Reducing NICU Transfers for Infants at Risk for Hypoglycemia

Ashley Sutton MD
Sherry LeBlanc NNP-BC
Jamie Haushalter CPNP-PC, IBCLC
Carl Seashore MD
Karen Wood MD

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Background

- Risk for transient neonatal hypoglycemia is common
  - 1 in 3 infants with at least one risk factor
    - Infant of diabetic mother, SGA, LGA, late preterm gestation
- Management is highly variable both within and between institutions
  - Varied definitions of hypoglycemia, limited options in newborn nursery setting
- Hypoglycemic infants may require NICU transfer for glucose stabilization
  - Separation of mother-infant dyad, increased cost, poor bed utilization

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Background

- Providers frustrated with a rigid protocol and perception of infants transferred to NICU being managed with only PO feedings
- Families unhappy with being separated from asymptomatic infant during critical period for bonding and feeding
- Bed constraints in NICU

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Aims

- Eliminate "unnecessary" NICU transfers
- Decrease overall transfer rate to NICU to < 10% of at-risk infants
- Update protocol
  - Emphasis on non-pharmacologic management
    - Skin-to-skin care (SSC) and early feeding
  - Standardize timing of initial blood glucose obtainment
  - Incorporate provider input prior to transfer

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Methods: Planning the Intervention

- Multi-disciplinary team formed
  - Pediatrics, Family Medicine, Ob/Gyn, NICU, Lactation, Nursing (L&D, OR, mother-baby)
- Population:
  - Inborn infants ≥ 35 weeks gestation
  - Risk factor for hypoglycemia
    - SGA (<2.5 kg), LGA (>4 kg), IDDM, late preterm
  - Excluded infants with any other reason for NICU transfer or condition that would impact feeding
- Baseline data obtained (4 months, n = 208)
  - 16.7% of infants at risk for hypoglycemia required NICU transfer
  - 10 at-risk infants (4%) transferred to NICU without intervention

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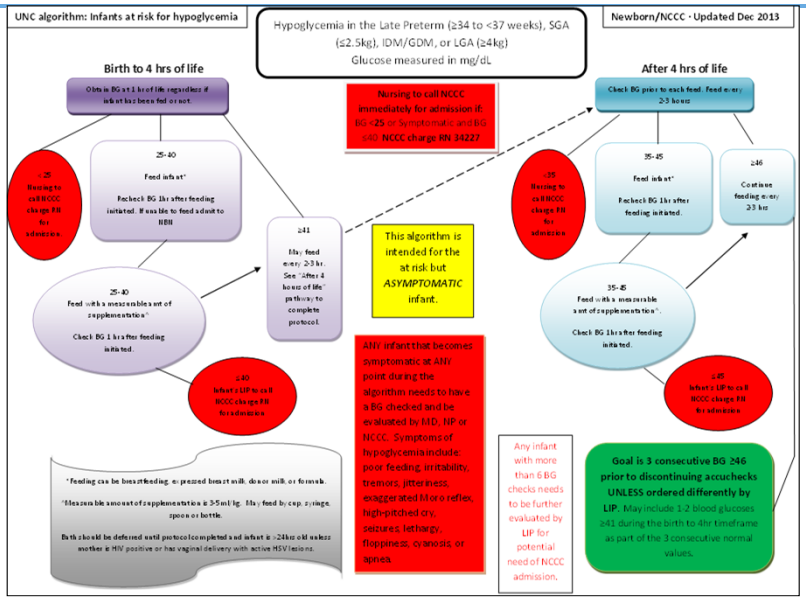
Methods: Key Interventions



Methods: Key Interventions

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Neonatal Hypoglycemia

Newborn/NCCC 3.6.15

Symptomatic Hypoglycemia (BG<40mg/dL) – Notify LIP STAT

Asymptomatic Infant with Risk Factors*

Birth through 4 hours of life:		
First hour: Uninterrupted skin to skin. Initiate first feed by 1 hour of life. Obtain BG at **90** minutes of life.		
<25mg/dL: Continue skin to skin & feed measurable amount⁺ **Notify NBN LIP**	**≤40mg/dL**: Continue skin to skin. Feed measureable amt.⁺ & recheck BG in 1 hour.	**≥41mg/dL**: Routine care See box to right →
If after 2nd feeding the blood glucose is <25mg/dL, **notify NBN LIP to facilitate transfer to NCCC**. Continue skin to skin.		

After 4 hours of life:
Feed at least every 2-3 hrs Check BG prior to each feeding
<35mg/dL feed measureable amount⁺ & call NBN LIP **35-45mg/dL** feed and re-check after 1hr. If no improvement **Notify Newborn LIP** **≥46mg/dL** feed on demand min q2-3hr
Three normal **consecutive pre-prandial** BGs = PASS ^ Call NBN LIP if infant has not passed protocol by 12 hours of life.

Methods: Key Interventions

- Hypoglycemia "bundle" in protocol
  - Uninterrupted skin-to-skin care (SSC) at birth
    - Delay measurements and any non-stabilizing interventions
  - Early feeding (within 1st hour)
  - Initial blood glucose screen at 90 minutes
  - Clinical evaluation of symptoms or hypoglycemia by provider prior to transfer
  - Specific parameters for supplementing a "measureable" amount of expressed breast milk, donor breast milk or formula

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Methods: Studying the Intervention

- Charts obtained bimonthly of at-risk infants
- Manual chart review during intervention period
  - Measures:
    - Mean percent of first feeding in first hour of life
    - Mean percent with skin-to-skin care in first hour of life
    - Time to first blood glucose
    - Transfer rate to NICU
    - Management if transferred to NICU (eg. IV dextrose, antibiotics)
  - Balancing/Safety:
    - Symptomatic hypoglycemia, any adverse event, rule-out sepsis occurrence, readmission within 7 days
  - Monitored using statistical process control charts

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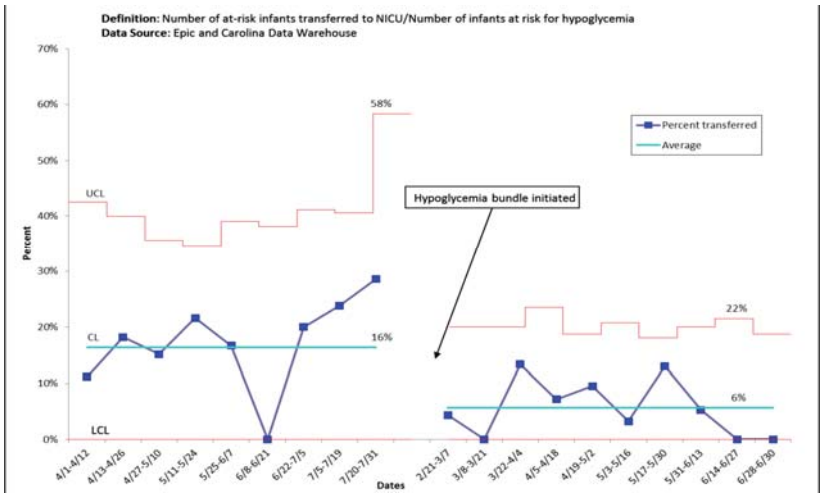
Percent of at-risk Infants Transferred to NICU



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Results, cont.

- Secondary outcomes in at-risk infants
  - Skin-to-Skin within first hour: 45% to 62%
  - Fed within first hour: 43% to 58%
  - Time to first blood glucose: 78 minutes (SD 137) to 97 minutes (SD 26 minutes)
  - Only 2 unnecessary transfers (4% to 0.9% of at-risk infants)
- No change in symptomatic hypoglycemia
- No adverse events, difference in r/o sepsis, or readmission

Limitations

- Single center, tertiary care referral center
- Definition of SGA/LGA were strictly weight-based (<2.5 kg or >4.0 kg)
- Some elements rely on accurate documentation
- 7 month gap between baseline data and improvement work
  - No other interventions targeted at this group during the gap

Conclusions

- Hypoglycemia bundle was effective at reducing rate of NICU transfer
  - 2 out of 3 babies previously transferred stayed with their mother
  - Non-pharmacologic interventions were effective
    - Skin-to-skin placement
    - Early feeding
  - Timing of blood glucose was standardized and targeted to avoid the physiologic nadir
  - Updated protocol was easy to follow, involved provider input, and guided standardized supplementation with measurable milk

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Questions?

Contact information:

Ashley Sutton
agsutton@email.unc.edu

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