In term and preterm healthy neonates, compared with placebo, no treatment, swaddling or pacifier, breastfeeding or breast milk feeding in general reduces procedural pain of heel lance or venepuncture, regardless of setting.

RHL Commentary by Agarwal R

1. INTRODUCTION

As recently as two decades ago it was believed that neonates are incapable of experiencing pain. Since then, evidence continues to mount that neonate not only experience pain, but do so at much intensity than adults or older children. Moreover, neonatal pain has long-term adverse effects on the babies’ subsequent neurodevelopment (1).

There has been considerable awareness regarding the need to prevent and manage pain in neonates, thanks to the researchers and clinicians who championed this cause. Several pharmacological and non-pharmacological measures to prevent pain in neonates have been shown to be effective and are gradually making their way into clinical practice (2). Use of concentrated solutions of glucose/sucrose has been the most commonly tested strategies for this purpose (3).

Some researchers have also examined analgesic potential of breast milk. There are sufficient reasons to believe why breast-feeding or feeding breast milk should provide pain relief for procedural pain in neonates. Breast-feeding or breast milk feeding involves the presence of a person who cares for the baby. It involves holding the baby closely, which helps in moderating the painful experience. There is also skin-to-skin contact with the caregiver and, additionally, breast milk contains agents that have analgesic properties or can be endogenously converted into analgesic substances. Breast-feeding or breast milk feeding is a natural way to achieve analgesia and, unlike sucrose, does not have any adverse effect on successful breast-feeding.

This review intended to assess the effect of either direct breast feeding or breast milk feeding (expressed and fed by an alternative method) on procedural pain in neonates, as assessed by changes in: physiological parameters such as heart rate, respiratory rate or saturations; behavioral responses such as crying or facial expressions; and a variety of pain scores (4).

2. METHODS OF THE REVIEW

This review was last updated in April 2006 and includes studies up to February 2006. It includes all relevant
randomized or quasi-randomized controlled trials enrolling term as well as preterm neonates (up to 44 weeks postmenstrual age) scheduled for blood sampling for any diagnostic or therapeutic indication by either heel prick or venepuncture. The comparison group included infants that were given placebo, no treatment, swaddling or glucose/sucrose or any other sweetening agent(s).

All the relevant databases, including MEDLINE, EMBASE, CINAHL, CENTRAL, and of major conference abstracts were searched comprehensively using appropriate search terms and without any language restrictions. The process of article review and data abstraction was done by two authors independently, cross-checked by the third author whenever needed. The quality of included studies was assessed based on standard criteria such as process of randomization, masking of intervention and outcome assessment, allocation concealment and completeness of data. The outcomes and subgroups were pre-specified. Standard Cochrane methodology and tools were used for comparisons and meta-analysis.

3. RESULTS OF THE REVIEW

This review included a total of eleven studies: five had enrolled 526 neonates to test breast feeding as an intervention while six had enrolled 511 infants to test supplemental breast milk as an intervention. The painful procedure was heel lance in seven studies and venepuncture in five studies. All studies, except one, had enrolled term neonates. The age of the infants was less than one week. There was significant variability (heterogeneity) across the studies with regard to selection of comparison group and the way pain was assessed in the infants. There were multiple comparisons and most of them included just one study and limited number of patients. The results are highly heterogeneous with wide confidence intervals (hence statistically insignificant in most cases).

Breast-feeding compared to swaddling or pacifier use was more effective in terms of lesser increase in heart rate and reduced crying, but not in terms of oxygen saturation or blood pressure change. Breast-feeding was more effective compared to no treatment, placebo or swaddling, but it was less effective compared to sucrose solution in reducing pain as measured by PIPP and DAN scores.

Supplemental breast milk as compared to either placebo, no treatment, 10% glucose, artificial sweetener or glycine did not reduce pain as measured by heart rate or oxygen saturation changes. However supplemental breast milk was less effective than higher concentration of glucose or sucrose (>25%) in reducing procedural pain as measured by heart rate changes and duration of crying. The crying was not reduced by breast milk feeding compared to measures such as placebo, glycine, 10% glucose or artificial sweetener.

4. DISCUSSION

4.1 APPLICABILITY OF THE RESULTS

This review showed that, in term and preterm healthy neonates, compared with placebo, no treatment, swaddling or pacifier, breast-feeding or breast milk feeding in general reduces procedural pain of heel lance or venepuncture, regardless of setting.

There are certain issues that are worth mentioning here. The review included healthy (mainly term gestation) neonates undergoing heel lance or venepuncture for blood sampling for things like metabolic screening or blood sugar or serum bilirubin measurement. In real life, however, it is the sickest and smallest neonates that are most exposed to painful procedures. The second issue is that the included neonates underwent only one-time painful procedure. Again in real life, the neonates that experience painful procedures do so on multiple occasions.

Therefore, the results may not be applicable to sick and small neonates that undergo multiple painful experiences during their hospital stay.
There was also significant variability in the results. There were multiple outcomes, multiple comparisons and significant variations. However, breast-feeding and breast milk seem to be effective in reducing procedural pain in neonates. Higher concentration of sucrose may be more effective than breastfeeding for this purpose, but a recent study from Italy involving 101 term neonates found breast-feeding superior than 25% sucrose (5).

4.2. IMPLEMENTATION OF THE INTERVENTION

Based on the available evidence from this review, it seems reasonable that neonates undergoing a single painful procedure should be offered breast-feeding to reduce procedural pain. In situations where the mother is not available or is sick, expressed breast milk could be offered to the neonates before painful single procedures. In the event of unavailability of both these options, supplemental breast milk alternatives such as glucose or sucrose should be considered.

Promoting breast milk as an analgesic would spread a positive message about the breast-feeding, which facilitate bonding between mother and infant, promote humane care of neonatal infants and eventually improves breast-feeding rates without any additional cost to the health care system.

4.3. IMPLICATIONS FOR RESEARCH

Further research is needed to evaluate analgesic effects of breast-feeding or breast milk feeding for repeated painful procedures including the ones other than heel lance and venepuncture. Future research should also include sick and small-for-age neonates in adequate numbers. Large multicentre trial are needed to compare higher concentration of sucrose or glucose and breast-feeding for their analgesic action. Such studies should use standardized outcomes for pain assessment and, additionally, outcomes pertaining to breast-feeding behaviour on follow-up and long-term neurodevelopment. The elucidation of mechanisms to understand how breast milk reduces procedural pain would improve our understanding and generate ideas to take care of procedural pain.

References


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