Original Article

Possible sources for transmission of Hepatitis B Virus Infection in 80 Children in Babol, North of Iran

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Abstract

Background: *To determine the possible sources for the transmission of Hepatitis B Virus (HBV) infection to children in Babol, North of Iran.*

Methods: *Forty-five boys and 35 girls with the mean age of 9.2±5.1 years were evaluated from 1993 to 2004. Hepatitis B viral markers in all the family members were assessed. The risk factors for other sources were also determined.*

Results: *Sixty-five (81.3%) of them were HBeAg positive. Chronic HBV infection was found in the family members of 53 (66.2%) infected children. Chronic HBV infection was seen in 27 (33.8%) cases without any evidence of chronic HBV infection in their family members. Chronic HBV infected mothers were the most probable source of infection in 54.3% of the girls and in 24.4% of the boys (p=0.006). There was no evidence of chronic HBV infection in the family members of 48.9% of infected boys and in 14.5% of infected girls (p=0.002).*

Conclusion: *The results of this study show that more than one-third of children acquired HBV infection in the society.*

Key words: *Hepatitis B virus, Transmission, Children, Iran.*

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Approximately, 5% of the world's population has chronic HBV infection, which is the leading cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (1). HBV is transmitted by percutaneous or permucosal exposure to infectious body fluids, sexual contact with an infected person, and perinatally from an infected mother to her infant (1, 2). The frequency of HBV infection and patterns of HBV transmission vary markedly in different parts of the world (3-7). Five to 20% of infants born from HBsAg-positive and HBeAg negative mothers become infected at birth. Infants of HBsAg-positive women who are not infected at birth are at increasing risk of HBV infection during early childhood because of household contact with infected persons (8). Intra-household horizontal person-to-person transmission is an important route of HBV transmission in some parts of the world (9). Children under four years of age seemed to become carriers more easily than older children (10). Strategies for the control of hepatitis B virus (HBV) infection rely on the information about the modes of its spread and the numbers of individuals who are at risk in particular community subgroups. The aim of the present study was to determine the possible routes of transmission of Hepatitis B Virus to children in Babol, Iran.

Methods

This prospective study was performed on 80 children <15 years with chronic HBV infection at the Department of Infectious Diseases, Babol Universityof Medical Sciences, from 1993 to 2004. Children with previous history of Hepatitis B vaccination were excluded from this study.

Most of these cases were diagnosed during the screening of children of chronic HBV infected parents. The purpose of the study was explained and the written informed consent for the study was obtained from the parents of these children. A 5 ml blood sample was taken from each of these children born before 1993 and tested in Elisa for HBsAg, HBeAg, HBsAb, (HBsAg, from Bio Merieux, the Netherlands; anti-HBs from Radim Italy, HBeAg from Dia.Pro Diagnostic BioProbes, Italy). In Iran, the universal neonatal vaccination against HBV started in 1993 according to WHO recommendations. HBV markers in all family members of these children were assessed and the probable sources for acquiring of the infection in these children were determined. Categorical variables were tested by the two-tailed Chi-square test and Fisher exact test.

Results

Fourty-five boys and 35 girls with the mean age of 9.2±5.1 years were evaluated. The mean age of the girls was lower than the boys. Sixty-five (81.3%) of them were HBeAg positive. Chronic HBV infection was found in the family members of 53 (66.2%) infected children. Chronic HBV infection was seen in 27 (33.8%) cases without any evidence of chronic HBV infection in their family members. Chronic HBV infected mothers were the most probable source of infection in 54.3% of the girls and in 24.4% of the boys (p=0.006).

There was not any evidence of chronic HBV infection in the family members of 48.9% of the infected boys and in 14.5% of the infected girls (p=0.002). Boys acquired HBV infection more often than the girl in the society (48.3% versus 14.3%, p=0.002). The most probable sources for the transmission of HBV are shown in table 1.

Table 1. Possible source for HBV transmission to 80 children in Babol, northern Iran

Possible source for HBV transmission	Boy No (%)	Girl No (%)	Total
Mother	11(36.7)	19 (63.3)	30 (100)
Father	5(41.7)	7 (58.3)	12 (100)
Brother or sister	7(77.8)	2 (22.2)	9 (100)
Both father and mother	0(0)	2 (100)	2 (100)
Society	22(81.5)	5 (18.5)	27 (100)
Total	45(56.3)	35 (43.7)	80 (100)

Discussion

In this study, the most probable source for HBV transmission in 80 HBV infected children were from their mother (37.5%), father (15%), and the society (33.8%)(table 1). HBsAg-positive mothers who are anti-HBe positive transfer the infection from 5 to 20 percent to their infants while the infection transfer occurs in 70 to 90% infants of HBs and HBeAg positive mothers if not given immunoprophylaxis (11).

A study from Singapore showed that the prevalence of HBV infection in children of infected mothers and fathers was almost equal, 48% and 44%, respectively (12). Our results are consistent with the results of a study from Saudi Arabia showing that the prevalence of HBV infection in siblings of families where the mother is a carrier is higher than the families where the father is the carrier (13). In that study, 17.9% of siblings were carriers and 34.8% had a resolved HBV infection. A number of studies have reported that mother–to-child transmission is a main route of HBV transmission (14-19).

In this study, most of these mothers were HBsAg and anti-HBe positive. Consequently, HBV infection likely occurred only in a small percentage of children during the prenatal period and most of the children were infected during early childhood. In one study, all babies born from carrier mothers became HBsAg positive at one year of age (20). Several studies from other countries where the prevalence of HBV is considered intermediate, reported relatively high transmission rates from infected mothers or fathers to their children (21-24).

However, one study in the Middle East showed that 21% of the children born from HBsAg positive mothers became HBV carriers. One factor accounting for this may be the low prevalence of Hepatitis B e antigen in HBsAg positive mothers in this region (14). In conclusion, the results of this study show that more than one-third of children acquired HBV infection in the society.

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