

THE EPIDEMIOLOGY OF HEPATITIS B ANTIGEN AND ANTIBODY AMONG PANAMANIAN CUNA INDIANS*

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Abstract. Previous studies of hepatitis B antigen (HBsAg) and antibody to it (anti-HBs) showed widely differing exposures between Panamanian Indian tribes. Cuna Indians living on islands appeared infrequently exposed to HBsAg; we found no one antigenemic and low age specific anti-HBs rates. In contrast, mainland dwelling Guaymi and Chocó Indians had a high prevalence of anti-HBs. We have now measured HBsAg by counter-electrophoresis and anti-HBs by radioimmunoassay in two Cuna Indian groups who live in the Darien forest. The prevalence of HBsAg among Darien Cuna was low, 3 positive of 239 tested, but 106 (44%) had anti-HBs. Darien Cuna thus evidenced greater exposure to HBsAg than island Cuna (8% had anti-HBs) and had an anti-HBs prevalence similar to the neighboring Chocó Indians (42%). The Guaymi Indians of western Panama had a lower frequency of anti-HBs (29%) than either Chocó or mainland Cuna but their frequency of chronic antigenemia was significantly greater. These data suggest that while exposure may be a function of village habitat, chronic antigenemia may reflect differences in host responses.

Exposure to hepatitis B antigen (HBsAg) varies considerably among Panamanian Indians. In a previous study, mainland dwelling Guaymi and Chocó Indians had a high frequency of antibody to HBsAg (anti-HBs) (26 and 42%) whereas only 8% of island Cuna Indians were positive.¹ It was difficult to account for these differing exposures to HBsAg, since the Indian groups did not practice self-mutilation nor were injections common. Village habitat constituted the most striking disparity between the three groups. The Guaymi live in western Panama's tropical deciduous forest and savannah; Chocó Indians live in the Darien rain forest; the previously sampled Cuna Indians occupy coral islands off eastern Panama's Caribbean coast. However, the Cuna Indian tribe also has villages close to the Chocó in the Darien forest. The present paper describes

the seroepidemiology of HBsAg and anti-HBs among the forest dwelling Cuna.

METHODS

Blood samples were obtained from the inhabitants of two clusters of mainland Cuna villages. In 1967 Drs. Pedro Galindo and Carl Johnson (Gorgas Memorial Laboratory) collected 99 sera during a Chagas disease survey in the Chucunaque River villages of Nura, Huala and Morti. During 1972 we sampled 140 inhabitants of Maje, Icanti, Ipeti and Ibesipgana on the Bayano River. In each village we established medical clinics to vaccinate children against measles and provide medical care, and everyone 6 months or older attending the clinic had blood specimens taken. We also attempted to bleed all relatives of those attending the clinic.

Sera were assayed for HBsAg using counter-electrophoresis² and a guinea pig antiserum.³ An aliquot from each serum was tested for anti-HBs at the Laboratory of Infectious Diseases, NIAID, using the radioimmunoprecipitation technique.^{4,5}

Statistical analysis of HBsAg and anti-HBs frequencies utilized the Mantel Haenszel method,⁶ which combines individual 2×2 tables for each age group and controls them according to relative sample size and percent positive.

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TABLE 1
Age specific anti-HBs prevalence in Cuna Indians

Age (yrs)	Chucunaque	Bayano	Island
0-4	0/0 (0)*	1/20 (5)	1/63 (2)
5-9	4/7 (57)	5/34 (15)	3/50 (6)
10-19	20/24 (83)	2/17 (12)	3/78 (4)
20-29	17/20 (85)	9/27 (33)	10/125 (8)
30-39	25/30 (83)	4/13 (31)	9/84 (11)
40+	13/15 (87)	6/29 (21)	9/66 (14)

* No. positive/no. tested (% positive).

RESULTS

None of the 140 individuals from Bayano River villages had HBsAg. Three of 99 Chucunaque River inhabitants were antigenemic. All three were 8-year-old males from different families.

Table 1 shows age specific anti-HBs frequencies among Chucunaque and Bayano Cuna. A significantly greater anti-HBs prevalence occurred among Chucunaque Cuna than Bayano Cuna ($p < .001$).

Bayano Cuna older than 19 years had a higher anti-HBs prevalence than younger Bayano Cuna ($p < .05$). A statistically significant difference in anti-HBs frequency by age could not be shown for the Chucunaque Cuna.

DISCUSSION

Mainland Cuna had a low rate of antigenemia, similar to that of island Cuna and the neighboring Chocó.¹ As with all other antigenemic Panamanian Indians yet studied, the three HBsAg-positive forest Cuna were subtype *ad*.⁷

In contrast to their low antigenemia rates, the high anti-HBs prevalence among mainland Cuna indicated frequent past exposure to HBsAg. Mainland Cuna are similar genetically, linguistically, and anthropologically to the island Cuna.^{8,9} who suffered significantly fewer infections with hepatitis B virus ($p < .01$) (Table 1). Village habitat provides the most plausible explanation for these different exposure rates. Island Cuna inhabit the San Blas archipelago off Panama's Caribbean coast. Mainland Cuna live in villages located alongside large rivers in the Darien forest. The Chocó Indians live in close proximity to mainland Cuna, often only miles apart on the same river; are unrelated to Cuna;^{8,9} and anti-HBs prevalence among Chocó is similar to that

of mainland Cuna.¹ Both Darien Cuna and Chocó urinate, defecate and bathe in the rivers as well as obtain drinking water from them. In contrast, island Cuna urinate and defecate into the ocean and transport drinking water from streams on the sparsely inhabited mainland coast. Since several studies have shown HBsAg in the urine and feces of infected individuals,^{10,11} water supply may be the most important environmental difference between these groups.

In spite of their relatively intense exposure early in life to HBsAg, Darien Cuna had a low rate of antigenemia. This contrasts with our previous findings in the Guaymi Indians of western Panama who manifest lower age specific antibody rates but had a significantly greater proportion of chronically antigenemic individuals.² We think different host responses following exposure to HBsAg best explain this discrepancy. Longitudinal studies of primitive population groups are necessary to further clarify this hypothesis and to elucidate the epidemiology of hepatitis B infection in nature.

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