



Stony Brook **Medicine**



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Medicine



Hypoglycemia affects as much as 5-15% of babies

- Standard practices to treat hypoglycemia include:
 - Supplemental feedings with formula
 - Interrupts breastfeeding, suppresses healthy gut flora and promotes growth of pathogenic microbes (i.e. E coli, bacteroides, clostridia, streptococci)
 - IV glucose with NICU admission
 - Increase hospital cost, separation of parents and baby, interrupts breastfeeding and parental bonding





Normal metabolic adaptation

- Baby's glucose at birth is 70% of mother's serum glucose
- Decreases insulin production and increases glucagon, epinephrine, growth hormone and cortisol
- After birth, baby must assume control of glucose through intermittent feed cycle

Glycogenolysis	Mobilize glycogen stores
Gluconeogenesis	Hepatic synthesis of glucose from substrates
Alternative fuel	Ketone bodies, lactate, glycerol and amino acids



Newborn Hypoglycemia – The Dilemma

- Normal physiologic decreases occur after birth and continues for 1st 2-3 hours of life
- Committee on Fetus and Newborn found that levels of 30mg/dL are common in healthy neonates during initial 1-2 hours of life
- No evidence that gives a specific number that defines hypoglycemia



- Only documented cases of neurologic damage have occurred when glucose levels drop to low levels for many hours

Normal newborn levels begin to increase to 40-60 mg/dL thereafter – even in the absence of feeds



In 2011 AAP guidelines set threshold for treatment at 25mg/dL for asymptomatic newborns

- Policy changes put into effect to stop glucose testing all newborns
- Focus on differentiation of symptomatic vs asymptomatic at-risk infants
- Decrease threshold for treatment or interventions
- Increase awareness of non-separation, early breastfeeding and skin-to-skin





Clinical Signs: Defining Symptomatic

- Cyanosis
- Seizures
- Apneic
- Tachypnea
- Weak or high pitched cry
- Floppiness or lethargy
- Poor feeding
- Jitteriness
- Hypothermia (<36)



Critical Question

Is this newborn symptomatic?
Immediate testing and treatment
for symptomatic newborn



Dextrose gel for neonatal hypoglycemia (the Sugar Babies Study): a randomized, double-blind, placebo-controlled trial

Summary

- Dextrose gel is used to reverse hypoglycemia in adults but there is little evidence to support its use in babies
- Study to determine if treatment with glucose gel was more effective than feeding alone

Methods

- Neonates 35-42 week gestation <42 hours old at risk for hypoglycemia were randomly assigned to 40% dextrose gel or placebo gel
 - ❖ 514 enrolled babies, 242 became hypoglycemic and were randomized
 - ❖ 118 in dextrose gel
 - ❖ 119 in placebo group



Findings

- Dextrose gel reduced frequency of hypoglycemia
- Neonates receiving dextrose gel were:
 - ❖ Less likely to be admitted to NICU for hypoglycemia
 - ❖ Less likely to receive dextrose
 - ❖ Less likely to have episodes of recurrent hypoglycemia
 - ❖ Less likely to need expressed breast milk or supplementation with formula
- No serious adverse effects were noted
- Well tolerated by newborns





Implementing a Protocol: Using Glucose Gel to Treat Neonatal Hypoglycemia – A Quality Improvement Project

- Development and implementation of a hypoglycemia protocol including use of glucose gel at a tertiary care hospital with >4000 deliveries/year
- Asymptomatic infants ≥ 35 weeks gestation with blood glucoses ≤ 35 mg/dL were given a maximum of 3 doses of glucose gel along with feeds
- Findings:
 - NICU transfers from newborn nursery decreased by 73%
 - Glucose gel reversed neonatal hypoglycemia in 88% of neonates during the first 24 hours of life
 - Increased exclusive breastfeeding rate in women intending to breastfeed to 50%
 - Decreased hospital costs with decreased NICU admission rate
 - No adverse events noted

Newborn Nursery/L&D Hypoglycemia Clinical Algorithm – Birth to 4 hours of Age

Late preterm (34 0/7-36 6/7), SGA, IUGR <2200 grams, LGA, Infants of Diabetic Mothers, Mothers on selected drug treatment (beta blockers, oral hypoglycemic agents, terbutaline, or maternal steroid exposure after 34 weeks gestation) at delivery

Symptomatic and <40 mg/dl → NICU evaluation

Asymptomatic – High Risk Infants

Birth to 4 hours of Age – Goal is ≥ 40 mg/dl

Initial feed within 1 hour. Screen glucose 30 minutes after feed completed

OR

If unable to feed/won't feed, obtain glucose at 1 hour of life

Initial screen <40mg/dl

Yes

Administer dextrose gel, feed and check glucose 30 minutes after feed completed

**If after 30 minutes
<25mg/dl
Transfer to NICU**

**If after 30 minutes
25-39mg/dl**

Administer gel, feed and check glucose
30 minutes after feed completed

**If glucose remains <40mg/dl
after 2 gel/feed cycles. NICU
consult**

No

≥ 40 mg/dl
Glucose checks q2-3 hours
before feeds

Key Points:

- Early skin to skin contact, initiate breastfeeding/colostrum feeds or formula feeding within 1 hour of life (3-10ml/kg)
- Initial blood glucose 30 minutes after first feeding completed/OR if unable to feed, obtain at 1 hour of life
- Repeat POC and send serum for any glucose <40mg/dl, regardless of clinical presentation
- Dextrose gel works best when administered concurrently with feeding

Symptoms of hypoglycemia include: irritability, tremors, jitteriness, exaggerated Moro reflex, high-pitched cry, seizures, lethargy, tachypnea, hypotonia, poor feeding, apnea, coma, temperature instability and hypothermia (<36)

Infant's weight	Dose (ml)
≤ 2 kg	1 ml
2.1 to 3 kg	1.5 ml
3.1 to 4 kg	2 ml
4.1 to 5 kg	2.5 ml

Newborn Nursery/L&D Hypoglycemia Clinical Algorithm – 4-24 hours of Age

Late preterm (34 0/7-36 6/7), SGA, IUGR <2200 grams, LGA, Infants of Diabetic Mothers, Mothers on selected drug treatment (beta blockers, oral hypoglycemic agents, terbutaline, or maternal steroid exposure after 34 weeks gestation) at delivery

Symptomatic and <40 mg/dl

NICU evaluation

Asymptomatic – High Risk Infants

4-24 hours of Age – Goal is ≥ 45

Continue feeds q2-3 hours
Screen glucose prior to each feed

Screen <45mg/dl

Administer dextrose gel*, feed and check glucose 30 minutes after feed completed

**If after 30 minutes
<30mg/dl**

Transfer to NICU for IV glucose

If after 30 minutes 30-44mg/dl

Administer gel*, re-feed and check glucose 30 minutes after feed completed

If after 30 minutes <45mg/dl

Initiate NICU consult

**Glucose ≥ 45 continue
AC d-sticks**

Key Points:

- Maximum of 4 gels can be ordered by pediatric providers in a 24 hour period
- Repeat POC and send serum for any glucose <40mg/dl, regardless of clinical presentation

For LGAs/IDMs may discontinue screens once baby is both:

- Greater than 12 hours of age
- Has had 2 consecutive POC glucoses ≥ 50 mg/dl (at 12 or more hours of age)

For All other high risk infants may discontinue screens once baby is both:

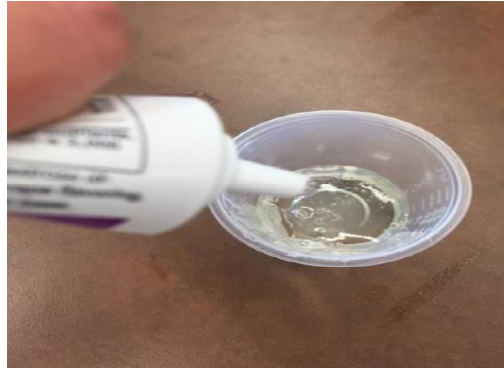
- Greater than 24 hours of age
- Has had 2 consecutive POC glucoses ≥ 50 mg/dl (at 24 hours or more of age)

Infant's weight	Dose (ml)
≤ 2 kg	1 ml
2.1 to 3 kg	1.5 ml
3.1 to 4 kg	2 ml
4.1 to 5 kg	2.5 ml



Supplies:

- 40% glucose gel (pyxis)
- 3ml oral syringe
- Medicine cup



Squeeze gel
into medicine
cup



Draw up
ordered dose



1. Dry buccal cavities with sterile 2x2



2. Place partial dose on latex free gloved finger



3. Massage into buccal mucosa alternating sides until dose is complete



Glucose gel will be ordered as prn for all babies in Newborn Immediate Power Plan

NBNTST, FOURKG

NBNTST, FOURKG DOB:06/14/2019
Allergies: No Known Allergies Inpatient FIN: 060000
Attend:HZOIQ DY , QGHXSX
Isolation Code(0): N/A CODE STATUS: No Resu
Newborn PCP: (Please Update)Verified date: (Please Update)

Menu - Ambulatory

- Dynamic Documentation Viewpoint
- Eclipsys Links
- ED Admit Log Report
- ED RN ViewPoint
- ED ViewPoint
- EMT Invoice
- ENT Viewpoint
- FIN Barcode
- Flowsheet
- Form Browser
- Form Browser
- Gastroenterology Viewpoint
- General Surgery Viewpoint
- Health Maintenance
- Held Charges
- HIM Coding

MAR

Time View	Medications	06/21/2019 08:42 EDT
☒ Scheduled	Unscheduled	
☒ Unscheduled	hepatitis B pediatric vaccine ...	0.5 mL Not given within 5 days.
☒ PRN	0.5 mL, Suspension, IntraMuscular, OneDoseUnsch, First dose is Routine, 06/14/19 15:20:00 EDT, NEEDS Permission. To b...	
☒ Continuous Infusions	hepatitis B pediatric vaccine	
☒ Future	PRN	
☒ Discontinued Scheduled	glucose (glucose oral gel) PRN 800 mg	Not given within 5 days.
☒ Discontinued Unscheduled	800 mg, Gel, Buccal, Q30MIN, PRN, Blood Sugar, First dose is Routine, 06/14/19 15:20:00 EDT, 4 doses, Stop date Limited # of times	
☒ Discontinued PRN	Treat if glucose is less than 4...	
☒ Discontinued Continuous Infus	glucose	
	PRN Response	



- Once glucose gel is administered, baby should be breastfed, given expressed breastmilk or be given formula - and be placed skin to skin
- Skin to skin supports increased glucose levels, thermoregulation, and decreases the physiologic stress in newborns
- 2 glucose gel should not be administered within a 24 hour period without notifying NICU – need not be consecutive doses



References

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