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Neonatal Pain

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NEONATAL PAIN
OR IS IT
AGITATION?

**HOW DO WE ASSESS AND
TREAT IT!!**

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OBJECTIVES

- ◆ Increase understanding of the JCAHO Standards
- ◆ Identify behavioral and physiological signs of pain in the neonate/infant.
- ◆ Utilize the PIPP pain tool to assess pain/agitation in the neonate.

OBJECTIVES

- ◆ Identify non-pharmacological interventions to decrease pain/agitation.
- ◆ State medications commonly used in treating pain/agitation.

JCAHO Standards

- ◆ Pain must be assessed in all patients (including newborns) upon admission as well as regular reassessment of pain.
- ◆ Educate family
- ◆ Sensitivity to cultural, spiritual and ethnic beliefs
- ◆ Pain is the “5th Vital Sign”
- ◆ Appropriate medication ordering and safe administration of prescribed medications
- ◆ Monitoring of patient post procedure

DEFINITION OF PAIN

- ◆ “An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Pain is always subjective”

– Merskey et al, 1979; adopted by International Association for the Study of Pain, 1982

DEFINITION OF PAIN

- ◆ “Golden Rule”: What is painful to an adult is painful to an infant until proven otherwise”

– Franck, 1989

Myths regarding neonatal pain

- ◆ Neonates have no memory of pain
- ◆ Objective assessment of pain is impossible
- ◆ Analgesia cannot be administered safely
- ◆ Pain is a subjective experience that cannot be communicated by neonates.
- ◆ Neonates immature CNS consists of non-myelinated pain fibers making transfer of painful stimuli impossible.

BELIEFS/ASSUMPTIONS OF NEONATAL PAIN

- ◆ All infants, term and preterm, have the ability to feel pain.
- ◆ Infants can demonstrate pain with both behavioral and physiological responses – but – some may not exhibit any changes.

BELIEFS/ASSUMPTIONS OF NEONATAL PAIN

- ◆ Anything that causes pain in an adult may cause pain in infant's – pain may be more intense than the adult.

PAIN vs AGITATION

- ◆ Difficult to distinguish between the 2
- ◆ Agitation is a common term to describe gross motor behavior and crying.
- ◆ Evaluate the environment and provide comfort measures (non-pharmacological)
- ◆ Consider medications if not relieved by the comfort measures

PAIN vs AGITATION

Pain

- ◆ Decreased respiratory effort (guarding)
- ◆ BP & HR increase/decrease
- ◆ Diaphoresis
- ◆ Palmar sweating
- ◆ Metabolic changes

Agitation

- ◆ Increased respiratory effort
- ◆ Increased HR & RR with activity only
- ◆ No diaphoresis
- ◆ No Palmar sweating
- ◆ No metabolic changes

NEURODEVELOPMENT of PAIN

- ◆ Peripheral and spinal structures for pain transmission are present and functional between the 1st and 2nd trimester.
- ◆ Nociceptors are free nerve endings found throughout the body and are in place between 20-30 weeks gestation.

NEURODEVELOPMENT of PAIN

- ◆ Recognition of most pain occurs in the cerebral cortex.
- ◆ Cerebral cortex has a full complement of neurons by 20 weeks gestation.

NEURODEVELOPMENT of PAIN

- ◆ Heightened pain perception via cortical connections with the thalamus are completed by 24 weeks gestation.
- ◆ Well developed pituitary with the ability to produce endorphins detected at 20 weeks gestation.

PATHOPHYSIOLOGY of PAIN

- ◆ Effects all organ systems that can be life threatening:
 - reduced tidal volume and vital capacity in the lungs
 - increased demands of the cardiovascular system
 - hypermetabolism resulting in neuroendocrine imbalances.

POTENTIAL LONG TERM EFFECTS

- ◆ “The neonatal CNS must be considered an organ system at risk, as important as the cardiovascular or pulmonary systems, and should be protected from adverse environmental events, including pain.”

- From: Franck, L. S. (1993). Comprehensive Neonatal Nursing: A Physiological Perspective. (1st Ed.). Chapter 40: “Identification, Management, and Prevention of Pain in the Neonate”, pg. 913-925.

ASSESSMENT OF INFANT PAIN: Behavioral Responses

- ◆ Crying
- ◆ “Cry face”
- ◆ Gross motor movements
- ◆ Limp/flaccid/decreased activity
- ◆ Fussiness
- ◆ Grimace
- ◆ Rigid posturing
- ◆ Clenched hands
- ◆ Flushed face
- ◆ Flexing extremities
- ◆ Tensing muscles
- ◆ Sleeplessness
- ◆ Restlessness/irritability
- ◆ Decreased periods of alertness
- ◆ Hand splaying

ASSESSMENT OF INFANT PAIN: Physiologic/Autonomic Responses

- ◆ Increased heart rate
- ◆ Increased blood pressure
- ◆ Change in respirations
- ◆ Duskiness/color change
- ◆ Decreased oxygen saturation
- ◆ Palmar sweating

ASSESSMENT OF INFANT PAIN: Metabolic Responses

- ◆ Metabolism and utilization of fats, proteins and carbohydrate stores
- ◆ Electrolyte disturbances
- ◆ Hyperglycemia
- ◆ Metabolic acidosis

COMMON causes of pain

- ◆ Birth trauma
- ◆ Noxious environment
- ◆ Arterial puncture
- ◆ Heel sticks
- ◆ Venipuncture/PIV
- ◆ Intubation/Surfactant administration
- ◆ PICC line placement/removal
- ◆ Chest tube placement/removal
- ◆ Injections
- ◆ Mechanical ventilation
- ◆ ROP exam
- ◆ ETT suctioning
- ◆ Circumcision
- ◆ Tape removal
- ◆ LP
- ◆ Bladder catheterization
- ◆ Gavage tube placement

Prevention of neonatal pain

- ◆ This is the key!! Think ahead and plan!
- ◆ Anticipate the event
- ◆ Know the birth history
- ◆ Proper positioning
- ◆ Comprehensive and ongoing assessment
- ◆ Premedicate before the procedure

Prevention of neonatal pain

- ◆ Use smallest needle gauge for injections/use automatic heel lancet
- ◆ Cluster care as appropriate
- ◆ Communication with the multidisciplinary team

NEONATAL PAIN ASSESSMENT TOOLS

- ◆ Some type of tool should be used
- ◆ Know the pain tool used for your institution.
- ◆ Pain tool for the well baby may differ from the pain tool used on the NICU
- ◆ Ideal tool should measure both physiological and behavioral activity

EXAMPLES of NEONATAL PAIN ASSESSMENT TOOLS

- ◆ Neonatal Infant Pain Scale [NIPS] (Children's Hospital of Eastern Ontario, 1989)
- ◆ Premature Infant Pain Profile [PIPP] (Stevens et al, 1996)
- ◆ Neonatal Postoperative Pain Assessment Scale [CRIES] (Krechel et al, 1993)

PREMATURE INFANT PAIN PROFILE (PIPP)

- ◆ All infants should be assessed on admission and a minimum of once a shift
- ◆ Assessment should be done pre- and post-invasive procedures and/or when analgesics have been administered to evaluate its effectiveness.
- ◆ This tool will is not to be used on those infants who are receiving Pavulon/Vecuronium (paralytic agents).

PREMATURE INFANT PAIN PROFILE (PIPP)

- ◆ 7 criteria
 1. Gestational age: scored at time of observation (i.e. corrected age)
 2. Behavioral state: need to observe infant for 15 sec.
 - 3-4. Heart rate and oxygen saturation: look at last 8 hrs. for average (trend), then observe baby for 30 sec. to determine maximum reading.

PREMATURE INFANT PAIN PROFILE (PIPP)

- ◆ 7 criteria (continued)
 5. Brow bulge: bulging, creasing and vertical furrows above and between brows occurring as a result of the lowering and drawing together of the eyebrows.
 6. Eye squeeze: Identified by the squeezing or bulging of the eyelids. Bulging of the fatty pads above the infant's eyes is pronounced.

PREMATURE INFANT PAIN PROFILE (PIPP)

◆ 7 criteria (continued)

7. Naso-labial furrow: Primarily manifested by the pulling upwards and deepening of the naso-labial furrow (a line or wrinkle which begins adjacent to the nostril wings and runs down and outwards beyond the lips corners).

PREMATURE INFANT PAIN PROFILE (PIPP)

◆ Document pain score on the flow record as well as intervention(s).

- Pain score <6 = minimal or no pain
- 7-12 = mild pain; use non-pharmacological comfort measures
- >12 = moderate to severe pain; will most likely require pharmacological intervention in conjunction with non-pharmacological comfort measures

MANAGEMENT OF NEONATAL PAIN: Non-pharmacological

- | | |
|--|---|
| ◆ Environmental modifications (i.e. light and sound) | ◆ Rocking |
| ◆ Swaddling | ◆ Allow for rest periods |
| ◆ Assisting with hand-to-mouth contact | ◆ Containment |
| ◆ Nonnutritive sucking on a pacifier | ◆ Organizing care/minimal handling |
| | ◆ Positioning for self-comforting behaviors |

MANAGEMENT OF NEONATAL PAIN:
Pharmacological

- ◆ Opioid Analgesics:
 - Morphine sulfate
 - ❖ Bolus dose: 0.05-0.1 mg/kg Q4 hr.
 - ❖ Continuous drip: 0.01-0.03 mg/kg/hr
 - ❖ Wean dose if on for longer than 5 days
 - Fentanyl citrate
 - ❖ Bolus dose: 0.05-3 mcg/kg Q2-4 hrs.
 - ❖ Continuous drip: 0.5-2 mcg/kg/hr
 - ❖ Wean dose if on for longer than 5 days

MANAGEMENT OF NEONATAL PAIN:
Pharmacological

- ◆ Anesthetic Agents:
 - EMLA cream
 - ❖ Effective for circumcision
 - ❖ Must be applied min. 1 hr. prior to procedure
 - ❖ Do not use for venipunctures or heelsticks due to vasoconstrictive properties
 - Lidocaine
 - ❖ Local anesthetic

MANAGEMENT OF NEONATAL PAIN:
Pharmacological

- ◆ Other Agents:
 - Acetaminophen
 - ❖ Oral dose: 10-15 mg/kg
 - Sucrose
 - ❖ 20% solution 2 min. before and during the procedure (2-4 ml for term infants; 0.1-0.4 ml for preterm infants)
 - ❖ Can be used in conjunction with penile block and/or EMLA for circumcision

MANAGEMENT OF NEONATAL PAIN:
Other

- ◆ Infants who are on Pavulon/paralyzed:
 - should be on a continuous infusion of an opioid
 - The PIPP is not a useful tool to assess for pain.
 - Heart rate and blood pressure changes may be the only indicator for the need to increase the medication dose.

ADDICTION vs PHYSICAL DEPENDENCE

- ◆ Addiction:
 - Pattern of compulsive drug use characterized by continued craving for an opioid and the need for the opioid for effects other than pain relief. Taking opioids for pain relief is not addiction, no matter how long a person takes opioids or the amount. (McCaffery) Incidence of addiction when opioids are taken for pain relief is <1%.

ADDICTION vs PHYSICAL DEPENDENCE

- ◆ Physical Dependence:
 - Physiologic phenomenon characterized by the development of withdrawal syndrome following abrupt discontinuation of therapy, substantial dose reduction, or administration of an opioid antagonist.

ADDICTION vs PHYSICAL DEPENDENCE

◆ Tolerance:

- Increasing amount of opioid is required to produce the same effect as was produced with the lesser dose; is a physiological response and not a predictor of abuse.

PARENT EDUCATION/SUPPORT

- ◆ Involve parents in care of their infant
- ◆ Teach them cues their infant demonstrates when stressed and when self-comforting
- ◆ Reassure them
- ◆ Religious/cultural consideration

NURSING CONSIDERATIONS

- ◆ Assess for effectiveness of medication 30 min. after administration or every 4 hours while on continuous infusion
- ◆ Think prior to doing!! PREVENTION!
- ◆ A few sucks on a sucrose nipple during circumcision will not increase the risk for aspiration nor will it increase their blood sugar level.

NURSING CONSIDERATIONS

- ◆ Know the difference between addiction and tolerance
- ◆ Reassure parents
- ◆ Document, document, document!! And follow-up with reassessment!

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