

Chapter 7: Screening for Hypoglycemia in Newborn Nursery

Transient hypoglycemia after birth is normal in full term, healthy newborns. However, hypoglycemia has been associated with poor developmental outcomes. Because hypoglycemia is typically asymptomatic in newborns, babies at high risk for hypoglycemia are screened in the first 12-24 hours of life.

Management of Hypoglycemia in the Newborn Nursery

Screen per Patient Care Policy #34: Hypoglycemia in Birthing Center Infants

Babies with symptomatic hypoglycemia require immediate evaluation.

Symptoms of Hypoglycemia		
Lethargy	Vital sign instability	Apnea
High pitched cry	Cyanosis /Pallor	Seizures
Irritability	Sweating	Hypotonia
Jitteriness	Poor feeding	Respiratory distress

symptomatic babies who require screening for hypoglycemia

- Screen IDM and LGA infants for first 12 hours of life
- Screen SGA infants, infants < 2500 gm and infants < 37 weeks for first 24 hours of life
- One time screen if Apgars <4 at 1 minutes or, <7 at 5 minutes of life, temperature < 97.4, maternal beta blocker, IUGR or exposure to steroids within 2 weeks of delivery

Low blood sugars (<40 in first 4 hours of life and <45 4-24 hours of life) are treated with the hypoglycemia treatment bundle which includes warming, feeding, and extrose gel.

Hypoglycemia can be treated with 4 total hypoglycemia treatment bundles in the newborn nursery. If baby has a low blood sugar after 4 hypoglycemia bundles the baby should be transferred to the NICU for further management.

Management of Hypoglycemia in NICU

Plasma glucose homeostasis requires gluconeogenesis and ketogenesis to maintain normal rates of fuel use. Neonatal hypoglycemia occurs with impaired gluconeogenesis and ketogenesis. As glucose is an essential source of cerebral energy, prolonged hypoglycemia can result in adverse neurologic sequelae.

Etiology

- A. Causes of transient hypoglycemia
 - Perinatal stress, asphyxia, hypothermia
 - LGA and/or IDM, polycythemia
 - Sepsis, shock
 - Maternal meds: terbutaline, chlorothiazide, labetalol, propranolol
 - Exchange transfusion
- B. Decreased glycogen storage
 - IUGR/SGA: **Must monitor pre-feed blood sugar when infant coming off IVF and with any change of feeds to lower calories.**
 - Premature and post mature infants
- C. Causes of persistent hypoglycemia
 - Hyperinsulinism: Beckwith-Wiedemann Syndrome, Islet cell adenoma, beta cell hyperplasia, Nesidioblastosis
 - Hormone Deficiencies: GH, Glucagon, cortisol, thyroid hormone
 - Defects of CHO metabolism: Glycogen storage disease type I, Galactosemia, Fructose intolerance, Fructose 1, 6 diphosphate deficiency
 - Defects in amino acid metabolism: MSUD, Tyrosinosis, Propionic acidemia, Methylmalonic acidemia
 - Defects in fatty acid metabolism: Medium and long chain fatty acid deficiency

reatment

- A. Asymptomatic hypoglycemia
- Early and frequent feeds
 - Follow hypoglycemia management guidelines for starting IVF
- B. Symptomatic and persistent hypoglycemia
- Monitor glucose level closely
 - Start IVF: D10W 60-80 ml/kg/d (GIR = 4-6 mg/kg/min)
 - **Maintain blood glucose >50-60 mg/dl**
 - Consider bolus of D10W 2 ml/kg (200 mg/kg) if persistently **<40 mg/dl** followed by infusion
 - Monitor GIR (mg/kg/min) =
$$\frac{\text{Dextrose concentration (gm/100 ml)} \times \text{rate (ml/hr)}}{6 \times \text{weight (kg)}}$$
- D10W has 10 gm/100 ml
- Need central line if dextrose concentration >12.5%
 - If stable, start enteral feeds and increase calories as tolerated
 - Once three preprandial blood glucoses > 60 mg/dl, begin weaning IVF. Suggested weaning protocol: wean IVF by 2 ml/hr if blood glucose > 70 mg/dl; wean IVF by 1 ml/hr for blood glucoses 60-69 mg/dl; hold current rate of IVF for blood glucoses 50-59 mg/dl; Notify provider for blood glucoses < 50 mg/dl.
 - If no improvement, endocrine and metabolic consults and w/u
 - Pharmacologic: For persistent hyperinsulinemic hypoglycemia: cornstarch, diazoxide and octreotide have been used.

Work up for persistent hypoglycemia, in order of priority:

- Blood sugar, Insulin, Growth hormone, Cortisol
- Serum ketones, CBG, Lactate, Ammonia
- Glucagon, T4, TSH
- Consider metabolic work up: Free fatty acids, alanine, amino acids, uric acid

Initial Management of Newborn Hypoglycemia

Birthing Center

Screening Criteria:

Symptomatic (e.g., jittery, Temp < 97.4°F any time, low tone) – check blood sugar (BS); if less than target range for age, initiate Hypoglycemia Treatment (HG Tx) Bundle

Asymptomatic:

- Check for 12 hours if LGA, IDM (infant of diabetic mother)
- Check for 24 hours if SGA, late preterm or <2500 gms
- Check once if: Apgar < 3 @ 1 min or < 6 @ 5 min; prenatal dx IUGR; maternal beta blockers; prenatal steroids w/in 2wks of delivery

Birth to 4 hours of life

- Place infant skin to skin
- Feed by 1 hour of life
- First blood sugar between 90-120 min of life (unless symptomatic); goal is 30 min after feeding completed
- Goal temperature $\geq 98^{\circ}\text{F}$

After 4 hours of life

- Feed on demand (at least every 2-3hrs)
- Check blood sugar before feeding
- Goal temperature $\geq 98^{\circ}\text{F}$

Blood Sugar <40 (HG Tx Bundle)

1. Warm blanket
2. Feed minimum 10-15ml*
3. Glucose gel
4. Skin to skin (STS)
5. Recheck 1 hour after gel

Target Blood Sugar ≥ 40

- Feed at least every 2-3 hours
- Check blood sugar before feeding
- Goal temp $\geq 98^{\circ}\text{F}$

Blood Sugar <45 (HG Tx Bundle)

1. Warm blanket
2. Feed minimum 10-15ml*
3. Glucose gel
4. Skin to skin (STS)
5. Recheck 1 hour after gel

Target Blood Sugar ≥ 45

- Feed at least every 2-3 hours
- Check blood sugar before feeding
- Goal temp $\geq 98^{\circ}\text{F}$

Notify provider when: POC BS < 25 mg/dL or if 2 BS in a row < 40mg/dL (whether screening due to symptoms or to presence of risk factors)

Feeding, then Glucose Gel (Symptomatic and Asymptomatic):

*Feed EBM, DHM or Formula per parental choice. RN actively assists with feeding (e.g., spoon, tube at breast, finger feeding, paced bottle feeding). Feeding time not to exceed 20 minutes. Give glucose gel directly after.

Transfer to NICU for intermediate care when: BS still low after 4 Treatment Bundles (feeding + glucose gel + STS/warm per bundle)

NICU

Standard NICU Care.

Recheck blood sugar on admission to NICU.

Recommended feeding is EBM, DHM, or 20 calorie formula.

Criteria for transfer back to the Birthing Center: Stable blood sugars x 3. Transition Feeding Plan/Lactation Consult. Normal feeding volume for day of life with EBM, DHM or 20 cal formula. Stable temperature.