Pediatrics and Neonatology (2014) 55, 262–268

Available online at www.sciencedirect.com

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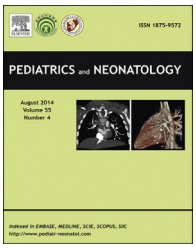

ORIGINAL ARTICLE

Cobedding of Twin Premature Infants: Calming Effects on Pain Responses

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Received Jun 5, 2013; received in revised form Nov 14, 2013; accepted Nov 26, 2013
Available online 30 March 2014

Key Words
heel lance;
pain;
preterm infant

Background: The purpose of this trial was to determine whether cobedding of preterm twins has analgesic effects during heel lancing or not.
Methods: One hundred premature twins (50 sets) born between 26 weeks' and 34 weeks' gestation undergoing heel blood sampling were randomly assigned into two groups: the cobedding group (receiving care in the same incubator) and the standard care group (receiving care in separate incubators). Pain was assessed using the premature infant pain profile score. Duration of crying was measured after heel blood sampling, and salivary cortisol was measured prior to and after heel blood sampling.
Results: Infants in the standard care group cried for a longer time during heel lancing than those in the cobedding group (42.6 ± 19.8 seconds vs. 36.4 ± 21.7 seconds, $p = 0.03$). The mean premature infant pain profile score after heel lancing was significantly higher in the standard care group (9.8 ± 2.6 vs. 8.06 ± 2.8, $p = 0.002$). The mean salivary cortisol after heel lancing was also significantly higher in the standard care group (24.3 ± 7.4 nmol/L vs. 20.8 ± 7.4 nmol/L, $p = 0.02$). No significant adverse effects were seen with cobedding.
Conclusion: Cobedding is a comforting measure for twin premature infants during heel lancing, which can be performed without any significant adverse effects.

1. Introduction

Over the past 10–15 years, the rate of multiple births has risen in many countries.[1] Because multiple births are at high risk of resulting in preterm birth and low birth weight, their increasing incidence has led to a rising number of premature infants being admitted to neonatal intensive care units (NICUs).[2–4]

Technological and therapeutic advances in perinatal care have resulted in an increased survival rate in premature infants. These premature infants are subjected to a variety of invasive painful procedures as part of their management. Although pain management for routine

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http://dx.doi.org/10.1016/j.pedneo.2013.11.008

procedural pain has improved in recent years, almost 40% of infants undergoing heel prick for blood collection have not received any form of intervention for pain reduction.[5]

Several lines of evidence suggest that early and repeated exposure to painful stimuli during the development of nervous system leads to persistent behavioral changes, alteration in pain processing, and development.[6–8]

Therefore, it is essential to prevent or treat pain in newborn infants. There are pharmacological and nonpharmacological methods for pain management in newborn infants. Nonpharmacological pain intervention is a prophylactic and complementary approach to reduction of pain. A number of nonpharmacological methods have been shown to be useful in the management of mild-to-moderate pain in newborn infants. These methods include nonnutritive sucking, breastfeeding, swaddling, facilitated tucking, kangaroo care, music therapy, and sensory saturation including the senses of touch (massaging), sound, smell, and vision.[9] Some methods such as premature infant pain profile (PIPP) score are used for assessing pain in premature infants.[10] Recently, Nishitani and colleagues[11] showed that salivary cortisol could be a useful index of biochemical responses to pain in infants. Application of salivary cortisol in addition to the PIPP score appears to assess pain more accurately in premature neonates. By contrast, during fetal life, twins share a small, dark, enclosed space in which their bodies touch and are very close to each other.[12] After birth, they are routinely separated and placed in separate incubators, which may lead to separation stress.[13] Cobedding twins is the practice of placing siblings in the same crib or incubator. Cobedding is believed to enhance twin coregulation, improve physiological stability, decrease oxygen requirement, improve growth and development, and decrease the length of hospitalization and number of readmissions.[14–16] In addition, cobedding provides tactile, olfactory, and auditory stimulation and may decrease pain response in premature infants.[17,18] Therefore, it is proposed that the presence of a twin who has shared the same uterine environment may have comforting effects on a preterm infant especially during the neonatal care. Recently Campbell-Yeo and colleagues[17] evaluated the pain reducing effects of cobedding and found that cobedding could not decrease pain score in twin premature newborns. However, they used sucrose and a pacifier prior to heel lancing, which might have obscured the analgesic effects of cobedding. In addition, they did not evaluate the biochemical responses to pain. The purpose of this study was to assess the effects of cobedding alone on pain reactivity in premature twin newborns.

2. Materials and Methods

This open randomized controlled trial was performed between May 2012 and December 2012 at the NICU of Shahid Beheshti University Hospital, affiliated to Isfahan University of Medical Sciences, Isfahan, Iran.

Newborns with gestational ages of 26–34 weeks and postnatal ages of less than 20 days who underwent heel blood sampling for blood glucose determination were included in the trial. Infants who had received sedatives or analgesics within 48 hours of heel lancing, or those who had major congenital malformations, an Apgar scores of less than 6 at 5 minutes after birth, severe respiratory distress requiring mechanical ventilation, or severe intraventricular hemorrhage were excluded from the study. The Ethics Committee of Isfahan University of Medical Sciences approved the study, and written consent was obtained from the parents of all participants.

Randomization was performed using a computer-generated random number algorithm. Allocation of eligible newborns to intervention and control groups was performed using a sealed opaque envelope. Participants were randomly allocated to either the cobedding group or the standard care group. Infants in the standard care group remained in separate incubators following the current NICU standards. Newborns in the cobedding group were placed side by side in an incubator without any clothing except for diapers so that they could touch each other freely, with each side of the incubator pertaining to one twin. Infants were cobedded from 24 hours prior to heel sticks to the end of the study, and heel lancing was performed between 8 AM and 10 AM.

The incubator temperature was adjusted according to the weight, gestational age, and postnatal age of newborns. Each infant's axillary temperature was closely monitored and maintained between 36.8°C and 37.2°C for both groups.

Blood sampling was performed in a standardized manner by expert technicians who could not be blinded to the study. The same technician held up each baby's heel, pricked it to collect the blood sample, and applied an adhesive bandage to the heel immediately afterward. Data were collected just once for each infant. The reason for blood sampling was diagnostic or routine screening for hypoglycemia. Oxygen saturation and heart rate were recorded on a Masimo pulse oximeter (Masimo Corporation, Irvine, CA, USA) during the study. Salivary cortisol was collected 1 minute prior to heel lancing and 20 minutes after the heel lancing with a 2 mL syringe. Samples were washed in the laboratory with WASHER ELISA instrument (SEAC Company, Calenzano, Italy), and then they were measured by ELISA (Human ELISA kits, Diametra, Foligno, Italy).

Prior to starting the study, researchers were trained to assess the PIPP. The researchers could not be blinded for the assigned groups. The PIPP score is a pain assessment tool that has been validated for procedural pain in premature and term infants.[10] Pain assessment using the PIPP score is based on several criteria, including gestational age, behavioral state, heart rate, oxygen saturation, and three facial scores. Scores range from 0 to 21, with a higher score indicating more pain (Appendix 1).

From 1 minute prior to the start of the procedure to 2 minutes after its completion, physiological and facial changes were video recorded. On the basis of these recordings, newborns were evaluated for the PIPP score during 30 seconds after heel lancing by trained researchers.

The primary outcome of the study was to evaluate the pain caused by the heel stick in preterm infants using the PIPP score and the secondary outcome was to evaluate cortisol secretion in response to pain. The PIPP score was calculated based on the recordings by three researchers. The inter-rater reliability was 0.9.