Glucose Screening in Newborns at Risk for Hypoglycemia

Neonatal Policy & Procedure Clinical Practice Guideline

Policy Group: GI/GU

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Date Effective: April 2017

Next Review: April 2020

Purpose

To promote best practice in the prevention, screening and management of hypoglycemia in at-risk neonates in the newborn period.

Points of Emphasis

Neonatal hypoglycemia is common, occurring in up to 15% of babies born near or at term. The brain utilizes 95% of the body’s available glucose. Long term follow-up studies of hypoglycemic infants suggest there is an association between hypoglycemia and adverse neurologic sequelae, even if asymptomatic.

There is lack of consensus on optimal strategy for management of hypoglycemia, though it is known that early and frequent feeds provide nutrient substrates to support gluconeogenesis to possibly prevent hypoglycemia in at-risk infants.

There is no standard definition of minimum safe blood glucose level, and neonatal hypoglycemia cannot be defined by a single value of blood glucose applicable to all clinical situations and to all infants. According to the Canadian Pediatric Society (CPS, 2004, reaffirmed 2016), at this time the operational cut-off for blood glucose level in newborns is 2.6mmol/L, even when asymptomatic.

Guideline Elements

Prevention

a. “Well” late preterm and term neonates should have their first feed within 30-60 minutes of birth.

b. Babies requiring intensive care, that are unable to feed or have limited enteral intake, should have an intravenous glucose solution started soon after admission to NICU, ideally within 30 minutes of receiving a patient care order to do so.
Screening
Fetuses receive their glucose via the placenta. At birth, the neonate must produce glucose from glycogen reserves or synthesize new glucose. Neonatal glucose levels fall during the first hour or two after birth, reaching a natural trough before rising to stable neonatal levels.

The CPS recommends that screening be initiated in at-risk babies at 2 hours of age, after an initial feed. Ideally the initial feed occurs within 30-60 minutes of birth, and frequently thereafter. Blood glucose screening in at-risk infants should be continued until the period of risk is considered over (see Appendix A).

Many infants with hypoglycemia are clinically asymptomatic, therefore early guided screening of at-risk infants is necessary.

a. Screening glucose levels may be obtained from a point of care meter, blood gas analyzer, or as ordered from rapid laboratory testing. Of note, RBC glycolysis continues in lab specimens and values can artefactually decline as much as 6mg/dL hourly (0.35mmol/l per hour).

b. For infants receiving TPN, laboratory glucose level is checked with TPN bloodwork, or by point of care testing more frequently as ordered (Eg. daily during the initiation phase progressing to once or twice weekly).

c. Frequency of glucose level as ordered.

At-risk Infants
a. Small for gestational age infants (less than 10th percentile)

b. Infants of diabetic mothers
c. Premature infants (less than 37 weeks gestation)
d. Large for gestational age infants¹ (greater than 90th percentile)

Additional Risk Factors

e. Infants with a history of perinatal asphyxia or suspected sepsis

f. Infants undergoing exchange transfusion
g. Any infant with symptoms of acute illness

<table>
<thead>
<tr>
<th>Gestation (completed weeks)</th>
<th>Birth weight (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10th percentile</td>
</tr>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>37</td>
<td>2552</td>
</tr>
<tr>
<td>38</td>
<td>2766</td>
</tr>
<tr>
<td>39</td>
<td>2942</td>
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<td>41</td>
<td>3179</td>
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<tr>
<td>42</td>
<td>3233</td>
</tr>
</tbody>
</table>

¹ Questions have been raised as to whether LGA infants that are not IDMs are at risk. Per the CPS, until further data are available LGA infants are to be considered at risk for neonatal hypoglycemia.
Symptoms of Hypoglycemia

a. Asymptomatic  
b. Apathy, lethargy, refusal to feed or poor feeder  
c. Inability to maintain temperature  
d. Decreased muscle tone  
e. Tremors, jitteriness  
f. Cyanosis, grey shock-like state  
g. Convulsions  
h. Laboured or irregular respirations  
i. Eye rolling

Management of Hypoglycemia

The above-mentioned symptoms are not restricted to hypoglycemia. A blood glucose level (point of care) is measured when a patient exhibits these symptoms. If the glucose level is less than 2.6 mmol/L in symptomatic infants, or if the blood glucose level is less than 1.8 mmol/L even if asymptomatic, this is an emergency and the Pediatrician/Neonatologist or designate must be notified. See Appendix A for recommended management.

Asymptomatic at-risk newborns, 35 to 42 weeks gestational age with a blood glucose level between 1.8-2.5 mmol/L may be managed with 40% oral dextrose gel. See Appendix B for recommended management, Appendix C for dextrose gel dosing and administration and Appendix D for suggested feeding volumes.
Appendix A: Management of Symptomatic Infants, or Those with Blood Glucose Level less than 1.8 mmol/L, Even if Asymptomatic

For Asymptomatic babies, ≥ 35 – 42 weeks, with glucose levels 1.8 – 2.5 mmol/L see Appendix B

Figure 1) Screening for neonatal hypoglycemia. IDM Infant of diabetic mother; IV Intravenous; LGA Large-for-gestational-age; SGA Small-for-gestational-age. CPS Statement: www.cps.ca/english/statements/FR/inf04-01.htm

Used with permission.
Appendix B: Management of Asymptomatic Infants with Blood Glucose 1.8-2.5 mmol/L

**Algorithm for the Screening and Initial Management of Asymptomatic Babies at Risk for Neonatal Hypoglycaemia (≥35-42wks)**

1. **SYMPTOMS OF HYPOGLYCEMIA INCLUDE:**
   - Tremors, jitteriness, seizures, apathy, lethargy, refusal to feed or poor feeding, cyanosis, grey shock-like state, hypothermia, hypotonia, laboured or irregular respirations, apnea

2. **NOTIFY MOST RESPONSIBLE PRACTITIONER IF:**
   - Blood glucose level < 1.6 mmol/L at any time
   - Blood glucose level is not ≥ 2.6 mmol/L or greater after 2 doses of gel
   - Recurrent episode of hypoglycaemia after return to ≥ 2.6 mmol/L
   - Symptoms of hypoglycaemia
   - There is any clinical concern

3. **Is the baby at risk? SGA, LGA, IDM or preterm?**
   - **YES**
     - FEED EARLY and FREQUENTLY ON DEMAND (At minimum feed within 1-2 hours of birth)
   - **NO**
     - ROUTINE CARE: FEED EARLY and FREQUENTLY ON DEMAND AS LONG AS INFANT IS FEEDING AND REMAINS WELL

4. **CHECK GLUCOSE AT 2 HOURS**
   - < 1.8 mmol/L
   - 1.8 - 2.5 mmol/L
   - ≥ 2.6 mmol/L

5. **< 1.8 mmol/L**
   - Rub oral Insta-Glucose into the buccal membrane and feed (refer to Insta-Glucose dosing chart)
   - Check glucose in 30 min

6. **1.8 - 2.5 mmol/L**
   - Rub oral Insta-Glucose into the buccal membrane and feed (refer to Insta-Glucose dosing chart)
   - Check glucose in 30 min

7. **≥ 2.6 mmol/L**
   - Remains < 2.6 mmol/L despite feeding or Intolerant of feeds
   - Rises to ≥ 2.6 mmol/L after feeding

8. **NOTIFY MOST RESPONSIBLE PRACTITIONER**
   - Anticipate further management per CP3 Guideline

9. **Repeat glucose measurement before feeds**
   - Until two consecutive levels ≥ 2.6 mmol/L without dextrose gel

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Adapted from:
Appendix C: Dextrose gel 40% (Insta-Glucose®) Dose and Administration

Indication
- To manage hypoglycemia in babies born at greater than or equal to 35 weeks gestational age in the first 48 hours after birth.
- Follow the hypoglycemia treatment algorithm to determine how often and under what circumstances it can be administered.

Product Background
- Dextrose gel 40% (Insta-Glucose®) is available in a single use tube containing a pink, cherry flavored gel.
- In neonates, it is appropriate to use the same tube for the same baby if further doses are required within 24 hours.
- The tube cannot be “recapped” but it should be returned to the clear plastic container with the white lid after use.

How to Use
- Product will be available as wardstock.
- Label the tube with the patient’s addressograph.
- Twist off cap and discard.
- Use a new 5mL oral syringe to attach directly to the tube. Pull and release the plunger 2-3 times, then pull and hold the plunger and the suction will draw the gel into the syringe. You may get some air in your syringe which may be difficult to remove therefore draw up an approximate amount in the syringe as indicated in the table below.
- Dose is 200mg/kg (0.5 mL/kg):

<table>
<thead>
<tr>
<th>Baby's Weight</th>
<th>Dose (mL)</th>
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<tbody>
<tr>
<td>Less than or equal to 2 kg</td>
<td>1 mL</td>
</tr>
<tr>
<td>2.1 to 3 kg</td>
<td>1.5 mL</td>
</tr>
<tr>
<td>3.1 to 4 kg</td>
<td>2 mL</td>
</tr>
<tr>
<td>4.1 to 5 kg</td>
<td>2.5 mL</td>
</tr>
</tbody>
</table>
- Prior to application, dry mouth with a gauze.
- Empty ½ of the contents of the oral syringe onto a gloved finger and massage into the buccal mucosa of one cheek. Repeat with the remaining dose inside the other cheek. For large gel volumes, the dose may be divided into four equal amounts and given alternating between cheeks.
- After use, return the tube to its plastic container with the white lid and keep at the bedside.
- If the blood glucose level still remains 2.5mmol/L or less refer to treatment algorithm.
Appendix D: Recommended Weight-Based Feeding Volumes for Hypoglycemic Newborns

- It is recommended to breastfeed immediately after administering oral dextrose gel, ensuring milk transfer.
- If breastfeeding is not successful, it is recommended to enterally feed the baby 5-10mL/kg breastmilk or breastmilk substitute.

<table>
<thead>
<tr>
<th>Baby’s Weight (kg)</th>
<th>Volume of feed (5-10mL/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2kg</td>
<td>10-20 mls minimum every 3 hours</td>
</tr>
<tr>
<td>2.5kg</td>
<td>13-25 mls minimum every 3 hours</td>
</tr>
<tr>
<td>3kg</td>
<td>15-30 mls minimum every 3 hours</td>
</tr>
<tr>
<td>3.5 kg</td>
<td>18-35 mls minimum every 3 hours</td>
</tr>
<tr>
<td>4kg</td>
<td>20-40 mls minimum every 3 hours</td>
</tr>
</tbody>
</table>

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2 Hypoglycemia is a medically indicated reason for administering a breastmilk substitute (Formula)
3 Canadian Pediatric Society (2016)
4 Babies at risk for hypoglycemia are ideally fed a minimum of every 3 hours
Related Documents


References


Revisions

July 2008
April 2007
July 2005
October 2015
April 2017
Signing

Original Signed

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