

# Time to first blood glucose determination and administration of intravenous glucose at birth in Extremely Low Birth Weight Infants

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## Background

- ❖ Pre-term infants are at risk of hypoglycemia and therefore require timely feedings and monitoring of serum glucose levels
- ❖ Infants diagnosed with hypoglycemia are associated with an increased risk for adverse neurodevelopmental outcomes
- ❖ Interventions within the golden hour have been shown to reduce adverse neonatal outcomes

## Purpose of Study

- ❖ Study the incidence of hypoglycemia at admission in ELBW (birth weight  $\leq 1000$  g) infants,
- ❖ Study the percentage of infants who had blood glucose determination and received IV glucose within the golden hour,
- ❖ Assess clinical outcomes at discharge between hypoglycemic vs euglycemic infants.

## Methods Used

Data were collected and analyzed from 244 ELBW infants born between 2017-2020 at the Regional One Health NICU.

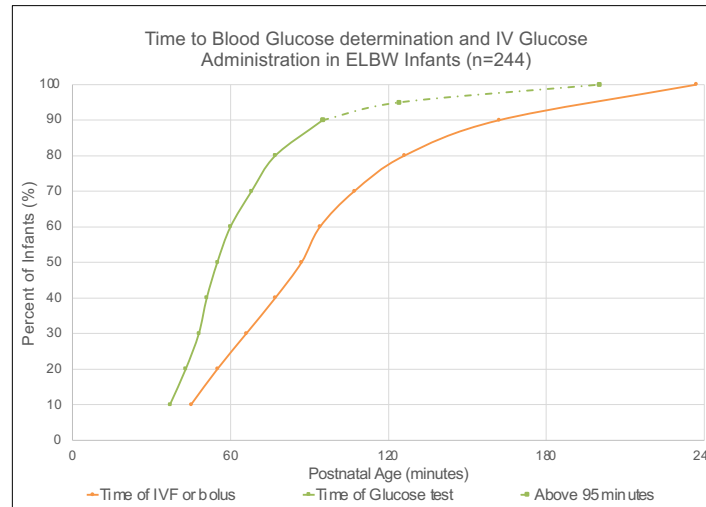
Hypoglycemia is defined as glucose level of  $<47$  mg/dL. Severe hypoglycemia is defined  $40$ mg/dL.

Data Collected:

- ❖ Time to first blood glucose determination
- ❖ Time of first IV glucose administration (bolus and/or IV dextrose infusion)
- ❖ Demographic characteristics
- ❖ Maternal history
- ❖ Birth history
- ❖ Outcomes at discharge

Statistical significance was determined with chi-squared analysis and t-tests.

## Results



- ❖ 244 infants enrolled birth weight of  $\leq 1000$ g
- ❖ Mean  $\pm$  SD GA:  $26.2 \pm 2.4$  weeks
- ❖ Mean  $\pm$  SD birth weight:  $739 \pm 161$ g

- ❖ Time to first blood glucose determination
  - Median (IQR): 56 (45-73) minutes
  - 145 (59%) of all infants tested within first hour of life
  - 190/244 infants had glucose determination before IV glucose initiation

- ❖ Time to administration of IV fluids or given bolus dextrose
  - Median (IQR): 88 (60-120) minutes
  - 59 (24%) given within an hour of life
  - 123 (51%) had hypoglycemia ( $<47$ mg/dL)
  - 91 (37%) had severe hypoglycemia ( $<40$ mg/dL)

- ❖ Significant risk factors for severe hypoglycemia: C-section, IUGR, and  $\beta$ -Blocker use, (all had  $p < 0.005$ ).
- ❖ The composite mortality and/or major morbidity (BPD, ROP, NEC, HAI and neurological symptoms which included seizures, jitters, tremors adverse neurological sequelae), did not significantly differ between severely hypoglycemic and euglycemic infants.
- ❖ Euglycemic and hypoglycemic infants showed no difference in incidence of maternal diabetes, hypothermia on admission, Apgar scores, and use of antenatal corticosteroids
- ❖ Maternal Chorioamnionitis decreases the risk of severe hypoglycemia.

## Conclusions

- ❖ Incidence of hypoglycemia on admission is high among ELBW infants, and administration of IV glucose is often delayed beyond an hour of life.
- ❖ All ELBW infants need to be screened for hypoglycemia and provided IV glucose within an hour after birth.
- ❖ We have started a QI initiative to improve glucose monitoring and IV glucose administration during the golden hour

### Clinical Data for Infants with Severe Hypoglycemia

	Initial Blood Glucose Level		p value
	$<40$ mg/dL n=91	$\geq 40$ mg/dL n=153	
Gestational age (weeks) *	$27 \pm 2$	$26 \pm 2$	$<0.005$
Birth Weight (grams) *	$721 \pm 172$	$745 \pm 147$	
IUGR	44 (48%)	33 (22%)	$<0.005$
Race			ns
African American	82 (90%)	123 (80%)	
Caucasian	9 (10%)	29 (19%)	
Mode of Delivery			$<0.005$
Vaginal Delivery	14 (15%)	48 (31%)	
C-section	77 (85%)	105 (69%)	
Beta Blocker therapy	19 (21%)	8 (5%)	$<0.005$
Chorioamnionitis	17 (19%)	72 (47%)	$<0.005$

\* Mean  $\pm$ SD