Prevention and control of hepatitis B with combined vaccines, and birth dose vaccination

Prof. Yong Poovorawan
Center of Excellence in Clinical Virology
Faculty of Medicine Chulalongkorn University
The mode of transmission of HBV in SE is perinatal transmission
Therefore, immature of immunity in children are not effective to protective from HBV infection

In 1992, WHO has recommended HB vaccine in immunization programs to infants for all countries by the year 1997.
In the year 1986
We started pregnant women screening

HBsAg positive 6%
HBeAg positive 40% of HBsAg
Neonates born from HBV carrier mothers were immunized with HB vaccine
Protective efficacy of hepatitis B vaccine without immunoglobulin in high-risk neonates


Protective efficacy of a recombinant DNA hepatitis B vaccine in neonates of HBe antigen-positive mothers.

Poovorawan Y, Songavat S, Pongpunlert W, Chumdermpadotsuk S, Sontakul P, Safary A
Department of Pediatrics, Faculty of Medicine, Chulalongkorn University and Hospital, Bangkok, Thailand.

Abstract
We have assessed the protective efficacy of a recombinant DNA hepatitis B vaccine alone in infants of women who were positive for the surface antigen and additional doses 1, 2, and 12 months later. No significant adverse reactions to vaccination were observed and the vaccine was highly immunogenic. Only evidenced by the persistent presence of hepatitis B surface antigen in serum samples. Without immunoprophylaxis, 65% to 90% of such infants would be hepatitis B immunoglobulin, therefore, considerably decreased the incidence of the carrier state.

PMID: 2523981 [PubMed-indexed for MEDLINE]
High Protective Efficacy in Neonates with or without HBlg

Hepatitis B immunization program in Thailand

August 1988: Demonstrate methods of incorporating HB vaccine into EPI program

Program sites: 2 provinces
- Chiangmai
- Chonburi
Thailand EPI

- At birth: HB1, BCG
- 2 months: OPV1, DPT1, HB2
- 4 months: OPV2, DPT2
- 6 months: OPV3, DPT3, HB3
- 9-12 months: Measles or MMR
- 18 Months: OPV4, DPT4, JE1 & 2
  (2 weeks apart, booster 1 yr after)
- 4-6 years: OPV5, DPT5, Measles
Universal HB vaccination in Thailand

- 1988 implemented in 2 provinces
- 1990 included in 10 more provinces
- 1992 all newborns
Long term study of DTP-HB in Thai children
Combine HBV-DTP vaccine was started in 1994.

The schedule for HB vaccine:

- Birth: BCG, HB vac
- 2 mos: OPV, DTPw-HB
- 4 mos: OPV, DTPw-HB
- 6 mos: OPV, DTPw-HB
- 9-12 mos: MMR1
- 18 mos: OPV, DTPw (JE vac 0, 1, 6-12)
- 4-6 yrs: OPV, DTPw, MMR2
Sero survey of HBV markers in ChaingRai province, 2004

Seroprevalence of HBsAg in ChaingRai 2004

Seroprevalence of anti-HBs in ChaingRai 2004

Seroprevalence of anti-HBc in ChaingRai 2004

Chongsrisawat V et al. 2006
Effect of dose number and interval between the first two doses of hepatitis B vaccine on the carrier rate of infants born to hepatitis B surface antigen positive mothers

Prof. Yong Poovorawan, MD
Center of Excellence in Clinical Virology Faculty of Medicine Chulalongkorn University
(A) Location of Chiangrai, the northern most province of Thailand
(B) 11 district hospitals participating in this study
The number in B stands for 1 - Khun Tan; 2 – Thoeng; 3 - Wiang Kaen; 4 - Phan;
5 - Chiang Saen; 6 - Wiang Pa Pao; 7 - Phaya Mengrai; 8 - Mae Sai; 9 - Mae Chan;
10 - Mae Fa Luang and 11 - Mueang Chiangrai districts.

Tharmaphornpilas P, Rasdjarmrearnsook A, Plianpanich S, Sa-nguanmoo P, Chongsrisawat V, Poovorawan Y
Recommended HB vaccination schedule for newborns of HBsAg positive and negative mothers, Chiangrai, 2004 - 2006

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Birth</td>
</tr>
<tr>
<td>Children born from HBsAg negative mother</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HB</td>
</tr>
<tr>
<td>Children born from HBsAg positive mother</td>
<td></td>
</tr>
<tr>
<td>- Group 1</td>
<td>HB</td>
</tr>
<tr>
<td>- Group 2</td>
<td>HB</td>
</tr>
</tbody>
</table>
## HBV carrier rate by HB1-2 interval in the study

<table>
<thead>
<tr>
<th>Interval</th>
<th>Total children</th>
<th>No of HB carrier</th>
<th>HB carrier rate (%) and 95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>277</td>
<td>4</td>
<td>1.44, 0.46 - 3.91</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>240</td>
<td>11</td>
<td>4.58, 2.43 - 8.28</td>
</tr>
<tr>
<td><strong>By HB1-2 interval</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Less than 6 weeks</td>
<td>21</td>
<td>1</td>
<td>4.76, 0.25-25.87</td>
</tr>
<tr>
<td>• 6 – 7 weeks</td>
<td>30</td>
<td>1</td>
<td>3.33, 0.17-19.05</td>
</tr>
<tr>
<td>• 8 – 9 weeks</td>
<td>89</td>
<td>2</td>
<td>2.25, 0.39-8.65</td>
</tr>
<tr>
<td>• 10 weeks above</td>
<td>100</td>
<td>7</td>
<td>7.00, 3.1-14.38</td>
</tr>
</tbody>
</table>

4 children, received vaccine of different schedule not belong to group 1 or 2, were excluded from this table.
<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>BCG, HB vac</td>
</tr>
<tr>
<td>1 mo</td>
<td>(HBsAg+ve mother) HB vac</td>
</tr>
<tr>
<td>2 mos</td>
<td>OPV, DTPw-HB</td>
</tr>
<tr>
<td>4 mos</td>
<td>OPV, DTPw-HB</td>
</tr>
<tr>
<td>6 mos</td>
<td>OPV, DTPw-HB</td>
</tr>
<tr>
<td>9-12 mos</td>
<td>MMR1</td>
</tr>
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<td>18 mos</td>
<td>OPV, DTPw (JE vac 0, 1, 6-12)</td>
</tr>
<tr>
<td>4-6 yrs</td>
<td>OPV, DTPw, MMR2</td>
</tr>
</tbody>
</table>
Combine DTPw-HB vaccine into Thailand EPI program
Study of the Impact of universal HB immunization as part of EPI program (2014)
Impact of universal HB vaccination in Thailand since 1992

Poovorawan et al. 2014
Impact of universal HB vaccination in Thailand since 1992

Poovorawan et al. 2014

Universal HB vaccination

Before HBV vaccination

anti-HBs Seroprotective (≥ 10 mIU/mL) (%)

(n = 5954)
Impact of universal HB vaccination in Thailand since 1992

Poovorawan et al. 2014
Conclusion

By the year 2030

We hope that HBV will be eliminated by universal HB vaccine into newborn and effective HBV therapy
Acknowledgement