

STANDARD GUIDELINE: Management of Hypoglycemia in the Neonate



Program Area: Obstetrics
Section: General
Reference Number: CLI.5810.SG.007
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PURPOSE:

To provide guidelines for identification, monitoring and management of hypoglycemia in neonates born at 35 weeks gestational age or greater. See [Canadian Pediatric Society Guideline link](#).

DEFINITIONS:

Canadian Birthweight Chart for 10th and 90th Percentiles

Gestation (completed weeks)	Birth weight (g)			
	10th %ile		90th %ile	
	Male	Female	Male	Female
37	2,552	2,452	3,665	3,543
38	2,766	2,658	3,877	3,738
39	2,942	2,825	4,049	3,895
40	3,079	2,955	4,200	4,034
41	3,179	3,051	4,328	4,154
42	3,233	3,114	4,433	4,251

Canadian Pediatric Society, 2019

Carnitine Palmitoyl Transferase-1 (CPT-1) Deficiency – autosomal recessive genetic disorder that affects metabolic processes. Neonates of Hutterite and Inuit heritage are at an increased risk of having this deficiency.

Glucose Gel – Dextrose in a gel form for buccal administration.

Glucose Level – Plasma or whole blood glucose level, measured in mmol/L regardless of method of measurement. Measured at the bedside using a point-of-care blood glucose meter.

Infant of a Diabetic Mother (IDM) – neonates whose mothers have diabetes which may be Type 1, Type 2 or gestational diabetes.

Large for gestational age neonates (LGA) – birth weight greater than the 90th percentile on the Neonatal Birth Weight Chart.

Preterm Neonates – gestational age less than 37 weeks.

Small for Gestational Age Neonates (SGA) – birth weight less than the 10th percentile on the Neonatal Birth Weight Chart.

Target Glucose Level – the goal blood glucose level above which interventions may be weaned as per protocol or glucose monitoring discontinued. The goal is to achieve this level by 6 hours of age (greater than or equal to 2.6 mmol/L).

True Blood Sugar (TBS) – Venous/capillary/arterial blood sample sent to the laboratory.

IMPORTANT POINTS TO CONSIDER:

Asymptomatic hypoglycemia:

- In the first few hours after birth is considered part of the transition to extrauterine life.
- Early and exclusive breastfeeding meets nutritional and metabolic needs of most neonates.
- Term neonates do not develop clinically significant hypoglycemia as a result of expectant variations in feeding patterns.

Symptomatic hypoglycemia:

- Severe or prolonged hypoglycemia with clinical signs may result in neurologic injury.
- **Requires immediate intervention.**

GUIDELINE:

Identify all neonates who are “at risk” for development of hypoglycemia based on any of the following criteria:

- Weight less than 10th percentile (SGA)
- Intrauterine growth restriction (IUGR)
- Weight greater than 90th percentile (LGA)
- Infants of diabetic mothers (IDMs)
- Preterm infants less than 37 weeks gestational age (GA)
- Maternal exposure to labetalol within 2 weeks of delivery
- Late preterm exposure to antenatal steroids
- Perinatal asphyxia
- Metabolic conditions (e.g., CPT-1 deficiency)
- Syndromes associated with hypoglycemia (e.g., Beckwith-Wiedemann)

Identify neonates who are unwell or unable to be fed enterally, including, but not limited to those who:

- Are septic or have signs of sepsis
- Have respiratory distress with or without hypoxia
- Have had significant intrapartum depression or asphyxia
- Have hypo or hyperthermia
- Have significant congenital anomalies such as congenital heart disease
- Are Rh iso-immunized

Identify the symptomatic neonate with a blood glucose level below 2.6 mmol/L and exhibiting the following clinical signs:

- Jitteriness/tremulousness/convulsions
- Episodes of cyanosis
- Eye rolling
- Apnea or tachypnea
- Weak or high-pitched cry
- Limpness, lethargy or unresponsiveness
- Difficulty feeding/uninterested in feeding
- Episodes of sweating, pallor, hypothermia
- Cardiac failure/arrest

PROCEDURE:

For all neonates at risk for hypoglycemia:

***NOTE- If the infant is unwell, symptomatic, or should not be fed, check blood glucose immediately.**

1. Place neonate skin to skin with birthing parent or support person to reduce pain during the procedure.
2. Attempts to feed the newborn at the breast or formula feed 5ml/kg for non-breastfeeding neonates should be encouraged within the first 2 hours after birth.
3. Check blood glucose at **2 hours after birth**.
4. Subsequent blood glucose is done prior to feeds (breastfeeding or formula feeding).
5. If glucometer glucose is less than **1.8mmol/L** in the first 72 hours of life:
 - If possible, send True Blood Sugar (TBS) to lab and **immediately treat according to steps #6 or #7** and notify Primary Care Provider (PCP). **Do not delay treatment for TBS lab results.**
 - Consider consult to Neonatology.
6. If hypoglycemic and **asymptomatic**:
 - **Give glucose gel 0.5ml/kg, see** CLI.5810.SG.007.SD.01 Measuring Instructions for Glucose Gel (Insta-Glucose) for Newborns and **feed neonate with 5-10mls/kg expressed breast milk (EBM) or formula.**
 - Repeat glucometer glucose 30 minutes post feed and follow next steps according to the glucose result.
7. If hypoglycemic and **symptomatic**:
 - **Give glucose gel 0.5ml/kg, see** CLI.5810.SG.007.SD.01 Measuring Instructions for Glucose Gel (Insta-Glucose) for Newborns **and initiate intravenous access (IV/UVC).**
 - Consider administering IV bolus D10W at 2ml/kg, and/or infusion of D10W at 80ml/kg/24hrs.
 - Repeat glucometer glucose 30 minutes post IV bolus and follow next steps according to the glucose result.
8. See CLI.5810.SG.007.SD.02 Canadian Pediatric Society Management Hypoglycemia Algorithm.

Next Steps

Neonate's glucometer glucose is greater than or equal to 2.6mmol/L (continued monitoring):

- Check glucometer glucose every 3-6 hours **prior** to feeds. Continue until two consecutive measurements are greater than or equal to 2.6mmol/L **AND** time criteria of:
 - 12 hours of age if IDM or LGA; CPT-1 deficiency; experienced asphyxia; if any maternal exposure to labetalol in past 2 weeks; if any maternal exposure to antenatal steroids in past two weeks.
 - 24 hours of age if SGA or less than 37 weeks gestation **AND** feeding is established.

Symptomatic neonate's glucometer glucose is greater than or equal to 2.6mmol/L:

- Notify PCP to assess for alternate causes of symptoms.

Glucometer glucose 1.8 – 2.5 mmol/L and infant is greater than or equal to 35 weeks GA in first 72hrs:

- Give glucose gel **0.5ml/kg AND** feed the neonate at the breast for maximum of 30 minutes (exhaustion causes poor feeding) or 5ml/kg EBM or formula.
- Repeat glucometer glucose 30 minutes **after** the feed.
 - If glucometer glucose remains between 1.8 – 2.5 mmol/L, repeat glucose gel, feed and repeat glucometer glucose 30 minutes **after** the feed.
 - If glucometer glucose is greater than or equal to 2.6 mmol/L, follow **continued monitoring**.
 - If glucometer glucose remains less than 2.6 mmol/L after two doses of glucose gel and feeds, **establish intravenous access**, follow CLI.5810.SG.007.SD.02 Canadian Pediatric Society Management Hypoglycemia Algorithm infusion pathway.
 - Consider consult to Neonatology.

Intravenous Weaning

- **The neonate must maintain a glucose level of greater than or equal to 2.6mmol/L for two consecutive readings to qualify for weaning.**
- Continue to feed the neonate breastmilk or formula every 3 hours, and maintain the rate until the next feed. Check glucometer glucose **prior** to the next feed.
 - If the glucose is in the range of 2.2 – 2.5mmol/L and infant is asymptomatic, feed and continue IV therapy at same rate.
 - If the glucose is greater than or equal to 2.6mmol/L the IV may be decreased.
- Decrease the IV rate by 10 – 20% of the initial full rate following the feed.
- Repeat glucometer glucose checks prior to feeds and maintain or decrease IV according to the blood glucose level and toleration of feeds.
- If the blood glucose is 2.2 – 2.5mmol/L and infant becomes symptomatic, bolus D10W 2ml/kg over 3-5 minutes and increase IV to previous rate and notify Neonatology.
- **If blood glucose is less than 2.2mmol/L call PCP.**
- When IV rate is decreased to 2ml/hr, infusion can be discontinued and IV site switched to saline lock. Continue glucometer glucose checks before the next two feeds. If neonate remains stable (glucose greater than or equal to 2.6mmol/L) IV may be discontinued once an order is written.

Supporting Documents

[CLI.5810.SG.007.SD.01](#)

Measuring Instructions for Glucose Gel (Insta-Glucose) for Newborns

[CLI.5810.SG.007.SD.02](#)

Canadian Pediatric Society Management Hypoglycemia Algorithm

REFERENCES:

Boulton, J. E., Coughlin, K., O'Flaherty, D., Solimano, A., (2021). *ACoRN: Acute Care of at-Risk Newborns*. Oxford. DOI: 10.1093/med/9780197525227.001.0001

Canadian Pediatric Society, 2019 24(8):536-544, Screening guidelines for newborns at risk for low blood glucose. *Paediatrics and Child Health*, 9(10), 723-729

[Canadian Pediatric Society Hypoglycemia Algorithm](#)

[Canadian Pediatric Society Guideline link](#)