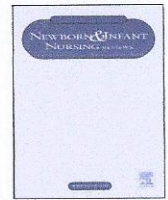




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A Protocol for Swaddled Bathing in the Neonatal Intensive Care Unit

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ABSTRACT

A review of the literature revealed a lack of consensus concerning the type of bath, water temperature, and the length of the bath. Because our neonatal intensive care unit had already transitioned to swaddle bathing, the aim of this Performance Improvement project was to determine preferred initial water temperature and the length of the bath in the neonatal intensive care unit. Results of the Performance Improvement project indicated that above 101°F, the higher the initial water temperature, the higher the baby's temperature during the bath. Therefore, it was determined that the initial bath water temperature should be between 100° and 101° F and the average length of bath should be 8 minutes. Results of the chart review indicated that by 5 minutes after the bath, the initial water temperature had no lasting effect on the baby and the baby self-regulated his/her own body temperature. There was no difference in baby temperature after bath with a warmed blanket.

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The neonatal intensive care unit (NICU) is markedly different from the environment of the womb. The NICU environment is characterized by excessive light, noise, painful procedures, interrupted sleep, and separation from mom, which has been associated with increased stress for the preterm infant. Stress can have detrimental effects on brain development and outcome.¹ Therefore, NICU procedures for the high-risk infant aim to reduce stressful exposures.

Developmental care provides a methodology that can reduce the stress that premature infants experience upon an early arrival to a world markedly different from the in utero environment. This care involves creating an environment for the infant that minimizes stress while providing a developmentally appropriate experience for the infant and family.² Developmental care recognizes the physical, psychological, and emotional vulnerabilities of premature and/or critically ill infants and focuses on minimizing potential complications associated with premature birth and/or hospitalization.³

Although painful and stressful procedures are common aspects of providing medical interventions in the NICU, daily care such as position changes, diaper changes, feeding, and bathing can be stressful to the neurologically immature infant and/or the infant who has medical complications. In the 2001 neonatal skin care guidelines from the Association of Women's Health, Obstetric and Neonatal Nurses/National Association of Neonatal Nurses,⁴ it was recommended that stable term and preterm infants receive immer-

sion baths once their umbilical lines were discontinued. This suggests that some form of bathing should be a part of regular developmental care. Routine bathing in the NICU has been defined in the literature as an extremely stressful form of stimulation for ill premature infants that elicits both adverse physiological and behavioral responses. This study also noted a decrease in heart rate and oxygen saturation of the preterm infant during the sponge bathing process.⁵ Bathing can be stressful because of extra energy expenditure from movement and changes in temperature.

Despite the stress it may invoke, bathing is important in the NICU to remove contaminants from the skin, in addition to being an activity that can promote parent-child interaction and attachment. Increased alertness and improved participation in breastfeeding or bottlefeeding have been documented immediately after a bath.⁶ Bathing can also promote increased confidence in handling the infant, increased confidence in parenting skills, attachment, enhanced interaction with the baby, and decreased parental stress because the baby is calm and quiet.⁶

Although bathing can present stress to the high-risk infant in the NICU, adaptations to the process of bathing can be made to reduce stress while providing the benefits that bathing affords. Swaddle bathing is bathing a baby while swaddled in a flexed midline position. The baby and the swaddle blanket are immersed together into a tub of water. The water should cover the baby and blanket up to the baby's shoulder. Each limb is then individually unwaddled, washed, rinsed, and reswaddled allowing the infant to remain in a fixed, midline position for the duration of the bath. By providing containment to the infant during the bathing process, stress can be decreased.

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Fig 1. Place baby in the tub, with the head toward the top of incline so water is just below the shoulders. Parents provide support to the baby on the mesh cover under the baby's shoulders/neck throughout the entire bath. Feet may be braced on the side of the tub for additional comfort of the baby.

There are numerous methods of swaddling and variations in the type and tightness of the wrapping to be used. Benefits of swaddled infants include a decrease in the baby's ability to transition from sighs to startles to full arousal when in the quiet sleep state and longer sleep cycles. Improved neuromuscular development, less physiological distress, improved motor organization, and improved self-regulatory abilities were found with babies who were swaddled when weighed. Swaddled babies were able to return to baseline heart rates and oxygen saturation measures post-heel sticks vs nonswaddled babies.⁶ Therefore, providing the benefits of swaddling during the process of bathing, which can be stressful, can be appreciated.

There is evidence that supports the use of swaddle bathing in the NICU. Compared with routine bathing, infants who were swaddle bathed demonstrated decreased physiological and motor stress, better energy conservation, improved state control, decreased crying and agitation, fewer stress signs, and less temperature instability.⁶ No adverse effects of swaddle bathing have been reported. Although benefits of swaddle bathing have been reported, adequate water temperature and duration of bath for the high-risk infant are important factors to consider.

The infant's thermal environment consists of factors such as ambient air temperature, air flow velocity, relative humidity, and temperature and composition of objects in direct contact with the infant. The goal in controlling a neonate's environment is to minimize energy expended by the neonate to maintain a "normal" temperature, thus eliminating thermal stress. The 2007 Association of Women's Health, Obstetric and Neonatal Nurses/National Association of Neonatal Nurses⁸ evidenced-based clinical practice guidelines for neonatal skin care recommend bath water temperature to be from 100°F to less than 104°F for the newborn infant. Studies that have looked at temperature loss during immersion bathing using an initial bathing temperature between 98.0°F and 100.4°F found that, on average, there was a temperature loss of 0.1°F to 1.1°F after 10 to 30 minutes.^{9,10} One study that started with a water temperature of 100.4°F found significant heat loss experienced by the newborns and that a return to normal thermal ranges took approximately an hour after an immersion bath.¹¹

Based on clinical observations and a review of literature, it is established that bathing an infant causes distress, as evidenced by the behavioral cues such as crying that an infant displays. A new method to bathe babies that minimizes the destabilizing effects of a traditional bath is needed. Swaddled bathing is an infant bathing method that has been shown to decrease heat loss via radiation, conduction, and evaporation and help contain the infant at the same time. Therefore, swaddle bathing can be a good alternative bathing strategy to reduce stress and allow for the benefits of bathing. The purpose of this study is to document a proposal for a specific swaddle bathing protocol.

We found the range of initial water temperature to be widely varied and recommend that more research is needed to ascertain the

ideal initial water temperature and length of bath. For our protocol, we suggest a water temperature of 100°F to 102°F, that the bath be limited to 8 minutes, and that frequent monitoring of temperature be undertaken during the swaddle bath.

Proposed Swaddle Bathing Procedure

Note that the infant should not be in the water for more than 8 minutes.

While parents are completing steps 1 to 4, fill wash basin with water temperature between 100°F and 101°F until it is almost full. Place wire frame with mesh covering that supports the infant into the tub (see Figs 1–3).

1. Take baby's axillary temperature.
2. Disconnect leads and pulse oximeter from monitor and leave nasogastric tube in place.
3. Remove all clothes, diaper, and pulse oximeter. (Leads may be removed during the bathing process.)
4. Wrap baby in a blanket with hands to face and arms and legs flexed.
5. Have parents clean the infant's face using a washcloth or gauze and no soap. Start with the eyes by gently wiping from nose to ears using a new washcloth or piece of gauze for each eye and then gently clean around entire face.
6. Place baby in the tub with the head toward the top of mesh incline, so water is just below the shoulders.
7. Parents should provide support to the baby on the incline under the baby's shoulders and neck throughout the entire bath.
8. Have parent place soap on his/her wrist.
9. Have parent gently unwrap one of the infant's arms and use soap to wash the baby's arm.
10. Rinse and reswaddle the arm.
11. Repeat step 9 and 10 for all extremities including the stomach, genital region, and back, one at a time. (When washing the stomach, remove leads with soap. Do not use soap on the head of the penis because it does sting.)
12. Reswaddle the baby and end bath with hair washing.
13. Gently rinse hair with irrigation bottle. When using the irrigation bottle, remember to have the flow of the water going toward the top of the head so water is not squirted into the baby's eyes. Shampoo hair and rinse again with irrigation bottle.
14. Once bath is complete, place a warm dry blanket up against the parent's chest.
15. Unswaddle the baby.
16. Remove the infant from the tub, and leave the wet swaddle blanket in the tub.



Fig 2. Unswaddle leg, wash with mild soap, rinse, and reswaddle—repeat for all extremities. (Do not use soap on the head of the penis because it does sting.)

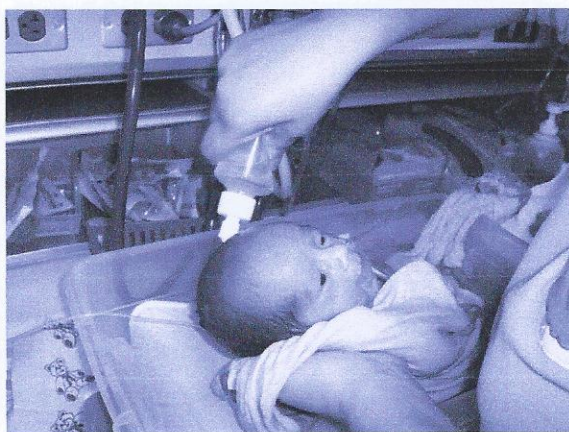


Fig 3. End bath with hair washing. When using the irrigation bottle, remember to have the flow of the water going toward the top of the head so you do not squirt water into the baby's eyes.

17. Place the baby on the parent's chest using the previously placed blanket for drying.
18. Dry baby and dress with a hat and clean diaper.
19. Place new leads and pulse oximeter on the baby and reattach to monitor.
20. Prepare for feeding or skin to skin care.

Summary

Maintaining the infant in a neutral thermal environment has been a hallmark of NICU care since the late 19th and early 20th centuries.

Following these guidelines allows NICU staff to create an environment conducive for growth and development of babies and their families.

As care providers in the NICU, it is important to recognize that even the most routine care has implications for the preterm and ill neonate. Providing care using developmental principles such as a swaddled bath and further refining those techniques may be a way to mitigate these complications.

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