

JOHNS HOPKINS ALL CHILDREN'S HOSPITAL – HEART INSTITUTE

Neonatal Hypoglycemia: Early Management Clinical Pathway (CVICU)

Johns Hopkins All Children's Hospital – Heart Institute

Neonatal Hypoglycemia: Early Management Clinical Pathway (CVICU)

Table of Contents

1. [Rationale](#)
2. [Background](#)
3. [Diagnosis](#)
4. [Clinical Management](#)
 - a. [Phase 1](#)
 - b. [Phase 2](#)
 - c. [Phase 3](#)
 - d. [Phase 4](#)
5. [Inpatient](#)
 - a. [Inpatient Pathway](#)
 - b. [Inpatient Management](#)
6. [Documentation Reminders](#)
7. [References](#)
8. [Outcome Measures](#)
9. [Clinical Pathways Team Information](#)

Updated: October 21, 2025
Owner: Reema Patel, MD

This pathway is intended as a guide for physicians, physician assistants, nurse practitioners and other healthcare providers. It should be adapted to the care of specific patient based on the patient's individualized circumstances and the practitioner's professional judgment.

Neonatal Hypoglycemia: Early Management Clinical Pathway (CVICU)

Rationale:

This clinical pathway was developed by a consensus group of Johns Hopkins All Children's Hospital (JHACH) physicians, advanced practice providers, nurses, and pharmacists to standardize the management of children hospitalized for neonatal hypoglycemia.

Neonatal hypoglycemia is a blood glucose concentration below which normal function of the brain cannot occur in a neonate. According to the 2011 guidelines on hypoglycemia from the American Academy of Pediatrics (AAP), blood glucose levels in healthy newborns can be as low as 30 mg/dL during the first 1 – 2 hours of life. Significant hypoglycemia within the first few hours of life can lead to significant comorbidities and potentially seizures if not properly identified and addressed expeditiously. This guideline has been developed to standardize clinical management and treatment of neonatal hypoglycemia detected within the first 48 hours of life.

Background:

Neonatal transitional hypoglycemia can be a normal finding in newborns for up to 48 hours after birth. Clinically significant hypoglycemia results from a newborn's inadequate supply of glucose within the bloodstream. While this can be a transient normal phenomenon, metabolic conditions, infant conditions, and maternal factors can all impact neonatal plasma glucose homeostasis as well. While there are no set thresholds for which long-term sequelae are expected, a consensus amongst most guidelines is to keep blood glucose levels greater than 50 mg/dL in most neonates, especially high-risk neonates.

Diagnosis:

The thresholds for hypoglycemia after this transitory period are listed below:

- Birth – 4 hours of age: < 50 mg/dL
- 4 – 24 hours: < 55 mg/dL

Lab tests:

- Point-of-care blood glucose testing
- Metabolic panel (renal function panel (RFP) or complete metabolic panel (CMP))
- Critical sample labs (obtained as clinically indicated, [Table 1](#))

Table 1: Critical Labs to Consider with Persistent Neonatal Hypoglycemia		
	Blood test	Normal values in the setting of glucose < 50 mg/dL
Critical fasting labs These are required labs and should be drawn when glucose < 50 mg/dL	Plasma lactate (critical)	0.6 – 2 mmol/L
	Plasma insulin level (critical)	< 2 µIU/L
	Bicarbonate	15 – 20 mmol/L
	CMP	Routine laboratory standard
	Beta-hydroxybutyrate (serum ketones)	> 2 mmol/L
Additional labs to consider, as directed by Endocrinology consultation	Free fatty acids	> 2 mmol/L
	Growth hormone	> 7 ng/mL
	C-peptide	< 0.5 ng/mL
	Cortisol	> 10 mcg/dL
	Ammonia	< 33 µmol/L
	Acyl-carnitine profile, total and free carnitine	Routine laboratory standard
	Urine organic acids	Routine laboratory standard
	Insulin-like growth factor-binding protein 1 (IGFBP-1)	> 180 ng/mL

Clinical Management:

Patient Screening:

Phase 1: Assess all patients for symptoms or risk factors for developing hypoglycemia in the neonatal phase. Typical symptoms in neonates are listed below:

Symptoms of Hypoglycemia:

- Jitteriness
- Irritability
- High-pitched cry
- Apnea, cyanosis, irregular/rapid breathing
- Hypotonia
- Seizures
- Temperature instability
- Poor feeding

Risk Factors for Hypoglycemia:

- Small for gestational age (Weight < 10th percentile)
- Large for gestational age (Weight > 90th percentile)
- History of intrauterine growth restriction
- Infants of diabetic mothers (IDM)
 - Especially with maternal failure of the 1-hour glucose test
- Preterm infants (< 34 weeks gestational age)
- Late preterm infants (34-36.6 weeks gestational age)
- Family history of congenital hypoglycemia
- Maternal medications (terbutaline, beta-blockers, oral hypoglycemics)
 - Genetic syndromes (Beckwith-Wiedemann, Turner Syndrome)

- Midline defects
- Suspected sepsis
- Hypothermia

Phase 2: Screening for Hypoglycemia

- Initial feeding within one hour of birth (if able to feed)
 - Check blood glucose (BG) with bedside point of care test (POCT) 30 minutes after feed
- If not able to feed, patients should be started on dextrose 10% (D10) infusion at 80 mL/kg/day on day of life 0 and advanced per neonatal intensive care unit (NICU) recommendations
 - Check BG with bedside POCT at 1 hour of life if risk factors present

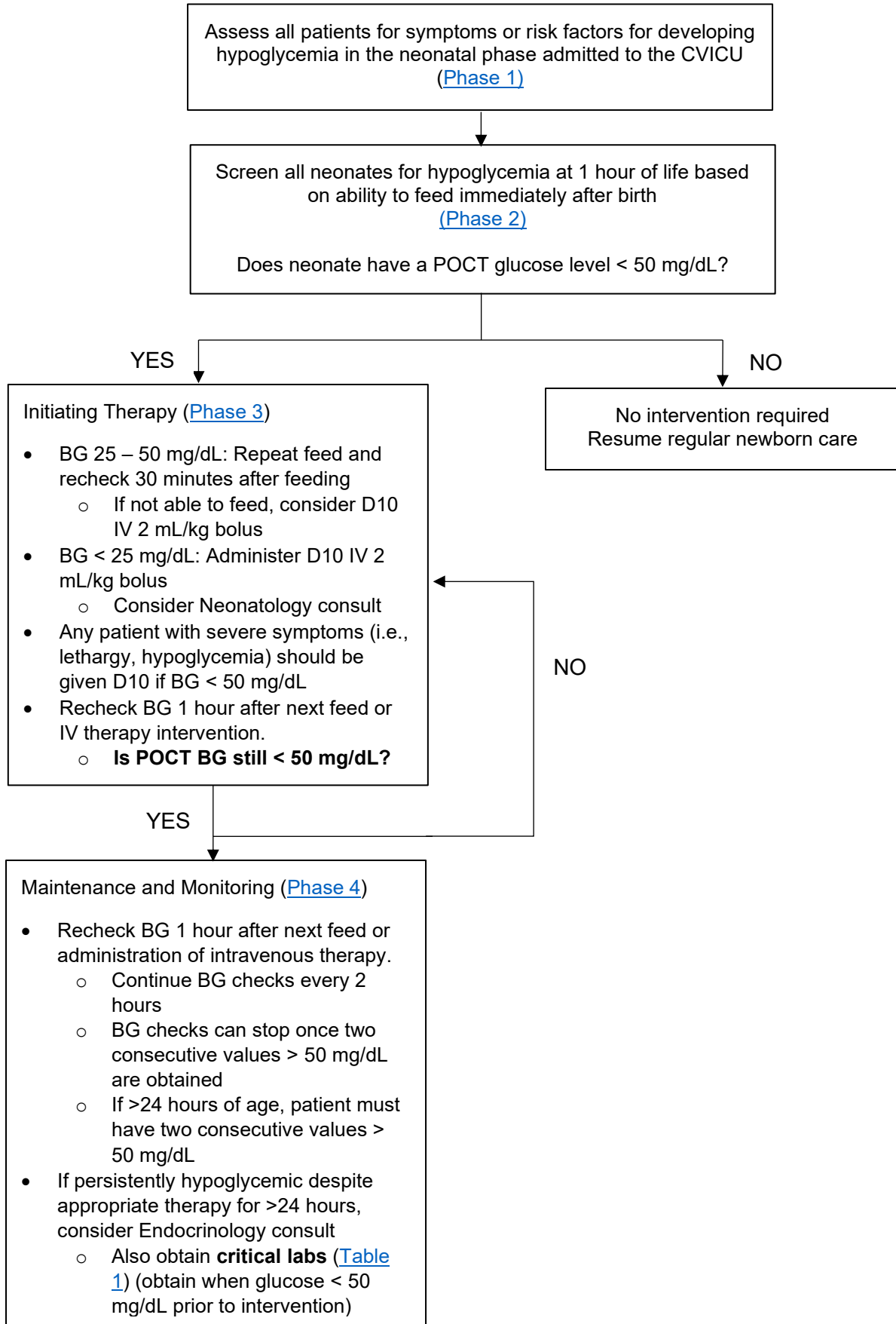
Phase 3: Initiating therapy

- If 1 - 4 hours of age and:
 - BG > 50 mg/dL: no intervention required
 - BG 25 – 50 mg/dL: repeat feed and recheck 30 minutes after feeding
 - If not able to feed, consider D10 intravenous (IV) 2 mL/kg bolus
 - BG < 25 mg/dL: administer D10 IV 2 mL/kg bolus
 - Consider Neonatology consult
 - Any patient with severe symptoms (i.e., lethargy, hypoglycemia) should be considered for D10 IV therapy if BG is < 50 mg/dL

Phase 4: Maintenance of BG in the target range and spacing checks

- Recheck BG 1 hour after the next feed or administration of IV therapy
 - Continue BG checks every 2 hours
 - BG checks can stop once two consecutive values > 50 mg/dL are obtained
 - If > 24 hours of age, the patient must have two consecutive values > 50 mg/dL
- If persistently hypoglycemic despite appropriate therapy for > 24 hours, consider an Endocrinology consult
 - Also obtain critical labs (obtain when glucose < 50 mg/dL prior to intervention):
 - Plasma lactate
 - Plasma insulin level
 - Bicarbonate level
 - CMP
 - Beta-hydroxybutyrate
- Other indications for Endocrinology consult:
 - IV fluids > 7 days
 - Use of glucagon
 - BG < 45 mg/dL for three consecutive checks
 - Family history of genetic forms of hypoglycemia
 - Suspicion of a syndrome associated with hypoglycemia
 - Beckwith-Wiedemann
 - Turner Syndrome

Neonatal Hypoglycemia: Early Management Clinical Pathway (CVICU)



Outcome Measures:

- Hypoglycemia in neonates in the CVICU
- Neonatology or Endocrine consults for hypoglycemia

Documentation Reminders:

None

References:

1. Committee on Fetus and Newborn, Adamkin DH. Postnatal glucose homeostasis in late-preterm and term infants. *Pediatrics*. 2011;127(3):575-579. doi:10.1542/peds.2010-3851
2. Shah R, Harding J, Brown J, McKinlay C. Neonatal Glycaemia and Neurodevelopmental Outcomes: A Systematic Review and Meta-Analysis. *Neonatology*. 2019;115(2):116-126. doi:10.1159/000492859
3. Rozance PJ, Hay WW Jr. New approaches to management of neonatal hypoglycemia. *Matern Health Neonatol Perinatol*. 2016;2:3. Published 2016 May 10. doi:10.1186/s40748-016-0031-z
4. van Kempen AAMW, Eskes PF, Nuytemans DHGM, et al. Lower versus Traditional Treatment Threshold for Neonatal Hypoglycemia. *N Engl J Med*. 2020;382(6):534-544. doi:10.1056/NEJMoa1905593
5. Gray K, Dalrymple R, Brunton A. Lower glucose treatment threshold could be as safe as the traditional threshold in hypoglycaemic neonates. *Arch Dis Child Educ Pract Ed*. 2021;106(4):255-256. doi:10.1136/archdischild-2020-319938
6. Thompson-Branch A, Havranek T. Neonatal Hypoglycemia. *Pediatr Rev*. 2017;38(4):147-157. doi:10.1542/pir.2016-0063

Clinical Pathway Team
Heart Institute Neonatal Hypoglycemia Management Clinical Pathway
Johns Hopkins All Children's Hospital

Owner & Primary Author: Reema Patel, MD

Pathway Review Panel:

Cardiac ICU Physicians

Heart Institute Clinical Practice Council Members

Clinical Pathways Program: Courtney Titus, MPAS, PA-C; Kristel Lassiter, APRN, Clinical
Pathway Implementation Specialist

Date Approved by JHACH Heart Institute Clinical Practice Council: August 20, 2025

Date Approved by CPDC: September 2, 2025

Content Last Revised: October 21, 2025

Last Formatted: August 27, 2025

Date Available on Webpage: October 21, 2025

Disclaimer

Clinical Pathways are intended to assist physicians, physician assistants, nurse practitioners and other health care providers in clinical decision-making by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of specific diseases or conditions. The ultimate judgment regarding care of a particular patient must be made by the physician in light of the individual circumstances presented by the patient.

The information and guidelines are provided "AS IS" without warranty, express or implied, and Johns Hopkins All Children's Hospital, Inc. hereby excludes all implied warranties of merchantability and fitness for a particular use or purpose with respect to the information. Johns Hopkins All Children's Hospital, Inc. shall not be liable for direct, indirect, special, incidental, or consequential damages related to the user's decision to use the information contained herein.