Ensuring Human Milk & Breastfeeding in the NICU

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Clinician Educator Role

- University of Pennsylvania
  - Teach and mentor students across the curricula - BSN, MSN, PhD
- Children’s Hospital of Philadelphia
  - Nurse Researcher & Director of the Lactation Program

Objectives

- List 3 ways that human milk is a medical intervention for NICU infants
- Describe the Spatz 10 step model for milk & breastfeeding in the NICU
- Understand the process of transitioning mothers from being pump dependent to direct at breast feedings for their infants

Baby Friendly Hospitals

- 292 Baby Friendly Hospitals as of 9/26/15
  - 14% of births in USA
  - [http://www.babyfriendlyusa.org/](http://www.babyfriendlyusa.org/)

Baby Friendly Hospital Initiative

- Step 1 - Maintain a written breastfeeding policy that is routinely communicated to all health care staff
- Step 2 - Train all health care staff in skills necessary to implement this policy
- Step 3 - Inform all pregnant women about the benefits and management of breastfeeding
- Step 4 - Help mothers initiate breastfeeding within one hour of birth
- Step 5 - Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants
- Step 6 - Give infants no food or drink other than breast milk, unless medically indicated
- Step 7 - Practice “rooming in” -- allow mothers and infants to remain together 24 hours a day
- Step 8 - Encourage unrestricted breastfeeding
- Step 9 - Give no pacifiers or artificial nipples to breastfeeding infants
- Step 10 - Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic
Best Practices to Ensure Human Milk and Breastfeeding for the Critically Ill Neonatal

How do you get from here to there?

Mothers of NICU Infants
Need Different Care than BFHI

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Need Different Care than BFHI

2nd Summit in May 2015

The Associations Between the Nurse Work Environment, Breastfeeding Support and Human Milk Provision in the NICU

Purpose: To examine the associations between the nurse work environment in the NICU and two measures:
1. Nurse-reported breastfeeding support
2. The practice of VLBW infant discharge on human milk

1. Only 14% of NICU infants in the sample received nurse-reported breastfeeding support.
2. Many NICUs (49%) had no lactation consultants.
3. Parents were present 60% of the time across all shifts. Nurses reported providing breastfeeding support to 1 in 5 parents across all shifts.
4. NICUs with better staffing ratios and more experienced nurses had more parents who received breastfeeding support (p<.05).
5. NICUs with more BSN-prepared nurses had more VLBW infants discharged on human milk (p<.01).

Mothers of NICU Infants Need Different Care than BFHI

Healthy Infants
• BFHI has been well implemented in world but has only recently gained momentum in United States
• Focus is on healthy term infants
• http://www.babyfriendlyusa.org/

NICU Infants
• Hospitals that care for NICU infants need multiple policies to ensure infants receive human milk & breastfeed
• Pumping initiation
• Label & storage
• Skin to skin
• Oral care
• Transition to at breastfeeds
• Need for technology!

How do you get from here to there?

Mothers of NICU Infants Need Different Care than BFHI

• Sweden-September 2011 conference
• World Health Organization
• Each country should develop own methods for the NICU
• 11/32 countries

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Ten Steps for Promoting/Protecting Breastfeeding in the Vulnerable Infant

- Step 1: Informed decision
- Step 2: Establishment & maintenance of milk supply
- Step 3: Human milk management
- Step 4: Feeding the infant the milk
- Step 5: Skin-to-skin care
- Step 6: Non-nutritive sucking
- Step 7: Transition to breast
- Step 8: Measuring milk transfer
- Step 9: Preparation for discharge
- Step 10: Appropriate follow-up

*14 years of published outcomes from CHOP & other institutions worldwide

Significant U.S. Outcomes!

Spatz 10 Steps at TGH

- 3 year continuous quality improvement project
- Increase in number of mothers pumping < 6 hours post-delivery
- Increase in patient satisfaction
- Human milk at discharge rate increase 3 fold!
- Increase in # of infants receiving human milk as first feed

THAILAND

HUMAN MILK RATES AT DISCHARGE INCREASE 3-6 FOLD!

STEP 1: INFORMED DECISION
The Center for Fetal Diagnosis & Treatment & Special Delivery Unit

- Families re-locate from all over the United States and world
- Over 50% of our families come from over 100 miles away

Centering Model-Group Prenatal Care

- Modified version
- Transfer of care for in-utero surgery between 16-20 weeks or in third trimester
- 5 sessions with group
- Improved satisfaction with care
- Improved contact with providers (nurse midwives)
- Sense of community!

Ten Steps for Partners/Family Members to Support Mother

Prenatal Lactation Consultation & Power of Pumping DVD

- Personalized 1:1 prenatal assessment & education tailored specifically to infant’s diagnosis
- Assessment, education & demonstration
- Involvement of partner/support person
- Human milk “Story Book”

Informed Decision: Prenatal Lactation Consultation

- Focus-the provision of human milk
  - Exclusivity
  - Dose & exposure

- In the U.S. only 79% of women even try breastfeeding once
- Worldwide <40% of infants are exclusively breastfed for the first six months
- In our program, 99% of women initiate pumping for their critically ill infants


**Top 5 Reasons Human Milk=Medical Intervention**

- Protection from infection
- NEC
- Feed tolerance
- Brain development & developmental outcomes
- Protection from both short & long term health illnesses

**Top 7 Components of Human Milk**

- Human milk oligosaccharides
- Antibodies
- Anti-oxidants
- Lactoferrin
- Osteopontin
- White blood cells
- Stem cells

**Power of Pumping**

- [http://www.chop.edu/service/breastfeeding-and-lactation/home.html](http://www.chop.edu/service/breastfeeding-and-lactation/home.html)
STEP 2: ESTABLISHMENT & MAINTENANCE OF MILK SUPPLY

Randomized Control Trial!

  - Mothers who pumped within 1 hour had (compared to mothers who pumped within 6 hours):
    - Significantly more milk during the first 7 days (P=0.05)
    - Significantly more milk at week 3 (P=0.01)
    - Significantly earlier lactogenesis stage II (P=0.03).

Parker & Colleagues 2015 Study

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- Significantly earlier lactogenesis stage II (P=0.03).

CHOP Parameters for Pumping

- Pump is at bedside
- Mother initiates expression of milk immediately post delivery with maximum variation tolerance of:
  - 2 hours for vaginal deliveries
  - 4 hours for cesarean deliveries
- Instruct mother to pump for goal of 8 pumps/24 hours in order to establish milk supply
- Premie Plus® used for all mothers regardless of infant’s gestational age at birth

CHOP’s Pump Recommendations

- Over 175 bedside hospital grade Symphony® pumps
  - Mothers are encouraged to spend as much time as possible at CHOP to use our pumps & pump at bedside
- Hospital grade pump rental encouraged
  - If family has no financial contrains for paying out of pocket
  - If a greater than 1 month hospital stay is predicted for infant
- CHOP has rental station with Symphony®, Premie Plus®, Classic®, and Lactina® pumps all available
  - *Symphony® preferred rental pump

Special Delivery Unit Pumping CQI Project


Special Delivery Unit Pumping CQI Project
• Breastfeeding Resource Nurse education
• One to one education
• Monthly lactation/Special Delivery Unit staff meetings
  • Monthly chart audits
• Daily collection of maternal milk volume logs


*Funded by the Center for Nursing Research at the Children’s Hospital of Philadelphia and the National Association of Nurse Practitioners

Ten Steps for Promoting/Protecting Breastfeeding in the Vulnerable Infant
• Step 1: Informed decision
• Step 2: Establishment & maintenance of milk supply
• Step 3: Human milk management
• Step 4: Oral care & feeding the infant the milk
• Step 5: Skin-to-skin care
• Step 6: Non-nutritive sucking
• Step 7: Transition to breast
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STEP 4: ORAL CARE & FEEDING HUMAN MILK
**INITIATION OF ENTERAL FEEDS**

**Colostrum for Enteral Feeds**

- Save colostrum separately until at transitional milk
  - About 20 mls/breast or 320 mls/day
- Feed colostrum in exact order that it was pumped!
- Avoid formula!

**IMPORTANCE OF HUMAN MILK DIET ONLY**

**Human Milk Matures the Gut**

- Epidermal growth factor
- Nerve growth factor
- Insulin like growth factor
- Insulin
- Cortisol
- Osteopontin
- Thyroxine
- Nucleotides
- Taurine
- Glutamine
- Lactose
- Amino sugars
- Cytokines

**FEED TOLERANCE-HUMAN MILK REDUCES THE NUMBER OF DAYS OF IV NUTRITION!**
Prioritization of Fresh Milk is Essential!

- When milk is frozen components are not as potent
  - Lysozyme 32% lower
  - IgA 51% lower
  - Lactoperoxidase 66% lower
- Frozen milk has increased risk for bacterial proliferation

Human Milk Management Center

- Opened 8/2/12 & has the following functions:
  - Optimization of human milk
  - Human milk nutrient analysis
  - Fortification
  - Skim milk
  - Donor milk in absence of mother’s own milk
  - HMMC/lactation/RD weekly rounds

Donor Milk

- Donor milk if mom’s own milk is not available
  - Donor milk is a low-cost intervention
  - Cost of TPN about $1,000 per day
    - $18.4 million on TPN
    - $155,000 on donor milk
  - *Only about 40% of NICUs in USA utilize donor milk

Prolacta Plus Human Milk Fortifier

- Medical NEC costs on average $74,004
  - Range $47,501-$100,957
- Surgical NEC costs on average $198,040
  - Range $159,261 to $236,819
- Cost savings with Prolacta+
  - 3.9 NICU days
  - $8,167

STEP 5-SKIN TO SKIN CARE

- Continuous uninterrupted skin to skin from birth is NOT an option for the type of infants we care for!
- However, infants will be skin to skin as soon as their diagnosis & stability permits
STEP 6: NON-NUTRITIVE SUCKING

Facilitating Milk Transfer Use of the Nipple Shield

- Meier, Brown, Hurst, Spatz (2000) *JHL*
  - Initiated use in hospital
  - Increases both the duration of sucking bursts and the volume of milk consumed
  - Improves milk transfer and breastfeeding success
  - Duration of breastfeeding = mean 169.4 days (5 ½ months!)
    - This exceeds published statistics for low-risk infants

STEP 7: TRANSITION TO BREAST

Nipple Shields Keep Mothers Breastfeeding

- Re-examination of ultra-thin nipple shield use, infant growth, and maternal satisfaction
  - Use in term infants
  - 89.8% reported satisfaction with use of nipple shield
  - 67.3% reported that it prevented breastfeeding termination
  - Chertok, I. (2009) in *Journal of Clinical Nursing*

Nipple Shields Keep Mothers Breastfeeding

  - 81 postpartum mothers at a Baby Friendly community hospital participated in an exploratory, longitudinal descriptive study. Mothers included had been:
    - Referred to a lactation consultant for difficulty initiating breastfeeding
    - Given a nipple shield as a postpartum inpatient to aid breastfeeding
    - Available for follow-up telephone contact

- Majority of mothers were satisfied with the nipple shield
  - 72% found the nipple shield to be “extremely helpful”
  - Median duration for nipple shield use was 6.6 weeks.
  - Close to half of mothers stopped use of the nipple shield by fifth week postpartum
  - On average, study mothers breastfed for 12.6 weeks
  - 31% of mothers were still breastfeeding at 6 months postpartum
Step 8: Measuring Milk Transfer

- The amount of milk an infant consumes as determined by pre- and post-weights
- Only method to accurately know exactly what infant is getting at breast!

Pre- and Post-Weights

- Pre- and post-weight are essential to ensure that the infant is not over or under fed
- Essential during strict feed advancement
- What is wrong with this picture?

Evaluation of Milk Transfer

- #1 concern of women worldwide is “how do I know my baby is getting enough”?
- Use of Baby Weigh® Scale to validate milk transfer and increase maternal confidence

Step 9: Preparation for Discharge

Cue Based Feeds

- Cue based feeding in the NICU is hard to do but essential to facilitate breastfeeding

Infants Go Home on Human Milk!

- United States Vermont Oxford Network data report a mean human milk at discharge rate of only 44% for VLBW infants
- CHOP NICU over 86% discharged on human milk
Breastfeeding Exclusivity & Duration in Surgical Infant Graduates

- Post-discharge telephone survey research of mothers who delivered at CHOP between 2009-2012 & had prenatal lactation consultation
- Breastfeeding outcomes
  - Exclusivity
  - Duration

Sample


Mean/Median Breastfeeding Duration = 8 months (Range 0.25 to 30 months!)

Research Outcomes
Thank You!

- To contact me: spatz@nursing.upenn.edu
- Guest Editor-May/June 2015- The Journal of Obstetric, Gynecologic, & Neonatal Nursing
- AWHONN Evidence Based Practice Guideline and Position Statement