Sweet Solutions:

Treating asymptomatic term and late preterm hypoglycemic babies with glucose gel to promote exclusive breastfeeding and decrease NICU admissions

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Background

The "Sugar Babies" study by Harris et al. (2013) was groundbreaking in its investigation of using 40% oral glucose gel via buccal administration to manage neonatal hypoglycemia. Harris and colleagues proposed that glucose gel, already utilized in diabetic adults, could offer neonates a simple, cost-effective solution. Subsequent research confirmed that glucose gel, as opposed to traditional formula feeding, improved exclusive breastfeeding rates and reduced NICU admissions for hypoglycemia (Desai et al., 2022; Hammer et al., 2018; Hubbard & Hay, 2021). By decreasing NICU admissions, glucose gel also lessened mother-infant separation, further promoting breastfeeding (Harris et al., 2013; Hubbard & Hay, 2021). Infants receiving glucose gel alongside breastfeeding were less likely to require additional doses of the gel (Hubbard & Hay, 2021) and were less likely to be given formula at two weeks (Harris et al., 2013).

NICU admissions pose significant challenges, including increased costs, parental anxiety, and lower rates of exclusive breastfeeding (Washer et al., 2021). Research shows that glucose gel significantly reduces NICU admissions for hypoglycemia (Desai et al., 2022; Hammer et al., 2018; Harris et al., 2013; Hubbard & Hay, 2021; Washer et al., 2021). For example, Gregory et al. (2019) reported a decrease in admissions from 8.6% to 5.6%. Hammer et al. (2018) also demonstrated that their "Toolkit," which included glucose gel, led to a 5% reduction in NICU admissions and a 6.5% increase in exclusive breastfeeding rates.

Image courtesy of Dandle Lion Medical

Introduction

The standard practice for treating neonatal hypoglycemia at the Houston Methodist Sugar Land Hospital (HMSL) Childbirth Center was to offer a feeding to the infant, breast or formula, and recheck after one hour. Often, infants that were only breastfed were requiring the addition of formula to treat their hypoglycemia. If the neonatal hypoglycemia was unresolved, infants would require IV dextrose, resulting in admission to the neonatal intensive care unit (NICU) for a higher level of care. As a Texas Ten-Step-designated hospital, breastfeeding is a very important part of caring for our patients at HMSL. To promote breastfeeding to the greatest extent, introducing glucose gel would lead to many benefits.

The review of the literature provided many positive points for changing the existing policy and algorithm. Glucose gel was already being used at other Houston Methodist facilities, and with the guidance of the HMSL neonatologists and evidence gathered from the literature, the process was started. Each of these findings helped support the approval by the Women's Council to begin the implementation process and adopt both the new policy and algorithm.

Purpose

This project aims to decrease NICU admissions by utilizing glucose gel as a treatment for hypoglycemic infants, thereby reducing the need for formula supplementation and simultaneously increasing exclusive breastfeeding rates. By implementing glucose gel as an effective and less invasive alternative, we aim to stabilize infant blood sugar levels while promoting and supporting breastfeeding. This initiative strives to enhance neonatal health, reduce the incidence of complications related to formula feeding, and support mothers in achieving successful exclusive breastfeeding, ultimately leading to improved outcomes for infants and their families.

Algorithm

GLUCOSE SCREENING ALGORITHM FOR INFANTS < 24 hrs of Age

Signs and symptoms of hypoglycemia are non-specific but may include:

Tachypnea	Feeding difficulty
Lethargy	Apnea
Respiratory distress	Jitteriness
Tremors/Seizures	Temperature instability
Irritability	Hypotonia
Diaphoresis	Cyanosis

-Check Glucose
-Notify Provider

Perform POC glucose test if the infant is asymptomatic and has any of the following:

-Infant of diabetic mother (IDM)
-Large for gestational age (LGA) infant (Olsen Growth Chart)
-Small for gestational age (SGA)infant (Olsen Growth Chart)
-Infant <37 weeks gestation (Preterm)
-Infant of a mother who has had no documented prenatal care or has no Glucose Tolerance Test (GTT) on file.
-Infant greater than 41 weeks

* "Feed" refers to breastfeeding, expressed breastmilk, and/or formula depending on the mother's preference.

** Administer each dose of glucose gel alternating between the right and the left buccal cavity, massaging the infant's cheek gently to stimulate

**40% gel provides 400 mg/kg glucose

Recommended dose:200 mg/kg=0.5 ml/kg

-2 kg: 1 ml -4 kg: 2 ml
-2.5 kg: 1.3 ml -4.5 kg: 2.3 ml
-3 kg: 1.5 ml -5 kg: 2.3 ml
-3.5 kg:1.8 ml

Follow the algorithm based on hours of life.

If less than 4 hours of life and ≥ 41mg/dL initiate feed. Do not administer glucose gel.

The infant should **NOT** receive more than **2 TOTAL** doses in a 24-hour period or any doses after 24 hours of life.

Appendix A

ASYMPTOMATIC INFANTS (Birth to 24 hrs of age) FOR HYPOGLYCEMIA

Skin-to-skin (STS) and initiate a feed within 1 hour of birth

Glucose screen 30 minutes after a feed

≤ 40 mg/dl

- Notify provider *immediately for any* glucose ≤ 24 mg/dl
- Administer glucose gel**
- STS and feed*
- Glucose screen 1 hr after Glucose gel

≤ 24 mg/dl

- Notify the provider
- Consider glucose gel administration.
-Transfer to NICU
-Draw confirmatory serum Glucose.

25-40 mg/dl

- Administer glucose gel **
- STS and feed *
- Glucose screen 1 hr after glucose gel administration.

≤ 40 mg/dl

- Notify provider
-Draw confirmatory serum glucose
- Consider NICU admission

≥ 41 mg/dl

≥ 41 mg/dl

≥ 41 mg/dl

Birth to 4 hours of life

Obtain glucose screen prior to feeding (PREFEED) no later than 2 hours after the previous screen.

STOP If less than 4 hours of life and ≥41 mg/dl initiate a feed. Do not administer glucose gel.

≤ 34 mg/dl

- Notify provider immediately for glucose is ≤ 34 mg/dl
- Administer glucose gel**if <2 doses have been given
- Feed* as tolerated, place STS
- Glucose screen 1 hr after gel administration

≤ 34 mg/dl

- Notify provider
-Consider glucose gel administration.
-Draw confirmatory serum glucose
- Consider NICU admission

35-45mg/dl

35-45mg/dl

- Notify the provider if the patient has already received 2 doses.
- Administer glucose gel **<2 doses have been given
- Feed* as tolerated, place STS
- Glucose screen 1 hr after gel administration

≥ 46 mg/dl

- For < 37 wks and/or SGA, screen glucose Q 6 hrs, prior to feeding, x3
- For all others, screen glucose in 6 hrs prior to a feed, x1

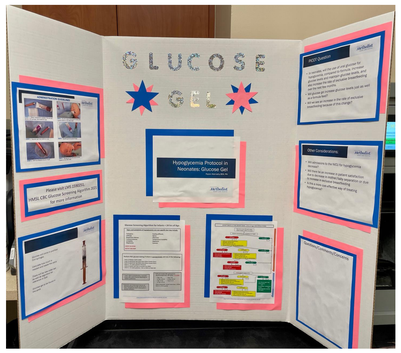
4-24 hrs of life

NOTE: Infant may receive a TOTAL of 2 doses of glucose gel in 24 hrs. AFTER 24 HOURS OF LIFE, THE GEL WILL NO LONGER BE USED. If 2 doses of gel have already been administered and/or for any subsequent glucose <46mg/dl contact the provider.

Education and Implementation

Staff educated in numerous ways:

- Poster available on the unit
- Laminated copies of the algorithm at every nurses' station
- Video assigned on learning platform with follow-up quiz to test knowledge retention
- Education sessions at day-shift and night-shift huddles



Acknowledgments

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Continued improvement

Infants on Hypoglycemia Protocol

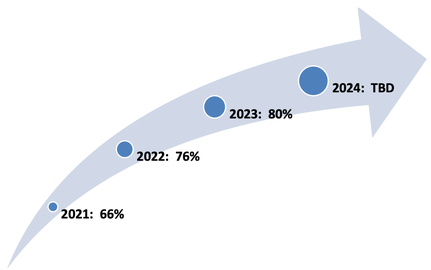
SGA (<10%) and/or <37 weeks	Time	Result
30mins after feed		
2hrs prefeed		
6hrs prefeed		
6hrs prefeed		
6hrs prefeed		

Helpful tip: You can set a reminder on your Vocera by saying "set a reminder" to remember the due time for the next blood sugar.

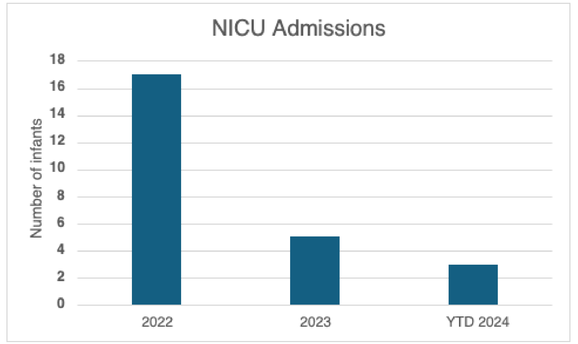
LGA (>90%), GDM, limited/no PNC, >41 wks (and SGA/LGA on WHO growth chart)	Time	Result
30mins after feed		
2hrs prefeed		
6hrs prefeed		

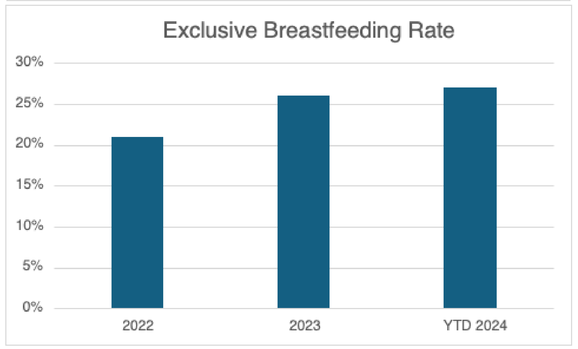
Sweet Cheeks	1st dose	2nd dose
Time		
Result		
Follow up result		

Compliance



Results





The number of NICU admissions in 2022 was 17 infants after at least one dose of Sweet Cheeks. In 2023, the number of NICU admissions decreased to only 5 infants. This year, 2024, there have been 3 infants admitted to the NICU for hypoglycemia after the use of glucose gel.

The exclusive breastfeeding rate increased from 21% to 26% from 2022 to 2023. This year, there is an exclusive breastfeeding rate of 27%.

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