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Safe Sleep and Skin-to-Skin Care in the Neonatal Period for Healthy Term Newborns

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Skin-to-skin care (SSC) and rooming-in have become common practice in the newborn period for healthy newborns with the implementation of maternity care practices that support breastfeeding as delineated in the World Health Organization's "Ten Steps to Successful Breastfeeding." SSC and rooming-in are supported by evidence that indicates that the implementation of these practices increases overall and exclusive breastfeeding, safer and healthier transitions, and improved maternal-infant bonding. In some cases, however, the practice of SSC and rooming-in may pose safety concerns, particularly with regard to sleep. There have been several recent case reports and case series of severe and sudden unexpected postnatal collapse in the neonatal period among otherwise healthy newborns and near fatal or fatal events related to sleep, suffocation, and falls from adult hospital beds. Although these are largely case reports, there are potential dangers of unobserved SSC immediately after birth and throughout the postpartum hospital period as well as with unobserved rooming-in for at-risk situations. Moreover, behaviors that are modeled in the hospital after birth, such as sleep position, are likely to influence sleeping practices after discharge. Hospitals and birthing centers have found it difficult to develop policies that will allow SSC and rooming-in to continue in a safe manner. This clinical report is intended for birthing centers and delivery hospitals caring for healthy newborns to assist in the establishment of appropriate SSC and safe sleep policies.

INTRODUCTION

Definition of Skin-to-Skin Care and Rooming-In

Skin-to-skin care (SSC) is defined as the practice of placing infants in direct contact with their mothers or other caregivers with the ventral skin of the infant facing and touching the ventral skin of the mother/

abstract

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caregiver (chest-to-chest). The infant is typically naked or dressed only in a diaper to maximize the surface-to-surface contact between mother/caregiver and the infant, and the dyad is covered with prewarmed blankets, leaving the infant's head exposed. SSC is recommended for all mothers and newborns, regardless of feeding or delivery method, immediately after birth (as soon as the mother is medically stable, awake, and able to respond to her newborn) and to continue for at least 1 hour, as defined by the World Health Organization's (WHO's) "Ten Steps to Successful Breastfeeding."[1,2] SSC is also a term used to describe continued holding of the infant in the manner described above and beyond the immediate delivery period and lasting throughout infancy, whenever the mother/caregiver and infant have the opportunity. For mothers planning to breastfeed, SSC immediately after delivery and continued throughout the postpartum period also involves encouraging mothers to recognize when their infants are ready to breastfeed and providing help if needed.[2] Additional recommendations by the WHO, as part of the Baby-Friendly Hospital Initiative and endorsed by the American Academy of Pediatrics (AAP) in 2009, include the following specifications for the period of time immediately after delivery: routine procedures such as assessments and Apgar scores are conducted while SSC is underway, and procedures that may be painful or require separation should be delayed until after the first hour; if breastfeeding, these procedures should occur after the first breastfeeding is completed.[3] The AAP further delineates that the administration of vitamin K and ophthalmic prophylaxis can be delayed for at least 1 hour and up to 4 hours after delivery. The Baby-Friendly Hospital Initiative encourages continued SSC throughout the hospital stay while rooming-in.[4]

Unless there is a medical reason for separation, such as resuscitation, SSC may be provided for all newborns. In the case of cesarean deliveries, SSC may also be provided when the mother is awake and able to respond to her infant. In some settings, SSC may be initiated in the operating room following cesarean deliveries, while in other settings SSC may begin in the recovery room. SSC for healthy newborns shall be distinguished from "kangaroo care" in this clinical report, because the latter applies to preterm newborns or infants cared for in the NICU.[5] This report is intended for mothers and infants who are well, are being cared for in the routine postpartum or mother-infant setting, and have not required resuscitation. Although sick or preterm newborns may benefit from SSC, this review is intended only for healthy term newborns. Late preterm infants (defined as a gestational age of 34–37 weeks) may also benefit from early SSC but are at increased risk of a number of early neonatal morbidities.[6]

Rooming-in is defined as allowing mothers and infants to remain together 24 hours per day while in the delivery hospital. This procedure is recommended for all mothers and their healthy newborns, regardless of feeding or delivery method, and in some cases applies to older late preterm (>35 weeks' gestation) or early term (37–39 weeks' gestation) newborns who are otherwise healthy and receiving routine care, who represent up to 70% of this population.[7] Mothers are expected to be more involved with routine care, such as feeding, holding, and bathing. Newborns may remain with their mothers unless there is a medical reason for separation for either the mother or the infant. Procedures that can be performed at the bedside can be performed while the infant is preferably being held skin-to-skin or at least in the room with the mother. Being held skin-to-skin by the mother has been shown to decrease pain in newborns undergoing painful procedures such as blood draws.[8,9] Mothers may nap, shower, or leave the room with the expectation that the mother-infant staff members monitor the newborn at routine intervals. Mothers are encouraged to use call bells for assistance with their own care or that of their newborns.

Evidence for SSC and Rooming-In

SSC has been researched extensively as a method to provide improved physiologic stability for newborns and potential benefits for mothers. SSC immediately after birth stabilizes the newborn body temperature and can help prevent hypothermia.[10,11] SSC also helps stabilize blood glucose concentrations, decreases crying, and provides cardiorespiratory stability, especially in late preterm newborns.[12] SSC has been shown in numerous studies as a method to decrease pain in newborns being held by mothers[13–16] and fathers.[17] In preterm infants, SSC has been shown to result in improved autonomic and neurobehavioral maturation and gastrointestinal adaptation, more restful sleep patterns, less crying, and better growth.[18–21] Although not specifically studied in full-term infants, it is likely that these infants also benefit in similar ways.

SSC also benefits mothers. Immediately after birth, SSC decreases maternal stress and improves paternal perception of stress in their relationship.[22] A recent study suggested that SSC and breastfeeding within 30 minutes of birth reduce postpartum hemorrhage.[23] Experimental models indicate that mother-infant separation causes significant stress, and the consequences of this stress on the hypothalamic-pituitary-adrenal axis persist.[24] In a randomized trial examining the relationship between SSC and

maternal depression and stress, both depression scores and salivary cortisol concentrations were lower over the first month among postpartum mothers providing SSC compared with mothers who were provided no guidance about SSC.[22] For breastfeeding mother-infant dyads, SSC enhances the opportunity for an early first breastfeeding, which, in turn, leads to more readiness to breastfeed, an organized breastfeeding suckling pattern, and more success in exclusive and overall breastfeeding,[12,25,26] even after cesarean deliveries.[27] Further evidence shows a benefit for mothers after cesarean deliveries who practice SSC as soon as the mother is alert and responsive in increased breastfeeding initiation, decreased time to the first breastfeeding, reduced formula supplementation, and increased bonding and maternal satisfaction.[28] Increasing rates of breastfeeding ultimately have short- and long-term health benefits, such as decreased risk of infections, obesity, cancer, and sudden infant death syndrome.[3]

The evidence for rooming-in also extends beyond infant feeding practices and is consistent with contemporary models of family-centered care.[29] Rooming-in and the maternity care practices aligned with keeping mothers and newborns together in a hospital setting were defined as best practice but not fully implemented in the post–World War II era, largely because of nursing culture and the presumption that newborns were safer in a sterile nursery environment.[30] Rooming-in leads to improved patient satisfaction.[31,32] Integrated mother-infant care leads to optimal outcomes for healthy mothers and infants, including those with neonatal abstinence syndrome.[33] Rooming-in also provides more security, may avoid newborn abductions or switches, leads to decreased infant abandonment,[34] and provides more opportunity for supervised maternal-newborn interactions.[35] Hospital staff members caring for mother-infant dyads have more opportunities to empower mothers to care for their infants than when infant care is conducted without the mother and in a separate nursery. For the breastfeeding mother-infant dyad, rooming-in may help to support cue-based feeding, leading to increased frequency of breastfeeding, especially in the first few days[36]; decreased hyperbilirubinemia; and increased likelihood of continued breastfeeding up to 6 months.[37]

SSC and rooming-in are 2 of the important steps in the WHO's "Ten Steps to Successful Breastfeeding" and serve as the basic tenets for a baby-friendly–designated delivery hospital.[1,38,39] The Ten Steps include practices that also improve patient safety and outcomes by supporting a more physiologic transition immediately after delivery; maintaining close contact between the mother and her newborn, which decreases the risk of infection and sepsis; increasing the opportunity for the development of a protective immunologic environment; decreasing stress responses by the mother and her infant; and enhancing sleep patterns in the mother.[40–42]

SAFETY CONCERNS REGARDING IMMEDIATE SSC

Rarely are there contraindications to providing SSC; however, there are potential safety concerns to address. A newborn requiring positive-pressure resuscitation should be continuously monitored, and SSC should be postponed until the infant is stabilized.[43] Furthermore, certain conditions, such as low Apgar scores (less than 7 at 5 minutes) or medical complications from birth, may require careful observation and monitoring of the newborn during SSC and in some cases may prevent SSC.[11] Other safety concerns are attributable to the lack of standardization in the approach, discontinuous observation of the mother-infant dyad (with lapses exceeding 10 to 15 minutes during the first few hours of life), lack of education and skills among staff supporting the dyad during transition while skin-to-skin, and unfamiliarity with the potential risks of unsafe positioning and methods of assessment that may avert problems.[44] The main concerns regarding immediate postnatal SSC include sudden unexpected postnatal collapse (SUPC), which includes any condition resulting in temporary or permanent cessation of breathing or cardiorespiratory failure.[45–48] Many, but not all, of these events are related to suffocation or entrapment. In addition, falls may occur during SSC, particularly if unobserved, and other situations or conditions may occur that prevent SSC from continuing safely.[44,49]

SUPC is a rare but potentially fatal event in otherwise healthy-appearing term newborns. The definition of SUPC varies slightly depending on the author and population studied. One definition offered by the British Association of Perinatal Medicine[50] includes any term or near-term (defined as >35 weeks' gestation in this review) infant who meets the following criteria: (1) is well at birth (normal 5-minute Apgar and deemed well enough for routine care), (2) collapses unexpectedly in a state of cardiorespiratory extremis such that resuscitation with intermittent positive-pressure ventilation is required, (3) collapses within the first 7 days of life, and (4) either dies, goes on to require intensive care, or develops encephalopathy. Other potential medical conditions should be excluded (eg, sepsis, cardiac disease) for SUPC to be diagnosed. The incidence of SUPC in the first hours to days of life varies widely because of different definitions, inclusion and exclusion criteria of

newborns being described, and lack of standardized reporting and may be higher in certain settings. The incidence is estimated to be 2.6 to 133 cases per 100 000 newborns. In 1 case series, the authors described one-third of SUPC events occurring in the first 2 hours of life, one-third occurring between 2 and 24 hours of life, and the final third occurring between 1 and 7 days of life.[51] Other authors suggested that 73% of SUPC events occur in the first 2 hours of life.[52] In the case series by Pejovic and Herlenius,[51] 15 of the 26 cases of SUPC were found to have occurred during SSC in a prone position. Eighteen were in primiparous mothers, 13 occurred during unsupervised breastfeeding at <2 hours of age, and 3 occurred during smart cellular phone use by the mother. Five developed grade 2 hypoxic-ischemic encephalopathy (moderate encephalopathy), with 4 requiring hypothermia treatment. Twenty-five of the 26 cases had favorable neurologic outcomes in 1 series; however, in another review, mortality was as high as 50%, and among survivors, 50% had neurologic sequelae.[53] Experimental models suggest that autoresuscitation of breathing after hypoxic challenge takes longer with lower postnatal age and decreased core body temperature.[54]

SUPC, in some definitions, includes acute life-threatening episodes; however, the latter is presumed to be more benign. An apparent life-threatening episode, or what may be referred to as a brief resolved unexplained event, may be low risk and require simple interventions such as positional changes, brief stimulation, or procedures to resolve airway obstruction.[46,53]

Falls are another concern in the immediate postnatal period. Mothers who are awake and able to respond to their newborn infant immediately after birth may become suddenly and unexpectedly sleepy, ill, or unable to continue holding their infant. Fathers or other support people providing SSC may also suddenly become unable to continue to safely hold the newborn because of lightheadedness, fatigue, incoordination, or other factors. If a hospital staff member is not immediately available to take over, unsafe situations may occur, and newborns may fall to the floor or may be positioned in a manner that obstructs their airway.

SUGGESTIONS TO IMPROVE SAFETY IMMEDIATELY AFTER DELIVERY

Several authors have suggested mechanisms for standardizing the procedure of immediate postnatal SSC to prevent sentinel events; however, none of the checklists or procedures developed have been proven to reduce the risk. Frequent and repetitive assessments, including observation of newborn breathing, activity, color, tone, and position, may avert positions that obstruct breathing or events leading to sudden collapse.[41] In addition, continuous monitoring by trained staff members and the use of checklists may improve safety.[35] Some have suggested continuous pulse oximetry; however, there is no evidence that this practice would improve safety, and it may be impractical. Given the occurrence of events in the first few hours of life, it is prudent to consider staffing the delivery unit to permit continuous staff observation with frequent recording of neonatal vital signs. A procedure manual that is implemented in a standardized fashion and practiced with simulation drills may include sequential steps identified in Box 1.[55]

BOX 1: PROCEDURE FOR IMMEDIATE SKIN-TO-SKIN CARE

1. Delivery of newborn
2. Dry and stimulate for first breath/cry, and assess newborn
3. If the newborn is stable, place skin to skin with cord attached (with option to milk cord), clamp cord after 1 minute or after placenta delivered, and reassess newborn to permit physiological circulatory transition[56]
4. Continue to dry entire newborn except hands to allow the infant to suckle hands bathed in amniotic fluid (which smells and tastes similar to colostrum), which facilitates rooting and first breastfeeding[57]
5. Cover head with cap (optional) and place prewarmed blankets to cover body of newborn on mother's chest, leaving face exposed[58]
6. Assess Apgar scores at 1 and 5 minutes
7. Replace wet blankets and cap with dry warm blankets and cap
8. Assist and support to breastfeed

Risk stratification and associated monitoring and care may avert SUPC, falls, and suffocation.[59] High-risk situations may include infants who required resuscitation (ie, any positive-pressure ventilation), those with low Apgar scores, late preterm and early term (37–39 weeks' gestation) infants, difficult delivery, mother receiving codeine[60] or other medications that may affect the newborn (eg, general anesthesia or magnesium sulfate), sedated mother, and excessively sleepy mothers and/or newborns. Mothers may be assessed to determine their level of fatigue and sleep deprivation.[61] In situations such as those described, increased staff vigilance with continuous monitoring, as described previously, is important to assist with SSC throughout the immediate postpartum period.[62] Additional suggestions to improve safety include enhancements to the environment, such as stabilizing the ambient temperature,[63] use

of appropriate lighting so that the infant's color and condition can be easily assessed, and facilitating an unobstructed view of the newborn (Box 2). Additional support persons, such as doulas and family members, may augment but not replace staff monitoring. Furthermore, staff education, appropriate staffing, and awareness of genetic risks may limit sentinel events such as SUPC. These suggestions, however, have not yet been tested in prospective studies to determine efficacy.

BOX 2. COMPONENTS OF SAFE POSITIONING FOR THE NEWBORN WHILE SKIN-TO-SKIN[62]:

1. Infant's face can be seen
2. Infant's head is in "sniffing" position
3. Infant's nose and mouth are not covered
4. Infant's head is turned to one side
5. Infant's neck is straight, not bent
6. Infant's shoulders and chest face mother
7. Infant's legs are flexed
8. Infant's back is covered with blankets
9. Mother-infant dyad is monitored continuously by staff in the delivery environment and regularly on the postpartum unit
10. When mother wants to sleep, infant is placed in bassinet or with another support person who is awake and alert

SSC may be continued while moving a mother from a delivery surface (either in a delivery room or operating room) to the postpartum maternal bed. Transitions of mother-infant dyads throughout this period, and from delivery settings to postpartum settings,

FIGURE 1
Side-car bassinet for in-hospital use. Photo courtesy of Kristin Tully, PhD.

facilitate continued bonding, thermoregulation, and increased opportunities for breastfeeding. These transitions may be accomplished safely with skilled staff members by using a standardized procedure.[64] A newborn who is not properly secured may pose a risk for falls or unsafe positioning, leading to suffocation.

SAFETY CONCERNS REGARDING ROOMING-IN

Despite all of the advantages of rooming-in, there are specific conditions that pose risks for the newborn. Many of the same concerns that occur during SSC in the immediate postnatal period continue to be of concern while rooming-in, especially if the mother and infant are sleeping together in the mother's bed on the postpartum unit.[65] In addition, breastfeeding mothers may fall asleep unintentionally while breastfeeding in bed, which can result in suffocation.[66] Infant falls may be more common in the postpartum setting because of less frequent monitoring and increased time that a potentially fatigued mother is alone with her newborn(s).[67] The Oregon Patient Safety Review evaluated 7 hospitals that were part of 1 larger health system and identified 9 cases of newborn falls (from 22 866 births), for a rate of 3.94 falls per 10 000 births over a 2-year period from 2006 to 2007, which is higher than previous reports of 1.6 per 100 000.[68–70] It is not clear whether this higher incidence was attributable to an actual increase or better reporting. For hospitals transitioning to mother-infant dyad care (1 nurse providing care for both mother and infant) or separate mother-newborn care while rooming-in, it is important to communicate to staff that the same level of attention and care is necessary to provide optimal safety. Mothers will be naturally exhausted and potentially sleep-deprived or may sleep in short bursts.[61] They may also be unable to adjust their position or ambulate safely while carrying a newborn. The postpartum period provides unique challenges regarding falls/drops and is understudied compared with

falls in the neurologically impaired or elderly patient. Checklists and scoring tools may be appropriate and have the potential to decrease these adverse events, particularly if geared to the unique needs of the postpartum period, such as short-term disability from numbness or pain, sleepiness or lethargy related to pregnancy and delivery, and effects from medication.[71]

Even though mothers and family members may be educated about the avoidance of bed-sharing, falling asleep while breastfeeding or holding the newborn during SSC is common. Staff can educate support persons and/or be immediately available to safely place newborns on a close but separate sleep surface when mothers fall asleep. Mothers may be reassured that they or their support persons can safely provide SSC and that staff will be available to assist with the transition to a safe sleep surface as needed. Mothers who have had cesarean deliveries are particularly at risk because of limited mobility and effects of anesthesia and warrant closer monitoring.[72]

Several studies examining safety while rooming-in have been conducted. Sixty-four mother-infant dyads were studied in the United Kingdom and randomly assigned to have newborns sleep in a stand-alone bassinet, a side-car bassinet (Fig 1), or the mother's bed to determine perception of safety (by video monitoring) and breastfeeding outcomes.[73] Breastfeeding was more frequent among those sharing a bed and using a side-car than a separate bassinet, but there were more hazards associated with bed-sharing than using a side-car or bassinet. Although there were no adverse events in this study, the authors concluded that the side-car provided the best opportunities for breastfeeding with the safest conditions. In a similar study examining dyads after cesarean delivery, more hazards were associated with stand-alone bassinets than side-car bassinets. However, side-car technology for hospital beds is not yet well established in the United States, and safety data are not yet available. Given the level of disability in mothers who have had a cesarean delivery, side-car technology holds promise for improvement in the safety of the rooming-in environment.[74]

SUGGESTIONS TO IMPROVE SAFETY WHILE ROOMING-IN

Healthy mother-infant dyads are safest when kept together and cared for as a unit in a mother-infant setting. Staffing ratios are determined to meet the needs of both the mother and her newborn(s) and to ensure the best possible outcomes. The Association of Women's Health, Obstetric and Neonatal Nurses' recommendations are to have no more than 3 dyads assigned to 1 nurse to avoid situations in which nursing staff are not immediately available and able to regularly monitor the mother-infant dyads throughout the postpartum period.[75] These ratios may permit routine monitoring, rapid response to call bells, and adequate time for teaching; however, nursing staff extenders, such as health educators and nursing assistants, may augment care. Mothers and families who are informed of the risks of bed-sharing and guided to place newborns on separate sleep surfaces for sleep are more likely to follow these recommendations while in the hospital and after going home. Family members and staff can be available to assist mothers with transitioning the newborn to a safe sleep location, and regular staff supervision facilitates the recognition of sleepy family members and safer placement of the newborns in bassinets or side-cars.

SUGGESTIONS FOR ROOMING-IN

1. Use a patient safety contract with a particular focus on high-risk situations (see parent handout Newborn Safety Information for Parents[68] and sample contract[71]).
2. Monitor mothers according to their risk assessment: for example, observing every 30 minutes during nighttime and early morning hours for higher-risk dyads.[69]
3. Use fall risk assessment tools.[76]
4. Implement maternal egress testing (a modification of a tool originally designed to transfer obese patients from bed to stand, chair, or ambulation by using repetition to verify stability), especially if the mother is using medications that may affect stability in ambulating.[69]
5. Review mother-infant equipment to ensure proper function and demonstrate the appropriate use of equipment, such as bed rails and call bells, with mothers and families.
6. Publicize information about how to prevent newborn falls throughout the hospital system.
7. Use risk assessment tools to avoid hazards of SSC and rooming-in practices.[77]

TRANSITIONING TO HOME AND SAFE SLEEP BEYOND DISCHARGE

Information provided to parents at the time of hospital discharge should include anticipatory guidance about breastfeeding and sleep safety.[3,78,79] Pediatricians, hospitals, and other clinical staff should abide by AAP recommendations/guidance on breastfeeding and safe sleep, pacifier introduction, maternal smoking, use of alcohol, sleep positioning, bed-sharing, and appropriate sleep surfaces, especially when practicing SSC.[79] In addition, the AAP recommends the avoidance of

practices that increase the risk of sudden and unexpected infant death, such as smoking, the use of alcohol, placing the infant in a nonsupine position for sleep, nonexclusive breastfeeding, and placing the infant to sleep (with or without another person) on sofas or chairs.[79,80] To facilitate continued exclusive breastfeeding, the coordination of postdischarge support is recommended to enable the best opportunity to meet breastfeeding goals. Mothers may be referred to peer support groups and trained lactation specialists if breastfeeding problems occur. Community support is optimized by coordination with the medical home.[81]

CONCLUSIONS

Pediatricians and other providers have important roles in the implementation of safe SSC and rooming-in practices. Safe implementation with the use of a standardized approach may prevent adverse events such as SUPC and falls.

The following suggestions support safe implementation of these practices:

1. Develop standardized methods and procedures of providing immediate and continued SSC with attention to continuous monitoring and assessment.
2. Standardize the sequence of events immediately after delivery to promote safe transition, thermoregulation, uninterrupted SSC, and direct observation of the first breastfeeding session.
3. Document maternal and newborn assessments and any changes in conditions.
4. Provide direct observation of the mother-infant dyad while in the delivery room setting.
5. Position the newborn in a manner that provides an unobstructed airway.
6. Conduct frequent assessments and monitoring of the mother-infant dyad during postpartum rooming-in settings, with particular attention to high-risk situations such as nighttime and early morning hours.
7. Assess the level of maternal fatigue periodically. If the mother is tired or sleepy, move the infant to a separate sleep surface (eg, side-car or bassinet) next to the mother's bed.
8. Avoid bed-sharing in the immediate postpartum period by assisting mothers to use a separate sleep surface for the infant.
9. Promote supine sleep for all infants. SSC may involve the prone or side position of the newborn, especially if the dyad is recumbent; therefore, it is imperative that the mother/caregiver who is providing SSC be awake and alert.
10. Train all health care personnel in standardized methods of providing immediate SSC after delivery, transitioning the mother-infant dyad, and monitoring the dyad during SSC and rooming-in throughout the delivery hospital period.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
SIDS: sudden infant death syndrome
SSC: skin-to-skin care
SUPC: sudden unexpected postnatal collapse
WHO: World Health Organization

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