

Occurrence of Hepatitis B Surface Antigen in Patients with Down's Syndrome*

M. Yüksel, M.D.** / Ö. Uzunlimalıoğlu, M.D.***
G. Öge, M.D.**** / B. Demirağ, M.D.*****

Hepatitis B surface antigen (HBsAg, Australia antigen) is an infectious agent that causes hepatitis in many who are infected with it. Since the discovery of the antigen in 1963¹, and its association with hepatitis in 1967², many aspects of its immunologic, infectious, epidemiologic, chemical, and clinical characteristics have been studied. Although it has many attributes of a virus, it also has the characteristics of serum protein polymorphism.

Individuals who develop persistent HBsAg with clinically inapparent hepatitis, or with no evidence of hepatitis at all, have been of particular interest. Sutnick et al³ have proposed the hypothesis that they have an innate (perhaps inherited) susceptibility to developing this persistence, and can be detected only following exposure to the infecting agent. Persistent HBsAg is associated with certain specific groups of individuals.³

1-Chronic forms of hepatitis. 2-Down's syndrome patients. 3-Patients with leukemia, lepromatous leprosy, chronic renal disease patients who are the subjects of chronic hemodialysis. 4- Normal people in some populations (particularly in tropical areas).

The relation between HBsAg and Down's syndrome has been studied by several workers²⁻¹² HBsAg was found in almost 30 percent of institutionalized patients with Down's syndrome in U.S.A.^{2,8} It

* From the department of Pediatrics, School of Medicine, Ankara University, Ankara.

** Associate Professor in Pediatrics.

*** Professor in Gastroenterology.

**** Assistant in Pediatrics

***** Professor in Pediatrics.

was extremely rare in the other mentally retarded patients in the same institutions and was not found in out-patients. It was also extremely rare in patients with Down's syndrome who were being maintained in small institutions.

The results obtained in a study to determine the incidence of HBs Ag in non-institutionalized Down's syndrome patients and their family members are reported in the present paper.

Materials and Methods

Subjects included 30 patients with Down's syndrome, 66 parents of Down's syndrome patients, and 50 normal controls matched for age, sex, and environment (Table I). The diagnosis of Down's syndrome had been made clinically and trisomy 21 had been found on chromosome analysis in all patients. All patients with Down's syndrome were not institutionalized.

Detection of HBsAg was made by counter immunoelectrophoresis technique. This method is a modification of Gocke and Kavey and Pesendorfer^{14,15} and described elsewhere.¹⁶

Results

The age and sex distribution of patients and controls is shown in (Table I)

TABLE I
AGE AND SEX DISTRIBUTION PATIENTS WITH DOWN'S SYNDROME
AND CONTROLS

Age	Down's Syndrome		Controls	
	Male	Female	Male	Female
0-1	11	4	14	12
2-4	7 (1)	1	11	3
5-10	2	5 (1)	6	4
	20	10	31	19
Total	30 (2)		50	

() Number of HBsAg positive patients with Down's syndrome.

HBsAg was detected in 2 of the 30 patients with Down's syndrome. The antigen could not be identified in sera from 36 mothers and 30 fathers, and 50 normal controls. The first patient with HBsAg was 5 years old. There was no known hepatitis exposure in her past history. The second case with HBsAg was a four year old male. His father had an history of hepatitis 4 years ago, but HBsAg could not be detected in his serum.

Discussion

The results of various investigations held in different populations revealed that the carrier state of HBsAg differs from one population to another (Table II). The frequency of HBsAg in the Turkish blood donors is about 3 percent.¹⁹⁻²¹ In another study, the incidence of HBsAg in a healthy population from the different parts of Turkey is found to be approximately 3 percent.²² The frequency of HBsAg in school children (between the ages of 7 to 12) was found 0 percent in high socioeconomic groups and 1.05 percent in the lower socio-economic groups. Among high school students the incidence is found to be 1.22 percent in high socio-economic population.²³ In a vocational school in Ankara this value is found to be 8.24 percent.²³ These results revealed that the frequency of HBsAg in Turkey is significantly higher than in European countries, U.S.A., and lower than in African countries.

TABLE II

PREVALENCE OF HBsAg AMONG INSTITUTIONALIZED AND NON INSTITUTIONALIZED PATIENTS WITH DOWN'S SYNDROME AND IN NORMAL POPULATION FROM DIFFERENT COUNTRIES

Authors and country	Institutionalized Down's syndrome patients	Non-institutionalized Down's syndrome patients	Normal Population
Blumberg (U.S.A) ² 1967	29.8	—	0.9 ¹⁸
Kobayashi (Japan) ⁸ 1969	41.7	—	0.5 ¹⁸
Hayashi (Japan) ⁸ 1970	54.5	—	0.5 ¹⁸
Ceppellini (Italy) ⁸ 1970	44	—	0 ¹⁸
Vierucci (Italy) ⁸ 1970	32.1	—	0 ¹⁸
Rittner (Germany) ⁵ 1970	25	—	0.2 ⁵
Sutnick (U.S.A) ⁸ 1972	29.3	—	0.9 ¹⁸
Zdzienicka (Poland) ²⁵ 1971	8.3	5.2	1.25 ²⁵
Ferris (Australia) ⁷ 1972	31.9	0	2.6 ¹⁸
Higgins (U.S.A) ¹¹ 1974	—	0	0.9 ¹⁸
Noura (S. Paulo) ¹⁰ 1974	—	0	0.4 ¹⁸
Rundle (England) ²⁴ 1975	31.3	—	0.12
Shiono (Japan) ¹² 1975	10.4	2.4	0.5 ¹⁸
Yüksel (Turkey) 1977	—	6.6	319-22

Table II also shows the frequency of HBsAg in Down's syndrome patients living at home or in large institutions in different countries. According to these results the frequency of HBsAg in Down's syndrome is the highest in patients living in large institutions and almost zero in

patients living at home. Shiono from Japan and Zdzienicka from Poland are the only investigators who found an increased frequency of HBs Ag in Down's syndrome patients living at home.^{12, 25}

Our studies demonstrate that in Turkey the frequency of HBsAg in Down's syndrome patients is considerably higher than in other countries. The difference for HBsAg between Turkish blood donors and Down's syndrome patients, is not significant ($t = 0.8$ $p > 0.05$). But, in our own age-matched control group we could not detect any antigen. Again the incidence of HBsAg in school children is found to be lower than in normal adult population²³ ($t = 4.2555$ $p > 0.05$). This study suggests that in addition to environmental factors, an immunologic defect may also play a role for the development of increased frequency of antigen in some Down's syndrome patients. Sutnick et al. found that Down's syndrome patients had persistent antigen for 2 to 5 years during which they were followed. They suggested that the persistence of HBsAg and perhaps chronic infection with other organisms is based on an immunologic defect related to lymphocyte function and an environmental factor, probably infectious, present in large institutions.^{8, 13}

Summary

There has been evidence in the literature suggesting that children with Down's syndrome have a higher incidence of HBsAg than the normal population. This is especially true for children living in institutions. The sera of 30 patients with Down's syndrome and their families were tested for hepatitis associated antigen. These children were routinely seen on out-patient basis, and all of them lived at home with their family. HBsAg was not detected in 66 parents of Down's syndrome patients. Only two children were positive (6.6 %). Our study suggests that in Turkey the frequency of HBs Ag in Down's syndrome patients is considerably higher than in other countries.

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