



EDUCATION ISSUES

Promoting the use of sucrose as analgesia for procedural pain management in neonates: A review of the current literature

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Neonatal procedural pain;
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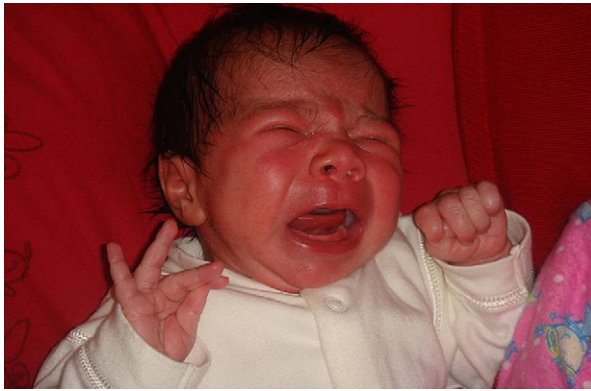
Introduction

Assessment and treatment of pain in neonatal nursing are important areas for consideration and our practice in relation to pain management must be evidence based. Unlike adults or children, neonates cannot tell us when they are in pain and it is therefore our responsibility as caregivers to recognise when they are and to act upon it using evidence based principles. One area that has attracted much research interest over the past few years is the use of sucrose as analgesia for procedural pain management in neonates. This practice, in the author's opinion, is certainly not

utilised across all neonatal units and so is certainly not standardised or universal practice by any means at present within the UK (Robins, 2007) or indeed elsewhere. It is acknowledged that practice guidelines exist but may not be used reliably and consistently (Losacco et al., 2011; Meek, 2012). This paper will firstly discuss what is known about sucrose use in neonatal care followed by a review of the current literature in this specific area of pain management. An overview of available protocols shall be discussed and recommendations for practice development will be put forward in view of widening the knowledge, understanding and ultimately the actual use of sucrose for procedural pain in neonates. Optimising comfort and a pain-free environment for all neonates and families in our care is the universal goal.

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Sucrose as an analgesia

Sucrose is a naturally occurring product and has been reported as having analgesic and comforting properties in neonates (Shann, 2007; Anand, 2008). It is thought to take effect in one of two ways, or both. The first is that the sweet taste causes an 'immediate and short acting response' which calms the crying neonate (Harrison et al. (2003); p. 591. The second is through the production of endorphins from the stimulation of opioid receptors on the tongue (Royal Children's Hospital, Melbourne, 2009). This peaks at 2 min after administration with the effect lasting for approximately 5 min (Harrison et al., 2003; Taddio et al., 2008; Hatfield, 2008). Due to the opioid receptors on the tongue, the effect is only achieved by oral administration and not by nasogastric instillation straight into the stomach. Since the effect is short acting, it should be used for *procedural* pain management for the many tasks neonates are subjected to on a frequent basis within the neonatal unit; namely heel pricks, cannulation and venepuncture, naso/orogastric tube insertion, intramuscular injection, urinary catheterization, eye examinations, suturing, lumbar puncture, suction, immunizations and dressing changes (Thompson et al., 2011; Harrison et al., 2008a).

The effect of sucrose is also said to be enhanced by breast milk (Shah et al., 2007) and using a pacifier is proposed to augment the benefits due probably to the effects of non-nutritive sucking as a consoling measure (Harrison et al., 2009). Strategies such as swaddling and containment should also be considered to aid comfort.

There appears to be an optimum effect within the first month of life but sucrose can also have analgesic actions up to 18 months. It is also documented to be safe if given over a period of time with repetitive use if given within appropriate guidelines (Stevens et al., 2005; Harrison et al., 2007, 2009).

Finally, we must also consider the contraindications for sucrose use; that of the very preterm neonate, those at risk of Necrotizing Enterocolitis, those NBM or on other analgesics, infants of Diabetic mothers (if the blood sugars are not stable) and known carbohydrate malabsorption conditions. Moreover, in line with a critical perspective on practice, we must also acknowledge the concerns about sucrose use and present these within a balanced argument which will be done in the next section.

Analysis

Effectiveness of sucrose for procedural pain

All newborns experience painful procedures in the first days of life and the number of painful procedures can quickly increase if the newborn's health is compromised (Taddio et al., 2008; Hatfield, 2008). A literature search on the use of sucrose in neonatal care, dating back five years was undertaken.

As a starting point, the 2010 systematic review by Stevens et al. (2010) analysed 44 studies on term and preterm infants in relation to the use of sucrose as an analgesic agent in painful procedures.

The published studies included >1800 infants with gestational ages from 25 to 42 weeks. Significant decreases in crying, grimacing, heart rate, and pain scores were reported in neonates who were given sucrose solution before a procedure when compared with water and repeating the dose every 2 min up to 3 times increased the effect. From the review it was concluded that sucrose is a safe and effective intervention to reduce pain in neonates. However, the authors do suggest that further research is required on the topic in relation to the most effective dose.

Many individual trials have also been undertaken within the past few years.

In a double-blind, randomised controlled trial of 240 newborns (>36 weeks gestation) of diabetic and non-diabetic mothers, receiving either 24% sucrose or a placebo solution, Taddio et al. (2008) found that pain scores were lower in the sucrose group. It was found that sucrose was mainly effective for venipuncture, and not for heel lances or vitamin K injections.

However, a study by Okan et al. (2007) compared the effect of glucose versus sucrose for heel pricks. While they did not find a significant difference between the two preparations, they did conclude that oral sucrose was effective in reducing pain

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