Transitioning the Premature Infant from Nonsupine to Supine Position Prior to Hospital Discharge

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ABSTRACT
Purpose: The purpose of this study was to document the clinical practice of transitioning the hospitalized premature infant to the supine position and determine if hospital policy influenced practice.
Design: This study was a retrospective medical chart review.
Sample: The charts were reviewed from two urban hospitals that had Level III NICUs in upstate New York.
Main Outcome Variable: The outcome variable was to determine clinical practice of transitioning premature infants to the supine position.
Results: The percentage of premature infants who were transitioned to the supine position at least 24 hours prior to hospital discharge varied, but the postmenstrual age at transition did not vary. The hospital with a policy transitioned premature infants to the supine position one week prior to discharge as compared with two days in the hospital without a policy. Despite national recommendations, no infants were transitioned into the supine position by 32 weeks postmenstrual age.

Keywords: supine position; sudden infant death; infant; premature

SUDDEN INFANT DEATH SYNDROME (SIDS) remains the leading cause of death during the first year of life. Between 1992 and 2000, the rate of SIDS was reduced by >50 percent through the “Back to Sleep” public health campaign. Since that time, the rate of SIDS as well as the rate of supine sleep position for infants has plateaued at 70 percent. Research strategies to improve the rate of supine sleeping in infants are needed to further reduce the SIDS rate.

For physiologic and developmental reasons, preterm infants spend time in nonsupine positions while in the NICU. However, after discharge, the preterm infant sleeping in a nonsupine position has an increased risk of dying of SIDS; the risk is four times greater if the infant is <37 weeks of age and ten times greater if the infant is <34 weeks of age. Unless a medical condition such as gastroesophageal reflux disease exists where the risk of dying from the condition in the supine position outweighs risk of death from SIDS in a nonsupine position, infants should be placed in the supine position for sleep in the first year of life.

In 2008, the American Academy of Pediatrics (AAP) recommended by expert consensus that stable preterm infants be positioned primarily supine at 32 weeks postmenstrual age to become acclimated to this position prior to hospital discharge.
TABLE 1  Comparison of Infant and Clinical Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Hospital A (n = 96)</th>
<th>Hospital B (n = 92)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformed to supine position</td>
<td>100</td>
<td>68</td>
<td>0.00*</td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>PMA at supine transition (wk)</td>
<td>35.8 (1.0)</td>
<td>36.0 (1.4)</td>
<td>0.44</td>
</tr>
<tr>
<td>Difference between day of transition to supine position and discharge</td>
<td>7.2 (6.4)</td>
<td>2.0 (2.0)</td>
<td>0.00*</td>
</tr>
<tr>
<td>PMA at discharge (wk)</td>
<td>37.0 (1.2)</td>
<td>36.0 (1.4)</td>
<td>0.00*</td>
</tr>
</tbody>
</table>

*Abbreviations: PMA = postmenstrual age; SD = standard deviation.
*p<.01.

The position was reinforced in 2011, stating stable infants should be positioned supine by 32 weeks postmenstrual age. Transitioning the preterm infant to the supine position is encouraged by the AAP so that both parents and the infant can become acclimated to the position prior to hospital discharge to potentially improve the rate of supine sleep and reduce the risk of SIDS. Parents are more likely to place infants in a particular sleep position if they have seen the practice role modeled in the nursery and heard the advice from multiple sources. The guideline to place preterm infants in the supine position is based on expert consensus and not necessarily an evidence-based recommendation. Currently, there is no empirical research on transitioning preterm infants to the supine position; therefore, there is no evidence to build policy on and no research on the impact of associated covariates on which to guide clinical practice.

The current clinical practice of supine transition in the hospital is unknown. The literature shows great variability in when NICU nurses think infants should begin to sleep supine; these include the following: anytime with proper positioning, when in an open crib, between 34 and 36 weeks postmenstrual age, before 34 weeks postmenstrual age, after 37 weeks postmenstrual age, when the infant has good head control, one to two days prior to discharge, and never. No studies have documented if preterm infants are being transitioned supine prior to hospital discharge or if they are being transitioned, when are they being transitioned to the supine position? Thus, the purpose of this study was to document the current clinical practice of transitioning the preterm infant to the supine position prior to hospital discharge and determine if hospital policy influences the clinical practice.

DESIGN

Because there was a paucity of literature on transitioning the preterm infant to the supine position in the hospital, a retrospective medical chart review was conducted. A retrospective chart review was an efficient way to document preliminary information about a topic to base further prospective studies.

SAMPLE AND SETTING

This retrospective chart review was conducted in two tertiary level NICUs in upstate New York; both hospital institutional review boards approved this study. One of these institutions had a hospital policy stating stable preterm infants would be transitioned supine at 32 weeks (Hospital A), and the other hospital had no policy related to transitioning infants (Hospital B). Hospital A was a 20-bed urban unit that admitted both infants born in that hospital as well as transported infants and had 400 admissions per year (Table 1). Hospital B was a 64-bed urban unit that admitted infants born in that hospital as well as transported infants and had 700 admissions per year. These two institutions were used to determine if there were differences in practices with and without a standing policy on transitioning infants to the supine position.

Medical records management was different at the two hospitals; that is, Hospital A scanned the medical charts into a computer system and Hospital B used paper-based medical records. There were no changes in charting or education specific to safe sleep at either hospital during the study period. Medical infant charts from 2010 were reviewed at both hospitals for this analysis. These charts were initially randomly selected using a randomization table with the goal of equal representation at each gestational age between 24 and 36 weeks. Medical records that were available for the year 2010 and met inclusion and exclusion criteria were reviewed at each institution and were included in the randomization table. Infants were excluded if the mother had no prenatal care; had multiple gestation; or had a neonatal diagnosis of bronchopulmonary dysplasia, cleft lip and palate or isolated cleft palate, necrotizing enterocolitis, Pierre Robin syndrome, congenital heart defect, myelomeningocele or encephalofly, perinatal asphyxia or hypoxic ischemic encephalopathy, greater
than Grade II intraventricular hemorrhage or periventricular leukomalacia, or chromosomal anomaly; was transferred to another facility, or died. By design, a relatively healthy preterm sample was selected to mitigate illness as a confounding variable.

METHODS

For each subject, the primary investigator verified each estimated date of confinement. The first day of the last menstrual cycle and the ultrasound dates were used, and if there was >7-day discrepancy in delivery date between the last menstrual cycle and the ultrasound, the ultrasound date was used. The day the infant was transitioned to the supine position was defined as the last date the infant was documented as being placed supine in at least seven of eight “hands-on” periods and remained in the supine position until discharge. The date was then converted into the postmenstrual age using an estimated date of confinement dating wheel.

Illness Severity Instrument

To capture illness severity of the infants, the Score for Neonatal Acute Physiology (SNAP-II) was used. SNAP-II is a parsimonious instrument using six physiologic variables within the first 12 hours of admission to assess illness acuity. These variables include lowest mean blood pressure, core body temperature, serum pH of capillary or arterial blood sample, the presence of single or multiple seizure activity, urine output assessment, and lowest ratio of partial pressure of oxygen in blood to oxygen concentration. SNAP-II has been validated on >14,000 infants and found to be valid for assessing illness severity of newborn infants.

RESULTS

Overall, 188 NICU infant medical charts were reviewed at two institutions. Both institutions had a Level III NICU. Hospital A had a safe sleep policy to transition stable preterm infants to the supine position by 32 weeks postmenstrual age, whereas Hospital B had no safe sleep policy. There was no statistical difference between Hospital A and Hospital B in the SNAP-II score, in the percentage of male infants, or in the percentage of white infants. There was a statistical difference between Hospital A and Hospital B in sample mean gestational age at birth (34.3 weeks vs 33.3 weeks, p<.05). There was a 25.0 percent of unknown race in Hospital A versus 2.2 percent of unknown race in Hospital B. Other races found in Hospital A sample were African American, Hispanic, Asian, Burmese, Guatemalan, and Eskimo, and other races in Hospital B sample were African American, Hispanic, Asian, and American Indian.

Equal representation was attempted for each gestational age through random selection, but, because of exclusion criteria, the preterm infants at lower gestational ages were not eligible for inclusion, resulting in greater representation at higher gestational ages. Thus, random selection was abandoned to include all preterm infants who met inclusion and exclusion criteria.

Hospital A—with Hospital Policy to Transition Infants Supine (n = 96)

There were 96 charts that met inclusion/exclusion criterion for 2010 at Hospital A (two charts had missing data, and the day of transition was not able to be determined). Of these, most were white males with a mean birth weight of 2,318 g (SD ± 597.0) and a mean gestational age at birth of 34.3 weeks (SD ± 2.2). One hundred percent of the infants were transitioned at least 24 hours prior to discharge. The mean postmenstrual age when infants were transitioned to the supine position was 35.8 weeks (SD ± 1.0), whereas the mean postmenstrual age at discharge was 37.0 weeks (SD ± 1.2). The mean difference in number of days between when the infant was transitioned to the supine position and hospital discharge was 7.2 days (SD ± 6.4).

Hospital B—without Hospital Policy to Transition Infants Supine (n = 92)

There were 102 charts that met inclusion/exclusion criterion at Hospital B. There were 92 charts reviewed (ten were not available in medical records for review). Of these 92 charts, most were white males, and the mean birth weight was 2,124 g (SD ± 724.0). The mean gestational age at birth was 33.3 weeks (SD ± 2.1). Overall, 68 percent were transitioned at least 24 hours prior to hospital discharge. The mean postmenstrual age when infants were transitioned to the supine position was 36 weeks (SD ± 1.4), whereas the mean postmenstrual age at discharge was 36 weeks (SD ± 1.4). The mean difference in number of days between when the infant was transitioned to the supine position and hospital discharge was two days (SD ± 2).

Overall Sample Results

Most infants are being transitioned to the supine position at least 24 hours prior to discharge (76 percent). The mean number of days between when the infant was placed in the supine position and discharge was five days. The mean postmenstrual age when infants were transitioned to the supine position was 36.0 weeks, and the mean postmenstrual age at discharge was 36.8 weeks. The sample demographics were 64 percent white and 59 percent male with a mean birth weight of 2,223 g. Twenty-eight percent were born at 32 weeks or less.

DISCUSSION

Hospital A had a policy to transition stable preterm infants at 32 weeks gestation and achieved full compliance in transitioning to the supine position at least 24 hours prior to hospital discharge (vs 68 percent in Hospital B without a policy; see Table 1). Hospital A had on average five days longer duration of supine position prior to discharge as compared with
Hospital B. Hospital B had a mean gestational age at birth one week earlier than Hospital A, which was statistically significant. Both hospitals transitioned infants at approximately the same postmenstrual age, although, because discharge was a week later at Hospital A, they were in a sleeping supine position longer before discharge.

It may be speculated that the differences in practice are a result of hospital policy, infant acuity, and NICU nurses’ comfort with the practice of transitioning infants to the supine position, but the underlying cause of these clinical differences is unknown. Hospital policy directs practice, and it has been reported that a hospital policy on infant sleep position increased the likelihood of advisement of parents to place their infant supine for sleep \((OR = 4.3, CI [1.7–11.2]).\)

Policy is only one variable shaping clinical practice. Another variable is infant acuity; infants who are acutely ill benefit from the improvement in oxygenation and ventilation in the prone position. Infants who have a higher acuteness take longer to recover and, therefore, may take longer to transition to the supine position. Infants on oxygen have been found to require additional oxygen in the supine position.\(^\text{19}\) The culture of the unit and knowledge of the nursing staff also influence clinical practice.\(^\text{5,14}\) Nursing staff may not appreciate the importance of the supine position to reduce the risk of SIDS after discharge and may not see the transition to the supine position as an important part of preparation for discharge. Nurses may be concerned about development when transitioning infants to the supine position and delay the practice. Many variables are potentially involved in the clinical practice of transitioning the preterm infant to the supine position.

Despite the AAP recommendation that stable preterm infants be positioned primarily supine at 32 weeks postmenstrual age to become acclimated to this position prior to hospital discharge, none of the infants born at <32 weeks gestation were transitioned by 32 weeks postmenstrual age. Seventeen infants (18 percent) at Hospital A and 21 infants (23 percent) at Hospital B were born at fewer than 32 weeks gestation, and none were placed in the supine position by 32 weeks postmenstrual age.

Future research is needed to determine the ideal timing to transition preterm infants into the supine position. A survey study to determine nursing assessment for when an infant is ready to be transitioned to the supine position would reveal rationale for clinical practice. The development of a “readiness to transition” guideline may assist nurses in an objective means to assess the readiness of the preterm infant to transition to the supine position. In addition to postmenstrual age, data such as the amount of inspired oxygen and respiratory support required by the infant, the ability to wean the incubator temperature, and the ability to tolerate the supine position are a few of the measures that could be assessed. A standard and clear definition of a stable preterm infant could empower nurses to initiate change in practice and improve the duration of infants sleeping supine prior to hospital discharge.

In addition, a randomized controlled trial is needed to determine if transitioning infants at different postmenstrual ages has an effect on neurodevelopment; further research should determine if infants born at an earlier gestation (<27 weeks) should be transitioned at the same postmenstrual age as infants born at later gestations. It would also be clinically relevant to determine if infants transitioned to the supine position by 32 weeks postmenstrual age are more likely to remain in the supine position between two and four months of age when the risk of SIDS is highest.

LIMITATIONS
There are weaknesses in retrospective research study design including no methods to confirm documentation, no possibility to recover missing data and missing charts, as well as human error factors related to data abstraction. To provide intrarater reliability, the primary investigator reviewed a sample of charts (10 percent) a second time and no errors in data collection were found. Despite the weaknesses in a retrospective design, this is an efficient way to document the clinical practice of transitioning preterm infants to the supine position.

Limitations specific to this study include lack of data on nursing staff demographics and education for nurses about the supine sleeping position.

CONCLUSIONS
Supine transition while in the hospital provides infants time to adjust to the supine position prior to hospital discharge and provides parents the opportunity to observe the tolerance and safety of this position prior to hospital discharge. Thirty percent of infants continue to sleep in nonsupine positions after hospital discharge, which continues to contribute to SIDS.\(^\text{5}\) Researchers must continue to investigate ways to improve supine compliance in both clinicians and parents to reduce these untimely deaths. Caution should be used in clinical practice when defining when the stable preterm infant is ready to sleep in the supine position and assessing new evidence as it emerges to determine consistent clinical practice and evidence-based care. A period of supine positioning for preterm infants should be practiced prior to hospital discharge, and, until more definitive evidence is published, complying with the AAP clinical guideline to transition preterm infants to the supine position by 32 weeks postmenstrual age will allow an adequate transition to the supine position prior to hospital discharge, providing an adjustment period for both the infant and the parents.

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REFERENCES

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