> 512 X	adr	negative
		3	64 X	adw	positive
		4	128 X	adw	negative
		5	> 512 X	adw	negative
	Bolivian	1	8 X	a?w	negative
		2	64 X	a?w	negative
		3	> 512 X	adw	negative
School children	Japanese	1	> 512 X	adw	negative
Colonia San Juan					
Adults	Japanese	1	> 512 X	adr	negative
		2	> 512 X	adr	negative
		3	256 X	adw	positive
		4	> 512 X	adw	negative
School children	Japanese	1	> 512 X	adw	negative
		2	> 512 X	adw	negative
		3	> 512 X	adw	negative
		4	> 512 X	adw	negative
		5	> 512 X	adw	negative
		6	> 512 X	adw	negative
		7	> 512 X	adw	negative
		8	> 512 X	adyw	negative
		9	32 X	ad?	negative

?: not determined because of low titer

Colonia Okinawa and 41.4% in Colonia San Juan) of the Japanese adult immigrants and in 12.9% (10.0% in Colonia Okinawa and 22.7% in Colonia San Juan) of the native Bolivians. Japanese immigrants revealed statistically significant (chi-square test: $P<0.05$) higher rates of prevalence than Bolivians in both colonies, although there was no significant difference between Colonia Okinawa and Colonia San Juan in prevalence among both ethnic groups.

In school children, these rates were 4.3% (Japanese), 0.0% (mixed parentage) and 0.9% (Bolivian) in Colonia Okinawa and 32.6% (Japanese), 0.0% (mixed parentage) and 0.0% (Bolivian) in Colonia San Juan. An extremely hgh rate was found in Japanese children of Colonia San Juan, compared to that of Bolivian children or even that of Japanese children of Colonia Okinawa. There were no significant differences between Japanese and Bolivian children of Colonia Okinawa.

The titers of HBsAg, its subtypes and antibody to HDV for HBsAg positive cases are shown in **Table 2**. The subtype with the "w" epitope was predominant in both colonies and both ethnic groups, particularly in Japanese children of Colonia San Juan. One of the 22 HBsAg positive cases was also positive for antibody to HDV.

Discussion

The proportion of people having infection markers of either HBsAg or HBsAb, was consistently higher in Japanese immigrants than in their Bolivian neighbors in both colonies. This indicates that HBV is not endemic to this area and that HBV among Japanese immigrants had originated in Japan. In addition to infection in Japan, transmission is likely to occur among Japanese immigrants after immigration to Bolivia, because the prevalence of HBsAg or Ab is approximately twice that of Japanese in Japan[10,11].

The percentage of individuals positive for HBV marker was lower among school children than adults of Colonia Okinawa. This remarkable difference in HBsAg positivity reflects the differences in occasions of exposure to HBV between adults and school children. The combination of improved sanitation and nutrition, as observed among the Japanese in Japan may be responsible[10].

On the contrary, the positive rate of HBV markers was extraordinarily high among school children of Colonia San Juan. The rate of HBsAg positive children surpassed that of adults. Furthermore, the HBsAg subtyep with the "w" antibody was found in 8 out of 9 HBsAg positive children. This is notably inconsistent with the distribution in the homeland of their parents in Japan, especially northern Kyushu, where adr is predominant[11-15]. Generally, it is believed that vertical transmission plays the most significant part in the transmission of HBV, especially in children. An endemic heptitis of an unknown type had been found in Colonia San Juan between 1982 and 1984, suggesting a horizontal infection from

adw type carriers on that occasion. An alternative hypothesis is that the adw subtype is more infectious and more easily transmitted, especailly in a horizontal manner.

The subtype HBsAg among native Bolivian was recognized in three cases, all of whom had the "w" antibody. This finding is consistent with HBsAg subtypes in other South Ameircan countries (mainly Brazil and Argentina)[16], although no additional information on the subtype is available concerning Bolivians.

The prevalence of antibody to HDV among Japanese HBsAg carriers is very low, whereas the Amazon basin is known to be an endemic area of delta virus[5,17,18]. There is no currently available information on antibody to HDV from the neighboring districts of Santa Cruz and the upper part of the Amazon river. We found only one individual with the antibody to HDV. He was a male farmer, 64 years of age, who was neither a drug abuser nor hemophiliac, therefore he did not seem not to belong to a high risk group for HDV infection[19]. He had a history of dengue fever (at age 25), malaria (at age 25), and hepatitis (at age 45), but the origin of HDV infection was not determined.

Our data consisted of rather limited information obtained from the Japanese colonies about the frequency, distribution and varieties of HBV infection, but it may provide an important basis for future studies on the epidemiology of HBV related diseases in South America.

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