**Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency**

- Severe neonatal jaundice (NJ) triggered by environmental factors and/or medications is the major health impact of G6PD deficiency in newborns.

- Severe NJ may lead to kernicterus and cause death or permanent neurological damages.

**Glucose-6-Phosphate + NADP+ → 6-Phosphogluconate + NADPH**

**Results of Newborn G6PD Screening in Taiwan**

- Since 1996, the effective coverage rate has reached >99%
- Screening results and efficiency (2013 - 2015)
  - Positive: ~2.5%
  - Positive result notification before 7 days old: 97.4% ~ 99.0%
  - Successful referred: 86 ~ 91%
  - Confirmed: 80 ~ 92%
- The overall incidence of G6PD deficiency in Taiwan: ~2%

**Outcomes of Newborn G6PD Screening in Taiwan, 2000 ~ 2010**

- To access the outcome of newborn G6PD screening program, the patient data of those hospital admissions with NJ, after discharged from birthing facilities, between 2000 and 2010 was studied.
- The patient data were retrieved from the National Health Insurance Research Database (NHIRD), which covered >98% population of Taiwan, for analysis.
- Admitted NJ cases were identified as newborns who were hospitalized with NJ diagnostic code (ICD-9-CM, 774) and/or the procedure codes of phototherapy (ICD-9-CM, 99.83).

**Newborn Admitted to Hospital with NJ after Discharged from Birthing Facilities**

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth No.</td>
<td>305,312</td>
<td>260,354</td>
<td>247,530</td>
<td>227,070</td>
<td>216,419</td>
<td>205,854</td>
<td>204,459</td>
<td>204,414</td>
<td>198,753</td>
<td>191,330</td>
<td>166,886</td>
<td>2,428,341</td>
</tr>
<tr>
<td>Admitted NJ</td>
<td>812</td>
<td>1,006</td>
<td>1,080</td>
<td>933</td>
<td>1,049</td>
<td>1,095</td>
<td>1,170</td>
<td>1,415</td>
<td>1,451</td>
<td>1,366</td>
<td>1,405</td>
<td>12,782</td>
</tr>
<tr>
<td>Kernicterus</td>
<td>8 (0.27%)</td>
<td>(0.39%)</td>
<td>(0.44%)</td>
<td>(0.41%)</td>
<td>(0.49%)</td>
<td>(0.53%)</td>
<td>(0.57%)</td>
<td>(0.69%)</td>
<td>(0.73%)</td>
<td>(0.83%)</td>
<td>(0.85%)</td>
<td></td>
</tr>
<tr>
<td>ET</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>27 (0.27%)</td>
</tr>
</tbody>
</table>

1. Data from "Department of Household Registration database, Ministry of Health and Welfare, Taiwan"
2. ET (Exchange Transfusion): cases were identified by the procedure codes of ICD-9-CM, 99.01

**Conclusions & Discussion**

- Newborn G6PD Screening Program in Taiwan (since 1987)
  - Providing preventive education before discharge to all parents
  - >97% of G6PD positive cases were informed before 7 days old
  - The overall incidence of G6PD deficiency: ~2%
- The admitted NJ newborns who need to be treated with exchange transfusion were dramatically decreased to 0 ~ 2 cases per year since 2004 nationwide.
- The public health prevention program (including universal newborn G6PD screening) and effective clinical management in Taiwan almost eliminated all the "severe morbidity and mortality" caused by NJ in Taiwan.

**Mortality and Severe Morbidity of Admitted NJ Newborns**

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
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<tr>
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<td>198,753</td>
<td>191,330</td>
<td>166,886</td>
<td>2,428,341</td>
</tr>
<tr>
<td>Mortality*</td>
<td>8 (0.27%)</td>
<td>(0.39%)</td>
<td>(0.44%)</td>
<td>(0.41%)</td>
<td>(0.49%)</td>
<td>(0.53%)</td>
<td>(0.57%)</td>
<td>(0.69%)</td>
<td>(0.73%)</td>
<td>(0.83%)</td>
<td>(0.85%)</td>
<td></td>
</tr>
<tr>
<td>Kerintector</td>
<td>1 (0.03%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td>(0.02%)</td>
<td></td>
</tr>
</tbody>
</table>

* Within 1 month of age

None of the dead cases (most of them are premature babies) had HIHA (Hereditary Hemolytic Anemia, which includes G6PD deficiency)

Only 1 kernicterus case (*) had HIHA

**Newborn G6PD Screening Program in Taiwan**

- Nationwide routine G6PD screening program started in 1987
- Prevent severe NJ triggered by environmental factors and/or medications
- Preventive education provided by the birthing facilities before discharge
  - Avoid contacting naphthalene
  - Don’t give any medication to the newborn without prescription
- Watch out for jaundice
- Newborn babies after discharged from birthing facilities were increased slightly, the numbers of severe cases who needed to be treated with ET were dramatically decreased to 0 ~ 2 cases per year since 2004.

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