

Hepatitis Bs Antigen Transmission By Close Contact*

Meliha Ertuğrul, M.D.** / Münevver Bertan, M.D.*** /
Nevzat Eren M.D.****

Hepatitis B surface antigen (HBsAg) formerly termed serum hepatitis antigen, is transmitted by inoculation of blood or blood products containing hepatitis Bs antigen. Recent experimental and epidemiologic evidence suggest that this disease can also be transmitted by non-parenteral route¹, many people have HBsAg but they do not have any history of inoculation or transfusion of blood or blood products.

There have been many reports on the detection of HBsAg in human body excretions²⁻⁹ which may suggest the possibility of transmission of the virus with these excretions.

The purpose of this study was to find out the frequency of HBsAg in various groups of children (school children, family members, orphanage and rural area children) and to consider the transmission of hepatitis B antigen through parenteral and nonparenteral routes.

Materials and Methods

We studied 25 children from an elementary half-day school and 74 children from an orphanage, 28 siblings of 14 patients with hepatitis from the out-patient clinic and 40 healthy children from a rural area.

From all children serum specimens were collected and information related to history of jaundice, transfusion of blood and blood products was obtained, and they all had complete physical examination.

* From Hacettepe University, Faculty of Medicine, Departments of Pediatrics and Community Medicine and Hacettepe Children's Medical Center.

** Associate Professor of Pediatrics.

*** Professor of Pediatrics.

**** Associate Professor in Community Medicine.

The patients and their siblings were tested for serum transaminase levels, these were also determined for healthy children in whom HBsAg was positive.

Standard procedures were used to prepare the specimens for evaluation by Ouchterlony immunodiffusion technique in agarose gel modified by Prince (ID)¹⁰ and micro complement fixation test (CF) (Behringwerk). And Radio-Immuno-Assay (RIA) technique (Abbott Laboratories) was used in the last group.

Results

Table I shows the frequency of HBsAg in two groups. One out of 25 (4%) elementary school children had positive HBsAg by ID technique and 2 (8%) had positive by CF technique, in 11 out of 74 (14.8%) children in orphanage by ID technique and in 18 (24.3%) by CF technique.

Statistical comparison was made using chi square (X^2) test, the difference between elementary school and orphanage children was found to be insignificant ($p > 0.05$).

Table II shows distribution of HBsAg in 14 patients with hepatitis and their 28 siblings. 8 out of 14 (57%) hepatitis patients had antigen, five of their siblings also had HBsAg (17.8%). All 28 siblings had normal serum transaminase levels.

Table III shows HBsAg in healthy children from a rural area by RIA technique. Two out of 40 (5%) children had antigen in their sera.

TABLE I
THE FREQUENCY OF HBsAg IN CHILDREN

Groups	No. Tested	HBsAg Positive			
		I.D. technique		C.F. technique	
		No.	%	No.	%
Elementary School children	25	1	4	2	8
Orphanage	74	11	14.8	18	24.3

(X^2) Difference is statistically insignificant ($p > 0.05$)

TABLE II

DISTRIBUTION OF HBsAg IN 14 PATIENTS WITH HEPATITIS AND THEIR 28 SIBLINGS BY CF TECHNIQUE

Patients With Hepatitis	No. Tested	Siblings HBsAg	
		Positive	Negative
HBsAg Positive	8	4 (2)*	16
HBsAg negative	6	1	7
Total	14	5	+ 23 = 28

* Had had hepatitis 3-6 months previously

TABLE III

HBsAg IN HEALTHY CHILDREN FROM A RURAL AREA BY RIA TECHNIQUE

No. Tested	HBs Ag Positive	
	No.	%
40	2	5

Discussion

Viral hepatitis B is known to be transmitted parenterally, but majority of viral hepatitis B may be attributed to a non-parenterally transmitted infection¹. One published report showed that in 69.7 % of the adults and in 90.1 % of the children transmission of the infection was non-parenteral.¹¹

HBsAg was present in the saliva of 76 % of patients with acute hepatitis during the first three weeks after clinical onset of the disease and in 86 % of chronic carriers intermittently. Thirty-five percent of sneeze samples from antigenemic patients were antigen positive⁵. Saliva is probably the main route of infection in non-parenterally transmitted type B hepatitis.

Hepatitis B antigen has been demonstrated by various methods in urine, feces, saliva, semen, breast milk, tears, and bile.²⁻⁹

Table I shows two healthy groups one of them from an orphanage, these children lived in the same building and used the same toilet and bathroom and ate their meals together. The other group from an elementary school, class mates who do not eat at school. The elementary school

group was found to have the HBsAg incidence 4% by ID technique, this is about the same as the prevalence of HBsAg in Turkey which is 3.2%.¹²

The incidence of HBsAg in orphanage was 14.8% by ID and 24.3% by CF technique, these are very high percentages. But statistical comparison showed the difference between these two groups to be insignificant. None of the children in the orphanage had had jaundice nor transfusion of blood. However, previously two children had had hepatitis within a year in this orphanage, they had HBsAg and were not included in this study. Two antigen positive children had palpable liver but their transaminase levels were found normal, two other antigen positive children in this orphanage had high serum transaminase levels, but they were non icteric. We assumed that they have had anicteric hepatitis.

In five of 28 siblings HBsAg was positive. Two of these 5 siblings have had a history of jaundice 3-6 months earlier. They were in good health and the transaminase levels were normal at the time of the study. Probably, these two children were sources of hepatitis for their siblings.

These results suggested that HBsAg transmission was from close contact among the orphanage and siblings, from using same glass, sleeping in the same bed, kissing or by exchange of something (pencil, rubber, food or candies). Suggesting that oral contact was the most important factor, especially, saliva which may be a critical factor. Also, HBsAg transmission maybe by direct contact with antigen containing body fluids. Consequently it seems that the main route of transmission of the viral hepatitis type B is the non-parenteral.

Summary

Hepatitis Bs Antigen (HBsAg) was detected in sera from children whose living conditions varied (25 elementary school children, 74 children from an orphanage, 28 children whose siblings had hepatitis and 40 children from a rural area).

HBsAg was found in 8% of normal healthy school children by CF technique and in 5% of rural area controls by RIA technique. The frequency of HBsAg was high among the children from an orphanage (24.3%) and among siblings of children who had hepatitis (17.7%). All these children lived in the same building or house, and they were in close contact with one another. Also none of these children had history of parenteral exposure. This seems to indicate that household contact

and close physical contact are the most important factors in increasing the risk of HBsAg transmission.

REFERENCES

1. Krugman, S., Giles, J. P.: Viral Hepatitis: New Light on an old disease. *JAMA*, 212: 1019, 1970.
2. Apostolov, K., Bauer, D. J., Selway, J. W. T., Fox, R. A., Dudley, F. J., Sherlock, S.: Australia antigen in urine, *Lancet* 1: 1274, 1971.
3. Grob, P. J., Jemelka, H. I.: Fecal SH-Antigen in acute hepatitis, *Am. J. Dis. Child.* 123: 400, 1972.
4. Ward, R., Borchert, P., Wright, A. et al.: Hepatitis B antigen in saliva and mouth washings. *Lancet* 2: 726, 1972.
5. Villarejes, V. M., Visona, K. A., Gutierrez, A., Rodriguez, A.: Role of Saliva, Urine and Feeces in the Transmission of type B Hepatitis, *New Eng. J. Med.* 291: 1375, 1974.
6. Vittal, S. B., Dourdourekas, D., Steigmann, F.: Hepatitis B Antigen in saliva, urine, and tears, *Am. J. Gastroenterol.* 61: 133, 1974.
7. Boxall, E. H.: Breast-feeding and Hepatitis B, *Lancet* 2: 979, 1975.
8. Heathcote, J., Cameron, C. H., Dane, D. S.: Hepatitis B antigen in saliva and semen, *Lancet* 1: 71, 1974.
9. Serpeau, D., Mannoni, P., Dhumeaux, D. et al: Hepatitis associated antigen in human bile, *Lancet* 2: 1266, 1971.
10. Prince, A. M.: An antigen detected in the blood during the incubation period of serum hepatitis, *Proc. Nat. Acad. Sci.* 60: 814, 1968.
11. Kaszo, L., Makai, M., Palencsar, A., Szekely, P., Marer, E. S.: Parenteral versus non-parenteral transmission of HBsAg, *Lancet* 1: 675, 1974.
12. Ertuğrul, M., Say, B.: Australia Antigen in Turkey, *Lancet* 1: 1302, 1971.