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Risk of Hepatitis B in a Ward for Mentally Retarded HBsAg Carriers

Summary: A screening of 615 mentally retarded residents in a Finnish institution revealed 22 HBsAg-positive asymptomatic carriers in 1972. Thirteen of them were placed in a special ward and followed up for 12 years. Only one patient had hepatitis eight years later. During the years all 52 staff members of the ward and the laboratory had been HBsAg-negative, but one laboratory nurse and two ward nurses showed antibody production. The seroconversion rate was one per 33 person-years among the staff. The results suggest that the risk of transmitting hepatitis B still exists, even in special wards in such institutions, and isolation of the carriers alone cannot guarantee full protection for hepatitis B infections.

Zusammenfassung: *Risiko der Hepatitis B-Virus-Infektion auf einer Station für geistig retardierte HBsAg-Carrier.* Beim Screening von 615 Insassen einer Anstalt für geistig Retardierte in Finnland fanden sich im Jahr 1972 22 asymptomatische, HBsAg-positive Hepatitis B-Virus-Träger. Von diesen wurden 13 auf einer eigenen Station untergebracht und 12 Jahre lang überwacht. Nach acht Jahren war nur bei einer dieser Personen eine Hepatitis aufgetreten. Von den 52 Mitgliedern des Pflege- und Laborpersonals blieben alle bis auf eine Laborantin und zwei Stationsschwestern, die Antikörper bildeten, HBsAg-negativ. Die Serokonversionsrate betrug 1 auf 33 Patientenjahre. Folglich besteht in solchen Institutionen auch auf Spezialstationen das Risiko der Hepatitis B-Virus-Übertragung, und die Isolation der Carrier reicht für einen sicheren Schutz vor Hepatitis B-Virus-Infektion alleine nicht aus.

Introduction

The prevalence of hepatitis B virus (HBV) surface antigen (HBsAg) carriers is high in institutions for the mentally handicapped (1–3). There are at least two reasons for this: the occurrence of a carrier state is exceptionally high in Down's syndrome (4, 5), and the behaviour of some inmates – poor hygienic practices or aggressive behaviour, such as biting – favours the spread of infection (6). A high incidence of HBV markers raises the question of long-term consequences, both to the carriers and the staff (7–10).
Estimating the risk of transmitting hepatitis to contacts is also of importance when the residents are outside the institution (11–13). Possibilities for such contacts are increasing because integration into society is presently the goal in the care of mentally retarded persons.
We studied retrospectively the follow-up data collected over a period of 12 years from staff members and HBsAg-positive residents in an institution for the mentally retarded. Our purpose was to evaluate the risk of hepatitis among the staff in a ward for HBsAg-positive patients.

Patients and Methods

In 1972, the epidemiology of HBsAg was studied in Rinnekoti, an institution for the mentally retarded (14).The number of patients studied was 615, 22 of whom were HBsAg-positive. Eight of them had Down's syndrome. A special ward was arranged for the carriers in order to prevent spreading of the infection. Five of these 22 patients died during the 12-year period; the deaths were all unrelated to HBV or liver disease. Four patients were relocated in other institutions. Data concerning 13 persons were available for the study in 1984. Their age range at the end of the follow-up was from 22 to 59 years. Five of them had Down's syndrome.
During these years, the nurses of this ward (40) and the laboratory staff of the institution (12) had also been followed up to detect asymptomatic infections. Serum samples for HBsAg, anti-HBs and alanine aminotransferase (ALAT) activity were examined twice a year during the whole employment period. Follow-up time for the nursing staff ranged from six months to 12 years, and for laboratory personnel from one to 12 years, depending on the length of employment. The total follow-up time was 1,246 person-months.
The serum samples were tested in 1972 both by the immunodiffusion and complement fixation methods (14). Since 1980, the HBsAg, HBeAg, anti-HBs and anti-HBe have been tested by enzyme-linked immunosorbent assays (Abbott Laboratories, North Chicago, Ill.).

Results

Thirteen mentally retarded persons were asymptomatic HBsAg carriers at the beginning of the follow-up in 1972. Ten had antigenaemia throughout the 12-year study period and three became antigen-negative, and antibodies against HBsAg were detected (Table 1) in significant ti-

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Table 1: HBV-markers among the mentally retarded residents and the staff members in 1984.

	HBsAg	Anti-HBs	HBeAg[3]	Anti-HBe
Residents[1]	10/13	3/13	1/10	7/10
Ward staff[2]	0/40	4/40[x]	ND	ND
Laboratory personnel[2]	0/12	1/12	ND	ND

[1] All HBsAg-positive in 1972;
[2] All HBsAg-negative when employed;
[3] HBeAg determined on HBsAg-positive patients;
[x] Two already positive when employed.

ters (the anti-HBs titers were 36–112 × mean of the negative titer). Seven out of 10 HBsAg carriers had antibodies against HBe antigen.

One male patient with Down's syndrome had clinically diagnosed hepatitis with high transaminase activities in 1980. The autoimmune studies suggested chronic persistent hepatitis; a liver biopsy was, however, not performed. After complete clinical recovery, he had a relapse in 1982, and during that period HBeAg was also detected in his blood and it has remained positive since then. He was the only HBeAg-positive patient in the whole group.

All 52 staff members studied remained HBsAg-negative (Table 1). Two of the ward nurses had anti-HBs antibodies before they started work on the ward. They were excluded from the calculation of risk indicators because they were already immune at the beginning of follow-up. Two ward nurses and one laboratory nurse developed antibody production during the follow-up period. Thus, the seroconversion rate was approximately one per 33 person-years (three per 1,182 person-months). None of the staff had any symptoms suggesting hepatic injury.

On four occasions a nurse received HBV hyperimmune globulin after being bitten by an HBsAg-positive patient. The blood samples revealed a transient anti-HBs antibody rise.

Two of the inmates had slightly elevated ALAT activity in 1984 (52 and 85 IU/ml). Both of them were asymptomatic, but one of them had had HBe-antigen-positive hepatitis (see above). Serum gamma glutamyl transferase values were normal in all patients. The transaminase values of the staff were normal throughout the study.

Discussion

A high incidence of HBsAg among mentally retarded persons was cause for concern during the first years after this connection had been found. Asymptomatic HBsAg carriers were considered dangerous, and both the other patients and the personnel were thought to be at increased risk of infection. The carriers were isolated and special wards were established for them. The problem is of current interest because mentally retarded persons now have more opportunities to live in a community and go to public schools instead of being residents of institutions. The mode of HTLV-III/LAV transmission is quite similar to HBV infection, and the estimations based on our results may be applicable even in some situations when AIDS risk is concerned.

The results of the present follow-up suggest that the risk of either transmitting or contracting hepatitis was not negligible in the groups followed. The prevalence of hepatitis B markers among staff members was lower than that reported earlier, but certainly higher than among volunteer blood donors (15–17). The relative rarity of hepatitis B in the institutions, in spite of high carrier frequency, has been explained by the low infectivity of HBsAg carriers, the type of exposure (low intensity, high frequency) and the host factors in healthy employees (8).

HBeAg-positive persons are evidently a greater potential risk than chronic asymptomatic HBsAg carriers (18, 19), and it would be beneficial if these persons were identified. Their living conditions should be arranged appropriately so that the possibility of contamination is as low as possible. Isolating mentally retarded HBsAg carriers as a group seems questionable because these attempts can never guarantee full protection against potential hepatitis B infection (17) and would possibly do more harm than good. We believe that our results are probably due to other preventive measures carried out simultaneously with the isolation: strict hygiene, awareness of exposure to HBsAg-positive blood or saliva, and readiness to give hyperimmune globulin after such an accident. These measures can possibly be arranged outside the institution as well. Because the current vaccine has proven to be safe and well tolerated, it has been recommended to all clients and staff of institutions for the mentally retarded (20, 21). Its use will certainly further decrease the risk of infection.

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