THE IMPACT OF ORAL GLUCOSE ON PAIN RESPONSE AMONG PRETERM BABIES IN NEONATAL INTENSIVE CARE UNITS

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Abstract

Neonates in a neonatal intensive care unit are exposed to a high number of painful procedures during routine care. The most painful intervention is blood sampling such as vein puncture. The prevention of pain is important not only because it is an ethical expectation but also because untreated pain in newborns may result in increased morbidity and length of stay in NICU. Management of pain must be considered as important of health care. Glucose 25% solution seems to reduce pain and may be a useful and safe analgesic for minor procedures in neonates as vein puncture. So, the aim of the study was to investigate the impact of oral administration of glucose (25%) on pain response among preterm babies. The study was done on a sample of 60 preterm babies attending the NICUs of both El Manial University Hospital (Kasr El Aini) and Pediatric University Hospital (El Monira). Three data collection sheets were used to gather data for the study; neonatal assessment sheet, blood sampling assessment sheet and a pain assessment sheet. Both first and second sheets were designed by the investigator, while third sheet was developed by Susan Givens Bell, 1993-1994. Results of the study revealed that the oral glucose (25%) had a positive effect on the pain response which enhances adequate pain control in the study group compared with the control group. Also there were positive relationships between pain score and duration of needle insertion, nurse experience, respiration during procedure and behavioral pain score. The study recommended that glucose 25% should be given for neonates before painful procedure. Pain management (pharmacological and nonpharmacological) should be applied as a routine care in neonatal intensive care unit.

(Key words: oral glucose, pain, blood sampling and behavioural response)

Chairperson Signature

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The researcher

Eman Ali Moselhi

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LIST of ABBREVIATION

AGA	Appropriate gestational age
CAT	Critically Appraisal technique
CRIES	Cry, Requires increased oxygen, Increased V.S, Expression and Sleeplessness Scale
C.S	Caesarian section
ELBW	Extremely low birth weight
G.A	Gestational age
IASP	International Association for the study of pain
IDM	Independent diabetes mellitus
LBW	Low birth weight
I.V	Intravenous Infusion
LIDS	Liverpool Infant Distress Scale
LGA	Large for gestational age
NEC	Necrotizing enterocolitis
NICU	Neonatal Intensive Care Unit
NIPS	Neonatal Infant Pain Scale
NFCS	Neonatal Facial Coding System
NPAS	Neonatal Pain Assessment Scale
NSAID	Non opoids, Salicylates, Anti inflammatory Drugs
PAIN	Pain Assessment In Neonates

PIH	Pregnancy Induced Hypertension
PIPP	Premature Infant Pain Profile
RDS	Respiratory distress syndrome
ROP	Retinopathy of prematurity
SGA	Small for gestational age
TTN	Transient Tachypnia of neonates
VLBW	Very low birth weight infant
KC	Kangaroo Care

CHAPTER I

Introduction

Neonates in a neonatal intensive care unit are exposed to a high number of painful procedures during routine care such as needle insertions (Brenda et al., 2005 and Cignacco et al., 2006). Painful procedures ranged from 0 to 53 per day and 40% of all neonates didn't receive any analgesia during the intensive care stay. Each 124 preterm neonates with gestational age of 27- 31 weeks received an average of 134 painful procedures within first 2 weeks of life. Approximately 10% of infants received more than 300 painful procedures (Cignacco et al., 2006).

Painful procedures in the NICU can be tissue damaging or none tissue damaging (American Academy of Pediatrics, 2006). Most of painful interventions include blood sampling such as vein puncture and heel stick (Hutchinson & Catherine, 2005; and Cignacco et al., 2006). One can assume that, the prick of a needle will hurt anyone. (Abd Rabou, 2005).

Common practiced approach was justified by the belief that infants do not feel pain because of immaturity of the central nervous system and there are no long-term effects. Today, we know that the neurotransmitters and structures required for pain sensation as well as structures needed for long-term memory are developed adequately in the neonate and thus have the potential to affect long term effects. A substantial body of anatomical and functional evidence supports the neonate's capacity to respond nonverbally to tissue damaging stimuli at birth (Steven, 1998).

Low priority given to pain control in the health care system because political problems such as lack of policies about pain measurement, lack of medical and nursing education about pain, and myths about painkillers and

economic barriers such as lack of staff time allocated to pain assessment and management (Abd Rabou, 2005). Every baby has a right to be assessed for pain and receive pain management (Ruth et al., 2009). Intervention for managing procedure related to pain and distress should take into account the type of procedures and the anticipated level of pain. (Abd Rabou, 2005). Many nurses have not been educated about infant pain and nursing pain assessments and 90% of the nurses believed that infant pain assessment is important (Reyes, 2003).

The long term consequences of repeated pain in vulnerable neonates may include emotional, behavioral, learning disabilities and alter psychosocial development (Bhutta & Anand, 2002; and Ricci & Kyle, 2009). Since repeated and sustained pain can have consequences for the neurological and behavior-oriented development of the newborn, the greatest attention needs to be paid to systematic pain management in neonatology. Nonpharmacological treatment methods are being increasingly discussed with regard to pain prevention and relief either alone or in combination with pharmacological treatment (Cignacco et al., 2006).

The goal of management is to minimize the amount, duration and severity of pain and to assist the newborn in coping (Ricci & Kyle, 2009). The clinical importance of alleviating pain in high risk neonates isn't only to decrease or eliminate the pain responses that contribute to catabolic states but also to improve the potential for improved long term neurobehavioral outcomes (Gibbins, 2003). The nurse is responsible to assess pain in the newborn and take measures to prevent, relieve and control discomfort (Towle, 2009).

Optimal pain management requires competent pain assessment, which can be especially difficult to perform in neonates. The pain scales can be used for regular, systematic pain assessment for infants undergoing intensive care or as guidance for staff on pain assessment (Lissauer, Fanaroff, Rodriguez, & Weindling, 2006). The pain assessment tool should be multidimensional, including measurements for both physiologic and behavioral indicators of pain because neonates cannot self report (International Association for the Study of Pain., 2006).

Pain assessment in neonates is mostly based on physiological and behavioral factors (Craig, 2002; and Ricci & Kyle, 2009). Neonatal Pain Assessment Scale (NPAS) is multidimensional because it assesses all behavioral signs (sleep, facial expression, motor activity, cry and consolability) and physiological signs (pulse, respiration, blood pressure and oxygen saturation) (Lissauer et al., 2006).

The frequency of painful procedures performed on preterm infants in the neonatal intensive care unit (NICU) presents a challenge to nurses who are attempting to provide effective pain relief, and to the infants themselves who may suffer adverse consequences in response to repeated painful procedures. One pain relief intervention is the administration of oral sweet as glucose or sucrose, which may activate endogenous opioid systems within the body (Mitchell & Waltman, 2003).

Glucose is a sweet monosaccharide that has been used to soothe and calm distressed neonates. Several systematic reviews have examined the efficacy of glucose for procedural pain in neonates and have shown that the analgesic effects glucose are rapid, enduring and dependent on the ability to detect sweet taste (Gibbins, 2003). It is an effective analgesic prior to painful procedures. It has antinociceptive properties for cutaneous procedures. The

sweet taste induces the release of endogenous opioids. The peak onset of action is to be 2 min lasting for approximately 5-10 min (Hutchinson & Catherine, 2005). Sucrose especially has become a popular substance in recent years for use in relieving minor pain in neonates, although sucrose solutions can't be found readily in intensive care units but glucose solutions are readily available and sterile in the nurseries and it is more practical to use them during painful procedures (Isik et al., 2000; and Henry, Husband,. & Dobrzykowski, 2004).

Significance of the Study

Neonates are at the greatest risk of neurodevelopment impairment as a result of preterm birth (i.e., the smallest and sickest), are also those most likely to be exposed to the greatest number of painful stimuli in the NICU (American Academy of Pediatrics, 2006). The prevention of pain is important not only because it is an ethical expectation but also because repeated painful exposures can have deleterious consequences (American Academy of Pediatrics, 2005). Untreated pain in newborns may result in increased morbidity and length of stay in NICU (Ricci & Kyle, 2009). Poorly controlled acute pain may lead to hyperalgesia, altered pain perception, and possibly a prediction to chronic pain states (Mathew, 2003).

So neonates are more sensitive to pain and more vulnerable to its long term effects. Management of pain must be considered as important of health care provided to all neonates regardless of their gestational age or severity of illness (El Sebaie, 2007). Neonatal unit should develop strategies to minimize the number of minor painful or stressful procedures and provide effective nonpharmacologic and/or pharmacologic pain relief for all procedures (American Academy of Pediatrics, 2006).