ABSTRACT

BACKGROUND: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. It is important to understand that inability to communicate verbally or non-verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain relieving treatment. Pain in newborn is commonly overlooked, under-recognized and under-treated. Health care providers must evaluate, recognize, prevent and manage pain in the newborn infant.

Aims and objective: To know the physiological and behavioral changes associated with pain and to grade its severity as per PIPP score in following procedures: nappy change, oral suctioning, feeding tube insertion, removal of adhesive tape, heel prick, intravenous catheter insertion.

MATERIALS AND METHODS: Gestation age of all neonates delivered and admitted in NICU during January 2014 to December 2014 were assessed by modified Ballards score. Neonates with gestational age <37 week were enrolled. Pain was assessed during six different procedures by premature infant pain profile (PIPP) score. Performa were filled and analysis was done.

RESULTS: Total number of patient (n=100). Total procedure done on each patient = 6(600). Maximal painful procedure: IV catheter insertion (PIPP -10), heel prick (PIPP -15). Moderately painful procedure: oral suctioning (PIPP -7), feeding tube insertion (PIPP -10), removal of adhesive tape (PIPP -7). Minimal painful procedure: nappy change (PIPP -3). Pain perceived by invasive procedure scores more than double than that by non-invasive procedure.

CONCLUSION: The perception of pain is “stressful” to the neonate. All preterm neonates regardless of gestational age felt pain. Pain perceived by invasive procedure scores more than the double of that by non-invasive procedure. No procedure is without pain.

Keywords: PIPP (premature infant pain profile), NICU (neonatal intensive care unit).

INTRODUCTION

Pain perception and effects of inadequately treated pain: The anatomic and physiologic basis for nociception is present even in very preterm neonates. Infants who are cared for in the intensive care neonate unit experience pain frequently and for prolonged period of time. Newborn infants have increase sensitivity to pain and are more sensitive to pain than older children and adults and are vulnerable to long term effects related to pain.

Preterm infant have pain perception pathway that render them capable of perceiving pain. Nocicepters are modified neurons which receive and transmit information about pain through two types of fibers, A-fibers and C-fibers. The A-fibers are delta fibers which are thinly myelinated rapid conducting fibers and C-fibers are unmyelinated slow conducting fiber. Neonates have a developing, incompletely myelinated nervous system at birth; however all the components of nociceptive pathways are present. A-delta fibers are myelinated and therefore capable of fast impulse conduction. These nerves are responsible for “fast” or first pain. C fibers are unmyelinated and conduct impulse more slowly; and are the main nociceptor for transmitting chemical, thermal and mechanical noxious stimuli.

During the first postnatal week linkage between the peripheral nervous system and the dorsal horn are unmyelinated slow conducting fiber. Neonates have a developing, incompletely myelinated nervous system at birth; however all the components of nociceptive pathways are present. A-delta fibers are myelinated and therefore capable of fast impulse conduction. These nerves are responsible for “fast” or first pain. C fibers are unmyelinated and conduct impulse more slowly; and are the main nociceptor for transmitting chemical, thermal and mechanical noxious stimuli.

Afferent neurotransmitter N-Methyl D-aspartate (NMDA) and tachykinin receptor in dorsal horns...
produce central sensitization that spreads to the several adjacent segments of the spinal cord to produce wind up phenomena. Glutamate and aspartate are amino acids that appear to be involved in the central hypersensitivity and wind up.\(^1\)

Commonly used measures of pain in neonates\(^2\) and manifestation of pain in neonates\(^3\):
1. PIPP (Premature Infant Pain Profile)
2. NIPS (Neonatal Infant pain score)
3. NFCS (Neanatal Facial Coding System)
4. N-PASS (Neonatal Pain, Agitation and Sedation Scale)
5. Cries (Cry, Requires oxygen, increased vital signs, Expression, Sleeplessness)

Treatment of neonatal pain\(^4\):

Pain is a subjective experience and neonates cannot verbalize their experience of pain. Assessment must be designed to confirm to the communication capabilities of the suffering neonate.

<table>
<thead>
<tr>
<th>TYPE OF PAIN</th>
<th>USEFUL AGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild pain</td>
<td>Oral sucrose, breast milk, 25% dextrose</td>
</tr>
<tr>
<td>Moderate pain</td>
<td>Oral or rectal parectamol</td>
</tr>
<tr>
<td>Severe Pain</td>
<td>Opiods like fentanyl or morphine</td>
</tr>
<tr>
<td>Local pain relief</td>
<td>Local infiltration of lignocain/ topical analgesic creams</td>
</tr>
</tbody>
</table>

RESULTS

Total number of patients (n=100)
Total procedures done on each patient= 6(600)

Maximum painful procedures
I.V. catheter insertion (average score 18)
Heel prick (average score 15)

Moderately painful procedures
Oral suctioning (average score 7)
Feeding tube insertion (average score 10)
Removal of adhesive tape (average score 7)

Minimum painful procedure
Nappy change (average 3)

Pain perceived by invasive procedure score more than the double of that by non-invasive procedures. In another study “Multidimensional pain assessment of preterm newborns at the 1st, 3rd and 7th days of life” done by Division of Neonatal Medicine, Department of Pediatrics, EscolaPaulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, CEP 01410-020, Brazil ; shows-Homogeneous pain scores were observed following venepuncture in premature infants during their first week of life.
Study of PIPP in preterm neonates admitted in NICU

Figure 1: Average PIPP score of each procedure (n=100)

DISCUSSION
As per literature stated above, the neonates have perception of pain and there is a prolonged pain response to noxious stimuli, which can be graded according to PIPP score and other scoring system. Pain lead to long term effect on cognition of NICU graduates, which is an established fact. The present study defines different grade of pain, with different procedure as minor as nappy change to IV cannulation, supporting different studies of perception of pain in preterm neonates.

CONCLUSION
1. The perception of pain is “stressful” to the neonate.
2. All preterm neonates regardless of gestational age felt pain.
3. Pain perceived by invasive procedure scores more than double than that by non-invasive procedure.
4. No procedure is without pain.

REFERENCES: