Hypoglycemia in newborns 37-40 weeks gestation contributes to poor neurodevelopment outcomes and affects 15 out of 100 newborns.

First line treatment is formula feeding, and/or transfer to the Neonatal Intensive Care Unit (NICU) for intravenous (IV) glucose.

- These options are costly and
  - Disrupt exclusive breastfeeding
  - Decrease breastmilk consumption

### Goals

- Short Term - Implement 40% buccal dextrose gel (200mg/kg) in conjunction with feeding as the first line treatment of asymptomatic hypoglycemia in newborns >37 weeks in the newborn nursery at an academic medical center in the Mid-Atlantic.

- Long Term - Achieve treatment success in all newborns who receive dextrose gel.

### Implementation Methods

- Quality improvement (QI) project alignment with organizational breastfeeding goals
- Modified neonatal hypoglycemia clinical practice guideline (CPG) to include dextrose gel
- Developed order set and documentation in electronic health record (EHR).
- Collaborated with pharmacy to stock gel
- Created and launched online training with post test utilizing hospitals educational platform.
- In person buccal gel trainings
- QI data collected during a 12-week period

### Results

- Outcomes for Buccal Gel (N=16)
  - IV Dextrose
  - NICU Admission
  - Formula Supplementation
  - Treatment Success

<table>
<thead>
<tr>
<th>Formula Supplementation</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV Dextrose</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>NICU Admission</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Formula Supplementation</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Treatment Success</td>
<td>14</td>
<td>2</td>
</tr>
</tbody>
</table>

- Formula Supplementation signifies administration of formula to infant's with documented “Breast” preference
- Treatment Success signifies blood glucose >40mg/dL for infants less than 24 HOL following the first and/or second administration of 40% dextrose gel

### Conclusions

- CPG revision with glucose gel implementation can be successful with organizational buy in and collaboration with unit champions/multidisciplinary team.
- Future QI cycles should include exploration of treatment failure with modifications to improve CPG adherence and consideration for increased doses for responsive newborns.

### Findings with Implications

- Nurses hesitant to utilize buccal gel due to lack of experience and knowledge.
  - Training sessions offered in person.
- Treatment success was attained in 87.5% of newborns.
  - Treatment failure occurred in newborns who did not meet the CPG inclusion criteria with initial blood glucose levels of <20mg/dL.
- Failure to maintain glucose levels following two doses of buccal gel (N=2) resulted in transfer to NICU (in accordance to CPG guideline).
  - Research supports administering up to four doses to newborns who have responded favorably to prior doses.
- 55% of newborns who were exclusively breastfeeding (N=9) received medically indicated formula supplementation.
  - Hi risk newborn populations may require increased formula supplementation due to patient acuity.
- Small hi-risk urban patient sample.
  - Findings may not be generalizable to other populations.

### Bibliography


Background: Neonatal hypoglycemia in the Newborn Nursery is a common problem that may contribute to apnea, cardiorespiratory instability, hypothermia and seizures. First line treatment for asymptomatic hypoglycemia includes formula feeding, and/or transfer to the Neonatal Intensive Care Unit (NICU) for intravenous glucose. Both of these options disrupt exclusive breastfeeding and have a negative impact on the duration and quantity of breastmilk consumption.

Aims: The purpose of this quality improvement (QI) project was to implement 40% buccal dextrose gel as the first line treatment of asymptomatic hypoglycemia in newborns > 37 weeks admitted to the newborn nursery at an academic medical center in the mid-Atlantic region.

Details of innovation: This QI project was implemented during a 12-week period in 2019. The target population included infants admitted to the Newborn Nursery less than 24 hours of life (HOL), with an identified risk factor for hypoglycemia (birthweight > 3800 grams or < 2500 grams, gestational age < 37 weeks, LGA or SGA, or is an infant of diabetic mother), and developing asymptomatic hypoglycemia (blood glucose levels between 20- 40mg/dl).

The QI project involved modifying the current neonatal hypoglycemia clinical practice guideline (CPG) to implement 40% dextrose gel as initial therapy in conjunction with feeding, developing an order set, creating documentation in the electronic health record, training personnel and collaborating with pharmacy to stock the gel. Newborns who experienced asymptomatic hypoglycemia received 40% dextrose gel (200 mg/kg) to the buccal mucosa and then received breastmilk or formula if breastmilk was not available. Thirty minutes after feeding a blood glucose level was reassessed. If the level was less than 40mg/dL the infants could be re-treated with one additional dose of 40% dextrose gel.

Findings: During the implementation 16 newborns received glucose gel (N=16). Treatment success, defined as blood glucose levels >40mg/dL following the first and/or second administration of gel, was achieved in 87.5% of newborns. Newborns in the treatment failure group had an initial blood glucose level of <20mg/dL, a deviation from the CPG inclusion criteria. More than half (55%) of newborns who were exclusively breastfeeding (N=9) received medically indicated formula supplementation. Chart audit revealed that increased patient acuity accounted for this high rate of formula utilization. Of the patients who were transferred (N=5) to the NICU, 2 patients achieved treatment success, but were not able to maintain adequate glycemic levels. Transfer to the NICU was indicated as per the CPG guideline. Although the revised CPG limits buccal gel to two doses, current research supports administering up to four doses if infants responded favorably to prior doses.

Discussion of effects/implications: Future QI cycles should include exploration of treatment failure with modifications to improve CPG adherence and consideration for increased doses for responsive newborns. Overall the outcomes of this QI project demonstrated the feasibility of implementing 40% dextrose gel as the initial treatment for infants with asymptomatic hypoglycemia in a newborn nursery. A primary driver for this included the organizational buy in and collaboration with unit champions and multidisciplinary team.