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RESEARCH

Skin-to-Skin Care After Birth for Moderately Preterm Infants

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ABSTRACT

Objective: To investigate the feasibility and safety of skin-to-skin care after birth for moderately preterm infants.

Design: Prospective cohort study.

Setting: The study was conducted at the maternity wards and NICUs of three study sites in Norway.

Participants: Ninety preterm infants born vaginally with gestational ages of 32 weeks/0 days to 34 weeks/6 days.

Methods: Comparison of groups of preterm infants who received skin-to-skin care or conventional treatment in incubators after birth.

Results: Median gestational age and birth weight were similar in the two groups: 33 weeks/5 days versus 34 weeks/3 days ($p = .464$) and 2,100 versus 2,010 g ($p = .519$). There were no differences in the first body temperature ($p = .841$) and blood glucose level ($p = .539$) between the groups.

Conclusion: Early skin-to-skin contact in the delivery room for moderately preterm infants may be feasible and safe.

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The adaptation from intrauterine to extrauterine life involves a variety of complex physiologic changes, among which are the change of circulation and oxygenation via placenta to spontaneous air breathing and the autonomous control of thermoregulation and metabolism (Hillman, Kallapur, & Jobe, 2012). Thermal homeostasis is essential to survival, and one researcher found that hypothermia is an independent factor for mortality in preterm infants (Fawcett, 2014). The body temperature of premature newborns drops precipitously after birth because of their disproportionate body mass to surface ratio, exposed body posture, decreased amounts of subcutaneous fat, poor vasomotor control, and thin skin with increased permeability. The thermogenic process requires oxygen and glucose; thus, cold stress can lead to increased oxygen demands, respiratory problems, and hypoglycemia (Fawcett, 2014).

To date, standard care to prevent hypothermia after birth includes a warm delivery room, drying the neonate immediately after birth, wrapping the whole body and head in prewarmed blankets, removing wet blankets, and prewarming contact surfaces (McCall, Alderdice, Halliday, Jenkins, & Vohra, 2010). Skin-to-skin care (SSC) has been shown to reduce hypothermia in full-term newborns (Bystrova et al., 2003; Christensson et al., 1992; Marin Gabriel et al., 2010; Nimbalkar et al., 2014; Srivastava, Gupta, Bhatnagar, & Dutta, 2014), and in a recent guideline, the World Health Organization strongly recommended SSC from birth for preterm infants who weigh less than 2,000 g to prevent hypothermia (World Health Organization, 2015). In addition to thermopreservation, researchers have indicated that early SSC improves cardiorespiratory stability (Moore, Anderson, Bergman, & Dowswell, 2012), influences the newborn's state organization according to sleep and motor activity (Ferber & Makhoul, 2004), facilitates early attachment (Bystrova et al., 2009; Klaus et al., 1972; Tessier et al., 1998), and promotes breastfeeding (Baylis et al., 2014; Moore et al., 2012; Srivastava et al., 2014). Skin-to-skin contact is also associated with better glycogen preservation (Moore et al., 2012). Efforts are increasingly being made to facilitate early SSC after cesarean birth (Brady, Bulpitt, & Chiarelli, 2014).

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For preterm infants, conventional treatment after birth includes immediate transfer to a NICU, which requires separation of mother and newborn.

Studies that address early SSC and its effects on preterm infants in the delivery room are scarce (Baylis et al., 2014; Niela-Vilen et al., 2013). However, one group of researchers showed beneficial effects on heart and respiratory rates, oxygen saturation, and body temperature in low-risk preterm infants who had SSC immediately after birth (Ludington-Hoe et al., 1993). Later, Bergman et al. (2004) reported better thermoregulation and cardiorespiratory stability in preterm infants with SSC compared with those cared for in an incubator. These results were recently confirmed in a study from Vietnam with a larger number of participants (Chi Luong, Long Nguyen, Huynh Thi, Carrara, & Bergman, 2015). In this study, the rate of hypoglycemia was significantly lower in the SSC group. In another contemporary study, Morelius, Ortenstrand, Theodorsson, and Frostell (2015) described the benefits of SSC on breastfeeding and stress levels after birth. They found significantly lower cortisol reactivity in response to handling in preterm infants who received almost continuous SSC from birth, compared with those who received standard care. Although newborns in the standard care group were separated from the mother after birth, they had on average 7 hours of SSC per day during the NICU stay. More newborns in the SSC group were breastfed at discharge (Morelius et al., 2015).

The purpose of our study was to determine if early SSC in the delivery room after the vaginal births of moderately preterm infants was safe and feasible with extant personnel resources. Safety was evaluated by body temperature warmer than 36.5°C measured within 30 minutes after birth, and a first blood glucose level of greater than 2.0 mmol/L measured before the newborn's second meal, 150 to 180 minutes after the first meal.

Methods

Design

We used a prospective cohort study design including three different hospitals in Norway. In one of the hospitals, mothers practiced SSC for 2 hours immediately after birth of their preterm infants; the two other hospitals transferred preterm infants to a NICU immediately after birth. Singletons and twins were allocated to the care that was standard procedure for the hospital to which they belonged. Before the study, we compared postnatal treatment between the three hospitals, and the hospitals were considered comparable.

Settings and Sample

The study was conducted between April 2010 and May 2013. St. Olavs University Hospital, which represented the skin-to-skin group (SSG), is situated in the third largest city in central Norway and has about 4,000 births annually. Preterm infants from Vestfold Hospital Trust (SiV) and University Hospital of North Norway (UNN) were considered suitable as control groups in the present study. Vestfold Hospital Trust is located in a small town in southern Norway and has 2,000 births per year. University Hospital of North Norway has approximately 1,400 births annually. The two latter hospitals represented the incubator group (IG). All study sites had guidelines stating that all newborns born younger than 35 weeks of gestation were to be admitted to the NICU.

We included single and twin preterm infants born vaginally at 32 weeks/0 days to 34 weeks/6 days gestation in stable medical condition. Gestational age (GA) was estimated by routine ultrasonography at about 18 weeks of pregnancy. Newborns with major congenital malformations were excluded. All participating hospitals offered their standard treatment during the study period, that is, SSC at St. Olavs Hospital and immediate transfer to NICU in an incubator at UNN and SiV. The parents received oral and written information about the study from a physician or a neonatal nurse before the birth or within 24 hours after birth and were asked to consent to the collection of data from the medical record. A data collection form, developed by the research group, was completed at all three hospitals. The data collection form included information obtained from admission through discharge and contained information about temperature, blood glucose, and nutrition the first day, in addition to information about weight and age at discharge. If the parents declined their newborn's participation in the study, the data collection form was destroyed.

Sample Size

Hypothermia was defined as body temperature less than 36.5°C. The sample size calculation was based on a pilot study in which the incidence of hypothermia was 31.8% in newborns of 32 weeks/0 days to 34 weeks/6 days GA who were born vaginally (Kristoffersen, 2011). With a sample size of 65 in the SSG and 65 in the IG, a difference in

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