JOGNN

RESEARCH

Effect of Nonpharmacologic Pain Control During Examination for Retinopathy of Prematurity

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Keywords
breast milk
pain
retinopathy of prematurity
sucrose
swaddling

ABSTRACT

Objectives: To examine the effects of infant swaddling with oral administration of sucrose, swaddling with oral administration of breast milk, and swaddling with oral administration of distilled water (control) on pain perception in premature infants during a screening examination for retinopathy of prematurity (ROP).

Design: A prospective, randomized controlled design was used.

Setting: The research was conducted in the NICU of a Level III university hospital in Istanbul.

Participants: Data were obtained from 87 premature infants (54% female) who were less than 32 weeks gestation and 1500 g body weight.

Methods: The nonpharmacologic methods of swaddling with orally administered 0.2 ml of 24% sucrose, swaddling with orally administered breast milk, and swaddling with orally administered distilled water were implemented immediately before the ROP examination. The Premature Infant Pain Profile was used to evaluate pain. Means, standard deviations, and repeated-measures analysis of variance and one-way analysis of variance tests were used to evaluate pain score data.

Results: For 72.4% of the infants, the experimental session was the first time they were examined for ROP. No significant differences in Premature Infant Pain Profile scores were found across the three groups.

Conclusion: Infant swaddlings with oral administration of sucrose or breast milk were no more effective than swaddling with oral administration of distilled water to reduce pain in premature infants during ROP examinations.

JOGNN, ■, ■–■; 2017. http://dx.doi.org/10.1016/j.jogn.2017.06.008

Accepted June 2017

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The authors report no conflict of interest or relevant financial relationships.

Premature infants are exposed to numerous painful, invasive procedures and examinations. Such procedures and examinations include blood draw; venous catheter, Foley catheter, or nasogastric tube insertion; arterial catheter aspiration; chest tube insertion; and the retinopathy of prematurity (ROP) examination (Anand & Pa, 2001). Parent–infant interactions, infant feeding patterns, and infants' growth, development, and adaptation to the outside world can be adversely affected by the pain that they experience (Efe & Savaser, 2007; Reyes, 2003). Because newborns are unable to verbally express the pain that they feel, physiologic variables, behaviors, and stress hormones are observed to identify their experiences of pain (Derebent & Yiğit, 2006). The presence and degree of pain and responses to treatments are evaluated through interpretation of the changes in the physiologic variables, behavior, and stress hormones (Cignacco et al., 2007).

Although the etiology and pathology of ROP are not exactly known, ROP is one of the major causes of preventable blindness in childhood. An ROP examination is a painful procedure. There is no routine protocol to serve as a guideline in alleviating pain aside from the administration of local anesthetic drops before the examination. To relieve the pain experienced Q3 during the ROP examination, nurses apply nonpharmacologic methods (Boyle et al., 2006; da Costa et al., 2013; Grabska et al., 2005; Mitchell et al., 2004; O'Sullivan, O'Connor, Brosnahan, McCreery, & Dempsey, 2010; Olsson & Eriksson, 2011). Nonpharmacologic methods are preferred primarily because they are easy to apply and relatively harmless. However, because these methods are insufficient to manage severe pain, they should be used in combination with pharmacologic treatments (Derebent & Yiğit, 2008).

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More research is needed on pharmacologic and nonpharmacologic strategies to minimize pain in neonates during routine retinopathy of prematurity examinations and other procedures.

Although a number of nonpharmacologic methods have been tested in various studies conducted abroad, to date, no research dealing with the subject of pain relief in ROP examinations has been published in Turkey. The most commonly used pain management strategies in these studies have been the oral administration of sucrose (Boyle et al., 2006; Grabska et al., 2005; Mitchell et al., 2004; Olsson & Eriksson, 2011) or glucose (da Costa et al., 2013) or the use of a dry or sweetened pacifier (Boyle et al., 2006; O'Sullivan et al., 2010). No studies were found in which the researchers examined the combined effect of swaddling with breast milk administration on ROP examination-related pain (Kleberg et al., 2008). Findings from further research on this subject, with particular focus on the roles of nurses responsible for the care of premature infants, may be used to support the growth and development of these infants and contribute to the body of evidence on pain relief in this population.

The present study was planned to evaluate the effectiveness of nonpharmacologic applications on the management of pain originating during ROP examinations. The nonpharmacologic applications used in the study included a swaddling–sucrose administration combination, a swaddling–breast milk administration combination, and a control of swaddling–distilled water administration. We hypothesized that the use of orally administered sucrose with swaddling (H1) and the use of breast milk with swaddling (H2), together with the routine and concurrent administration of local anesthetic drops for pain control in preterm infants during ROP examinations, would be more effective to reduce pain compared with the use of distilled water administration combined with swaddling.

Methods

Design and Setting

We conducted a three-group, randomized controlled trial to compare the effectiveness of nonpharmacologic applications for the treatment of pain during ROP examinations. This research was conducted during the period of June through September 2013 in a 32-bed NICU of a Level III university hospital in Istanbul, Turkey. The unit is staffed so that nurses care for two and sometimes three newborns at a time.

The study received human research ethics approval from the study site and from the Ethics Committee of Istanbul University, Istanbul Faculty of Medicine. The parents provided written consent for the participation of their infants after being informed about the study in accordance with the guidelines issued in the Declaration of Helsinki.

Sample

The study was conducted with premature infants who were hospitalized in the NICU between June and September 2013. In determination of sample size, a 2-degree difference between the groups in the evaluation of pain was considered significant in the studies previously conducted. Each of the groups included 29 infants, resulting in a total of 87 infants. This number was found to be sufficient because the level of power in the sample size calculation was 90%.

Randomization

For randomization, numbers 1 to 87 were randomized with no number repetition into three groups through the use of the Random Assignment computer program (Rankin, n.d.). The infants were thus randomly assigned to one of three groups: Group 1 (swaddling–sucrose), Group 2 (swaddling–breast milk), and Group 3 (swaddling–distilled water). This information was put in sealed envelopes that contained the private files of the infants. Only the research nurse responsible for the preparation of the nonpharmacologic solution for each infant group saw these envelopes. The nurses who assisted with the ROP examinations evaluated the pain level through the use of the Premature Infant Pain Profile (PIPP) scale. These nurses were blinded to the group assignments of the infants.

Inclusion criteria for participation were gestational age less than 32 weeks and body weight less than 1,500 g, parent approval on the consent form, no requirement for invasive or noninvasive mechanical ventilator support during the procedure, no intake of analgesic or sedative drug in the past 24 hours, no contraindications to oral feeding, and no congenital abnormalities.

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