Blood Glucose Screening in Neonates at Risk of or with Hypoglycemia.

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Neonatal Hypoglycemia is the commonest metabolic disorder of the newborn, and perhaps the only readily preventable cause of neonatal brain injury. Hypoglycemia is a laboratory supported diagnosis, rather clinical. In fact, most asymptomatic hypoglycemia in newborn are transient in nature, but symptomatic hypoglycemia is an emergency and requires intravenous treatment. Thus, adequate monitoring for early diagnosis in at risk neonate is necessary.

When to screen? How often?

For term baby with risk factors on postnatal wards:

- **Screening advised** at 2, 6, 12, 24, 48 and 72 hours of age, prior to feeding. In case of asymptomatic hypoglycemia on a feed trial, repeat test after one hour of feed is advised.
- Stable infants on parenteral nutrition : Initial 72 hours: every 6 to 8 hours. After 72 hours: once a day
- Growing VLBW infants: Once a week, as a part of weekly work-up if any.
- Infants exhibiting signs compatible with hypoglycemia at any time.

For sick infants:

- Once every 6-8 hours for first 72 hours, till blood sugar >50mg/dl, then once / day till full enteral feeds achieved.
- For infants with hypoglycemia on Glucose infusion : After 1 hour of starting IV fluids and then every hour (after every stepwise augmentation of GIR by 2 mg/kg/min till

blood sugars remain below 50 mg/dL). If the blood sugar levels are above 50 mg/dL, then monitor every 6 h for 48 h. [GIR- Glucose infusion rate]

What should be the goal for blood glucose levels:

- As per AAP recommendation goal is to have blood glucose values of 45 mg/dl or greater prior to feeding.
- PES recommends maintaining blood glucose >60 mg/dl after age 48 hours.

When to stop screening?

- At the end of 72 hours in at risk neonates
- An infant after stopping of the IV fluids and has two consecutive values >50mg/dl on total enteral intake.
- If preterm, now with corrected age >34 week, on full enteral feed and room in with mother (ready for discharge).

How is Blood Glucose ?

(A) Point of care test:

- **Reagent strips:** Heel prick method using either 26 G needle or lancet along the outer margin of feet is used. Caution to warm the feet and letting alcohol dry, as can affect the results. Post prick, the first blood drop to be discarded and free flowing blood to be used. Though reagent strips are most widely used method, low sugars especially < 40 mg/dL are not rightly diagnosed. Any low sugars, while acted upon needs laboratory confirmation. (*Most standard instruments use non-enzymatic methods to measure blood glucose concentration, which are less accurate at lower glucose values than laboratory analysis using glucose oxidase methods (the gold standard). Whole blood samples (used in POCT) have 10% to 18% lower glucose concentrations than plasma, depending on the hematocrit. Therefore, abnormally low glucose values on POCT require confirmation by measuring plasma glucose concentration using clinical laboratory methods*)

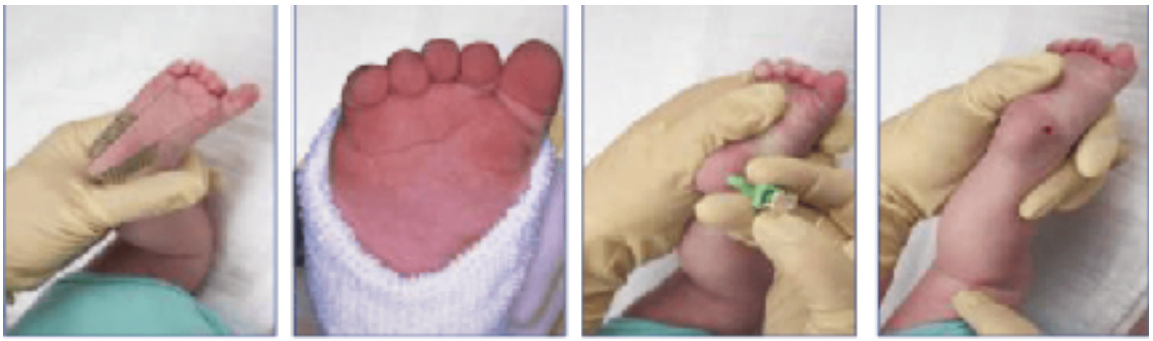
- 

Figure. 1. Heel site prick for sugar monitoring.

- **Blood gas analyzer:** Alternatively, cot-side enzymatic-based tests, e.g., i-STAT® (Abbott Laboratories, Abbott Park, Illinois, USA) or EPOC (Alere™, Massachusetts, USA), are increasingly used. They use the gold standard glucose oxidase reaction, produce reliable results, are portable and the result is available immediately. But the consumable are expensive, thus making its use as standard point of care not feasible for most NICUs.

(B) **Laboratory diagnosis**:

- It uses the gold standard enzymatic method (Glucose oxidase method) for diagnosis. Whole blood sample around 0.5- 1ml in pediatric fluoride bulbs (grey tops) is needed. Delay in processing affects glucose results with 18 mg/dL fall for every 1 hour delay. Thus, logistics with in house lab or earliest transportation and immediate processing needs to be available.
- While the laboratory confirmation is awaited, managing hypoglycemia is continued as supported by bed side test using reagent strips.

References:

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