A Hybrid Formal-Informal Mentorship Program to Accelerate Neonatal Nursing Knowledge Transfer: A Quality Improvement Project in a Level 3B Neonatal Intensive Care Unit (NICU)

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Keywords: neonatal nursing, mentorship program, novice nurses, quality of care, transition stress, burnout syndrome, turnover, recruitment, retention

Purpose

The NICU Mentorship Program was developed to address the increasing NICU novice nurse turnover and upcoming retirements; 42% of the Children’s Hospital of Eastern Ontario’s (CHEO) NICU nurses will be eligible to retire in the next three to five years. The program’s focus is to facilitate novice nurses’ transition and develop neonatal nursing expertise via structured knowledge transfer through shared responsibility between all key stakeholders at CHEO.

Findings

An NICU nurse needs assessment revealed that a hybrid formal-informal mentorship program could support novice nurse integration to the NICU, improve recruitment, retention, unit culture, job satisfaction, professional development, and increase innovation. This assessment guided the selection of several program evaluation measures: patient satisfaction, patient safety, a Maslach burnout inventory and areas of worklife, a trust survey and the Casey-Fink readiness to practice and retention surveys. A preliminary scan of the Maslach surveys exposed a concerning level of stress amongst younger nurses in our NICU. The development process, implementation and evaluation strategies are described.

Conclusion

The NICU Mentorship Program can successfully increase novice nurse retention and support neonatal nurses to maintain excellence in quality of care during the upcoming years of retirement turnover. Our initial program implementation evaluation and cost analysis supports investing in mentorship programs throughout the organisation because it aligns with CHEO’s mission, vision and strategic plan. Our initiative has received strong support from NICU nurses and our leadership team, creating potential for enhancing our core organisational values through building a strong neonatal and pediatric nursing workforce.
Objectives

A recent review of practice guidelines found inconsistencies in discharge care standards for late preterm infants (340/7 and 366/7 weeks’ gestation) in North America. Given the vulnerability of this population and the variation in discharge standards, the objective of this literature review is to explore the hospital discharge experiences of parents of late preterm infants.

Methods

A systematic search of the literature was conducted to examine late preterm infant hospital discharge practices and parent perspectives. MEDLINE, CINAHL, PsychINFO, and EMBASE databases were used. A total number of 1,576 articles were located. Inclusion criteria limited articles to LPIs (between 340/7 and 366/7 weeks’ gestation) in the postnatal period, under 6 months of age, and a final number of 32 articles were included in the literature review.

Results

Since redefining “Near Term” infants as “Late Preterm”, various clinical practice recommendations have been formed. Within hospital discharge guidelines, feeding recommendations, discharge timing, and family-friendly discharge were found to be key areas of focus. Limited research was found on the parent perspectives of late preterm infant discharge. From the articles retrieved, feeding difficulties were found to implicate maternal emotional distress, and parents reported feeling unprepared for the transition from hospital-to-home.

Conclusion

The experience of parents of late preterm infants requires further investigation to improve understanding of this population and promote optimal discharge care. Family collaboration has potential to lead to clinical care guidelines that improve late preterm infant health outcomes and reduced hospital readmissions.
SnackChats at McMaster Children’s Hospital

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Keywords: family integration, parent experience, quality improvement

Purpose

The family integration committee at the McMaster Children’s Hospital Neonatal Intensive Care Unit (NICU) formed in 2017 as part of our hospital’s collaboration with the Vermont Oxford Network. A parent survey was distributed to explore parent experiences in the unit. Parents identified a need for one-on-one support with NICU graduate parents. Due to limited resources this was not entirely possible; however, the committee sought to create something else to address this need. After reviewing practices of other level 3 NICUs, we created a group called “SnackChat”. SnackChat is held weekly and offers parents group education and peer support. Each session is facilitated by a graduate parent and offers light refreshments.

Findings/Review

The first 10 sessions included topics on: things to do in the NICU with your baby, RSV and immunizations, developmental care, safe sleep, and preparing for transitions. Feedback we received from anonymous surveys was overwhelmingly positive and provided suggestions for improvement. Thus, topics have now expanded to include “guest speakers” (e.g., respiratory therapists, a public health nurse and a psychiatrist). On average, 8-12 people attend weekly, and most are parents to micropreemies or babies with prolonged stays (>2 months).

Conclusion

SnackChat has existed for over a year and continues to develop to meet parents’ needs. It now includes monthly Dads’ Pizza Nights, holiday events, and a separate, weekly pumping and breastfeeding group called “Milk and Cookies.” As SnackChat evolves, it will always be centred on bettering parents’ experiences and improving parent support in the NICU.
Noise Levels in the NICU: What Are They?

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Keywords: noise, NICU, neonates, preterm infants

Purpose

This study proposes to examine what are the actual sound levels in the NICU in relation to the recommended guidelines by the American Academy of Pediatrics (AAP) of 45 decibels (dB). Ascertaining baseline data will inform future research, education, and knowledge translation interventions.

Background

Premature and sick infants in the Neonatal Intensive Care Unit (NICU) are at risk of being subjected to excessive noise on a continual basis. The AAP’s recommendation for maximal sound levels in the NICU is 45 dB, yet studies show that sound levels often exceed 120 dB. This highlights a gap between knowledge and practice in the NICU.

Study Aims

The purpose of this study is to identify current baseline sound levels in an Ottawa, Canada, level 3 NICU compared to recommended standards by the AAP.

Methods

A descriptive quantitative study.

Baseline sound levels will be measured through a sound audit in an open bay NICU room (8 beds) at known busy and known quiet times for 8 hours, alternating for 1 week of days, 1 week of evenings, and 1 weeks of nights, using a portable sound meter. The portable sound-measuring device will be calibrated and used to measure actual sound levels in dB. Observational data will be collected during multidisciplinary morning rounds, before, during, and after quiet time, during admissions, and during emergency procedures.
Depending on the distribution of the data, hourly means and their standard deviations or medians and their interquartile ranges (IQR) of noise recorded in the NICU will be calculated and represented graphically by plotting over time. Baseline-audit sound level results will be compared with those recommended by the AAP of 45 dB. The average sound level will be correlated to the NICU observational data collection within the room.

Mean differences of sound levels and standard deviations of sound levels or medians and (IQRs) depending on the distribution of the data at different time periods will be compared.

Run charts will be used to plot the sound measurements over time related to the observational data collection. Run charts to display observed data in a time sequence will be plotted over time.

**Setting**

The Ottawa Hospital (TOH), Ottawa, Ontario, Canada, Level 3 NICU

**Implications for Practice**

This study proposes to examine the actual sound levels in our NICU in relation to the recommended guidelines set by the AAP. Ascertaining baseline data will inform future research, education and knowledge translation interventions.

**Analysis**

Depending on the distribution of the data

**Findings/Review**

Research in progress

**Conclusion**

To follow
Decreasing Antibiotic Use in the NICU by Limiting Time to Blood Culture Results to 36 Hours

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Sunnybrook Health Sciences Centre, Toronto, Ontario

**Keywords**: antibiotic stewardship, blood culture, time to positivity, antibiotic usage rate, collaboration

**Purpose**

Antibiotic over-use is a risk factor for the development of antibiotic resistant bacteria and may cause unwanted microbiome perturbations. Our NICU set a goal to reduce our antibiotic usage rate (AUR) from 15.7 antibiotic days/100 patient days to 13 antibiotic days/100 patient days over a year. We implemented a change to report blood culture results at 36 hours rather than 48 hours to enable discontinuation of antibiotics earlier.

**Methods**

A Plan-Do-Study-Act (PDSA) cycle was designed to measure the effect of reduced blood culture reporting time from 48 hours to 36 hours. Measurements included AUR as an outcome measure and late bacterial infections as a balancing measure. First steps were to collect data on time to positivity for all NICU blood culture results over a span of 1 year. After reviewing this data with all stakeholders, a change to 36 hour blood culture reporting was implemented.

**Findings/Review**

By basing the decision to discontinue antibiotics on a 36 hour culture rather than a 48 hour culture result, we were able to decrease AUR by a relative 13% (15.7 to 13.7 antibiotic days per 100 patient days) over a span of 5 months. We also found that despite discontinuing antibiotics sooner, the incidence of late bacterial infection was not impacted (6.9% to 5.2%).

**Conclusion**

By shortening the time to receive blood culture reports from 48 hours to 36 hours, our NICU was able to reduce the antibiotic usage rate by 13% over 5 months without any increase in late bacterial infections.
The Infant Cuddler Study: Evaluating the Effectiveness of Volunteer Cuddling in Infants with Neonatal Abstinence Syndrome

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St. Michael’s Hospital, Toronto, Ontario

Keywords: Neonatal Abstinence Syndrome, volunteers, cuddling

Objectives

St. Michael’s Hospital launched a volunteer cuddling program in October 2015 for all infants admitted into the NICU. The objective of this study was to examine the impact of volunteer cuddling for babies with Neonatal Abstinence Syndrome (NAS).

Methods

A mixed methods approach was utilized to measure both quantitative and qualitative impact in this REB approved study. A pilot cohort study with a retrospective control group measured length of stay (LOS). Focus groups using semi-structured interviews were conducted with volunteers and nursing staff to illicit qualitative feedback.

Results

Infants with NAS in the volunteer cuddling program had a reduction in LOS by 6.3 days (U=34, p=0.072). Focus groups with bedside nurses and program volunteers described a positive impact of the cuddling program on infants, families, staff and volunteers.

Conclusion

Length of stay reductions of nearly one week is associated with a possible $20,000 savings in combined health care and family costs. Given the reduction in length of stay associated with the volunteer cuddling program, the authors recommend a future larger cohort study and consideration of implementing national guidelines for standardizing volunteer cuddling programs as a non-pharmacological treatment of NAS.
POSTER PRESENTATION

Books for Babies: Facilitating Parent-Infant Interactions, Attachment and Early Literacy in the NICU

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St. Michael’s Hospital, Toronto, Ontario

Keywords: reading, books, infants, NICU

Purpose

Literature has shown that reading to children beginning in infancy fosters brain, language and social development. Encouraging parents and caregivers to read aloud to their infants in the NICU promotes parent-child attachment as the infant learns to respond to their caregiver’s voice and emotions. Caregivers benefit from reading aloud as an additional activity to promote parent-child interaction, particularly for infants who are not medically stable enough to be consistently handled.

Review/Findings

St. Michael’s Hospital launched a Books for Babies program in September 2017. Two books are gifted to every baby, along with information educating caregivers about the developmental benefits to their child. Posters and educational material are displayed in the NICU, which promote reading and free literacy resources and programs that families can access in their community. As an inner-city hospital, St. Michael’s has a diverse patient population with a number of families living below the poverty line. A review of the literature highlights that there is a need to promote literacy in low-income neighbourhoods. NICU nurses have responded positively to the program, identifying it as facilitating parent-infant bonding and providing some families an opportunity that they might not be able to afford. Nurses have also commented on the impact of peer role modeling, inspiring caregivers to read in the NICU when they witness other parents doing so.

Conclusion

NICUs can promote life-long literacy and enhance developmental care by encouraging caregivers to read to their children immediately from birth.
Advancing Clinical Practice for Registered Nurses in the Neonatal Intensive Care Unit Using a Clinical Ladder

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Keywords: clinical ladder, job satisfaction, capacity, patient care, registered nurses, neonatal intensive care

Purpose

One identified area of dissatisfaction amongst registered nurses in neonatal practice was the perceived lack of opportunity for advancement at the clinical level.

Providing ongoing opportunities for leadership and professional growth and development builds capacity, provides a sense of accomplishment, and improves job satisfaction. A tool that demonstrates nursing opportunities over time such as a clinical ladder may assist the nurse in setting short- and long-term goals and may increase their professional accountability when used along with a performance appraisal.

Pierson (2010) found that after a 20-year period of employing the clinical ladder program in a 257 bed acute care facility, professional awareness amongst nurses had increased. Nurses were encouraged to utilize the tool to create a portfolio for their accomplishments.

Findings/Review

Using Benner’s Stages of Clinical Competence as a framework, a clinical ladder was created for neonatal intensive care nurses to empower them to build professional capacity by helping to identify milestones in the progression of their practice along a continuum from novice to expert. We have implemented this ladder retrospectively with new registered nursing staff hired over a 14-month period. The new staff were receptive to the ladder and encouraged by the opportunities for professional growth on the unit. The ladder will be presented to all registered nursing staff in March 2019.

Conclusion

Creating a method for nurses to continually advance practice builds confidence, creates job satisfaction, and improves the quality of patient care in the Neonatal Intensive Care Unit.
Direct Antiglobulin Titer (DAT) Strength and Hyperbilirubinemia in William Osler Neonates

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William Osler Health System, Brampton, Ontario

Keywords: positive DAT, DAT strength, need for phototherapy in high risk infants

Background

ABO incompatibility is a major risk factor for severe jaundice. Previous small studies have suggested that increasing DAT strength is associated with higher levels of bilirubin and greater need for phototherapy. There is no Canadian published data on DAT strength and hyperbilirubinemia. DAT strength is currently analyzed on all positive newborn DAT tests in our centres and could therefore be evaluated with respect to these high-risk infants.

Purpose

To evaluate a large cohort of DAT-positive Canadian newborns focusing on DAT strength, bilirubin levels, and the need for phototherapy.

Ethical Review Methods

A retrospective chart review of 1,437 DAT-positive newborns over a three-year period (total births of 23,628). Infants with risk factors in addition to DAT positive were excluded. 841 eligible infants were included. DAT strength was categorized as W, 1+, 2+, 3+ and 4+. All bilirubin test results performed from birth until 200 hours of age were analyzed. Bilirubin levels at 12 and 24 hours as well as the need for phototherapy were evaluated.

Results

Of the 841 infants, 594 DAT tests were weak positive, 225 were 1+, 21 were 2+, and 1 was 3+. Newborns with higher DAT strengths were more likely to need phototherapy than newborns with lower DAT strengths. Mean plasma bilirubin levels were higher at 12 and 24 hours in newborns with higher DAT strengths with the difference between 2+ and Weak being significant (P = 0.0087). Newborns with higher DAT strengths were more likely to be at or above the threshold for phototherapy initiation at 12 hours. Relative risk: 2+ versus weak 6.18; 2+ versus 1+ 3.34, and 1+ versus weak 1.85. Newborns with higher DAT strengths were also more likely to be in the high-risk zone on the Bhutani nomogram at 12 hours of age. Relative risk: 2+ versus weak 3.37, 2+ versus 1+ 1.96, and 1+ versus weak 1.72.
Conclusion

DAT-positive newborns due to ABO incompatibility do not exhibit the most severe form of hemolytic jaundice. Higher DAT strength newborns were more likely to require phototherapy. Newborns with higher DAT strengths were more likely to have bilirubin levels in the high-risk zone and be at or above the threshold for phototherapy at 12 hours of age. The majority of DAT-positive ABO-incompatible newborns with no other risk factors did not require phototherapy and many remained in the low or low intermediate risk zones.
ABSTRACT

Canadian Association of Neonatal Nurses
2019 National Conference

PARENT ENGAGEMENT: The Power of Empowerment

POSTER PRESENTATION

TUESDAY, APRIL 9, 2019
11:30-12:15

Care Conferences: Providing Anticipatory Guidance and Foundational Support to Parents of Micropremature Infants Admitted to NICU

Lisa Sampson, RN, Virginia McLaughlin, RN, Kate Robson, Karen Bong, Marion DeLand, PCM, Rena Rosenthal, DT, Jo-Ann Alfred, RN, Sabrina Wong, NP, Patti Schurr, NP, Rosanna Manarin, RN, Elizabeth McMillan-York, RN, Marilyn Hyndman, RT, PCM, Asaph Rolnitsky, MD, Eugene Ng, MD, Michael Dunn, MD

Sunnybrook Health Sciences Centre, Toronto, Ontario

Keywords: family conference, communication, trauma reduction, micropremature infant

Settings/Context

The Neonatal Intensive Care Unit (NICU) at Sunnybrook Health Sciences Centre provides care to over 75 micropremature infants (born <26 weeks) each year. We had few mechanisms for timely consistent information about the vital roles parents play in their infant’s care.

Problem Description/Rationale

The care conference was implemented as part of our Micropremature Infants Program after identifying the need for a meeting that provides support and anticipatory guidance for families. This meeting was felt to be of particular importance for families of micropremature infants because of the variability in their clinical course and the prolonged length of stay. Interprofessional providers were guided to include discussions on how the family is coping with the NICU stay and what challenges they may have. It also provides opportunity to learn more about the family. The specific aim for this project was to provide open communication and anticipatory guidance to families.

Interventions and Results

A template was developed and tested to facilitate consistent messaging in these family meetings. We have identified from a previous intake survey that 5-7 days would be an appropriate time for the care conference. Along with improved standardized practice assessment scores, feedback was largely positive, as these conferences are viewed as important and helped with their knowledge about their infants and improved their coping with the NICU.

Future Plan

To ensure sustainability, we will continue to evaluate the process and compliance of these care conferences. We are planning to implement a new care conference at 4-6 weeks of life.
Neonatal Golden Hour Redesign

Danica Hamilton, RN, BScN, MN, PNC(C), CNCCP(C), CNeoN(C)\textsuperscript{1}, Deepak Manhas, MD, FAAP, FRCP(C)\textsuperscript{2, 3}

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Keywords: resuscitation, stabilization, family presence, Golden Hour

Purpose

We have proposed a Golden Hour Pathway representative of resuscitation and stabilization in the first 60 minutes of life to meet best practice targets for family togetherness, vascular access, antibiotic administration, ventilation support beyond t-piece resuscitator.

Review

Our current state is to place an airway, if needed, and then transport the infant to the NICU for stabilization, the transportation process can delay care activities by up to 20 minutes. We can’t geographically change the locations, but we can change when the transportation takes place within the stabilization process. We have proposed to stay in the delivery environment for all resuscitation and stabilization activities to maximize parental involvement within the first hour. Right care, by the right team members, in the right place at the right time to meet BC Women’s Performance Improvement Framework: “To be recognized for exemplary patient experience, people, and performance”.

... / 2
Conclusion

We view this to meet best practice and innovation in that we will stay in the delivery environment rather than a separate resuscitation/stabilization room/bay commonly found in many other centres.
**ABSTRACT**

Canadian Association of Neonatal Nurses

2019 National Conference

**PARENT ENGAGEMENT:** The Power of Empowerment

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**Neonatal Golden Hour Redesign**

Team Leads: Danica Hamilton and Dr. Deepak Manhas

**GLOBAL AIM**

- Redesign the workflow for inborn newborns to support stabilization while critical tasks are completed in a timely manner and to reduce family togetherness.

**CURRENT ACHIEVEMENTS**

- Delay in stabilization interventions predisposes infants to a higher risk for hypoglycemia, progression of sepsis and respiratory disease.
- Competing activities for RN, RT and MDs precludes performing patient centered essential activities.
- Infants are invariably separated from mother if stabilization happens in NICU.

**Driver Diagram**

**GLOBAL AIM**

- Improve family experience during birth & stabilization.
- Maintain infant's wellness.

**SPECIFIC AIM**

- Inborn <33 week preemies.
- Complete stabilization within 60 min on NICU.
- 80% on NICU.

**MEASURES**

- Stabilization time.
- Time to vascular access, intubation & ventilator administration.
- Family & resuscitation team experience in resuscitation and stabilization period (resuscitation period).

**CHANGE CONCEPTS**

- Delivery room environment to be similar to NICU (device, mode, skills).
- Simulation-based learning to improve technical, decision-making, and team behavioral skills.

**CHANGE INTERVENTIONS**

- Standardization of practice wherever feasible
- Patient centered care

**IMPLEMENTATION**

- Pre-implementation (Jan-May 2019)
- Implementation (Jun-Aug 2019)
- Post implementation (Sep-Dec 2019)

**RESULTS**

- Median (range) minutes
  - Time to vascular access
    - 74 (24-256)
  - Time to N/Fluid initiation
    - 75 (24-145)
  - Time to intubation & ventilator administration
    - 106 (53-206)

**Acknowledgments**

We have had a great support group to facilitate this project which have helped us to set goals and keep us on track. We have planned the event week for March 4th to 8th, 2019 with two post-event workshops for education and implementation. For a redesign at this scale as a city, we have invited stakeholders from across the program, hospital, and campus from points of care, practice, operations, and patient and family engagement for involvement and feedback.

**Sponsors:**

Julie De Smedt, Dr. Elita Oosterhuis, Edna Rukhman and Dr. Serapide Shishmanian. Collaborators: BCW/Precision Health Network Team: Dr. Lesley Bingham, Dr. Joseph Ting, Jaslene Gual
Self-care and Beyond: Addressing Unmet Needs of NICU Families Related to Traumatic Stress, Postpartum Depression, and Anxiety during and after Their NICU Stay

Jennifer Callen, MSc, NP-Pediatrics¹, Karen Beattie, PhD², Ryan Van Lieshout, MD, PhD, FRCPC²

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Keywords: family integration, parent experience, quality improvement, self-care, traumatic stress, postpartum depression, anxiety, NICU, post-traumatic stress disorder, home

Purpose

The family integration committee at the McMaster Children’s Hospital Neonatal Intensive Care Unit (NICU) formed in 2017 as part of our hospital’s collaboration with the Vermont Oxford Network. Feedback from an anonymous survey after weekly group education and peer support sessions (termed “SnackChat”) revealed a need for more information on problems with post-traumatic stress disorder and postpartum depression and anxiety both during the NICU stay and once at home. Our family advisor, Karen Beattie, connected with a perinatal psychiatrist (Ryan Van Lieshout), inviting him to attend and then present at SnackChat sessions. He has presented his module on normal postpartum reactions to having a preterm infant in the NICU and risk factors for postpartum mental health disorders in parents. He has also discussed symptoms of these problems, when to seek help, strategies for optimizing mental health, and information on local resources.

Findings/Review

Dr. Van Lieshout has presented 4 sessions attended by an average of 8-10 parents. Sessions begin with introductions and a declaration of confidentiality and recognition of the safe space to share experiences and feelings. Responses from those who have attended these sessions has been very positive. The following feedback was provided from those in attendance: provides time as well as a safe space to talk with other parents and share experiences and challenges; helps to normalize and contextualize experiences; provides useful coping strategies for difficult times; and empowers families to recognize when help is needed to navigate their challenges, feelings and symptoms. These challenges have included both stresses associated with the NICU environment and the anticipation of different difficulties upon discharge home.
Conclusion

SnackChat sessions with Dr. Van Lieshout in attendance have provided mental health support for families in the NICU and are well received by families and staff. Research examining the stress experienced by parents of preterm infants suggests that interventions including the provision of resilience building skills and trauma focused treatments, including psychoeducation, cognitive restructuring, progressive muscle relaxation, and development of their trauma narrative can reduce parental anxiety and depression. Since this may ultimately improve outcomes for their infants, there is a strong case for further support of NICU families.
Sleep in Parents of Preterm Infants: A Systematic Review

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Keywords: infant, premature, intensive care, neonatal, parents, postpartum, sleep, systematic review

Objectives

To synthesize literature on sleep quantity, sleep quality, and factors influencing sleep among parents of preterm infants during initial infant hospitalization and following discharge.

Methods

Medline, EMBASE, CINAHL, PsycINFO, Scopus, and Cochrane Database of Systematic Reviews were searched from their inception to February 2017. Potentially eligible citations were reviewed by two independent reviewers. Both quantitative and qualitative studies were eligible for inclusion. Study bias was assessed and review outcomes were extracted using a customized form.

Results

Sixteen studies met inclusion criteria. Four studies included a control group of parents of full-term infants. Three studies reported sleep quantity means, of which only one provided values for an exclusive sample of mothers of preterm infants and found on average, mothers obtained 6.3 hours of sleep/day in the first 5-10 days. Twelve studies reported on sleep quality; most (n=10) relied on self-reported measures and identified poor subjective sleep quality whereas two studies objectively measured sleep of poor quality. Parental stress was the most consistent factor associated with sleep quality.

Conclusion

Quality and quantity of sleep among parents of preterm infants is inadequate and may negatively influence family health outcomes. Further research on correlates and changes in sleep is required to identify at-risk parents and inform targeted clinical recommendations and interventions aimed at maximizing sleep for parents of preterm infants.
Minimally Invasive Surfactant Therapy: A Quality Improvement Initiative

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Keywords: MIST, volutrauma, chronic lung disease

Purpose

Minimally invasive surfactant therapy (MIST) allows for the administration of surfactant without the risk of volutrauma, a cause of Chronic Lung Disease (CLD). A recent systematic review and meta-analysis has suggested that MIST may be associated with a lower risk of CLD over other methods. MIST has been endorsed by the European Consensus Guidelines as an acceptable method of surfactant delivery.

Findings/Review

A Quality Improvement Project was initiated at Sunnybrook aimed at establishing a protocol for MIST. A procedure was drafted and education video created after several Plan Do Study Act (PDSA) cycles which included: stakeholder engagement meetings, simulation sessions, and staff education. Ongoing PDSA cycles and data collection lead to protocol refinements. Changes were made in depth of catheter insertion, duration of surfactant instillation, pre-medications for procedure and choice of catheter.

Thirteen infants between the gestational ages of 26 and 31 weeks have undergone MIST. Seven infants needed subsequent intubation with six infants needing a second dose of surfactant. Initial failures were thought to be related to catheter dislodgement. Three of those six infants were less than 27 1/7 weeks gestational age. No procedure needed to be aborted for apnea or bradycardia. All initial head ultrasounds were reported as showing no significant abnormality. Intubators found the procedure cumbersome related to catheter floppiness.

Conclusion

We have had mixed success with the implementation of the MIST procedure. Skilled intubators are required. Ongoing refinements may include a smaller volume surfactant preparation and use of a different catheter.