A Study on HBsAg Carrier Rate of Children under Age Five in Danzhou City

Bo Hu, Dui-Liu Li, Yuan-Gui Feng

The Center for Disease Control and Prevention, Danzhou 571700 Hainan

ARTICLE INFO

Objective: To learn the state of HBsAg carrier after implementing vaccine hepatitis B immunization program for children in Danzhou, and providing a scientific basis for the development of the hepatitis B vaccination strategies. Methods: A combination of stratified sampling and mechanical sampling method was carried out, the authors surveyed vaccine immunization history with hepatitis B in these children who were born from January 1, 2008 to December 31, 2012, then collected blood 3 mL and detected HBsAg carrier status by ELISA from these surveyed children. Results: 250 children were included in the survey, the 24 h of birth Hepatitis B vaccine coverage rate in urban, rural newborns was 97.6% and 93.6%, respectively, hepatitis B vaccine three-pin vaccination rate for the whole vaccination course were 100%, only two children from rural area HBsAg carrier was positive, and their positive carrier rate was 0.8%, below 1%. Two HBsAg-positive carrier children from rural area and their families were under epidemiological survey, with discovery that their mothers were carriers of HBsAg, considered as mother to child transmission. Conclusions: Strengthen propaganda promotion to expand knowledge of Hepatitis B and to improve neonatal hepatitis B vaccine 24 h of the first dose timely rate, and standardize hepatitis B vaccine three-pin qualified vaccination rate for the whole vaccination course in children. Take effective measures to improve PMTCT rate, it can reduce child carrier rate of hepatitis B surface antigen, and take effective measures to improve PMTCT rates, it will reduce children carrier rate of HBsAg.

1. Introduction

Hepatitis B (hereinafter referred to as Hep B) is one of the major public health problems in the P. R. China. According to relevant reports\(^1\), there are about 300 million people as carriers of Hep B virus in the world, whereas in the P. R. China, HBsAg carriers are about 120 million people with carrier rate of about 10% and total HBV (Hepatitis B virus) infection rate as 60%. The prevention and treatment of Hep B has become a grand task regarding the rise and fall of Chinese nationalities. Vaccination and immunization of Hep B have become a major means to control the disease and an important method to prevent Hep B. Since May 1, 2003, this city has included the vaccination and immunization of Hep B into the plan and management of vaccine programs, children carrier rate of HBsAg has decreased dramatically for those born after that day, but its infection rates in different towns and villages varied. To understand the state of children carrier rate of HBsAg in Dan Zhou city after the implementation of vaccination and immunization programs of Hep B, In May 2013 the authors chose Na Da town and Xin Ying town to target the children there born from January 1, 2008 to December 31, 2012 as the research subjects, evaluating the state and reasons of the carrier rate of HBsAg.

2. Materials and methods

2.1. General data
The research adopted the cluster stratification and randomly sampling method, randomly selecting children in Na Da town and Xin Ying town under the age of five for surveying the state of children carrier rate of HBsAg; children born from January 1, 2008 to December 31, 2012 were selected, Na Da town is for those in the town, 25 children in each age group were surveyed for a total of 125 persons (representing children from the town). Xin Ying town is located in the rural area, 25 children were surveyed for each age group for a total of 125 persons (representing children from the rural area), taking up 250 persons as the research subjects with effective serum samples collected.

2.2. Methods

Such demographic characteristics as age, genders, date of birth and vaccination history of Hep B were recorded, collecting vein blood 3mL and storing for testing in the refrigerator under -20°C after separating serum. ELISA method was adopted to test HBsAg and diagnostic reagent was supplied by Shanghai Ke Hua Industrial Biotechnological Co., Ltd., while establishing negative and positive contrast and quality control products (HBsAg 1 mg/μL). The testing was undertaken by the permanent staff under the same apparatus in the same laboratory. The research method of cases comparison was adopted to analyze the relation between the mothers with Hep B carrier and their children.

3. Results

3.1. The state of HBsAg carrier among eligible children in town and rural area

The HBsAg carrier rates between eligible children in Na Da town (the town group) and eligible children in Xin Ying group (the rural area group) were compared with finding that indicated that there had no obvious difference between the town group and the rural area group regarding HBsAg positive rate (χ²=1.00, P>0.05). The finding indicated that vaccination and immunization as well as whole course immunization rate of Hep B were effectively guaranteed after Dan Zhou city had included Hep B vaccine into plans and management of vaccination programs while Hep B infection among newly born children was significantly controlled. Two children with Hep B positive in the rural area group were interviewed and investigated in that their mothers were the Hep B surface carriers and the cases were considered to be mother-infant transmission.

3.2. The state of HBsAg carrier among children in different age groups

On May 1, 2003, Dan Zhou city included Hep B vaccine into the plan of immunization programs, thereafter in 2008 children under the age of five were with HBsAg carrier rate of 4% and in 2009 it was 0%; after the implementation of the vaccination programs, children’s HBsAg carrier rate came down every year, whereas in 2012 it decreased to 0.8%. The targets of “2006-2010 National Hepatitis B Prevention and Treatment Planning” were accomplished here. See table 2.

### Table 1. Hep B vaccine and immunization as well as surface HBsAg carrier rate for children under the age of five.

<table>
<thead>
<tr>
<th>Area</th>
<th>Persons surveyed</th>
<th>Children numbers in whole course vaccination</th>
<th>24h of birth vaccine timely rate (%)</th>
<th>No., of HBsAg positive rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na Da (town)</td>
<td>125</td>
<td>125</td>
<td>100</td>
<td>97.6</td>
</tr>
<tr>
<td>Xin Ying (rural)</td>
<td>125</td>
<td>125</td>
<td>100</td>
<td>93.6</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>250</td>
<td>100</td>
<td>95.6</td>
</tr>
</tbody>
</table>

Note: Age 1 group (born on January 1, 2012 - December 31, 2012); age 2 group (born on January 1, 2011 - December 31, 2011); age 3 group (born on January 1, 2010 - December 31, 2010); age 4 group (born on January 1, 2009 - December 31, 2009); age 5 group (born on January 1, 2008 - December 31, 2008).

4. Discussion

Dan Zhou city is an area of high Hep B infection rate. In 1992, in accordance with the nation’s requirement, our city began to promote and apply Hep B vaccine to newly born infants and included it in the plans and management of vaccination programs. But the promotion of Hep B vaccine was based on the principle of “those who paid benefited”; with the expensive price for Hep B vaccine,
its vaccination and immunization rate were low for infants and children after being surveyed and relevant preventive effects were not achieved. On May 1, 2003, in accordance with requirement from the province, our city included Hep B vaccination and immunization into the free vaccine programs for management, improved its management works, strived to improve Hep B vaccination and immunization rate, especially infants’ 24 h of birth vaccine timely rate, hepatitis B vaccine three-pin vaccination rate for the whole vaccination course was effectively improved. Through the survey of 250 children in Na Da town (town group) and Xin Ying town (rural area group) for the state of HBsAg carrier, the findings indicated that hepatitis B vaccine three-pin vaccination rate for the whole vaccination course were 100%, only two children from rural area HBsAg carrier was positive, and their positive carrier rate was 0.8%, below 1%. With Hep B vaccination becoming normalized, in recent five years HBsAg carrier rate has had the tendency to be decreased progressively, whose vaccination effect indicated that Hep B vaccination and immunization have had obvious effect after relevant programs were implemented in the country.

HBsAg carrier rate in the town group and rural area group has no obvious difference ($\chi^2=1.00, P>0.05$), but two children with Hep B positive in the rural area group were investigated by epidemiological survey in that their mothers were the Hep B surface carriers and the cases were considered to be mother-infant transmission. In 2008, there was a research done in Hainan province by matching for 12-36 months old children and their mother’s state of HBsAg carrier. Its findings showed that in Hainan Province fertile women’s HBsAg carrier rate was 18.96%, and mothers with HBsAg, HBeAg double positive gave birth to children with HBsAg carrier rate of the highest as 13.79%, mothers with HBsAg single positive gave birth to children with HBsAg carrier rate of 1.52%; mothers with negative gave birth to children with HBsAg carrier rate of 0% as lowest, three parties’ differences are significant[2], therefore mother-infant transmission is one of the major means for newly born infants to contract with Hep B. As a result, to arduously publicize knowledge about Hep B vaccination and its prevention and treatment, to improve neonatal hepatitis B vaccine 24 h of the first dose timely rate, to standardize hepatitis B vaccine three-pin qualified vaccination rate for the whole vaccination course in children, and to take effective measures to improve PMTCT rate can reduce child carrier rate of hepatitis B surface antigen, while taking effective measures to improve PMTCT rates will reduce children carrier rate of HBsAg.

References
