

Seroepidemiology of Hepatitis B Virus Infection in Children in The Eastern Anatolia

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Objective: The aim of this study was to investigate antibody (hepatitis B virus (HBV) immunity) seropositivity and HBV carriage state in children in the Eastern Anatolia.

Method: The study was performed from January to December 1999. Eight-hundred and fifty-three healthy children (421 boys and 432 girls) younger than 15 years were included in the study. Serum HBsAg and its antibody (antiHBs) were tested by radioimmunoassays using Ausria II and Ausab (Abbott Laboratories, North Chicago, Ill), respectively.

Results: HBsAg and anti-HBs positivity were found as 84/853 (9.8 %) and 64/853 (7.5%), respectively. HBsAg seropositivity is significantly higher than the reported rates in previous studies in Turkey.

Conclusion: The prevalence of HBV carriage in childhood is significantly high in the Eastern Anatolia. Effective screening and vaccination programmes with health education and socioeconomic development are cornerstones in the prevention of HBV infection in this region.

Key words: Hepatitis B, seroepidemiology, children

HBV infection is an important cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma. It is reported that 3.9-12.5% of Turkish population are chronic HBV carriers (1-3). However, this ratio differs in various parts of the country. According to some reports from Eastern Anatolia, HBV seropositivity is higher than those from Western Anatolia (3-10). Determining the areas with intensive HBV carrier inhabitants may be important stimulating factor for preventive measures in that area. The estimation of regional and epidemiologic situation in this area regarding the severe complications of the disease is very important. Perinatal transmission accounts for approximately half of the carrier pool: 40% of infants born to mothers who carry HBsAg also become chronic carriers (11-12). This fact shows the importance of determination of HBV infection and carriage status. In this region of the country, especially in the rural area where the age of marriage and reproductivity is early, it is necessary to perform this investigation during childhood. To our knowledge, a survey study of HBV infection has not been carried out so far in this part of the country. Only one report from Eastern Anatolia (Erzurum) (8) and another from Southeast Anatolia (Diyarbakır) (7) have been published. This study was carried out in a wide area including the cities of Van, Bitlis, Hakkari, Ağrı, Siirt and Muş. Detection

of the prevalence of HBV infection and the carriage rate in such a wide area would be interesting and provide valuable information for protecting children. Therefore, the aim of this study was to investigate HBV infection carriage in childhood in Eastern Anatolia and to promote immunization of seronegative children.

Material and Method

From January to December 1999, blood samples were collected from 853 healthy children (421 boys and 432 girls) younger than 15 years. Among those were the following: (1) 257 infants aged between 6 months to 2 years who were attending to the well-baby clinic at Yüzüncü Yıl University Hospital (patients were volunteers recruited by research assistant invitation), and (2) 596 children aged between 2 to 15 years from outpatient clinics of Yüzüncü Yıl University Hospital.

The sample recruitment and participation were similar in all children. All of them had no hepatitis B vaccination according to their vaccination card or history from parents. Parents of all enrolled children signed an informed consent and provided the child's vaccination history.

Serum HBsAg and its antibody (antiHBs) were tested by radioimmunoassays using Ausria II and Ausab kits (Abbott Laboratories, North Chicago, Ill), respectively. Differences in frequency between the groups were examined by Fisher's Exact Test. A p value below 0.05 was judged to be significant.

Results

The overall seroprevalence rate of HBsAg and anti-HBs were 9.85% and 7.5% respectively with no sex difference (Table I).

HBsAg seropositivity was found significantly higher in children than infants (13.5% and 0.011%, respectively) ($p < 0.05$). Besides, anti-HBs seropositivity was found significantly higher in children than infants (9.89% and 0.019%, respectively) ($p < 0.001$) (Table II).

Discussion

HBV infection is ubiquitous all over the world especially in underdeveloped regions with low socioeconomic status. The prevalence of HBV infection varies widely in different parts of the world. In the Far East, the Middle East, Africa and some parts of South

Table I. HBsAg and Anti-HBs prevalence in 853 children.

	Girls (n:432)	Boys (n:421)	Total (n:853)
HBsAg (+)	43 (5.04 %)	41 (4.81 %)	84 (9.85%)
Anti- HBs (+)	30 (3.52 %)	34 (3.98 %)	64 (7.5%)

Table II. HBsAg and Anti-HBs seropositivity in infants and children.

	Infants (n:257)	Children (n:596)	P*
HBsAg (+)	3 (0.011 %)	81 (13.5 %)	0.031
Anti-HBs (+)	5 (0.019 %)	59 (9.89 %)	0.001

Fisher's Exact Test.

America, the prevalence is high, with HBsAg positivity ranging from 8% to 15%. Regions of intermediate prevalence (2% to 7%) include Japan, some parts of South America, eastern and southern Europe, and some parts of central Asia. Prevalence is lowest (<2%) in the United States and Canada, Northern Europe, Australia, and the southern part of South America (12-15).

HBV is a parenterally transmitted virus acquired via blood or blood products, sexual contact, or perinatal exposure. Contact with mucous membranes and their secretions is likely to be one mode of transmission of HBV. Hepatitis B is most prevalent in people born in regions of high HBV endemicity and their descendants. High levels of virus in serum (HBV DNA and HBeAg positivity) have been associated with increased risk of transmission by needlestick exposure and by vertical routes. Infection occurs through occult inoculation of the infant at the time of birth or shortly thereafter. Anti-HBcIgM is not detectable in cord blood, so intrauterine infection is unlikely. Even with active and passive immunization, 10% to 15% of babies may acquire HBV infection at birth. In developing countries with high prevalence rates, children born to HBsAg negative mothers are at risk for acquiring HBV infection in the perinatal period with infection rates of 7% -13% (11-12). In addition, children of HBsAg positive mothers who are not infected at birth remain at very high risk of early childhood infection, with 60% of those born to HBeAg positive mothers becoming infected by the age of 5 (11). Although HBsAg can be detected in breast milk, breast-feeding is not believed to be an important mode of transmission. Children living in areas of high endemicity may also acquire infection outside the family (11-12).

Turkey is situated in a region of intermediate HBV prevalence. Many investigators found that HBsAg seropositivity ranges from 3.1% to 10.4% and that anti-HBs seropositivity ranges from 19.8% to 50% (1, 4-6). According to the results of these studies overall HBsAg and anti-HBs seropositivity rates are 6.1% and 34.6% respectively in adult population of Turkey (2).

In the pediatric age groups, same results ranging from 1.7% to 7.7% for HBsAg seropositivity and from 6.1%

to 13% for anti-HBs seropositivity have been obtained (5, 7-11, 16, 17).

All Turkish studies revealed that HBV infection is correlated inversely with the socioeconomic and cultural status. The Western and Middle Anatolia are more developed regions of Turkey than Eastern Anatolia where HBV carriage rate is between of 3.1% and 10.3% (1, 4-6, 18-21).

However in the Eastern Anatolia which has poor hygienic conditions, HBV infection poses a serious and fatal health problem because of the high prevalence of chronic liver diseases and hepatocellular carcinoma. For long, many studies revealed high seroprevalence (8.3-13%) of HBV infection in the Eastern Anatolian cities. In Diyarbakır, the biggest city of the South Eastern Anatolia, HBsAg seropositivity was reported as 13% in teenagers. In Erzurum, another big city in the region, HBV carriage was cited as 4.9% in 2-10 years old children (5, 7, 8, 22).

In Van region of the Eastern Anatolia, Turkdoğan et al. (6) found that HBsAg and anti HBs seropositivity were respectively 9.5% and 44.4% in adult population. Similarly, in this study we observed high seroprevalence (9.85%) of HBV carriage and low rate (7.5%) of immunization in children population. These findings suggest early vertical transmission of HBV infection in the perinatal period and lesser possibility of intrafamilial spread.

When we consider the infants (6 months to 2 years old babies) as a group, both HBsAg and anti-HBs rates were found significantly low ($p < 0.05$) than children. This reveals that the first encounter with hepatitis B virus mostly occurs after first two years of life. However, Kösecik et al. reported that HBsAg seropositivity was 11.1% in infants the Southeastern Anatolia which is higher than our finding (10).

In conclusion, Van city and Eastern Anatolia are high endemic regions of HBV infection in Turkey. Effective screening and vaccination programmes with health education and socioeconomic development are cornerstones in the prevention of HBV infection in this region.

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