

Intrafamilial Transmission of Hepatitis B: Experience and Lessons Learned in Bosnia and Herzegovina

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The prevalence of chronic hepatitis B virus (HBV) infection varies markedly throughout the world, ranging from 0.1% to 20%, hence the conceptual division into zones of low (< 2%), intermediate (2-8%), and high (> 8%) endemicity. It is widely accepted that in regions of high endemicity, infection in the neonatal and early-childhood periods is very frequent, and apparently 70% to 90% of the population in highly endemic areas is exposed to HBV before reaching 40 years of age⁽¹⁾. On the other hand, in low-endemicity areas, neonatal and early-childhood infection are rare or sporadic. The situation becomes quite interesting in areas of intermediate endemicity, in which the age of infection and dominant routes of transmission vary from region to region and depend on regional characteristics⁽²⁾.

Family members and household contacts of HBV carriers are a well recognized risk group for HBV transmission, and the routes of intrafamilial spread of HBV infection have been investigated since the very beginning of HBV research^(3, 4). Investigation of intrafamilial transmission in a particular region usually reveals valuable information about the routes of HBV spread in general, and many researchers from several distinct geographic areas have explored the problem and described local peculiarities⁽⁵⁻¹²⁾.

Hepatitis B in Bosnia and Herzegovina

Prior to 2007, exact data on HBV prevalence in Bosnia and Herzegovina (B&H) did not exist; the only data we had came from the World Health Organization's (WHO) estimate, calculated as a

simple average of prevalence in neighboring countries. Also, we did not know anything about the dominant routes of HBV transmission in our country, nor did we know anything about intrafamilial transmission of HBV. Still, this lack of reliable information was not unusual. As a country just coming out of a horrible war, with massive population migration and with the society's resources directed toward restoration of everything that was destroyed, we had a challenging setting for any type of epidemiological research in that particular period.

In response to this lack of trustworthy information, during 2004 and 2005, a small group of researchers in University Clinical Center, Tuzla (a tertiary referral hospital in the northeast region of B&H) conducted a prospective study with several aims. Our primary goal was to determine the prevalence of HBV infection in families of confirmed chronic carriers and to investigate the routes and risk factors of intrafamilial transmission. Our secondary goal was to make a more accurate estimate of chronic carriage in the general population through data collected from first-time blood donors, which we also used as a control group (compared against a group of family members). Our results were published in two complementary papers^(13, 14).

What did we learn from our research?

The practical implications of our findings are numerous. Firstly, we determined the prevalence of hepatitis B surface antigen (HBsAg) in the population of first-time blood donors (3.5%), which confirmed that our country indeed belongs to the

zone of intermediate endemicity for HBV. We also clearly established family members of chronic HBsAg carriers as a risk group for HBV infection in our region (prevalence of HBsAg = 12.2%), and what is more important, we found that this part of the population is poorly protected, with an alarmingly low vaccination rate of 8.7%. Vaccination programs for all infants have been established in Bosnia and Herzegovina since 2001, but most of the adult population remains unprotected.

Our findings also indicated that the main risk factors for HBV transmission inside the family were female sex, hepatitis B e antigen (HBeAg) seropositivity of the index case, and HBsAg positivity of the mother in the family. This pattern of risk factors provides indirect evidence of the dominance of the vertical, mother-to-child route of transmission, which leads to a higher percentage of chronic HBsAg carriers, especially in younger age groups⁽¹⁵⁾. Horizontal transmission is not a dominant route of transmission in our region, although sexual transmission usually ends up without a chronic HBsAg carrier. Age appeared to be another important risk factor for HBV exposure, as a direct result of the number of exposures to virus and infection reservoirs within the family.

Children of HBeAg-positive mothers appeared to be at the highest risk for becoming chronic carriers themselves, and generally, the combination of female sex and HBeAg positivity dramatically increased the chances of HBV transmission within the family (odds ratio [OR] = 70.39; 95% confidence interval [CI] = 8.20 - 604.61; P < 0.001).

What can be done?

Considering the intolerably low rate of HBV vaccination within family members, it is of essential importance to ensure the vaccination of all family members of chronic HBV carriers in our country. Our findings indicate that it would be a very wise strategy to establish a nationwide program of pregnancy screening for HBsAg. This approach would essentially block the main route of HBV transmission in our country and prevent many cases of HBV chronicity. Mother- to-child transmission usually occurs either perinatally or soon after childbirth, resulting in very high rates (90%) of chronicity⁽¹⁵⁾. Screening and vaccination at the high school or university age or at the time of marriage to protect susceptible cases born before 2001 would also be an important addition to this approach.

Treatment and complications of chronic hepatitis B and its associated costs represent a serious burden

for any society, and there is no doubt that any type of preventive strategy in a country with limited resources like B&H is more than necessary. The health infrastructure for such program already exists, and it is up to us, healthcare providers who deal with hepatitis B and its consequences on a daily basis, to provide scientific evidence that will persuade those controlling the funds of the necessity of this strategy. An ounce of prevention is worth a ton of cure.

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