**PREDICT Project: Pre- and Intra-Delivery Developmental Care Team Project**

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**Background:** Newborn Individualized Developmental Care and Assessment Program (NIDCAP)-based developmentally supportive care and Patient Family Centered Care (PFCC) have been shown to improve the development outcomes of infants born extremely preterm.\(^1\) Given that WakeMed is a NIDCAP Certified nursery, an important component of care in the nursery is the integration of the NIDCAP-based developmentally supportive PFCC throughout the infant’s hospitalization and following NICU discharge. WakeMed’s existing developmental team is made up of neonatal physical therapist, psychologist and developmental specialist. The NICU team currently does an excellent job of incorporating NIDCAP-based developmental supportive PFCC throughout the NICU hospitalization and following NICU discharge. This care approach has not been systematically examined and implemented prior to the delivery of extremely low birth weight infant (ELBW) or during the stabilization period following birth.

**Aims:**

1. 75% of ELBW deliveries have prenatal developmental consultations by December 31, 2015
2. 100% compliance with the Developmentally Sensitive Stabilization Protocol by December 31, 2015
3. 75% completion rate on the Parental Questionnaire by December 31, 2015

**Setting:** WakeMed’s Neonatal Intensive Care Unit (NICU) is a 48 bed level IIIB nursery that cares for infants born at WakeMed and referred from surrounding areas. Our NICU is made up for 24 private patient rooms and 24 beds in a traditional open-pod design. We admit approximately 50-60 extremely low birth weight infants a year.

**Methods:**

1. **Prenatal Consultation:** After developing a workflow to integrate the developmental team with the existing medical team in the prenatal consultation workflow (Figure 1), we tracked ELBW consultations and deliveries (Table 1 and Figure 2). We created a Parental Questionnaire (Appendix A) to assess usefulness and parental anxiety surrounding the delivery of their ELBW infant. The questionnaires were intended to be administered to all ELBW families during the discharge process or in the NICU follow-up clinic to gain insight relating to the usefulness of the prenatal consultation and parental stress surrounding an ELBW infant birth.

2. **Developmentally Sensitive Stabilization Protocol (Appendix B):** After observing delivery room practices and behaviors, we developed a protocol to promote developmentally appropriate care practices in the delivery room and during the stabilization period (positioning, handling, environmental supports, environmental conditions, team member roles, etc.). We are currently in the process of assessing the delivery team’s (physicians, nurses, nurse practitioners, and respiratory therapists) current practice of developmentally supportive care during this period and will then educate the delivery team regarding the aforementioned protocol. Our intent is to reassess the delivery team’s practices relating to developmentally supportive care during the stabilization period following education on the protocol. Our measures for this aspect of the project will be delivery team developmental care practice as measured by our pre- and post- protocol implementation assessments.

**Measures:**

1. Percentage of inborn ELBW deliveries with prenatal developmental consultations per eligible deliveries. Eligible delivery includes any inborn infant with an estimated birth weight ≤ 1000 grams whose mother received a prenatal medical consultation.

2. Percentage of parental questionnaires completed per eligible family. Eligible family includes any family of an inborn infant with an estimated birth weight ≤ 1000 grams whose family received a prenatal developmental consultation.
Preliminary Data:

Table 1. Prenatal Consultation Data 3/1/2014-6/30/2015

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ELBW Deliveries since 3/1/2014</td>
<td>67</td>
</tr>
<tr>
<td>ELBW Deliveries with Medical Consult</td>
<td>46</td>
</tr>
<tr>
<td>Prenatal Consultations Completed</td>
<td>48</td>
</tr>
<tr>
<td>ELBW Prenatal Consultation Completed</td>
<td>24 (52%)</td>
</tr>
<tr>
<td>Questionnaire Completed</td>
<td>13 (54%)</td>
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Figure 2. Percentage of Developmental Prenatal Consults Completed Prior to ELBW Delivery

Discussion:

Given the importance of providing developmentally supportive PFCC care to the most fragile infants in the NICU, we successfully integrated the existing developmental team into the prenatal consultation process (Figure 1). Since March 2014, the developmental team completed 48 total prenatal consultations, but only 24 of these were on ELBW families. Of the 67 ELBW babies that were born at WakeMed during this time period, 46 had a medical prenatal consult. As a result, the developmental team spoke with only 24 of 46 (52%) inborn ELBW infant’s families prior to birth. There have been many challenges with successfully completing the developmental prenatal consult prior to the birth of an ELBW infant. One significant challenge relates to the timing of the birth. Many of these babies were born during hours when our developmental team was unavailable (nights and weekends). Additionally, some of the missed opportunities occurred because of precipitous deliveries when the developmental team was not able to speak with the family prior to the infant’s quick delivery. Additionally, because the birthweight of the infant is unknown prenatally and many of the mothers remained pregnant for extended periods of time following the consultation, some of the consultations were completed on families that did not deliver ELBW infants. Fifty percent (24 of 48) of the completed consultations during the study period were completed on families that delivered babies weighing greater than 1000g at birth. Because these infants were not ELBW, they were not included in our final analysis. In order to capture a higher percentage of ELBW families prior to birth, the developmental team will need to significantly increase the number of families that they speak with prenatally.

It is our hope that the prenatal developmental consultation will alleviate some of the anxiety surrounding the birth of an ELBW infant. We developed a Parental Questionnaire (Appendix A) and are currently gathering data from the survey to assess the utility of the consult. Thus far, we have collected 15 completed surveys. Although we are continuing to
collect data, the preliminary analysis reveals that the majority of families value learning about both the medical and developmental outlook of their babies prior to birth. Eighty percent of the families surveyed rank learning about the medical outlook prior to the birth of their child as very important. Similarly, 73% of those questioned rank learning about the developmental outlook prior to the birth of their child as very important. There have been challenges associated with completing the survey as well. The optimal time to complete the survey is unknown at this time. If we wait too long to administer the questions, the families may forget the prenatal consultation. On the other hand if we administer the survey soon after delivery, the families are in crisis and it is hard to gain useful or insightful information. The surveys we have collected thus far were completed during the hospital discharge process or during one of the first follow-up visits in the Special Infant Care Clinic. We plan to continue to modify the parental survey to gain insight on the stressors families experience around the birth of their child. Additionally we will continue to work towards finding an optimal time to administer this questionnaire to gain useful information.

Following developmental team delivery room observations (in person and via video), we created a Developmentally Sensitive Stabilization Protocol (Appendix B). The protocol includes positioning, handling techniques, environmental supports, and recommendations for the various roles of individuals typically attending an ELBW delivery. The protocol also outlines infant stress behavior and suggested responses to the stress behaviors to help foster a developmentally supportive environment during this critical time period. Our next steps for this aspect of the project are to assess the delivery team’s current practice of developmentally supportive care during this period and then educate the delivery team regarding the newly developed protocol. We will then reassess the delivery team’s practices relating to developmentally supportive care during the stabilization period following protocol education.

Team Acknowledgement:

- Jonathan Seigel MD – Neonatologist
- James Helm PhD – Developmental Specialist, Member of the Developmental Team
- Melissa Johnson PhD – Child Psychologist, Member of the Developmental Team
- Marie Reilly PhD – Physical Therapist, Member of the Developmental Team
- Tara Bastek MD - Neonatologist
- Stephen Kicklighter MD – Neonatologist
Figure 1. Prenatal Consultation Workflow

- Daytime Consult Request
  - OB RN/MD calls NICU secretary to request consult
  - OB RN/MD calls NICU provider directly to request consult

- NICU Provider Notified

- Night Consult Request
  - OB RN/MD calls NICU secretary to request consult
  - OB RN/MD calls NICU provider directly to request consult

- Medical Consult Completed
- Consult MD Notified
  - Overnight medical provider notifies consult MD of completed consult

- Developmental Consult Completed
  - Consult MD notifies psychologist of consult
  - Developmental team checks “consult” list in electronic medical record

OB – Obstetric; RN – Registered Nurse; MD – Medical Doctor; NICU – Neonatal Intensive Care Unit
Appendix A. Parental Questionnaire

Dear Family,

In an effort to provide the best care to our patients and improve the parental experience in the NICU, we would appreciate your answers to the following survey. The following short questionnaire should only take a few minutes to complete and will help us improve the care we deliver to future babies and their parents.

1) I spoke with a neonatologist or nurse practitioner before my baby was born.
   YES  NO  NOT SURE

2) I spoke with a developmental specialist from the NICU before my baby was born.
   YES  NO  NOT SURE

3) The information I received before my baby’s birth was:
   1  2  3  4  5
   Very helpful  Somewhat helpful  Neutral  Not very helpful  Not helpful at all

4) Around the time of my baby’s birth, I felt:
   1  2  3  4  5
   Very worried  Somewhat worried  Neutral  Fairly relaxed  Very relaxed
   and anxious  and anxious

5) The following question is about topics that you feel are important to discuss prior to the birth of your baby. Please rate each topic using the following scale.
   1  2  3  4  5
   Very important  Somewhat important  Neutral  Not very important  Not at all important
   a) Medical outlook for babies born at my child’s gestational age
   b) Developmental outlook for babies born at my child’s gestational age
   c) What to expect in the NICU
   d) A chance to meet some of the people who will care for my baby

6) In your own words, feel free to let us know what was useful and what could have been more helpful about the information you received prior to your baby’s birth.

   ________________________________________________________________
   ________________________________________________________________

NICU – Neonatal Intensive Care Unit
A goal of developmentally supportive care is to support infants in ways that foster growth and development during all activities and procedures. The intent of this protocol is to increase awareness of developmental and behavioral needs and encourage developmentally appropriate care immediately after birth and through the stabilization period. The first hour of life is a stressful time for all infants but especially for the extremely low birth weight (ELBW) population. These infants have immature brains, limited resources to self-regulate, and are particularly vulnerable to stress. Developmental support during this period may have significant impact on the infant’s physiology and developmental outcomes.

**Principles:**

1. Provide an environment that fosters stabilization in addition to decreasing infant stress
2. Provide an environment that adapts to individual infant needs based on cues and infant responses

**General Guidelines:**

*Environment – Room, Bedding, and Personnel*

- **Neutral Thermal Environment**
  - Set the resuscitation room thermostat to 77-79 °F
  - Ensure the warmer is on and pre-warmed
  - Ensure warm blankets are available
  - Place the NeoDrape® on the warmer

- **Lighting**
  - Minimize direct light exposure to the infant’s eyes

- **Quiet Environment**
  - Encourage resuscitation team to use quiet voices

- **Bedding**
  - Ensure bedding supports containment
    - “Dress” giraffe with nest
    - Provides boundaries that comfort, support flexion (body and limbs) and contain movements
    - Place infant onto NeoDrape® when delivered, then onto nest
    - Place infant into either Dandle ROO™ or SnuggleUp after lines are secured
- Maintain head in midline, limbs flexed and close to body and contained

- Personnel
  - Move slowly
  - Move infant slowly
  - Monitor for signs of stress as below
  - Assign member of the stabilization team to support development and mitigate stressors while the other members are performing the resuscitation/stabilization tasks
  - Take turns providing developmental support when not performing technical tasks
  - Encourage communication between personnel so if one team member recognizes infant stress, they can ask the other members to respond/support the infant

*Infant Stress Behavior*

- Autonomic and motor stress behaviors
  - Note stress behaviors and reduce stimulation when possible
  - Possible autonomic or motor stress behaviors (but not limited to): extension, searching for boundaries, arcing, loss of tone

- Responses to stress behavior
  - Provide containment and reduction of stimulation
  - Support infant’s efforts to self-regulate
    - Provide recovery breaks when possible
    - Support and encourage “intent” of behavior – grasping, tucking, inhibiting movements, finding boundaries, bracing feet, hand to head

*Personnel and Suggested Roles:*

1. *Physician*
   - Assign team member to the development role
   - Manage airway and direct resuscitation
   - Note infant stress behaviors and provide guidance to team to reduce stressors

2. *Nurse Practitioner/Physician Extender*
   - Assign team member to the development role
   - Manage airway and direct resuscitation
   - Note infant stress behaviors and provide guidance to team to reduce stressors

3. *Nurse*
a. Set up room and bedding as suggested above to ensure a neutral thermal environment and bedding supports containment
b. Note infant stress behaviors and alert team to reduce stressors
c. Provide containment and reduce stimulation
d. Remind team for the need for recovery breaks

4. Respiratory Therapist
   a. Assist with airway management
   b. Provide containment when airway is stabilized
   c. Monitor stress behaviors and alert team to reduce stressors
References:


