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Postdischarge Breastfeeding Outcomes of Infants With Complex Anomalies That Require Surgery

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Keywords
lactation
human milk
NICU
congenital anomalies
breast milk expression
enteral nutrition

ABSTRACT

Objective: To examine the duration and exclusivity of breastfeeding and provision of human milk among infants with complex anomalies that require surgery postdischarge from a neonatal intensive care unit (NICU).

Design: Prospective cohort study.

Setting: A tertiary care children's hospital with a fetal diagnostic and treatment center, special delivery unit, and NICU.

Participants: Mothers who had delivered infants with complex anomalies that require surgery between 2009 and 2012 ($N = 165$).

Methods: Phone interviews were used for data collection and were analyzed using descriptive statistics methods.

Results: The average duration of breastfeeding/provision of human milk was 8 months. The percentage of infants who received human milk at 6 months was 60.1% ($n = 98/163$,; $p = .0063$) and at 12 months was 34.5% ($n = 57/165$, $p = .023$). Of infants in this cohort, the percentage of those infants exclusively receiving human milk was 54.3% ($n = 89/164$, $p = .0004$) at 3 months of age and 35.6% ($n = 58/163$, $p < .0001$) at age 6 months. Another clinically important finding is that 30.7% of the cohort required gavage feeds postdischarge from the NICU.

Conclusion: Even for the most surgically complex infant/mother dyads, breastfeeding outcomes can improve significantly with a strong prenatal lactation program, nursing staff with specific breastfeeding education, and a hospital culture that values and supports breastfeeding and the provision of human milk. These findings support the use of hospital-grade electric breast pumps postdischarge for families of infants with complex anomalies that require surgery, as approximately one third of the cohort went home on tube feeds and their mothers continued to pump their breast milk at home.

JOGNN, 44, 450-457; 2015. DOI: 10.1111/1552-6909.12568

Accepted November 2014

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The authors report no conflict of interest or relevant financial relationships.

Human milk is the optimal form of nutrition for all infants (American Academy of Pediatrics Section on Breastfeeding [AAPSB], 2012). The American Academy of Pediatrics (AAP) and the World Health Organization (WHO) recommend a diet exclusively comprised of human milk for all infants for the first 6 months of life with complementary breastfeeding extending past the first year of life (AAPSB, 2012; Kramer & Kakuma, 2001). Human milk is especially important for the preterm, ill, or postsurgical infant (Edwards & Spatz, 2012; U.S. Department of Health and Human Services, 2011).

Traditionally, breastfeeding exclusivity and duration measures have been reported for healthy, full-term, and preterm infants. To date, infants with congenital anomalies requiring surgery have been excluded from state and national surveys on breastfeeding duration and exclusivity. The purpose of this study was to fill this gap by addressing the breastfeeding outcomes of mother/infant dyads when the infant is born with a complex congenital anomaly that requires surgery and is cared for in a NICU.

Background

This study was conducted at The Children's Hospital of Philadelphia (CHOP), which is home to the Center for Fetal Diagnosis and Treatment (CFDT) and special delivery unit (SDU), an in-hospital birthing unit for neonates (preterm and term) with prenatally identified congenital anomalies. CHOP has implemented hospital-wide policy, infrastructure, and education/training initiatives over the last

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10 years to create an institution-wide culture that highly values the provision of human milk (Edwards & Spatz, 2010; Spatz, 2004, 2005).

To optimize the delivery of human milk for the hospital's vulnerable infant population, CHOP uses Spatz's Ten Steps for Promoting and Protecting Breastfeeding in Vulnerable Infants (Ten Steps) (Spatz, 2004; see Table 1). The Ten Steps begin prenatally with informed decision making regarding enteral infant feeding choices. Families expecting an infant with a congenital anomaly requiring surgery are provided with a prenatal lactation consultation with a PhD-prepared nurse researcher from the hospital's lactation department. These consultations are standard of care at CHOP and are evidence based to focus on the significance and importance of a human milk diet for an infant diagnosed with a complex anomaly. The content of each consultation is individually tailored to address the infant's diagnosis; ideally a family leaves their consultation understanding specific ways that their infant will benefit from human milk. Each consultation generally lasts one hour. All families expecting to give birth within the CHOP SDU, regardless of previous intent to breastfeed, are scheduled for this consultation to ensure an informed decision in regard to infant feeding.

In response to a hospital-wide survey of nursing staff's knowledge of breastfeeding support and human milk management data, the Breastfeeding Resource Nurse (BRN) program was created (Spatz, 2005). All nurses are eligible and encouraged to attend the 16-hour training. The BRN program is a systematic approach to education for nursing staff and is focused on preparing bedside nurses with evidence-based lactation and breastfeeding knowledge. This enables the BRNs to assist in pumping, managing, and storing human milk as well as supporting the breastfeeding dyad through the transition to direct breastfeeding. In addition, continuous quality improvement projects are implemented to consistently monitor and improve the program (Spatz, 2005).

Table 1: Spatz Ten Steps for Promoting and Protecting Breastfeeding for Vulnerable Infants

Step	Description
1	Informed decision
2	Establishment and maintenance of milk supply
3	Human milk management
4	Oral care and feeding of human milk
5	Skin-to-skin contact
6	Non-nutritive sucking
7	Transition to breast
8	Measurement of milk transfer
9	Preparation for discharge
10	Appropriate follow-up

To date, infants with congenital anomalies requiring surgery have been excluded from state and national surveys on breastfeeding duration and exclusivity.

The majority of nursing staff in the SDU and NICU are BRNs. These BRNs hold normal patient assignments (standard patient nurse ratios are one to two patients per one nurse) and utilize their BRN skill set in their daily assignments. The nurses caring for the mother and infant are highly knowledgeable and trained to support families regarding breastfeeding and pumping. This enables the staff to encourage and support the mother to initiate lactation via pumping. Following the infant's birth, standard of care in the SDU is that mothers with vaginal births pump within 2 hours of delivery and mothers with cesarean births pump within 4 hours. Mothers are instructed to pump every 2 to 3 hours for a goal of eight pumps per day. BRNs provide education and support on a daily basis, and mothers are seen one or more times by the NICU-based International Board-Certified Lactation Consultants (IBCLCs).

When the infant requiring surgery is ready for enteral feeding, human milk is the preferred form of nutrition, and all eligible infant/mother dyads are encouraged to preform skin-to-skin care daily (Edwards & Spatz, 2010). After the infant's extubation, nonnutritive sucking at the breast is encouraged to develop the strength and coordination to transition to direct breastfeeding (Edwards & Spatz, 2010). Yet it should be noted that not all dyads have a personal breastfeeding goal that includes transitioning to direct breastfeeding. For some of the dyads, the mother will continue to exclusively pump and provide her milk via gavage or bottle.

Once infants who require surgery are receiving at least one half of their nutrition enterally, direct breastfeeding can be considered. The hospital uses a standard procedure for pre- and

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