



Pain and Stress in the NICU

And how you can help!





Did you know?

- Preterm infants endure an average of 10-16 painful procedures per day
- Preterm infants <29 weeks experience 300-400 painful procedures during their NICU stay
- Sensing of pain starts by the 7th week of gestation. By the 23rd week fetus is thoroughly sensing!
- Discrimination of pain and discomfort is immature until 35 weeks. This means reactions and responses are similar for a painful arterial stick, or a simple diaper change.

Common painful procedures include:

- Heel sticks (data shows this is MORE painful than a venous stick for an infant!)
- Feeding tube insertions
- ETT/Nasal sx
- Vaccines
- Venous/arterial sticks
- Diaper changes
- Temperatures
- ROP exams
- LP
- Tape Removal
- Line placements (central and peripheral!)
- CT insertions



Effects of Pain on the Developing Brain

- **Brain Differences in Preemies:** Decreased white matter, gray matter, cortical thickness, brain size-frontal and parietal lobes
- **Altered function:** Connectivity, cognitive/motor/behavior abnormalities, hormonal/neurotransmitter changes and alteration in function
- Immune System impairment
- Affects future pain perception and development of “pain pathways”
- Decreased brain development and postnatal growth—even at school age!





Pain Responses Include:

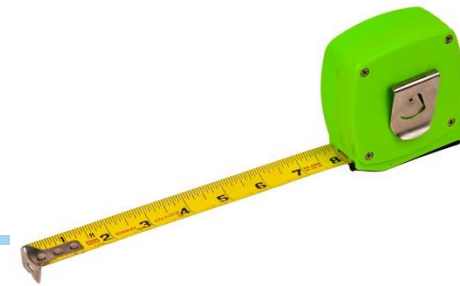
- Heart rate and respiratory rate variability
- Decreased SpO₂
- Rapid variation in BP and ICP (important to remember in our IVH babies)
- Hyperglycemia
- Behavioral responses you may see include facial grimace, cry, moving/squirming, withdrawal of limbs, arching, decrease in LOC-baby “shuts down”



Preterm vs. Term Differences

- Lower gestational age=decreased pain behaviors....this does not mean they do not feel pain...rather they have a decreased ability to show typical pain “signs”.
- Care times and handling are more stressful for these babies.
- Unable to discriminate stimuli before 35 weeks. Therefore, **environmental changes** and **stress = PAIN** for our preterm infants.
- Effects of pain are enhanced and last longer

Assessment Tools



- Current scales:
NPASS, NIPS, NFCS,
NIPP-R
- Additional research indicators monitor HR variability, cortisol levels, cry times/behavioral cues, time to return to infant's baseline
- Emerging Assessment tools include NIRS (near infrared spectroscopy), EEG, Function MRI, Skin conductance and HR variability based assessments

Got it. Pain and stress=**Bad**.

- So what can we do about it as nurses in the NICU?





Interventions

- Appropriate Developmental Care:
- Position of comfort-this means baby is: midline, flexed, contained, boundaries, joints protected, hands to chest face or mouth
- Nesting with boundaries
- Swaddle or containment
- Facilitated tucking for all uncomfortable procedures (even VS and assessments-**Remember**: environmental changes and stress will signal as pain to our littlest babies) Parents, cuddlers, PCA's and RT can all help with this!
- Low noxious stimulation environment



**Developmental Care should always
be our baseline!**





Interventions

- Pharmacological
 - Topical agents
 - Morphine
 - Versed
 - Fentanyl
 - These all come with their own set of risks and benefits as well as potential long term side effects. Use with discretion.



Non-Pharmacologic Pain/Stress Relief

- Minimize and decrease stressful procedures-ask: Does the baby really NEED this?
- Decrease attempts of these painful/stressful procedures
- Be mindful of clustering care to decreased environmental changes and stressful stimuli.



Non-Pharmacologic Pain/Stress Relief

- **Minimize negative tactile input:** Multiple handling, tape, suction, heelsticks, cold hands and equipment, hard surfaces, painful/stressful procedures
- Utilize “task oriented” procedural touch-cluster care
- **Promote positive tactile input:** Kangaroo care, clustering cares, soft bedding, containment, warm hands and stethoscope, tucking for procedures, infant massage, non nutritive breast feeding

Non-Pharmacologic Pain/Stress Relief

- **Minimize negative vestibular input:** fast movements, frequent handling, head movement, flipping, poor positioning, rocking (Preemies do not have the ability to process this vestibular input until 37 weeks and it is very disorienting for them).
- **Promote positive vestibular input:** 2 person care for hands on times, minimize handling, midline support/containment through position changes, gradual position changes, supportive boundaries (swaddle, brace feet!), support in movement (bathing/weights/movement through space)



Non-Pharmacologic Pain/Stress Relief

- **Minimize negative tastes/smells:** Oral ETT, metal and plastic equipment, NGT/OGT, oral sx, humidified air, oral meds, reflux, hand gel on hands, cleaners, alcohol swabs, gloves, cigarette smoke
- **Promote Positive tastes/smells:** Colostrum/BM for oral care/on cotton ball in isolette, kangaroo care, non nutritive breast feeds, hands to mouth, oral feeds, heaven scent blankets (only without a central line)



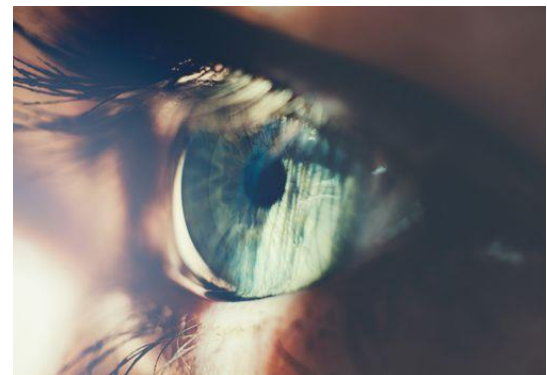
Non-Pharmacologic Pain/Stress Relief

- **Minimize negative auditory input:** attend to alarms quickly, decrease equipment noise where possible, lower loud voices, decrease volume on radio or music makers
- **Promote positive auditory stimulation:** Mom and dad's voice, low soothing talking to infant, cuddlers, music therapy
- **Too quiet not good either:** being in utero limits background noise but low intensity sounds heard (auditory processing starts at 30 weeks though fetal hearing starts at 24 weeks)



Non-Pharmacologic Pain/Stress Relief

- **Minimize negative visual input:** protect eyes from bright lights/computer glare, flickering lights, ROP exams, phototherapy lights, disrupted sleep cycles
- **Promote positive visual stimuli:** Cover isolette, ambient lights low, promote and protect sleep, cycled lighting day/night as baby gets older, natural light at 32 weeks, mobiles ok at 38 weeks



Non-Pharmacologic Pain/Stress Relief

- Oral sucrose; see guideline:

[Sucrose Use During Painful Procedures](#)

- Dosed by gestational age
- Begin 2 minutes before painful procedure
- Continue incrementally throughout procedure
- Do not forget to chart assessment/reassessment of pain on NPASS screen for this Non-Pharmacologic intervention
- **Not without concerns:** appropriate/repetitive dosing, long term neurodevelopmental and health outcomes, increased glucose at cellular level



Non-Pharmacologic Pain/Stress Relief

- **Breast milk:** Smell, taste and feeding are all pain relievers!
- For oral care, the preferred solutions in order are colostrum/milk from the patient's mother, donor preterm milk, and then sterile saline.
- Colostrum or mother's milk can be used for oral care, even if the baby is NPO.
- During tube feedings, it is preferred practice to place a cotton ball or 2x2 gauze with a few drops of human milk on it in bed with baby so baby can smell the milk during feeding.



Non-Pharmacologic Pain/Stress Relief

- Infant Massage:
- Increased blood flow to extremities
- Decreased pain and stress
- Improved autonomic responses
/sleep patterns
- Improved weight gain
- Decreased length of stay
- Supports parental bonding and nurturing
- Performed in our NICU by Carrie Alexander, PT. She received special training and certification to perform infant massage. She also teaches parents these techniques when baby is ready.




Parents can be some of our
greatest helpers to decrease
pain and stress!!!



Partner with Parents!

- Build positive, calming experiences
- Baby knows mom and family
- Baby calms best to voice and touch of his
- Positive changes noted in brain size and connectivity on MRI with babies of more involved and connected parents
- Parents “helps” can include kangaroo care, voice, touch, smell, breast feeding and infant massage





By taking at least 1 thing (and hopefully more) from this presentation and applying it to your practice you can make a difference in the long term outcomes of your patients



- Thank you for reviewing the CBL.
- Please click the **Take Test** button above to continue.