Neonatal Hypoglycemia

Virtual PHM20
Subcommittee on Neonatal Hospitalists
"Hot Topics in Newborn Medicine for the Pediatric Hospitalist"
July 27, 2020
Rakhi Gupta Basuray, MD, FAAP

1. NH Definition, Controversies, Incidence
   - <47 mg/dL associated with long term impacts
   - AAP: Screening and Management
     - <40 mg/dL and Symptomatic OR Asymptomatic & 0-4 H of age
     - <45 mg/dL Asymptomatic and 4-24 hours of age
     - Prior to wide-spread oral dextrose gel reporting
   - PES: Mean plasma glucose ~55-65 mg/dL
   - Occurs in ~15% of all newborns and ~50% with risk factors

2. Does Treatment Threshold Affect Psychomotor Development?
   - Lower Threshold Group, treated if <36 mg/dL
   - Traditional Threshold, treated <47 mg/dL
   - Prospective, Multicenter, Randomized, Controlled, Non-inferiority Trial, n = 582
   - Inclusion Criteria
     - ≥ 35 weeks GA
     - ≥ 2000g BW
     - Otherwise healthy
     - Glucose values 36-46 mg/dL
   - Exclusion Criteria
     - Initial plasma glucose <36 mg/dL [n = 106]
     - All glucose levels ≥47 mg/dL
Lower Threshold is Non-Inferior to Traditional

<table>
<thead>
<tr>
<th></th>
<th>Lower Threshold Group (n = 287)</th>
<th>Traditional Threshold Group (n = 295)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Score</td>
<td>102.9</td>
<td>102.2</td>
</tr>
<tr>
<td>Motor Score</td>
<td>104.6</td>
<td>104.9</td>
</tr>
<tr>
<td>Glucose Values</td>
<td>57 mg/dL</td>
<td>61 mg/dL</td>
</tr>
<tr>
<td># Glucose Measurements</td>
<td>6.4</td>
<td>7</td>
</tr>
<tr>
<td>LOS</td>
<td>4.6 days</td>
<td>4.7 days</td>
</tr>
</tbody>
</table>

Non-Inferior, but... Caution if Recurrent Episodes Persist

<table>
<thead>
<tr>
<th></th>
<th>Lower Threshold Group (n = 287)</th>
<th>Traditional Threshold Group (n = 295)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent Hypoglycemic Episodes</td>
<td>57%</td>
<td>47%</td>
</tr>
<tr>
<td>Severe Range Hypoglycemia</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Supplemental Oral Feeds</td>
<td>79%</td>
<td>97%</td>
</tr>
<tr>
<td>Tube Feeds</td>
<td>5%</td>
<td>13%</td>
</tr>
<tr>
<td>IV Glucose</td>
<td>6%</td>
<td>21%</td>
</tr>
<tr>
<td>Breastfeeding &gt;3 months</td>
<td>21%</td>
<td>29%</td>
</tr>
</tbody>
</table>

  • Quasi-experimental, Controlled (Prophylaxis group n = 72, Control n = 164)
  • Inclusion Criteria
    • GA: 35⁰⁰⁰ – 36⁰⁰⁰ weeks
    • BW <2500g or >4000g
    • Infants of Mothers with Diabetes
  • Exclusion Criteria
    • SGA or LGA but did not meet BW criteria
    • Chromosomal abnormalities, Congenital anomalies, Hyperinsulinemic d/o
    • NICU transfer or IV fluids before first feed
Prophylactic Dextrose Gel - Study Design

- Insta-Glucose, s/p first feed
  - 77% carbohydrate concentration (vs 40% dextrose)
  - 0.5 mL/kg (vs 200mg/kg)
- Glucometer check 30' s/p first feed
  - Glucose dehydrogenase method (vs glucose oxidase)
- AAP Algorithm
- NICU for IVF
  - 0 – 4 hours of age: <25 mg/dL despite PO feed
  - >4 hours of age: <35 mg/dL despite PO feed

Exogenous Glucose Minimally Influenced Glucose Homeostasis

- No difference in
  - Initial glucose (52.1 vs 50.5 mg/dL)
  - NICU admission (9.7% vs 14.6%)
  - Incidence of hypoglycemia w/ thresholds <35, <40, <45, <47 mg/dL
- No hyperglycemic occurrences

**Higher carb concentration in dextrose gel → hyperinsulinemic response?**

Key Clinical Take-Home Points

- Long term clinical impact unclear
- Prospective data emerging
- Lower glucose thresholds may be acceptable
- Prophylactic dextrose gel on NICU transfer ambiguous
  - Area for further research: IV dextrose fluids vs dextrose gel

Questions?
Thank You and Stay Well!


References