

DISCHARGE OF AN INFANT WITH PERSISTENT HYPOGLYCEMIA

1. Specialist Consultation

Pediatric Endocrinology should be consulted prior to discharge for all infants who fail a safety fast or require diazoxide, to assist with discharge planning and to coordinate outpatient follow-up.

Pediatric Endocrinology does not routinely need to be consulted inpatient for infants who pass the safety fast. If an infant passes a safety fast but the medical team is concerned about high risk of recurrence of hypoglycemia due to additional risk factors (prematurity, poor feeding, significant difficulty weaning IV fluids, or other factor), the team can consider prescribing a glucometer at discharge and arranging an outpatient appointment with Endocrinology 1-2 weeks after discharge.

2. Assessment of Discharge Readiness

Goal blood sugars are ≥ 60 mg/dL after 48 hours of life, both for pre-feed blood sugar checks and during a safety fast. A goal of ≥ 70 mg/dL may be used in especially high-risk infants with additional risk factors for persistent hypoglycemia; namely infants who have a sibling with congenital hyperinsulinism or infants with a diagnosis of glycogen storage disease or other known hypoglycemic disorder.

3. Glucometer Prescription and Teaching

The preferred glucometer for home monitoring in infants is the Bayer Contour Next due to its superior accuracy measuring blood glucose levels in the low range (< 70 mg/dL). A prior authorization is often required to obtain this glucometer. Currently the Bayer Contour Next is available at the CVS at Longwood, but not at the BWH or Boston Children's Hospital pharmacies. If the patient is not able to obtain a Bayer Contour Next, then the Freestyle Lite, or One Touch Verio are recommended. The One Touch Ultra performs very poorly in the low range of blood glucose levels, and is not recommended. The Freestyle Lite meters are stocked by the Brigham and Women's Hospital outpatient pharmacy. Glucometers can be ordered in EPIC discharge prescription section as "blood-glucose meter kit." Test strips, lancets, and alcohol swabs should also be ordered.

Glucometer teaching is often provided by the pharmacy that dispenses the glucometer. If the family is being discharged with the Freestyle Lite meter, the BWH pharmacist will deliver the glucometer to the floor and review set up with family. This teaching usually encompasses the mechanics of turning on and setting time and date on the device. It is the responsibility of the bedside nurse to teach the family how to obtain a proper blood sample for testing. If patient is going home with a glucose meter that is not supplied by the BWH pharmacy (such as the Bayer Contour), then it is also the responsibility of the

nurse to teach the mechanics of setting up the glucometer. NICU Professional Development Manager, Julie Cadogan and Liz Brennick, RN are available for assistance if the bedside nurse requires assistance providing teaching for the family.

Parents should obtain the glucometer prior to discharge, and after teaching, should obtain a minimum of 2 samples under supervision prior to discharge. When possible, both parents (or other primary caregivers for the infant) should be trained. When the parent performs testing in the hospital, the bedside nurse will also perform a simultaneous measurement of the blood glucose using the hospital glucometer, and the value from the hospital glucometer will be the value entered into the electronic medical record. Parents and providers should be aware that there is significant variation in the blood glucose readings obtained from different glucometers so the two values are not expected to be identical. (The 2014 U.S. Food and Drug Administration (FDA) guidance for over-the-counter glucometers requires $\geq 95\%$ of results to fall within $\pm 15\%$ of the true value and $\geq 99\%$ of results within $\pm 20\%$ across the whole glycemic range. Thus, if a patient's true blood glucose concentration is 60 mg/dL, acceptably accurate results range from 51 to 69 mg/dL according to the FDA criteria.)

4. Discharge Prescriptions

Prescriptions should be written as soon the team determines that the patient will require a glucometer, gel, glucagon, and/or diazoxide as this will give the care coordinator time to investigate which glucometer the family can obtain through their insurance and facilitate early teaching.

Discharge prescription checklist for providers entering orders in EPIC:

- Glucometer ("BLOOD-GLUCOSE METER KIT" then enter the preferred brand in the comments section)
- Test strips for glucometer ("BLOOD SUGAR DIAGNOSTIC STRIPS" then enter the preferred brand in the comments section)
- Lancets ("LANCETS 28 GAUGE")
- If recommended:
 - glucagon (dosing provided by Endocrine team) and insulin syringes (for drawing up glucagon; "INSULIN SYRINGE-NEEDLE U-100 0.3mL 30 gauge x 5/16")
 - dextrose gel ("DEXTROSE 40% GEL"): note this is not a prescription but parents can purchase this at the outpatient pharmacy
 - Diazoxide and Diuril if using inpatient

The bedside nurse will provide teaching for the family for all home medications, including glucagon if prescribed.

5. Discharge Checklist

At least 3 days before discharge:

- ____ Consult endocrinology
- ____ Prescribe glucometer, test strips, lancets

48 hours before discharge:

- ____ Complete safety fast
- ____ Obtain glucometer
- ____ Glucometer teaching
- ____ Order discharge prescriptions for medications (if any)

24 hours before discharge:

- ____ Fill meds
- ____ Review follow-up plans/teaching/appointments/home medications
- ____ Call pediatrician to give sign-out

6. Discharge Instructions for Families

An EPIC smartphrase is available to assist with providing consistent discharge instructions for families (.NICUHYPOGLYCEMIADISCHARGE). A copy of these instructions is shown here:

Hypoglycemia Home Monitoring Plan:

Diazoxide dose:

Please continue Diazoxide *** mg ***twice daily (**provider should check with Endocrine team if will be BID or TID dosing)

Blood glucose monitoring:

- Check blood glucose at least twice daily, best prior to feeds and just before next diazoxide dose
- Additional reasons to check:
 - Feeds spaced longer than 3 hours apart
 - Any symptoms of hypoglycemia (sweating, lethargy, jitteriness)
 - Check more frequently if infant is sick (fever, cold, GI illness)

Treatment of low blood glucose (BG):

- If BG 60-70 mg/dL may feed with breastmilk or formula and recheck BG before next feeding
- If BG 45-60 mg/dL and well appearing may feed with breastmilk or formula and recheck BG in 15-30 minutes
 - If unwilling to eat give 5 grams (12.5 mL) 40% Dextrose Gel gel and recheck in 15 minutes

- If BG <45 mg/dL or if infant is symptomatic (sweating, lethargy, jitteriness) then give 5 grams of 40% Dextrose Gel and recheck in 15 minutes. If not improving or if unresponsive or having seizure, turn the infant in his/her side and administer 0.5 mg of glucagon, and call 911

Endocrinology Contact:

For non-urgent questions during business hours (8AM-6PM) or to schedule appointment please call: 617-355-7476.

If emergency after hours please call main BCH 617-355-6363 and ask for “endocrinology on call

Please call endocrinology in case of persistently low BG <70 mg/dL or for any questions

Please call endocrinology if pre-feed BG is >100 mg/dL more than 2 times per day

Please schedule a follow-up endocrinology appointment 1-2 weeks after discharge
Please tell the scheduler this is an “inpatient follow-up for hyperinsulinism”. The family may see any Endocrine provider at any BCH location.

References:

1. Klaff LJ, Brazg R, Hughes K, Tideman AM, Schachner HC, Stenger P, Pardo S, Dunne N, Parkes JL. Accuracy evaluation of contour next compared with five blood glucose monitoring systems across a wide range of blood glucose concentrations occurring in a clinical research setting. *Diabetes Technol Ther.* 2015 Jan;17(1):8-15.
2. Ekhlaspour L, Mondesir D, Lautsch N, Balliro C, Hillard M, Magyar K, Radocchia LG, Esmaili A, Sinha M, and Russell SJ. Comparative Accuracy of 17 Point-of-Care Glucose Meters. *J Diabetes Sci Technol* 2016:1-9.
3. Food and Drug Administration U.S. Food and Drug Administration. Self-monitoring blood glucose test systems for over-the-counter use: draft guidance for industry and Food and Drug Administration staff [article online], 2014. Available from <http://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM380327.pdf>. Accessed Oct 24, 2018.